PUGET SOUND REGION

Final Comprehensive Climate Action Plan

For the Seattle-Tacoma-Bellevue Metropolitan Statistical Area (MSA), on behalf of all cities and counties in the four-county Puget Sound Region of King, Kitsap, Pierce, and Snohomish Counties

December 1, 2025

PUGET SOUND
Clean Air Agency

Acknowledgments

The Puget Sound Clean Air Agency thanks Puget Sound residents and the following organizations and staff for contributing to the development of this Comprehensive Climate Action Plan. See **Appendix E** for a complete list of CPRG Steering Committee and Technical Workgroup members.

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Executive Summary for Decision Makers

Overview

Climate change threatens people and ecosystems. Local and regional partners across the Puget Sound are developing and implementing the policies and solutions necessary to curb the worst impacts of climate change. Our region's collective approach to climate action channels a spirit of innovation, inclusion, and success, and embodies bold and coordinated action for the benefit of all Puget Sound communities, waterways, habitats, and residents.

Development of this Comprehensive Climate Action Plan (referred to as "climate plan") was led by the Puget Sound Clean Air Agency (Agency) for the Puget Sound region, encompassing King, Kitsap, Pierce, and Snohomish counties. Together, these counties represent over half of the state's population and the region includes the junction of two major interstate highways (I-5 and I-90) as well as two major seaports and the state's major airport.

The Puget Sound Region Comprehensive Climate Action Plan encompasses King, Kitsap, Pierce, and Snohomish Counties.

Climate Plan Purpose

This climate plan is a guiding roadmap for local and regional governments to mitigate the effects of climate change. While not an implementation plan, this document is a call to action for the scale of ambition required to reduce greenhouse gas emissions and meet regional and state targets. This plan identifies and facilitates high-impact regional actions to reduce climate emissions through coordinated efforts, with a focus on maximizing benefits in overburdened communities. It brings together decades of existing climate planning efforts across the Puget Sound region to develop a comprehensive list of actions to achieve greenhouse gas reductions in the region, with the added benefit of including information on costs, co-benefits, and workforce development implications to provide decision-makers with the information needed to make effective climate planning decisions and investments. It also identifies which strategies are poised for regional implementation and which are better for state implementation. **We encourage local and regional governments to regularly use this plan as they prioritize and select proposed climate strategies for implementation.**

As a primary deliverable for the federal Climate Pollution Reduction Grant (CPRG) program, the contents of this climate plan are largely dictated by grant requirements. A main purpose of the CPRG grant and this climate plan is to identify a suite of greenhouse gas reduction strategies that will help the region meet its 2030 and 2050 emission reduction targets.

Many jurisdictions in the region are already implementing some of the strategies in this climate plan; for others, implementation is still in the initial planning phases. Through successful regional programs and initiatives like the Energize Program (CPRG Phase 2 Implementation Grant), the development of a regional electric vehicle charging roadmap, and others, we can point to concrete examples today that demonstrate our success in funding, planning, and implementing regional climate actions. Partners can use this plan to leverage, expand, and accelerate implementation efforts, achieving economies of scale that can benefit the region as a whole.

The Agency is committed to working with partners to determine ongoing steps for strategy implementation and collaborating with overburdened and frontline communities to do this work equitably.

This climate plan is organized into three parts:

Part I. Where we are now: A greenhouse gas emissions inventory for the four-county region, the current climate policy landscape, and a summary of existing and planned large-scale greenhouse gas reduction projects.

Part II. Where we need to go: A summary of regional and state greenhouse gas reduction targets and greenhouse gas emissions projections for 2030 and 2050.

Part III. How we will get there: A climate pollution reduction plan for all sectors of the regional economy (consisting of 25 strategies and 110 actions), and a discussion of important considerations for equitable implementation, including potential funding sources, and which entities might best be positioned to implement proposed actions. This plan also includes analyses of potential benefits and impacts of proposed climate actions, with a focus on overburdened communities, as well as workforce development needs to implement the proposed actions, and information about next steps.

Development of this plan was guided by the following principles:

- Regional planning will align with and complement state and local policies and plans, and support jurisdictions at all stages of planning.
- Identified actions will be developed into funding-ready strategies that are more competitive for future funding opportunities, providing a clear path to implementation.
- Collaborative relationships will benefit jurisdictions through leveraging collective resources and aligning priorities to maximize impacts for emissions reductions, workforce development, and equitable distribution of resources.

This document represents the first comprehensive, region-wide climate plan for the Puget Sound in over a decade. It is built on a strong foundation of climate planning work already underway across the region and state, and is designed to synergize, complement, and reinforce state, tribal, and local climate planning efforts.

Evaluating Climate Strategies

The climate strategies in this plan reduce greenhouse gas emissions and provide several other benefits including localized air quality improvements, better public health outcomes, cost savings, improved ecosystem function, and workforce development. Given the urgency of action needed, this plan focuses on strategies that can bring us closer to our 2030 emission reduction target while also providing estimates for what could be achieved by 2050. Taking actions toward the 2030 targets will build momentum and lay the foundation for shaping projects and programs that can bring the 2050 target within reach.

To help guide decisions about which strategies to implement in the near-term, the following tables provide ranked lists of strategies that maximize outcomes across multiple benefits.

- **Table ES-1**: Strategies with the highest greenhouse gas emission reduction potential by 2030
- **Table ES-2**: Strategies with the greatest air quality and public health co-benefits with a focus on overburdened communities
- **Table ES-3**: Strategies well-positioned for regional and local implementation

Given that transportation and the built environment are the leading contributing sectors to greenhouse gas emissions in our region, it is not surprising that many strategies in these sectors appear on these tables that maximize outcomes. Many of these strategies and corresponding actions reflect the urgency for a coordinated and comprehensive approach to decarbonizing these sectors.

The ten strategies in Table ES-1 show the highest greenhouse gas emission reduction potential by 2030 in addition to existing strategies and actions. It's important to note that several actions already in place will not realize their full potential until 2050, well after the 2030 emissions reduction potential calculations used for this report. For example, large state programs like the Climate Commitment Act, Clean Fuel Standard, and Vehicle Emission Standards won't realize their full emission reductions until well after 2030, and regional transit is actively being built out under the Regional Transportation Plan.

Table ES-1: Top 10 Strategies Ranked in Order of Their Greenhouse Gas Emission Reduction Potential by 2030*

Sector	Strategy	Summary of Actions
Built Environment	1.3 Electrify or Decarbonize Existing Buildings	Electrify appliances; Develop renewable electricity generation and battery storage systems; Develop building emissions performance standards and building decarbonization plans; Promote low-carbon fuels
Transportation	2.3 Electrify or Reduce the Carbon Intensity of On-Road Medium- and Heavy-Duty Freight and Service Vehicles	Support the electrification of government and privately medium- and heavy-duty fleets; Support Advanced Clean Trucks and Advanced Clean Fleet Rules; Support medium- and heavy-duty charging infrastructure build-out; Require low-carbon alternatives for medium- and heavy-duty government fleets
Built Environment	1.2 Reduce Energy Use in Existing Buildings	Weatherize existing buildings; Upgrade appliances for efficiency, and upgrade lighting; Support utility demand response programs; Develop efficiency standards
Transportation	2.2 Increase Sales and Use of On-Road Passenger Electric Vehicles and Promote Low-Carbon Fuel Alternatives	Support charging infrastructure build-out and develop a regional charging infrastructure plan; Electrify government fleets and high-emitting vehicles; Support electric vehicle car sharing programs; Provide electric vehicle purchase incentives and support the State's Zero-Emission Vehicle Standard
Natural and Working Lands**	4.1 Steward Natural Lands to Reduce Tree Loss	Increase tree planting and stewardship; strengthen zoning requirements to protect trees; Promote tree retention and planting and increase green stormwater infrastructure

Built Environment	1.5 Reduce Industrial Emissions (especially process heating)	Support low-emission technology upgrades; Establish greenhouse gas auditors/consultants; Create low-emission ratings/awards to identify low emitters; Promote low-carbon fuels
Transportation	2.5 Electrify or Reduce the Carbon Intensity of Off-Road Equipment	Phase-out new sales of gas- and diesel-powered off-road equipment; Promote low-carbon fuels for off-road equipment
Transportation	2.6 Electrify or Reduce the Carbon Intensity of Aviation Vehicles and Equipment and Reduce Air Travel	Promote low-carbon fuels for government-related travel; Electrify equipment and non-road vehicles; Establish stronger fuel efficiency and emissions standards for aircraft and engines; Promote alternative options to air travel and increase use of virtual meetings
Built Environment	1.1 Build Low-Carbon New Buildings	Strengthen building codes to require low- or zero-emission building materials and appliances in new construction; Provide education and outreach for developers and builders of new commercial and residential construction
Solid Waste	3.2 Divert Other Recyclable and Compostable Materials from Landfills	Provide education and outreach to encourage landfill diversion; Improve the handling and processing of organics waste and reduce food waste; Support new and existing markets for compost; Increase methane capture in farming

* Strategies appear in order of their estimated maximum emission reduction potential by 2030. The maximum potential impact of each strategy assumes the largest realistic scale of action; estimates are not plans or predictions and don't guarantee results.

** While some Natural and Working Lands sector strategies can prevent direct carbon emissions from soils (e.g., reducing tree loss) most Natural and Working Lands (e.g., stewarding natural lands, planting trees, etc.) primarily increase carbon sequestration rather than directly reduce emissions. Natural and Working Lands to increase carbon sequestration are critical to meeting our 2050 climate targets but cannot compensate for direct emission reductions in other sectors of the economy.

The seven strategies in Table ES-2 are likely to result in air quality and public health co-benefits, especially in overburdened communities. Overburdened communities, shown in Figure 1 of this climate plan, are geographic areas where vulnerable populations face combined, multiple environmental harms and health impacts. The strategies of the climate plan are ranked approximately highest to lowest according to their likely benefit for air quality and public health including impacts on ambient air quality and exposure, indoor air quality, urban livability, and home heating and cooling. Diesel particle pollution from diesel engines is the top air quality toxics risk in the region (driving 85% of the potential cancer risk from air pollution) and remains a top priority for public health, especially for overburdened communities. Some built environment strategies can lead to improvements in indoor environments, where people spend a majority of their time. Some natural and working lands strategies can increase urban green areas; while these do not directly reduce pollutant exposures, they can reduce urban heat island effects that can cause heat-related illnesses and death.

Table ES-2: Top 7 Climate Strategies with the Greatest Air Quality and Public Health Co-Benefits with a Focus on Overburdened Communities

Sector	Strategy	Summary of Actions
Transportation	2.3 Electrify or Reduce the Carbon Intensity of On-Road Medium- and Heavy-Duty Freight and Service Vehicles	Support the electrification of government and privately medium- and heavy-duty fleets; Support Advanced Clean Trucks and Advanced Clean Fleet Rules; Support medium- and heavy-duty charging infrastructure build-out; Require low-carbon alternatives for medium- and heavy-duty government fleets
Transportation	2.5 Electrify or Reduce the Carbon Intensity of Off-Road Equipment	Phase-out new sales of gas- and diesel-powered off-road equipment; Promote low-carbon fuels for off-road equipment
Transportation	2.2 Increase Sales and Use of On-Road Passenger Electric Vehicles and Promote Low-Carbon Fuel Alternatives	Support charging infrastructure build-out and develop a regional charging infrastructure plan; Electrify government fleets and high-emitting vehicles; Support electric vehicle car sharing programs; Provide electric vehicle purchase incentives and support the State's Zero-Emission Vehicle Standard
Built Environment	1.3 Electrify or Decarbonize Existing Buildings	Electrify appliances; Develop renewable electricity generation and battery storage systems; Develop building emissions performance standards and building decarbonization plans; Promote low-carbon fuels
Built Environment	1.2 Reduce Energy Use in Existing Buildings	Weatherize existing buildings; Upgrade appliances for efficiency, and upgrade lighting; Support utility demand response programs; Develop efficiency standards
Transportation	2.1 Reduce Vehicle Miles Traveled of On-Road Passenger Internal Combustion Engine Vehicles	Implement transit-oriented, compact growth and development; Develop income-sensitive vehicle use/congestion pricing programs; Expand biking and walking networks and prioritize transit access; Provide education and outreach to encourage mode-shift and car trip reduction
Natural and Working Lands	4.1 Steward Natural Lands to Reduce Tree Loss	Increase tree planting and stewardship; Strengthen zoning requirements to protect trees; Promote tree retention and planting and increase green stormwater infrastructure

This regional climate plan complements the statewide climate plan developed by the Washington Climate Partnership (Washington State Departments of Commerce and Ecology). While many strategies and actions detailed in this plan can be implemented effectively at different scales and levels of government, based on preliminary analysis the five strategies in Table ES-3 are well-positioned for collaboration and implementation at the local or regional level or have the potential to scale across the four-county Puget Sound region.

Table ES-3: Top 5 Climate Strategies Well-Positioned for Implementation at the Regional or Local Level

Sector	Strategy	Summary of Actions
Built Environment	1.2 Reduce Energy Use in Existing Buildings	Weatherize existing buildings; Upgrade appliances for efficiency, and upgrade lighting; Support utility demand response programs; Develop efficiency standards
Built Environment	1.3 Electrify or Decarbonize Existing Buildings	Electrify appliances; Develop renewable electricity generation and battery storage systems; Develop building emissions performance standards and building decarbonization plans; Promote low-carbon fuels
Transportation	2.1 Reduce Vehicle Miles Traveled of On-Road Passenger Internal Combustion Engine Vehicles	Implement transit-oriented, compact growth and development; Develop income-sensitive vehicle use/congestion pricing programs; Expand biking and walking networks and prioritize transit access; Provide education and outreach to encourage mode-shift and car trip reduction
Transportation	2.2 Increase Sales and Use of On-Road Passenger Electric Vehicles and Promote Low-Carbon Fuel Alternatives	Support charging infrastructure build-out and develop a regional charging infrastructure plan; Electrify government fleets and high-emitting vehicles; Support electric vehicle car sharing programs; Provide electric vehicle purchase incentives and support the State's Zero-Emission Vehicle Standard
Natural and Working Lands	4.1 Steward Natural Lands to Reduce Tree Loss	Increase tree planting and stewardship; strengthen zoning requirements to protect trees; Promote tree retention and planting and increase green stormwater infrastructure

Considerations for Successful Implementation

Turning climate strategies and actions into effective programs and policies requires thoughtful, context-sensitive and community-centered approaches. While specific program design for each climate strategy isn't yet known, several high-level considerations can help ensure successful implementation:

1. **Environmental Justice:** The State's Healthy Environment for All (HEAL) Act requires state agencies to set a goal of directing 40% of all grants and expenditures that create environmental benefits to vulnerable populations and overburdened communities. Jurisdictions in the region can demonstrate our commitment to the state's environmental justice goals by striving to meet this goal when implementing climate strategies. Likewise, partners should prioritize strategies that both reduce emissions and result in direct community benefits, thereby stacking benefits for the region's most vulnerable communities.
2. **Community Engagement**: Implementing the strategies in this climate plan will require ongoing, deep collaboration with communities to inform equitable program and policy design, build trust, and avoid unintended consequences, particularly at the local level. Program design should center equitable community engagement. Refer to Appendix D for more information.
3. **Utilities**: Many of the challenges associated with the state's clean energy transition largely fall upon electric and natural gas utilities to address. Our region's utilities must remain involved in strategy implementation, electrification, and grid modernization planning at all levels of government to meet the region's near- and long-term climate goals. Refer to the Utility Considerations section for more information.
4. **Geographic Disparities & Health Equity**: The impacts of climate change can have long-term, amplifying effects on social inequalities that already exist in communities. Data like the Washington Environmental Health Disparities Map and the Agency's Overburdened Communities Map show how benefits and burdens are distributed unevenly across communities in the Puget Sound. Implementers should leverage this data and develop new modeling and geospatial analyses to quantify the public health impacts of climate strategies in a way that maximizes benefits for overburdened communities. Refer to the Benefits Analysis section for more information.
5. **Workforce Development**: Implementing the actions in this climate plan will require accelerated job growth in important sectors like building electrification; electric vehicle production, infrastructure and maintenance; renewable fuel production; energy transmission, storage, and distribution; and others. Jurisdictions must prioritize green jobs and youth development and address known workforce challenges, including a just transition for fossil fuel workers, to support this job growth in our region. Refer to the Workforce Development Analysis section for more information.
6. **Tracking Progress:** Implementation planning should identify roles and responsibilities to maintain accountability and include clear and transparent metrics to ensure that progress is being made to reach climate and environmental justice goals.
7. **Ongoing Coordination:** The climate strategies in this plan must scale across jurisdictional borders to maximize their impact. The Puget Sound Clean Air Agency can serve as a backbone organization, bringing transparency to implementation activities and highlighting opportunities for necessary collective action.

Addressing the climate crisis will require urgent action that is supported by strong coordination at all levels of government. Many jurisdictions in the region have demonstrated bold climate leadership, yet meeting the challenge of climate change requires bolder actions, new examples of local leadership, deeper commitments to collaboration, and a willingness to take action.

Acronyms and Glossary

Action	Policy, program, or project that reduces greenhouse gas emissions
Agency	Puget Sound Clean Air Agency
C-PACER	Commercial Property Assessed Clean Energy and Resilience: County-administered program for commercial property owners to access long-term financing to implement energy, water, and resilience upgrades in buildings
CAFE	Corporate Average Fuel Economy: National Highway Traffic Safety Administration's requirements for the fuel-efficiency of passenger cars and light-duty trucks
CETWAC	Clean Energy Technology Workforce Advisory Committee: State committee responsible for research and policy recommendations about workforce needs for clean energy technologies
Climate plan	Comprehensive Climate Action Plan
Co-benefit	Social, environmental, or economic benefit associated with an action to reduce greenhouse gas emissions
CPRG	Climate Pollution Reduction Grant: The Environmental Protection Agency grant program through which the Comprehensive Climate Action Plan development is funded
EPA	U.S. Environmental Protection Agency: The federal Agency from which the Puget Sound Clean Air Agency receives authority for enforcement of the federal Clean Air Act. EPA also funds the CPRG program
FAA	Federal Aviation Administration: The federal agency within the U.S. Department of Transportation that regulates civil aviation in the U.S.
Greenhouse gas	Gas that traps heat in the atmosphere, including carbon dioxide, methane, nitrous oxide, and fluorinated gases
Green hydrogen	Hydrogen that is produced by splitting water into hydrogen and oxygen using renewable electricity. No fossil fuels are used in the production of green hydrogen
GWP	Global warming potential: A measure of the potency of a greenhouse gas (i.e. how much it warms the atmosphere)
HCFC, HFC, CFC	Hydrochlorofluorocarbon, hydrofluorocarbon, or chlorofluorocarbon: Chemicals often used as refrigerants that are also potent greenhouse gases
Health Equity	The state in which everyone has a fair and just opportunity to attain their highest level of health
IPCC	Intergovernmental Panel on Climate Change: The United Nations body that creates regular reports on climate change science, impacts, and mitigation strategies
K4C	King County Cities Climate Collaboration: Partnership of 24 local governments in King County collaborating to advance climate action and resilience

LEED	Leadership in Energy and Environmental Design: A rating system by the U.S. Green Building Council to recognize green building accomplishments
MSA	Metropolitan Statistical Area: Geographic definition used by the federal government to identify a group of communities around a shared urban center(s) with a collective population of at least 50,000
MTCO2e	Metric tons of carbon dioxide equivalent: A standardized unit that allows for the comparison of the global warming potential of various greenhouse gases. It represents the number of metric tons of carbon dioxide emissions that have the same global warming potential as one metric ton of another greenhouse gas.
NHTSA	National Highway Traffic Safety Administration: The federal agency within the U.S. Department of Transportation that works to reduce deaths and injuries and economic costs due to motor vehicle crashes.
ODP	Ozone Depletion Potential: A measure of a substance's impact on depleting the stratospheric ozone layer
ORCA	One Regional Card for All: Shared fare payment system across multiple transit agency jurisdictions in the Puget Sound region
Overburdened	Overburdened communities are geographic areas where vulnerable populations face combined, multiple environmental harms and health impacts, and includes, but is not limited to, highly impacted communities as defined in RCW 19.405.020. [RCW 70A.02]
Priority climate plan	Priority Climate Action Plan
PSREA	Puget Sound Regional Emission Analysis: In 2022, a 2019–based regional greenhouse gas emissions inventory was led by King County. During development of this climate plan, Agency staff updated the PSREA using more recent data from 2022
PSRC	Puget Sound Regional Council: The Metropolitan Planning Organization that develops policies and coordinates decisions about regional growth, transportation and economic development planning within King, Kitsap, Pierce, and Snohomish counties.
RCW	Revised Code of Washington State: The compilation of all permanent laws now in force in Washington State
Sector	The various parts of the economy that generate emissions
SOC	Standard Occupational Classification: Statistical classification standard used by the federal government to describe occupations
Strategy	A group of similar or interrelated greenhouse gas reduction actions
VMT	Vehicle Miles Traveled: The total number of miles traveled by all vehicles in a region over a certain period of time.

Introduction

The Puget Sound Clean Air Agency (Agency) collaborated with multiple local partners across the four-county region (including the Seattle-Tacoma-Bellevue Metropolitan Statistical Area (MSA) and the Bremerton-Silverdale-Port Orchard MSA) to produce this Comprehensive Climate Action Plan (referred to as "climate plan"). This document represents the first comprehensive, region-wide climate plan for the Puget Sound in over a decade. It is built on a strong foundation of climate planning work already underway across the region and state, and is designed to synergize, complement and reinforce state, tribal, and local climate planning efforts. This plan can serve as a reference to support partners in the implementation of policies and programs that reduce greenhouse gas emissions, improve public health and air quality, spur green job growth, and enhance the quality of life for all residents of the Puget Sound.

This project has been funded wholly or in part by the United States Environmental Protection Agency (EPA) under assistance agreement #5D - 02J38301. The contents of this document do not necessarily reflect the views and policies of the EPA, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

Developing this Climate Plan

This climate plan is the second major deliverable of the EPA's Climate Pollution Reduction Grant (CPRG) program. The first major deliverable, the Seattle-Tacoma-Bellevue MSA's Priority Climate Action Plan (priority climate plan), was submitted to EPA in March 2024. The priority climate plan focused on near-term, high-priority, implementation-ready actions to reduce greenhouse gas pollution by 2030. Led by King County, the region was awarded a $50M Implementation Grant for specific actions described in the priority climate plan. This climate plan builds off the priority climate plan, as well as the numerous other local climate planning processes underway in the region.

How Community Input Shaped the Climate Plan

Meaningful community and stakeholder engagement and feedback were critical to the development of this climate plan. The Agency and partners across the Puget Sound region hosted four in-person workshops where community members shared their concerns and input on the climate plan's draft greenhouse gas emission reduction strategies and their implementation. While feedback heard at these workshops and through other engagement methods is interwoven throughout this climate plan, common themes included:

- The importance of educating and raising community awareness around climate strategies and actions.
- The need to increase engagement opportunities for community members to provide feedback on actions and their implementation.
- The importance of tracking and reporting progress on emission reduction actions to hold implementors accountable.

"Feedback" by Lyn Tampi
Creative Climate Action Art Contest Winner

Creative Climate Action Art Contest

As part of our outreach and engagement efforts for this climate plan, the Agency sponsored a **Creative Climate Action Art Contest**. Bringing people together in new and unique ways, the art contest helped us to reach members of the public who might not otherwise engage in climate topics.

This concept was inspired by the Art x Climate art gallery featured in the 5th National Climate Assessment: "The US Global Change Research Program issued a call for art with the understanding that, together, art and science move people to greater understanding and action."

Submissions are featured throughout this climate plan, as well as on the Agency's web site and social media channels, and in presentation materials. We are grateful to all the artists who shared their interest and passion for climate and our environment through art.

Youth Winners: Ansh Kumar, Elise Robison, Sally T., Tanisha Manna

Adult Winners: Lyn Tampi, Randy Bott Photography, Sherene

The Agency also used other methods to reach different segments of the community, allowing community members to engage in the ways most accessible to them. These included two virtual climate plan meetings, an online survey (available in six languages), and an online engagement hub using Konveio, a web-based platform allowing members of the public to review and comment on the draft climate plan. For more details on public engagement, please see **Appendix D**, Engagement Summary. For a record of all public input received, please see **Appendix H**, Public Input Received on the Draft Climate Plan.

Prior to developing this climate plan, all counties and many cities in the region had already conducted climate-focused community engagement. The Agency reviewed results from these past engagement efforts to inform this climate plan. Jurisdictions often used best practices for engagement to reach overburdened communities, including providing translation and interpretation services, compensation for input received, and childcare to remove barriers to participation. The Agency implemented these same best practices for community engagement workshops on this climate plan.

Community members can often experience engagement burnout when they are asked the same questions multiple times, especially without seeing immediate or appreciable change in their communities. To avoid this dynamic and build upon past efforts, the Agency worked with city and county partners to compile the results of past climate-focused engagement. Recurring themes from past engagement helped Agency staff to identify initial community priorities and concerns, and to plan content for the community engagement workshops.

How Environmental Justice is Embedded into this Climate Plan

Environmental justice is the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Environmental justice can be achieved by acknowledging existing disparities among communities and implementing climate strategies that work to address these inequities. A primary goal of this climate plan is to identify equitable climate strategies that not only reduce greenhouse gas emissions but also prioritize social, environmental, or economic

co-benefits in the region's overburdened communities. Environmental justice principles were incorporated throughout the development of this climate plan, including in the design and implementation of community engagement opportunities, and in the analysis of the greenhouse gas reduction strategies themselves.

We know well that pollution in the region impacts some communities more than others. This plan aims to understand major environmental health disparities in our region and identify climate strategies that maximize co-benefits and environmental justice outcomes for overburdened communities. The anticipated benefits and impacts of the greenhouse gas reduction strategies in the region's overburdened communities are summarized throughout this document and in the Benefits Analysis section. For more information on data used, please refer to **Appendix C**, Benefits Analysis.

EPA previously required meaningful engagement and a benefits analysis for "low income and disadvantaged communities" or "LIDAC" for CPRG planning grantees. For the purposes of this climate plan, we will use the term "overburdened communities" as defined in RCW 70A.02.010 (11) of the Washington State Healthy Environment for All (HEAL) Act, in alignment with state law.

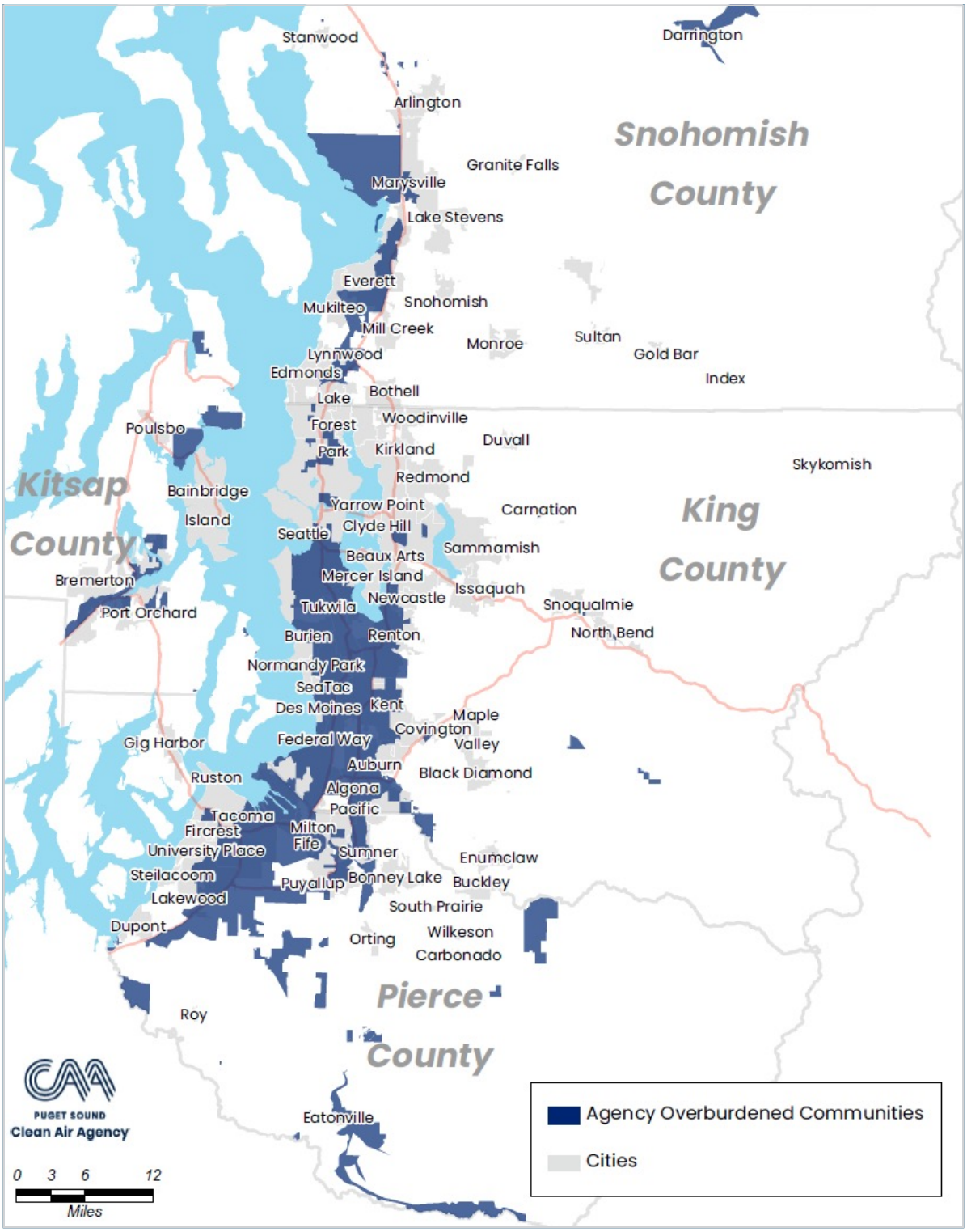
As shown in **Figure 1**, the Agency has adopted a map defining "overburdened communities" within the four-county Puget Sound region.[1] The map overlays other environmental justice maps including the Washington State Environmental Health Disparities Map, Ecology's Climate Commitment Act Overburdened Communities, and the Agency's Community Air Tool. The Agency will continue to update this map as new information and data becomes available, including forthcoming updates to the State's Environmental Health Disparities Map.

[1]https://pscleanair.gov/382/Overburdened-Communities

"Crying of the Sea" by Sally T.
Creative Climate Action Art Contest Winner

"Untitled" by Elise Robison
Creative Climate Action Art Contest Winner

Figure 1: Agency Map of the Region's Overburdened Communities



An interactive version of this map can be found on the Agency's website

How Qualitative and Quantitative Analysis Informed this Climate Plan

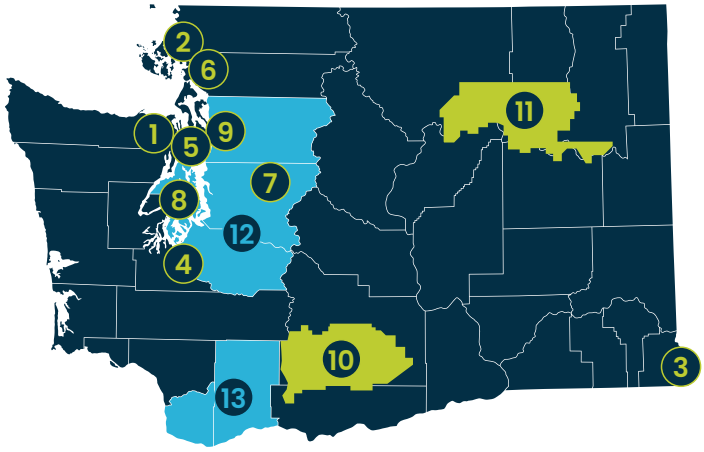
Both qualitative and quantitative data informed the development of this climate plan. This plan relied on subject matter expert analysis to identify the greenhouse gas reduction actions that will support us in reaching the region's emission reduction targets, while simultaneously highlighting the co-benefits that will improve the overall well-being of our region's residents and ecosystems. For more information on the data and assumptions behind the greenhouse gas analyses in this climate plan, please refer to **Appendix B**, Quantified Emission Reductions.

Qualitative stakeholder and community input and storytelling allows us to highlight the pathways that can help our region to meet our targets most effectively and equitably. Community input on this climate plan can be found in **Appendix D**, Community Engagement Workshop Summary.

Partners for Climate Plan Development

The Agency collaborated with numerous partners across the state and region to develop this climate plan. The Agency coordinated closely with State partners from the Washington Climate Partnership (Departments of Commerce and Ecology), which is simultaneously developing the State's climate plan under the CPRG grant. Agency and state staff met regularly to ensure that both plans align with and complement each other where feasible. In addition to collaborating with the Washington Climate Partnership, the Agency also attended the State's monthly CPRG Tribal Workgroups and collaborated with other CPRG grantees in EPA Region 10 through regular meetings. Alongside the State, **Figure 2** illustrates the 14 additional regional and tribal government CPRG grantees who are developing climate plans in Washington.

Figure 2: CPRG Grantees in Washington State



Tribes and Tribal Consortiums:

1. Jamestown S'Klallam Tribe
2. Lummi Nation
3. Nez Perce Tribe
4. Nisqually Tribe
5. Port Gamble S'Klallam Tribe
6. Samish Indian Nation
7. Snoqualamie Tribe
8. The Suquamish Tribe of the Port Madison Reservation
9. Tulalip Tribe
10. Yakama Nation
11. Upper Columbia United Tribes
* Affiliated Tribes of Northwest Indians (ATNI)

Metropolitan Statistical Areas:

12. Seattle-Tacoma-Bellevue MSA
13. Portland-Vancouver Metro Area MSA

*ATNI is a 501(c)(3) tribal consortium supporting 57 member Tribes that reside in Oregon, Washington, Idaho, Alaska, California, Montana, and Nevada.

The Agency is grateful to the members of the regional Steering Committee who helped to guide and shape the development of this climate plan, as well as the members of six Technical Workgroups, including equity, built environment, transportation, consumption and waste, utilities, and workforce development. A list of Steering Committee and Technical Workgroup members can be found in **Appendix E**. The Agency also partnered with Cascadia Consulting Group as well as numerous community-based organizations for communications, outreach, and engagement.

Through the Utility Workgroup, the Agency partnered closely with the four largest utilities in the region: Puget Sound Energy, Seattle City Light, Snohomish Public Utility District, and Tacoma Public Utilities. Utilities are critical partners in planning for a fully electrified future, and each have their own strategies and programs to assist in the energy transition. For more information, please refer to the Utility Considerations section.

Figure 3 illustrates the many partners we worked with to develop this regional climate plan.

Figure 3: State, Regional, and Community Partners for Climate Plan Development

About the Climate Plan

How to Navigate this Document

This climate plan examines all major sources and sinks of greenhouse gas emissions for the four-county Puget Sound region and outlines recommended climate actions to achieve our 2030 and 2050 emission reduction targets. This climate plan is organized into three main sections:

Part I. Where we are now: A greenhouse gas emissions inventory for the four-county region, the current climate policy landscape, and a summary of existing and planned large-scale greenhouse gas reduction projects.

Part II. Where we need to go: A summary of regional and state greenhouse gas reduction targets and greenhouse gas emissions projections for 2030 and 2050.

Part III. How we will get there: A climate pollution reduction plan for all sectors of the regional economy (consisting of 25 strategies and 110 actions), and a discussion of important considerations for equitable implementation, including potential funding sources, and which entities might best be positioned to implement proposed actions. This plan also includes analyses of potential benefits and impacts of proposed climate actions, with a focus on overburdened communities, as well as workforce development needs to implement the proposed actions, and information about next steps.

Who This Plan is For

This climate plan is designed as a roadmap for regional climate action. It is designed with decision-makers in mind, whether they are at the local, county, or regional level. It can also serve as a guide for other entities in the region, including utilities, ports, transit agencies, industry leaders, private businesses, climate advocacy groups, community-based organizations, non-profits, and others with a desire to implement climate actions. This regional climate plan is also designed to help Washington achieve its commitment to reducing greenhouse gas emissions by 95% below 1990 levels by 2050. It is a guide to help state decision-makers understand regional priorities, identify synergies, and leverage resources to maximize climate benefits.

Climate Plan Goals

This climate plan focuses on greenhouse gas reduction actions that can be implemented by local and county municipalities, as well as ports, transit agencies, utilities and others within the Puget Sound region. It presents climate actions that will impact over half of the state's population and approximately 47% of the state's total emissions.

EPA has identified the following goals for entities in developing climate plans:

- Improve understanding of current and future greenhouse gas emissions so that state and local governments can prioritize actions to reduce them.
- Adopt and implement ambitious policies and programs to reduce greenhouse gas emissions and accelerate decarbonization across multiple sectors.
- Collaborate closely with other entities in their state, region, municipality, and/or air district to develop coordinated plans.

- Stimulate innovative technologies and practices to reduce greenhouse gas emissions and co-pollutants.
- Prioritize actions and policies that will be durable, replicable, and provide certainty in pollution reductions.
- Reduce climate pollution while building the clean energy economy in a way that benefits all Americans and provides new workforce training opportunities.
- Adopt robust metrics and reporting programs to track emission reductions and important benefits throughout their jurisdiction.

As the first region-wide climate plan in over a decade, this plan highlights common challenges faced by many of our region's communities and identifies collective actions that have the potential to drive greenhouse gas emission reductions at scale. The goal of this climate plan is to identify and facilitate high-impact regional actions to reduce climate emissions through coordinated efforts. Development of this plan was guided by the following principles:

- Regional planning will align with and complement state and local policies and plans, and support jurisdictions at all stages of planning.
- Identified actions will be developed into funding-ready strategies that are more competitive for future funding opportunities, providing a clear path to implementation.
- Collaborative relationships will benefit jurisdictions through leveraging collective resources and aligning priorities to maximize impacts for emissions reductions, workforce development, and equitable distribution of resources.

Intersection with Other Climate Policies and Plans

State Climate Policies and Plans

Washington continues to establish itself as a state leader in climate action. Washington's largest climate policies and plans all work towards one goal: reducing climate pollution 95% below 1990 levels by 2050. This climate plan builds on existing state policies and plans, including:

- Clean Energy Transformation Act: Requires elimination of coal-fired electricity after 2025, for greenhouse gas-neutral supplies by 2030, and 100% clean electricity by 2045.
- Climate Commitment Act: Sets a declining annual cap on climate pollution from Washington's top sources, enabling businesses to find the most efficient path to lower carbon emissions. Revenues fund state and local investments to reduce greenhouse gas emissions in key sectors.
- Clean Fuel Standard: Reduces the carbon intensity of transportation fuels to cut vehicle emissions.
- Clean Buildings Act: Requires existing large commercial buildings (floor area exceeds 50,000 square feet) to implement Clean Buildings Performance Standard requirements. The 2022 expansion bill added a second tier of buildings (floor area exceeds 20,000 square feet), including multifamily buildings.
- Large Utility Decarbonization Act: Requires large combination electric and gas utilities to conduct integrated system planning to support decarbonization.
- Vehicle emissions standards: Reduces pollution from new gas- and diesel-powered vehicles sold in state and increases the availability of new clean vehicles for sale (Advanced Clean Cars II, and Advanced Clean Trucks).
- Move Ahead Washington: A state transportation funding package that provides $3 billion for public transportation over the next 16 years.
- Hydrofluorocarbon transition: Transitions refrigerants and other products and equipment away from potent greenhouse gases known as hydrofluorocarbons (HFC).

- Recycling Reform Act: Updates the state's recycling system, funding statewide collection services, reducing unnecessary packaging, and requiring the establishment of a producer responsibility organization, funded by manufacturers and consumer brands.
- Organics Management Law: Diverts organic materials away from landfills through prevention, food rescue, and organics management facilities.
- Landfill Methane Emissions Law: Requires certain landfills to monitor and reduce methane emissions.
- Growth Management Act Climate Goal and Element: A new Climate Change and Resiliency goal was added to the Growth Management Act, which requires local governments to integrate climate change into their comprehensive plan.
- Transit-Oriented Development: State law (HB 1491) sets minimum standards for increased density within high-frequency transit station areas and affordability requirements for new residential buildings in those areas.
- Healthy Environment for All (HEAL) Act: Embeds environmental justice considerations into state policies and programs and aims to reduce environmental and health disparities.
- 2021 State Energy Strategy: Washington's blueprint for achieving comprehensive decarbonization across all economic sectors that depend on clean energy.
- Transportation Electrification Strategy: A plan to ensure electric vehicle incentives and infrastructure are accessible and available to all people in Washington.
- Transportation Carbon Reduction Strategy: A plan that focuses on ways to reduce transportation greenhouse gas emissions in Washington.
- Washington State Climate Resilience Strategy: A strategy that addresses the greatest climate risks facing our state and proposes actions for resilience.

Regional Climate Plans

The Puget Sound region has a strong history of climate planning, with numerous regional, county, and city plans already adopted and underway. This includes regional growth plans, transportation planning, ports strategies and initiatives, utility plans and programs, city and county climate plans, and comprehensive plans with climate elements, all of which inform this regional climate plan.

The Puget Sound Regional Council (PSRC) is the region's Metropolitan Planning Organization, designated with developing policies and coordinating decisions about regional growth, transportation, and economic development across the four-county region. PSRC, in collaboration with its member jurisdictions, developed VISION 2050, the region's long-range framework for how and where the region grows through 2050. VISION 2050's multi-county planning policies, actions, and regional growth strategy guide growth towards centers and near high-capacity transit.

Tracking Progress on Regional Transportation Plan Goals

The Regional Transportation Plan **Performance Dashboard** is a resource to help the region understand how well it is meeting long-range goals and desired outcomes identified in the plan. The Dashboard is updated each Fall as various census and transportation-related data sources are released.

The Regional Transportation Plan is the long-range transportation element of VISION 2050, and contains a Four-Part Greenhouse Gas Strategy, which recognizes that decisions and investment in land use, transportation choices, pricing, and technology are the primary factors that influence on-road transportation emissions in the region. An analysis of the region's Four-Part Greenhouse Gas Strategy is conducted every four years with development of each Regional Transportation Plan.

PSRC is currently developing the next Regional Transportation Plan to be adopted in 2026, which includes plans to:

- Expand regional and local transit systems, including light rail, buses, and ferries.
- Increase bicycle and pedestrian infrastructure.
- Improve and expand access to transit.
- Support state and federal policies that advance transportation technology and reduce emissions, such as electric vehicles and related innovations.

Ports also play a key role in achieving regional and state-wide clean air, climate, and environmental justice goals. The Northwest Ports Clean Air Strategy is a collaborative framework for clean air and climate action across the two largest ports in the Puget Sound Region, Port of Seattle and Port of Tacoma, and the Northwest Seaport Alliance. It establishes the goal of phasing out all seaport-related emissions by 2050 or sooner, including those from ocean going vessels, harbor vessels, drayage trucks, and cargo-handling equipment.

These three entities, along with the Port of Everett and other Puget Sound ports, are also members of the Puget Sound Maritime Air Forum. Members actively work together to ensure they continue to collectively meet federal air quality standards and implement emission reduction measures. The Forum is committed to accurately quantifying and voluntarily reducing emissions associated with the maritime transportation of freight and passengers.

"Untitled" by Ansh Kumar
Creative Climate Action Art Contest Winner

"Refelections of my World" by Tanisha Manna
Creative Climate Action Art Contest Winner

County Climate Plans

Puget Sound counties are leading the way for climate action at the local level. **Table 1** summarizes key climate plans and their major focus areas for each county in the region:

Table 1: County Climate Plans and Major Focus Areas

County	Plan	Major Focus Areas
King County	Strategic Climate Action Plan (2025)	Reducing Greenhouse Gas Emissions: • Countywide greenhouse gas policy and leadership • Transit and transportation • Building energy and green building • Circular economy • Forest and agriculture • Enterprise leadership and accountability • Sustainable county infrastructure • Zero-emission county fleets The King County Strategic Climate Action Plan also contains numerous strategic priorities for Sustainable and Resilient Frontline Communities and Climate Preparedness not listed here.
Kitsap County	Comprehensive Plan Climate Chapter and Greenhouse Gas Reduction Element (2024)	• Transportation • Transit and land use • Off-road equipment • Built environment • Forests
Pierce County	Sustainability 2030 Plan (2025)	• Energy and buildings • Transportation • Waste reduction • Nature-based climate solutions • Education and outreach • Growing community capacity • County actions (buildings & fleet, commute trips, waste system, natural lands & resources, employee education & equitable practices)

County	Plan	Major Focus Areas
Snohomish County	Comprehensive Plan Climate Change and Resiliency Element (2024) Urban Core Subarea Plan Element Communitywide Climate Resiliency Plan (currently drafting)	• Reductions in vehicle miles traveled via improved multi-modal infrastructure. • Light Rail Communities Plan: Planning for two light rail stations and high-capacity bus service in the southwest urban growth area, includes Light Rail Community zone to support high-density residential, commercial, office, and community services. • Urban tree canopy policies and urban tree retention regulations. • Land use: Areawide rezoning; protection and enhancement of natural areas, shorelines, estuaries, nearshore habitats. Increased coordinated efforts for land conservation of priority habitats and strategic green and open spaces. • Increasing energy efficiency in County-owned buildings and operations, transition of County fleets to zero emission by 2050. • Continue weatherization and energy assistance programs including C-PACER. • Increase coordination on decarbonizing/energy efficiency upgrades for community anchor institutions/community based organizations.

Local Climate Plans

Currently, 37 cities across the Puget Sound region have adopted climate plans or included climate elements in their comprehensive plans, and many more are in the process of adding them. In total, approximately 53% of the four-county Puget Sound region's population is covered by a finalized climate plan.

Washington State's Growth Management Act includes fifteen planning goals to guide counties, cities, and towns in the Puget Sound region in the development and adoption of their comprehensive plans and development regulations. The Growth Management Act Climate Change and Resiliency Element is the result of a state law (HB 1181) that requires the inclusion of greenhouse gas emission reduction and climate resilience sub-elements for all jurisdictions in the region with a population over 6,000. Cities and counties are required to set goals and design transportation, land use, buildings and energy actions to meet them. By the end of the decade, all municipalities in the region will be required by the Growth Management Act to incorporate climate change mitigation and adaptation into their comprehensive plans.

This climate plan is designed to energize, reinforce, synergize, and complement local climate planning efforts. The Agency views overlap in local, regional, and state plans as an advantage, strengthening the case for implementation of similar priority climate actions across government levels. For more information on local jurisdictions' climate action plans in the region, please refer to **Appendix F**, Jurisdictions with Climate Action Plans and Climate Change/Resiliency Projects.

Part I. Where We Are Now

What you do makes a difference, and you have to decide what kind of difference you want to make."
- Jane Goodall

This section describes the foundations already in place for meaningful climate action in the Puget Sound region. It provides an overview of the most recent updates to the greenhouse gas emissions inventory for our four-county region, and identifies existing and planned large-scale climate mitigation projects.

By understanding our emissions profile and leveraging coordinated policy and investment, we can accelerate the transition to a cleaner, healthier, and more resilient future for all.

Greenhouse Gas Inventories Included in the Climate Plan

A greenhouse gas inventory provides information about emissions by economic sector, which can be used to guide the scope and scale of reduction strategies needed in each sector.

2019 Puget Sound Regional Emissions Analysis

In 2022, King County led the Puget Sound Regional Emissions Analysis (PSREA), which analyzed greenhouse gas emissions from the 2019 calendar year. The project was developed in close partnership with the King County-Cities Climate Collaboration (K4C), Kitsap County, Pierce County, the Agency, PSRC, the City of Seattle, and Snohomish County.

The 2019 geographic inventory identified that nearly 40% of total emissions were produced by transportation sources including cars, trucks, ships, trains, and planes. The built environment sector, which includes electricity and natural gas use in residential and commercial buildings, contributed 39% of total emissions. Information in the PSREA allows jurisdictions to track progress toward climate goals, identify priority areas for emission reductions, and coordinate strategies across local governments.

2022 Greenhouse Gas Inventory

During development of this climate plan, Agency staff updated the PSREA using more recent data from 2022. At the same time, numerous other agencies were also updating their emissions inventories. The Agency worked closely with the Washington Department of Commerce and King County to ensure consistency in methodologies and scopes, where feasible.

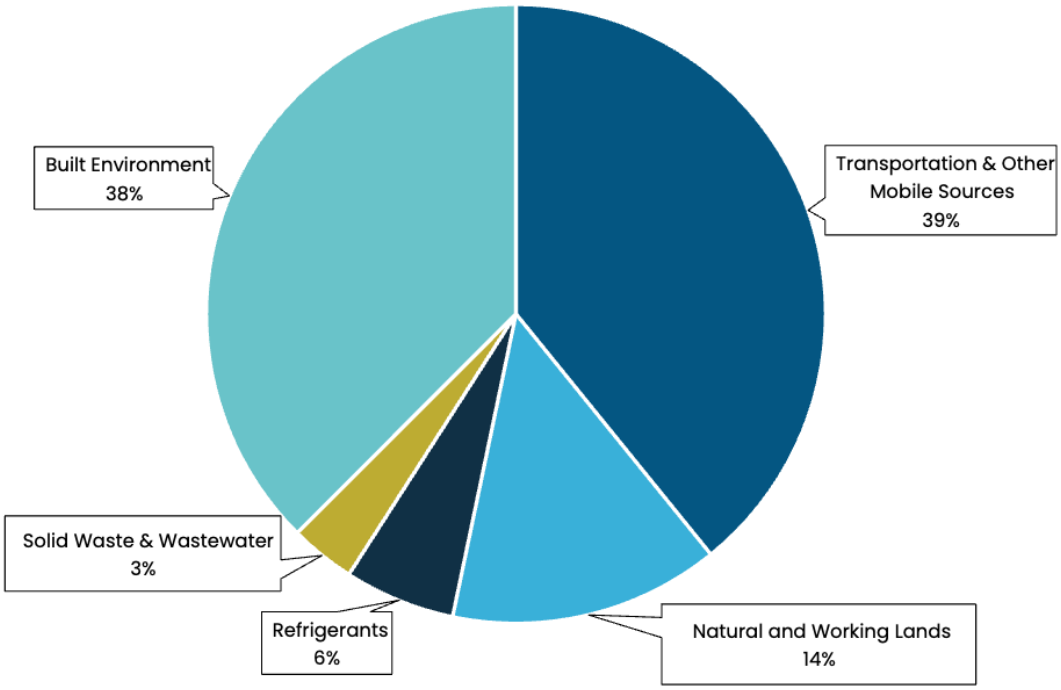
The Agency's analysis aligned closely with Commerce's 2022 inventory for King, Kitsap, Pierce, and Snohomish Counties.

Emissions inventories referenced during the development of this climate plan include:

- Washington Department of Commerce inventory for 2022 for the 11 most populous counties in the state, including King, Kitsap, Pierce, and Snohomish Counties.
- King County inventory update for 2022, and efforts to create sub-inventories for King County municipalities.
- Puget Sound Clean Air Agency update of the PSREA for the year 2022.

Figure 4 shows the main sources of greenhouse gas emissions by sector in our four-county region for year 2022. Transportation (39%) and the built environment (38%) are the two largest sources of emissions, together accounting for more than three-quarters of the region's total emissions. The remaining sectors, natural and working lands (14%), refrigerants (6%), and solid waste and wastewater (3%), contribute a much smaller share. These sector results are similar to the emissions estimates from the 2019 PSREA.

Figure 4. Main Sources of Greenhouse Gas Emissions in the Puget Sound in 2022



Some emissions in the 2022 inventory were placed in different subcategories compared to the 2019 inventory to align with the Department of Commerce's inventory. For example, in the 2022 inventory, emissions from industrial use of fuels like distillate fuel oil were moved from the industrial processes category to the fuel oil category within the built environment sector. The 2019 inventory had included only residential fuel oil in the fuel oil category, so this change helps group all fuel oil emissions together for better consistency. This reclassification does not change the total emissions, but simply places them in the more appropriate category.

Additionally, the 2022 inventory reclassified landfill emissions, moving them from the industrial processes category within the built environment sector to the solid waste sector. Unlike the fuel oil reclassification, landfill emissions were double counted in the 2019 inventory because they appeared in both categories. These updates help ensure greater consistency and clarity across all sectors, and improve alignment with the Department of Commerce's inventory. Some of the 2019 greenhouse gas emission estimates from the PSREA inventory were retroactively updated to incorporate newly available data for the aviation and on-road transportation sectors. These methodological differences and retroactive updates to 2019 data are described in more detail in Appendix A, Greenhouse Gas Inventory Assumptions.

Figure 5 provides a more detailed breakdown of estimated greenhouse gas emissions by subsector. On-road vehicles contribute the largest share, accounting for approximately 25% of the region's total emissions. Natural gas (18%), electricity (15%), and tree loss (13%) follow. Other notable sources include aviation (9%), refrigerants (6%), and off-road equipment (5%). Note that tree loss includes land development, wildland fires, and commercial tree harvesting.

Figure 5. Sources of Greenhouse Gas Emissions by Subsector in the Puget Sound in 2022

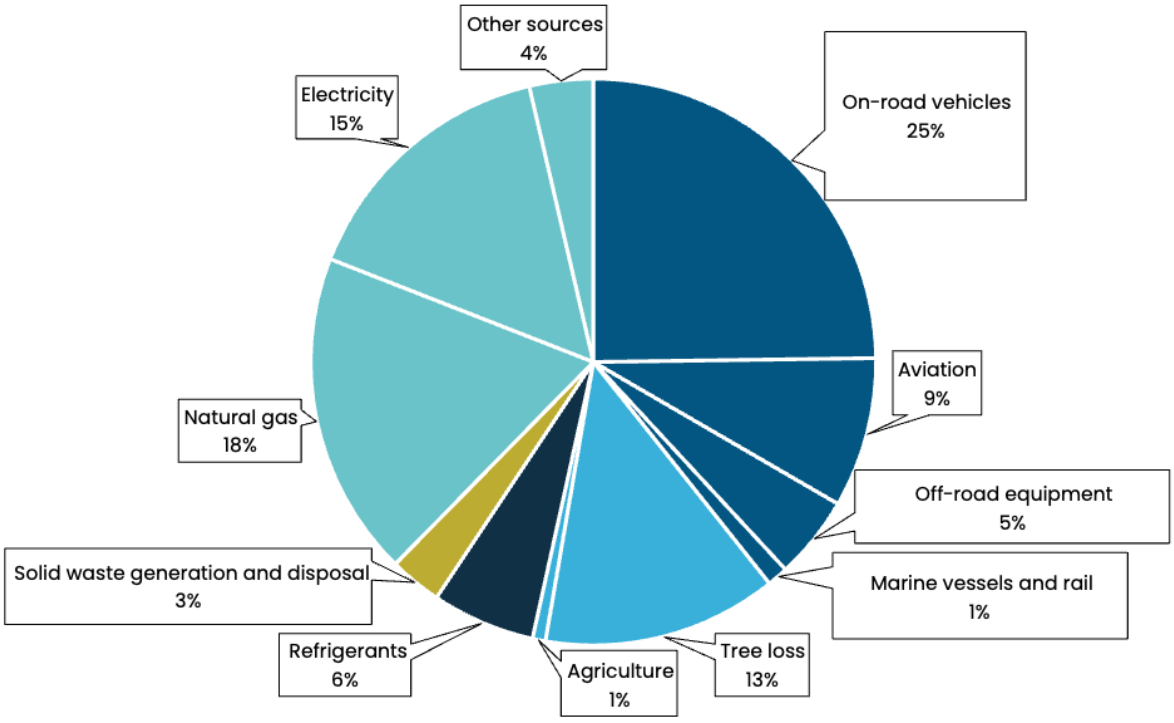


Figure 6 shows the breakdown of greenhouse gas emissions by county. In every county, transportation and built environment are the largest emissions sources. King County, the most populous county in the region, produces the highest total emissions, which are driven largely by these two sectors. Emissions in Pierce and Snohomish Counties are somewhat more evenly distributed among sectors, with natural and working lands also contributing a significant share. Kitsap County, while reporting the lowest overall emissions, follows the regional pattern, with the built environment and transportation remaining its primary sources.

Figure 6. Greenhouse Gas Emissions by County and Main Sector for 2022

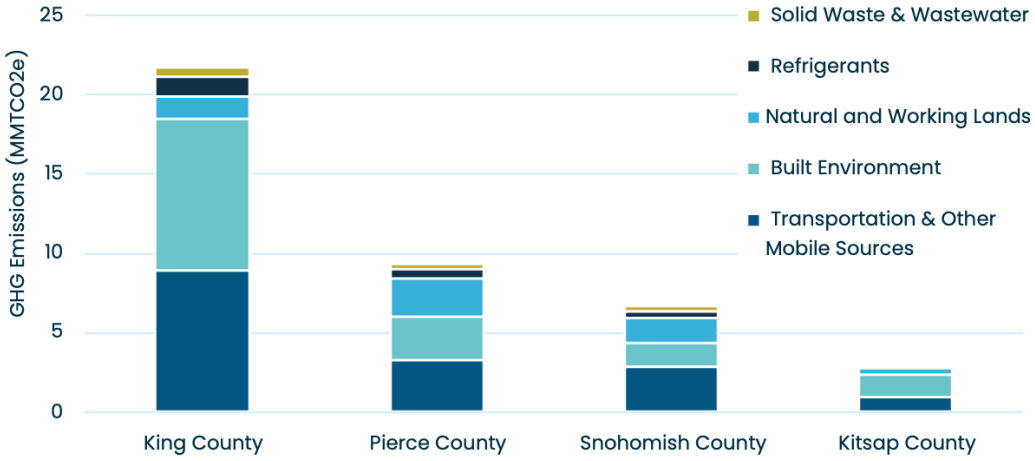


Figure 7 shows the per person greenhouse gas emissions by county for both 2019 and 2022. Transportation and built environment remain the largest sources of emissions per person across all counties. Generally, emissions per person have decreased across all counties between 2019 and 2022. In King and Pierce Counties, the reductions were driven by decreases in both transportation and built environment emissions. In Snohomish County, the decline was primarily due to lower transportation emissions, while built environment emissions remained stable. Built environment emissions per person in Snohomish County are notably lower than in other counties for both years, likely reflecting the county's cleaner energy grid. In Kitsap County, reductions were mainly in the built environment, with transportation unchanged. Per person emissions from other categories have remained relatively steady over this period. The net emissions from each county for 2019 and 2022 are also presented in Appendix A.

Figure 7. Per Person Greenhouse Gas Emissions by County and Main Sector for 2019 and 2022

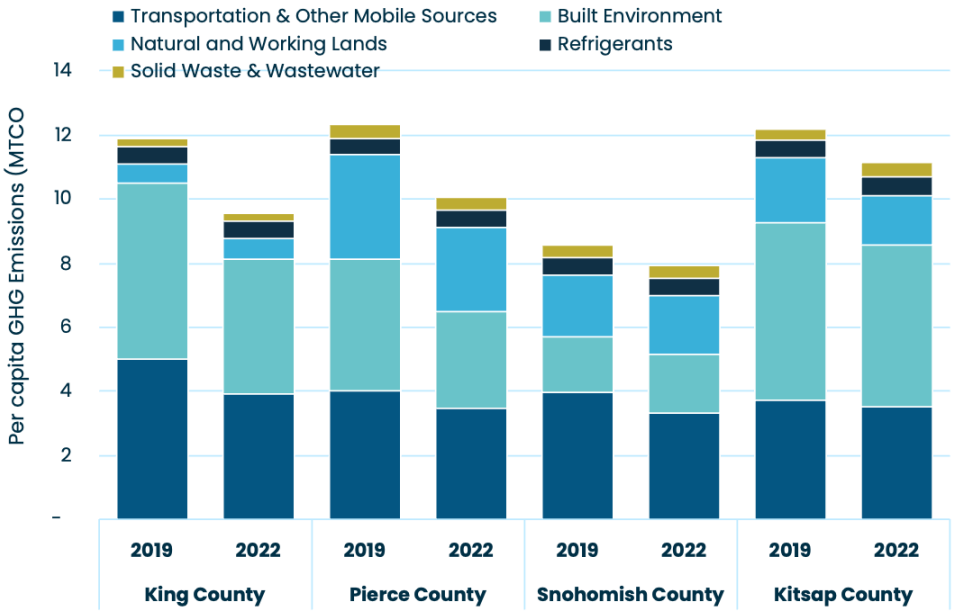


Table 2 provides the specific emissions amounts in metric tons of carbon dioxide equivalent (MTCO2e) by sector and county for 2022. See Appendix A for further information.

Table 2. Estimated 2022 Greenhouse Gas Emissions by County and Sector (rounded to the nearest thousand)

Greenhouse Gas Emissions by Sector (MTCO2e)	King County	Pierce County	Snohomish County	Kitsap County	Grand Total
Transportation & Other Mobile Sources	**8,948,000**	**3,235,000**	**2,829,000**	**978,000**	**15,990,000**
On-road vehicles	**5,367,000**	**2,164,000**	**2,001,000**	**553,000**	**10,085,000**
Freight and service vehicles	1,003,000	362,000	354,000	66,000	1,785,000
Passenger vehicles	4,244,000	1,778,000	1,608,000	468,000	8,098,000
Transit vehicles	120,000	24,000	38,000	19,000	201,000
Aviation	**2,296,000**	**563,000**	**406,000**	**224,000**	**3,489,000**
Off-road equipment	**1,074,000**	**392,000**	**361,000**	**102,000**	**1,929,000**
Marine vessels and rail	**212,000**	**116,000**	**61,000**	**99,000**	**488,000**
Built Environment	**9,560,000**	**2,807,000**	**1,544,000**	**1,407,000**	**15,318,000**
Natural gas	**4,158,000**	**1,600,000**	**1,296,000**	**499,000**	**7,553,000**
Commercial	1,437,000	461,000	379,000	114,000	2,391,000
Industrial	551,000	417,000	199,000	217,000	1,384,000
Residential	2,170,000	722,000	719,000	168,000	3,779,000
Electricity	**4,404,000**	**937,000**	**109,000**	**828,000**	**6,278,000**
Commercial	1,966,000	275,000	38,000	253,000	2,532,000
Industrial	235,000	68,000	8,000	3,000	314,000
Residential	2,203,000	594,000	64,000	572,000	3,433,000
Other sources	**997,000**	**270,000**	**139,000**	**80,000**	**1,486,000**
Fuel oil	396,000	67,000	48,000	38,000	549,000
Industrial processes	370,000	133,000	-	-	503,000
Residential propane	86,000	40,000	70,000	35,000	231,000
Commercial propane	145,000	29,000	22,000	7,000	203,000
Natural and Working Lands	**1,378,000**	**2,418,000**	**1,537,000**	**432,000**	**5,765,000**
Agriculture	84,000	32,000	182,000	5,000	303,000
Tree loss	1,294,000	2,386,000	1,355,000	428,000	5,463,000
Refrigerants	**1,271,000**	**514,000**	**465,000**	**154,000**	**2,404,000**
Refrigerants	1,271,000	514,000	465,000	154,000	2,404,000
Solid Waste & Wastewater	**534,000**	**380,000**	**331,000**	**131,000**	**1,376,000**
Solid waste generation and disposal	**463,000**	**344,000**	**299,000**	**112,000**	**1,218,000**
Compost	47,000	20,000	1,000	1,000	69,000
Landfill	417,000	323,000	298,000	112,000	1,150,000
Wastewater process emissions	**71,000**	**36,000**	**32,000**	**19,000**	**158,000**
Grand Total	**21,692,000**	**9,354,000**	**6,706,000**	**3,102,000**	**40,854,000**

Existing and Planned Large-Scale Projects and Programs

Many large-scale climate mitigation projects and programs are currently underway in the region as of 2025, demonstrating existing momentum and hard-won achievements. **Table 3** highlights specific planned and existing climate action projects and programs for each county and across the region, organized by sector.

Table 3. Existing and Planned Large-Scale Climate Projects and Programs in the Region

Built Environment Projects	
King County	• In 2023, Seattle Mayor Harrell introduced new Building Emissions Performance Standards aimed at reducing emissions from existing large buildings (over 20,000 square feet). The goal is a 27% reduction from the 2008 baseline by 2050, with compliance measured in five-year intervals. The first compliance deadline is set for 2031. • While several entities in King County already have building decarbonization and incentive programs, by 2030, local or regional programs to support building retrofits will be available to residential and commercial building owners in all King County jurisdictions and unincorporated King County. • King County's Energize Program installs heat pumps and other home efficiency upgrades in low- and moderate-income homes in King County. Seattle's Clean Heat Program reduces utility costs for eligible residents by converting oil furnaces to electric. Energy Smart Eastside provides heat pump rebates to residents of Bellevue, Issaquah, Kirkland, Mercer Island, Redmond, and Sammamish. • King County and Seattle continue to enact progressive commercial energy codes that ensure new buildings, renovations, and equipment replacements meet evolving high-performance standards. • King County established the C-PACER (Commercial Property Assessed Clean Energy and Resiliency) program with $80 million of project financing for energy efficiency and water conservation.
Kitsap County	• Kitsap County's 2024 comprehensive plan update includes a C-PACER (Commercial Property Assessed Clean Energy and Resiliency) Program to ensure lower-cost financing options are accessible and affordable to building owners for higher-efficiency electrified systems and resiliency improvements.

Pierce County	• In 2025, Pierce County received a Silver designation from the national SolSmart program due to exemplary work by the Planning & Public Works Department. They continue to strive for higher SolSmart designations, like Gold or Platinum, making it faster, easier, and more affordable for residents, businesses, and non-profit organizations to install solar. • In 2024, Pierce County was awarded a $2.3M Commerce grant to construct a community solar array on the closed Purdy landfill. The project will be operational in 2026. • Tacoma's 2024 Community Building Decarbonization Strategy outlines a comprehensive plan to phase out fossil-fuel appliances and decarbonize residential and commercial buildings by 2050. • In 2025, the Orange Grove Foundation in Tacoma was awarded a $135,993 state Clean Energy Communities Grant for installation of a solar microgrid and heat pump. • Pierce County's C-PACER (Commercial Property Assessed Clean Energy and Resiliency) program helps commercial, industrial, agricultural, and multi-family buildings become more efficient.
Snohomish County	• Snohomish County adopted Green Building Requirements requiring Leadership in Energy and Environmental Design (LEED) Gold certification for new County buildings and major remodels and completion of a life cycle cost assessment. • Snohomish County's C-PACER Program helps commercial, industrial, agricultural and multi-family buildings become more efficient. • Snohomish County administers the state's weatherization program helping low-income households with energy efficiency and decarbonizing upgrades. • Snohomish PUD provides several rebate programs for heat pumps, heat pump water heaters, weatherization, and qualifying Level 2 ENERGY STAR® certified connected electric vehicle chargers.
Puget Sound Energy	• Puget Sound Energy now provides the Port of Seattle and Sea-Tac Airport with renewable natural gas supply sourced from landfill methane, cutting about 1,291 metric tons of carbon emissions annually. • Launched in 2023, Puget Sound Energy's Home Electrification Pilot provided free energy assessments for gas-using homes, including income-qualified households receiving full subsidization for heat pump installations. The program ended in 2024.

Cross-county and Statewide	• In 2024, EPA awarded King County $50 million to decarbonize buildings across the four-county region as part of the CPRG program. Key targets include: ◇ Electrify and weatherize 600+ affordable housing units, 150 home-based care centers, and 55 community buildings ◇ Replace 300 gas water heaters with heat-pump models ◇ Update building codes for new construction • King and Pierce County participated in a cross-county home electrification campaign, Switch Is On, from January 2024-June 2025. • In 2019 the Clean Buildings Act was signed into law (expanded in 2022 and augmented in 2023), with the objective of lowering costs and pollution from fossil fuel consumption in the state's commercial and multifamily buildings, and campus district energy systems. The law also provides incentives to encourage building owners to make energy efficiency improvements earlier than required. • In 2022, the State passed legislation to update its three existing appliance standards with the objective of reducing long-term operating costs and cutting greenhouse gas emissions. • The Washington State Weatherization Assistance Program offers eligible residents cost-effective energy efficiency and related repairs to reduce energy bills and increase home health, safety and durability. • The State Home Electrification and Appliance Rebates Program (HEAR) facilitates the adoption of high-efficiency electric equipment among low- and moderate-income households and adult family homes in King and Pierce Counties.
Transportation Projects	
King County	• Implemented Free Youth Transit Pass, launched RapidRide H and G lines, improved connections to Link Light Rail, expanded flexible transit services such as MetroFlex and implemented spot improvements for transit speed and reliability. • By 2030, King County Metro will launch two new RapidRide bus lines, and plan for two additional lines as well as expanded trails for walking, biking, and rolling. • By 2030, King County will have 2000 Level 2 and 1800 direct current fast charge public charging ports. • Invested significant resources to support a transition to a zero-emission Metro bus fleet. Secured over $40 million of Federal Transit Administration funding to procure battery electric buses for Metro in South King County and put 40 battery electric buses into service with over 1.5 million miles traveled through the end of 2024.
Pierce County	• In 2024, Pierce Transit was awarded a $14.8M grant from the Federal Transit Authority to purchase new battery electric buses and install new charging equipment in line with its Zero Emission Bus Strategy. • The City of Tacoma launched its E-bike Rebate Pilot Program in Spring 2025 with the goal of supporting access to e-bikes and e-bike education.

Snohomish County	• Community Transit is testing a 40-foot battery-electric bus (BEB) and a 40-foot hydrogen fuel cell electric bus for comparison and aim to convert their fleet to 100% zero-emissions by 2044. • Everett Transit has made great strides in electrifying their bus fleet and installing enroute charging equipment in line with their Fleet Electrification Transit Plan. • By 2044, Snohomish County will transition its fleet of passenger cars and light duty pickups to zero-emissions vehicles, such as electric or renewably produced hydrogen, as feasible. • Snohomish County developed a subarea plan for areas that include two planned and one provisional Link Light Rail station. The County will make key transportation investments to ensure multimodal infrastructure supports connectivity to and from the light rail stations, as well as within the subarea. It will also implement land use changes and rezonings encouraging higher density development near the stations, promoting mixed-use development, and increasing walking and biking while reducing long-distance vehicle trips.
Cross-county and Ports	• Sound Transit is building 13 new and expanded light rail stations with service across the region, including: ◇ 1 Line extension to Federal Way with three new light rail stations (Kent Des Moines, Star Lake and Federal Way Downtown, anticipated by the end of 2025); ◇ 2 Line extension across Lake Washington (anticipated in early 2026); ◇ West Seattle (anticipated 2032) and Ballard (anticipated 2037-2039) extensions; ◇ T-line extension to add six new stations including Tacoma Community College (anticipated 2039); and ◇ New Stride S1, S2 and S3 bus rapid transit service. • In 2025, the Port of Seattle, the Northwest Seaport Alliance, and Seattle City Light released the Seattle Waterfront Clean Energy Strategy to expand electrical infrastructure to meet growing demands for shore power and other clean-energy equipment. Port of Seattle and Northwest Seaport Alliance are installing infrastructure on cruise and cargo ship terminals to allow ships to plug into the local electricity grid while docked. Port of Tacoma's South Harbor Electrification Roadmap similarly outlines plans and priorities for decarbonizing port activities in South Harbor. • Port of Seattle, Port of Tacoma, Northwest Seaport Alliance, and Vancouver Fraser Port Authority in British Columbia developed the 2024 Progress Report to the Northwest Ports Clean Air Strategy to reduce air and greenhouse gas emissions from shipping and port operations in the ports' shared airshed. Ongoing projects include increasing shore power use, adding cleaner cargo handling equipment, and improving building efficiency across port facilities. • Northwest Seaport Alliance's Zero Emission Drayage Program is facilitating a just and equitable transition to zero-emission drayage trucking for the 5,000 or so heavy-duty trucks that provide cargo-hauling services in and out of port terminals in Seattle and Tacoma. The program consists of a Zero Emission Drayage Incentive Program and the Decarbonizing Drayage Roadmap, a shared regional vision and strategy for zero-emission drayage developed by the Puget Sound Zero Emission Truck Collaborative.

	• The Port of Everett is investing in maritime infrastructure to modernize the seaport and support the movement of commerce, while also greening the supply chain. Port electrification efforts are underway to construct charging infrastructure at the Port's South Terminal, procure zero-emission yard trucks, and fund equipment that will enable Port tenants to use electric shore power for their operations. Additional work to modernize its international seaport include installing shore power infrastructure to power cargo operations and other maritime tenant uses at the Port's Pier 3. • Washington State Ferries will expand the fleet by converting six existing vessels to hybrid-electric power, building 16 new hybrid-electric vessels and adding shore charging to 16 terminals. They are actively building new hybrid diesel-electric vessels and planning for a full electric fleet by 2050, with a contract awarded in 2025 to build three new hybrid-electric ferries. The conversion of the Wenatchee ferry to hybrid-electric was completed in 2025 and the ferry is back in service. A new hybrid-electric ferry currently runs between Seattle and Bainbridge. Ecology continues to fund zero-emission transportation projects across the region through Volkswagen settlement funds including for electric buses, ferries, forklifts, charging infrastructure and more. • The Agency's EPA-funded yard truck electrification project offers incentives to replace diesel-powered yard trucks with all-electric models, and has replaced 20 yard trucks since 2019, with seven more trucks scheduled to be replaced by the end of 2026.
Solid Waste and Wastewater Projects	
King County	• Launched King County's Re+ Strategic Plan–an ambitious effort to reach zero waste and create a circular economy. Since then, several Re+ actions have been implemented including to establish the Re+ Community Panel; fund Re+ City Grants and Circular Economy Grants; collaborate to help pass impactful statewide organics legislation; and sign King County cities on to support the Re+ campaign. • By 2030, King County will provide food waste and organics curbside collection services to 75% of its unincorporated single-family customers. Additionally, all businesses generating at least 0.25 cubic yards of food waste per week will receive this service.
Pierce County	• In 2024, all Pierce County residents gained access to food waste composting through their yard waste bin. Previously, this service was limited to City of Tacoma residents.
Snohomish County	• In addition to the state-mandated requirements for monitoring and managing methane emissions from the closed landfills, and diverting organics from the waste stream, the County's Comprehensive Solid and Hazardous Waste Management Plan includes climate change and sustainability goals and policies. The Capital Facilities and Utilities Element of the Snohomish County Comprehensive plan adopted a policy requiring the County to implement measures to reduce greenhouse gas emissions and air pollution from its solid waste management operations.
Cross-county and Statewide	• In 2025, the state enacted the Recycling Reform Act, updating the state's recycling system, funding statewide collection services, reducing unnecessary packaging, and requiring the establishment of a producer responsibility organization, funded by manufacturers and consumer brands.

Natural and Working Lands Projects	
King County	• King County will plant, protect, and prepare 5 million trees between 2020 and 2030. Additionally, the County will work to prevent any net loss of forest cover in major watersheds in King County between 2025 and 2030. Through accelerated restoration of county-owned forest and natural areas, King County is on track to restore 2,000 acres by 2030. • King County protected 4,480 acres of forests, natural areas, and urban greenspace from 2016– 2024. • In 2021, King County developed the 30-year Forest Plan, including pilot projects and expanded capacity to focus on urban forests. • King County manages a unique program offering certified carbon credits for protecting urban and rural forests, making it the first government-led carbon-credit system of its kind. Over the past five years, this initiative has expanded tree canopy, sequestered carbon, enhanced wildlife habitat, and improved local water quality. • In 2023, Seattle enacted a tree protection ordinance with the goal of protecting tree canopy citywide and addressing inequities in tree canopy distribution in historically underserved communities. Seattle also won a $12.9M U.S. Forest Service grant to plant and maintain trees, combat extreme heat and climate change, improve access to nature, and support green careers for young people.
Kitsap County	• Kitsap County's 2024 comprehensive plan update includes a tree loss prevention strategy, calling on the County to develop and implement tree canopy regulations, standards, and incentives to protect existing tree canopy cover. These measures will also require replacing removed trees in areas slated for development, while addressing best management practices for wildfire prevention.
Pierce County	• In 2023-2024, Pierce County coordinated a steering committee of land conservation practitioners from local agencies and partners to create a Land Conservation Plan. The plan outlines the history of land use change in Pierce County, identifies conservation priorities, and explores funding and program opportunities to conserve high-priority lands. The plan was adopted by the Pierce County Council on June 24, 2025. • In the 2024 Comprehensive Plan Update, Pierce County set a goal to conserve up to 100,000 areas by 2044 and achieve a tree canopy cover of 40%.
Snohomish County	• Snohomish County's Healthy Forest and Land Conservation Strategy projects help to recruit and train volunteer stewards to lead forest restoration projects in priority parks, and protect high-conservation-value lands. • Snohomish County completed the Land Conservation Initiative to identify and conserve ecologically significant and strategic land areas that promote co-benefits. • Snohomish County adopted a new Urban Tree Canopy sub-element for the Natural Environment Element of the 2024 Comprehensive Plan. which contains a new goal, objectives, and policies for tree canopy in urban growth areas within unincorporated Snohomish County. It prioritizes preserving existing tree canopy, developing a management plan, and seeking recognition as an Evergreen Community.

Cross-county	• Puget Sound Info, a collaborative funded by Puget Sound Partnership, hosts the 2022-2026 Action Agenda Explorer which includes lists of strategies including sequestration of greenhouse gas emissions through ecosystem restoration (Strategy 19).
Refrigerants Projects	
Cross-county and Statewide	• Washington State passed two laws to address refrigerant emissions: ◇ House Bill 1112 (2019) banned new equipment using hydrofluorocarbons (HFC), directed Ecology to explore strategies for phasing out high-global warming potential (GWP) refrigerants, and required the state to prioritize low-GWP equipment in its purchasing decisions. ◇ House Bill 1050 (2021–2022) built on House Bill 1112 by setting maximum GWP thresholds for refrigerants, adding residential air conditioners and heat pumps to the list of regulated equipment, and establishing programs to reduce leaks and promote refrigerant recovery from large systems.

Part II. Where We Need to Go

"Life is like riding a bicycle. To keep your balance, you must keep moving." – Albert Einstein

The Puget Sound region is on the leading edge of climate action in the United States, but more work must be done to ensure a rapid and just transition to a zero-emissions future where all residents benefit. This section includes a summary of state and regional greenhouse gas reduction targets and goals, as well as greenhouse gas emission projection scenarios for 2030 and 2050. Every step we take to reduce climate impacts makes for stronger and healthier communities across the Puget Sound.

Greenhouse Gas Reduction Targets

Washington State Targets

In 2020, the Washington Legislature set new science-based greenhouse gas emission limits to combat climate change. Under the law, the state is required to reduce emissions in line with the following targets:

2020
reduce to 1990 levels.

2030
45% below 1990 levels.

2040
70% below 1990 levels.

2050
95% below 1990 levels and achieve net zero emissions.

Puget Sound Region Targets

The following science-based goals are established in the region. While there are small differences, they are all similar in their scale, ambition, and urgency:

Agency (and VISION 2050)
Reduce the region's greenhouse gas emissions to 50% below 1990 levels by 2030 (and ensure the region is on a trajectory to achieve the state goal of 95% below 1990 levels by 2050).

King County and King County Cities
Reduce greenhouse gas emissions, compared to a 2007 baseline, by 50% by 2030, 75% by 2040, and 95%, including net-zero emissions through carbon sequestration and other strategies, by 2050.

Kitsap County
Reduce greenhouse gas emissions to 80% below 1990 levels by 2050.

Pierce County
Reduce countywide greenhouse gas emissions as well as the County's operational emissions 45% below 2015 levels by 2030.

Snohomish County
Reduce greenhouse gas emissions to 50% below 1990 levels by 2030 and 80% below 1990 levels by 2050.

Greenhouse Gas Emissions Projections & Analysis

A core activity of the PSREA was to project emissions to target years, compare projected emissions to the target levels, and evaluate options for addressing any gaps. This process involved three scenarios:

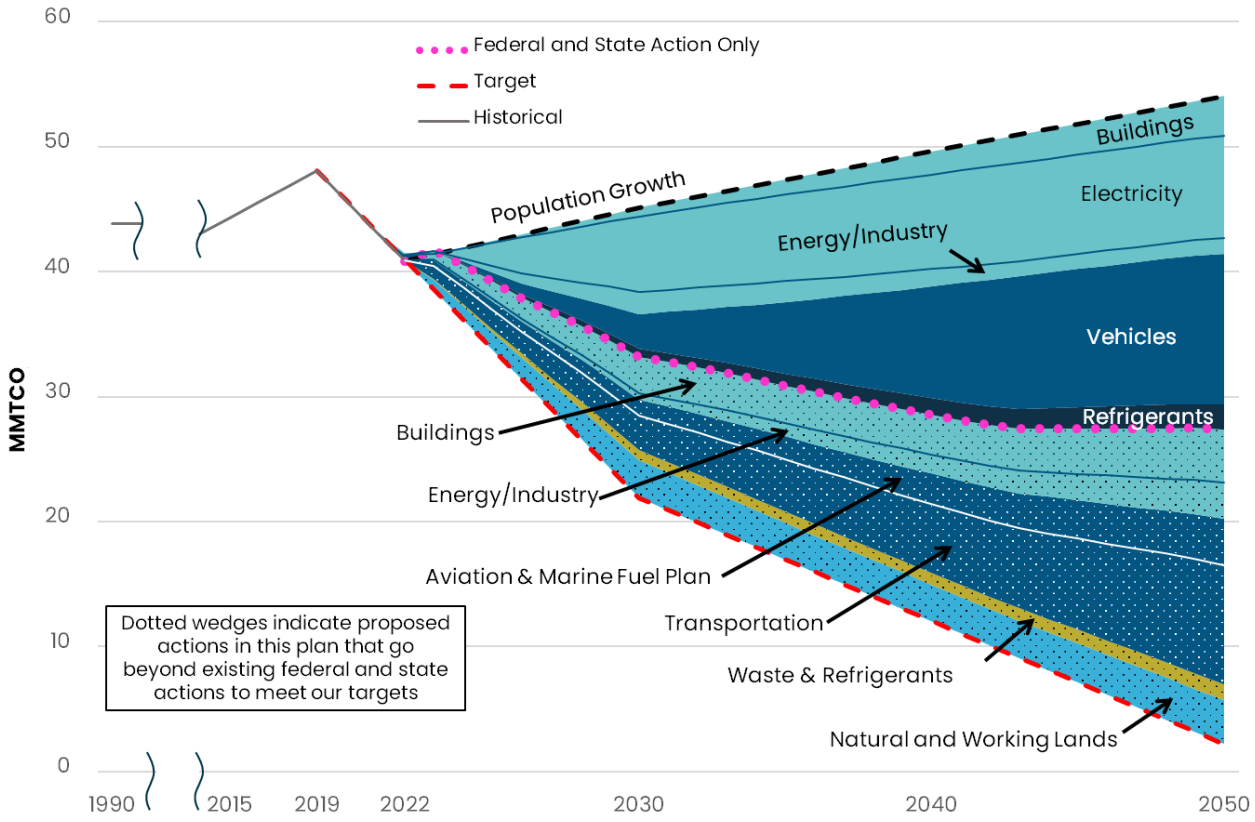
i) Calculating a "population growth only future" where current emissions rates and activities are held constant except for changes with forecasted population growth.

ii) Applying anticipated emissions reductions due to existing federal, state, and regional policies. This includes federal vehicle regulations, multiple state policies and regulations covering vehicles and energy, and regional transportation and land use policies. These existing policies bring projected regional greenhouse gas emissions down to about 24% below 1990 levels in 2030, and about 35% below 1990 levels in 2040 and 2050.

iii) Identifying the additional effort that would be needed in each sector to reach the state's greenhouse gas goals in 2030, 2040, and 2050.

The regional emissions projections and reduction targets are shown in **Figure 8**. The dotted areas with show the gap that must be filled with additional hypothetical actions to reach the goals, and do not represent actual forecasted values for any specific actions.

Figure 8. Forecasted Regional Greenhouse Gas Emissions and Reductions Under Three Scenarios



Part III. How We Will Get There

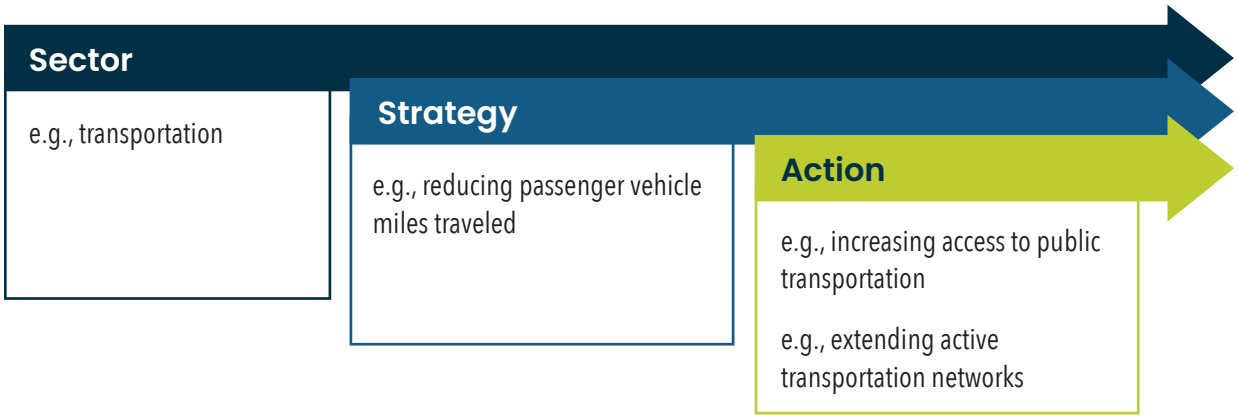
"Energy and persistence conquer all things." –Benjamin Franklin

Addressing the climate crisis will require urgent action that is supported by strong coordination at all levels of government. Many jurisdictions in the region have demonstrated bold climate leadership, yet meeting the challenge of climate change requires bolder actions, new examples of local leadership, deeper commitments to collaboration, and a willingness to take action whenever possible.

How to Read this Section

In the following analysis, greenhouse gas reduction activities are classified by *sector, strategy, and action*. These terms are defined as follows:

- **Sector:** The parts of the economy that generate greenhouse gas emissions. This climate plan includes six sectors:
  - Built Environment
  - Transportation
  - Solid Waste and Wastewater
  - Natural and Working Lands
  - Refrigerants
  - Consumption
- **Strategy:** a group of similar or interrelated greenhouse gas reduction actions that relate to a common topic.
- **Action:** a policy or program that reduces greenhouse gas emissions and/or enhances carbon sinks



For each sector we present the following information:

- Sector Overview: Presents a high-level description of the sector.
- Major Greenhouse Gas Emitting Activities and Reduction Opportunities: Identifies the major sources of greenhouse gas emissions and general opportunities for reducing emissions.
- Existing Policies and Efforts to Reduce Greenhouse Gas Emissions: Identifies the major policies and efforts to reduce emissions in the region.
- Cost-Benefits and Co-Pollutant Considerations: Identifies major co-benefits and other high-level considerations for decision-making.
- Summary of Feedback Heard at Community Workshops: Presents a summary of public input heard at workshops regarding implementation of climate strategies.

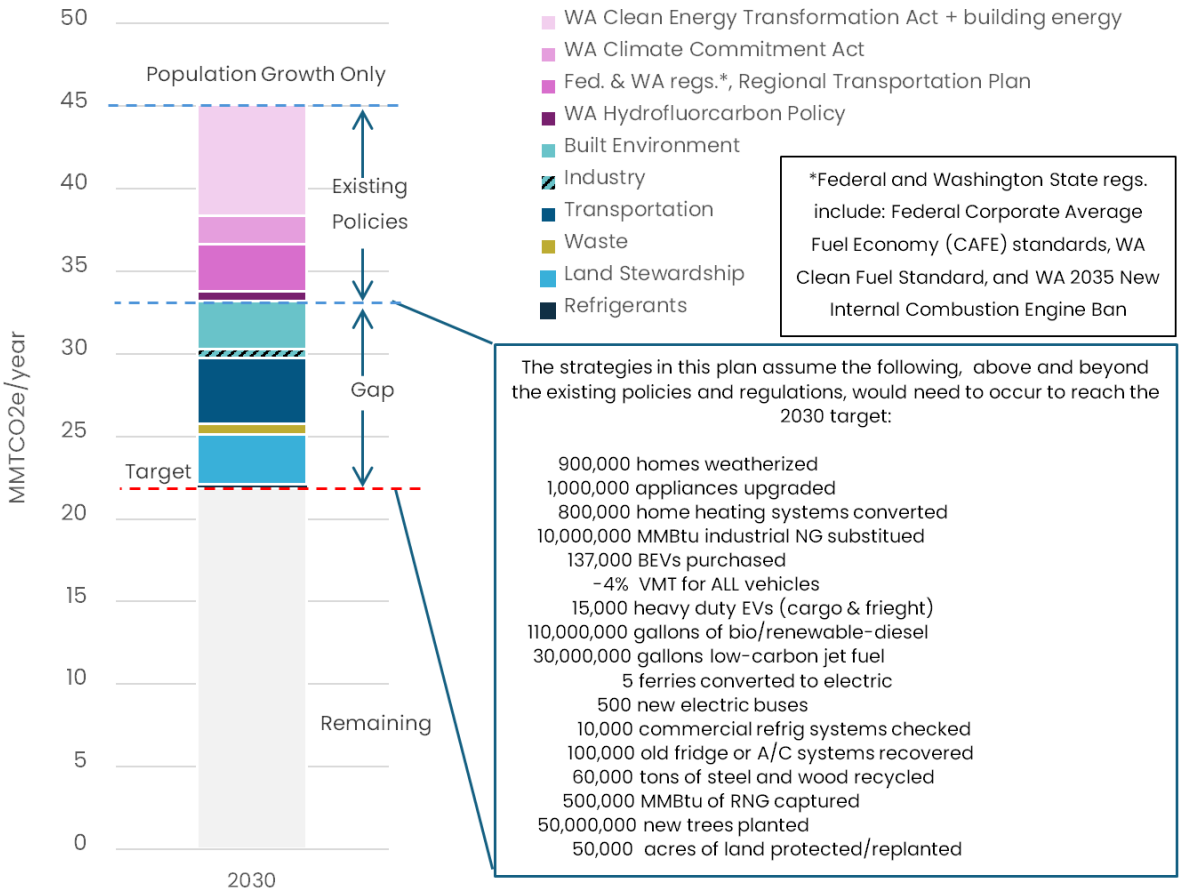
For each strategy, we describe the main actions that reduce greenhouse gas emissions. We then present tables containing data on the following four elements. Where it is not possible to accurately quantify data or costs, values have been labeled "unknown."

1. **Emission Reduction Potential:** The remaining greenhouse gas emissions that may need to be reduced to meet the proportional 2030/2050 target for the respective sector (see additional information below).
2. **$/ton:** The total cost per ton of greenhouse gas emissions reduced in 2030 if the strategy were implemented.
3. **Authority to Implement:** Identifies what level of government would have authority to implement a particular strategy.
4. **Co-benefits:** Identifies the types of co-benefit(s) expected from implementation of each strategy.

Understanding the Emission Reduction Potential of Strategies

The "Emission Reduction Potential" (Gap) is the difference between current greenhouse gas emissions and the 2030 or 2050 reduction targets for a sector. We estimated the maximum potential impact of each strategy by assuming the largest realistic scale of action. These estimates are not plans or predictions and don't guarantee results. They simply help decision-makers see which strategies could contribute most to meeting climate goals. **Figure 9** uses the assumptions for potential strategies from each sector to help meet the 2030 emission reduction target. Regionally, the implementation of actions to support this climate plan will need to be designed to achieve this level of ambition.

Figure 9. Potential Strategies and Assumptions to Meet the 2030 Climate Target



Our Pathway to 2050

Our region is progressing on an achievable and bold course to 2050. With just four years left, we recognize our 2030 target is challenging to reach without extraordinary acceleration. However, our estimates for 2030 lay the foundation for moving forward now to reach the 2050 target. Through collaboration, focus, and innovation, we can create a cleaner future.

Like the previous figure, **Figure 10** shows our 2050 target, the emission reductions we expect from current policies, and the additional impact of potential new projects. Many of these actions are scaled up versions of what we included for 2030. As a result, using our 2030 estimates as a starting point helps us shape projects that can bring the 2050 target within reach.

Figure 10. Potential Strategies and Assumptions to Meet the 2050 Climate Target

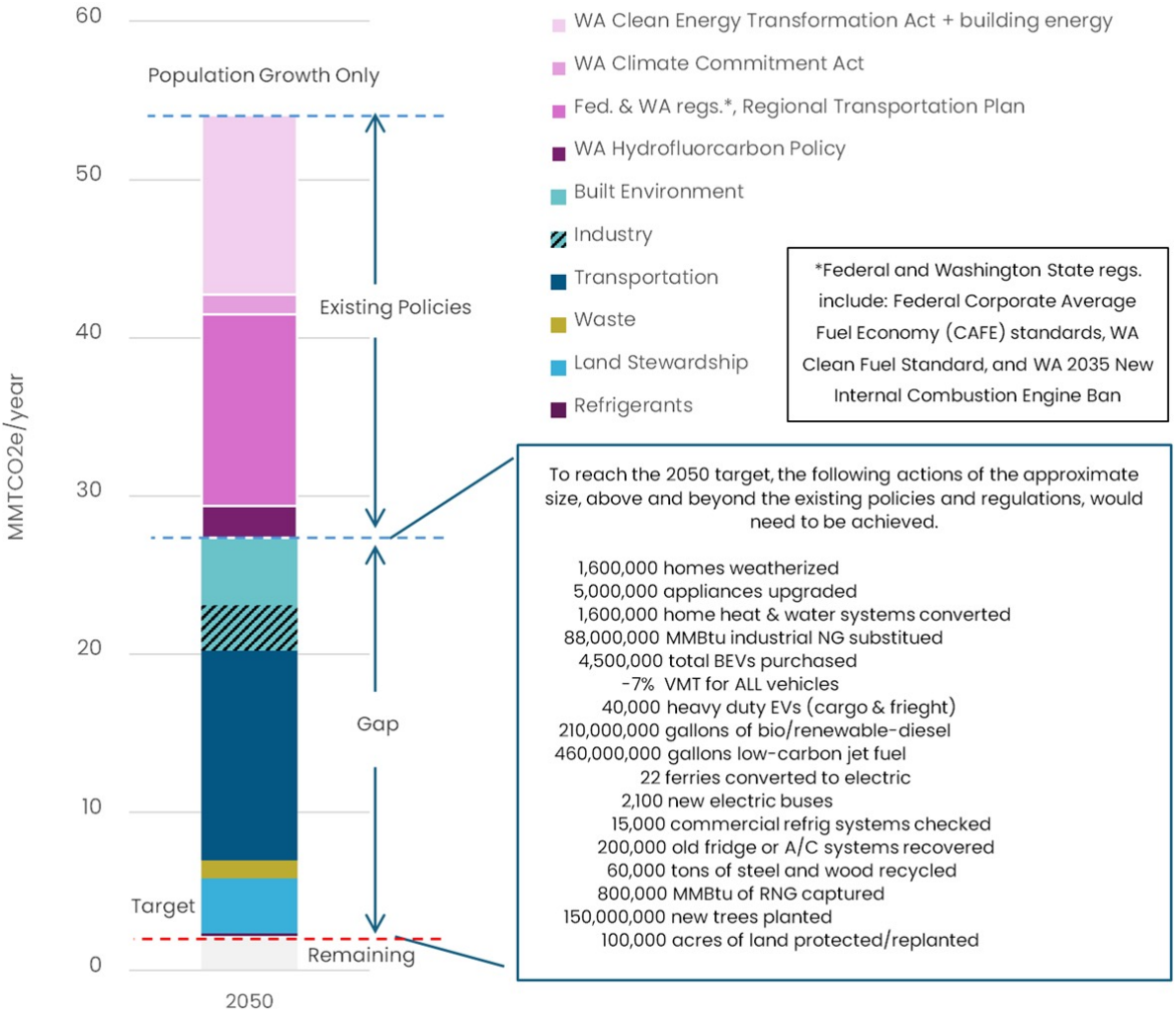


Table 4. Defines the Icons Used Throughout this Section to Indicate Authority to Implement and Co-benefits

Co-benefits		Authority to Implement	
Improves air quality, reduces air pollution.	Improves or protects the overall natural environment.	**Federal Government:** Congress, EPA, FAA, NHTSA	
Reduces pollution levels for overburdened communities.	Creates job opportunities or expands job sectors.	**State Level:** Washington State Legislature, Dept. of Ecology	
Saves money, reduces costs, or produces value.	Reduces consumption and promotes circular economy.	**Regional or multi-county:** PSCAA, PSRC	
Reduces or prevents health problems.		**Local:** County or city	
		Ports	

It should be noted that "authority to implement" can include the need to obtain future authority. For example, some of the actions that list the State Level as having the authority to implement could require authority to be granted by the State Legislature. For more information on obtaining authority, please refer to Appendix G.

Emission Reduction Strategies and Actions

This section compiles a comprehensive list of greenhouse gas reduction strategies and actions for all sectors of the economy, including estimates for the amount of emissions reductions they could achieve. We also include additional information to help jurisdictions make informed decisions about their climate planning efforts. Information on potential funding sources, implementation milestones, and metrics for tracking progress for strategies in each sector can be found in **Appendix G**.

Sector 1: Built Environment

Sector Overview

The built environment sector accounts for 38% of regional emissions and covers activities that take place in buildings as well as activities that support building operations. We divide this sector into three categories: residential, commercial, and industrial.

1. Residential includes single-family homes, duplexes, multiplexes, apartment buildings, and condominiums.
2. Commercial covers most other building types, many of which are not businesses. These include hospitals and healthcare facilities, government buildings, schools, community centers, retail stores, shopping centers, offices, hotels, gyms, grocery stores, restaurants, and warehouses.
3. Industrial includes buildings and facilities used for manufacturing, assembly, refrigerated storage, warehousing, refining, bulk storage, maintenance, and power or heat generation and distribution.

Major Greenhouse Gas Emitting Activities and Reduction Opportunities

Greenhouse gas emissions from this sector come from three primary types of activities:

1. Process heating, mostly for industry
2. Space heating and cooling
3. Residential water heating

Process heating primarily relies on natural gas combustion, or the combustion of other fossil fuels, mainly heavier oils, and some electricity.

Opportunities for greenhouse gas reduction in this sector generally come from reducing energy consumption, lowering the carbon intensity of heat sources, and upgrading to more energy-efficient, electric-powered appliances.

Existing Policies and Efforts to Reduce Greenhouse Gas Emissions

For industry, climate actions tend to vary more and are process-specific. In the short-term, industries can lower greenhouse gas emissions by switching from fossil fuels to renewable natural gas or bio-derived fuels. Long-term strategies may involve redesigning processes to electrify or use cleaner fuels, such as green hydrogen.

Many local jurisdictions implement programs and policies that reduce energy use and emissions in residential and commercial buildings. Major regional utilities (Puget Sound Energy, Seattle City Light, Tacoma Power and Snohomish Public Utility District) offer incentives for energy audits and appliance upgrades. Federal programs like the Low-Income Home Energy Assistance Program provide heating and weatherization assistance for low-income households. Local governments, including King County and the cities of Seattle, Tacoma, and Everett, also support related initiatives, including heat pump rebate programs for households converting from natural gas or oil. Likewise, Northwest Seaport Alliance and Port of Tacoma have set the goal of net-zero emissions from port-owned buildings and facilities by 2040.

At the state level, existing policies help shape future emissions reductions. The Clean Energy Transformation Act mandates that electricity provided to customers reaches net-zero emissions by 2030 and is fully non-emitting by 2045. After 2030, electricity will not be contributing to greenhouse gas sources in the built environment sector, including industry.

The Climate Commitment Act sets a declining emissions cap for natural gas providers and those industries who use natural gas. While the current trajectory under the Climate Commitment Act likely falls short of meeting the state and regional 2030 and 2050 climate goals, it marks an important starting point.

It is unclear how natural gas providers will meet their greenhouse gas reduction targets. To get there, they would likely need a mix of renewable natural gas substitution, energy efficiency improvements, fuel switching, and offset purchases. However, without more information available or new policies, we cannot predict specific actions or whether they can achieve the required reductions.

Washington's Buy Clean and Buy Fair law (2024) represents and important first step in reducing statewide emissions from building materials such as concrete, wood, and steel.

Cost-Benefits and Co-Pollutant Considerations

Costs and co-benefits vary for the built environment sector. Generally, newer, more efficient appliances and weatherization improvements have an upfront cost, but typically pay for themselves through reduced energy consumption, resulting in a small, or in some cases a negative, net cost/benefit ratio. The costs to decarbonize industrial process emissions vary widely based on the process. Some industrial process improvements may be able to recover their costs with lifetime fuel cost savings but for some processes the capital costs are currently much higher.

Most residential projects offer several benefits: lifetime energy cost savings, better appliance performance, enhanced indoor comfort, and, in many cases, the added benefit of cooling from heat pumps during hot weather. Health benefits from building weatherization include improved indoor air quality, and protection from extreme heat and cold events. Non-emitting appliances can also improve indoor air quality. Switching from natural gas cooking stoves to electric improves indoor air quality by reducing nitrogen oxides and fine particle pollution. Changing appliances that already vent to the outside does not result in a substantial change in indoor air quality. Residential projects are impactful for co-benefits because people spend the majority of their time in indoor environments.

Ambient air quality co-benefits from industrial greenhouse gas reductions vary widely based on location and process. Facilities that switch from fossil to low-carbon fuels can reduce fine particle pollution, nitrogen oxides, and air toxics emissions. In considering strategies for the built environment section, jurisdictions should emphasize solutions that preserve affordable housing, reduce energy bills for low- and moderate-income residents and families, and ensure upgrade costs are not passed on to tenants. Financial tools such as loan loss reserve programs or other financing mechanisms that make it easier for homeowners to make upgrades can also be considered.

Summary of Feedback Heard at Community Workshops

- Education and Outreach: Participants noted that educating the public about financial incentives, energy cost savings, and opportunities to reduce emissions at the neighborhood level was seen as essential to increasing participation in building decarbonization efforts. Participants recommended engaging with building owners and managers for multifamily homes and apartments to ensure improvements beyond single-family homes.
- Incentives: Participants recommended providing incentives for solar panel installations and battery storage systems to support residential and commercial clean energy use.

- **Technical Assistance:** Participants recommended creating "one-stop-shops" for technical support on building weatherization and appliance upgrade programs. They also recommended support for training and workforce development for building material reuse and recycling programs.
- **Improved Standards:** Participants recommended improving standards for construction and building materials to reduce the amount of repair and remodeling needed and ensure new buildings are more durable. They also recommended streamlined permitting processes, including pre-approved accessory dwelling unit (ADU) designs and modular "plop-on" homes.

Built Environment Strategies and Actions

Strategy 1.1 Build Low-Carbon New Buildings

To help achieve the region's climate goals, this strategy assumes that the vast majority of new housing units built in the region (165,000 by 2030 and an additional 200,000 by 2050) have fully non-greenhouse gas emitting space and water heating systems. The implementation of actions to support this strategy will need to be designed to achieve this level of ambition.

Major Emitting Activities

- Space and water heating
- Other appliances

Existing Policies and Efforts

- Washington State Energy Code (RCW 19.27A)
- Building Emissions Performance Standards (e.g. Seattle)

Actions

a. Strengthen building codes
b. Provide education and outreach for new commercial construction
c. Provide education and outreach for new residential construction

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)	2030 $ per ton*	Authority to Implement
	420,000/930,000	300	

Co-benefits

Other Considerations

- Less combustion reduces air pollution
- Less pollution and improved indoor air quality can reduce health impacts
- Efficiency standards can reduce ongoing and lifetime costs

* Cost for 2030 considers only the capital cost assuming $15,000 marginal cost per house, and doesn't count reduced heating and cooling costs which can bring the net costs to <$0/ton (a net savings). Due to significant uncertainty, costs for 2050 are not quantified.

Action Descriptions

- **Action 1.1a.** Strengthen building codes: Strengthen and revise commercial building codes to require/limit installed equipment, construction materials, or construction methods such that greenhouse gas emissions would be reduced overall. Examples include code revision that requires, for new construction, some amount of space or water heating supplied from non-greenhouse gas emitting devices, and employing electric appliance replacement requirements at end of life in existing buildings. Incentives for voluntary installation of high efficiency equipment that is above code could help pave the way for subsequent code cycles requirements. Embodied construction emissions (from producing the materials) are addressed in Strategy 1.6.
- **Actions 1.1b-c:** Provide education and outreach for new commercial and residential construction: Provide education and outreach for developers and builders of new construction, apart from code revisions. Examples include promoting ease of use, versatility, or cost savings for changing to lower emitting methods or equipment.

Estimating Emissions

Reductions from this strategy are represented by the number of new housing units that have zero-emission space and water heating systems.

- The Emission Reduction Potential for 2030 assumes the vast majority of new housing units built in the four-county jurisdiction (165,000) between now and 2030 have fully non-greenhouse gas emitting space and water heating. The Strategy Total was calculated using:
  - The assumed number of houses built that are non-greenhouse gas emitting (for space and water heating), multiplied by the average energy use per housing unit.
- The Emission Reduction Potential for 2050 assumes an additional 200,000 new housing units built in the region (365,000 total) are fully non-greenhouse gas emitting. This means nearly all new housing built after 2030 is non-emitting. Emissions calculations are identical to 2030 but use the larger values corresponding to 2050.

Strategy 1.2 Reduce Energy Use In Existing Buildings

To help achieve the region's climate goals, this strategy assumes 900,000 homes are weatherized, 1 million appliances are upgraded, and 5 million lightbulbs are changed out by 2030. Quantification for 2050 assumes 1.6 million homes (total) have been weatherized and 5 million appliances (total) have been upgraded. The implementation of actions to support this strategy will need to be designed to achieve this level of ambition.

Major Emitting Activities

- Space and water heating
- Other appliances

Existing Policies and Efforts

- Seattle Commercial Energy Codes
- Clean Buildings Act (RCW 19.27A)
- Building Emissions Performance Standards (e.g. Seattle)

Actions

a. Weatherize existing buildings
b. Upgrade appliances
c. Upgrade lighting
d. Provide training, coaching, audits and advisors
e. Support utility demand response programs
f. Develop residential point-of-sale energy disclosures and performance standards
g. Develop building emissions performance standards

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)	2030 $ per ton*	Authority to Implement
	580,000/1,200,000	<0	

Co-benefits

Other Considerations

- Can reduce pollution in overburdened communities
- Efficiency can produce net lifetime savings and lower costs for low-income households
- Improved indoor air quality can reduce health impacts

***** Costs for 2030 includes ongoing cost savings which typically exceed upfront costs (net negative). Due to significant uncertainty, costs for 2050 are not quantified.

Action Descriptions

- **Action 1.2a.** Weatherize existing buildings: Implement weatherization and weatherization plus health programs, with measures including sealing leaks, replacing windows, upgrading wall, ceiling/attic, crawlspace insulation, or other minor upgrades to reduce heat loss.
- **Action 1.2b.** Upgrade appliances: Implement appliance electrification programs for residential and commercial buildings, particularly appliances using natural gas, heating oil, and propane, with energy-efficient electric equipment (induction cooktops, clothes washers and dryers, heat-pump space heating and cooling systems, heat pump water heaters).
- **Action 1.2c.** Upgrade lighting: Replace older light bulbs with long-life LED bulbs with equivalent light output.
- **Acton 1.2d.** Provide training, coaching, audits, and advisors: Develop public training sessions, "train the trainer" webinars, free energy audits for homes and businesses, web-based apps to assist in estimating costs and savings, and others.
- **Acton 1.2e.** Support utility demand response programs: Support utility demand response programs to lower residential and commercial energy use in existing buildings.
- **Action 1.2f.** Develop residential point-of-sale energy disclosures and performance standards: Develop information disclosures and performance standards at the time of sale for residential appliances to increase transparency around energy efficiency features and encourage the purchase of more efficient appliances.
- **Action 1.2g.** Develop building emissions performance standards: Develop building performance standards for commercial and multi-family buildings to reduce energy use and greenhouse gas emissions from building operations.

Estimating Emissions

Reductions from this strategy are represented by summing three elements: weatherization, appliance upgrades, and lighting upgrades.

- The Emission Reduction Potential for 2030 assumes that 900,000 homes are weatherized, 1 million appliances are upgraded, and assumes 5 million lightbulbs are changed out. The Strategy Total was calculated using:
  - Weatherization assumes 18% reduction in natural gas use per house.
  - Conversion to higher efficiency appliances is based on Energy Star prediction of annual savings per appliance for refrigerator, dishwasher, clothes dryer.
- The Emission Reduction Potential for 2050 assumes 1.6 million homes (total) have been weatherized and 5 million appliances (total) have been electrified. This corresponds to about 75% of all houses or housing units, and the vast majority of natural gas devices. Emissions calculations are identical to 2030 but use the larger values corresponding to 2050.

Strategy 1.3 Electrify or Decarbonize Existing Buildings

To help achieve the region's climate goals, this strategy assumes that, by 2030, 800,000 residential space heaters and 100,000 residential water heaters are converted to electric, along with the entire commercial water heater sector. Quantification for 2050 assumes 1,600,000 home heat and water systems (total) have been converted to electric along with all commercial water heating. The implementation of actions to support this strategy will need to be designed to achieve this level of ambition.

Major Emitting Activities

- Space and water heating
- Other appliances

Existing Policies and Efforts

- Seattle Commercial Energy Codes
- Clean Buildings Act (RCW 19.27A)
- Building Emissions Performance Standards (e.g. Seattle)

Actions

a. Upgrade appliances
b. Support market development and promotion for electric appliances
c. Develop renewable electricity generation and storage systems
d. Support battery storage systems and technologies
e. Provide education, outreach, and ambassadors for appliances and coordination around natural gas options
f. Develop building emissions performance standards
g. Develop building decarbonization plans

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)	2030 $ per ton*	Authority to Implement
	1,900,000/4,900,000	350	

Co-benefits

Other Considerations

- Can significantly lower costs for low-income households
- Less combustion reduces indoor and outdoor air pollution
- Efficiency can produce net lifetime savings
- Can reduce air pollution in overburdened communities, improve indoor air quality, and reduce health impacts

* Cost for 2030 considers only the capital cost, assuming $20,000 marginal cost per housing unit. It excludes reduced heating and cooling costs, which would lower the net cost for households and businesses. Due to significant uncertainty, costs for 2050 are not quantified.

Action Descriptions

- **Action 1.3a.** Upgrade appliances: Implement appliance electrification programs for residential and commercial buildings, particularly appliances using natural gas, heating oil, and propane, with energy-efficient electric equipment (induction cooktops, clothes washers and dryers, heat-pump space heating and cooling systems, heat pump water heaters).
- **Action 1.3b.** Support market development and promotion for electric appliances: Support market development strategies to increase desirability of electric appliances and reduce purchasing hesitancy in order to drive increased adoption.
- **Action 1.3c.** Develop renewable electricity generation and storage systems: Develop smaller scale (e.g. building solar) electricity generation and storage systems to reduce grid electricity need and make electrification cheaper.
- **Action 1.3d.** Support battery storage systems and technologies: Support emerging battery storage technologies to create a resilient grid including small modular reactors, bioenergy, and hydrogen.
- **Action 1.3e.** Provide education, outreach, and ambassadors for appliances and coordination around renewable natural gas options: Provide education and outreach programs to promote electric devices or renewable natural gas options such as subsidizing renewable natural gas injection or other future approaches for commercial and residential buildings.
- **Action 1.3f.** Develop building emissions performance standards: Develop building performance standards for commercial and multi-family buildings to reduce energy use and greenhouse gas emissions from building operations.
- **Action 1.3g.** Develop building decarbonization plans: Develop state- or municipal-owned building decarbonization plans and fund capital improvements and electrification upgrades to meet plan outcomes.

Estimating Emissions

Reductions from this strategy are represented by summing two elements: replacement of residential natural gas space and water heating with electric heating, and replacement of commercial natural gas water heating with electric heating.

- The Emission Reduction Potential for 2030 assumes 800,000 residential dwelling units and 100,000 residential water heaters are converted to electric, along with the entire commercial water heater sector, which is estimated to be 43 million therms per year, scaled from natural averages. The Strategy Total was calculated using:
  - Replacement of existing natural gas space heating and water heating with electric powered heating for residential buildings, which assumes 365 and 175 therms (of natural gas/dwelling unit/year), respectively.
  - No basis or subunit (e.g. per person, per building, per square foot) has been identified to scale this action for scenario exploration for commercial buildings, so it is assumed to be 0.
- The Emission Reduction Potential for 2050 assumes 1.6 million home heat and water systems (total) have been converted to electric along with all commercial water heating. This corresponds to virtually all home space- and water-heating. Emissions calculations are identical to 2030 but use the larger values corresponding to 2050.

Strategy 1.4 Increase Solar Adoption

To help achieve the region's climate goals, this strategy assumes new solar installations of 10,000 kW by 2030, and 40,000 kW (total) by 2050. The implementation of actions to support this strategy will need to be designed to achieve this level of ambition.

Major Emitting Activities

- Electricity generation, especially during peak demand

Existing Policies and Efforts

- WA Clean Energy Transformation Act (RCW 19.405)
- WA Climate Commitment Act (RCW 70A.65)

Actions

a. Promote solar for government buildings, public schools, covered surface parking, etc.
b. Promote solar for brownfields
c. Promote solar for affordable housing buildings
d. Promote solar for warehouses or commercial buildings
e. Reduce net metering barriers

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)	2030 $ per ton*	Authority to Implement
	24,000/94,000	<60	

Co-benefits	Other Considerations
	• Solar with storage increases resilience and supports the grid • Can improve ecological health of brownfields • Creates demand for solar installation and maintenance jobs • Can reduce electricity costs

* Cost for 2030 considers only the upfront costs. Ongoing cost savings could exceed upfront costs (net negative). Due to significant uncertainty, costs for 2050 are not quantified.

Action Descriptions

- **Action 1.4a.** Promote solar for government buildings, public schools, covered surface parking, etc.: Target government buildings, public schools and unused open or public spaces for installation of solar and energy storage systems to increase renewable power supply and reduce reliance on electricity from fossil fuels.
- **Action 1.4b.** Promote solar for brownfields: Target brownfields (former/current contaminated sites) for installation of solar and energy storage systems to increase renewable power supply and reduce reliance on electricity from fossil fuels.
- **Action 1.4c.** Promote solar for affordable housing buildings: Target affordable housing buildings for solar projects to increase renewable power supply and reduce reliance on electricity from fossil fuels.
- **Action 1.4d.** Promote solar for warehouses or commercial buildings: Target warehouses or commercial buildings with roof area greater than a given threshold for solar projects to increase renewable power supply and reduce reliance on electricity from fossil fuels.
- **Action 1.4e.** Reduce net metering barriers: Reduce or eliminate state barriers for access to net metering by electricity customers, leveraging net metering benefits to encourage the adoption of solar power.

Estimating Emissions

Reductions from this strategy are represented by estimating the amount (kW) of new solar installed.

- The Emission Reduction Potential for 2030 assumes 10,000 kW of new installed solar. Because of the Clean Energy Transition Act, it is unclear if this value is above-and-beyond existing regulations or is simply fulfilling it. The Strategy Total was calculated using:
  - Assumed nominal kW of the new solar installed and scaling it by an annual kWh production factor from NREL (see Appendix B for details).
  - The kWh produced is converted to grams of carbon dioxide equivalent emitted based on the current emission factors of electricity delivered to the plug in Washington (Ecology GREET model).
- The Emission Reduction Potential for 2050 assumes a total of 40,000 kW of new installed solar. Similar to the 2030 values, since the grid is required to be carbon neutral by 2030 and fully non-emitting by 2045, it is unclear if this strategy would result in additional emission reductions beyond existing Clean Energy Transition Act requirements. Emissions calculations are identical to 2030 but use the larger values corresponding to 2050.

Strategy 1.5 Reduce Industrial Emissions

To help achieve the region's climate goals, this strategy assumes 10 million MMBtu (10 trillion Btu) of natural gas are converted to non-emitting power by 2030, and an additional 88 million MMBtu (88 trillion Btu, 98 trillion total) are converted by 2050. The implementation of actions to support this strategy will need to be designed to achieve this level of ambition.

Major Emitting Activities

- Process heating

Existing Policies and Efforts

- WA Climate Commitment Act (RCW 70A.65)
- Northwest Ports Clean Air Strategy and associated 5-Year Clean Air Implementation Plan

Actions

a. Support low-emission technology upgrades
b. Establish greenhouse gas auditors/consultants
c. Create low-emission ratings/awards for businesses
d. Require governments to use low-carbon businesses when feasible
e. Provide education, outreach, and ambassadors for appliances and coordination around renewable natural gas options

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)	$ per ton	Authority to Implement
	530,000/4,700,000	~50*	

Co-benefits

Other Considerations

- Less air pollution
- Lower pollution can reduce health impacts
- Can lower pollution in overburdened communities

*For 2030 costs this value reflects lower temperature processes, which are close to net payback at current conditions due to fuel savings. Cost per ton could be substantially higher for some industrial processes. Due to significant uncertainty, costs for 2050 are not quantified.

Action Descriptions

- **Action 1.5a.** Support low-emission technology upgrades: Support low-emission technology upgrades for industrial sources to accelerate transitions and drive emission reductions. This could include electrification, green hydrogen, fuel cells, renewable fuels, etc.
- **Action 1.5b.** Establish greenhouse gas auditors/consultants: Establish greenhouse gas auditors and consultants who work with industrial sources to develop strategies for reducing emissions, costs, and co-pollutants.
- **Action 1.5c.** Create low-emission ratings/awards for businesses: Create or adopt a greenhouse gas rating award to identify low-emitting businesses and increase their appeal to environmentally conscious consumers.
- **Action 1.5d.** Require governments to use low-carbon businesses: Require government purchasing and contracting to seek out businesses and suppliers with the best emission profiles, or better than a threshold, to reduce supply chain emissions.
- **Action 1.5e.** Provide education, outreach, and ambassadors for appliances and coordination around renewable natural gas options: Provide education and outreach programs to promote electric devices or renewable natural gas options such as subsidizing renewable natural gas injection or other future approaches for industrial buildings and processes.

Estimating Emissions

Reductions from this strategy are represented by estimating the amount (MMBtu) of natural gas converted to non-emitting power.

- The Emission Reduction Potential for 2030 assumes 10 million MMBtu (10 trillion Btu) are converted to non-emitting power. This strategy assumes that most industrial greenhouse gas emissions are due to the combustion of natural gas or other fossil fuels for process heating. These fuels are replaced with electricity or other zero (or near-zero) emissions energy sources. The Strategy Total was calculated using:
  - Assumed total MMBtu of energy from fossil fuels (natural gas or other liquid fuels) and multiplying the appropriate greenhouse gas emissions factor per MMBtu. See Appendix C for more details.
- The Emission Reduction Potential for 2050 assumes an additional 88 million MMBtu (88 trillion Btu, 98 trillion Btu total) are converted to non-emitting power. This corresponds to >90% of the industrial process heating sector. Emissions calculations are identical to 2030 but use the larger values corresponding to 2050.

Strategy 1.6 Reduce Embodied Carbon From Building Materials

To help achieve the region's climate goals, this strategy assumes the use of 30,000 tons of both low-carbon steel and low-carbon concrete annually in 2030, increasing to 120,000 tons of low-carbon concrete and steel produced annually by 2050. The implementation of actions to support this strategy will need to be designed to achieve this level of ambition.

Major Emitting Activities

- Steel production from ore
- Concrete production
- Manufacturing other materials (gypsum, brick, etc.)

Existing Policies and Efforts

- Washington Buy Clean Buy Fair (RCW 39.116.020)

Actions

a. Develop building codes
b. Develop environmental product declarations

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)	2030 $ per ton	Authority to Implement
	46,000/190,000	170*	

Co-benefits	Other Considerations
	• Can reduce pollution in communities near producers

*Costs for 2030 are based in industry estimates of carbon capture with existing processes. Due to significant uncertainty, costs for 2050 are not quantified.

Actions Descriptions:

- **Action 1.6a.** Develop building codes: Develop building codes that would require or promote obtaining materials from low-emissions producers, primarily steel and concrete.
- **Action 1.6b.** Develop environmental product declarations: Develop environmental product declarations that encourage take-back requirements for manufacturers and include greenhouse gas emissions from material production to support market comparisons and inform purchasing decisions with a focus on low-emission materials.

Estimating Emissions

Reductions from this strategy are represented by estimating the amount of steel and concrete that is replaced by (or sourced from) low-carbon sources (i.e., uses carbon capture or a low-carbon energy source).

- The Emission Reduction Potential for 2030 assumes that 30,000 tons of low-carbon steel and 30,000 tons of low-carbon concrete are used annually in 2030. The Strategy Total was calculated using:
  - Tons of steel replaced, scaled by the difference in emission factors (per ton) for conventional steel vs low-carbon steel.
  - Tons of conventional concrete replaced with concrete that is produced with a full carbon capture method. Emissions are the median emission factor for concrete scaled by the amount of concrete. Note: Since this strategy was not part of our previous inventory as it is Scope 3, we don't have a clear framework to scale the size of the activity.
- The Emission Reduction Potential for 2050 assumes 120,000 tons each of low-carbon concrete and steel are produced annually for construction in the four-county region. This is about 10-20% of estimated current concrete and steel use in the Puget Sound region. Emissions calculations are identical to 2030 but use the larger values corresponding to 2050.

Strategy 1.7 Cross-Cutting Built Environment Actions

The actions in this strategy support or enable other strategies in the built environment sector. Implementation of these actions will help to achieve the region's climate goals.

Actions

a. Develop financing programs for decarbonization
b. Streamline permitting for construction of electric generation, transmission and storage projects while maintaining adequate timelines for meaningful community engagement
c. Develop air quality standards for appliances

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)*	2030 $ per ton	Authority to Implement
	unknown	unknown	

* The actions in this strategy help to support or enable other strategies in the built environment sector. We are not able to quantify emission reductions nor cost per ton from this strategy.

Action Descriptions

- **Action 1.7a.** Develop financing programs for decarbonization: Develop or support financing mechanisms (e.g. C-PACER) that would make it easier for builders or building owners to finance emission reduction projects.
- **Action 1.7b.** Streamline permitting for construction of electricity generation, transmission and storage projects: Implement new policies to reduce permitting delays for the construction of clean energy generation and transmission capacity, long-duration battery storage and other emission reduction projects while maintaining adequate timelines for meaningful community engagement.
- **Action 1.7c.** Develop air quality standards for appliances: Develop health, safety, and air quality standards for appliances including space and water heating, kitchen appliances, and cooking appliances to reduce public health risk and incentivize non-natural gas devices or increased efficiency.

Estimating Emissions

The actions in this strategy help to support or enable other strategies in the built environment sector. We are not able to quantify emission reductions from this strategy.

Sector 2: Transportation

Sector Overview

The transportation sector accounts for 39% of regional emissions and covers activities involved in the service of moving people or goods, as well as developing the associated infrastructure needed to do so. We divide this sector into two categories: on-road sources and off-road/non-road sources of emissions.

- On-road sources consist primarily of passenger vehicles and small trucks, medium-duty vehicles and heavy-duty freight trucks, along with a smaller number of buses, motorcycles, and other miscellaneous vehicles.
- Off-road and non-road sources cover mobile equipment, aviation, and marine transport.
    - Mobile equipment includes construction machinery, farm vehicles, logging equipment, lawn and garden equipment, portable generators, and movable industrial machines such as forklifts and saws.
    - Aviation is dominated by commercial passenger flights from Sea-Tac Airport, but also includes general aviation, private aircraft, and smaller volumes of commercial passenger traffic from Seattle Paine Field International Airport in Everett, and King County International Airport in south Seattle and Tukwila.
    - Rail includes diesel-powered locomotives used for trains and switchers for freight or passenger transportation.
    - Marine sources include passenger ferries and cruise ships, cargo ships, tugs, harbor vessels, and the cargo-handling equipment used at port berths.

Major Greenhouse Gas Emitting Activities and Reduction Opportunities

The transportation sector produces greenhouse gas emissions primarily through the combustion of petroleum-based fuels.

- On road sources:
    - On-road vehicles, such as passenger cars and small trucks, medium-duty vehicles and heavy-duty freight trucks, generate almost all their greenhouse gas emissions by burning gasoline and diesel. A small number of vehicles use natural gas, with an even smaller subset that use landfill gas.
- Off road/non-road sources:
    - Mobile equipment–including construction machinery, farm and logging vehicles, lawn and garden tools, portable generators, and industrial machines like forklifts and saws–relies mainly on diesel and heavier petroleum fuels. Gasoline use is more common in lawn and garden tools, while natural gas and propane use remains minimal.
    - Aviation emissions come almost entirely from petroleum-derived jet fuel, with general aviation (using aviation gasoline or "avgas") contributing a smaller share.
    - For rail, most train locomotives use diesel engines for power generation and thus rely on diesel fuel.
    - Marine sources–passenger and cargo ships, tugs, harbor vessels, and cargo-handling equipment at ports–also rely heavily on fossil fuels.

Opportunities for greenhouse gas reductions in this sector generally come from replacing or upgrading on- and off-road vehicles and equipment to electric or renewable fuels (to reduce or eliminate fossil fuel use), replacing petroleum-based fuels with low-carbon alternatives, fuel cells and green hydrogen, and mode shift towards low-carbon transportation alternatives.

Existing Policies and Efforts to Reduce Greenhouse Gas Emissions

Several policies already target greenhouse gas reductions in the transportation sector:

- For on-road vehicles, federal Corporate Average Fuel Economy (CAFE) standards continue to improve fuel efficiency in light-duty and heavy-duty vehicles. These improvements will persist as fleets turn over. Washington State has adopted California's more stringent vehicle emission standards and Zero-Emission Vehicle mandate. The Zero-Emission Vehicle mandate requires an increasing fraction of new vehicles sold in the state each year to be zero-emission vehicles, reaching 100% by 2035.
- The state also adopted (and recently strengthened) a Clean Fuel Standard program that requires fuel suppliers to lower the carbon intensity of fuels over time. At the state level, the Clean Fuel Standard program reduces greenhouse gas emissions pollution from transportation by reducing emissions from the production and supply of transportation fuels.
- The Regional Transportation Plan and VISION 2050 outline actions to support sustainable growth while reducing greenhouse gas emissions. Key strategies include:
  - Expanding transit infrastructure (light rail, commuter rail, passenger only ferry, bus rapid transit and local bus systems) and safe infrastructure for biking and walking.
  - Aligning land use and growth patterns to encourage transit use and active transportation to reduce vehicle miles traveled.
  - Investing in charging infrastructure to accelerate the transition to electric vehicles.
- For off-road, marine, and aviation sectors, few existing regulations match the scope of federal and state on-road standards. However, international bodies have set non-binding greenhouse gas reduction targets: the International Maritime Organization for marine, and the International Civil Aviation Organization for aviation. While not enforceable, these targets guide national-level action. Federal New Source Performance Standards also help limit off-road emissions.
- The Northwest Ports Clean Air Strategy has a goal of phasing out all emissions from seaport activities by 2050 or sooner. Through the five-year Clean Air Implementation Plans they are working systematically, in partnership with a wide array of partners and stakeholders, to advance that goal. Port activities include transiting and docked ships, cargo handling equipment, and local freight haulers.
- The Port of Everett, Maritime Blue and others launched the Sustainable Maritime Fuels Collaborative, which aims to accelerate the availability, affordability, and deployment of sustainable maritime fuels, nd low- and zero-emission vessels in the Pacific Northwest.
- The Sustainable Advanced Fuels program is an outgrowth of Sustainable Aviation Fuels Northwest (SAFN), a process created by The Boeing Company, Alaska Airlines, Portland International Airport, Seattle-Tacoma International Airport, Spokane International Airport, Washington State University, and Climate Solutions to develop sustainable and economically viable aviation biofuels in the Northwest. The SAFN initiative consisted of biofuel producers, non-profit advocacy organizations, research institutions, government agencies, agricultural producers and other entities representing the biofuel supply chain, and ultimately resulted in the Sustainable Aviation Fuels Northwest (SAFN): Powering the Next Generation of Flight report (published on May 25, 2011). The Sustainable Aviation Fuels (SAF) Research & Development Center, located at Paine Field Airport, is led by Snohomish County and supported by Washington State University to find alternatives to advance sustainable aviation fuel technologies.

- The Growth Management Act Climate Change and Resiliency Element (HB 1181) requires the inclusion of greenhouse gas emission reduction and climate resilience sub-elements in the comprehensive plans for large local governments. A key change to the transportation element is the requirement to incorporate active transportation facilities and multimodal levels of service, consistent with environmental goals.
- New state transit-oriented development policy (HB 1491) sets minimum standards for increased density within high-frequency transit station areas and adds affordability requirements for new residential buildings in those areas. The deadline for cities in King, Kitsap, Pierce, and Snohomish counties to comply with these requirements is December 31, 2029, in line with the next comprehensive plan update.

Cost-Benefits and Co-Pollutant Considerations

Costs and co-benefits vary across subsectors and actions in the transportation sector:

- On-road vehicle electrification eliminates harmful tailpipe emissions, including particulate matter, diesel exhaust, and other criteria pollutants and air toxics, while also cutting fuel and maintenance costs by roughly 50%. Moving to renewable hydrogen or other low- or no-carbon fuels can also provide a similar benefit.
- Transit investments reduce vehicle emissions, improve mobility, lower transportation costs, and expand access to housing—especially benefiting low-income households.
- Land use and growth strategies support mass transit, lower transportation costs, and increase housing options while reducing vehicle-related emissions.
- Living with more density and access to transit can increase public health (e.g., through reduced chronic disease from increased physically activity) and increase economic benefits for historically marginalized communities.
- Off-road and non-road equipment electrification and other alternative fuel opportunities are emerging, particularly for construction machinery. However, these transitions offer slower turnover and smaller cost savings compared to on-road electric vehicles. Electrification still reduces diesel particulate matter, volatile organic compounds, and other air pollutants.
- Fuel substitution for non-road diesel equipment, especially with biodiesel and renewable diesel, offers immediate greenhouse gas reduction benefits. These fuels, produced in Washington, Oregon, and California, can cut greenhouse gas emissions by 40–60%. Biodiesels can reduce harmful diesel particulate matter emissions by up to 50%, depending on the blend (% biodiesel and renewable diesel) and the engine's pollution control technology. The air pollution co-benefits of renewable diesel can be substantially less than biodiesel and vary according to feedstock and processing.
- Aviation has fewer near-term reduction options. The primary strategy involves scaling up sustainable aviation fuel, which emits less greenhouse gas than conventional jet fuel. Sustainable aviation fuel remains more expensive, and researchers are still evaluating whether it significantly reduces other pollutants like particulate matter and air toxics. Early results suggest some improvement in fine particulate emissions.

Summary of Feedback Heard at Community Workshops

- Education and Outreach: Participants noted that educating the public about the long-term cost savings and co-benefits associated with electric vehicles is a key strategy to increasing their adoption. They also recommended ongoing outreach to expand electric vehicle carshare programs across the region.
- Transit Accessibility: Participants expressed support for making transit more convenient, accessible, and reliable to increase overall transit use and reduce emissions. Increasing public transit usage could be supported by providing school-issued transit passes, subsidizing fares or providing free ORCA cards, expanding service hours, offering transit for large events, and improving the overall convenience and accessibility of transit options.
- Commuting: Participants presented ideas for addressing and reducing emission associated with commuting including partnering with major regional employers and unions to encourage/allow remote work, subsidizing or incentivizing transit, and promoting shared transportation options like carpooling, vanpooling, and car sharing.
- Active Transportation: Participants recommended expanding the region's active transportation network and suggested that upgrades to the network should prioritize crash or accident "hot spots." They suggested piloting one-way and complete streets programs to prioritize multimodal transportation and safety.
- Funding: Participants suggested that the State address overall funding deficits for transportation while also increasing funding for medium- and heavy-duty electric vehicles that travel through neighborhoods, like garbage trucks and school buses.

Transportation Strategies and Actions

Strategy 2.1 Reduce Vehicle Miles Traveled of On-Road Passenger Internal Combustion Engine Vehicles

To help achieve the region's climate goals, this strategy assumes that annual vehicle miles traveled are reduced by 1.1 billion miles by 2030, which is about 4% of the annual total. By 2050, an additional 3% reduction in annual vehicle miles traveled (7% total) is assumed. The implementation of actions to support this strategy will need to be designed to achieve this level of ambition.

Major Emitting Activities

- Gas- and diesel-powered passenger vehicles/light trucks

Existing Policies and Efforts

- VISION 2050 and Regional Transportation Plan
- WA Commute Trip Reduction Program (468-63 WAC)
- Growth Management Act Climate Change and Resiliency Element (RCW 36.70A.095)
- Transportation Oriented Development (HB 1491)

Actions

a. Implement transit-oriented, compact growth and development
b. Develop income-sensitive vehicle use/congestion pricing programs
c. Expand biking/walking networks and prioritize transit access that serves overburdened and underserved communities
d. Reduce single occupant driving and increase public transit service and ridership
e. Provide education and outreach to encourage mode-shift and car trip reduction
f. Review parking minimums

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)	$ per ton*	Authority to Implement
	320,000/790,000	unknown	

Co-benefits	Other Considerations
	• Reduces air pollution near major roadways • Reduces health impacts near major roadways • Improves transportation options and access to services

* Due to the range and complexity of items in this strategy, it is not possible to calculate a representative $/ton for 2030 or 2050

Action Descriptions

- **Action 2.1a.** Implement transit-oriented, compact growth and development: Implement transit-oriented, compact growth and development consistent with adopted growth targets.
- **Action 2.1b.** Develop income-sensitive vehicle use/congestion pricing programs: Develop and implement vehicle use and/or congestion pricing programs to encourage use of alternative transportation options.
- **Action 2.1c.** Expand biking/walking networks and prioritize transit access: Expand biking and walking networks and transit, continuing to prioritize access that serves underserved and overburdened communities, and advocate for every city to adopt a complete streets policy.
- **Action 2.1d.** Reduce single occupant driving and increase public transit service and ridership: Continue ongoing work to reduce single occupant driving and increase public transit service and ridership by extending and completing the high-capacity transit network, expanding transit services in supportive density areas, and expanding transportation demand management and promotion.
- **Action 2.1e.** Provide education and outreach to encourage mode-shift and car trip reduction: Provide education and outreach programs to encourage mode shift and car trip reduction including information on employer-paid commuter benefit programs and other congestion management strategies.
- **Action 2.1f.** Review parking minimums: Reduce or eliminate requirements for minimum number of parking spaces for buildings and properties to discourage driving passenger vehicles.

Estimating Emissions

Reductions from this strategy are represented by estimating the total annual vehicle miles traveled reduced in the region due to expansion of transit, transit-oriented development, and enabling of transit usage through increased bike and pedestrian paths, trails, or lanes.

- The Emission Reduction Potential for 2030 assumes 1.1 billion vehicle miles traveled were reduced each year, which is about 4% of the annual total. The Strategy Total was calculated using the following:
  - The total annual vehicle miles traveled reduced due to expansion of transit and development is an input that is assumed and isn't calculated or estimated from some other action.
  - The vehicle miles traveled reduction due to expansion of bike and pedestrian paths is calculated from the total miles of paths, multiplied by a usage factor that has been estimated by PSRC.
  - The vehicle miles traveled reduction is multiplied by the average greenhouse gas emission per mile (for passenger vehicles) in the Puget Sound.
- The Emission Reduction Potential for 2050 assumes an additional 3% of annual vehicle miles traveled are reduced by 2050, which is about 7% total reduction or an additional 800 million (1.9 billion total) vehicle miles each year. Emissions calculations are identical to 2030 but use the larger values corresponding to 2050.

Strategy 2.2 Increase Sales and Use of On-Road Passenger Electric Vehicles and Promote Low-Carbon Fuel Alternatives

To help achieve the region's climate goals, this strategy assumes that electric vehicle adoption occurs one year ahead of the current Zero-Emission Vehicle mandate adoption rates. This is about 137,000 additional electric vehicles on the road (~780,000 total) by 2030, above and beyond the state Zero-Emission Vehicle mandate. By 2050, an additional 1.1 million combustion engine vehicles (1.9 million total) are assumed to be replaced or displaced by zero-emission vehicles. The implementation of actions to support this strategy will need to be designed to achieve this level of ambition.

Major Emitting Activities

- Gas- and diesel-powered passenger vehicles/light trucks

Existing Policies and Efforts

- WA Zero Emission Vehicle Standards (RCW 70A.30.010)
- WA Clean Fuel Standard (RCW 70A.535)
- VISION 2050 and Regional Transportation Plan

Actions

a. Build out charging infrastructure
b. Develop a regional charging infrastructure plan
c. Revise building codes to support charging infrastructure
d. Electrify government fleets and promote the use of low-carbon fuels
e. Provide outreach ambassadors for electric vehicles
f. Support electric vehicle car sharing programs
g. Support the electrification of high-emitting vehicles
h. Provide electric vehicle purchase incentives
i. Support Zero-Emission Vehicle standards

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)	2032 $ per ton*	Authority to Implement
	460,000/3,200,000	84	

Co-benefits

Other Considerations

- Reduces air pollution near major roadways
- Reduces health impacts near major roadways
- Can make transportation and electric vehicles more affordable
- Creates demand for electric vehicle-related installation and maintenance jobs

* Cost for 2030 assumes $3,000 per vehicle (in an unspecified method such as an incentive, credit, etc.) is required, but doesn't include reduced lifetime cost of ownership, which could result in an overall net savings and $/ton < 0. Due to significant uncertainty, costs for 2050 are not quantified.

Action Descriptions

- **Action 2.2a.** Build out charging infrastructure: Develop programs and streamline permitting and siting processes to support increased availability of public and private charging infrastructure.
- **Action 2.2b.** Develop a regional charging infrastructure plan: Develop a region-wide electric vehicle charging infrastructure plan to provide local governments with clear steps for charging infrastructure deployment to meet the region's electrification targets and provide a roadmap for regionally-aligned infrastructure development.
- **Action 2.2c.** Revise building codes to support charging infrastructure: Revise building codes to facilitate an increase in available public and private charging infrastructure.
- **Action 2.2d.** Electrify government fleets and promote the use of low-carbon fuels: Develop requirements to transition government fleets to electric vehicles or low-carbon fuels as soon as is practicable. This could include prohibiting the purchase of new light-duty internal combustion engine vehicles without waiver approval and using alternative fuels when zero-emission vehicles are unavailable. This may require expanding the purchase of low-carbon fuels such as renewable diesel.
- **Action 2.2e.** Provide outreach ambassadors for electric vehicles: Provide outreach ambassadors to the public and car dealerships to help promote electric vehicles.
- **Action 2.2f.** Support electric vehicle car sharing programs: Support the development or expansion of electric vehicle car sharing programs.
- **Action 2.2g.** Support the electrification of high-emitting vehicles: Develop programs that support and prioritize electrification of high-emitting vehicles.
- **Action 2.2h.** Provide electric vehicle purchase incentives: Advocate for increased state and federal incentives for electric vehicle purchases, preferably at the point of purchase and with a focus on benefits to lower-income individuals.
- **Action 2.2i.** Support Zero-Emission Vehicle standards: Support, protect, and advance the state's Zero-Emission Vehicle standards.

Estimating Emissions

Reductions from this strategy are represented by estimating electric vehicle adoption rates in the region.

- The Emission Reduction Potential for 2030 assumes the electric vehicle adoption rate occurs one year ahead of the Zero-Emission Vehicle Mandate adoption rates. This is about 137,000 additional electric vehicles on the road (~780,000 total), above and beyond the state Zero-Emission Vehicle (ZEV) mandate. The Strategy Total was calculated using:
  - The total number of electric vehicles sold before (and on the road in) 2030, which are presumed to occur in place of a conventional gasoline vehicle sale.
  - The number of electric vehicles is multiplied by the number of annual miles per vehicle in the Puget Sound, and the greenhouse gas emissions per mile from PSRC recommendations.
- The Emission Reduction Potential for 2050 assumes an additional 1.1 million (1.9 million total) vehicles in the region are replaced or displaced by zero-emission vehicles. Emissions calculations are identical to 2030 but use the larger values corresponding to 2050.

Strategy 2.3 Electrify or Reduce the Carbon Intensity of On-Road Medium- and Heavy-Duty Freight and Service Vehicles

To help achieve the region's climate goals, this strategy assumes 15,000 heavy-duty electric vehicles are on the road by 2030, increasing to 40,000 by 2050. Also, this assumes 15 million gallons of lower-carbon fuels are used by 2030, increasing to 30 million gallons by 2050. The implementation of actions to support this strategy will need to be designed to achieve this level of ambition.

Major Emitting Activities

- Diesel-powered freight and service trucks

Existing Policies and Efforts

- WA Zero Emission Vehicle Standards (RCW 70A.30.010)
- WA Clean Fuel Standard (RCW 70A.535)
- VISION 2050 and Regional Transportation Plan

Actions

a. Support the electrification of medium-duty and heavy-duty vehicle fleets and installation of charging infrastructure
b. Provide education and outreach to encourage privately-owned medium- and heavy-duty fleets to electrify
c. Support Advance Clean Fleet Rules
d. Support Washington's Alternative Fuel corridors and medium- and heavy-duty charging network
e. Require low-carbon alternatives for government medium- and heavy-duty fleets

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)	2030 $ per ton	Authority to Implement
	590,000/2,300,000	120*	

Co-benefits

Other Considerations

- Reduces air pollution near major roadways
- Reduces health impacts near major roadways
- Can make transportation and shipping/service cheaper
- Reduces pollution in overburdened communities

* Cost for 2030 is an average of electric vehicles and biofuels. For electric medium- and heavy-duty vehicles, this assumes $40,000 marginal cost per vehicle upfront, but doesn't count net fuel cost savings over life of the vehicle. For biofuels assumes a marginal cost of $0.50 per gallon. Due to significant uncertainty, costs for 2050 are not quantified.

Action Descriptions

- **Action 2.3a.** Support the electrification of medium- and heavy-duty vehicle fleets and installation of charging infrastructure: Provide education and incentive programs to support electrification of medium- and heavy-duty vehicle fleets and installation of charging infrastructure, with a focus on government, schools, and large medium- and heavy-duty fleet operators.
- **Action 2.3b.** Provide education and outreach to encourage privately-owned medium- and heavy-duty fleets to electrify: Develop education and outreach programs to encourage private fleets to convert to electric vehicles.
- **Action 2.3c.** Support Advance Clean Fleet Rules: Support and advocate for adoption of Advanced Clean Fleets rules to require fleet owners to purchase near- and zero-emission medium- and heavy-duty vehicles as existing vehicles are replaced.
- **Action 2.3d.** Support Washington's Alternative Fuel Corridors and medium-duty and heavy-duty charging network: Support the installation of medium-duty and heavy-duty chargers through the West Coast Collaborative and Washington's Alternative Fuel Corridors to make it possible for electric and alternative fuel vehicles to transit through the region.
- **Action 2.3e.** Require low-carbon alternatives for government fleets: Require government-owned medium- and heavy-duty fleets to use the maximum amount of low-carbon fuels possible (e.g., renewable diesel and biodiesel) until the vehicles can be electrified.

Estimating Emissions

Reductions from this strategy are represented by estimating two major elements: adoption of heavy-duty electric vehicles and use of low-carbon fuels.

- The Emission Reduction Potential for 2030 assumes 15,000 heavy-duty electric vehicles are on the road and 15 million gallons of lower-carbon fuels are used. The Strategy Total was calculated using:
  - The assumed number of heavy-duty electric vehicles on the road in 2030, which are presumed to take the place of diesel heavy-duty vehicles.
  - The number of heavy-duty vehicles is multiplied by the assumed miles per work day (100), the days per week (5), and the weeks per year (50). This vehicle miles traveled per year is then multiplied by the average/typical greenhouse gas emissions per mile for electric heavy-duty vehicles.
  - Reductions from the use of low-carbon fuels are calculated first by estimating the number of gallons of conventional diesel substituted with low-carbon fuels. This is multiplied by the difference in the average carbon intensity of the conventional vs low-carbon fuel.
- The Emission Reduction Potential for 2050 assumes 40,000 heavy-duty electric vehicles (total) are on the road and 30 million gallons of low-carbon fuels are used. This represents a large fraction of the current on-road heavy duty vehicle fleet and a high percentage of low-carbon fuels. Emissions calculations are identical to 2030 but use the larger values corresponding to 2050.

Strategy 2.4 Electrify or Reduce the Carbon Intensity of Heavy-Duty Transit Vehicles and Ferries

To help achieve the region's climate goals, this strategy assumes that by 2030, an additional 500 buses have been electrified, 3 million gallons of low-carbon diesel fuel have been used, and 5 ferries have been electrified. Quantification for 2050 assumes all 22 ferries operated by Washington State Ferries have been fully electrified with at-berth charging, 3 million gallons of low-carbon fuel are used, and an additional 1,100 buses (1,600 total) have been replaced with electric. The implementation of actions to support this strategy will need to be designed to achieve this level of ambition.

Major Emitting Activities

- Diesel-powered buses and ferries

Existing Policies and Efforts

- WA Zero Emission Vehicle Standards (RCW 70A.30.010)
- WA Clean Fuel Standard (RCW 70A.535)
- VISION 2050 and Regional Transportation Plan

Actions

a. Pursue bulk/collective vehicle purchasing
b. Pilot alternative vehicles or fuels
c. Prepare for, and leverage, funding for low- and zero-emission vehicles and fueling infrastructure
d. Deploy zero-emissions ferries and ferry terminal infrastructure

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)	2030 $ per ton	Authority to Implement
	120,000/260,000	<0*-1200**	

Co-benefits

Other Considerations

- Can lower pollution for communities near transit
- Electrification can produce net lifetime savings

* For ferries in 2030, includes the reduced cost of ownership from fuel and maintenance over the lifetime.

** For 2030 for buses and the hardest to electrify heavy-duty vehicles. Due to significant uncertainty, costs for 2050 are not quantified.

Action Descriptions:

- **Action 2.4a.** Pursue bulk/collective vehicle purchasing: Coordinate to pursue bulk/collective purchases of vehicles to reduce costs and work with manufacturers to understand and plan for delays in vehicle availability resulting from supply chain or manufacturing disruptions.
- **Action 2.4b.** Pilot alternative vehicles or fuels: Pilot or test alternative vehicles and fuels for heavy-duty transit vehicles to advance technology development and adoption.
- **Action 2.4c.** Prepare for, and leverage, funding for low- and zero-emission vehicles and fueling infrastructure: Help transit agencies leverage and stack multiple funding sources including federal and state grants to purchase low- and zero-emission vehicles and fueling infrastructure.
- **Action 2.4d.** Deploy zero-emissions ferries and ferry terminal infrastructure: Support electrification of the ferries and terminals as quickly and efficiently as possible.

Estimating Emissions

Reductions from this strategy are represented by estimating three major elements: electrifying buses, substituting low-carbon fuels, and converting ferries to electric.

- The Emission Reduction Potential for 2030 assumes an additional 500 buses have been electrified, 3 million gallons of low-carbon diesel fuel has been used, and 5 ferries were electrified. The Strategy Total was calculated using:
  - The number of buses assumed to be replaced by electric vehicles, multiplied by the assumed daily or annual miles per bus (150/day, 5 days/week, 50 weeks/year), multiplied by the average greenhouse gas emissions per mile for heavy-duty vehicles.
  - The number of gallons of conventional diesel substituted with low-carbon fuels, multiplied by the difference in the average carbon intensity of the conventional vs low-carbon fuel.
  - The number of ferries assumed to be converted to electric. The average fuel consumption for a ferry is taken as the fleet average. The baseline carbon intensity of the diesel that is being displaced is assumed to be a 50:50 blend of petroleum diesel and renewable diesel. The emission reduction is the average fuel consumption multiplied by the blended carbon intensity.
- The Emission Reduction Potential for 2050 assumes all 22 ferries operated by Washington State Ferries have been fully electrified along with at-berth charging, 3 million gallons of low-carbon fuel are used, and an additional 1,100 combustion engine buses (1,600 total) have been replaced with electric. This corresponds to all current ferries and nearly all (estimated) buses in the region. Emissions calculations are identical to 2030 but use the larger values corresponding to 2050.

Strategy 2.5 Electrify or Reduce the Carbon Intensity of Off-Road Equipment

To help achieve the region's climate goals, this strategy assumes 4 million hours of heavy equipment use are substituted with electric equipment, 10,000 pieces of small gas-powered equipment are replaced with electric, and 80 million gallons of low-carbon fuels are used by 2030. In 2050, these assumptions increase to 50 million equipment use hours (total) replaced with electric,1 million pieces of small gas or diesel equipment replaced with electric, and the use of 80 million gallons of low-carbon fuels. The implementation of actions to support this strategy will need to be designed to achieve this level of ambition.

Major Emitting Activities

- Construction equipment and generators
- Portable landscaping and forestry equipment

Existing Policies and Efforts

- WA Clean Fuel Standard (RCW 70A.535)

Actions

a. Phase-out new sales of off-road gas- and diesel-powered equipment
b. Support the decarbonization of off-road equipment
c. Electrify off-road equipment for governments and schools
d. Provide education and outreach to encourage the use of electric landscaping equipment
e. Provide education, outreach, and ambassadors for off-road electric equipment

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)	2030 $ per ton	Authority to Implement
	650,000/2,100,000	167*	

Co-benefits

Other Considerations

- Can reduce pollution for nearby communities and workers

* Cost for 2030 is an average of electric vehicles and biofuels. For electric equipment, assumes $50,000 marginal cost per vehicle upfront, but doesn't count net fuel cost savings over life of the vehicle. For biofuels assumes a marginal cost of $0.50 per gallon. Due to significant uncertainty, costs for 2050 are not quantified.

Action Descriptions

- **Action 2.5a.** Phase-out new sales of off-road gas- and diesel-powered equipment: Require sales of new combustion-powered equipment to be phased-out by a certain date.
- **Action 2.5b.** Support the decarbonization of off-road equipment: Develop programs to electrify or support the use of low-carbon fuels in off-road equipment as well as associated charging or fueling infrastructure.
- **Action 2.5c.** Electrify off-road equipment for governments and schools: Develop requirements for governments and schools to switch to electric off-road equipment as soon as possible.
- **Action 2.5d.** Provide education and outreach to encourage the use of electric landscaping equipment: Develop education and outreach programs to encourage increased use of electric lawn and garden equipment.
- **Action 2.5e.** Provide education, outreach, and ambassadors for off-road electric equipment: Provide education and outreach programs to promote electric off-road equipment.

Estimating Emissions

Reductions from this strategy are represented by estimating three major elements: electrification of small non-road equipment, electrification of large construction equipment, and use of low-carbon fuels.

- The Emission Reduction Potential for 2030 assumes 4 million hours of heavy equipment use are substituted with electric equipment, 10,000 pieces of small gas equipment are replaced with electric, and 80 million gallons of lower-carbon fuels are used. The Strategy Total was calculated using:
  - The total number of pieces of small non-road equipment that are replaced with (battery) electric equipment, multiplied by the typical number of hours per year of use, the fuel consumption rate for typical engines and use, and the emission factor for gasoline.
  - The total number of hours of large electric construction equipment used, multiplied by the typical fuel consumption rate, and the fuel emission factor.
  - The volume of low-carbon fuel replaced, multiplied by the difference in the carbon intensities of the conventional vs lower-carbon fuel.
- The Emission Reduction Potential for 2050 assumes 50 million hours (total) of large equipment use is substituted with electric equipment, 1 million pieces of small gas/diesel equipment are replaced with electric equipment, and 80 million gallons of low-carbon fuels are used. This corresponds to most large and small equipment being electrified, and all remaining equipment using only low-carbon fuels. Emissions calculations are identical to 2030 but use the larger values corresponding to 2050.

Strategy 2.6 Electrify or Reduce the Carbon Intensity of Aviation Vehicles and Equipment and Reduce Air Travel

To help achieve the region's climate goals, this strategy assumes that by 2030, an additional 30 million gallons of low-carbon aviation fuel are substituted annually for conventional fuel, and the overall volume of aviation fuel is reduced by 34 million gallons. By 2050, an additional 360 million gallons (460 million total) of low-carbon aviation fuel are assumed to be used annually. The implementation of actions to support this strategy will need to be designed to achieve this level of ambition.

Major Emitting Activities

- Passenger and freight aircraft burning jet fuel
- Ground support equipment using gasoline or diesel

Existing Policies and Efforts

- WA Clean Fuel Standard (RCW 70A.535)

Actions

a. Require the use of low-carbon fuel for government-related travel
b. Research low-carbon materials, fuels, and ground support equipment
c. Support the electrification of non-road vehicles and equipment
d. Develop stronger fuel efficiency and emissions standards for aircraft
e. Support alternative options to air travel
f. Increase the use of virtual meetings

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)	2030 $ per ton	Authority to Implement
	500,000/2,700,000	500*	

Co-benefits

Other Considerations

- Non-air travel could be less expensive
- Non-air travel can encourage more local travel, contributing to local economies

* For 2030, the low-carbon fuel portion only and assumes current estimates of $3.00/gallon marginal cost for jet fuel. Does not consider alternative travel options. Due to significant uncertainty, costs for 2050 are not quantified.

Action Descriptions

Decarbonize aviation fuels and airports:

- **Action 2.6a.** Require the use of low-carbon fuel for government-related travel: Develop requirements for government to collectively purchase (with competitive bidding) low-carbon aviation fuel equivalent to the expected volumes needed for its travel.
- **Action 2.6b.** Research low-carbon materials, fuels, and ground support equipment: Support research into low-carbon fuels, materials, and equipment to support market development and increase access to low-carbon options.
- **Action 2.6c.** Support the electrification of non-road vehicles and equipment: Develop programs to support the aviation industry transition to electric ground equipment and other non-road support vehicles.
- **Action 2.6d.** Develop stronger fuel efficiency and emissions standards for aircraft. Develop stronger requirements for fuel efficiency and emission standards for aircraft and engines.

Reduce air travel by supporting non-air travel options:

- **Action 2.6e.** Support alternative options to air travel: Support planning for alternative modes of travel such as existing Amtrak service, (ultra) high-speed rail, or the study currently underway for the Cascadia High-Speed Rail Program.
- **Action 2.6f.** Increase the use of virtual meetings: Develop requirements for governments to hold virtual meetings, workshops, and conferences whenever possible, or invest in advanced virtual meeting technology that improves the user experience.

Estimating Emissions

Reductions for this strategy are represented by estimating two elements: substitution of conventional petroleum aviation fuel with low-emission aviation fuel; and a reduction in air travel which is replaced by train travel, low-carbon vehicle travel, or virtual meetings.

- The Emission Reduction Potential for 2030 assumes that an additional 30 million gallons of low-carbon aviation fuel are substituted and the overall volume of aviation fuel is reduced by 34 million gallons. The Strategy Total was calculated using:
  - The total number of gallons of aviation fuel that are being replaced with low-carbon fuels, multiplied by the difference in carbon intensity of the conventional vs low-carbon fuel.
  - The overall reduction in aviation fuel used multiplied by the emission factor for aviation fuel.
- The Emission Reduction Potential for 2050 assumes about 420 million gallons of low-carbon aviation fuel are used, which corresponds to blend rate of 70%, which is above the current approved maximum blend of 50%. Emissions calculations are identical to 2030 but use the larger values corresponding to 2050.

Strategy 2.7 Electrify or Reduce the Carbon Intensity of Off-Road Marine and Rail Vessels, Vehicles, and Equipment

To help achieve the region's climate goals, this strategy assumes an additional 15 million gallons of low-carbon marine fuels are used, about 9 million kWh hours of electricity are supplied, and 200 pieces of cargo handling equipment are electrified by 2030. By 2050, another 75 million (90 million total) gallons of low-carbon marine fuels are used, an additional 12 million kWh of electricity are supplied, and most cargo handling equipment has been electrified. The implementation of actions to support this strategy will need to be designed to achieve this level of ambition.

Major Emitting Activities

- Ocean going vessels, harbor craft, private boats
- Regional rail and switchers, cargo handling equipment

Existing Policies and Efforts

- WA Clean Fuel Standard (RCW 70A.535)

Actions

a. Support low-carbon marine fuels
b. Support low-carbon fuel handling systems
c. Encourage the use of shore power
d. Support shore power with grid upgrades
e. Support low-carbon or electric port and rail equipment and vehicles
f. Support shore power policy
g. Support charging infrastructure zero-emissions vessels
h. Research zero- and near zero-emission cruise ships

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)	2030 $ per ton	Authority to Implement
	100,000/690,000	80-400*	

Co-benefits

Other Considerations

- Reduces pollution in overburdened communities near ports
- Reduces pollution near ships and cargo handling equipment

* For 2030 costs, this represents the range from low-carbon fuels at $0.50/gallon marginal cost to replacement with electric equipment based on current marginal cost for cargo handling equipment. Due to significant uncertainty, costs for 2050 are not quantified.

Action Descriptions

Expand and support access to, and the use of, alternative fuels:

- **Action 2.7a.** Support low-carbon marine fuels: Develop programs to encourage new facilities to produce low-carbon marine fuels and encourage ship operators to use the low-carbon marine fuels.
- **Action 2.7b.** Support low-carbon fuel handling systems: Develop programs to support the construction of new handling and distribution systems for large quantities of low-carbon fuels for marine and rail needs.

Expand shore power at all major berths:

- **Action 2.7c.** Encourage the use of shore power: Encourage vessel operators to use shore power in a manner that does not significantly impact ports' ability to move cargo.
- **Action 2.7d.** Support shore power with grid upgrades: Upgrade the electrical grid to facilitate broad use of shore power.

Support low-carbon or electric alternatives:

- **Action 2.7e.** Support low-carbon or electric port and rail equipment and vehicles: Develop programs to support the transition of off-road port and rail equipment and vehicles to low-carbon or electric alternatives.
- **Action 2.7f.** Support shore power policy: Support national and international efforts to transition ocean-going and harbor vessels to shore power.
- **Action 2.7g.** Support charging infrastructure for zero-emissions vessels: Develop programs and streamline permitting and siting processes to support charging equipment for ships and boats.
- **Action 2.7h.** Research zero- and near zero-emission cruise ships: Research the feasibility of alternative fuels for powering cruise ships including green methanol, green ammonia, renewable natural gas, and biofuels with the goal of identifying viable alternatives for implementation.

Estimating Emissions

Reductions from this strategy are represented by summing three elements: substituting low-carbon fuels, expanding shore power availability and use, and electrifying cargo handling equipment.

- The Emission Reduction Potential for 2030 assumes an additional 15 million gallons of low-carbon marine fuels are used, about 9 million kWh hours of electricity are supplied, and 200 pieces of cargo handling equipment are electrified. The Strategy Total was calculated using:
  - The volume of conventional marine fuel being replaced with low-carbon marine fuel, multiplied by the difference in their carbon intensities.
  - The reductions from shore power are calculated from the assumed or reported kWh of electricity provided multiplied by the typical amount of diesel fuel that would have been required to generate the electricity (from onboard generators), multiplied by the emission factor for the diesel fuel.
  - For cargo handling equipment, the reduction is the number of pieces of equipment multiplied by the average annual fuel consumption per piece, multiplied by the emission factor for diesel fuel.
- The Emission Reduction Potential for 2050 assumes another 75 million gallons of low-carbon fuel (90 million total) are used, an additional 12 million kWh of electricity are sup-plied for shore-power, and most cargo handling equipment has been electrified. This corresponds to about 65% of the current marine fuel dispensed. Emissions calculations are identical to 2030 but use the larger values corresponding to 2050.

Strategy 2.8 Cross-Cutting Transportation Actions

The actions in this strategy support or enable other strategies in the transportation sector. Implementation of these actions will help to achieve the region's climate goals.

Actions

a. Streamline permitting for construction of electric generation, transmission and storage projects while maintaining adequate timelines for meaningful community engagement.

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)*	2030 $ per ton	Authority to Implement
	unknown	unknown	

* The actions in this strategy help to support or enable other strategies in the transportation sector. We are not able to quantify emissions reductions nor costs per ton from this strategy.

Action Descriptions

- **Action 2.8a.** Streamline permitting for construction of electricity generation, transmission and storage projects: Implement new policies to reduce permitting delays for the construction of clean energy generation and transmission capacity, long-duration battery storage and other emission reduction projects while maintaining adequate timelines for meaningful community engagement.

Estimating Emissions

The actions in this strategy help to support or enable other strategies in the transportation sector. We are not able to quantify emission reductions from this strategy.

Sector 3: Municipal Solid Waste and Wastewater

Sector Overview

The municipal solid waste sector accounts for 3% of regional emissions and includes waste that specialized trucks regularly collect from residences and businesses (curbside pickup) as well as waste that individuals or businesses drop off at transfer stations. In some collection areas, people separate a large portion of this waste for recycling, and it is collected separately curbside. Individuals, contractors, and businesses also drop off a significant amount of waste material at transfer stations. This material often includes a significant recyclable volume, but most of it typically ends up in landfills.

The wastewater subsector handles waste that sewer systems carry to city, county, or other treatment facilities.

Major Greenhouse Gas Emitting Activities and Reduction Opportunities

Municipal Solid Waste

In the solid waste sector, most greenhouse gas emissions come from organic materials degrading in landfills. Organic matter, such as paper, wood, vegetation, and food scraps, decomposes slowly until microbes consume much of the carbon. Landfills are covered and compacted resulting in an an aerobic environment, and this anaerobic environment allows methane-producing bacteria to consume the carbon. These bacteria release a significant amount of methane before which can be captured and used as a renewable energy source or flared. Methane that escapes into the atmosphere has approximately 30 times (over 100 years) or 85 times (over 20 years) more climate-warming potential than carbon dioxide.

Opportunities for greenhouse gas reduction in this sector generally come from methane collection at landfills, and diverting or recycling organic and non-organic materials before they reach landfills. Recycling reduces greenhouse gas emissions by offsetting the need to produce new materials (e.g., recycling metals uses far less energy than mining, refining, and processing metal ores).

Wastewater

Like the solid waste sector, wastewater emits greenhouse gases primarily through the decomposition of organic materials. Organic matter in sewer water decomposes continuously at treatment facilities, generating substantial methane emissions. Opportunities for greenhouse gas reduction in this sector generally come from methane collection at treatment facilities.

Existing Policies and Efforts to Reduce Greenhouse Gas Emissions

For organic or compostable waste, Washington State law (HB 2301 and 1497) mandates separate organic waste collection for single-family residences and qualifying businesses. These laws require some cities and counties to offer dedicated organic waste disposal services. The collected materials will be composted or otherwise processed to avoid methane emissions during decomposition.

Before 2025, Washington State had enacted limited legislation that directly addressed the recyclable content in waste streams or recycling overall. Senate Bill (SB) 5022 restricted certain types of food carryout containers, limited restaurant service item distribution, and required recycled content in some packaging. These measures had minimal impact on total greenhouse gas emissions, since they addressed relatively small portions of the landfill stream and involved limited recyclable material.

Washington passed the Recycling Reform Act in 2025 (HB 5284) to expand recycling efforts statewide, improve recycling infrastructure, and reduce landfill waste. The law increases producer responsibility by requiring fees from manufacturers of waste-producing products. These fees can be used to fund better collection systems and public education, and to incentivize reduced packaging and increased recyclability. Curbside recycling already covers 88% of households in Washington, and King County has one of the highest recycling rates in the country. While the Recycling Reform Act may not significantly increase the number of households participating in recycling in the Puget Sound region, it will establish a uniform statewide list of materials accepted for recycling, thereby drastically reducing the confusion about what materials should and should not be recycled.

For salvage and demolition waste, Washington adopted Appendix P (Construction and Demolition Material Management) from the International Building Code, giving local governments the option to integrate these requirements into their own codes. Appendix P requires applicants to submit a salvage assessment before receiving a demolition permit, provide separate containers for non-recyclable materials on-site, and submit a final waste diversion report before obtaining an occupancy permit. The assessment must estimate the quantity of salvageable and recyclable materials in the building, and the diversion report must document total materials, amounts diverted and amounts sent to landfills, the hauler, and material destinations.

Cost-Benefits and Co-Pollutant Considerations

For organic and compostable waste, materials sent to landfills emit methane before operators can begin effective gas capture. Organic material also generates emissions during its production and distribution, requiring energy for fertilization, irrigation, harvesting, processing, and transport. Emissions vary depending on local practices and energy sources, but often include a mix of greenhouse gases and air toxics. Avoiding waste of organic materials can also provide important local co-benefits. For example, food recovery programs reduce emissions and redirect edible food from landfills, thereby helping to address food security for community members.

For general recyclables (non-organic and non-compostable materials), the greatest greenhouse gas benefits come indirectly from avoiding emissions associated with producing materials from raw resources. Recycling most metals avoids the high emissions from harvesting, mining, smelting, and refining. These upstream processes also generate significant co-pollutants, including particulate matter from mining vehicles and activities, and particulates and air toxics from smelting and refining. When these activities occur near communities, reducing them provides substantial public health benefits. To a smaller extent, recycling also reduces emissions from processing and transporting waste, including traffic into landfills. The increasing cost of recycling remains relatively low and can often be offset by the resale value of recovered materials. When including benefits from reduced greenhouse gas emissions and air toxics, recycling often delivers a clear net environmental and economic gain.

Construction and demolition materials focus more on wood products (e.g., dimensional lumber, flooring, furniture), metals, concrete, and gypsum. As with general recyclables, avoiding the need for new raw material production yields significant benefits. In particular, diverting wood from landfills prevents methane emissions during decomposition. Many recovered materials hold resale value that approaches cost-neutral levels. Strategies to reduce construction and demolition waste often result in a strong net benefit when other climate and environmental benefits are considered.

Summary of Feedback Heard at Community Workshops

- **Education and Outreach:** Participants recommended creating programs to educate residents about proper waste disposal and organizing public tours of local composting, recycling, and landfill facilities. They recommended new and expanded workshops and internship opportunities focused on waste and recycling to educate and employ young people in sustainability fields. They also recommended expanding existing community events, such as Styrofoam and recycling workshops, to promote sustainable behaviors.
- **Diversion through Recycling and Reuse:** Participants supported producer responsibility policies that require manufacturers to make products more durable, repairable, and recyclable. They also supported the creation of new markets for recyclable materials to strengthen the local recycling economy, such as recycling diesel- and gas-powered equipment and materials to create new electric equipment. Participants also suggested investment in additional staff for waste sorting and recycling in order to improve waste diversion rates.
- **Organic Waste:** Participants encouraged the development of new and expanded food rescue and donation efforts (e.g., home-grown produce donations), to reduce food waste and support community needs. They also suggested developing new programs to encourage food composting at restaurants and in multifamily apartment buildings.

Municipal Solid Waste and Wastewater Strategies and Actions

Strategy 3.1 Divert Construction and Demolition Materials from Landfills

To help achieve the region's climate goals, this strategy assumes 30,000 additional tons of both steel and wood are diverted from landfills by 2030, increasing to 60,000 tons of both steel and wood diverted each year by 2050. The implementation of actions to support this strategy will need to be designed to achieve this level of ambition.

Major Emitting Activities

- Decomposition of wood in landfills
- Production of new materials from raw resources

Existing Policies and Efforts

- Washington Building code Appendix P (RCW 19.27)

Actions

a. Develop codes, permitting, or planning to maximize material reclamation
b. Support new and existing markets for salvaged and recycled materials
c. Train and provide auditors to maximize material diversion
d. Provide or facilitate physical locations for processors, manufacturers, or resellers of diverted materials

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)	2030 $ per ton	Authority to Implement
	80,000/160,000	unknown	

Co-benefits	Other Considerations
	• Reduces consumption of resources, grows circular economy • Produces stream of lower cost materials • Creates demand for solid waste diversion-related jobs

Actions Descriptions

- **Action 3.1a.** Develop codes, permitting, or planning processes to maximize material reclamation: Develop or revise building codes, permitting processes, planning processes and requirements (e.g., manufacturing take-back regulations, etc.) to encourage the maximum amount of building materials be reclaimed and diverted from landfills.
- **Action 3.1b.** Support new and existing markets for salvaged and recycled materials: Support the development or expansion of markets for salvaged construction materials to encourage reuse and reduce waste.
- **Action 3.1c.** Train and provide auditors to maximize diversion: Develop programs to support the training of workers to conduct audits and reviews, ideally during abatement, to help builders and developers maximize diversion of construction materials from landfills.
- **Action 3.1d.** Provide or facilitate physical locations for processors, manufacturers, or resellers of diverted materials: Provide or facilitate physical locations for businesses that focus on processing, using, storing, reselling or other logistics for diverted construction materials.

Estimating Emissions

Reductions from this strategy are represented by estimating total tons of wood and of steel diverted from landfills.

- The Emission Reduction Potential for 2030 assumes 30,000 additional tons of both steel and wood are being diverted. The Strategy Total was calculated using:
  - Tons of wood or steel that are being diverted multiplied by the emission reduction per ton, which was obtained from the WARM model.
- The Emission Reduction Potential for 2050 assumes 60,000 tons (total) of both steel and wood are being diverted each year. Emissions calculations are identical to 2030 but use the larger values corresponding to 2050.

Strategy 3.2 Divert Other Recyclable and Compostable Materials from Landfills

To help achieve the region's climate goals, this strategy assumes 156,000 additional tons of general waste and 90,000 tons of organic waste are diverted annually from landfills by 2030, with an additional 290,000 tons (~450,000 total annually) of general waste and 60,000 tons (150,000 total annually) of organic waste diverted by 2050. The implementation of actions to support this strategy will need to be designed to achieve this level of ambition.

Major Emitting Activities

- Decomposition of organics in landfill produces methane

Existing Policies and Efforts

- WA Organics Management Laws (HB 2301 and 1497)
- WA Recycling Reform Act (HB 5284)

Actions

a. Provide education and outreach to encourage landfill diversion
b. Improve the processing and handling of compostable organic waste
c. Reduce food waste
d. Support new and existing markets for compost
e. Increase methane capture in farming
f. Research non-direct-combustion power

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)	2030 $ per ton	Authority to Implement
	440,000/1,300,000	unknown	

Co-benefits

Other Considerations

- Reduces general consumption, grows circular economy
- Produces stream of lower cost materials
- Nutrient recycling with compost reduces the need for fossil fuel-based fertilizers
- Redirects edible food from landfills helping to address food insecurity

Action Descriptions

- **Action 3.2a.** Provide education and outreach to encourage landfill diversion: Develop education and outreach programs to encourage the public to properly sort waste, and educate waste collectors to better collect, separate, and divert recyclable and compostable materials from landfills.
- **Action 3.2b.** Improve the processing and handling of compostable organic waste: Develop programs to help waste management companies improve the processing and handling of compostable organic waste.
- **Action 3.2c.** Reduce food waste: Develop programs to reduce and prevent food waste in food production, distribution, and use systems.
- **Action 3.2d.** Support new and existing markets for compost: Support the development or expansion of markets for composted materials.
- **Action 3.2e.** Increase methane capture in farming: Provide incentives and develop outreach and education programs for farmers to capture more methane from their organic wastes.
- **Action 3.2f.** Research non-direct-combustion power: Research and pilot alternative uses for organic waste such as biodigesters.

Estimating Emissions

Reductions from this strategy are represented by estimating the total amount of general recyclables and organics diverted from landfills annually.

- The Emission Reduction Potential for 2030 assumes 156,000 additional tons of general waste and 90,000 additional tons of organic waste are being diverted from landfills. The Strategy Total was calculated using:
  - The tons of general recyclables and organics being diverted, multiplied by the emission reduction per ton, which was obtained from the WARM model.
- The Emission Reduction Potential for 2050 assumes an additional 290,000 tons (~450,000 total annually) of general waste and 60,000 tons (150,000 total annually) of organic waste are being diverted. Emissions calculations are identical to 2030 but use the larger values corresponding to 2050.

Strategy 3.3 Increase Methane Capture at Landfills

To help achieve the region's climate goals, this strategy assumes capture and use of 500,000 MMBtu of methane annually by 2030, and an additional 300,000 MMBtu (800,000 MMBtu total) of methane captured and used each year by 2050. The implementation of actions to support this strategy will need to be designed to achieve this level of ambition.

Major Emitting Activities

- Methane produced from decomposing organics
- Gas collection is delayed years after material is deposited

Existing Policies and Efforts

- WA Clean Fuel Standard (RCW 70A.535)
- WA Climate Commitment Act (RCW 70A.65)

Actions

a. Increase methane capture from landfills

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)	2030 $ per ton	Authority to Implement
	53,000/84,000	<30*	

Co-benefits

Other Considerations

- Can cheaply produce natural gas that can displace petroleum diesel and fossil natural gas

* For 2030, cost is based on production cost for large volumes in WSU Biomethane for Transportation study (2012). Due to significant uncertainty, costs for 2050 are not quantified.

Action Descriptions

- **Action 3.3a.** Increase methane capture from landfills: Provide incentives and develop outreach and education programs to encourage more methane capture from landfills.

Estimating Emissions

Reductions from this strategy are represented by assuming the otherwise emitted (escaped) methane would be used as a fuel substitute for diesel fuel.

- The Emission Reduction Potential for 2030 assumes 500,000 MMBtu of methane are captured and used each year. The Strategy Total is calculated using:
  - The MMBtu of methane collected, converted to kg of methane, and multiplied by its 20-year global warming potential (GWP, 85).
- The Emission Reduction Potential for 2050 assumes an additional 300,000 MMBtu (800,000 MMBtu total) are being captured and used each year. Emissions calculations are identical to 2030 but use the larger values corresponding to 2050.

Strategy 3.4 Cross-Cutting Waste Actions

The actions in this strategy support or enable other strategies in the solid waste and wastewater sector. Implementation of these actions will help to achieve the region's climate goals.

Major Emitting Activities

- Unnecessary production of new materials
- Handling and transporting current waste stream

Existing Policies and Efforts

- WA Recycling and Waste and Litter Reduction (SB 5022)
- King County Waste per capita target

Actions

a. Support markets and infrastructure for additional recycled materials
b. Reduce emissions from other waste handling processes
c. Reduce per capita waste disposed of in landfills

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)*	2030 $ per ton	Authority to Implement
	unknown	unknown	

* The actions in this strategy help to support or enable other strategies in the solid waste and wastewater sector. We are not able to quantify emission reductions nor costs per ton from this strategy.

Action Descriptions

- **Action 3.4a.** Support markets and infrastructure for a range of additional recycled materials: Promote market development for a range of recycled materials and infrastructure to support reuse.
- **Action 3.4b.** Reduce emissions from other waste handling processes: Reduce emissions from other waste handling processes such as waste infrastructure, handling equipment, and facilities.
- **Action 3.4c.** Reduce per capita waste disposed of in landfills: Reduce per capita waste disposed of in landfills by encouraging reduced consumption, and working with waste handlers to increase recycling and diversion.

Estimating Emissions

The actions in this strategy help to support or enable other strategies in the transportation sector. We are not able to quantify emission reductions from this strategy.

Sector 4: Natural and Working Lands

Sector Overview

The natural and working lands sector accounts for 14% of regional emissions and includes activities that cause land or biomass to either release or absorb (sequester) greenhouse gas emissions. This sector does not cover emissions from using or burning biomass, which are accounted for in other sectors.

Major Greenhouse Gas-Emitting Activities and Reduction Opportunities

The most significant greenhouse gas emissions in this sector result from removing biomass, primarily trees for timber harvesting and, to a lesser extent, land development. Cutting trees for timber harvesting triggers carbon releases from soils as roots decompose and organic matter loses inputs from living trees. In addition to releasing carbon, cutting trees reduces future sequestration potential by eliminating living biomass. Land conversion for development permanently decreases sequestration capacity. Changes in drainage, streamflow, and agricultural practices can positively and negatively impact land's ability to retain carbon, depending on the scale and scope of changes.

When harvesting trees for lumber or pulp, foresters can reduce emissions by managing the extent of thinning and preserving older trees. Research shows that thinning about 30% of a forest, while preserving mature, second-growth and old-growth trees, stimulates growth in the remaining vegetation and restores soil carbon sequestration to pre-thinning levels within 20 years. In contrast, heavy thinning that includes old-growth trees may take over 100 years to recover equivalent biomass and soil carbon. Foresters can minimize emissions and maximize future sequestration by adjusting thinning levels and protecting older trees.

When developers clear trees for construction, they typically cannot replant enough biomass on the same land to restore its original sequestration potential. To offset this loss, planners and developers can replant equivalent biomass on nearby or comparable land, ideally planting as close to the development site as possible to preserve co-benefits such as shade and cooling.

To enhance carbon sequestration, land managers can use replanting, agricultural practice changes, and soil amendments. They can protect and restore forestlands, wildlands, parks, and open spaces to support natural vegetation growth. Farmers can adopt techniques such as cover cropping, optimized fertilization, and crop rotation to increase soil carbon. These methods not only store carbon but also improve soil health, productivity, and local water quality. Land managers can also apply carbon-rich soil amendments like biochar to farmlands, forests, and open spaces. Biochar can store carbon long-term and enhance soil quality, making it a potential tool for sequestration.

Existing Policies and Efforts to Reduce Greenhouse Gas Emissions

Washington State has enacted few policies that directly regulate greenhouse gas emissions from land use or soils, primarily because most relevant activities occur on private land.

House Bill 1181 (2023) requires cities and counties to integrate climate mitigation and adaptation into their comprehensive plans. This law focuses on land use, transportation, and environmental justice but does not give local governments authority to regulate tree canopy, forest harvesting, or agricultural practices related to greenhouse gas emissions.

Washington also passed Senate Bill 5961 (now RCW 43.19A.140) in 2022, which requires public works projects to assess whether they can use biochar. The choice to use biochar for this legislative directive should include consideration of the source of the biochar and methods of production to ensure that it is consistent with the climate goal. If feasible under defined criteria, projects must incorporate it.

Cost-Benefit and Co-Pollutant Considerations

In timber harvesting, the primary mitigation tactic involves the extent of thinning and adopting sustainable forest management practices. While specific cost data is limited, the dominance of clear-cutting suggests cost may drive current practices. Since most forests are located far from population centers, changes in co-pollutant emissions from these areas likely have negligible public health impacts.

For land development, local governments and planners can reduce greenhouse gas emissions by discouraging tree removal and requiring replanting to achieve carbon neutrality for both soil and biomass carbon. Replanting with seedlings and young plants can be relatively inexpensive; however, the carbon benefit takes years or decades to materialize and must be accompanied by stewardship. In urban settings, mature vegetation delivers additional co-benefits such as shade, reduced cooling costs, lower heat stress, and better moisture retention. Replanting far from development displaces these benefits.

In agriculture, land managers can choose from a wide range of sequestration practices with highly variable costs and outcomes depending on crop type, soil conditions, and location. While most co-benefits affect farmers and farm workers more than the general population, some practices reduce costs or boost productivity. Other strategies may not directly benefit operations but can generate revenue under broader greenhouse gas policies such as the Clean Fuel Standard or Climate Commitment Act.

Summary of Feedback Heard at Community Workshops

- **Education and Outreach:** Participants recommended expanding programs to educate the public about the importance of wetlands and the benefits of natural ecosystem functions. They also recommended new programs to educate the public about local trail systems and outdoor spaces to promote physical activity and environmental stewardship. Local organizations, such as native plant groups, should be engaged in land and park stewardship efforts.
- **Zoning:** Participants recommended that all major zoning changes support the development of walkable neighborhoods to reduce reliance on vehicle travel.
- **Funding:** Participants recommended that tax revenue be redirected to improve natural lands along sidewalks and bike lanes, especially in neighborhoods where property owners cannot afford to upgrade the public right of way. Participants emphasized the importance of improving maintenance of existing parks and ensuring that people have equitable access to a range of recreational uses.
- **Subsidies and Incentives:** Participants recommended that subsidies be offered to businesses willing to locate in walkable areas, helping to connect land use and transportation planning more effectively. Incentives for rain garden installations in new developments could improve stormwater management and increase urban green space.

Natural and Working Lands Strategies and Actions

Strategy 4.1 Steward Natural Lands to Reduce Tree Loss

To help achieve the region's climate goals, this strategy assumes 50 million new trees would be planted by 2030, and an additional 100 million trees (150 million total) would be planted by 2050. The implementation of actions to support this strategy will need to be designed to achieve this level of ambition.

Major Emitting Activities

- Tree cutting for harvesting & land development
- Roots and soil of cut trees release carbon

Existing Policies and Efforts

- WA Growth Management Act, Comprehension Plan Mandatory Elements (RCW 36.70A.070)
- Use of Biochar in Public Works Projects (RCW 43.19A.140)

Actions

a. Increase tree planting, stewardship, and monitoring
b. Strengthen zoning and permitting to protect trees
c. Promote tree retention and planting
d. Increase green stormwater infrastructure

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)	2030 $ per ton	Authority to Implement
	500,000/1,500,000	70*	

Co-benefits

Other Considerations

- Can reduce heat island effects
- Improves overall ecological health
- Supports other public health benefits

* For 2030, assumes cost from middle of range for afforestation in significant programs from Pew Center estimates (2005). Due to significant uncertainty, costs for 2050 are not quantified.

Action Descriptions

- **Action 4.1a.** Increase tree planting, stewardship, and monitoring: Support increased tree planting, accounting, stewardship, and monitoring as part of comprehensive planning.
- **Action 4.1b.** Strengthen zoning, permitting and other requirements to protect trees: Strengthen local zoning and permitting requirements to protect existing trees, require appropriately-located compensation planting for tree losses, and ensure monitoring for tree longevity.
- **Action 4.1c.** Promote tree retention and planting: Develop programs to support tree retention and new tree planting.
- **Action 4.1d.** Increase green stormwater infrastructure: Develop programs to support increased installation of green stormwater infrastructure projects that use vegetation and soil to simultaneously manage runoff and increase the carbon sequestration potential of natural lands.

Estimating Emissions

Reductions for this strategy are represented by the number of trees that would be planted. The planted trees would not, strictly speaking, reduce carbon emissions, but rather would increase carbon sequestration, offsetting the emissions from the cut trees.

- The Emission Reduction Potential for 2030 assumes 50 million new trees would be planted. The Strategy Total is calculated using:
  - The assumed number of trees to be planted multiplied by the average carbon uptake per tree per year.
- The Emission Reduction Potential for 2050 assumes an additional 100 million trees (150 million total) would be planted in the region by 2050. Emissions calculations are identical to 2030 but use the larger values corresponding to 2050.

Strategy 4.2 Steward Natural Lands to Increase Carbon Sequestration and Reduce Emissions

To help achieve the region's climate goals, this strategy assumes that, by 2030, 50,000 hectares of natural lands are protected, replanted, or otherwise enhanced to stop carbon loss or increase uptake, increasing to 100,000 total hectares by 2050. This represents sequestration of carbon, not direct emission reductions. The implementation of actions to support this strategy will need to be designed to achieve this level of ambition.

Major Emitting Activities

- Agricultural practices that release stored carbon
- Public and open lands with carbon storage potential

Existing Policies and Efforts

- WA Growth Management Act, Comprehension Plan Mandatory Elements (RCW 36.70A.070)
- Use of Biochar in Public Works Projects (RCW 43.19A.140)

Actions

a. Increase soil carbon sequestration on farms
b. Steward forests, farmland, and open spaces
c. Promote de-paving to restore natural vegetation

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)*	$ per ton	Authority to Implement
	2,500,000/5,000,000	100**	

Co-benefits	Other Considerations
	• Improves overall ecological health

* This represents sequestration of carbon, not direct emission reductions.

** For 2030, based on published estimates from Austin, et al. (2020) Nat Commun. Due to significant uncertainty, costs for 2050 are not quantified.

Action Descriptions

- **Action 4.2a.** Increase soil carbon sequestration on farms: Develop education and outreach programs for farmers to increase soil carbon stocks on farms and encourage biochar use, where appropriate.
- **Action 4.2b.** Steward forests, farmland, and open spaces: Steward natural and working lands, pursue land acquisition, or develop easements to increase the carbon sequestration potential of forests, farmland and open spaces.
- **Action 4.2c.** Promote de-paving to restore natural vegetation: Support or promote de-paving programs to restore natural vegetation.

Estimating Emissions

Reductions from this strategy are represented by the amount of land that would be protected or otherwise enhanced to increase its carbon sequestration, as compared to unprotected land, which has a carbon loss (based on models).

- The Emission Reduction Potential for 2030 assumes 50,000 hectares of land are protected, replanted, or otherwise enhanced to stop carbon loss or increase uptake. The Strategy Total is calculated using:
  - The assumed number of hectares that are being protected multiplied by the emissions per hectare.
- The Emission Reduction Potential for 2050 assumes an additional 50,000 hectares (100,000 total) are protected, replanted, or otherwise enhanced. This corresponds to about 7% of all land in the four-county region. Emissions calculations are identical to 2030 but use the larger values corresponding to 2050.

Sector 5: Refrigerants

Sector Overview

The refrigerants sector accounts for 6% of regional emissions and includes the chemicals used as working fluids in systems that transfer heat, such as air conditioners, refrigerators, freezers, and heat pumps. In the 1920s, engineers developed chlorofluorocarbons (CFCs) as safer, less toxic, and more effective alternatives to earlier refrigerants. However, scientists later discovered that CFCs severely damaged the ozone layer, which protects the planet from harmful ultraviolet radiation.

In response, manufacturers shifted to hydrochlorofluorocarbons (HCFCs) and hydrofluorocarbons (HFCs), which had lower ozone-depleting potential and became the industry standard by around 2000. Unfortunately, most HFCs and HCFCs have high GWPs, making them significant climate pollutants. Regulators designated them as transitional chemicals and planned phase-outs for HCFCs by roughly 2020, and HFCs by roughly 2030.

Despite the phase-out plans, many older systems still use CFCs because of the high cost of replacement and the continued availability of CFCs through illegal production and distribution. While manufacturers have stopped using HCFCs in new equipment, many existing systems still contain them and remain in operation.

Although most refrigerant use occurs in buildings, a significant share also comes from mobile sources, primarily vehicle air conditioning systems. Some inventories classify refrigerants under the broader built environment sector, but we treat them separately due to distinct inventory methods and mitigation strategies. Unlike the main built environment emission sources (i.e., combustion of natural gas and petroleum), this sector focuses on chemical leakage and refrigerant management.

We categorize the refrigerants sector into three main sub-sectors:

- Commercial: Large refrigeration systems in facilities like warehouses, cold storage centers, and grocery stores.
- Residential: Household systems, including air conditioners, heat pumps, and kitchen refrigerators/freezers.
- Mobile: Air conditioning in most passenger vehicles and trucks, along with refrigeration units in delivery trucks and train cars.

Common Refrigerant Acronyms: As a reminder, the following acronyms are commonly used when discussing refrigerants and ways to reduce their climate impact

- CFC (chlorofluorocarbons) were developed starting in the late 1920s as less-toxic and more effective alternatives to the first refrigerants
- HCFCs (hydrochlorofluorocarbons) and HFCs (hydrofluorocarbons), are refrigerants that have lower ozone-depleting potential than CFC alternatives
- GWP (global warming potential) refers to the potency of a greenhouse gas (i.e. how much it warms the atmosphere)
- ODP (ozone depletion potential) refers to a substance's impact on depleting the stratospheric ozone layer

Major Greenhouse Gas Emitting Activities and Reduction Opportunities

Greenhouse gas emissions in this sector primarily occur when equipment releases HFCs or HCFCs into the atmosphere. These releases can occur through small, continuous leaks during normal operation, sudden equipment failures, or when owners or scrappers dispose of equipment without recovering the refrigerants, either due to lack of awareness or willful neglect.

Leak detection and repair is often easiest in large commercial systems where continuous operation matters more, monitoring is easier, and equipment replacement costs are higher. Surveys show that most commercial systems leak very little, but a small number of systems account for the majority of refrigerant emissions due to large, unchecked leaks. In contrast, small systems, like window air conditioners, household refrigerators, or ductless heat pumps, pose a challenge. These systems are more prone to undetected small leaks, and fixing them often costs more than the value of the refrigerant lost.

Low- or zero-GWP refrigerant alternatives can reduce impacts even when small leaks occur, which are an unavoidable issue with millions of pieces of equipment in use. However, because these refrigerants have different chemical and physical properties, manufacturers must design entirely new systems to use them (they cannot serve as "drop-in" replacements). Manufacturers are currently developing many new systems that use low- or zero-GWP refrigerants, but these alternatives likely won't reach widespread availability for another decade.

Opportunities to reduce greenhouse gas emissions from this sector generally come from recovering HFCs and HCFCs from scrapped equipment in the short term, and transitioning to low- or zero-GWP refrigerants in the longer term.

Existing Policies and Efforts to Reduce Greenhouse Gas Emissions

Washington State passed two laws to address refrigerant emissions. House Bill 1112 (2019) banned new equipment using HFCs, directed Ecology to explore phase-out strategies for high-GWP refrigerants, and required the state to prioritize low-GWP equipment in its purchasing decisions. HB 1050 (2021–2022) expanded on House Bill 1112 by setting maximum GWP thresholds for refrigerants, adding residential air conditioners and heat pumps to the list of regulated equipment, and establishing programs to reduce leaks and promote refrigerant recovery from large systems.

Cost-Benefits and Co-Pollutant Considerations

Most refrigerants do not produce co-pollutants that affect local air quality, so reducing leaks will not significantly improve local health outcomes related to ambient air pollution. However, CFCs and many HCFCs also damage the ozone layer. Recovering these high ozone depletion potential (ODP) refrigerants and repairing or replacing leaking systems can help prevent global ozone depletion, especially in polar regions.

Since industry originally adopted CFCs and HCFCs for their low cost and high performance, most low-GWP and zero-ODP alternatives come with higher upfront costs. Few existing systems can accommodate drop-in replacements, so owners must upgrade or replace systems to adopt alternatives. Current estimates suggest that equipment using low-GWP refrigerants may cost 10–40% more upfront.[2] However, newer systems often improve efficiency and reduce maintenance, leading to potential long-term savings or at least cost neutrality.[3]

Federal law requires certified technicians to recover CFCs and HCFCs from equipment being scrapped using EPA-approved equipment and methods.[4] However, compliance appears inconsistent. For example, King County charges a fee to recycle refrigerators, which may reduce the number of refrigerators recycled. To improve recovery rates, policymakers could implement incentive programs or impose deposit/recovery fees at the point of sale, though these programs and fees would likely shift costs to consumers or the public sector.

[2] https://bellomyims.com/the-shift-to-eco-friendly-refrigerants-and-its-impact-on-costs/
[3] https://www.epa.gov/sites/default/files/2015-10/documents/deca_commercial_refrigeration_case_study.pdf
[4] https://www.epa.gov/sites/default/files/documents/ConstrAndDemo_EquipDisposal.pdf

Refrigerants Strategies and Actions

Strategy 5.1 Reduce Use of High-GWP Devices and Increase Recovery of High-GWP Refrigerants

To help achieve the region's climate goals, this strategy assumes 100,000 high-GWP devices have been replaced with zero- or low-GWP devices, and 100,000 old devices with very high-GWP refrigerants have had their refrigerant recovered. By 2050, this increases to an additional 100,000 devices (200,000 total) replaced, and 100,000 very high-GWP devices (200,000 total) have had their refrigerants recovered. The implementation of actions to support this strategy will need to be designed to achieve this level of ambition.

Major Emitting Activities

- Small refrigerant leaks through normal operation
- Large refrigerant leaks through failure or improper disposal

Existing Policies and Efforts

- WA Hydrofluorcarbons Emission Reductions (RCW 70A.60)

Actions

a. Replace existing high-GWP refrigerant devices
b. Support governments' and schools' transition to low-GWP refrigerant devices
c. Increase good device disposal practices
d. Increase the purchase of low-GWP devices
e. Subsidize proper disposal of high-GWP devices

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)	2030 $ per ton	Authority to Implement
	120,000/240,000	unknown	

Co-benefits

Other Considerations

- Newer equipment with low-GWP refrigerants can lower energy costs for residents
- Incentives or subsidies may increase compliance for individuals

Action Descriptions

- **Action 5.1a.** Replace existing high-GWP refrigerant devices: Replace older devices containing high-GWP refrigerants with newer, more efficient equipment containing low-GWP refrigerants.
- **Action 5.1b.** Support governments' and schools' to transition to low-GWP refrigerant devices: Develop programs to support governments and schools to transition from high-GWP devices to low-GWP devices.
- **Action 5.1c.** Promote good device disposal practices: Develop education and outreach programs to increase public awareness of good disposal practices for devices containing refrigerants to encourage proper disposal.
- **Action 5.1d.** Increase the purchase of low-GWP devices: Develop education and outreach programs to consumers to promote the purchase and use of low- or no-GWP refrigerant devices in homes and businesses.
- **Action 5.1e:** Subsidize proper disposal of high-GWP devices: Develop incentive programs to subsidize or eliminate disposal fees for high-GWP devices to encourage proper disposal.

Estimating Emissions

Reductions from this strategy are represented by estimating two elements: the number of high-GWP devices that are removed from use and have their refrigerant recovered, and the number of zero-GWP or low-GWP refrigerant devices that are purchased instead of conventional high-GWP devices.

- The Emission Reduction Potential for 2030 assumes that assumes that 100,000 devices have been replaced with zero- or low-GWP devices, and 100,000 old devices with high-GWP refrigerants have had their refrigerant recovered. The Strategy Total was calculated using:
  - The number of devices, multiplied by the grams of refrigerant and the effective carbon intensity of the refrigerant (median value from the range).
  - All devices are assumed to have 100 grams of refrigerant that would have otherwise been emitted (leaked).
- The Emission Reduction Potential for 2050 assumes an additional 100,000 devices (200,000 total) have been replaced and the refrigerant from 100,000 very-high GWP devices (200,000 total) have been recovered. Emissions calculations are identical to 2030 but use the larger values corresponding to 2050.

Strategy 5.2 Reduce Refrigerant Leaks from Commercial and Industrial Systems

To help achieve the region's climate goals, this strategy assumes 10,000 refrigeration systems are inspected annually by 2030 and 15,000 (total) system inspections are completed annually by 2050. The implementation of actions to support this strategy will need to be designed to achieve this level of ambition.

Major Emitting Activities

- Small refrigerant leaks through normal operation
- Large refrigerant leaks through malfunctions

Existing Policies and Efforts

- WA Hydrofluorcarbons Emission Reductions (RCW 70A.60)

Actions

a. Support commercial and industrial leak detection and repair

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)	2030 $ per ton	Authority to Implement
	90,000/140,000	unknown	

Co-benefits	Other Considerations
	• Reduced leaks can reduce energy costs

Action Descriptions

- **Action 5.2a.** Support commercial and industrial leak detection and repair: Develop programs to increase requirements for leak inspection, monitoring, repair, and recovery of refrigerants from larger commercial and industrial systems.

Estimating Emissions

Reductions from this strategy represented by the number of inspections that result in the fixing of leaks based on current estimates of leak rates. Estimates are developed for three industrial system sizes and uses.

- The Emission Reduction Potential for 2030 assumes that 10,000 systems are inspected annually. The Strategy Total was calculated using:
  - The number of systems inspected; the typical split of small, medium, and large systems (with a ratio of sizes of 16:4:1); and system coolant volumes and leak rates.
  - The number of systems is multiplied by the leak rate. Emissions are summed for all three industrial system sizes.
- Emission Reduction Potential for 2050 assumes 15,000 systems are inspected annually. Emissions calculations are identical to 2030 but use the larger values corresponding to 2050.

Sector 6: Consumption

Sector Overview

Historically, greenhouse gas inventories for the Puget Sound region have not directly included emissions from a consumption perspective. This was due to standard inventorying conventions (which were geographic) and the complexity of tracking emissions from consumption. However, the recently completed 2022 PSREA inventory included a companion consumption-based inventory, which now enables a more comprehensive understanding of regional greenhouse gas emissions.

Many actions that reduce emissions in a geographic inventory also influence a consumption-based inventory. However, because it is difficult to define the precise scope of consumption-based actions, this plan does not quantify the strategies for this sector. This sector is grouped into two subsectors: food, including strategies for addressing emissions from food handling, storage, use and waste; and general goods, including strategies encouraging the reuse, recycling, or repair of general household goods at the end of their useful life if possible.

Major Greenhouse Gas Emitting Activities and Reduction Opportunities

The consumption-based approach accounts for the full lifecycle greenhouse gas emissions of goods and services used within a geographic region. This includes emissions from producing consumable and durable goods, providing services, and supporting transportation and housing. Geographic inventories already include emissions from transportation and energy use in buildings, so one of the main differences lies in capturing the emissions from producing food and goods imported from outside the region.

In the food subsector, significant greenhouse gas emissions come from food production, including, handling, storage and use. Reductions in greenhouse gas emissions from food production include producing protein sources with lower climate impacts (i.e., plant-based proteins have the lowest emissions, followed by fish and poultry, with pork and beef having the highest) and reducing food waste, both before and after purchase, especially waste driven by cosmetic standards rather than safety or nutritional quality.

Many household general goods are recyclable, repairable, or reusable, but most people lack the tools or information necessary to assess an item's reparability, locate recycling options, or find repurposing opportunities. In many cases, people purchase tools or equipment they only need temporarily, which then sit unused for years before being discarded, despite having much of their useful life remaining. To address this, a growing number of community-based centers, such as tool libraries and material reuse facilities, have begun to offer alternatives. These centers recover and redistribute salvaged materials, rent or loan tools and equipment, and help individuals repair or refurbish personal items.

What is the difference between geographic and consumption-based inventories?

A geographic inventory accounts for the greenhouse gas emissions resulting from activities that occur within the boundaries of a specific region, in this case the Puget Sound region. A consumption-based inventory accounts for the greenhouse gas emissions required to support the activities of all residents, businesses, and organizations within the region, regardless of where those emissions occur. For example, a consumption-based inventory includes emissions from growing food, manufacturing furniture, or mining raw materials, even if those processes happen outside the Puget Sound region. A geographic-based inventory would not account for these emissions.

Because consumption-based and geographic-based inventories follow different scopes, consumption-based inventories are less useful for identifying overall emissions trends or determining progress in meeting greenhouse gas reduction targets. However, they serve as a valuable foundation for future work and deeper exploration of regional emissions responsibility.

Existing Policies and Efforts to Reduce Greenhouse Gas Emissions

Washington State does not currently have legislation that directly targets consumption or its associated greenhouse gas emissions associated. However, several Extended Producer Responsibility laws address lifecycle emissions for specific types of consumer goods. These laws apply to products such as electronics, paint, mercury-containing lights, solar panels, and consumer packaging and paper products.

In addition, the State Department of Ecology has taken a leadership role in launching the NextCycle Washington program and the Center for Sustainable Food Management. The NextCycle program supports businesses and organizations that promote circular economy practices, such as salvaging, reclaiming, recycling, and repairing materials. While these efforts do not directly reduce consumption, they help lower emissions by reducing the need to produce new goods. By extending product lifespans and increasing material reuse, these programs indirectly reduce the greenhouse gas emissions associated with manufacturing and disposal. Ecology's Center for Sustainable Food Management established five key focus areas to prevent food waste, as informed by the Use Food Well Washington Plan.

The Recycling Reform Act established a Reuse Financial Assistance Fund to direct investments into the reuse sector. The Fund will open at $5 million (minimum) in 2029 and must grow if reuse targets are not met.

Cost-Benefits and Co-Pollutant Considerations

The costs of actions within the consumption sector vary widely, and it can be difficult to isolate specific expenditures or directly attribute greenhouse gas reductions to them.

For food-related choices and handling, public education, outreach, and messaging are the primary tools for encouraging change. These efforts can differ significantly in both scope and cost, depending on the target audience and delivery methods.

Recycling, reuse, and repair programs often operate with little or no need for public funding. Many of these initiatives sustain themselves through the resale of materials, rental or membership fees, or community partnerships.

Residents pay for recycling services because there are significant costs for collecting and sorting recyclables. The Recycling Reform Act may result in shifts to the total ratepayer costs.

Beyond greenhouse gas reductions, most of these actions offer a major co-benefit of reduced costs for individuals and households. By minimizing waste, lowering unnecessary consumption, and providing affordable alternatives to new products, these actions help both the environment and household budgets.

Consumption Strategies and Actions

Strategy 6.1 Reduce Food Waste and Promote Low-Emission Dietary Choices

Though emissions reductions for the actions in this strategy are too complex to quantify, implementation of these actions will help to achieve the region's climate goals.

Major Emitting Activities

- Consumption of food and products with high associated greenhouse gas emissions
- Production and decomposition of unused and wasted food

Existing Policies and Efforts

- WA Extended Producer Responsibility Laws (SB 5284)
- NextCycle Washington program and Center for Sustainable Food Management

Actions

a. Promote low-emission diets and dietary choices
b. Reduce food waste from over-purchasing and improve storage and use of purchased food more completely
c. Improve food rescue and donation practices
d. Increase repurposing of leftovers for other products

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)*	2030 $ per ton	Authority to Implement
	unknown	unknown	

Co-benefits

Other Considerations

- Efficiency can produce net lifetime cost savings

* We are not able to quantify emission reductions from this strategy.

Action Descriptions

- **Action 6.1a.** Promote low-emission diets and dietary choices: Develop education and outreach programs with partners (e.g., the Sustainable Food Center) to support adoption of plant-based and low-emission diets.
- **Action 6.1b.** Reduce food waste from over-purchasing and improve storage: Identify ways to reduce over-purchasing and associated food waste, improve food storage to prevent spoilage, and identify ways to use food products more completely.
- **Action 6.1c.** Improve food rescue and donation practices: Identify ways to improve food rescue and encourage food donation programs and practices to reduce waste of unspoiled food.
- **Action 6.1d.** Increase repurposing of leftovers for other products: Develop programs targeted at commercial-scale operations to encourage repurposing of leftovers to produce other food products (e.g., drying, grinding, fermenting, etc.) to reduce waste and over-production.

Estimating Emissions

We are not able to quantify emission reductions from this strategy.

Strategy 6.2 Promote a Circular Economy for General Goods

Though emissions reductions for the actions in this strategy are too complex to quantify, implementation of these actions will help to achieve the region's climate goals.

Major Emitting Activities

- Manufacturing and selling goods with a single or limited use
- Manufacturing new items for purchase rather than consumers borrowing or fixing existing items

Existing Policies and Efforts

- WA Extended Producer Responsibility Laws (SB 5284)
- NextCycle Washington program

Actions

a. Extend producers' responsibilities to end-of-life and recycling
b. Promote reuse and repair of general goods
c. Support organizations that encourage reuse, repair, renting, and borrowing

Strategy Total	Emission Reduction Potential 2030/2050 (MTCO2e)*	2030 $ per ton	Authority to Implement
	unknown	unknown	

Co-benefits

Other Considerations

- Promotes less consumption
- Efficiency can produce net lifetime cost savings

* We are not able to quantify emission reductions from this strategy.

Actions Descriptions

- **Action 6.2a.** Extend producers' responsibility to end-of-life and recycling: Require producers to take responsibility for the full lifecycle of the materials and goods they produce.
- **Action 6.2b.** Promote reuse and repair of general goods: Develop education and outreach programs to support and increase the reuse and repair of general goods.
- **Action 6.2c.** Support organizations that encourage reuse, repair, renting, and borrowing: Support and promote businesses and organizations that encourage reuse, repair, renting and borrowing of general goods.

Estimating Emissions

We are not able to quantify emission reductions from this strategy.

Utility Considerations

The Puget Sound region is fortunate to be relatively well-poised to transition to an electrified future given our non-emitting hydroelectric resources and the passage of major laws and strategies to decarbonize the transportation and built environment sectors including the Clean Energy Transformation Act, Clean Fuel Standard, and State Transportation Electrification Strategy, among others. However, this energy transition will require thoughtful planning and implementation, taking into account energy challenges in production and transmission that largely fall to electric utilities to address. Decision-makers in the region should keep in mind the following considerations:

Utility Involvement in Electrification Planning Efforts

Whether implementing jurisdiction-wide electrification policies or identifying project-specific needs, local and regional governments must involve utilities in their electrification planning conversations early and often to identify utility constraints and to ensure projects stay on track.

While local government regulations, policies and incentives to encourage electrification are necessary to achieving our greenhouse gas reduction targets, they also have significant implications for utilities. To meet the region's energy goals, utilities must find new and improved ways to generate, supply, store, and transmit electricity loads across and beyond their service territories, while simultaneously managing ratepayer costs and significant lead times for infrastructure build-out. The process of planning, permitting, and constructing new storage, transmission, and distribution infrastructure can take over a decade. This process can take even longer when utilities require interconnection with regional power systems like Bonneville Power Association, when permitting processes take longer than expected, or when there is local opposition to a critical energy infrastructure project, such as a proposed transmission-line pathway. For these reasons, utility involvement in planning efforts is critical.

Utility Fuel Mix in the Puget Sound

Washington State law requires each electric supplier or utility serving retail customers to disclose the mix of fuels in their energy portfolio. The objective of this process is to inform customers and policy makers about the characteristics of the electricity delivered by each utility. More information about utility fuel mixes in our region can be found in the States' 2025 fuel mix disclosure report.

Building on Regional Conservation Successes

Just as our region is fortunate from clean energy supply and policy standpoints, we also have a rich and successful history of conservation leadership. This thoughtful leadership has resulted in energy development over the last several decades that has avoided high costs and negative environmental impacts. Building on the successes and lessons learned from this history can help to mitigate demand from increased electrification.

Our history of energy conservation has set a precedent for utilities partnering with customers and communities to collaborate on energy and environmental goals. These partnerships often have far-reaching benefits beyond energy conservation (i.e., improved health, comfort, safety, and financial outcomes). Opportunities to continue to partner with customers and communities to achieve smart and beneficial electrification goals include:

1. Increased emphasis on energy efficiency and conservation, particularly as consumers purchase and install electrified equipment in homes and businesses.
2. Transportation electrification planning that results in managed and bi-directional electric vehicle charging strategies.
3. Expanded implementation of demand-response programs, including rate design, that encourages energy consumption at times of low demand.
4. Expansion of local distributed energy resources, including solar installations paired with battery energy storage.

5. Development of public-private partnerships to implement innovative load management projects in concert with electrification to optimize grid operations.
6. Broad stakeholder engagement to ensure electrification opportunities are accessible across all demographics and to avoid system-wide cost-shifts to overburdened households and communities.
7. Broad access to funding, technical resources, grant administrative assistance, and installer networks to decrease barriers to implementation.

Cost-effective Decision-making

Utilities must balance the need for more cost-effective efficiency investments with the up-front costs of new generation sources in their long-term planning decisions, and ensure replacement sources are established before eliminating greenhouse gas-emitting energy sources (e.g., natural gas).

Promoting energy efficiency measures through incentive programs and energy code changes continues to be a low-cost way for our region to reduce electricity demand. However, as the market transforms and code changes are implemented, the energy savings from many common low-cost measures, such as energy-efficient lighting, are not as readily available as they once were.

Awareness Around Utility Incentive Programs

Local and regional governments should ensure they understand the rules and eligibility requirements associated with utility programs to help their residents make clean energy choices.

Utilities in the region have developed various incentive programs with the intent of creating an inclusive and equitable energy transition for communities. Examples of utility incentive programs include:

- Puget Sound Energy Up & Go Electric Program
- Tacoma Public Utilities Community Electric Vehicle Charging Rebate
- Seattle City Light Fleet Electrification Program
- Seattle City Light Multifamily Electric Vehicle Charging Program

Utilities and local government should work together to raise awareness and communicate the benefits of these programs to communities, and identify how these programs can complement and bolster existing climate action.

Opportunities for Local Government to Incentivize Electrification

Local governments can work with their utilities to develop solutions to ensure all residents, especially low-income residents, can benefit from electrification incentives programs (see Seattle's Clean Heat Program).

Washington State law prohibits most utilities from using incentives to promote fuel switching, with an exception for cooperative utilities, investor-owned utilities, or utilities that provide two or more types of fuel (e.g., electricity and natural gas). In our region, Seattle City Light, Tacoma Public Utilities, and Snohomish Public Utility District are subject to this requirement, meaning that, for example, a resident that relies on heating oil is ineligible to receive assistance from these utilities to switch to electric appliances. Incentives from local governments could help with this transition.

Local government should also work with utilities to ensure incentive programs are implemented in the correct order to ensure maximum effectiveness (e.g., weatherization incentive programs should always be implemented before appliance replacement incentive programs).

Partnering with Utilities to Meet Growing Energy Needs and Decarbonization Goals

Local governments can encourage the development of clean energy sources, including small modular reactors, bioenergy, long-duration battery storage, and hydrogen, to create a resilient electric grid that can support decarbonization strategies at the local level. Additional transmission capacity to deliver clean energy to utility customers will require transmission expansion across multiple segments. Local governments can advocate for new policies to reduce permitting delays for the construction of clean energy generation and transmission capacity while maintaining adequate timelines for meaningful community engagement.. Local governments can also advocate with state policy makers to explore new mechanisms and governance structures for increasing transmission capacity.

The 2025 Northwest Regional Forecast from the Pacific Northwest Utilities Conference projects electricity demand in the region could grow by more than 30% in the next 10 years. The report also projects rising demand for power during the hottest and coldest times of the year, with summer peak demand growing at a faster rate, mostly because of hotter weather driving increased need for air conditioning.

The transition to cleaner energy means that reliable, dispatchable sources of energy that have traditionally provided baseload power, such as coal, will no longer be available. Replacement of these resources with renewable resources requires additional capacity and innovative approaches to manage their intermittency effectively. Investments in generation, transmission, and storage will help enhance our energy resilience and enable a robust clean energy pathway for the future.

Benefits Analysis

In addition to the reduction of greenhouse gas emissions, many of the strategies proposed in this plan have additional benefits. This section summarizes these benefits at a high level. For specific calculations and values for benefits that we can quantify, and for a qualitative description of those we can't, please refer to **Appendix C**, Benefits Analysis. Climate strategies will require thoughtful implementation to avoid potential unintended consequences, which are also described at a high level in this section.

For the purposes of this analysis, benefits are grouped into three categories: reductions in air pollutants and improvements in public health, financial and economic gains, and environmental and ecological benefits. Co-benefits from air pollution reductions are easier to quantify. For the other co-benefits, quantification remains challenging, so we describe these co-benefits qualitatively. A high-level list of areas to consider for avoiding potential unintended consequences follows the discussion of benefits.

Understanding Geographic Disparities in Pollution

Environmental health disparities refer to the unequal distribution of environmental health risks and outcomes among different populations. Many strategies and actions in this plan aim to reduce pollution across broad areas or sectors, and they may affect neighborhoods, locations, or demographic groups unevenly. Pollution impacts certain communities more than others, and recognizing and understanding these unequal impacts is essential for effective planning and implementation. This climate plan aims to understand major environmental health disparities in our region and identify climate strategies that can help reduce them in a way that maximizes environmental justice outcomes for overburdened communities.

Since we cannot predict with high certainty how, or to what extent, this climate plan's strategies will be carried out, we face uncertainty when estimating their indirect effects and any resulting disparities. Broadly, implementation of the strategies in this climate plan could lead to several important benefits:

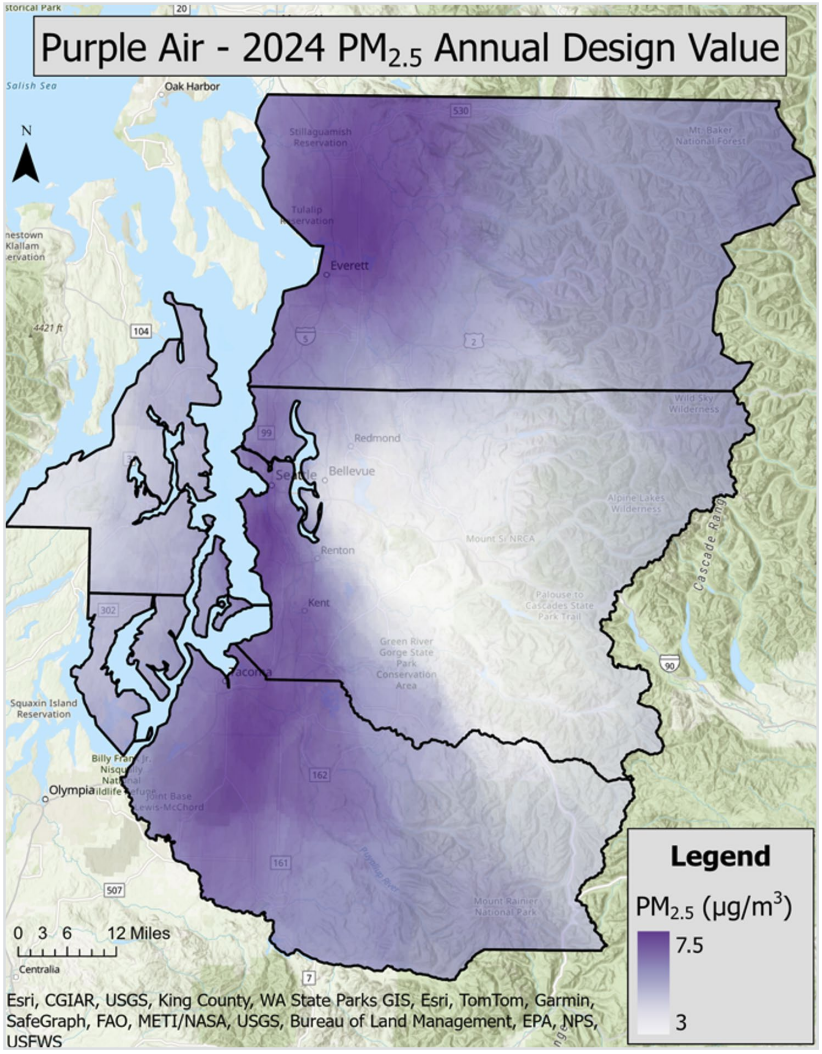
- **Reduced vehicle pollution**: Communities living near roadways would likely experience lower levels of air pollution from strategy implementation.
- **Lower built environment emissions**: Through strategy implementation, neighborhoods with older housing stock can realize improved indoor air quality and air pollution exposure benefits; neighborhoods near industrial sources may see limited improvements in air quality.
- **Improved public transit**: Strategies to expand and enhance transit options would especially benefit people who cannot drive or struggle to afford car ownership.
- **Tree planting and retention**: Strategies to enhance and retain greenspace would support neighborhoods with fewer existing trees, improving aesthetics, livability, and reducing heating and cooling costs.

Reductions in Air Pollutants and Improvements in Public Health

Many processes emitting greenhouse gases from combustion of petroleum-based fuels also emit other air pollutants that impact human health, particularly for heart and lung disease and potential cancer risk. Due to the potential for adverse impacts to public health and the environment, regulations help control many air pollutants. These regulations may include limits on maximum acceptable ambient air concentrations, requirements for emission-reduction technologies, or risk thresholds (e.g. Washington State Acceptable Source Impact Levels).

The most important air pollutant in the region is fine particulate matter ($PM_{2.5}$), as it drives the majority (90%) of cardiac and respiratory risk from air pollution. Figure 11 shows how $PM_{2.5}$ levels vary across our region. Its subset, diesel particulate matter, is also important, as it drives potential cancer risk from air pollution. We also describe pollutants nitrogen oxides and volatile organic compounds.

Figure 11: Annual Average PM2.5 levels for 2024 from regional air sensors.



Monitoring Air Quality in the Puget Sound

The Agency monitors air pollution across King, Kitsap, Pierce, and Snohomish Counties and creates tools to help residents and communities check levels of air pollution in our region. These tools provide the most recent pollution levels, air quality summaries, and historical information, helping residents understand health risks and make clean air choices. **Figure 11** displays an example image of annual average fine particle levels for 2024 from an Agency analysis of regional air sensors.

Fine Particulate Matter ($PM_{2.5}$) and diesel particulate matter:

- Particulate matter is emitted during fuel combustion. In the Puget Sound region, fine particulate matter is responsible for about 90% of respiratory and cardiovascular health risks.[5] Particulate matter from diesel exhaust is responsible for about 85% of the potential cancer risk from air pollution. A major source of total particulate matter is residential woodburning.
- In Washington, fine particulate matter causes hundreds of early deaths each year and contributes to other health problems including non-fatal heart attacks, asthma attacks, strokes, respiratory infections, and reduced quality of life.
- The transportation sector offers the greatest potential for reducing particulate matter, particularly through measures that reduce diesel fuel use. Replacing diesel-powered trucks and equipment with electric alternatives can eliminate emissions from diesel particulate matter entirely.

Nitrogen Oxides:

- Nitrogen oxide is emitted by any process that burns fossil fuels. A major source in the region is transportation (e.g., gas- and diesel-powered vehicles and equipment, trains, and ships), which contributes about two-thirds of the nitrogen oxide emissions. Other notable sources are natural gas combustion, residential appliances (e.g., home ranges, stoves, furnaces, water heaters, etc.), industrial furnaces and processes, and space heating for many commercial buildings.
- Exposure to nitrogen oxides can adversely affect the respiratory system. In the region, concentrations of nitrogen oxides are higher in urban, near-roadway and overburdened communities.

Volatile Organic Compounds:

- Volatile Organic Compounds are found in a wide range of products and materials, including fossil fuels, solvents, cleaning agents, paints, and others. The major sources in the region include vehicle exhaust and industrial processes.
- Volatile Organic Compounds generally have a smaller health impact in our region. Concentrations of Volatile Organic Compounds are higher in near-roadway and overburdened communities.

To fully assess the public health impacts of air pollutant reductions, researchers estimate the typical costs of medical treatment, the societal losses from these events, and the societal value placed on preventing early deaths, commonly referred to as the "value of a statistical life". Among all health outcomes, early death, measured through the value of a statistical life, represents the greatest cost, both individually and collectively. As a result, the overall societal cost of air pollution is largely driven by the number of early deaths from cardiovascular issues caused by particulate matter. While other health outcomes, such as non-fatal heart attacks, lung cancer, strokes, asthma attacks, and respiratory infections, carry lower total costs from a societal perspective, they can still be severe for individuals.

Implementing strategies that reduce emissions and air pollutants also results in improvements in public health. Benefits include but are not limited to lower risk of respiratory and cardiovascular disease, decreased incidence of premature deaths, reduced exposure to harmful air pollutants, and reduced risk of cancer. Appendix C provides additional details by sector and health outcome.

[5] From an Agency analysis using EPA's COBRA model.

Using Data Modeling to Maximize Benefits

Prior to implementation, decision-makers can use data modeling to quantify the public health impacts of climate strategies in a way that maximizes benefits for overburdened communities. For example, local governments and public health departments could work together to develop modelling that reveals the public health costs and co-benefits of interventions like transportation planning or appliance upgrade programs.

Best practices for data modelling and geospatial analysis include:

- Determining a regional baseline to show spatial variability in pollution exposures;
- Conducting assessments and future state modeling to understand how each climate strategy reduces or exacerbates existing health disparities; and
- Developing a health equity profile for each strategy with information on exposures, harms, and co-benefit opportunities, based on potential mechanisms for implementation (e.g., requirement, enforcement, guidance, technical assistance, education and outreach, etc.)

Financial & Economic Gains

Many of the strategies in this climate plan change the fuel type, technology, or energy use in key processes, which leads to changes in operating costs. We describe the financial and economic gains from implementing the strategies qualitatively by sector.

In the transportation sector, the primary shift involves replacing gasoline- and diesel-powered vehicles and equipment with electric-powered alternatives, primarily using batteries for energy storage. Most battery electric vehicles offer significantly lower costs for fuel and maintenance compared to gas powered vehicles. Although battery electric vehicle technology has only been in mainstream production for about 10–15 years, many battery electric vehicles already have a lower total cost of ownership (20-30%) than comparable gasoline or diesel vehicles. For heavy-duty applications, particularly short-range trucking and shipping, battery electric vehicles also tend to offer lower total ownership costs. The upfront cost of electric vehicles can be a barrier to adoption.

Where electrification of transportation is not yet possible, alternative fuels such as renewable natural gas, biodiesel, and sustainable hydrogen will continue play a crucial role in reducing greenhouse gas emissions and improving air quality in the region. Upfront costs for alternative fuel production and supporting infrastructure can vary significantly based on several factors, including the type of fuel, the scale of production, and the location of the facilities.

In the built environment, many strategies in this plan reduce heating needs through improved insulation or more efficient systems. These strategies directly lower fuel consumption, often yielding net savings or a positive return on investment over the life of the equipment or building. Similarly, solar installations either supply electricity directly to buildings or feed it into the grid, reducing owners' overall utility costs. In industrial and commercial sectors, fuel costs often far exceed equipment costs. As a result, investments in energy efficiency typically deliver strong return on investment, although the high upfront infrastructure or capital investment required can be a barrier.

In the waste sector, many materials can be reclaimed or recycled at costs comparable to producing items from raw resources. Although there may be upfront costs to creating the supply chain systems necessary for recycling and reusing materials (e.g., operational costs for collection, sorting, cleaning etc.), recycled products often become cheaper than newly manufactured ones when factoring in pollution-related externalities. Many discarded items can be repaired with minimal effort or salvaged for parts, avoiding unnecessary landfill use. Repaired items usually cost much less than new ones, offering savings to users or resale opportunities at lower prices.

In the refrigerant sector, newer equipment such as air conditioners, freezers, and refrigerators operate far more efficiently than older models. These improvements significantly reduce electricity use, lowering both energy costs and associated greenhouse gas emissions from power generation.

In the consumption sector, financial benefits closely align with those in the waste sector. Improving the efficiency of food production, handling, and purchasing lowers costs at every stage. Repurposing food waste into animal feed or other organic products creates additional value streams from materials that would otherwise be discarded.

Environmental & Ecological Benefits

Many strategies in this plan provide indirect benefits by improving environmental and ecological health. We describe these benefits qualitatively by sector.

In the built environment and transportation sectors, any action that reduces the combustion of fossil fuels will lower emissions of other air pollutants and reduce their harmful environmental effects. For example, reducing fossil fuel use decreases the deposition of organic compounds that can adversely impact nearby water bodies, and lowers ground-level ozone formation, which lessens ozone damage to vegetation.

Strategies to reduce emissions from the waste and consumption sector also offer significant ecological benefits. Diverting materials from landfills reduces the land area required for waste disposal and lowers the risk of groundwater contamination and air pollution. Additionally, reducing waste decreases the demand for manufacturing new products, along with the associated environmental impacts of mining, harvesting, or extracting raw materials.

Strategies in the refrigerant sector also provide another key opportunity to improve ecological health. Older refrigerants, such as CFCs, severely damaged the stratospheric ozone layer, particularly over the Antarctic, but also in mid-latitudes. While their interim replacements, HCFCs and HFCs, had lower ozone-depleting effects, they remained potent greenhouse gases. Today, manufacturers have developed refrigerants that are both ozone- and climate-friendly. As the industry transitions to these alternatives, we can expect benefits not only for the climate but also for the ozone layer, and in turn, for both human and ecological health.

Strategies in the natural and working lands sector, such as tree planting and stewardship, offer a number of environmental and ecological health benefits including nutrient cycling, erosion control, biodiversity support, water conservation, and others.

Avoiding Potential Unintended Consequences of Climate Strategies

Strategies will require thoughtful implementation to avoid unintended consequences. Some potential areas of focus include:

- Producing electric vehicle batteries using raw materials that are extracted in a way that avoids environmental degradation and human rights abuses.
- Properly disposing of used electric vehicle batteries in a way that avoids health risks to communities and ecosystems.
- Engineering electric vehicles and batteries to decrease vehicle weight and reduce tire wear and tire-related particulate emissions.
- Developing decarbonization programs in a way that avoids placing disproportionate financial burden on low-income individuals and families, and frontline and overburdened communities.
- Designing natural and working lands strategies in a way that does not inadvertently increase fire severity, reduce water yield, or negatively impact nutrient cycles.

Workforce Planning Analysis

As the region's investment in clean technology grows, so will the need for a future clean technology workforce. Existing employment reports and data are provided in this section to identify workforce development needs in the Puget Sound region to successfully implement climate actions.

Clean Energy Employment

The region is experiencing job growth in clean energy sectors as a result of the state's climate policies and recent federal investments. Key areas of growth include occupations related to electrification and building efficiency upgrades (e.g., heating, ventilation and air conditioning technicians), clean fuels (e.g., biofuel producers), and energy generation, transmission and distribution (e.g., electrical workers, engineers and line technicians).

Identifying clean energy industries and occupations is not straightforward. While some occupations are obviously related to clean energy (e.g., electrical power-line installers), the connection is less direct for others (e.g., mechanics and service technicians). Government agencies use Standard Occupational Classifications (SOC) codes to classify workers into occupational categories for the purposes of collecting or disseminating data.[6] This section categorizes clean energy occupations into four industry groups, mirroring those used in the State's 2024 Clean Energy Employment Preliminary Report:

1. Clean energy generation and energy grid occupations include nuclear engineers and technicians, power plant operators, wind turbine service technicians, power distributors and dispatchers, and electrical power-line installers and repairers.
2. Energy efficiency occupations are occupations in construction trades involved with energy efficiency or weatherization. These include electricians, insulation workers, plumbers, pipefitters and steamfitters, roofers, and miscellaneous construction and related workers.
3. Engine maintenance and repair occupations include mechanics and service technicians who focus on engine-based transportation.
4. Fossil fuel occupations include petroleum engineers and petroleum pump system operators.

[6] There is currently no established consensus on which SOC codes constitute clean energy.

Table 5 presents 2024 employment and wage data for the region's clean energy occupations based on the Washington Employment Security Department's occupational employment and wage statistics estimates, utilizing the SOC codes used in the State's 2024 Clean Energy Employment Preliminary Report.[7]

Table 5: Regional Employment and Wage Data for Clean Energy Occupations

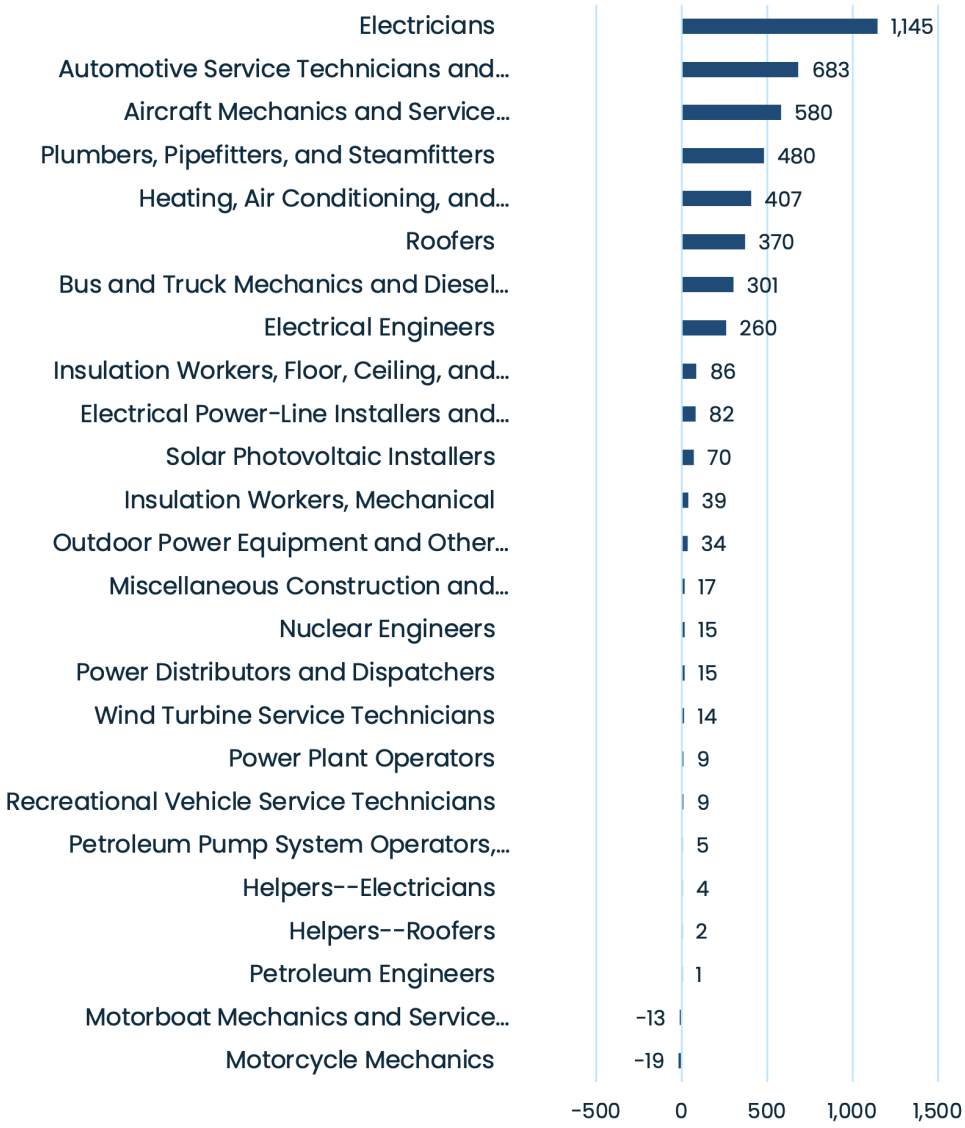
Industry Category	SOC code	Occupation	Est. 2024 Employ.	Avg. hourly wage	Avg. annual wage
Clean Energy Generation and Energy Grid	47-2111	Electricians	10,790	$41.07	$85,424
	49-9051	Electrical Power-Line Installers and Repairers	1,350	$52.40	$108,986
Energy Efficiency	47-2132	Insulation Workers, Mechanical	340	$41.39	$86,083
	47-2152	Plumbers, Pipefitters, and Steamfitters	6,870	$39.84	$82,863
	47-2181	Roofers	3,070	$33.57	$69,831
	49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	4,310	$36.55	$76,016
	47-2131	Insulation Workers, Floor, Ceiling, and Wall	620	$31.40	$65,310
	47-3013	Helpers--Electricians	450	$33.05	$68,752
	47-4090	Miscellaneous Construction and Related Workers	190	$31.34	$65,196
Engine Maintenance and Repair	49-3023	Automotive Service Technicians and Mechanics	6,910	$30.04	$62,475
	49-3031	Bus and Truck Mechanics and Diesel Engine Specialists	3,680	$37.64	$78,285
	49-3051	Motorboat Mechanics and Service Technicians	460	$32.42	$67,429
	49-3053	Outdoor Power Equipment and Other Small Engine Mechanics	390	$27.07	$56,315
	49-3011	Aircraft Mechanics and Service Technicians	3,530	$41.34	$85,988
	49-3052	Motorcycle Mechanics	240	$27.20	$56,567
	49-3092	Recreational Vehicle Service Technicians	270	$29.65	$61,674
Fossil Fuels	51-8013	Power Plant Operators	120	$61.15	$127,196
	51-8093	Petroleum Pump System Operators, Refinery Operators, and Gaugers	100	$46.33	$96,362

[7] Data provided for the Seattle-Tacoma-Bellevue and Bremerton-Silverdale MSAs. OEWS does not provide Washington State estimates for SOC 47-2231, solar photovoltaic installers.

Clean Energy Employment Projections

Figure 12 shows the 10-year projections (2022-2032) for total growth in energy-related occupations by job type for King, Pierce and Snohomish counties based on state employment projections data.[8] In total, clean energy occupations are projected to grow by 4,590 jobs over the 2022-2032 period. The occupation with the highest expected job growth is electricians, which is expected to add 1,145 jobs over the decade. This is followed by automotive service technicians and mechanics (683), aircraft mechanics (580), plumbers, pipe fitters, and steamfitters (480), heating, air conditioning and refrigeration mechanics (407), roofers (370) and bus and truck mechanics and diesel engine specialists (301). Occupations expecting jobs losses are motorcycle mechanics (-19) and motorboat mechanics and service technicians (-13).

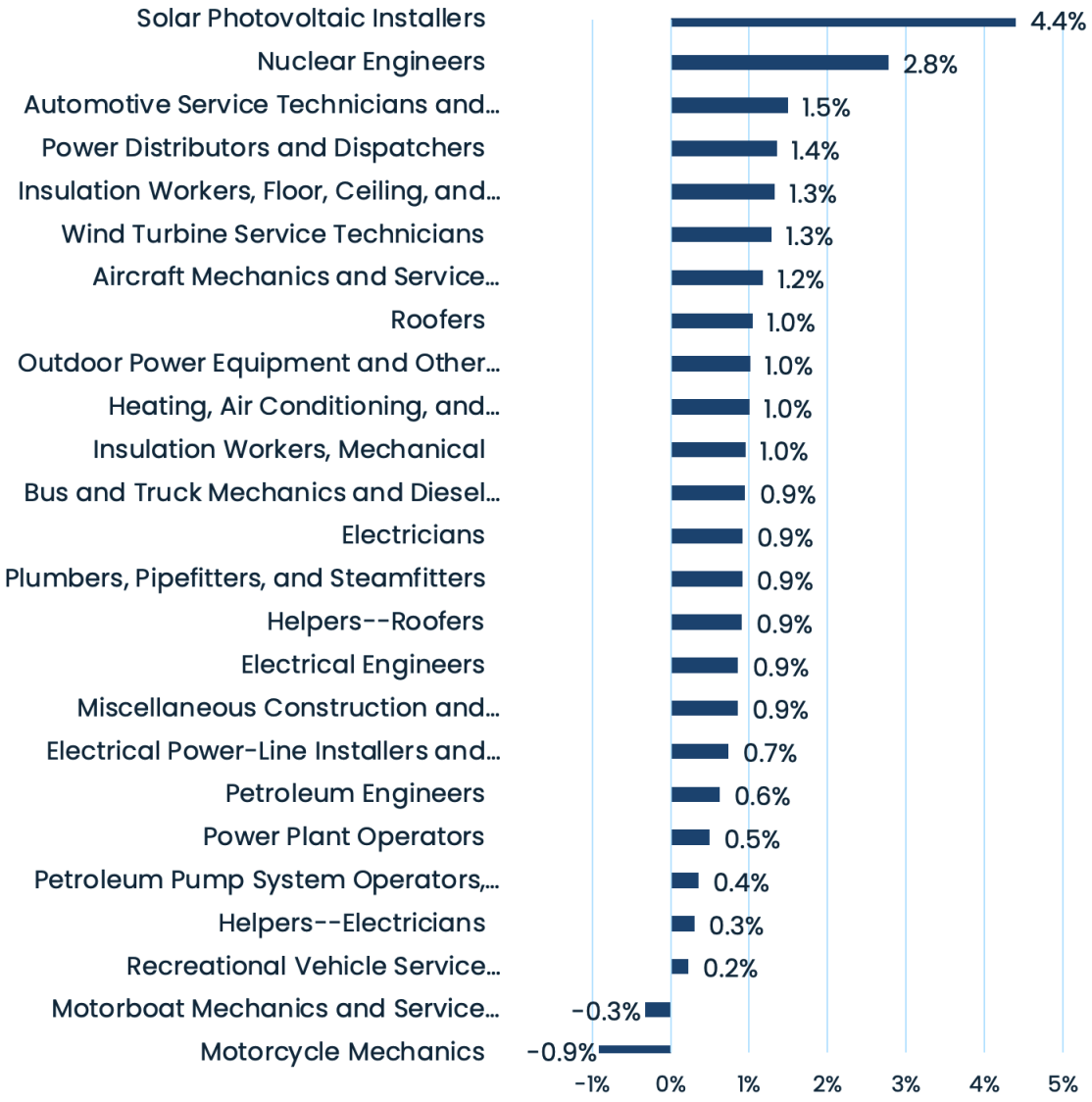
Figure 12: Projected Occupational Employment Growth 2022-2032 for King, Pierce, and Snohomish counties.



[8] Projections are provided for Washington's 12 Workforce Development Areas. Kitsap county is included in the Olympic WDA, alongside Jefferson and Callum counties. Because Kitsap County data could not be isolated, only King, Pierce and Snohomish counties are included.

Figure 13 shows the10-year projections (2022-2032) for average annual growth rates for the same clean energy occupations as Figure 12 for King, Pierce and Snohomish Counties. As shown, average annual growth rates for clean energy occupations are between -0.92% and 4.4% per year. The fastest growing occupation is solar photovoltaic installers (4.4%), followed by nuclear engineers (2.78), automotive service technicians and mechanics (1.49%), power distributors and dispatchers (1.35%), insulation workers, floor ceiling and wall (1.33%), wind turbine service technicians (1.28%), and aircraft mechanics and service technicians (1.18%).

Figure 13: Projected Occupational Annual Employment Growth Rate 2022-2032 for King, Pierce, and Snohomish Counties.



Existing Climate and Energy Workforce Development Programs

State Programs and Plans

The State's Workforce Training and Education Board (Workforce Board) is a Governor-appointed partnership of members from business, labor, and government. Created by the Washington Legislature in 1991, the Workforce Board is dedicated to helping Washington residents obtain and succeed in family-wage jobs and meeting employers' needs for skilled workers. The Workforce Board's activities are guided by the Talent and Prosperity for All Plan (2024-2028), a strategy that guides state and federal investments that help workers access living wage jobs and provides employers with a skilled workforce.

Washington is categorized into 12 regional Workforce Development Areas, each of which is overseen by a Workforce Development Board. Of these, four Workforce Development Boards cover counties located in the Puget Sound region:

- Workforce Development Council of Seattle-King County (serving King County)
- Olympic Workforce Development Council (serving Kitsap, Callum and Jefferson Counties)
- Workforce Central (serving Pierce County)
- Future Workforce Alliance (serving Snohomish County)

In 2023, the Legislature passed the Climate and Clean Energy Service Workforce Programs bill under the Climate-Ready Communities Act, establishing both the Washington Climate Corps Network and Clean Energy Technology Workforce Advisory Committee (CETWAC). CETWAC focused on research and recommendations for the workforce needs of growing clean energy technology sectors.

In response to the state's anticipated job growth in clean energy and climate-related fields, CETWAC is collaborating with workforce development and training partners across the state to advance training opportunities to ensure Washington's workforce is prepared to lead in the clean energy transition. Programs include, but are not limited to: Washington Climate Corps Network, Washington Conservation Corps, Ecology Youth Corps, Student Conservation Association, Career Connect Washington, King County JumpStart, King County NextGen Climate Internship Program, Emerald Cities Collaborative HVAC/R Training and Career Preparation Academy, Smart Buildings Center, and The Building Efficiency and Clean Operations Network (BEACON) Fellows program.

Regional Programs and Plans

The Coalition for Climate Careers (C3), sponsored by King County, the City of Seattle, and the Port of Seattle, brings together workforce development organizations from across the four-county area. C3 is committed to building an inclusive and prosperous green workforce in the region. It prioritizes frontline communities and workers most affected by the transition to a green economy by offering policy guidance, funding for workforce partnerships, promoting green career pathways, and fostering cross-community collaboration. As part of King County's $50M CPRG Implementation Grant, C3 is actively supporting a regional workforce development strategy for decarbonization projects, and promotes green job campaigns through public convenings and outreach efforts.

Beginning in 2026, the Puget Sound Zero Emission Truck Collaborative will be developing a regional workforce development strategy focused on the transition to zero-emission trucking in the region and state. Collaboration with C3 and state-wide programs will help ensure regional activities are coordinated and synergistic.

Snohomish County is in the process of conducting an economic impact analysis focused on the Sustainable Aviation Fuel Research and Development Center in Snohomish County, as part of a larger study that will also contain a separate analysis focused on the potential commercial terminal expansion at Paine Field Airport. The study will identify the types of jobs needed to implement and maintain the Center, and an analysis of how those jobs stand to impact the county economy.

Workforce Development Challenges and Gaps

Racial and Gender Diversity in Clean Energy Occupations

Advancements in zero-emission technology are bringing sustainable, living-wage career opportunities to the region, and it is essential that all communities have access to those benefits. While opportunities in the region's clean energy sector have great potential, this sector often lacks racial and gender diversity compared to other sectors. Supporting equitable pathways to finding and retaining clean energy talent will require continued collaboration between industry, government, educational institutions and community-based organizations. Regional partners can work together to build capacity among organizations within the workforce development ecosystem to ensure all communities can benefit from access to climate careers with living wage jobs and growth potential.

Worker and Trainee Support

For many vulnerable populations, including low-income and minority communities, finding and keeping a high-quality job, training course, or apprenticeship can be difficult without adequate logistical support. Wraparound services can provide comprehensive and coordinated support to help individuals become job-ready and stay employed. Examples of wraparound services include direct support like transportation vouchers, stipends, and tuition reimbursement, as well as other types of support such as access to affordable childcare, housing assistance, help navigating government benefits and non-profit resources, and financial coaching.

Work-Based Learning

As our region works to address systemic barriers and capacity gaps in the climate action workforce, accessible and practical solutions are essential to create opportunities for emerging workers to gain experience on projects central to decarbonization and clean energy deployment. These opportunities span skilled trades such as heating and cooling, electrical work, plumbing, and weatherization.

Historically, pre-apprenticeship programs have struggled to support graduates in securing competitive apprenticeship placements. Establishing paid work-based learning opportunities for graduates of registered pre-apprenticeship programs can provide real-world experience while simultaneously improving workers' competitiveness for future apprenticeship slots. More clarity is needed for contractors across trades on how to incorporate paid work-based learning into their projects, as well as how to utilize workforce development tools such as on-the-job training.

Success Story:
King County's JumpStart Program

King County's JumpStart program partners with local pre-apprenticeship initiatives to connect graduates directly with contractors across various fields, resulting in successful placements. JumpStart's growing network of over 20 local employers, eight education and training providers, and community partners connects youth ages 18-24 with paid, work-based learning and employment opportunities in the clean energy sector, providing a good model for additional work-based learning programs in the region.

Success Story: BUILT Cluster

Led by The CleanTech Alliance, the Buildings, Utilities, and Infrastructure Living Together – or the BUILT Cluster – leverages Washington State's social and intellectual capital to transform the built environment equitably and decarbonize related infrastructure materials and operations. The BUILT Cluster also supports cradle-to-career education and training opportunities for related industries and the trades including K-12 STEM pipeline, continuous education for the trades, internships/apprenticeships, and recruitment and talent acquisition.

Public-Private Partnerships

Public-private partnerships like C3 play a pivotal role in shaping a workforce development landscape that responds to the evolving needs and gaps across our region. Expanding access to public-private partnerships can catalyze private investment and scale successful workforce development models across counties. These efforts are essential to addressing existing workforce gaps and securing long-term partnerships that prepare our region for the demands of climate action.

Federal and State Funding

Recent reductions in federal and state funding for workforce development initiatives mean less funding for programs that provide training, upskilling, and employment support. Regional partners must find new ways to establish long-term funding streams and resource networks to advance skills training and workforce development in climate- and energy-related capital projects.

Workforce Development Recommendations

1. **Support Equitable Pathways to Finding and Retaining Talent:** Industry, government and educational institutions all have a role to play in building community capacity to support a diverse and equitable workforce in the region. Regional partners can work together through the C3 collaborative to explore new ways to increase awareness and perception of green jobs and skillsets with a focus on youth, and connect frontline communities to economic opportunity in the regional green economy.
2. **Enhance Employee and Trainee Support Services:** Local employers, education and training providers, schools, community colleges, labor partners, and national and community-based organizations all have opportunities to provide support for employees and trainees. These entities can connect with programs like C3 to identify and support consistent, regional guidelines and programs for wraparound services that eliminate employment barriers and promote long-term career aspirations.
3. **Scale Work-Based Learning Opportunities:** Leveraging coalitions like C3 and successful models like Jumpstart, regional partners across trades can work together to establish more paid work-based learning opportunities for graduates of registered pre-apprenticeship programs. Regional partners should work with the Washington State's Department of Labor and Industries to establish clear guidance around contractor participation and ratio requirements to ensure paid work-based learning is effectively implemented and scaled across the region.

Ideas for Success: 1% for Workforce Program

Inspired by existing "1% for Arts" programs in the region, King County is exploring a "1% for Workforce" program to create a funding stream to weave skills training, workforce development, minority- and women-owned business engagement, and living-wage career on-ramps into applicable County capital projects. This program can create a much-needed long-term funding source for workforce development and training activities to help fill gaps in state and federal funding.

4. **Leverage Public-Private Partnership to Support Innovation:** Public-private partnerships play a pivotal role in shaping a workforce development landscape that responds to the evolving needs and gaps across our region. Local and regional governments and employers can connect with coalitions like C3 and the BUILT Cluster to expand access to public-private partnerships and catalyze private investment to scale successful workforce development models across the region.
5. **Fill Gaps in Federal and State Workforce Development Funding:** Leveraging coalitions like C3 and potential models like the "1% for Workforce" program, industry, government and educational partners can work together to identify and establish durable public-private funding streams to support the region's climate workforce development needs. These same partners can support legislation to scale-up innovative workforce development programs and explore developing regional applications to state funding opportunities to enhance competitiveness (e.g., Green Jobs Grant Program).

The successful transition to a clean energy economy relies on a workforce that is trained to meet the region's evolving energy demands. Ongoing and expanded investments in workforce development programs and partnerships throughout implementation of this climate plan will help ensure our region's residents and communities are poised to meet the challenge and can benefit from access to the region's climate careers well into the future.

Next steps

While the magnitude of climate change is daunting, we have seen firsthand how collective action in the Puget Sound can turn ideas into meaningful, community-driven solutions. This region has realized a slight (about 5 percent) reduction in the emissions (below 1990 levels) that are damaging our climate, but we have a long way to go to achieve the state and region's targets.

Our region is progressing on an achievable and bold course to 2050. Our current momentum towards reaching our 2030 target will lay the foundation for reaching our 2050 target. Through the many examples of collaboration and dedication we have highlighted in this plan, we can continue to work together to create a cleaner future for our region's communities.

The climate strategies in this plan represent concrete steps to support greenhouse gas emission reductions in our region, and will be especially impactful for overburdened communities. The climate strategies also reinforce and complement the suite of policies and programs already underway at the State level which, together, will help us to meet our collective near- and long-term greenhouse gas reduction targets while centering social justice and equity.

Decision-makers can use this plan to understand the scale of ambition required in meeting climate targets, and build on the collaborative partnerships developed during this climate planning process to maintain momentum towards them. Leveraging partnerships for action, the Agency can serve as a coordinating body to support jurisdictions as they identify initial strategies and help us make progress towards emissions reduction goals.

This climate plan will provide valuable information as the next Regional Transportation Plan is developed. The Regional Transportation Plan and VISION 2050 both address climate change and the reduction of greenhouse gas emissions from on-road transportation. PSRC Boards will consider how to incorporate this climate plan's transportation strategies into the next Regional Transportation Plan.

To be successful, implementation of strategies and actions must be accompanied by ongoing community engagement. The Agency, alongside regional and state partners, may develop a plan for future community engagement to ensure frontline and overburdened communities are centered in ongoing climate planning implementation efforts. Implementation considerations may include technology readiness, emissions reduction and co-benefit potential, and community and partner interest in proposed actions.

The Agency may also consider developing a companion guide to this climate plan to help local jurisdictions prioritize and select strategies to implement. This guide may further explore which entity or organization is best situated to lead implementation. As non-federal funding becomes more important for climate action, this climate plan could also be used to guide coordinated regional applications to state funding opportunities, such as Climate Commitment Act, and identify opportunities to pursue innovative public-private funding sources.

Updates to this Climate Plan

After submittal of the Final Puget Sound Region Comprehensive Climate Action Plan on December 1, 2025, the next grant deliverable is a Status Report, due to EPA on July 1, 2027. This report should include:

- the implementation status of the quantified greenhouse gas reduction measures included in the climate plan,
- relevant updated analyses or projections supporting climate plan implementation, and
- next steps and future budget/staffing needs to continue climate plan implementation.

"Mermaid's Prayer" by Sherene
Creative Climate Action Art Contest Winner

"Seastack Glow" by Randy Bott Photography
Creative Climate Action Art Contest Winner

Appendix A: Greenhouse Gas Emission Inventory

Methodologies Used in 2019 and 2022 Emission Inventories

Key methodological differences between the current 2022 inventory and the previous 2019 inventory (PSREA) are described in Table A-1 below. These updates enhance consistency and clarity across all sectors and improve alignment with the Washington State Department of Commerce's 2022 inventory.

Table A-1. Brief methodological outline of 2019 and 2022 Inventories

Sector	Methodology for PSREA 2019 Inventory	Methodology for 2022 Inventory
Transportation & Other Mobile Sources		
On-road vehicles	PSRC activity-based travel model applied to MOVES model	Uses Washington State Department of Transportation's (WSDOT) Highway Performance Monitoring System (HPMS) at the county-level, combined with estimated vehicle and fuel type breakdowns to estimate emissions.
Aviation	SeaTac jet fuel usage downscaled to jurisdiction through passenger survey data; other airports jet fuel and aviation gas usage	SeaTac jet fuel usage downscaled to jurisdiction through passenger survey data; other airports jet fuel and aviation gas usage. Addition of small regional airports
Non-road vehicles and equipment	MOVES3 model	MOVES4 model
Freight and passenger rail	PSEI inventory, scaled to years/jurisdictions by tonnage	Uses emissions reported by the National Emissions Inventory at the county level.
Marine vessels	PSEI inventory, scaled to years/jurisdictions by tonnage and vessel calls. Ferry fuel consumed by route.	Uses emissions reported by the National Emissions Inventory at the county level.
Built Environment		
Electricity	kWh consumed and utility-specific emissions factors calculated or pulled from utility emissions reports	kWh consumed and utility-specific emissions factors calculated using WA Dept of Ecology methodology with Fuel Mix Disclosure reports
Natural Gas	Therms consumed and EPA natural gas emissions factor	
Steam	Steam emissions assumed to be already accounted for by commercial and industrial natural gas consumption and industrial processes	

Fuel oil	EIA sales data downscaled using ACS house heating data	EIA consumption data downscaled using ACS house heating data and commercial employee counts. Until 2019, this category included only residential fuel oil. In 2022, commercial and industrial fuel oil was also added here. In turn, industrial processes and commercial categories reduced in 2022
Propane	EIA sales data downscaled using ACS house heating data	EIA consumption data downscaled using ACS house heating data and commercial employee counts.
Industrial processes	Calculated emissions from individual King County facilities	Three major differences from 2019: 1. Industrial emissions were sourced from EPA FLIGHT data instead of ECY's database. 2. Landfill emissions were previously double counted under both industrial and solid waste categories; for 2022, they were removed from industrial processes. 3. Commercial fuel oil emissions were reclassified from industrial processes to the fuel oil category.
Natural and Working Lands		
Agriculture	Enteric fermentation and manure management from U.S. Community Protocol	
Tree cover loss	Global Forest Watch estimates	
Refrigerants		
Substitution of ozone-depleting substances (ODS)	National EPA value scaled to region by population	
Switchgear insulation (SF_6)	SF_6 emissions from PSE and SCL	Assumed to be estimated using Ecology's emission factor methodology.
Solid Waste & Wastewater		
Solid waste generation & disposal	Applied standard emission factors from EPA WARM v15 to tonnage estimates	
Wastewater process emissions	Included biogas emissions, BOD_5 emissions, and septic systems	Used emission estimates provided by each County's Wastewater Treatment Division.

Revisions to 2019 Aviation Sub-Sector Under Transportation Sector Emissions

We revised the 2019 aviation emissions estimates based on updated information provided by the Port of Seattle. In the original 2019 inventory, passenger survey results were allocated to total fuel usage at Sea-Tac Airport among counties. However, the Port recently identified an error in the survey data initially provided and supplied corrected results. Using this updated data, we recalculated the 2019 aviation emissions accordingly. Table A-2 below shows the original and updated county-level proportions of Sea-Tac fuel use, based on passenger survey data.

Table A-2. County-Level Allocation of Sea-Tac Airport Fuel Use: 2019 Inventory vs. Updated Port of Seattle Survey Results

County	2019 Inventory Proportions (Sea-Tac Fuel)	Updated Proportions from Port of Seattle Survey
King	82.0%	64.1%
Kitsap	2.2%	3.2%
Pierce	6.5%	9.8%
Snohomish	7.1%	8.6%

These revised 2019 estimates have been applied to both the aviation and transportation sectors for the purpose of ensuring consistency in any comparisons made between 2019 and 2022 within this report.

Revisions to 2019 On-Road Sub-Sector Under Transportation Sector Emissions

We revised the on-road emissions estimates based on updated vehicle miles traveled (VMT) analysis provided by Puget Sound Regional Council (PSRC). In the original 2019 inventory, daily VMT values were converted to annual VMT using an annualization factor of 300, as supplied by PSRC. Recently, PSRC provided updated guidance indicating that the annualization factor now should be 320. Accordingly, the factor was revised to reflect this correction.

These updated 2019 estimates have been applied to both the on-road and overall transportation sectors to ensure consistency in comparisons between the 2019 and 2022 inventories presented in this report.

Updated 2019 PSREA GHG Emissions

Table A-3 provides the updated 2019 greenhouse gas emission estimates in metric tons of carbon dioxide equivalent ($MTCO_2e$), broken down by sector and county. These data reflect the revised estimates described above.

Table A-3. Updated Estimated 2019 Greenhouse Gas Emissions by County and Sector (rounded to the nearest thousand)

Greenhouse Gas Emissions by Sector (MTCO2e)	King County	Pierce County	Snohomish County	Kitsap County	Grand Total
Transportation & Other Mobile Sources	**11,307,000**	**3,651,000**	**3,275,000**	**1,009,000**	**19,243,000**
Aviation	**3,201,000**	**457,000**	**397,000**	**148,000**	**4,203,000**
Marine vessels and rail	**197,000**	**144,000**	**96,000**	**102,000**	**539,000**
Off-road equipment	**1,016,000**	**378,000**	**335,000**	**99,000**	**1,829,000**
On-road vehicles	**6,893,000**	**2,673,000**	**2,447,000**	**660,000**	**12,673,000**
Freight and service vehicles	**1,282,000**	**445,000**	**436,000**	**80,000**	**2,243,000**
Passenger vehicles	**5,461,000**	**2,208,000**	**2,000,000**	**575,000**	**10,244,000**
Transit vehicles	**150,000**	**20,000**	**11,000**	**6,000**	**186,000**
Built Environment	**12,336,000**	**3,698,000**	**1,407,000**	**1,518,000**	**18,959,000**
Electricity	**7,110,000**	**1,552,000**	**147,000**	**1,176,000**	**9,985,000**
Commercial	3,609,000	580,000	52,000	425,000	4,666,000
Industrial	642,000	220,000	14,000	6,000	882,000
Residential	2,859,000	751,000	82,000	745,000	4,438,000
Natural gas	**4,111,000**	**1,515,000**	**1,064,000**	**258,000**	**6,948,000**
Commercial	1,442,000	448,000	325,000	135,000	2,349,000
Industrial	702,000	422,000	139,000	5,000	1,268,000
Residential	1,967,000	645,000	601,000	118,000	3,331,000
Other sources	**1,116,000**	**631,000**	**195,000**	**84,000**	**2,026,000**
Fuel oil	335,000	63,000	57,000	28,000	482,000
Industrial processes	668,000	519,000	38,000	1,000	1,227,000
Residential propane	113,000	49,000	101,000	55,000	317,000
Land Use	**1,341,000**	**2,975,000**	**1,612,000**	**544,000**	**6,473,000**
Agriculture	**121,000**	**45,000**	**202,000**	**6,000**	**375,000**
Tree loss	**1,220,000**	**2,930,000**	**1,410,000**	**538,000**	**6,098,000**
Refrigerants	**1,185,000**	**473,000**	**435,000**	**144,000**	**2,237,000**
Refrigerants	**1,185,000**	**473,000**	**435,000**	**144,000**	**2,237,000**
Solid Waste & Wastewater	**565,000**	**388,000**	**339,000**	**106,000**	**1,398,000**
Solid waste generation and disposal	**513,000**	**339,000**	**254,000**	**87,000**	**1,193,000**
Compost	47,000	37,000	26,000	3,000	114,000
Landfill	466,000	301,000	229,000	83,000	1,079,000
Wastewater process emissions	**51,000**	**50,000**	**84,000**	**19,000**	**205,000**
Grand Total	**27,110,000**	**10,867,000**	**6,846,000**	**3,232,000**	**48,055,000**

Additional Comparisons Between 2019 and 2022 GHG Emission Estimates for Each County

Figure A-1 compares greenhouse gas (GHG) emissions by sector across the four counties for 2019 and 2022. The figure illustrates changes in total emissions and the relative contribution of each sector over time.

Figure A-1. Greenhouse Gas Emissions by County and Sector for 2019 and 2022.

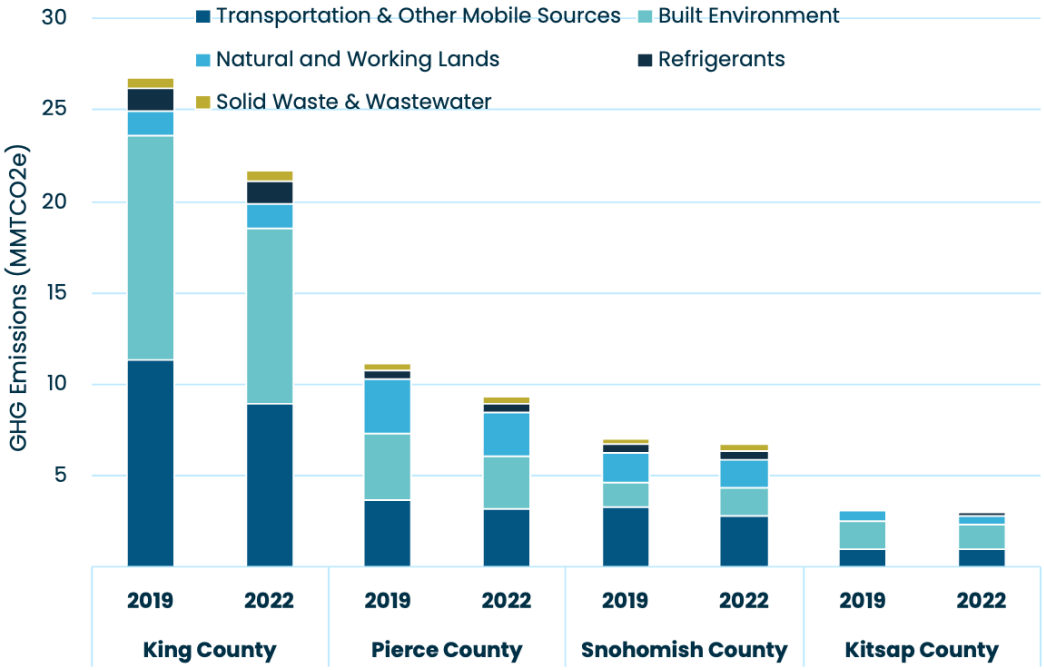
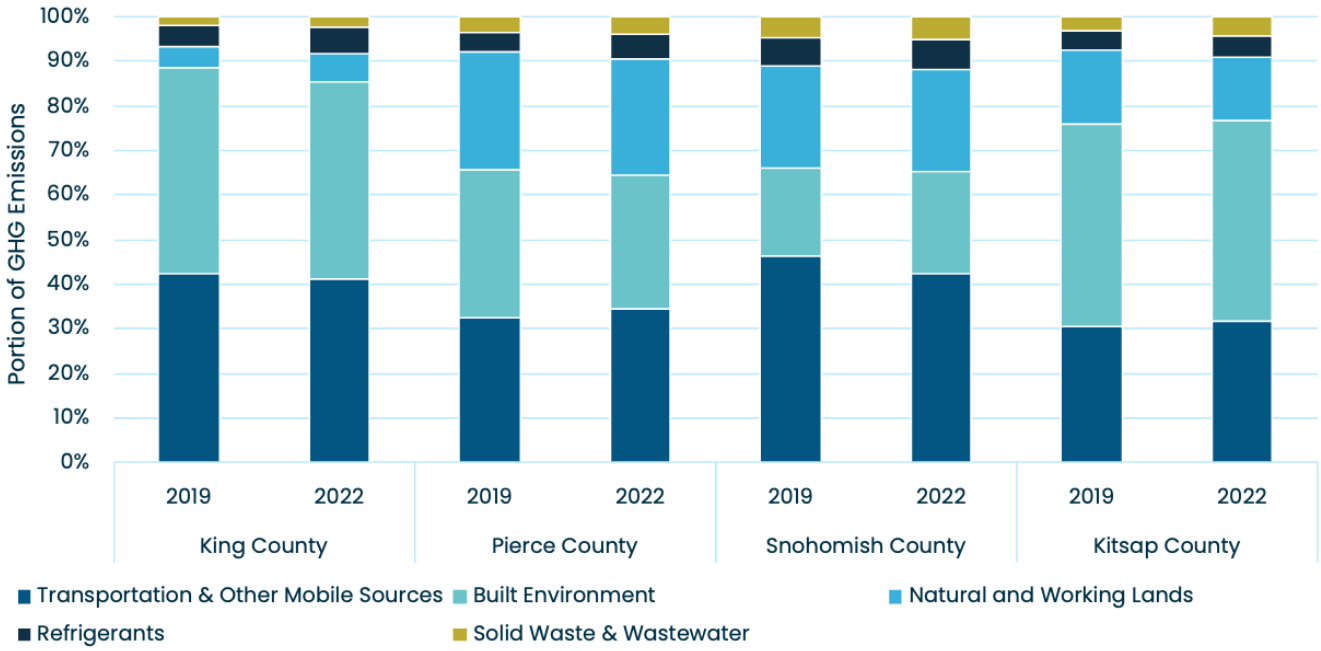


Figure A-2 shows the percentage contribution of each sector to total greenhouse gas (GHG) emissions by county for 2019 and 2022. The figure highlights how the sectoral composition of emissions has changed over time within each county.

Figure A-2. Sector Percent of Total GHG Emissions, by County for 2019 and 2022.



Appendix B: Quantified Emission Reductions

Strategy 1.1: Build Low-Carbon New Buildings.

This strategy assumes that at least some amount of housing and commercial space are being constructed with non-renewable natural gas to fuel space heating and domestic water heating. Under this strategy, developers/builders/owners would be incentivized to install non-fossil-fuel heating such as heat pumps or electric resistance heating. Since new residential construction is much larger than new commercial construction in terms of square footage and energy, and because commercial square footage is harder to predict, new commercial construction is omitted for this calculation.

The basis for the calculation is:

- The full action sum is residential space heating + domestic water heating.
- The average amount of annual energy used in a new housing unit is about 299 therms; the average for domestic water heating per household is about 18 therms.
- Therms are converted directly to carbon dioxide equivalent (CO_2e) emissions.

Strategy 1.2: Reduce Energy Use in Existing Buildings.

This strategy assumes that the energy need of existing buildings (residential and commercial) can be reduced through basic weatherization and more efficient lights and appliances. Greenhouse gas (GHG) emissions reductions will occur because of decreased use of GHG emitting fuels (natural gas) and reduced electricity consumption. Weatherization includes replacing windows, sealing leaks, adding insulation, and adding weather stripping. More efficient lights and appliances means replacing incandescent bulbs with LED bulbs, replacing appliances such as refrigerators, dishwashers with more efficient devices, and replacing cooking stoves with electric devices.

The basis for the calculation is:

- The action sum is the weatherization + appliances + lights.
- Weatherization assumes the house was using natural gas with the average annual consumption that would be replaced with electric powered heating.
- Average natural gas use per house is assumed to be 299 therms/year.
- Weatherization assumes an average of 18% reduction in annual energy consumption per house.
- Appliance upgrades assume an average kilowatt-hour (kWh)/year saved per appliance, applied to the total number of appliances. The average per appliance is the average of the four main device types (refrigerator, dishwasher, clothes washer, clothes dryer). The average value is 256 kWh/year saved.
- Light bulb savings described in references.
- Savings from appliances and light bulbs is the reduction in emissions from the electricity that would have been needed to power them. We use the current electric grid carbon intensity of Washington (Note: electricity reductions are conservatively treated as coming from a larger grid (e.g., Pacific Northwest grid) because the marginal production resources are generally limited and shared in this regional grid).
- To simplify and reduce the chances of double counting, water heating (residential and commercial) is calculated as part of Strategy 1.3. Domestic appliances are all included in this strategy (Strategy 1.2).

Strategy 1.3: Electrify or Decarbonize Existing Buildings.

This strategy assumes GHG emissions from existing buildings (residential and commercial) can be reduced by 1) changing the space heating to electricity or non-fossil fuel, and by 2) converting the domestic water heating (bathrooms, showers, wash sinks, clothes washing) to electricity for both residential and commercial buildings.

The basis for the calculation is:

- Average house uses 365 therms/year of natural gas for space heating.
- Average house uses 175 therms/year of natural gas for water heating.
- For commercial water heating, we used national averages for commercial buildings and calculated a per-capita annual use. For the maximum scenario, the total (100% of the per-capita scaled up to PSCAA population) was set as the amount converted. The range of heating devices, buildings, and equipment is too large to model (bottom up) on a per heater or per building basis.
- Other domestic appliances (natural gas stoves and dryers) are not included in Strategy 1.3 to reduce the potential of double counting. Instead, they are included in Strategy 1.2.

Strategy 1.4: Increase Solar Adoption.

This strategy assumes GHG emissions reductions would occur by decreasing the amount of fossil fuel (high GHG emitting) power generation needed. Current state law Clean Energy Transformation Act (CETA) requires that the state's electricity production be net-zero by 2030 (offsets allowed) and zero-carbon by 2045. For the purposes of an overall GHG emissions inventory, it is unclear how to define this action so that it is above-and-beyond CETA for net GHG emissions after 2030.

The basis for the calculation is:

- The assumed, nominal kW of new solar installed on the buildings.
- The installed kW is converted to an annual kWh produced through a factor calculated by NREL.
- The kWh produced is converted to grams CO2e emitted based on the current emission factors of electricity delivered to the plug in Washington (Ecology GREET model).

Strategy 1.5: Reduce Industrial Emissions.

This strategy assumes that most industrial greenhouse gas emissions result from combustion of natural gas or petroleum-derived fuels such as fuel oils, or heavy oils. We consider natural gas to be a suitable proxy for general greenhouse gas reduction approaches and calculations, given three key factors–(1) natural gas is the dominant fuel type in this sector, (2) other petroleum fuels have similar thermal properties per BTU of energy delivered, and (3) emissions reduction actions vary across industries.

We model this sector by assuming industries can reduce their GHG emissions through three actions: (a) reducing the amount of natural gas they need to use (efficiency), (b) replacing some amount of fossil natural gas with renewable natural gas, or (c) electrifying or using a low-/no-GHG energy source (e.g. green hydrogen, sustainable biomass, etc.). Since the Climate Commitment Act (CCA) requires these actions, defining them as "above-and-beyond" what the CCA mandates remains unclear. The CCA already includes a significant number of emission credits that will decline over time. However, some actions may plausibly drive additional reductions beyond the levels the CCA would achieve alone.

The basis for the calculation is:

- Beginning with the total energy content of the natural gas or fossil fuels that are being replaced with renewable natural gas, electricity, or other low-carbon energy sources.
- The total energy content is then multiplied by carbon/GHG emissions factor from known references.

Strategy 1.6: Reduce Embodied Carbon from Building Materials.

This strategy counts the carbon emissions needed to produce the most common building materials: steel and concrete. Emissions reductions can occur by obtaining steel and concrete manufactured with low-carbon methods. Since these actions were not considered to be part of the geographic emission inventory and wedge analysis, it is unclear how they could be included in a wedge analysis.

The basis for calculation is:

- The number of tons of low-carbon steel or substitute used.
- The number of tons of low-/zero-carbon cement used.
- The emissions per ton of low-carbon steel using manufacturers values.
- Current cost for carbon capture from concrete production.
- The emissions reduction is the total tons of the material multiplied by the respective emission/reduction factor.

Wedge Analysis: A graphical analysis of greenhouse gas emissions over time with portions of the overall emissions (the top line) shown as distinct layers, or wedges. This is usually illustrated as a stacked area chart. The wedges can be selected to illustrate different emissions sectors, policies, or other contributions to emissions or reductions.

Strategy 1.7: Cross-cutting Built Environment Actions.

This strategy cannot be quantified.

Strategy 2.1: Reduce Vehicle Miles Traveled of On-Road Passenger Internal Combustion Engine Vehicles.

This strategy aims to reduce internal combustion engine (ICE) vehicle miles traveled (VMT) by reducing the number of miles and trips needed or required by ICE vehicle owners. This is enacted by promoting and enabling non-vehicle transit such as walking, biking, and mass transit, and through better or more bicycle and pedestrian paths. This strategy also aims to reduce the distance needed to travel or reach transit (growth, land-use, and housing density). Conceptually, replacing ICE vehicles with zero-emission vehicles (ZEV) would produce the same result; however, to keep the actions simpler and reduce the risk of double counting, this action is included in Strategy 2.2. Significant development of transit and growth/land-use are a core part of existing regional planning efforts.

The basis for the calculation of general transit expansions and land-use planning:

- The baseline total annual VMT for passenger vehicles in the Puget Sound.
- The assumed reduction in total VMT for those vehicles.
- Emissions reductions corresponding to the reduced VMT are calculated from the average GHG per mile driven for the Puget Sound region.

For active transportation (walk/bike/scoot) enhancements:

- The number of people living within ½ mile of new bike and pedestrian paths.
- Emissions reductions for bikes/pedestrians come from daily VMT reduction per 1000 people, using rates published by PSRC.

Strategy 2.2: Increase Sales and Use of On-Road Passenger Electric Vehicles and Promote Low-Carbon Fuel Alternative.

This strategy aims to reduce emissions by replacing ICE vehicles with ZEVs, and increasing their use, or preference, over ICE vehicles. Since increasing ZEV sales is required by the state's ZEV mandate, it is not clear if this strategy should be considered above-and-beyond what would have already been required. If ZEV sales do meet or exceed the targets of the ZEV mandate, then any additional effort would be above-and-beyond.

The basis for the GHG reduction calculation is:

- The assumed number of new ZEVs sold and into regular use.
- The average number of miles driven per vehicle per year.
- The average gCO2e/mile per ICE vehicle in the Puget Sound.
- The total emissions is the product of ZEVs * miles/ZEV * gCO2/mile.

Strategy 2.3: Electrify or Reduce the Carbon Intensity of On-Road Medium- and Heavy-Duty Freight and Service Vehicles.

This strategy aims to reduce emissions from the heavy duty on-road sector. The actions in this strategy include: a) increased heavy-duty EV sales and the number in use, and b) substitution of low carbon intensity (CI) fuels for petroleum fuels. Similar to other sectors, both the ZEV mandate (slower/delayed ramp compared to light duty) and the Washington low-carbon fuel standard (CFS) require that these actions occur. Thus, it is unclear if these actions would be above-and-beyond the regulations, unless the activity levels have reached or exceeded the targets.

The basis of the GHG reduction calculation for a) is:

- The assumed number of heavy-duty EVs purchased and put into use instead of an ICE powered vehicle.
- The typical number of miles driven per day for heavy-duty EVs.
- Average gCO2/mile for heavy duty vehicles based on BTS statistics.
- The total GHGs reduced is the product of # EVs * miles/EV * gCO2/mile.

The basis of the GHG reduction calculation for b) substituting low-CI fuels is:

- The volume and carbon intensity (CI) of petroleum fuel that is being replaced with a low-CI fuels.
- The median CI of renewable diesel currently verified in California's CFS.
- The net (%) reduction in carbon, CI(petroleum) – CI(low-CI RND).
- The total GHGs are then the product of the net % reduction and fuel volume.

Strategy 2.4: Electrify or Reduce the Carbon Intensity of Heavy-Duty Transit Vehicles and Ferries.

This action primarily refers to buses, trains, and ferries for passenger travel within the Puget Sound. These are owned and operated by government agencies and can be targeted for replacement or upgrade in response to funding and priorities. There are two main activities in this strategy: 1) replacing combustion engines/vehicles (overwhelmingly diesel) with battery electric vehicles, or 2) substituting petroleum diesel with lower CI fuel such as biodiesel and renewable diesel. While ferries have the same two options for technology/equipment changes, their use is sufficiently different from on-road buses that are quantified separately.

The basis for the GHG calculations for 1) buses converting to (battery) electric:

- number of buses assumed to be replaced.
- assumed daily or annual miles per bus.
- estimated average gCO2e/mile for heavy duty diesel vehicles.
- the total is then the product of the number of buses * miles * gCO2e/mile.

The basis of the GHG reduction calculation for 2) substituting low-CI fuels is:

- The volume and CI of petroleum fuel that is being replaced with a low-CI fuel.
- The median CI of renewable diesel currently verified in California's CFS.
- The net (%) reduction in carbon, CI(petroleum) – CI(low-CI RND).

The basis for ferries is similar to the EV conversion and fuel substitution:

- The number of ferries.
- The average annual fuel used per ferry is calculated from data provided by the State Ferries system.
- The baseline carbon intensity is assumed to be from a 50:50 split of petroleum diesel and renewable diesel. This means assuming the entire ferry system otherwise reaches a 50% blend of renewable/petroleum diesel for their entire annual fuel use.
- The total GHG reduction is then the baseline carbon intensity * volume of fuel per ferry * number of ferries

Strategy 2.5: Electrify or Reduce the Carbon Intensity of Off-Road Equipment.

This strategy refers to a broad range of equipment that is off-road. This includes small residential lawn and garden equipment such as tillers, mowers, trimmers; larger commercial equipment, mowers, chainsaws, chippers, mixers, yard carts, golf carts, generators; and large construction and industrial equipment such as bulldozers, excavators, backhoes, fork lifts, cranes, etc.

GHG reduction activity in this sector relies on replacing equipment with electric equipment and substituting low carbon-intensity (CI) fuels for petroleum fuels. The reductions due to substitution of low-CI fuels are identical to the calculations in Strategy 2.4 and are not repeated here. For replacing equipment with electric equipment, the fuel use across the full range of equipment is not readily available, so we treat the sector as being represented by: 1) generic mid-sized construction equipment with median fuel usage and 2) small equipment/engines such as mowers.

For the mid-sized construction equipment:

- The typical number of hours used per piece of equipment per year varies greatly, with very little data. There are reasonable reports of fuel use per hour, and so the total hours is made the independent (assumed) value. This also allows emissions to be evaluated on a construction project basis, rather than limiting it to just equipment owners. For example, a construction project could estimate that they'll need 1000 hours of combined time for backhoe, bull dozers, graders, and compactors. The GHG reductions of specifying the use of electric equipment could be evaluated.
- The typical fuel use per hour comes from the median of hourly fuel use reported by Caterpillar (CAT) from their telematics for current equipment in the field.
- The GHG emissions per gallon of (presumed) petroleum diesel fuel.
- The total GHG reduction is then the number hours of equipment use that will be electric * the average fuel use per hour * emissions factor.
- The emissions from the electricity generation could also be subtracted from this, however the carbon intensity in 2030 will be low enough that for most estimation purposes it rounds to zero.

For small equipment/engines:

- The total number of pieces of equipment that are replaced with (battery)electric equipment.
- The average emissions per hour, which is a function of the fuel consumption and closely related to the engine size. The engine size is assumed to be mid-sized for the residential market.
- The average number of hours is assumed to be the typical hours for mowing per household each year.
- The total emissions are the total number of pieces of equipment * average emissions/hour * average number of hours per equipment.

Strategy 2.6: Electrify or Reduce the Carbon Intensity of Aviation Vehicles and Equipment and Reduce Air Travel.

This strategy refers to the fuel consumed by aircraft, primarily commercial passenger aircraft at Sea-Tac Airport. There are two primary actions in this strategy: 1) reduce the total amount of aviation travel, and 2) substitute conventional petroleum derived aviation fuel with renewable jet fuel that has a lower carbon intensity.

The GHG reductions from 1) are calculated by:

- Identify/assume the total number of gallons of aviation fuel that have been reduced from previous years.
- The emission factor for aviation fuel at the Sea-Tac Airport.
- The total GHGs are the product of the total number of gallons and the emission factor.

For 2), the calculation is similar but the difference in fuel CIs must be calculated. The calculation uses:

- The total volume of petroleum-based jet fuel to be substituted with renewable (low carbon) jet fuel.
- The median carbon intensity of the jet fuel obtained from the currently verified pathways in California.
- The total GHG reduction is the difference in carbon intensities * the volume of jet fuel being substituted.

Strategy 2.7: Electrify or Reduce the Carbon Intensity of Off-Road Marine and Rail Vessels, Vehicles, and Equipment.

This strategy refers to fuel consumed (diesel) by ocean going vessels (cargo ships and cruise ships), harbor vessels (tugs and miscellaneous boats), cargo rail in rail yards and trains passing through the region, and by cargo handling equipment in the terminals. For ocean going vessels, the primary method for reducing emissions in the short- to medium-term (5-10 years) is to replace the fuel with a lower carbon intensity (CI) "drop-in" fuel. Longer-term (10-30 years) activities will likely bring more significant changes (e.g., battery electric for some harbor vessels, and hydrogen or alternative power generation and fuels for ocean going vessels). Additionally, many vessels produce a significant amount of emissions when they are docked, so supplying electric power to the vessels through shore-power is also an important tactic. For rail, there is currently limited interest in battery-electric conversion, so the primary tactic is substitution of low-carbon fuels. For cargo handling, many pieces of equipment can and are being electrified. The three actions for this strategy are: 1) substitution of low-carbon fuels, 2) expanding shore-power availability and use, 3) replacement of cargo handling equipment with battery electric equipment.

For substituting low-carbon fuels, the calculation is similar to other sectors:

- The assumed volume of petroleum-based fuel that will be substituted with low carbon-intensity fuel.
- The median carbon intensity of the low carbon-intensity fuel.
- The reduction is then the product of the volume of petroleum-based fuel that will be substituted with low carbon intensity fuel and the net reduction in carbon intensity.

For expanding shore-power availability and use:

- The number of kilowatt hours for which shore power is being substituted.
- A typical number of kilowatt hours generated per gallon of diesel fuel burned.
- From this calculate the equivalent gallons of diesel fuel burned.
- The GHG emission factor for petroleum diesel.
- The total GHG emissions are then the product of the equivalent gallons of diesel fuel burned and the GHG emission factor.

For the replacement of cargo handling equipment with battery electric equipment:

- The assumed number of pieces of equipment replaced.
- The average fuel consumed per piece of equipment comes from Port of Seattle estimates.
- The total GHG reduction is then the product of the number of pieces of equipment replaced and the average fuel consumed per piece of equipment.

Strategy 2.8 Cross-Cutting Transportation Actions.

Streamline permitting for construction of electric generation, transmission and storage projects. This strategy cannot be quantified.

Strategies 3.1-3.4: Divert Construction and Demolition Materials from Landfills.

This sector includes solid and liquid wastes that are ultimately sent to landfills or sewage treatment facilities. In the solid waste subsector, we consider construction and demolition (C&D) waste separately from waste material collected at residences and businesses (curbside) and waste material taken to transfer stations by commercial or residential parties. The important solid wastes to note are organic materials and other recyclable materials such as paper, plastics, and metals. Liquid waste is solely referring to emissions from the sewage treatment facilities from processing the organic matter in the sewage.

Strategy 3.1: Divert Construction and Demolition Materials from Landfills

For C&D, the reduction calculations uses a unit factor that comes from the EPA WARM v16. For these scenarios:

- Use national defaults and typical values.
- A convenient input value (such as 1000 tons) is entered for Construction Materials, Dimensional Lumber, and for Structural Steel.
- The net change (Alt – Base) is obtained from the Summary Report page.
- The change is divided by the respective input value to obtain a reduction per unit (ton) input.
- The unit factor is then multiplied by the assumed tons of dimensional lumber or structural steel.

Strategy 3.2: Divert Other Recyclable and Compostable Materials from Landfills

For general solid waste, most of the GHG emissions are due to the anaerobic breakdown of organic matter that produces methane. In most landfills, the deposited waste remains in place for many months to years before it is covered and the gases are collected for energy production or use in other applications. So, the net effect of several actions can be represented by reducing the amount of organic matter that is sent to be landfilled.

This calculation uses:

- Similar to C&D, except the Material is Food Waste, under the Material Type, Food Waste.

For recyclable materials, the steps are the same as C&D, except Material is Mixed Recyclables under the Material Type, Mixed Materials.

Strategy 3.3: Cross-Cutting Solid Waste and Wastewater Actions

For liquid waste and solid waste, methane emissions could potentially be collected and used as a substitute fuel. The GHG reduction is calculated as follows:

- The assumed MMBTU of natural gas collected.
- Convert the MMBTU to MJ using standard factor.
- Use gCO2e/MJ factor to convert the energy to CO2e emissions.

Strategy 3.4: Cross-Cutting Solid Waste and Wastewater Actions

Support markets and infrastructure for additional recycled materials.; reduce emissions from other waste handling processes; and reduce per capita waste disposed of in landfills.

Strategies 4.1-4.2: Natural and Working Lands Sector Activities.

This sector describes the CO2e emissions from natural and working lands, and other potential sequestration activities on and in lands. The largest contributors to this sector in our region are emissions from soil, both after harvesting trees and from land use changes such as the removal of tree and plant cover and covering over soils with organic matter in the top layers.

Two strategies in this sector can be described sufficiently well to be quantified. Since these are also the two largest actions in this sector, they are considered sufficient to represent it.

Strategy 4.1: Steward Natural Lands to Reduce Tree Loss

Tree planting is not a reduction in CO2e emissions, but rather an increase in sequestration. The sequestration from planting trees is quantified using:

- The assumed number trees to be planted.
- The average CO2 uptake per tree per year .
- The total GHG sequestered is the number of trees * average uptake per year per tree.

Strategy 4.2: Steward Natural Lands to Increase Carbon Sequestration and Reduce Emissions

For protecting from deforestation, the calculation uses:

- The number of hectares (ha) that are being protected.
- A representative central value of total emissions per ha from this area from the last 20 years.
- The total amount of emissions reduced (emissions loss from soils) is then the product of the number of hectares and the emission factor for protected lands.

Strategy 5.1-5.3: Refrigerants Sector Activities.

This sector addresses the key working fluid hydrochlorofluorocarbons ((H)(C)FC) for a range of devices that move heat, including air conditioners, heat pumps, and freezers. These are found in many stationary sites and in mobile sources like cars, trucks, and some refrigerated trailers and train cars. While many refrigerant devices are located in the built environment, refrigerant strategies are categorically different from the overwhelming majority of other strategies in the built environment. Thus, we group refrigerants in a separate category.

The primary action causing CO2e emissions is the release, either accidental or through small leaks during normal use, of the refrigerant into the atmosphere.

Strategy 5.1: Reduce the Use of High-GWP Potential Devices and Increase Recovery of High-GWP Refrigerants

Emissions reductions are calculated as:

- The number of devices being replaced.
- The number of grams of refrigerant from typical refrigerators/freezers.
- The average carbon intensity per unit mass from recent IPCC inventories.
- The emissions are then product of devices * grams/device * CO2e/gram.

Strategy 5.2: Reduce Refrigerant Leaks from Commercial and Industrial Systems

For monitoring and fixing leaks on large commercial and industrial systems, the calculation is:

- The number of systems identified and being fixed.
- An approximate ratio of the distribution of small:medium:large commercial/industrial systems.
- The range of values of coolant load(charge/content) for small, medium, and large systems, from which we calculate the center of the range. We assume this is sufficiently representative of the average.
- The average annual leak rate of commercial systems is multiplied by each range's central value.
- The average leak for small, medium, and large systems is then multiplied by a weighted fraction of the total number of systems repaired.
- The total is the sum of the three size bins.

Strategy 5.3: Promote, Subsidize, and Enable Recovery of High GWP Refrigerants from Old Devices

For increasing the collection of refrigerants from old devices (CFC-12) being scrapped, the calculation is:

- The number of old devices that were recovered
- The average refrigerant load per device
- The GWP/coolant mass for CFC-12 (10,200)
- The total CO2e reduction is then the product of the number of devices, the average coolant per device, and the GWP ratio.

Strategies 6.1-6.2: Consumption Sector Activities.

This sector includes all the GHG emissions that are indirectly caused by the people and organizations within the region, but that aren't included in any of the sectors above. We divide it into two subsectors: food and general goods.

In terms of general emissions accounting practices, we consider consumption emissions to be Scope 3, while all other sectors above are mostly Scope 1 (with some Scope 2 and Scope 3 in the waste sector). Depending on how (or if) other regions, states, and countries are conducting emission inventories, or promoting GHG emissions reductions, a consumption-based analysis (Scope 3) may be double-counting or catching emissions that were otherwise missing. Since our most recent comprehensive GHG inventory (2019) was geographic and not consumption, we don't have benchmarks to track future progress made on consumption emissions. Thus, it is not possible to include consumption-based activities in our projections (wedge analysis), and it is unclear how much they overlap with the items described above.

Strategy 6.1: Reduce Food Waste and Promote Low-Emission Dietary Choices

For the food-focused subsector, GHG emissions from the decomposition of discarded food are included in the waste sector, while GHG emissions from growth, processing, and shipping would remain in this sector. We could not identify any actions in this subsector that directly resulted in reduced emissions, such as reduced food production or delivery.

Strategy 6.2: Promote Circular Economy for General Goods

For the general goods and circular economy subsector, there are two basic modes of action: a) reducing the need to purchase new items to replace old ones by extending the life or repairing existing items, and b) increasing the amount of materials that are recycled thereby reducing the amount of raw material that needs extracting. We did not identify any actions that would be considered additional to the actions in the waste sector for mode a). Actions for mode b) that are aimed at increasing recycling and reducing landfilling are included in the waste sector.

Appendix C: Benefits Analysis

The actions in this climate plan will result in many co-benefits. Some co-benefits can be readily quantified. For others, quantification remains challenging for three main reasons: a) the action can't be separated from several other actions, b) the uncertainty is too large, or c) there is very little or no data on one or more components of a calculation.

For actions where co-benefits are quantified, a considerable range exists in the resulting values due to uncertainties in the specifics of the action (e.g., location, normal ranges in use, efficiency, capability of alternatives/replacements, etc.) or changes or variability in the base rate/background/context. As a result, all co-benefit values are intended to be illustrative or representative of a range; smaller or more isolated actions may have very different values.

The key co-benefits that can be quantified are:

1. Air pollutant reductions:
    - Reducing fine particulate matter ($PM_{2.5}$), which contributes about 90% of the cardiovascular risk from air pollution. Additionally, $PM_{2.5}$, particularly from diesel exhaust, contributes about 85% of the potential cancer risk from air pollution.
    - Reducing other air pollution types. For our analysis, we focus on volatile organic compounds (VOCs) as they also contribute to potential cancer risk.
2. Fiscal health benefits from reduced pollution.
3. Reduced operating costs.

The key co-benefits that are not as easily quantified are:

1. Pollution reductions for demographics that are currently experiencing the highest pollution or risk levels.
2. Protection or improvement of the natural environment.
3. Creating job opportunities or expanding demand for high-quality jobs.
4. Reducing natural resource consumption and support for a circular economy.
5. Improving indoor air quality and reducing combustion safety hazards (carbon monoxide poisoning, reducing impacts of gas cooking)
6. Reducing energy burden
7. Improving climate adaptation/resilience through HVAC cooling, weatherization

Section 1 describes how co-benefits 1-3 are quantified. Section 2 includes a semi-quantitative or qualitative discussion of the remaining co-benefits.

Section 1: Quantified Co-Benefits

Air pollutant reductions

BUILT ENVIRONMENT

The calculation for the $PM_{2.5}$ reduction is generally as follows:

(1) $PM_{2.5}$ reduction (kg, lb, or ton) =
reduction in fuel (kg, lb, gal, ton, MMBtu) × $PM_{2.5}$ emissions per unit of fuel

For natural gas-based actions (e.g., space heating, water heating, industrial process heating), we use the EPA's emission factor for stationary gas turbines[1]: 6.6 × 10^{-3} lb/MMBtu (EPA Table 3.1-2a), which aligns with AP-42 values for residential furnaces[2]. This factor is assumed to represent broader natural gas combustion, though it may underestimate emissions from older or poorly controlled systems.

Volatile organic compound emissions reductions from built environment natural gas reductions follow the same equation as the $PM_{2.5}$ reductions, except they use a volatile organic compound emission factor and use the same source documents.

For the building materials strategy (steel) in the Built Environment, the baseline $PM_{2.5}$ emissions factor comes from EPA documents that describe typical process emissions for steel production from raw materials (iron ore and coal)[3]. We assume that green steel production has a higher recycled content, reducing the need for raw ore and coal (for coking). As a result, the $PM_{2.5}$ emissions reductions are just the baseline $PM_{2.5}$ emissions of producing the steel from raw materials, which is primarily from making and burning the coke. The volatile organic compound emissions make the same assumption and use the same emission factor source documents.

TRANSPORTATION

In the transportation sector, $PM_{2.5}$benefits from actions that reduce GHGs from internal combustion engines are calculated through their reduction in the number of miles driven. The calculation is generally:

(2) $PM_{2.5}$ reduction (kg, lb, or ton) =
$PM_{2.5}$/mile × total number of miles (not driven by gasoline/diesel vehicle)

The emission factor ($PM_{2.5}$/mile) comes from the total $PM_{2.5}$ currently emitted by the passenger vehicle fleet from EPA's CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA), and from the total miles driven by passenger vehicles. The total passenger miles driven in the Puget Sound comes from the 2019 PSREA which reported annual passenger vehicle mileage for King County. Since the four-county jurisdiction is close to twice the population of King County, the King County annual mileage is scaled up by a factor of 2.

The volatile organic compounds are calculated similarly, with the emissions from the EPA COBRA model. The ratio of their emissions is applied to the $PM_{2.5}$ reduction:

(3) VOC reduction (kg, lb, or ton) =
$PM_{2.5}$ reduction (kg, lb, or ton) × ratio of VOC emissions to $PM_{2.5}$ emissions (from COBRA)

[1] https://www.epa.gov/sites/default/files/2020-10/documents/c03s01.pdf
[2] https://www3.epa.gov/ttnchie1/ap42/ch01/final/c01s04.pdf
[3] https://www.epa.gov/sites/default/files/2020-11/documents/b12s0501.pdf

For actions that increase the number of electric vehicles (EVs) on the road, emissions reductions are assumed to be due to an EV substituting for the combustion engine vehicle, and the resulting tailpipe emissions for that vehicle being zero. Emissions are calculated from the combustion engine per mile, times the average annual mileage per car. The average number of miles per vehicle comes from Kelly Blue Book report of WA state average[4]. In equation form:

$$(4)\ PM_{2.5}\ reduction = PM_{2.5}\ reduction\ per\ EV \times number\ of\ EVs \times average\ mileage\ per\ vehicle$$

The VOC reduction is calculated by scaling the $PM_{2.5}$ emissions reduction by the VOC:$PM_{2.5}$ ratio as described above.

For the heavy-duty sector where diesel engine vehicles are replaced with EV (transit EV buses and ferries), we assume all the $PM_{2.5}$ emissions of the diesel vehicle are eliminated, so only need to calculate the $PM_{2.5}$ emissions. For this, we use the GHG emissions calculated based on the activity and apply a ratio of $PM_{2.5}$ to carbon dioxide equivalent (CO2e). For the ratio, we use Bureau of Transportation Statistics table of $PM_{2.5}$ and CO2e emissions[5] obtained from MOVES5. From these data we calculate a ratio of g $PM_{2.5}$:MT CO2e. In equation form:

$$(5)\ PM_{2.5}\ (heavy\ duty\ truck)\ reduction = MT\ CO2e\ reduction \times g\ PM_{2.5} / MT\ CO2e$$

The VOCs reduction is calculated with a ratio, like above, with the VOC:$PM_{2.5}$ ratio obtained from EPA's COBRA[6] model of emissions in the four-counties.

For the heavy-duty sector where biodiesel (BD) and renewable diesel (RD) are used instead of petroleum diesel, the $PM_{2.5}$ reduction is about 29% of the volume of RD blended in (used). There is a range in reduction based on the blend percentages of each and the pollution control technology of the engine and can range from none to a bit over 50%.[7] Since the range is large and an aggregate number is difficult to predict, we use a central value, 29%, from an analysis for California[8]. The $PM_{2.5}$ reduction calculation is similar to above, except the reduction is 29% rather than (implicitly) 100%. In equation form:

$$(6)\ PM_{2.5}\ (heavy\ duty\ truck)\ reduction = MT\ CO2e\ reduction \times g\ PM_{2.5} / MT\ CO2e \times 0.29$$

For ferries, we similarly assume that GHGs reduced are due to electrification, so the calculation is identical to that for the electrification of formerly diesel buses.

OFF-ROAD/NON-ROAD

The off-road and non-road sectors include a wide range of equipment, vehicles, and uses that make it impractical to calculate emissions by individual inventory subsectors. Instead, we assume that we can represent emissions by two proxies that are both large and conceptually representative:

- Non-road heavy duty equipment (backhoes, bulldozers, forklifts, cranes, etc.)
- Small equipment (lawn care equipment like mowers, trimmers, edgers, etc.).

Further details are provided in Appendix B: Quantified Emissions Reductions.

[4] https://www.kbb.com/car-advice/average-miles-driven-per-year/#average-mileage-by-state
[5] https://www.bts.gov/content/estimated-national-average-vehicle-emissions-rates-vehicle-vehicle-type-using-gasoline-and
[6] https://cobra.epa.gov/
[7] https://ww2.arb.ca.gov/sites/default/files/2021-12/Low_Emission_Diesel_Study_Final_Report_12-29-21.pdf
[8] Gladstein, Neandross & Associates (2017), Renewable Diesel as a Major Transportation Fuel in California: Opportunities, Benefits and Challenges

Construction equipment

We assume reductions result from replacing diesel-powered equipment with electric (battery-powered) alternatives, many of which are already commercially available. The $PM_{2.5}$ reduction is then calculated as in previous examples [equation (5)] by calculating the full $PM_{2.5}$ emissions and assuming that this is being eliminated. The VOCs are scaled from the $PM_{2.5}$ using the same approach and ratio as other equipment [equation (3)].

Smaller equipment

We assume the performance and emissions of small engines are representative of a larger group of equipment used in landscaping, construction, and forestry. The overall approach is the same as equation (5), but the emission factor (per MT CO2e) is calculated from EPA[9] emission factors, using a central value for small spark ignition engines. These factors are likely an underestimate for the subsector of gasoline 2-stroke chainsaws used for forestry. However, this underestimation is not significant for this plan, as most of that equipment operates far from population centers and has limited direct human impact. Additionally, the volatile organic compounds are calculated by scaling from the $PM_{2.5}$ emissions as in equation (3), with the hydrocarbon (HC):$PM_{2.5}$ ratio coming from the same emission factor reference.

AVIATION

For the aviation sector, evidence suggests that bio-derived jet fuel (Sustainable Aviation Fuel or SAF) produces significantly less $PM_{2.5}$ emissions compared to the petroleum-based standard fuel. Since there are no accepted standard value for the reduction, we note that literature reports 20-80% reductions, as a function of the SAF fuel volume blended in, depending on the throttle setting, etc. Therefore, we assume a 50% reduction (of the blended volume) is sufficiently representative for this plan. The $PM_{2.5}$ reduction can therefore be calculated similar to equation (6) except the reduction is 50% rather than 29%.

MARINE & RAIL

In this subsector, we have three proxy actions: 1) substitution of lower carbon-intensity biofuels, 2) installation and use of shore power at ports, and 3) electrification of cargo handling equipment (CHE) at terminals. The low-GHG biofuels could be used by train engines, ships at port, or cargo handing equipment, For the substitution of low-GHG biofuels, the diesel fuel is similar to diesel used in other on-road and off-road applications, so we apply the same calculation approach as in equation (5), and the emission factor is assumed to be the same as for on-road and off-road diesel used previously. For the installation and use of shore power, the metric of the action is the number of kWh delivered to ships using shore power, which would then displace power that would have been generated by diesel engines. The kWh delivered is converted to a number of gallons of diesel that would be needed to generate that electricity, using a fuel consumption per kWh delivered factor from a commercial generator manufacturer.[10] From the equivalent fuel consumed, we apply the same approach as equation (5). For the electrification of cargo handling equipment, we assume that the equipment was powered by diesel and therefore the previous approach can be used (equation (5)) but with the appropriate amount of diesel fuel consumed by the CHE, assuming 6,000 gallons per year per vehicle. From the diesel fuel consumption being displaced we calculate the MTCO2e and proceed with the equation (5) using the same $PM_{2.5}$:CO2e emission factor.

[9] EPA (2010), Exhaust Emission Factors for Nonroad Engine Modeling – Spark-Ignition, NR-010f, EPA-420-R-10-019, July 2010.
[10] https://www.generatorsource.com/Diesel_Fuel_Consumption.aspx

WASTE

For the waste sector, we have both solid waste and wastewater. For solid waste there are three actions that are quantified but only one has air pollution co-benefits that we can calculate. The first is diverting construction and demolition (C&D) materials from landfilling, with steel and wood being the two largest materials that can be quantified. The second action for solid waste is the reduction of compostable material being landfilled, which produces methane. The third action, which is the capture of methane, will be addressed below with wastewater.

For recycled steel, we assume that the recycled material displaces steel that would otherwise be produced from raw materials. In the production of steel from ore, coal is consumed to produce coke. The production of coke, and then its combustion to reduce the ore, results in the majority of $PM_{2.5}$ emissions. $PM_{2.5}$ emissions are calculated from an emission factor that is the sum of emissions from the coking and combustion steps, obtained from EPA AP-42, selecting moderate to low-end values when possible.[11] The supplied factors are per mass of coal input, which we convert to CO2e. In equation form:

$$(7)\ PM_{2.5}\ (\text{steel production from ore})\ \text{reduction} = \text{MT CO2e reduction} \times g\ PM_{2.5}/\ \text{MT CO2e(from coke production and combustion)}$$

Where the emission factor is:

$$(8)\ g\ PM_{2.5}/\text{MTCO2e (coke production \& combustion)} = \Sigma\ \text{of}\ gPM_{2.5}/\text{Mg (coal input) for 7 steps} \times \text{C content of bituminous coal (67\%)} \times \text{CO2:C ratio}$$

For wood reclamation from C&D, there was no clear step where $PM_{2.5}$ or air pollution reductions would occur, apart from reduction in landfill methane gas, which is addressed in the following section.

Reclaiming C&D wood would reduce the need for harvesting trees, resulting in a reduction in $PM_{2.5}$ because fewer new trees would be cut down and shipped to a lumber mill. However, any reclaimed wood would likely need to be shipped to one or more processing centers to sort, evaluate, clean/prep, or reprocess the wood. Since there is a broad range of materials that can be reclaimed (structural/dimensional, boards/decking, flooring, cabinets and furniture), and their lifecycles are unknown, we are not able to identify a clear or net $PM_{2.5}$ or volatile organic compound reduction from this action.

The third action, reduction in compostable materials going to landfill, does not have a clear air pollution benefit because its GHG impact is primarily the methane emissions from landfill before collection.

WASTEWATER

For both wastewater and solid waste (landfills), the breakdown process naturally produces significant amounts of methane. Methane can be captured, processed into renewable natural gas (RNG), and used to fuel a range of natural-gas powered vehicles or processes, including trucks and buses, industrial or commercial heaters, and others. Here we assume that the RNG is used to displace diesel in trucks or equipment. The $PM_{2.5}$ emission factor for newer (2008+) diesel and NG are close enough that it is not clear that this application would produce a net reduction in $PM_{2.5}$ emissions. Thus, we assume there is no net $PM_{2.5}$ reduction for these applications.

[11] https://www3.epa.gov/ttnchie1/old/ap42/ch12/s02/final/c12s02.pdf

NATURAL AND WORKING LANDS, REFRIGERANTS, and CONSUMPTION

These sectors have actions for which we could not identify a mechanism where a criteria or toxic pollutant would have a clear net reduction.

Fiscal Health Benefits from Reduced Pollution

The most significant health benefit from reduced air pollution comes from avoiding premature mortality caused by fine particulate matter ($PM_{2.5}$). This impact is quantified using the Value of a Statistical Life (VSL)–an estimate derived from epidemiological and economic analyses that reflects the value society places on preventing a single early death. VSL typically exceeds all other quantified health impacts by a factor of ten.

We estimate the total health value of $PM_{2.5}$ reductions using benefit factors from the EPA's BENMAP model, which summarizes average national-scale benefits across sectors in tables[12]. For each action, we multiply the amount of $PM_{2.5}$ reduced by the corresponding benefit factor:

$$(9)\ PM_{2.5}\ related\ health\ valuation = PM_{2.5}\ reduced\ (kg/ton) \times PM_{2.5}\ benefit\ per\ kg/ton$$

Sector-Specific Valuation Assumptions

In the built environment, we use the oil & natural gas sector value ($98,000/ton) for actions where natural gas combustion is being prevented, such as replacing space heating, water heating, cooking, drying, along with industrial process in which NG consumption is being reduced.

For solar panel installation, since this is assumed to displace peaker plant use of natural gas electricity production, we use the value from electrical utility generation ($113,000/ton).

For the mobile sector, we use values shown in Wolf et al. (2018)[13] which is broken out regionally. All from directly emitted $PM_{2.5}$, for the west.

Sector	$PM_{2.5}$ Benefit $/ton
light-duty gas cars and trucks	$1,200,000
heavy duty diesel	$580,000
aircraft	$570,000
lawn and garden (residential)	$660,000
all other non-road $PM_{2.5}$	$710,000

Reduced Operating Costs

For several of the actions, reducing GHG emissions will also result in a reduction in ongoing costs. Reduced ongoing costs are primarily due to: A) a reduction in the amount of fuel (NG) needed due to increased insulation (or weatherization), B) an reduction in electricity needed to power an equivalent piece of equipment, and C) a change in power method to electricity (e.g. EVs), which is cheaper than the higher-GHG emitting power method (gas or diesel vehicles) on a basis of desired activity produced (e.g. miles driven, a unit of process completed).

[12] https://www.epa.gov/benmap/sector-based-pm25-and-ozone-benefit-ton-estimates
[13] https://pmc.ncbi.nlm.nih.gov/articles/PMC7259328/

Effects A and B are primarily observed in the built environment where improvement in a building's insultation will reduce the heat needed, and thus the amount of NG consumed. Changing to higher efficiency appliances or more efficient light bulbs will reduce the electricity costs.

For effect A, we use average cost savings per house ($280) reported by a U.S. Dept. of Energy Weatherization Assistance Program fact sheet[14]. For the action total this is multiplied by the total number of houses.

Effect B is the savings from improved efficiency of appliances and light bulbs. For appliances, we estimate the annual savings from an average of four appliance types (fridge(*fr*), dishwasher(*dw*), clothes washer(*cw*), clothes dryer(*cd*)) for middle-of-the-road sized and priced devices listed on the energy star website[15]. For light bulbs we calculate the savings of an assumed common bulb as 90% of a 60 watt bulb used for an average of three hours per day. The appliances and bulbs are assumed to last for 20 years. So, in equation form this is:

(10) Lifetime cost reduction for appliance savings =
(kWh saved/year for fr + dw + cw + cd)/4 × # of appliances × 20 years

(11) Lifetime cost reduction for light bulb savings =
(60 watts × 0.9 × 3 hours × 365) × # of bulbs × 20 years

Each can be divided by the number of appliances or bulbs to calculate the per device savings.

Effect C applies to the number of vehicle types/fleets being electrified, including gasoline light-duty vehicles, diesel medium-duty and heavy-duty trucks and buses, diesel off-road equipment, and ferries.

For gas cars, we assume the EV replaces a gas car being driven 8,000 miles/year, with fuel economy of 30 mpg, and an average gasoline cost of $4.00/ gallon and will survive 15 years. In equation form the savings per car is then:

(12) Operating savings per EV = 8,000 miles/year /30 mpg × $4.00/gallon × 50% × 15 years

For diesel medium-duty and heavy-duty trucks converting to EV, the equation and assumptions are:

(13) Operating savings per EV =
(100 miles/day × 5 days/week × 50 weeks/year)/7.83 mpg × $4.40/gallon × 50% × 10 years

The equation and assumptions are similar for transit EVs, but with 150 miles/day and 15 year life.

For ferries, the average annual fuel consumption per ferry comes from PSRC. The fuel cost savings is calculated similar to equation (12) and (13), but with the total fuel coming from supplied data, and the life of the ship is assumed to be 50 years. For each ferry's life, the batteries would likely need to be replaced several times, so we assume the following:

- Replacement interval of 10 years
- Average 8,000 hp per ship
- Need 1 hour of full power capacity between charges
- $100 per kWh for batteries
- Installation and supporting equipment about $100 per installed kWh
- Approximately $1.2 million, 4 times, for each 10 year interval after commissioning, so at years 10, 20, 30, 40 is about $5 million additional costs

[14] https://www.energy.gov/sites/prod/files/2021/01/f82/WAP-fact-sheet_2021_0.pdf
[15] https://www.energystar.gov/products/

It is expected that the electrified ferries will have significantly less maintenance costs, due to the lack of diesel engines. We currently don't have any data from which we could quantify the size of this impact, so we conservatively assume it is zero.

For off-road equipment, we quantify larger construction equipment, and smaller residential/commercial equipment separately. For larger construction equipment, our metric of activity is the number of hours of use of electrified equipment compared to diesel equipment. This is because hours-of-use and gallons-per-hour are common metrics in the industry. Based on the gallons used/replaced (calculated from the hours of use, see Appendix B for further details), the lifetime fuel savings cost is:

$$(14)\ \text{Operating savings} = \text{diesel fuel used/replaced (gallons)/year} \times \$4.4/\text{gallon} \times 50\% \times 15\ \text{years}$$

For small equipment, the calculation from gasoline used/replaced is similar, but uses $4/gallon for gasoline, and assumes lifespan of 10 years for the equipment.

For Aviation, GHG emissions are reduced by substituting sustainable aviation fuel (SAF) for petroleum fuel, which has a net cost. The current premium on SAF is around 2x the cost of petroleum fuel or about $3/gallon. The total cost is then the number of gallons substituted multiplied by this premium.

Similarly, for low-GHG marine fuel, we assume its cost is similar to renewable diesel. The cost premium of petroleum diesel is quite variable and can be negative. Therefore, we conservatively assume it is $0.50/gallon. The total cost is then the number of gallons times the premium per gallon.

For shore power, the calculation is the same as equation (14), except we don't apply a year term (i.e., set the year to 1 or omit the term) and consider this on an annual basis because the shore power infrastructure would have a very long lifetime compared to the equipment that would be using it (and equipment is not considered in this action).

For the electrification of CHE, we estimate gallons of fuel used/replaced each year per piece of equipment and then follow equation (14).

Section 2: Qualitative Description of Co-Benefits

Many of the strategies in this plan have the potential to reduce pollution across large areas and sectors; thus, it's possible that certain neighborhoods, locations, or demographics could be unevenly impacted. Understanding and addressing these disparities through climate action is a key element of this plan. The following discussion presents a qualitative analysis of the potential direct and indirect impacts resulting from climate strategy implementation, with a focus on higher-risk populations.

The groups which experience the greatest environmental disparities tend to be those that are considered disadvantaged according to one or more criteria. These criteria generally include, but are not limited to:

- Household income
- Education
- General English proficiency
- Race and/or ethnicity
- Access to health care

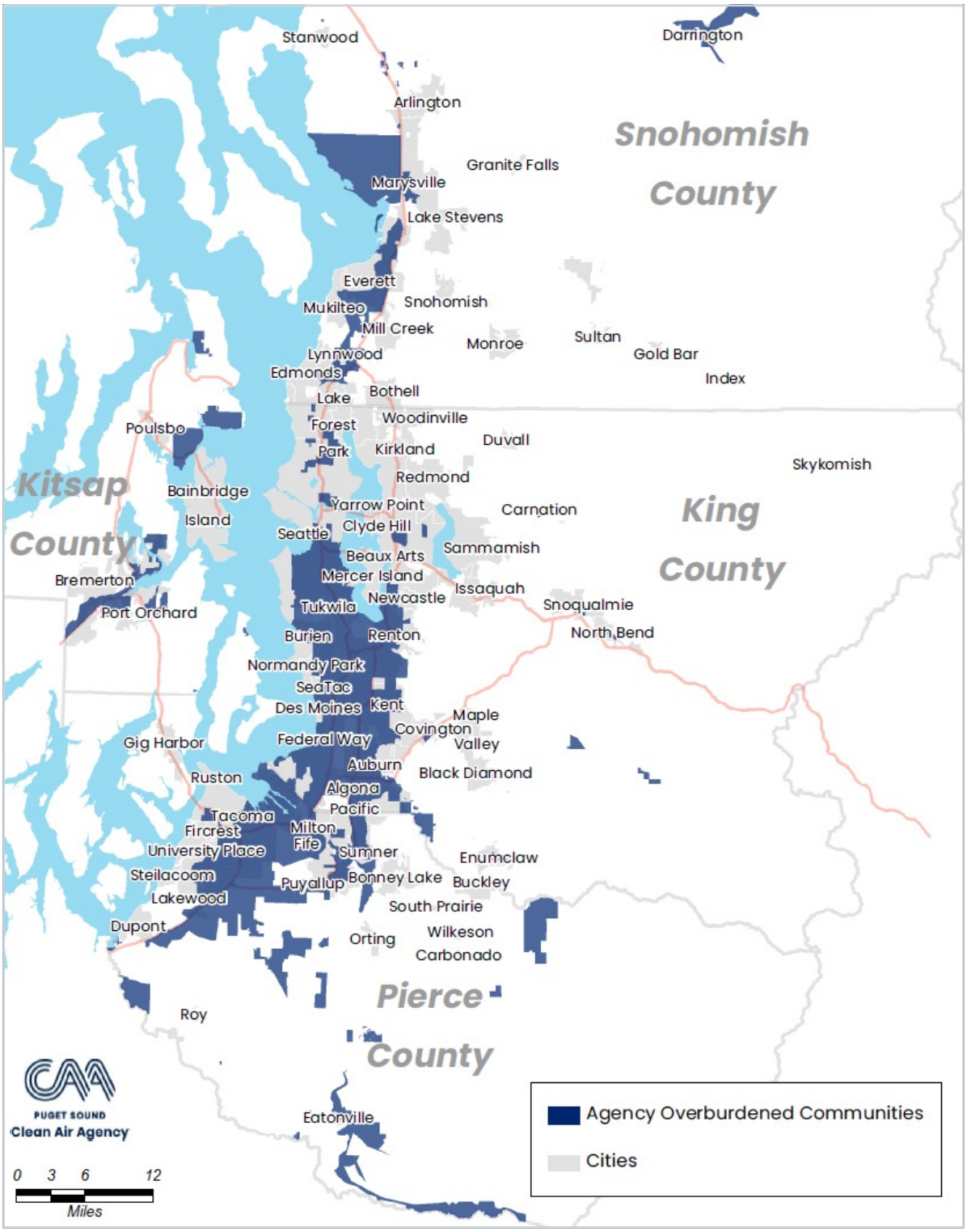
Washington State law defines overburdened communities as a geographic area where vulnerable populations face combined, multiple environmental harms and health impacts, and includes, but is not limited to, highly impacted communities as defined in RCW 19.405.020. Washington developed the Environmental Health Disparities Map to identify environmental and health disparities across communities and help decision-makers understand where more attention is needed to address specific inequalities. Similarly, the Agency developed the Community Air Tool (CAT) to identify the communities in our region that may have disparate exposures to air pollution.

We can qualitatively analyze climate strategies by their general impact and benefit. Most actions will have impacts that are location dependent. For example, neighborhoods that are located downwind of major emissions sources will benefit more than those that are located upwind. Likewise, neighborhoods or demographics that are closer to emissions sources will benefit more from climate action when compared neighborhoods that are located farther from these sources.

Climate actions near major pollution sources will deliver the greatest benefits to overburdened communities. Reducing greenhouse gases also generally reduces other types of harmful air pollution like fine particles. In the region, the most significant benefits would come to areas near major roads, especially with heavy diesel truck traffic. Actions resulting in industrial sources reducing fuels would also benefit adjacent populations. Neighborhoods considered overburdened—such as those along I-5 from south Seattle through Tacoma, in the industrial Duwamish Valley, around the Tacoma Tideflats, and near industrial facilities in Everett, stand to gain from the implementation of these actions.

Figure C-1 shows areas identified as overburdened by the Washington State Department of Ecology and the Puget Sound Clean Air Agency.

Figure C-1. Map of Puget Sound Overburdened Communities[16]



[16] https://pscleanair.gov/382/Overburdened-Communities

Appendix D: Community Engagement Workshops Summary

Comprehensive Climate Action Plan Community Workshops Summary

PUGET SOUND REGION | SPRING 2025

PUGET SOUND CLEAN AIR AGENCY & CASCADIA CONSULTING GROUP

PUGET SOUND
Clean Air Agency

CASCADIA
CONSULTING GROUP

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Introduction

The Puget Sound Clean Air Agency ("Agency") is creating a Comprehensive Climate Action Plan (CCAP), funded by U.S. Environmental Protection Agency's Climate Pollution Reduction Grant (CPRG) program. The CCAP will guide regional and local efforts to significantly reduce greenhouse gas (GHG) emissions and air pollution in Puget Sound communities.

Community and stakeholder feedback is fundamental to the development of a robust CCAP. As outlined in the CPRG program guidance, the CCAP should be informed by engaging communities to understand their concerns and ideas for solutions that reduce harmful pollution in places where people live, work, play, and go to school. To meaningfully engage communities around the Puget Sound, the Agency hosted a series of four in-person workshops where community members were invited to provide input on the draft emission reduction measures and their implementation.

This summary describes workshop outcomes and synthesizes the feedback shared by workshop participants. Community member and stakeholder feedback will also be integrated into the final CCAP, due in December 2025.

Methodology

The Agency and Cascadia Consulting Group, an engagement and facilitation consultant, (collectively "the Agency team"), hosted four (4) in-person workshops in March and April 2025, one in each of the Puget Sound counties: King, Kitsap, Snohomish, and Pierce. The workshops were two hours long, and included both an introductory presentation on greenhouse gas emissions in the Puget Sound region and facilitated small group discussions where participants provided input on a draft list of emission reduction measures. See Appendix A. Workshop Agenda for full workshop agenda and discussion guide.

County of Focus	Workshop Date	Workshop Venue	Workshop Location
Snohomish County	March 13, 2025, 5:30 – 7:30pm	Everett Community College	Everett, WA
Kitsap County	March 20, 2025, 5:30 – 7:30pm	Bremerton Government Center	Bremerton, WA
King County	April 3, 2025, 5:30 – 7:30pm	El Centro de la Raza	Seattle, WA
Pierce County	April 15, 2025, 5:30 – 7:30pm	Clover Park Technical College	Lakewood, WA

Workshop Objectives

- Gather community input to inform the LIDAC and community benefits analysis sections of the CCAP.
- Identify co-benefits and impacts of GHG emission reduction measures within local communities.
- Understand community perspectives on how actions can be implemented to maximize benefits and minimize unintended consequences.

Accessibility Considerations

The Agency team strove to reduce or eliminate common barriers to community participation throughout the workshop design and implementation process, taking several steps to ensure that workshops were accessible, particularly for overburdened community members. Accessibility measures included:

- **Workshop Time:** Hosting workshops after typical working hours (from 5:30 – 7:30 PM) to ensure people who work could attend.
- **Free, Locally Prepared Food:** Providing a free dinner for each participant at the workshops, catered by a local caterer or restaurant.
- **Activities for Children:** Creating a kid-friendly area at each workshop with activity bags, so children were engaged while parents/guardians participated in the workshop.
- **Interpretation and Translation in Multiple Languages:** Offering translated materials and simultaneous interpretation of presentations and discussions for any languages requested by participants during registration. See Language Access section for more information.
- **Participant Background Knowledge:** Emphasizing that no background knowledge about climate action was needed to participate in the workshops and distilling technical content.
- **Compensation:** Participants were each compensated $50 for their participation, unless they were already paid by an employer or other source to participate in the workshop.
- **Community Centers:** Hosting workshops at community centers or local convening spaces in each of the four counties. Each location was ADA accessible and had easy access to public transportation.
- **Promotional Materials and Networks:** Translating promotional materials into the region's top five languages other than English and collaborating with community-based organizations and other trusted partners to promote the workshops.

Agency staff presenting at the Pierce County workshop.

Participation

The workshops were attended by the following number of participants:

Workshop	Number of Participants
Snohomish County	6
Kitsap County	18
King County	43
Pierce County	31
TOTAL	**98**

Several county and/or city staff representatives attended each workshop to give a short presentation on climate action at the local level. These attendees are not reflected in the total participation counts above.

Language Access

Simultaneous interpretation and translated materials were provided for participants when requested. As part of the registration process, participants were able to select their preferred language and request interpretation services. King County was the only workshop where participants requested interpretation. King County registrants requested the following languages: Cantonese (17 requests), Spanish (5 requests), Arabic (1 request), and Korean (1 request). The

Agency team contracted with professional simultaneous interpreters in all four languages, along with fluent facilitators and notetakers in Spanish and Cantonese to conduct the small group discussions. Simultaneous interpreters interpreted the presentation content live, and then fluent facilitators and notetakers led the small group discussion with their respective attendees.

Promotion

The Agency promoted the workshops through a variety of methods and channels. See Appendix C. Promotional Materials for example materials. A packet of promotional materials was shared with outreach partners via email for co-promotion. Workshops were promoted through the following channels:

- Agency's social media channels
- Agency's Climate Pollution Reduction Grant email list
- Agency's webpage
- Agency press release
- Agency's Board of Directors and Advisory Committee
- Climate Pollution Reduction Grant Steering Committee and technical working groups
- Local jurisdictions' climate-related committees and forums
- Local jurisdictions' newsletters, social media, and websites
- Local event calendars
- Community-based organizations
- Other personal networks

Participants attending the Snohomish County workshop.

Key Takeaways Across Counties

This section summarizes key takeaways across all four workshops. For summaries of takeaways from each individual workshop, please see the Takeaways by Individual County.

Feedback on Emission Reduction Measures

At each workshop, the project team asked participants to evaluate the draft GHG emission reduction measures, organized into strategies and actions. Strategies were broader categories of measures, and actions were more specific steps to reduce emissions that fell within the broader strategies. Participants selected up to three strategies and actions they felt would have the **most benefit** to their community, and up to three strategies and actions that would have the **least benefit** to their community. This section summarizes workshop participants' feedback on the draft strategies and actions. For the full list of draft emissions reduction measures provided during the workshops, see Appendix B. Emissions Reduction Measures – Workshop Draft.

The project team learned from each workshop and integrated changes where possible for future workshops. Based on our learning in earlier workshops, the team elected to de-emphasize the "least benefit" strategies to increase clarity and efficiency in the small discussion groups. Thus, a direct comparison of the actions that participants identified as having the most benefit and least benefit is not possible.

Strategies

Table 1 lists the top three strategies that participants at all four workshops identified as having the **most benefit** for their communities.

Table 1. Top three most beneficial strategies as voted on by workshop participants, across all workshops.

STRATEGIES		
Sector	**Strategy**	**Number of Votes**
Transportation	Reduce the region's total vehicle travel	27
Buildings	Efficient, all-electric existing buildings (upgrades & weatherization)	26
Buildings	Reduce industrial emissions	17

As mentioned above, there were significantly fewer votes for strategies of least benefit across all workshops. Of the strategies that did receive votes for least beneficial, **Table 2** lists the top three strategies participants identified as having the least benefit for their communities:

Table 2. Three least beneficial strategies as voted on by workshop participants, across all workshops.

STRATEGIES		
Sector	**Strategy**	**Number of Votes**
Buildings	Local solar energy and battery storage	6
Buildings	Efficient, all-electric existing buildings (upgrades & weatherization)	5
Transportation	Electrify passenger vehicles	3

Figure 1 (on next page) summarizes the total participant votes for most and least beneficial strategies. Green shows the number of "most beneficial" votes each strategy received, and yellow shows the number of "least beneficial" votes across all workshops.

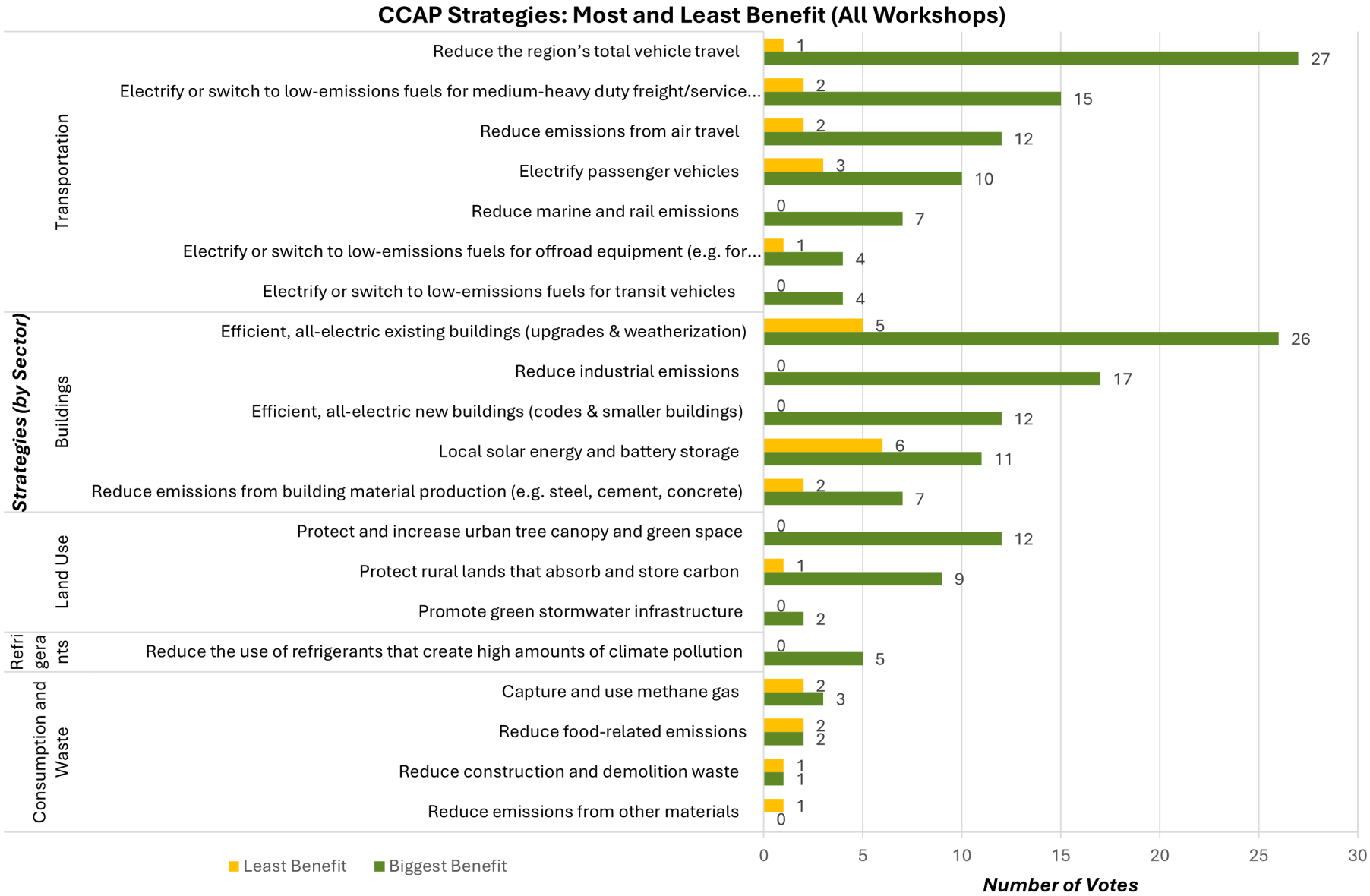

Figure 1. Total participant votes for strategies of most (green) and least benefit (yellow), across all four workshops.

Actions

Actions are more specific steps within the broader emission reduction strategies. **Table 3** lists the top three actions that participants at all four workshops identified as having the most benefit for their communities.

Table 3. Three most beneficial actions as voted on by workshop participants, across all workshops.

ACTIONS		
Sector	**Action**	**Number of Votes**
Transportation	Increase transit use	12
Transportation	Improve walking and cycling networks	9
Land Use	Protect existing forests and wetlands	8

Table 4 lists the top actions that participants at all four workshops identified as having the least benefit for their communities.

Table 4. Least beneficial actions as voted on by workshop participants, across all workshops.

ACTIONS		
Sector	**Action**	**Number of Votes**
Transportation	Consider vehicle usage pricing programs like congestion pricing or road usage pricing	8
Consumption and Waste Sector	Increase composting of non-edible food waste	4
Buildings	Promote smaller buildings with shared walls (reduces energy use)	4
Consumption and Waste Sector	Discourage unnecessary purchasing	4

Figure 2 shows the participant votes for most beneficial actions, and **Figure 3** shows the participant votes for least beneficial actions. Both figures only show the actions that received one or more votes. Actions that received zero votes are not included in these two figures.

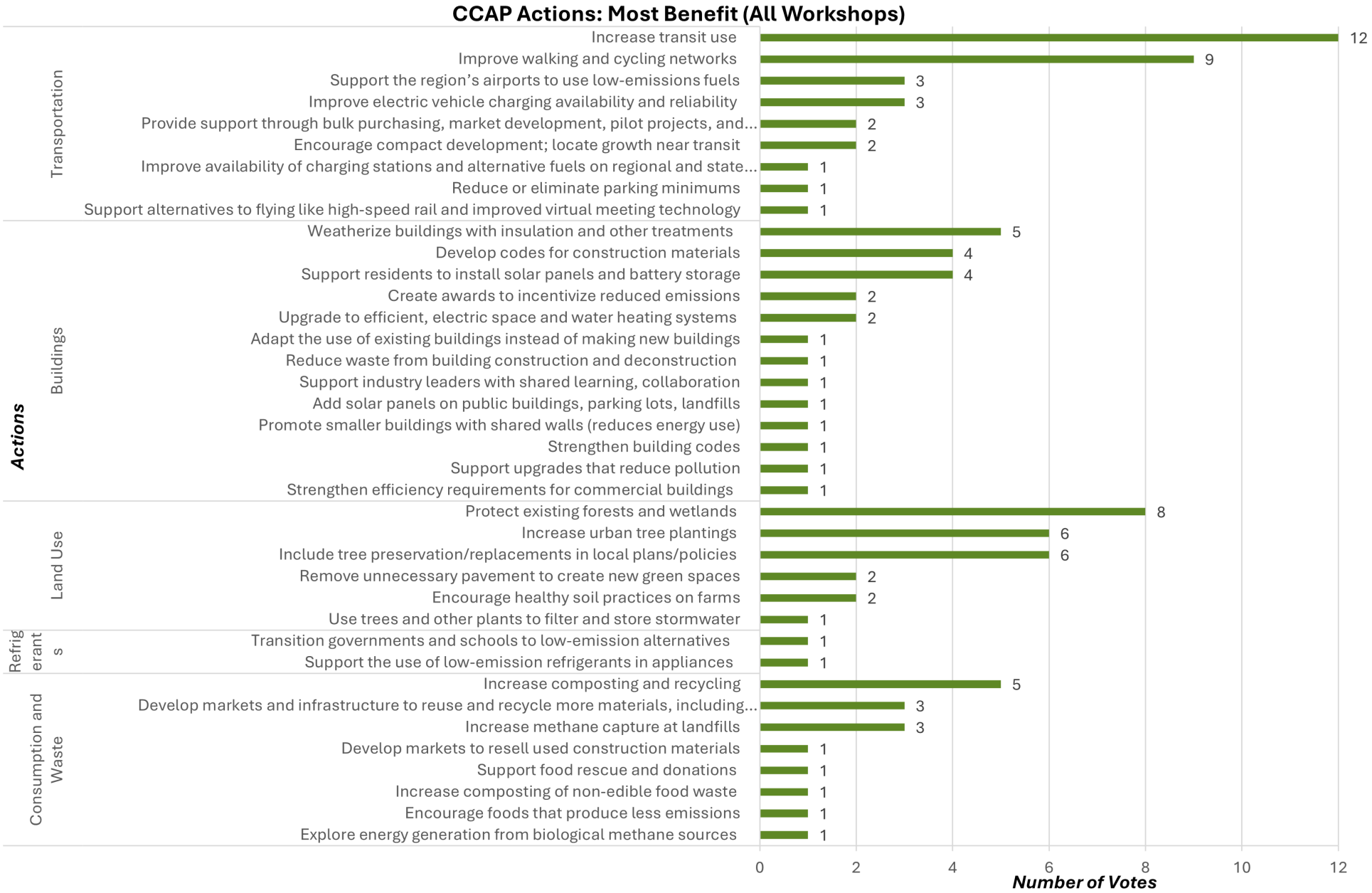

Figure 2. Total participant votes for actions of most benefit, across all four workshops. Only displaying actions that received one or more votes.

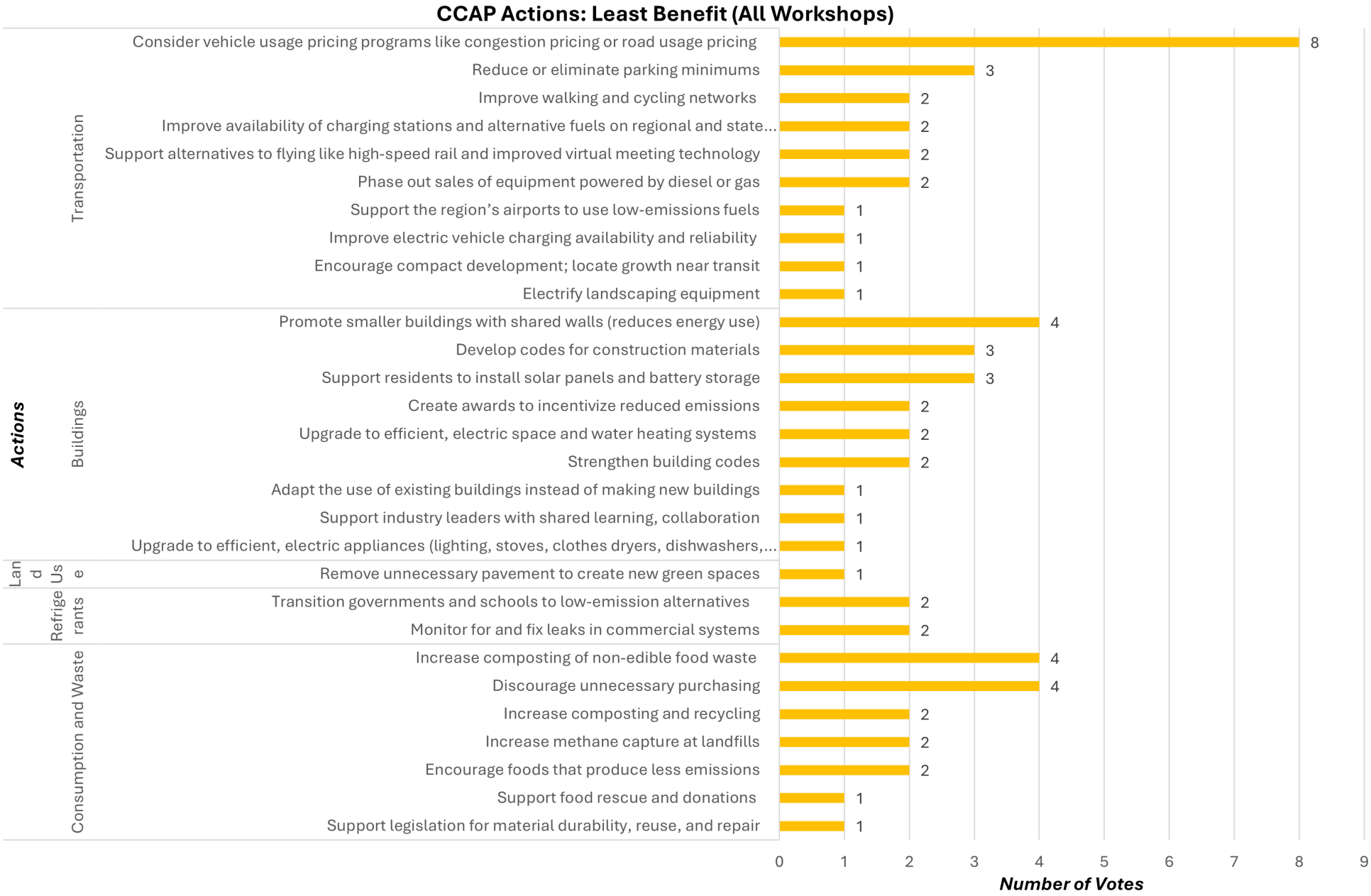

Figure 3. Participant votes for actions of least benefit, total from all four workshops. Only displaying actions that received one or more votes.

Themes Across All Workshops

The following discussion themes were shared across all four workshops.

Co-Benefits

Participants commented on the co-benefits that might result from the GHG reduction strategies and actions. Participants identified the following co-benefits:

- **Public health:** Across all four workshops, participants emphasized the public health benefits of some emissions reduction measures. They noted that several of the strategies and actions would improve air quality, increase green space and tree canopy, encourage more walking, biking, rolling, and playing, and create more livable, connected communities. All of these were considered to have physical and mental health benefits for community members. Participants, especially in Pierce and King Counties, noted that increased urban tree canopy reduces urban heat islands and cools down communities.

- **Safe and accessible transit:** Participants frequently expressed support for making transit more convenient, accessible, and reliable to increase overall transit use. They noted that these changes would result in safer and more comfortable trips on transit.

- **Building sense of community:** Beyond health benefits, participants in all four workshops noted that multiple emissions reduction measures would help foster community connections and sense of place and identity.

- **Cost savings:** Participants in all four workshops commented on cost-savings created by some of the emission reduction measures. Kitsap County participants noted that transitioning to electric vehicles helps eliminate the cost burden of gas, while Pierce County participants shared that upgrading and making buildings more efficient reduces utility costs.

- **Climate resilience:** Participants in the Pierce and Snohomish County workshops expressed that some strategies and actions would help build climate resilience in their communities and help them better withstand future impacts of climate change. Participants from Kitsap County shared that implementing certain strategies could help them prepare for future emergencies.

- **Job creation and workforce development:** Participants from the Pierce and King County workshops discussed green job creation and workforce development, noting the economic benefits and job opportunities for their communities. Participants in the King County workshop added that encouraging compact development near transit hubs could benefit local and small businesses.

- **Enhanced biodiversity:** Participants from both Kitsap and Pierce Counties commented on the benefits to biodiversity and ecological health that come from preserving forests, wetlands, and other Pacific Northwest ecosystems.

Implementation Ideas

Participants shared many suggestions for implementing the emission reduction measures, which are summarized for each workshop in the "Implementation Ideas" sections of Takeaways by County. Across all four workshops, several common themes around implementation emerged, including:

- **Education, outreach, and increased community engagement opportunities:** Participants in all workshops shared that educating and raising community awareness of climate action was essential to the success of the emission reduction measures. Participants also advocated for increased engagement opportunities for community members to provide feedback, be involved with implementation, and better understand climate actions happening in their community.

- **Transparency, tracking impact, and reporting to communities:** Participants emphasized the importance of tracking progress on the emission reduction measures, holding implementors accountable to meet emission reduction targets, and regularly reporting out to Puget Sound communities about tangible impacts and benefits of the measures.

- **Encouraging remote work (telework) and creating transit and carpool incentives:** Commuting, and the impact of commuting on overall vehicle miles traveled (VMT), came up in all four workshops. Participants discussed various ideas for addressing and reducing commuting, including partnering with major regional employers and unions to encourage/allow remote work, subsidizing or incentivizing transit (such as offering free ORCA cards), and enhancing or incentivizing vanpool, carpool, and ride share options for commuting.

- **One-stop-shop technical assistance:** Several participants across the workshops suggested "one-stop-shops" for technical subjects like building upgrades. Participants envisioned centralized hubs where people can easily access information, hands-on assistance, education, and financial opportunities, whether for building upgrades, vehicle electrification, or others.

- **Revenue programs:** Several participants across the workshops suggested utilizing revenue from programs like the Climate Commitment Act to implement strategies and actions like walking and biking infrastructure improvements.

Challenges to Implementation

Participants across the workshops identified the following common challenges to implementation:

- Lack of community and consumer buy-in due to misinformation, lack of education and understanding of benefits, and high upfront costs.

- High level of coordination is needed between governments and jurisdictions.

Emissions Reduction Measures Missing

Participants suggested that the Agency add the following strategies and actions to the draft emissions reduction measures list (organized by workshop):

- Snohomish
  - Hydrogen fuel cell as a low-emission fuel for transit and medium/heavy-duty vehicles. (Though other participants raised concerns about using hydrogen fuel as an alternative to electrification).
  - Promoting and creating local jobs, as well as encouraging remote work, to reduce commuting traffic.
- Kitsap
  - Reduce clothing and textile waste and consumption. Encourage manufacturers and consumers to purchase local goods to reduce emissions associated with the clothing supply chain. Encourage the purchase of clothing made from non-synthetic (petroleum-based) fabrics to reduce emissions and benefit public health.
  - Reduce incineration: People burn trash; there are concerns around air pollution and fire risk.
- Pierce
  - Geothermal heating/cooling solutions for residential buildings.
  - Producer responsibility that requires manufacturers to make products more durable, repairable, and recyclable.
- King
  - Fund the completion of ADA Transition Plans for rights of way. Ensure that these technical requirements are being completed, since they include curb ramps, ADA accessibility, and first/last mile connections to transit.
  - Accountability measures for industrial producers and private sector.

Takeaways by Individual County

Snohomish

Total number of Snohomish County workshop participants: **6 people**

Summary

While discussing the emission reduction measures, Snohomish County participants noted the measures that reduce car dependency would have the most benefit for their community. They shared that transit in Snohomish County needs to be more convenient, fast, and accessible to ensure it's a viable alternative to driving a personal car. Several participants also recommended electrifying medium- and heavy-duty vehicles, particularly freight, or enhancing rail options to reduce the dependence on trucks, as these were seen by participants as having substantial reductions in emissions. A few participants discussed their concerns about over-relying on vehicle electrification to reduce emissions, as a reliable and resilient electricity grid is needed to ensure these benefits are realized, which may become strained with other electrification efforts. A few participants also shared that increased solar panels could be beneficial for Snohomish County but needed to better understand the effectiveness of solar in a cloudy location and the cost of installation.

Feedback on Emission Reduction Measures

As mentioned above, the project team asked participants to select up to three strategies or actions they felt would have the **most benefit** to their community, and up to three strategies or actions that would have the **least benefit** to their community.

MOST BENEFICIAL STRATEGIES AND ACTIONS

Table 5 lists the top **strategies** that Snohomish County participants identified as having the most benefit for their communities. **Table 6** lists the top **action** that Snohomish County participants identified as having the most benefit for their communities. Nine other actions received one vote each and are not shown in the table.

Table 5. The most beneficial strategies as voted on by Snohomish workshop participants.

STRATEGIES		
Sector	**Strategy**	**Number of Votes**
Transportation	Electrify or switch to low-emissions fuels for medium-heavy duty freight/service vehicles	3
Buildings	Reduce emissions from building material production (e.g. steel, cement, concrete)	3
Buildings	Local solar energy and battery storage	2

Table 6. The most beneficial action as voted on by Snohomish workshop participants. Nine other actions received one vote each and are not shown here.

ACTIONS		
Sector	**Action**	**Number of Votes**
Transportation	Increase transit use	3

LEAST BENEFICIAL STRATEGIES AND ACTIONS

Table 7 lists the top **strategies** that Snohomish County participants identified as having the least benefit for their communities. Two participants noted that efficient, all-electric existing buildings were the least beneficial for their community, due to perceived lack of grid resiliency and redundancy against natural disasters in the more rural areas. **Table 8** lists the top **actions** that Snohomish County participants identified as having the least benefit for their communities.

Table 7. The least beneficial strategies as voted on by Snohomish workshop participants.

STRATEGIES		
Sector	**Strategy**	**Number of Votes**
Buildings	Efficient, all-electric existing buildings (upgrades and weatherization)	2
Land Use	Protect rural lands that absorb and store carbon	1

Table 8. The least beneficial actions as voted on by Snohomish workshop participants. Six other actions received one vote each and are not listed here.

ACTIONS		
Sector	**Action**	**Number of Votes**
Transportation	Consider vehicle usage pricing programs like congestion pricing or road usage pricing	2
Buildings	Promote smaller buildings with shared walls (reduces energy use)	2

Discussion Takeaways

CO-BENEFITS

Snohomish participants identified the following co-benefits:

- Improving public health, both mental and physical.

- Reducing homelessness and ensuring people are housed.
- Short- and long-term cost savings of upgrades and efficiency measures.
- Resilience to climate impacts.

UNINTENDED CONSEQUENCES

Participants acknowledged the following unintended consequences:

- There is already high demand for electricity, and demand is growing. Electricity demand can have other consequences, like the impacts of dams (for hydroelectricity production) on salmon populations.
- The cost of electric vehicles makes the transition to EVs challenging.
- EVs are heavy, which wears down tires faster. Tire wear produces 6PPD-Q, a toxic pollutant in our waters which has negative impacts on salmon populations.
- An all-electric system may lack resiliency against disasters or hazards, especially in rural locations.

IMPLEMENTATION IDEAS

Snohomish participants shared the following ideas for implementing the strategies and actions:

- Collaborate with labor unions to incentivize remote work and increased transit options for commuting.
- Develop limits on the size of cars and vehicles.

Kitsap

Total number of Kitsap County workshop participants: **18 people**

Summary

Kitsap County workshop participants identified the transportation and buildings sectors as offering the greatest potential benefits for emissions reduction, with strategies like reducing vehicle travel, electrifying transportation, and improving building efficiency receiving the most support. The action to increase transit use stood out as the highest-rated for community benefit. Participants also expressed support for preserving forests and wetlands, while vehicle usage pricing and food waste composting were viewed more skeptically. Co-benefits discussed frequently included improved air quality, physical health, and community livability, while concerns were raised about the relevance of some strategies and potential cost barriers. Attendees offered a wide range of implementation ideas, including transit and solar incentives, zoning changes, and expanded outreach. However, a key challenge identified was engaging a broad enough audience to drive meaningful action.

Feedback on Emission Reduction Measures

As mentioned above, the project team asked participants to select up to three strategies or actions they felt would have the **most benefit** to their community, and up to three strategies or actions that would have the **least benefit** to their community.

MOST BENEFICIAL STRATEGIES AND ACTIONS

Table 9 lists the top **strategies** that Kitsap County participants identified as having the most benefit for their communities. **Table 10** lists the top **actions** that Kitsap County participants identified as having the most benefit for their communities.

Table 9. The most beneficial strategies as voted on by workshop participants in Kitsap County. There was a four-way tie between strategies for first place.

STRATEGIES		
Sector	**Strategy**	**Number of Votes**
Transportation	Reduce the region's total vehicle travel	2
Transportation	Electrify passenger vehicles	2
Buildings	Efficient, all-electric new buildings (upgrades & weatherization)	2
Buildings	Local solar energy and battery storage	2

Table 10. The most beneficial actions as voted on by workshop participants in Kitsap County. There was a two-way tie between actions for third place.

ACTIONS		
Sector	**Action**	**Number of Votes**
Transportation	Increase transit use	6
Land Use	Protect existing forests and wetlands	4
Consumption and Waste	Increase composting and recycling	3
Buildings	Develop codes for construction materials	3

LEAST BENEFICIAL STRATEGIES AND ACTIONS

Table 11 lists the top **strategy** that Kitsap County participants identified as having the least benefit for their communities (only one strategy received votes for least benefit). **Table 12** lists the top **actions** that Kitsap County participants identified as having the least benefit for their communities.

Table 11. The least beneficial strategy as voted on by workshop participants in Kitsap County. Only one strategy received votes for least benefit.

STRATEGIES		
Sector	**Strategy**	**Number of Votes**
Transportation	Electrify or switch to low-emissions fuels for medium-heavy duty freight/service vehicles	1

Table 12. The least beneficial actions as voted on by workshop participants in Kitsap County.

ACTIONS		
Sector	**Action**	**Number of Votes**
Transportation	Consider vehicle usage pricing programs like congestion pricing or road usage pricing	5
Consumption and Waste	Increase composting of non-edible food waste	4
Consumption and Waste	Discourage unnecessary purchasing	3

Discussion Takeaways

CO-BENEFITS

Participants identified the following co-benefits:

- Participants shared that reducing private passenger vehicle use offers co-benefits such as improved air quality and enhanced physical health. Additionally, participants frequently noted the broader community benefits of reducing vehicle travel, including making neighborhoods more livable, improving safety, strengthening walking and cycling networks, and fostering stronger community connections. Preventing sprawling development also reduces traffic and pollution from cars.
- Transitioning to EVs was seen as a quieter, healthier alternative that removes the cost burden of gasoline.
- Several participants expressed that preserving forests and rural lands supports better air quality, wildlife habitat, and emotional well-being.
- Participants noted that many of the strategies discussed could also improve emergency preparedness. For example, battery storage systems can provide power during outages.

UNINTENDED CONSEQUENCES

Participants acknowledged the following unintended consequences:

- Participants expressed that reducing or eliminating parking minimums may not be as relevant or impactful in Kitsap.
- Concerns were raised that strengthening codes for buildings and construction materials may increase construction costs and as a result, hinder development.

IMPLEMENTATION IDEAS

Participants shared the following implementation ideas:

Transportation

- Participants suggested recycling diesel- and gas-powered equipment materials to create new electric equipment, which would also help prevent unnecessary landfill waste.
- Increasing public transit usage could be supported by providing school-issued transit passes, subsidizing fares, expanding service hours, offering transit for large events, and improving the overall convenience and accessibility of transit options.
- Promoting the long-term cost savings associated with EVs was identified as a key strategy to increase EV adoption.
- Participants recommended building a walking and biking trail in Kitsap similar to the Burke-Gilman Trail to support low-carbon transportation and recreation.
- Teleworking should be incentivized as a way to reduce commuting-related emissions.
- Staggering work hours was suggested to alleviate peak-hour traffic congestion.
- ORCA cards could be distributed to commuters to increase transit use.

Buildings

- Participants recommended providing incentives for solar panel installations and battery storage systems to support residential and commercial clean energy use.
- Educating the public about financial incentives, energy cost savings, and opportunities to reduce emissions at the neighborhood level was seen as essential to increasing participation in building decarbonization efforts.

Land Use

- Zoning changes should support the development of walkable neighborhoods to reduce reliance on vehicle travel.
- Subsidies could be offered to businesses willing to locate in walkable areas, helping to connect land use and transportation planning more effectively.
- Participants emphasized the importance of improving maintenance of existing parks and ensuring that people have equitable access to a range of recreational uses.
- Local organizations, such as native plant groups, should be engaged in land and park stewardship efforts.
- Incentives for rain garden installations in new developments could improve stormwater management and increase urban green space.

- Educating the public about local trail systems and outdoor spaces to promote physical activity and environmental stewardship.

Consumption and Waste

- Participants called for the creation of new markets for recyclable materials to strengthen the local recycling economy.
- Investing in additional staff for waste sorting and recycling was seen as a necessary step to improve waste diversion rates.
- Workshops and internship opportunities focused on waste and recycling could help educate and employ young people in sustainable fields.
- Existing community events, such as Styrofoam and recycling workshops, should be expanded to promote sustainable behaviors.

Overarching

- Participants viewed increasing education and outreach efforts as a critical need.
- Community pledges were proposed as a way to encourage peer-to-peer education and accountability.
- Leveraging school networks could help engage both youth and families in climate action.
- Participants suggested using local celebrities—such as musicians, artists, and athletes—to attract broader interest in climate initiatives.
- PSCAA should consider hosting booths at local fairs and events to increase visibility and engagement.
- A large banner on a ship was proposed as a high-visibility tactic to raise public awareness about air quality and climate action.
- Establishing local information hubs could help share success stories, foster neighborhood-level engagement, and guide residents on how to implement proven climate strategies.
- Messaging should focus on motivation and practical actions, emphasize who bears the cost, and highlight real, tangible benefits rather than symbolic gestures.
- Participants expressed support for increasing the number of climate-focused workshops in the region.
- Climate initiatives should be aligned with emergency preparedness planning, as many of the co-benefits of climate strategies also enhance disaster readiness.

CHALLENGES TO IMPLEMENTATION

Participants identified the following challenges to implementation:

- Difficulty of reaching a broad enough audience to motivate meaningful action and engagement.

King

Total number of King County workshop participants: **43 people**

Summary

King County workshop participants identified upgrading buildings (both existing and new) and reducing total vehicle travel as the most beneficial strategies for their community. They also expressed that actions to improve walking, cycling, and transit would positively impact their community. However, participants emphasized that improvements to walking, cycling, and transit need to prioritize safety and comfort for users. King County workshop participants shared many ideas for implementation, but a clear theme was making sure that these strategies and actions prioritize and center community members – through engagement opportunities, technical assistance, and a focus on anti-gentrification and anti-displacement.

Feedback on Emission Reduction Measures

As mentioned above, the project team asked participants to select up to three strategies or actions they felt would have the **most benefit** to their community, and up to three strategies or actions that would have the **least benefit** to their community.

MOST BENEFICIAL STRATEGIES AND ACTIONS

Table 13 lists the top **strategies** that King County participants identified as having the most benefit for their communities. **Table 14** shows the top **actions** that King County participants identified as having the most benefit for their communities.

Table 13. The most beneficial strategies as voted on by workshop participants in King County.

STRATEGIES		
Sector	**Strategy**	**Number of Votes**
Buildings	Efficient, all-electric existing buildings	19
Transportation	Reduce the region's total vehicle travel	13
Buildings	Efficient, all-electric new buildings	11

Table 14. The most beneficial actions as voted on by workshop participants in King County. There was a three-way tie between actions for second place.

ACTIONS		
Sector	**Actions**	**Number of Votes**

ACTIONS		
Transportation	Improve walking and cycling networks	3
Transportation	Increase transit use	2
Buildings	Weatherize buildings with insulation and other treatments	2
Land Use	Include tree preservation/replacements in local plans and policies	2

LEAST BENEFICIAL STRATEGIES AND ACTIONS

Table 15 lists the top **strategies** that King County participants identified as having the least benefit for their communities. **Table 16** lists the top **actions** that King County participants identified as having the least benefit for their communities.

Table 15. The least beneficial strategies as voted on by workshop participants in King County. There was a four-way tie between strategies for second place.

STRATEGIES		
Sector	**Strategy**	**Number of Votes**
Buildings	Local solar energy and battery storage	6
Consumption and Waste	Capture and use methane gas	2
Transportation	Electrify passenger vehicles	2
Buildings	Efficient, all-electric existing buildings (weatherization & upgrades)	2
Consumption and Waste	Reduce food-related emissions	2

Table 16. The least beneficial actions as voted on by workshop participants in King County. There was a three-way tie between actions for first place.

ACTIONS		
Sector	**Actions**	**Number of Votes**
Transportation	Improve walking and cycling networks	2
Transportation	Improve availability of charging stations and alternative fuels on regional and state transportation corridors	2
Consumption and Waste	Increase compost and recycling	2

Discussion Takeaways

CO-BENEFITS

Participants identified the following co-benefits:

- Making communities more walkable, bikeable, and transit-friendly improves community connectivity and health.
- Focusing on enhancing transit connections, comfort, cleanliness, and safety will improve people's experiences on transit overall. Increased safety, particularly for immigrants, people of color, and women.
- Opportunities for small and local businesses to grow when compact development is planned near transit hubs.
- Protecting and increasing urban green space and tree canopy results in improved mental and physical health for community members.
- Building upgrades can protect people from old, toxic materials and improve public health.

UNINTENDED CONSEQUENCES

Participants acknowledged the following unintended consequences:

- If encouraging people to walk and bike more, there need to be substantial safety upgrades to the walking and cycling network to protect people from vehicles. Walking and biking areas need to be protected and separated from the road.
- Increasing transit use may not be feasible for people with disabilities; for example, they might need to drive in wheelchair-accessible vehicles rather than take transit.
- Concerns about relying on electricity that is still generated using fossil fuels. Electricity needs to be clean and renewably generated for electrification to have the intended positive impact on GHG emissions. (NOTE: Washington's Clean Energy Transformation Act is designed to address this concern.)
- There are barriers to charging EVs for people who live in apartments, condos, or multifamily buildings. Many multifamily buildings do not provide charging.
- Upgrading buildings, increasing transit connections, and enhancing green space, among other actions here, often increase gentrification in neighborhoods that were predominately populated by people of color. Gentrification and rising costs push people of color and overburdened communities out of their homes and out of the city.
- Concerns about the burden of these actions falling on the most vulnerable or overburdened communities, rather than forcing wealthier people and businesses, and/or major polluters, to reduce their consumption or change their actions. Investment in solutions by manufacturers, industry, government (those with power and influence) would be more impactful than putting the burden for change on individuals and residents.
- Environmental impacts of materials required for EV batteries, and limited options for recycling batteries.

- Concerns about the costs required to electrify buildings and vehicles.

IMPLEMENTATION IDEAS

Participants shared the following implementation ideas:

Transportation

- Focus on increasing transit connections/transfers and reliability, particularly outside of large urban centers like Seattle and Bellevue.
- Prioritize crash or accident "hot spots" for upgrades to the walking and cycling network.
- Incentivize transit by providing free ORCA cards for certain groups.
- Utilize Climate Commitment Act funding for projects to reduce emissions in medium and heavy-duty vehicles.
- Create EV sharing programs, particularly in south King County.
- Focus on electrification opportunities for medium- and heavy-duty vehicles that travel through neighborhoods, like garbage trucks and school buses.
- Address state funding deficits for transportation and educate the public about the benefits of transportation funding.

Buildings

- Creating one-stop-shops for technical support on building weatherization and upgrades (Energy Smart is a good model/example).
- Engage with building owners and managers for multifamily homes and apartments; don't just incentivize improvements to single-family homes occupied by owners.
- Improve standards for construction and building materials to reduce the amount of repair and remodeling needed. Currently, new homes are not built for durability.

Consumption and Waste

- Incentivize food composting at restaurants.
- Work with multifamily/apartment building owners and managers to ensure that compost and recycling are available to tenants.

Overarching

- Ensure financial aid and incentives, particularly for highly impacted and underserved communities.
- Provide advisory and technical assistance to help people navigate programs or opportunities.
- Create a community-led model for implementation. Provide funding to community-based organizations (CBOs) and trusted partners to lead the implementation.
    - Promote community-ownership models in land use (such as urban tree canopy and green space).

  - Ensure funding for implementation of community ideas.
- Increase the opportunities for community advocacy and engagement. Provide clear opportunities for people to provide their feedback and input.
  - Show people how their feedback influenced a policy or plan through clear feedback loops and celebrate wins.
- Educate the public to increase awareness of GHG emissions and how to reduce them. Engage people in their preferred language.
- Local governments should circulate monthly newsletters about climate action so community members better understand what is happening and how to stay involved.
- Prioritize language access to ensure non-English speaking communities understand how to access programs or opportunities, and have opportunities to participate. All materials should be translated into multiple languages.
- Implement penalties for polluters and require them to pay for harm caused. Utilize carbon tax/penalties to implement actions in the CCAP. Invest in solutions for manufacturers and industry to maximize reductions in GHG emissions, rather than putting the burden on individuals.

Pierce

Total number of Pierce County workshop participants: **31 people**

Summary

During the Pierce County workshop, participants identified the transportation and buildings sectors as offering the greatest potential for climate benefits, with top strategies including reducing vehicle travel and increasing urban tree canopy. Land use actions like protecting forests and enhancing walking and cycling networks were also highly rated. Co-benefits emphasized included improved health, stronger communities, economic opportunities, and environmental justice. However, participants also flagged potential unintended consequences, such as increased housing costs or inequitable impacts, if strategies are not implemented carefully. Suggestions for implementation included incentives, public education, cross-agency coordination, and pilot projects. Key challenges raised included high costs, limited funding, political barriers, and community resistance.

Feedback on Emission Reduction Measures

As mentioned above, the project team asked participants to select up to three strategies or actions they felt would have the **most benefit** to their community, and up to three strategies or actions that would have the **least benefit** to their community.

MOST BENEFICIAL STRATEGIES AND ACTIONS

Table 17 lists the top **strategies** that Pierce County participants identified as having the most benefit for their communities. **Table 18** lists the top **actions** that Pierce County participants identified as having the most benefit for their communities. Five actions received two votes each.

Table 17. The most beneficial strategies as voted on by workshop participants in Pierce County. There was a two-way tie between strategies for third place.

STRATEGIES		
Sector	**Strategy**	**Number of Votes**
Transportation	Reduce the region's total vehicle travel	11
Land Use	Protect and increase urban tree canopy and green space	8
Buildings	Reduce industrial emissions	5
Buildings	Efficient, all-electric existing buildings (upgrades & weatherization)	5

Table 18. The most beneficial actions as voted on by workshop participants in Pierce County. There was a two-way tie between actions for first place and a five-way tie between actions for second place.

ACTIONS		
Sector	**Action**	**Number of Votes**
Land Use	Protect existing forests and wetlands	3
Transportation	Improve walking and cycling networks	3
Land Use	Encourage healthy soil practices on farms	2
Consumption and Waste	Develop markets and infrastructure to reuse and recycle more materials, including supporting businesses and organizations	2
Buildings	Support residents to install solar panels and battery storage	2
Buildings	Weatherize buildings with insulation and other treatments	2
Land Use	Include tree preservation/replacements in local plans/policies	2

LEAST BENEFICIAL STRATEGIES AND ACTIONS

Table 19 lists the top **strategies** that Pierce participants identified as having the least benefit for their communities (each of these strategies only received one vote). **Table 20** lists the top **actions**

that Pierce participants identified as having the least benefit for their communities (each action only received one vote).

Table 19. The least beneficial strategies as voted on by workshop participants in Pierce County. There was a five-way tie between strategies for first place.

STRATEGIES		
Sector	**Strategy**	**Number of Votes**
Buildings	Efficient, all-electric existing buildings (upgrades & weatherization)	1
Buildings	Reduce emissions from building material production (e.g. steel, cement, concrete)	1
Transportation	Electrify or switch to low-emissions fuels for medium-heavy duty freight/service vehicles	1
Transportation	Electrify passenger vehicles	1
Transportation	Reduce emissions from air travel	1

Table 20. The least beneficial actions as voted on by workshop participants in Pierce County. There was a seven-way tie between actions for first place.

ACTIONS		
Sector	**Action**	**Number of Votes**
Buildings	Strengthen building codes	1
Buildings	Promote smaller buildings with shared walls (reduces energy use)	1
Buildings	Develop codes for construction materials	1
Consumption and Waste	Increase methane capture at landfills	1
Transportation	Consider vehicle usage pricing programs like congestion pricing or road usage pricing	1
Transportation	Reduce or eliminate parking minimums	1
Transportation	Support the region's airports to use low-emissions fuels	1

Discussion Takeaways

CO-BENEFITS

Participants identified the following co-benefits:

- Expanding regional transit and enhancing walking and biking infrastructure supports physical health, fosters community connections, improves safety, and creates jobs.
- Increasing the urban tree canopy helps reduce the urban heat island effect, improves quality of life, and provides cooling benefits for communities.
- Preserving wetlands, forests, and open space protects biodiversity, supports salmon recovery, and maintains the natural systems we rely on for clean air and water.
- Strengthening local food systems supports the immune system and gut health.
- Developing smaller, more energy-efficient buildings can lower utility costs, improve indoor air quality, and make housing more affordable and healthier.
- Efforts to reduce emissions can help communities build climate resilience and better withstand future climate impacts.
- Mental health resilience, safety, and a strong sense of place and community are all positively impacted by climate strategies that emphasize community design, green space, and social connection.
- Promoting green job pathways and workforce development creates economic opportunities and supports a just transition to a clean energy future.
- Cost savings from efficient appliances and sustainable infrastructure.
- Prioritizing environmental justice ensures that frontline communities, who are most impacted by pollution and climate change, receive targeted support to build resilience and reduce harm.

UNINTENDED CONSEQUENCES

Participants acknowledged the following unintended consequences:

- Concern that climate policies could disproportionately impact vulnerable communities if not paired with adequate support systems or equity-centered implementation.
- Pricing programs that penalize emissions, such as congestion or road usage fees, may be perceived as punitive if implemented before providing viable, affordable transportation alternatives.
- Eliminating parking minimums or strengthening building codes without sufficient alternatives or support may increase costs or cause delays, particularly in housing development.
- Reducing air travel emissions may currently lack feasible alternatives, and policies could inadvertently raise travel costs or limit access.
- Participants noted the need to ensure that well-intended building regulations do not unintentionally worsen housing affordability.
- Retrofitting older buildings can be costly and may unintentionally result in the loss of historic or aesthetic value if not carefully managed.

IMPLEMENTATION IDEAS

Participants shared the following implementation ideas:

Transportation

- Incentivize EV adoption through rebates and support for infrastructure upgrades like electric panel improvements.
- Expand and integrate public transit systems across the region with coordinated payment systems (e.g., a region-wide ORCA card), shorter wait times, and weekend service.
- Improve accessibility of public transit in rural communities and reduce barriers to public transit ridership.
- Promote shared transportation options like carpooling, vanpooling, and car sharing, and increase investment in high-speed rail and light rail.
- Pilot one-way streets and complete streets to prioritize multimodal transportation and safety.
- Partner with institutions like Joint Base Lewis-McChord and local businesses to support alternative fuels and sustainable commuting options.

Buildings

- Require or incentivize local power systems (nano grids) for industrial facilities and support renewable energy solutions like geothermal heating and cooling.
- Reduce construction barriers through streamlined permitting, including pre-approved accessory dwelling unit (ADU) designs and modular “plop-on” homes.
- Support training and workforce development for building material reuse and recycling programs.

Land Use

- Redirect tax revenue to improve sidewalks and bike lanes, especially in neighborhoods where property owners cannot afford to upgrade the public right of way.
- Expand public education on the importance of wetlands and the benefits of natural ecosystem functions.

Consumption and Waste

- Educate residents about proper waste disposal and organize public tours of local composting, recycling, and landfill facilities.
- Encourage food rescue and donation efforts, including gleaning and home-grown produce donations, to reduce food waste and support community needs.
- Support producer responsibility policies that require manufacturers to make products more durable, repairable, and recyclable.
- Shift the burden of product end-of-life management from individuals to producers.

Overarching

- Provide incentives and community-wide education to promote sustainable behaviors.
- Ensure coordinated action across agencies and governments to align climate action plans.

- Track progress, use adaptive management, and maintain transparency and accountability.
- Design communications that resonate with all demographics, including renters and older adults, and highlight health benefits as a key motivator.
- Engage community members through accessible outreach at events, places of worship, schools, and public spaces, using tools like murals, freeway signs, and mobile apps.
- Inspire participation through art and storytelling and encourage residents to advocate for change.
- Pilot small-scale demonstration projects to showcase the benefits of climate strategies and build public support.
- Allocate funding to assess the long-term consequences of proposed solutions, such as the environmental impact of EV batteries and solar panels, alongside funding for implementation.

CHALLENGES TO IMPLEMENTATION

Participants identified the following challenges to implementation:

- High upfront costs for EVs and home upgrades can limit participation.
- Government coordination remains a challenge.
- Insufficient federal funding and competing priorities (e.g., emergency response vs. traffic calming) can delay or derail implementation.
- Community and consumer buy-in may be limited by misinformation, fear of change, or a lack of understanding about the benefits of proposed actions.
- Developers may push to build on green spaces, undermining conservation efforts and reducing access to nature.
- Corporate lobbying and lack of political will were noted as significant obstacles to transformative climate policy.

Conclusion

The four climate action planning workshops brought together approximately 100 community members from the Puget Sound region. Participants from all four counties joined the workshops, reviewed the draft emission reduction strategies and actions, and engaged in meaningful conversations with the Agency team and representatives from local jurisdictions about emission and climate pollution reduction in their communities. Overall, participants expressed eagerness to learn about the climate action already taking place in the region, and enthusiasm to have an opportunity to provide feedback for the region's CCAP. While each county and community differed in its experiences of climate change and greenhouse gas emissions, many participants shared visions of healthy, connected communities who have access to clean air and water, accessible transit, walking, and cycling, thriving business districts, and ample green space.

The Agency will evaluate the feedback received from the community workshops and incorporate the feedback into the CCAP. The Agency plans to publish a draft CCAP in fall 2025 for a final round of community input, before publishing the final CCAP in December 2025.

Appendix A. Workshop Agenda

See next page.

Community Workshop on Reducing Climate Pollution: Snohomish County

Time	Agenda Item *Opportunities for participant discussion and/or questions **italicized**.*	Presenters
5:00 PM	**Arrival and Settle-In** • Free time: Please sign in, explore the community resources table, participate in a welcome activity, and eat some food! • Kids' area and activities available	N/A
5:30 PM	**Welcome** • Agenda overview • Land acknowledgement & ground rules • Interpretation instructions	Cascadia Consulting Group
5:45 PM	**Intro to the Comprehensive Climate Action Plan & Climate Pollution Reduction Grant** • Intro to the Clean Air Agency • Overview of the Comprehensive Climate Action Plan and Climate Pollution Reduction Grant • Emissions reduction strategies and actions • ***Participant questions & answers (10 min)***	Puget Sound Clean Air Agency
6:10 PM	**Discussion Overview** • Overview of discussion format • Transition to breakout groups	Cascadia Consulting Group
6:15 PM	**Discussion #1: Community Benefits & Impacts of Strategies** • ***Small group discussion and activities.*** *See guide on page 2.*	Discussion Groups
7:03 PM	**5 Minute Break**	
7:08 PM	**Discussion #2: Your Implementation Ideas** • ***Small group discussion questions.*** *See guide on page 2.*	Discussion Groups

7:25 PM	**Wrap Up & Next Steps**
	• Overview of next steps and ways to stay involved:
	  ○ If you have any outstanding questions, email CPRG@pscleanair.gov.
	  ○ Visit website at: pscleanair.gov/CPRG
		Puget Sound Clean Air Agency

PUGET SOUND
Clean Air Agency

1904 3rd Ave #105, Seattle, WA 98101
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pscleanair.gov

Discussion Guide

Discussion #1: Community Benefits and Impacts of Strategies

DISCUSSION QUESTIONS & STICKY NOTE ACTIVITY

1. Are there any crucial strategies missing and/or do you have new ideas for strategies not currently reflected here? Is there anything we can clarify about the strategies before we dive into discussion?
2. **Sticky note activity:** Add up to **five green** sticky notes to the strategies or actions you feel would have the biggest benefits. Add up to **five yellow** sticky notes to the strategies or actions you feel would have the least benefit.
3. Reflection & discussion by sector: We will go sector by sector, starting with transportation, to discuss the strategies and actions you selected.
    a. **Green** stickies share: Why/how would these strategies benefit your community?
    b. **Yellow** stickies share: Why/how would these strategies have less benefit for your community? Would any of these strategies have unintended consequences in their community?
    c. Everyone shares: Are there other benefits created by a strategy that you think are particularly important for your community, such as improved public health, increased mobility, cost savings, new green jobs, or more?

    [Questions A-C will be repeated for each sector.]

Discussion #2: Your Implementation Ideas

Return to your small group for this second discussion, focused on implementing the strategies.

DISCUSSION QUESTIONS

1. Looking at the strategies you identified as most beneficial, what are your ideas for the best way to implement these strategies in your neighborhood or community?
2. Looking at the strategies you identified as most beneficial, individually or in your community, what would keep a strategy from moving forward? Are there any challenges or barriers you foresee?
3. Now thinking about the full list of strategies, do you have any ideas or thoughts for implementation that we haven't yet talked about?

Community Workshop on Reducing Climate Pollution: Pierce County

Time	Agenda Item *Opportunities for participant discussion and/or questions **italicized**.*	Presenters
5:00 PM	**Arrival and Settle-In** • Free time: Please sign in, explore the community resources table, participate in a welcome activity, and eat some food! • Kids' area and activities available	N/A
5:30 PM	**Welcome** • Agenda overview • Land acknowledgement & ground rules • Interpretation instructions	Cascadia Consulting Group
5:40 PM	**Intro to the Comprehensive Climate Action Plan & Climate Pollution Reduction Grant** • Intro to the Clean Air Agency • Overview of the Comprehensive Climate Action Plan and Climate Pollution Reduction Grant • Emissions reduction strategies and actions • Pierce County & Tacoma climate planning efforts • ***Participant questions & answers (5-10 min)***	Puget Sound Clean Air Agency
6:10 PM	**Discussion Overview** • Overview of discussion format • Transition to breakout groups	Cascadia Consulting Group
6:15 PM	**Discussion #1: Community Benefits & Impacts of Strategies** • ***Small group discussion and activities.*** *See guide on page 2.*	Discussion Groups
6:45 PM	**Discussion #2: Your Implementation Ideas** • ***Small group discussion questions.*** *See guide on page 2.*	Discussion Groups

7:15 PM	**Wrap Up & Next Steps**
	• Overview of next steps and ways to stay involved:
	  ○ If you have any outstanding questions, email CPRG@pscleanair.gov.
	  ○ Visit website at: pscleanair.gov/CPRG
		Puget Sound Clean Air Agency

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Discussion Guide

Discussion #1: Community Benefits and Impacts of Strategies

DISCUSSION QUESTIONS & STICKY NOTE ACTIVITY

1. Are there any crucial strategies missing and/or do you have new ideas for strategies not currently reflected here? Is there anything we can clarify about the strategies before we dive into discussion?
2. Sticky note activity: Place up to three green sticky notes on the strategies you feel would have the biggest benefits to your community.
3. Other than reducing greenhouse gas emissions and air pollution, are there other benefits created by a strategy that you think are particularly important for your community, such as improved public health, increased mobility, cost savings, new green jobs, or more?

Discussion #2: Your Implementation Ideas

DISCUSSION QUESTIONS

1. Looking at the strategies you identified as most beneficial, what are your ideas for the best way to implement these strategies in your neighborhood or community?
2. Looking at the strategies you identified as most beneficial, individually or in your community, what would keep a strategy from moving forward? Are there any challenges or barriers you foresee?
3. Now thinking about the full list of strategies, do you have any ideas or thoughts for implementation that we haven't yet talked about?

CPRG Community Workshop Agenda

FACILITATOR VERSION

PUGET SOUND REGION (SEATTLE-TACOMA-BELLEVUE MSA)

WINTER/SPRING 2025 | PUGET SOUND CLEAN AIR AGENCY

1 Overview

The Puget Sound Clean Air Agency is creating a Comprehensive Climate Action Plan, funded by the Climate Pollution Reduction Grant program. This Plan will guide regional efforts to significantly reduce greenhouse gas (GHG) emissions and air pollution.
The Agency is hosting workshops in four counties around Puget Sound to collect community experiences and concerns about climate pollution in the region. Input from these workshops will help inform how actions that reduce climate pollution can best be designed and implemented.

Workshop Schedule

- **Snohomish County**
  - Thursday, March 13, 2025, 5:30-7:30PM at Everett Community College
- **Kitsap County**
  - Thursday, March 20, 2025, 5:30 – 7:30 PM at Bremerton Government Center
- **King County**
  - Thursday, April 3, 2025, 5:30-7:30PM at El Centro de la Raza
- **Pierce County**
  - Tuesday, April 15, 2025, 5:30-7:30PM at Clover Park Technical College

2 Workshop Objectives

- Gather community input to inform the LIDAC and community benefits analysis.
- Identify co-benefits and impacts of greenhouse gas emission reduction measures within local communities.
- Understand community perspectives on how actions can be implemented to maximize benefits and minimize unintended impacts.

3 Materials to Bring

Cascadia Materials	Amount	PSCAA Materials	Amount
Flip charts	7 (5 needed, 2 back-up)	Printed sign-in sheets	3 (2 sets for clipboards,1 back-up)
Easels	7 (5 needed, 2 back-up)	Printed CPRG materials	45 copies
Small sticky notes for discussion activity	Green and yellow sticky note pads	Kid activities	
Printed facilitators' packets: • Agenda • Facilitator table of measures	6	Community resources (from utilities and local governments)	
Printed participant agenda + discussion questions	Total # of participants	Printed sheets of measures table (posterboard size)	5 (1 per breakout group)
Printed participant table of measures	Total # of participants		
Printed copy of slideshow + speaker notes	1		
Felt-tip markers + sharpies	20	Foam core poster boards (clip measures to)	5 (1 per breakout group)

Cascadia Materials	Amount	PSCAA Materials	Amount
Extra pens	20	Food & drinks	
Computer (for slideshow)	1	Napkins, plates, cutlery, cups	
Extra connection cables (HDMI, USB adapter, extension cord)	2	Trash bag + compost bag	
Clipboards for sign-in sheets	2	Agency name tags	
Bluetooth speaker for music			
Extra binder clips for posterboards	30		
Sticky back name tags (for participants)	50		
Index cards for Q+A	50		
Printed name tags for CCG staff	3		
Rolling cart for materials	1		

4 Workshop Agenda

Time	Agenda Item	Presenters	Facilitation Notes

5:00 PM
30 mins
	Arrival and Settle-In
	• Participants begin to arrive
	• Food available, participants can mingle, sign in
	• When checking in, point out the kids' area and activities
	• Participants can browse available resources from utilities, local governments (community table)
	• Welcome activity: posterboard question(s)
	  ○ What makes you hopeful about the future of your community?
	  ○ What climate actions do you already see happening in your community?
		N/A	• Sign-in area includes: sign-in sheets, any CPRG materials, and printed meeting agendas
			• 2-3 people staffing sign-in table
			• Show kid area & activities
			• Community table with resources available
			• Music playing from 5 – 5:30 PM
			• Welcome reel slides play

Time	Agenda Item	Presenters	Facilitation Notes

5:30 PM
15 mins
	Welcome and Agenda Overview
	• Land acknowledgement
	• Logistics for in-person space
	• Interpretation available & expectations around interpretation
	• Workshop staff intro
	• Agenda overview – note times for questions and discussion
	• Participation guidelines
	• Interactive question:
	  ○ Why did you choose to come to this workshop?
	  ○ *Please share your answer with your table or a neighbor.*
		Cascadia:
		Alle/Gretchen
			• Logistics:
			  ○ Bathrooms
			  ○ Kid area & activities
			  ○ Emergency exits
			  ○ Food available!
			  ○ Ground rules of participation
			• Interpretation
			• Ground rules
			• Team members stand up during logistics slide

5:45 PM
25 mins
	Introduction to the Comprehensive Climate Action Plan & Climate Pollution Reduction Grant
	• Presentation (15 min)
	  ○ Introduction to the Agency
	  ○ Overview of CPRG + CCAP
	  ○ Timeline of the process
	  ○ Overview of GHG emissions and sector
	• Menu of GHG reduction measures
	• Question & Answer Session (10 min)
	  ○ Do you have any questions about what you just heard on the CCAP or the CPRG program to prepare for the upcoming discussion?
		Agency:
		Sara/Erica
			For Q&A (2 options to participate):
			• People can write down their questions on index cards – we collect that during presentation and go through questions.
			• Or people can raise hands and ask their question verbally.
			Clarify how much time we have for Q&A. For questions we don't have time to answer, people can email questions to CPRG@pscleanair.gov.
			
			CCG Staff take note of verbal questions.

6:10 PM *5 mins*	**Discussion Overview** • Overview of discussion format (2 min) ○ How your input will be used	Cascadia: Alle/Gretchen	Discussion format:

Time	Agenda Item	Presenters	Facilitation Notes

	• Transition to breakout groups (3 minutes)		• Small group discussions – stick with the same small group the whole workshop
			• Facilitator will either count people off or split the room by tables
			• Two discussion sections:
			  ○ First section is focused on community benefits & impacts of the emission reduction strategies
			  ○ Second section is focused on ideas for implementation

6:15 PM *30 min*	**Discussion #1: Community Benefits & Impacts of Strategies** • Small group discussion questions and activities. See guide: ○ Discussion Guide #1	Facilitator for each group (full PSCAA + CCG team)	• Up to 5 small groups • Supplies needed: Large flip charts for notes, small sticky notes, easels, markers • Printed discussion guide + measures sheet
6:45 PM *30 min*	**Discussion #2: Your Implementation Ideas** • Small group discussion questions and activities. See guide: ○ Discussion Guide #2	Facilitator for each group (full PSCAA + CCG team)	• Up to 5 small groups • Supplies needed: Large flip charts for notes, small sticky notes, easels, markers • Printed discussion guide + measures sheet
7:15 PM *15 min*	**Wrap Up & Next Steps** • Overview of next steps and timing	Agency	• Next steps:

Time	Agenda Item	Presenters	Facilitation Notes
	• Ways to stay involved and next opportunity to engage ○ If any outstanding questions, participants can email CPRG@pscleanair.gov.		○ Reviewing community feedback ○ Draft CCAP • Stay involved: ○ Listserv sign-up ○ Website ○ Comment on draft CCAP!

5 Discussion Guide

Discussion Group Structure

- **Discussion #1: Community Benefits and Impacts of Strategies (30 minutes)**
  - Give participants 5 minutes to review the menu of measures
  - Ask question #1 (clarifying or adding any missing strategies)
  - Complete the sticky activity (considering all sectors/full menu of measures) and ask participants individually to share why they made their choices. Call on participants one by one.
- **Discussion #2: Your Implementation Ideas (30 min)**
  - Roundtable discussion on discussion questions.

Discussion #1: Community Benefits and Impacts of Strategies

FACILITATOR INTRODUCTION

[Facilitator]: During this first discussion section, we're going to focus on the greenhouse gas emission reduction strategies that will be included in the CCAP. As we shared during the presentation, these are strategies we can take to reduce emissions in the Puget Sound region. We want to hear your feedback on these strategies, particularly focusing on how these strategies might benefit your local community. For the discussion, we'll start with any initial questions you may have, then we'll complete a sticky note activity using these poster boards, and then we'll discuss your sticky note selections.

Before we start, we'll give you 5 minutes to review the Emissions Reduction Strategies & Actions Handout. The handout is organized by sector (transportation, buildings, land use, refrigerants, and consumption & waste). The strategies refer to overarching approaches or key directions aimed at achieving emissions reductions. Actions are the specific, tangible steps taken to implement those strategies. In general, the strategies are ordered in the table based on how much emissions reduction they would achieve, from most reduction in greenhouse gas emissions to least reduction. The Clean Air Agency and partners around the region have already conducted engagement related to climate action. That includes community input on *which* actions should be included as well as *how* those actions should be implemented. In each sector of emissions, you'll see some of the key themes from past engagement processes.

[Facilitator gives group 5 minutes to review handout]

Now, we'll dive into our discussion questions on the strategies. As a reminder, we'll be talking about how actions can be implemented later on.

DISCUSSION QUESTIONS

1. Are there any crucial strategies missing and/or do you have new ideas for strategies not currently reflected here? Is there anything we can clarify about the strategies before we dive into discussion?
2. **Participant sticky note activity:** People add up to three **green** sticky notes to the strategies and actions they feel would have the biggest benefits (pre-written/printed on boards). People may add up to three **yellow** sticky notes to the strategies or actions they feel would have the least benefit or could cause unintended consequences (pre-written/printed on boards).
    a. **Participants share out**: Ask each person to explain why they chose the strategies/actions they did.

- **Green** stickies: Why/how would these strategies benefit their community?
- **Yellow** stickies: Why/how would these strategies have less benefit or unintended consequences for their community? *Examples if needed: Displacement, higher costs, higher electricity demand, impacts to jobs dependent on or using fossil fuels*.

3. **Group discussion**: Other than reducing greenhouse gas emissions and air pollution, are there other benefits created by a strategy that you think are particularly important for your community, such as improved public health, increased mobility, cost savings, new green jobs, or more?
    a. *Examples of potential benefits (can prompt people with these if they aren't sure): Better air quality on more days of the year, increased ridership on transit, less cases of asthma or other health issues exacerbated by poor air quality, cost savings, comfort, health, safety, resilience to climate impacts, improving air/water/soil quality, creating jobs, promoting equity and environmental justice*.

Discussion #2: Your Implementation Ideas

FACILITATOR INTRODUCTION

[Facilitator]: Now we're going to think about implementation, focusing on the strategies you identified as most beneficial. Implementation means putting these strategies into action in our region and working on these programs and projects. We're interested in hearing your ideas about how these strategies might be implemented in your community.

As we discussed earlier, past community engagement included input on how actions can best be implemented. Some of the cross-cutting themes that community members shared include *[facilitator shares list of cross-cutting themes]*.

DISCUSSION QUESTIONS

1. Looking at your top strategy (the strategy you identified as most beneficial), what are your ideas for the best way to implement these strategies in your neighborhood or community?
    a. *As needed: Examples include outreach, education, hands-on technical support, financial incentives, ambassadors to community*.

2. Looking at your top strategy, individually or in your community, what would keep a strategy from moving forward? Are there any challenges or barriers you foresee?
3. Now thinking about the full list of strategies, do you have any ideas or thoughts for implementation that we haven't yet talked about?

Roundtable discussion, with facilitator/notetaker capturing comments on board.

Appendix B. Emissions Reduction Measures – Workshop Draft

See next page.

Emissions Reduction Strategies & Actions

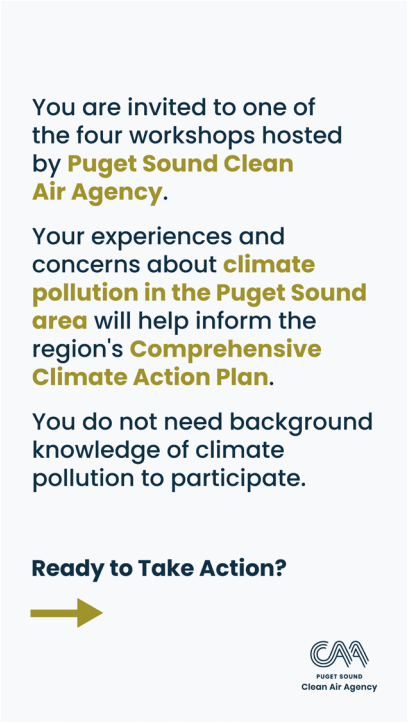
Transportation Sector: 40% of Regional Emissions	
Previous community input heard: • Reduce car dependency by making it easier and safer to walk, bike, and use transit • Support access to shared vehicles, especially near transit and dense development • Prevent sprawling development • Make electric vehicles more affordable and improve charging access • Electrify other polluting vehicles like trucks, planes, ferries, and landscaping equipment • Prioritize high-mileage and high-polluting vehicles in the switch to electric vehicles	
Strategies	**Actions**
Electrify passenger vehicles	Improve electric vehicle charging availability and reliability
	Support electric vehicle sharing programs
Reduce emissions from air travel	Support the region's airports to use low-emissions fuels
	Support alternatives to flying like high-speed rail and improved virtual meeting technology
Reduce the region's total vehicle travel	Consider vehicle usage pricing programs like congestion pricing or road usage pricing
	Increase transit use
	Improve walking and cycling networks
	Encourage compact development; locate growth near transit
	Reduce or eliminate parking minimums
Electrify or switch to low-emissions fuels for medium-heavy duty freight/service vehicles	Improve availability of charging stations and alternative fuels on regional and state transportation corridors
	Plan for low-emissions government and school vehicles
Electrify or switch to low-emissions fuels for offroad equipment (e.g. for construction and agriculture)	Phase out sales of equipment powered by diesel or gas
	Transition governments to low-emissions equipment or fuels
	Electrify landscaping equipment
Reduce marine and rail emissions	Support ports and railroad operators to switch to low-emissions fuels and technology
Electrify or switch to low-emissions fuels for transit vehicles	Provide support through bulk purchasing, market development, pilot projects, and collaborative funding applications
Buildings Sector: 39% of Regional Emissions	
Previous community input heard: • Make it easier to install solar panels • Make homes more efficient and comfortable through weatherization and appliance upgrades • Improve access to incentives and hands-on support for home efficiency and appliance upgrades	
Strategies	**Actions**
Efficient, all-electric existing buildings	Upgrade to efficient, electric space and water heating systems
	Upgrade to efficient, electric appliances (lighting, stoves, clothes dryers, dishwashers, refrigerators, etc.)
	Weatherize buildings with insulation and other treatments

	Strengthen efficiency requirements for commercial buildings
Reduce industrial emissions	Support upgrades that reduce pollution
	Create awards to incentivize reduced emissions
Efficient, all-electric new buildings	Strengthen building codes
	Promote smaller buildings with shared walls (reduces energy use)
Local solar energy and battery storage	Add solar panels on public buildings, parking lots, landfills
	Support residents to install solar panels and battery storage
Buildings Sector (continued)	
Reduce emissions from building material production (e.g. steel, cement, concrete)	Develop codes for construction materials
	Promote sustainable purchasing and contracting
	Support industry leaders with shared learning, collaboration
	Reduce waste from building construction and deconstruction
	Adapt the use of existing buildings instead of making new buildings
Land Use Sector: 13% of Regional Emissions	
Previous community input heard: • Preserve forests and rural lands • Partner with tribal organizations on preservation projects • Increase urban tree canopy and green spaces, focusing on equity • Consider responsibility for the maintenance of urban trees when planting • Use green infrastructure for stormwater management, roofs, roadsides, and others • Support small, family-owned growers using healthy soil practices	
Strategies	**Actions**
Protect rural lands that absorb and store carbon	Protect existing forests and wetlands
	Encourage healthy soil practices on farms
Protect and increase urban tree canopy and green space	Include tree preservation/replacements in local plans/policies
	Increase urban tree plantings
	Remove unnecessary pavement to create new green spaces
Promote green stormwater infrastructure	Use trees and other plants to filter and store stormwater
Refrigerants Sector: 5% of Regional Emissions	
Strategies	**Actions**
Reduce the use of refrigerants that create high amounts of climate pollution	Monitor for and fix leaks in commercial systems
	Recover harmful refrigerants and remove them from use
	Support the use of low-emission refrigerants in appliances
	Transition governments and schools to low-emission alternatives
Consumption & Waste Sector: 3% of Regional Emissions (Waste Only)	
Previous community input heard: • Increase recycling and composting • Reduce food waste • Use story-based education to show current successes and promote change	

Strategies	Actions
Capture and use methane gas	Increase methane capture at landfills
	Capture methane from agricultural and farming operations
	Explore energy generation from biological methane sources
Reduce food-related emissions	Encourage foods that produce less emissions
	Increase composting of non-edible food waste
	Support food rescue and donations
Reduce emissions from other materials	Increase composting and recycling
	Develop markets and infrastructure to reuse and recycle more materials, including supporting businesses and organizations
	Support legislation for material durability, reuse, and repair
	Discourage unnecessary purchasing
Reduce construction and demolition waste	Develop building codes for construction and deconstruction
	Develop markets to resell used construction materials

Appendix C. Promotional Materials

Social Media: Story Posts for Facebook, LinkedIn, and X



Social Media: Feed Posts for Facebook, LinkedIn, and X

Flyer

See next page.

Share your experiences and input about climate pollution in the Puget Sound region!

Join one of our workshops and influence the region's Comprehensive Climate Action Plan

Snohomish County
Thursday, March 13, 2025
5:30-7:30PM
Everett Community College

Kitsap County
Thursday, March 20, 2025
5:30-7:30PM
Bremerton Government Center

King County
Thursday, April 3, 2025
5:30-7:30PM
El Centro de la Raza

Pierce County
Tuesday, April 15, 2025
5:30-7:30PM
Clover Park Technical College

Doors open at 5 PM for each workshop.

Scan the QR code to register

or by going to pscleanair.gov/workshops

Your input will help inform how actions that reduce climate pollution within our neighborhoods can best be designed and implemented. You do not need previous knowledge of climate pollution to participate.

Live interpretation is available; please add your preferred language when registering.

The Comprehensive Climate Action Plan is funded by the Climate Pollution Reduction Grant. Learn more at pscleanair.gov/CPRG

PUGET SOUND
Clean Air Agency

Appendix E: Steering Committee and Technical Workgroups

Steering Committee Members

City of Bellevue	Patrick Babbitt
City of Bellevue	Jennifer Ewing
City of Bremerton	Katie Ketterer
City of Everett	Jennifer Gregerson
City of Everett	Karen Schraven
City of Seattle	Christine Bunch
City of Seattle	Michelle Caufield
City of Tacoma	Kristin Lynett
King County	Carrie Lee
King County	Terence Sullivan
Kitsap County	Christopher Piercy
Pierce County	Ryan Dicks
Pierce County	Kyla Wilson
Puget Sound Regional Council	Kelly McGourty
Snohomish County	Eileen Canola
Snohomish County	Molly Beeman

Technical Workgroup Members

Built Environment	
City of Bellevue	Patrick Babbitt
City of Bremerton	Katie Ketterer
City of Everett	Jennifer Gregerson
City of Seattle	Christine Bunch
City of Tacoma	Kristi Lynett
Climate Solutions	Megan Larkin
King County	Nicole Sanders
King County	Riley Lynch
King County	Andrew Larson
King County	Carrie Lee
King County	Jenny Cooper
King County	Terry Sullivan
Kitsap County	Kirvie Yobech
Pierce County	Kyla Wilson
Snohomish County	Alex Pidduck
Snohomish County	Eileen Canola

Transportation	
City of Bellevue	Colin Munson
City of Bellevue	Patrick Babbitt
Climate Solutions	Leah Missik
King County Metro	Peter Heffernan
Kitsap Transit	Steffani Lillie
Northwest Seaport Alliance	Steve Nicholas
Northwest Seaport Alliance	Graham VanderSchelden
Port of Everett	Adam LeMieux
Port of Seattle	David Fujimoto
Port of Seattle	Lucian Go
Pierce County	Eurydice Pentz
Puget Sound Regional Council	Kelly McGourty
Snohomish County	Eileen Canola
Sound Transit	Amy Shatzkin

Consumption & Waste	
King County	Andy Smith
King County	Matt Kuharic
King County	Nina Olivier
King County	Kelsey Bailey
Kitsap County	Chris Piercy
Pierce County	Ryan Dicks
Pierce County	Kyla Wilson
Seattle Public Utilities	Ashima Sukhdev
Seattle Public Utilities	Katie Kennedy
Snohomish County	Jon Greninger

Equity	
Climate Solutions	Altinay Karasapan
King County	Vicky Raya
King County	Bradley Kramer
King County PH	Richard Gelb
Kitsap PH	Adrienne Hampton
Pierce County	Nicole Avendano
Puget Sound Regional Council	Charles Patton
Snohomish County	Eileen Canola
Snohomish County	Molly Beeman
Snohomish Public Health Department	Christina Ciupitu-Plath
Tacoma-Pierce County Health Department	Erika Bartlett

Workforce Development	
City of Seattle	Vin Valentino
City of Seattle	Gus Williams
King County	Michael Carter
Snohomish County	Eileen Canola
WA Department of Commerce	Stephanie Scott
WA Department of Commerce	Dina Geiszler
WorkForce Central	Katie Condit
WorkForce Central	Teresa Delicino
Workforce Central	Josh Stovall
WorkForce Central	Samantha Paxton
WorkForce Central	Trudy Soriano

Appendix F: Jurisdictions with Climate Action Plans and Climate Change/Resiliency Projects

Appendix A: MSA Jurisdictions with CAPs and Climate Change/Resiliency Projects

Jurisdiction	Population	CAP?	Climate Component	Equity	Goal 2030	Buildings and Energy						Transportation					Green Space			Waste and Services		
						Electrification & Efficiency	Mixed-use	Design Stands.	Middle Housing	Renew. Energy	Charging	Transit Investment	Complete Streets	Micromobility	Parking Reform	Telework	TDM	Sequestration/Urban Canopy	Green Government	Offsets	Green/Circular Economy	Waste Reduction	Local Food Production
King County	2,266,789	Yes	Yes	Yes	70%	Yes	Yes	Yes		Yes	Yes	Yes	Yes					Yes	Yes		Yes	Yes	Yes
Pierce County	927,380	Yes	Yes	Yes	45%	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes			Yes	
Snohomish County	840,079	No	Yes (2024 Comp. Plan)		N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Seattle	749,256	Yes	Yes	Yes	58%	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes				Yes			Yes	
Kitsap County	277,673	No			N/A	Yes	Yes			Yes		Yes	Yes				Yes						
Tacoma	221,776	Yes	Yes	Yes	33%	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes	Yes		Yes	Yes	Yes
Bellevue	152,767	Yes	Yes	Yes	50%	Yes	Yes	Yes		Yes	Yes	Yes	Yes					Yes	Yes			Yes	
Kent	134,392	No			N/A	Yes	Yes		Yes	Yes			Yes				Yes					Yes	
Everett	111,337	Yes	Yes	Yes	50%	Yes	Yes				Yes	Yes	Yes	Yes				Yes	Yes	No	Yes	Yes	
Renton	104,047	No		Yes	N/A		Yes						Yes				Yes	Yes				Yes	
Federal Way	97,863	No	Yes		N/A		Yes		Yes				Yes				Yes	Yes					
Kirkland	92,151	Yes	Yes	Yes	50%	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes			Yes	Yes		Yes	Yes	Yes
Auburn	84,858	No			N/A		Yes		Yes		Yes	Yes	Yes				Yes					Yes	
Redmond	76,732	Yes	Yes	Yes	50%	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Marysville	72,275	No	Yes		N/A		Yes		Yes				Yes				Yes	Yes	Yes				
Sammamish	65,845	Yes	Yes		50%	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes		Yes	Yes	Yes	Yes	Yes	
Lakewood	62,572	No	Yes		N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes				Yes	Yes	Yes			Yes	
Shoreline	59,690	Yes	Yes	Yes	50%	Yes	Yes	Yes			Yes	Yes	Yes	Yes	Yes			Yes	Yes			Yes	
Burien	50,806	Yes	Yes	Yes	50%	Yes	Yes		Yes	Yes	Yes	Yes	Yes					Yes	Yes		Yes	Yes	
Bothell	49,017	No	Yes		N/A		Yes					Yes	Yes				Yes	Yes					
Bremerton	45,415	No	Yes		N/A	Yes	Yes		Yes				Yes					Yes	Yes				
Lynnwood	43,212	No	Yes	Yes	N/A		Yes			Yes		Yes	Yes				Yes	Yes	Yes			Yes	Yes
Edmonds	42,593	Yes	Yes	Yes	50% 2035		Yes				Yes	Yes	Yes	Yes				Yes	Yes	Yes	No		
Puyallup	42,452	No	Yes		N/A	Yes	Yes						Yes					Yes					
Lake Stevens	39,848	Yes		Yes	N/A	Yes	Yes				Yes	Yes	Yes					Yes	Yes		Yes	Yes	
Issaquah	39,344	Yes	Yes	Yes	50%	Yes	Yes	Yes	Yes	Yes	Yes	Yes				Yes		Yes	Yes			Yes	
University Place	34,634	No	Yes		N/A	Yes	Yes		Yes		Yes	Yes	Yes		Yes		Yes	Yes	Yes				
Des Moines	32,408	No			N/A		Yes		Yes		Yes		Yes				Yes		Yes			Yes	
SeaTac	30,525	No	Yes		N/A		Yes		Yes	Yes	Yes		Yes				Yes	Yes	Yes			Yes	
Maple Valley	28,220	No			N/A	Yes							Yes				Yes					Yes	
Mercer Island	25,172	Yes	Yes	Yes	50%	Yes				Yes	Yes	Yes	Yes	Yes				Yes	Yes		Yes	Yes	
Bainbridge Island	24,494	Yes	Yes	Yes	65% 2035	Yes	Yes		Yes	Yes	Yes	Yes			Yes	Yes		Yes	Yes			Yes	
Kenmore	23,478	Yes	Yes	Yes	50%	Yes	Yes		Yes	Yes	Yes		Yes			Yes		Yes	Yes		Yes	Yes	

Seattle-Tacoma-Bellevue MSA

Priority Climate Action Plan

Jurisdiction	Population	CAP?	Climate Component	Equity	Goal 2030	Buildings and Energy						Transportation					Green Space			Waste and Services		
						Electrification & Efficiency	Mixed-use	Design Stands.	Middle Housing	Renew. Energy	Charging	Transit Investment	Complete Streets	Micromobility	Parking Reform	Telework	TDM	Sequestration/Urban Canopy	Green Government	Offsets	Green/Circular Economy	Waste Reduction	Local Food Production
Bonney Lake	22,885	No	Yes		N/A		Yes		Yes		Yes	Yes	Yes				Yes	Yes				Yes	Yes
Mountlake Terrace	21,543	No			N/A	Yes	Yes		Yes		Yes	Yes	Yes				Yes	Yes					
Tukwila	21,377	No	Yes		N/A	Yes	Yes		Yes		Yes	Yes	Yes	Yes			Yes	Yes	Yes			Yes	Yes
Covington	21,374	No	Yes		N/A		Yes		Yes			Yes	Yes				Yes	Yes	Yes			Yes	
Mukilteo	21,096	No			N/A		Yes					Yes	Yes				Yes	Yes				Yes	
Arlington	21,059	No			N/A	Yes	Yes		Yes	Yes		Yes	Yes	Yes				Yes					
Mill Creek	20,828	No			N/A		Yes					Yes	Yes										
Monroe	19,243	No			N/A		Yes						Yes										
Port Orchard	17,089	No			N/A		Yes		Yes		Yes		Yes				Yes						
Snoqualmie	13,621	No	Yes		50%	Yes	Yes		Yes	Yes	Yes	Yes	Yes				Yes	Yes	Yes			Yes	Yes
Woodinville	13,261	Yes	Yes	Yes	50%	Yes	Yes				Yes		Yes	Yes				Yes	Yes		Yes	Yes	
Lake Forest Park	13,186	No	Yes		N/A	Yes	Yes		Yes	Yes			Yes				Yes	Yes	Yes			Yes	
Newcastle	12,902	No			N/A		Yes						Yes				Yes	Yes				Yes	
Edgewood	12,896	No			N/A		Yes		Yes				Yes					Yes					
Enumclaw	12,721	No			N/A		Yes		Yes			Yes	Yes				Yes						
Gig Harbor	12,484	Yes	Yes	Yes	45%	Yes	Yes			Yes	Yes	Yes	Yes					Yes	Yes			Yes	
Poulsbo	12,039	No			N/A		Yes		Yes	Yes			Yes				Yes	Yes	Yes				
Fife	10,809	No			N/A								Yes				Yes	Yes					
Sumner	10,595	No	Yes		N/A	Yes	Yes		Yes	Yes			Yes				Yes	Yes	Yes			Yes	
Snohomish	10,150	No			N/A	Yes	Yes		Yes		Yes	Yes	Yes					Yes	Yes			Yes	
DuPont	9,884	No	Yes		N/A	Yes	Yes	Yes			Yes	Yes	Yes				Yes	Yes					
Orting	8,954	No			N/A		Yes						Yes				Yes						
Stanwood	8,804	No			N/A		Yes		Yes				Yes				Yes					Yes	Yes
Milton	8,768	No			N/A	Yes	Yes		Yes			Yes	Yes				Yes						
Duvall	8,434	No			N/A		Yes		Yes			Yes	Yes				Yes	Yes				Yes	
North Bend	7,902	No	Yes		N/A		Yes		Yes	Yes	Yes		Yes				Yes	Yes				Yes	
Pacific	7,022	No			N/A	Yes	Yes		Yes	Yes		Yes	Yes					Yes	Yes				
Fircrest	6,998	No			N/A		Yes		Yes		Yes		Yes				Yes						
Steilacoom	6,727	No	Yes		N/A		Yes						Yes					Yes					
Normandy Park	6,607	No			N/A		Yes				Yes	Yes	Yes				Yes						
Brier	6,463	No			N/A							Yes	Yes			Yes	Yes	Yes					
Black Diamond	6,336	No	Yes		N/A	Yes	Yes	Yes	Yes	Yes		Yes	Yes				Yes	Yes				Yes	
Sultan	6,205	No			N/A		Yes		Yes			Yes	Yes				Yes					Yes	
Buckley	5,295	No			N/A		Yes		Yes			Yes	Yes									Yes	Yes
Granite Falls	3,364	No			N/A		Yes		Yes			Yes	Yes				Yes	Yes					
Algona	3,220	No	Yes		N/A		Yes		Yes				Yes					Yes					
Clyde Hill	3,110	No			N/A														Yes			Yes	

Seattle-Tacoma-Bellevue MSA

Priority Climate Action Plan

Jurisdiction	Population	CAP?	Climate Component	Equity	Goal 2030	Buildings and Energy						Transportation					Green Space		Waste and Services			
						Electrification & Efficiency	Mixed-use	Design Stands.	Middle Housing	Renew. Energy	Charging	Transit Investment	Complete Streets	Micromobility	Parking Reform	Telework	TDM	Sequestration/Urban Canopy	Green Government	Offsets	Green/Circular Economy	Waste Reduction	Local Food Production
Medina	2,920	No			N/A								Yes					Yes					
Eatonville	2,845	No			N/A		Yes			Yes	Yes		Yes					Yes					
Gold Bar	2,403	No			N/A		Yes		Yes				Yes										
Carnation	2,158	No			N/A		Yes		Yes			Yes	Yes				Yes	Yes					Yes
Darrington	1,460	No			N/A	Yes			Yes	Yes			Yes				Yes	Yes					Yes
Woodway	1,320	No			N/A								Yes				Yes	Yes					Yes
Yarrow Point	1,130	No			N/A																		
Ruston	1,055	No	Yes		N/A		Yes		Yes				Yes										
Roy	816	No			N/A		Yes		Yes		Yes		Yes				Yes						
Carbonado	734	No			N/A	Yes	Yes		Yes				Yes				Yes	Yes					
Wilkeson	499	No			N/A																		
Hunts Point	457	No			N/A																		
South Prairie	373	No			N/A																		
Beaux Arts Village	317	No			N/A																		
Skykomish	158	No			N/A	Yes						Yes	Yes										
Index	155	No			N/A	Yes						Yes	Yes						Yes				

Appendix G: Potential Funding Sources, Implementation Milestones, and Metrics for Tracking Progress by Sector

Sector 1. Built Environment

Potential Funding Sources

Local	State	Federal
• City of Bellevue Clean Buildings Incentive Program • City of Seattle Building Emissions Navigator • City of Seattle Clean Heat Program • Energy Smart Eastside • King County's Energize Program • Puget Sound Energy Up & Go Electric Program • Tacoma Public Utilities Community Electric Vehicle Charging Rebate • Seattle City Light Fleet Electrification Program • Seattle City Light Multifamily Electric Vehicle Charging Program	• Multifamily Building Efficiency Grants Program • Clean Building Performance Standard Incentive Program (Tier 1) • Early Adopter Incentive Program (Tier 2) • Small District Energy Assessment Grant • Community Development Block Grants • State Home Electrification and Appliance Rebate Program	• Credit for Builders of New Energy-Efficient Homes • Energy Efficiency and Conservation Loan Program • Distributed Generation Energy Project Financing • Title 17 Clean Energy Financing Program • Electric Infrastructure Loan & Loan Guarantee Program • Distributed Energy Resources Interconnection Solutions Collaboratives • Electric Infrastructure Loan & Loan Guarantee Program • Energy Efficient Home Improvement Credit (expires 12/31/2025) • Energy Efficient Commercial Buildings Deduction (no longer available to projects that begin construction after 6/30/2025) • Investment Tax Credit for Energy Property (no longer available to projects that begin construction after 7/4/2025) • Residential Clean Energy Credit • Home Electric Panel Upgrade • Residential Clean Energy Credit: Home Battery Storage

Local	State	Federal
		• Residential Clean Energy Credit: Home Battery Storage • Elective Pay and Transferability • Tribal Energy Financing • Clean Energy Tax Incentives for Businesses & Other Entities • Low-Income Energy Assistance Program • Tax Credit for Heat Pumps and Heat Pump Hot Water Heaters (expires 12/21/2025) • Rural Energy Savings Program • Energy Resource Conservation • Geothermal Heat Pump Tax Credit

Implementation Milestones

Most strategies in the built environment would require hiring new staff to provide program oversight, and the execution of one or more contracts for services. General milestones for the first five years include:

- Year 1:
  - Task 1: Hire staff
  - Task 2: Retain contract services
- Year 2:
  - Task 3: Program outreach
- Year 3:
  - Task 4: Program development
- Year 4-5, ongoing:
  - Task 5: Program activation and administration, tracking, monitoring and reporting

Authority to Implement

Some of the strategies and actions in this sector may require additional steps to obtain implementation authority. Specific timelines will depend on the time when the authorization is initiated, and progress through the relevant governing body.

For state policy action, Washington State legislature meets annually, and alternates between short and long sessions. In odd-numbered years, the legislative session is 105 days; in even-numbered years, the legislative session is 60 days. Bills are first introduced into session by legislators and then referred to a committee for hearing; committees may pass the bill (with or without changes), create a new version of the bill, reject the bill, or take no action. If a bill is approved by both the House and Senate, it goes to the Governor for consideration and signature into law.

Local and regional governments (cities, counties, and other regional governing bodies) have the authority to develop and adopt ordinances, and/or rules or regulations that deal with matters of local concern and/or are authorized by statute. Local governments in Washington are generally prohibited from passing ordinances or adopting a rule or regulation that conflict with state law. The specific processes for passing a local ordinance may vary slightly depending on the jurisdiction and local government structure; however, the general steps include proposing the ordinance, introducing the ordinance during a council or commission meeting, holding public hearings, and voting on adoption. When an entity adopts a rule or regulation the process is similar, including opportunity for public input and voting by the entity. Once the ordinance or rule or regulation is adopted, local government agencies are responsible for implementation and enforcement.

Metrics for Tracking Progress

- Percent reduction in energy use for existing residential, commercial, and industrial buildings by 2030
- Percent electrification of existing residential, commercial, and industrial buildings by 2030
- Megawatts of local solar developed by 2030 (for PSE areas)
- Percent reduction of residential, commercial, and industrial GHG emissions by 2030
- Percent of salvaged lumber reused by 2030
- Percent increase in whole building, and building material, reuse by 2030
- Percent increase in commercial buildings designed for disassembly by 2030
- Program enrollment numbers including number of rebates provided, total equipment swapped/replaced, etc.
- Number of individuals and buildings reached through outreach and technical assistance program

Sector 2: Transportation

Potential Funding

State	Federal
• Pedestrian and Bicycle Program • Charge Where You Are: Level 2 Charging • Charging Program Grant	• Vehicle Technology Office Program Wide • Advanced Technology Vehicles Manufacturing Loan Program • Community Energy Innovation Prize Round 2 • Transportation Alternatives Program • Used Clean Vehicle Tax Credit (expires 9/30/2025) • Clean Vehicle Tax Credits (expires 9/30/2025) • Commercial Clean Vehicle Credit (expires 9/30/2025) • Electric Vehicle Charging Equipment (Alternative Fuel Vehicle Refueling Infrastructure Property Credit-Commercial/Public Charging Stations) • Clean Bus Planning Awards • National Electric Vehicle Infrastructure

Implementation Milestones

Successful implementation of transportation strategies will involve partnerships between PSRC, the State, Ports, transit agencies, equipment manufacturers, and various other stakeholders across the region. The timeline for different projects will vary; a high-level timeline for the first five years is as follows:

- Year 1:
  - Task 1: Legal, engineering, and technical review of project designs
  - Task 2: Site design and utility consultation
- Year 2:
  - Task 3: Equipment purchases
  - Task 4: Installation of infrastructure
- Year 3-5, ongoing:
  - Task 6: Program administration, tracking, and monitoring

Authority to Implement

Some of the strategies and actions in this sector may require additional steps to obtain implementation authority. Specific timelines will depend on the time when the authorization is initiated, and progress through the relevant governing body.

For state policy action, Washington State legislature meets annually, and alternates between short and long sessions. In odd-numbered years, the legislative session is 105 days; in even-numbered years, the legislative session is 60 days. Bills are first introduced into session by legislators and then referred to a committee for hearing; committees may pass the bill (with or without changes), create a new version of the bill, reject the bill, or take no action. If a bill is approved by both the House and Senate, it goes to the Governor for consideration into law.

Local and regional governments (cities, counties, and other regional governing bodies) have the authority to develop and adopt laws, ordinances, and regulations that deal with matters of local concern. Local governments in Washington are generally prohibited from passing ordinances that conflict with state law. The specific process for passing a local ordinance may vary slightly depending on the jurisdiction and local government structure; however, the general steps include proposing the ordinance, introducing the ordinance during a council or commission meeting, holding public hearings, and voting on adoption. Once the ordinance is adopted, local government agencies are responsible for implementing and enforcing the new law.

Metrics for Tracking Progress

- Percent VMT reduction and GHG reduction for passenger vehicles by 2030
- Updates on investments and commitments made in the regional pedestrian and bicycle transportation networks
- Percent VMT reduction for freight and service vehicles by 2030
- Percent of new passenger vehicles sold as EVs by 2030Amount of funding invested in EV charging infrastructure for passenger vehicles, particularly for disadvantaged communities.
- Percent of new freight and service vehicles sold as EVs by 2030
- Percent increase of new transit fleet vehicles to ZEV, including buses, ferries, streetcars, vanpools, specialized transportation vehicles, light rail, and commuter rail, etc.
- Percent reduction in GHGs from offroad equipment by 2030

- Percent increase of the region's medium and heavy-duty vehicle fleet transitioned to ZEV, including port drayage trucks and other seaport and airport vehicles and infrastructure
- Percent reduction in fuel carbon intensity for aviation fuels
- Percent reduction in aviation fuel use

Consumption & Waste

Potential Funding Sources

State	Federal
• Local solid waste financial assistance program grants • Waste reduction and recycling education grants	• The Circular Supply Chains Accelerator

Implementation Milestones

Successful implementation of measures in the consumption and waste sector will involve partnerships between the State, counties, cities, and public health agencies across the region. A high-level timeline for the first five years is as follows:

- Year 1:
  - Task 1: Project and program design
  - Task 2: Site design and engineering review
  - Task 3: Outreach to cities, public health agencies
  - Task 4: Outreach to high impact establishments
- Year 2:
  - Task 5: Pilot program development
  - Task 6: Facility upgrades and construction
- Year 3:
  - Task 7: Continued program design based on pilot programs
- Year 4-5, ongoing:
  - Task 8: Program administration, tracking, and monitoring

Metrics for Tracking Progress

- Percent of construction and demolition materials diverted from landfills by 2030
- Percent of other recyclable and compostable waste diverted from landfills by 2030
  - Tonnage diverted (reduction in food waste in garbage)
- Percent decrease of household food waste by 2030 and 2050
  - Tonnage (reduction in tonnage of food waste in garbage and increased compost production and use)
- Tonnage of food purchased shifting from higher to lower-carbon intensity foods, agricultural processes, and sources

Natural and Working Lands

Potential Funding Sources

State	Federal
• Financial Assistance for Wildfire Resilience and Forest Health • National Coastal Wetlands Conservation Grant Program • Community Forests Program	• National Coastal Wetlands Conservation Grant Program

Implementation Milestones

The implementation of measures for natural and working lands can vary significantly based on factors such as project complexity, regulatory requirements, and community engagement. The natural carbon cycle, which includes natural disturbances and other ecosystem processes, must also be taken into account and is best considered at broad scales during land management planning. A high-level timeline for the first five years is as follows:

- Year 1
  - Task 1: Pre-permitting and site design
  - Task 2: Community outreach
  - Task 3: Environmental review and compliance
- Year 2:
  - Task 4: Construction
- Year 3-5, ongoing
  - Task 4: Program administration, tracking, and monitoring

Metrics for Tracking Progress

- Percent gain/loss in tree canopy by 2030
- Percent of land carbon sinks protected by 2030

Refrigerants

Potential Funding Sources

Potential funding sources were not identified for this sector.

Implementation Milestones

Most strategies in the refrigerants sector would require hiring new staff to provide program oversight, and the execution of one or more contracts for services. General milestones for the first five years include:

- Year 1:
  - Task 1: Hire staff
  - Task 2: Retain contract services

- Year 2:
  - Task 3: Program outreach
- Year 3:
  - Task 4: Program development
- Year 4-5, ongoing:
  - Task 5: Program activation and administration, tracking, and monitoring

Metrics for Tracking Progress

- Program enrollment numbers including the number of rebates provided, total equipment replaced, etc.
- Number of organizations, manufacturers, distributers, governments, and schools reached through outreach and technical assistance programs

Appendix H: Public Input Received on the Draft Climate Plan

PUGET SOUND REGION

Draft Comprehensive Climate Action Plan

For the Seattle-Tacoma-Bellevue Metropolitan Statistical Area (MSA), on behalf of all cities and counties in the four-county Puget Sound Region of King, Kitsap, Pierce, and Snohomish Counties

October 6, 2025

PUGET SOUND
Clean Air Agency

Acknowledgements

The Puget Sound Clean Air Agency thanks Puget Sound residents and the following organizations and staff for contributing to the development of this Comprehensive Climate Action Plan. See **Appendix E** for complete list of CPRG Steering Committee and Technical Workgroup members.

Puget Sound Clean Air Agency Climate Plan Development Team

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Bremerton Community College

Cascadia Consulting Group, Inc.

Clover Park Technical College

Everett Community College

El Centro de la Raza

Special Thanks

CPRG Steering Committee

CPRG Technical Workgroups

Puget Sound Clean Air Agency Advisory Council

Vexing Media

Workshop Participants

#001

Posted by **Graham 1** on **10/20/2025** at **7:40pm** [Comment ID: 76] - Link
Agree: 0, Disagree: 0
As well as our sadly suffering natural climate, the political climate worries me just as much?! Is the Federal funding locked in, or is there cause to be concerned that Washington could renege on the contract with Washington State?

#002

Posted by **Caitlin** on **10/09/2025** at **2:32pm** [Comment ID: 29] - Link
Agree: 0, Disagree: 0
Olympic College?

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Executive Summary for Decision Makers

Overview

Climate change threatens people and ecosystems. Local and regional partners across the Puget Sound are developing and implementing the policies and solutions necessary to curb the worst impacts of climate change. Our region's collective approach to climate action channels a spirit of innovation, inclusion, and success, and embodies bold and coordinated action for the benefit of all Puget Sound communities, waterways, habitats, and residents.

Development of this Comprehensive Climate Action Plan (referred to as "climate plan") was led by the Puget Sound Clean Air Agency (Agency) for the Puget Sound region, encompassing King, Kitsap, Pierce, and Snohomish counties. Together, these counties represent half of the state's population and the region includes the junction of two major interstate highways (I-5 and I-90) as well as two major seaports and the state's major airport.

The Puget Sound Region Comprehensive Climate Action Plan encompasses King, Kitsap, Pierce, and Snohomish Counties.

Climate Plan Purpose

This climate plan is a guiding roadmap for local and regional governments to address climate change. This climate plan identifies and facilitates high-impact regional actions to reduce climate emissions through coordinated efforts, with a focus on maximizing benefits in overburdened communities. It brings together decades of existing climate planning efforts across the Puget Sound region to develop a comprehensive list of actions to achieve greenhouse gas reductions in the region, with the added benefit of including information on costs, co-benefits, and workforce development implications to provide decision-makers with the information needed to make effective climate planning decisions and investments. It also identifies which strategies are poised for regional implementation and which are better for state implementation. **We encourage local and regional governments to regularly use this plan as they prioritize, select, and implement proposed climate strategies.**

This climate plan is organized into three parts:

Part I. Where we are now: A greenhouse gas emissions inventory for the four-county region, the current climate policy landscape, and a summary of existing and planned large-scale greenhouse gas reduction projects.

Part II. Where we need to go: A summary of regional and state greenhouse gas reduction targets and greenhouse gas emissions projections for 2030 and 2050.

Part III. How we will get there: A climate pollution reduction plan for all sectors of the regional economy (consisting of 25 strategies and 106 actions), and a discussion of important considerations for equitable implementation, including potential funding sources, and which entities might best be positioned to implement proposed actions. This plan also includes analyses of potential benefits and impacts of proposed climate actions, with a focus on overburdened communities, as well as workforce development needs to implement the proposed actions, and information about next steps.

#003

Posted by **Deepa Sivarajan** on **10/25/2025** at **10:49pm** [Comment ID: 131] - Link
Agree: 0, Disagree: 0

Climate Solutions thanks you for the opportunity to submit comments on the 2025 Comprehensive Climate Action Plan (CCAP). Climate Solutions is a clean energy nonprofit organization working to accelerate solutions to the climate crisis. The Northwest has emerged as a hub of climate action, and Climate Solutions is at the center of the movement as a catalyst and advocate.

We appreciate the hard work that has gone into developing the CCAP, in particular the thoroughness in identifying actions to combat climate change and adapt to its impacts, and the wide range of sectors considered, including the built environment, transportation, solid waste and waste water, land use and sequestration, refrigerants, and consumption. The list of suggested actions for local governments to take is, indeed, very comprehensive, and we do not see any major gaps in the menu of possible actions.

However, we have concerns that lack of prioritization of the actions within each of their “strategies” would make it difficult for local governments to use this guide effectively. Each strategy does provide helpful metrics including emissions reduction potential and an estimated cost per ton, as well a list of co-benefits and other considerations. But since most strategies contain several possible actions, it may not be clear how a local government using this plan should evaluate an action’s effectiveness relative to the other actions in the same strategy. While we realize that each local government has their own context and specific considerations to decide which actions are appropriate for their community, we do believe that the CCAP should provide stronger guidance on prioritization, given that PSCAA, as an agency that operates across four counties, has a higher-level view of how climate policies across the region may fit together, and local governments may not have the capacity to do this level of analysis themselves. In particular, climate justice should be elevated as a factor in prioritizing actions, since frontline communities are both the most impacted by climate change and those who have historically been left out of climate planning.

We also believe the Draft CCAP has missed an opportunity to identify actions that PSCAA itself can take as an air agency. We understand that PSCAA’s own policies and programs are driven by its Strategic Plan, last updated in 2023, but the climate elements of the 2023 Strategic Plan focused primarily on on-road transportation, and only lightly touched on other sources of carbon pollution. It’s also unclear if the CCAP identifies actions that PSCAA could take, since the symbol for “authority to implement” covers other regional agencies and bodies as well, and the symbols are, again, only applied at the strategy level, not the action.

We thank PSCAA for the work that has gone into this plan, including extensive stakeholder and community engagement. By prioritizing the different actions local governments could take, and by identifying areas where PSCAA itself can have a

direct impact, we believe the CCAP could be even stronger, to meet the needs of the climate crisis in the Puget Sound region.

- Deepa Sivarajan, Local Policy Manager at Climate Solutions

#004

Posted by **Sara** on **10/06/2025** at **11:21am** [Comment ID: 18] - Link
Agree: 0, Disagree: 0
Test comment

#005

Posted by **SiteAdmin** on **10/02/2025** at **9:12am** [Comment ID: 5] - Link
Agree: 2, Disagree: 0
Click anywhere in the document to leave a comment!

> Reply by **SiteAdmin** on **10/02/2025** at **9:14am** [Comment ID: 6] - Link
> *Agree: 2, Disagree: 0*
> Reply directly to other comments in the document!
>
> > Reply by **Sara** on **10/06/2025** at **11:22am** [Comment ID: 19] - Link
> > *Agree: 0, Disagree: 0*
> > Test reply

#006

Posted by **Addison Houston** on **10/17/2025** at **8:38am** [Comment ID: 44] - Link
Agree: 3, Disagree: 0
Does any of this plan address climate adaptation, or is its primary focus climate mitigation (GHG emissions reductions)? If the later, suggest specifying as "a guiding roadmap for local and regional governments to mitigate the effects of climate change" to be more direct in how climate change is being addressed.

Development of this plan was guided by the following principles:

- Regional planning will align with and complement state and local policies and plans, and support jurisdictions at all stages of planning.
- Identified actions will be developed into funding-ready strategies that are more competitive for future funding opportunities, providing a clear path to implementation.
- Collaborative relationships will benefit jurisdictions through leveraging collective resources and aligning priorities to maximize impacts for emissions reductions, workforce development, and equitable distribution of resources.

This document represents the first comprehensive, region-wide climate plan for the Puget Sound in over a decade. It is built on a strong foundation of climate planning work already underway across the region and state, and is designed to synergize, complement, and reinforce the state, tribal, and local climate planning efforts.

Evaluating Climate Strategies

The climate strategies in this plan reduce greenhouse gas emissions and provide several other benefits including localized air quality improvements, better public health outcomes, cost savings, improved ecosystem function, and workforce development. Given the urgency of action needed, this plan focuses on strategies that can bring us closer to our 2030 climate targets while also providing estimates for what could be achieved by 2050. Taking actions toward the 2030 targets will build momentum and lay the foundation for shaping projects and programs that can bring the 2050 target within reach.007

To help guide decisions about which strategies to implement in the near-term, the following tables provide ranked lists of strategies that maximize outcomes across multiple benefits.

- **Table ES-1**: Strategies with the highest greenhouse gas emission reduction potential by 2030
- **Table ES-2**: Strategies with the greatest air quality and public health co-benefits with a focus on Overburdened.008 Communities
- **Table ES-3**: Strategies well-positioned for regional and local implementation

Given that Transportation and the Built Environment are the leading contributing sectors to greenhouse gas emissions in our region, it is not surprising that many strategies in these sectors appear on these tables that maximize outcomes. Many of these strategies and corresponding actions reflect the urgency for a coordinated and comprehensive approach to decarbonizing these sectors.

The following ten strategies show the highest greenhouse gas emission reduction potential by 2030 in addition to existing strategies and actions. It's important to note that several actions already in place will not realize their full potential until 2050, well after the 2030 emissions reduction potential calculations used for this report. For example, large state programs like the Climate Commitment Act, Clean Fuel Standard, and Vehicle Emission Standards won't realize their full emission reductions until well after 2030, and regional transit is actively being built out under the Regional Transportation Plan. Some emissions gains from federal efforts like the greenhouse gas vehicle emissions standards are less certain given recent actions from the administration.

#007

Posted by **Addison Houston** on **10/17/2025** at **8:43am** [Comment ID: 45] - Link

Agree: 4, Disagree: 0

Would be helpful to include mention or provide a call out box re-stating what these targets are for readers who may be unfamiliar.

#008

Posted by **Kyla Wilson** on **10/24/2025** at **10:51am** [Comment ID: 100] - Link

Agree: 0, Disagree: 0

Define Overburdened Communities. This term is used earlier in the introduction but is not defined. Here it's capitalized which really makes it seem like it should be a defined term.

Table ES-1: Top 10 Strategies with the Highest Greenhouse Gas Emission Reduction Potential by 2030*

Sector	Strategy	Summary of Actions
Built Environment	1.3 Electrify or Decarbonize Existing Buildings	Electrify appliances; Develop renewable electricity generation and battery storage systems; Develop building emissions performance standards and building decarbonization plans; Promote low-carbon fuels
Transportation	2.3 Electrify or Reduce the Carbon Intensity of On-Road Medium- and Heavy-Duty Freight and Service Vehicles	Support the electrification of government and privately medium- and heavy-duty fleets; Support Advanced Clean Trucks and Advanced Clean Fleet Rules; Support medium- and heavy-duty charging infrastructure build-out; Require low-carbon alternatives for medium- and heavy-duty government fleets
Built Environment	1.2 Reduce Energy Use in Existing Buildings	Weatherize existing buildings; Upgrade appliances for efficiency, and upgrade lighting; Support utility demand response programs; Develop efficiency standards
Transportation	2.2 Increase Sales and Use of On-Road Passenger Electric Vehicles and Promote Low-Carbon Fuel Alternatives	Support charging infrastructure build-out and develop a regional charging infrastructure plan; Electrify government fleets and high-emitting vehicles; Support electric vehicle car sharing programs; Provide electric vehicle purchase incentives and support the State's Zero-Emission Vehicle Standard
Land Use**	4.1 Steward Natural Lands to Reduce Tree Loss	Increase support for tree planting and stewardship; strengthen zoning requirements to protect trees; promote tree retention and planting and increase green stormwater infrastructure
Built Environment	1.5 Reduce Industrial Emissions (especially process heating)	Support low-emission technology upgrades; Establish greenhouse gas auditors/consultants; Create low-emission ratings/awards to identify low emitters; Promote low-carbon fuels
Transportation	2.5 Electrify or Reduce the Carbon Intensity of Off-Road Equipment	Phase-out new sales of gas- and diesel-powered off-road equipment; Promote low-carbon fuels for off-road equipment
Transportation	2.6 Electrify or Reduce the Carbon Intensity of Aviation Vehicles and Equipment and Reduce Air Travel	Promote low-carbon fuels for government-related travel; Electrify equipment and non-road vehicles; Establish stronger fuel efficiency and emissions standards for aircraft and engines; Promote alternative options to air travel and increase use of virtual meetings
Built Environment	1.1 Build Low-Carbon New Buildings	Strengthen building codes to require low- or zero-emission building materials and appliances in new construction; Provide education and outreach for developers and builders of new commercial and residential construction
Solid Waste	3.2 Divert Other Recyclable and Compostable Materials from Landfills	Provide education and outreach to encourage landfill diversion; Improve the handling and processing of organics waste and reduce food waste; Support new and existing markets for compost; Increase methane capture in farming

* Strategies appear in order of their estimated maximum emission reduction potential by 2030. The maximum potential impact of each strategy assumes the largest realistic scale of action; estimates are not plans or predictions and don't guarantee results.

** While some Land Use sector strategies can prevent direct carbon emissions from soils (e.g., reducing tree loss) most Land Use sector strategies (e.g., stewarding natural lands, planting trees, etc.) primarily increase carbon sequestration rather than directly reduce emissions. Land Use strategies to increase carbon sequestration are critical to meeting our 2050 climate targets but cannot compensate for direct emission reductions in other sectors of the economy.

#009

Posted by **Addison Houston** on **10/17/2025** at **9:04am** [Comment ID: 46] - Link
Agree: 1, Disagree: 0
Are strategies ranked by GHG emissions reductions potential? If so, suggest adding GHG emissions reduction score or other metric that indicates how strategies compare to one another on GHG reductions potential.

> Reply by **Nick Maxwell** on **10/21/2025** at **3:21pm** [Comment ID: 80] - Link
> *Agree: 2, Disagree: 0*
> Please add expected CO2e reductions by 2030. To address your concern that some projects will have benefits after 2030, also include expected CO2e reductions by 2050.

#010

Posted by **Nick Maxwell** on **10/21/2025** at **3:25pm** [Comment ID: 82] - Link
Agree: 0, Disagree: 0
Do not promote low-carbon fuels. Promote no-carbon fuels. This section must include promoting heat pumps for HVAC and hot water, and shutting down natural gas pipelines into neighborhoods. We have 25 years to stop all natural gas burning. That commitment has already been made at the UN, at the federal level, and at the State level. Pretending that any less is OK is being part of the problem.

#011

Posted by **Ryan Kellogg (PHSKC)** on **10/17/2025** at **9:13am** [Comment ID: 49] - Link
Agree: 1, Disagree: 0
Should rail be referenced as an elecrification objective?

> Reply by **Nick Maxwell** on **10/21/2025** at **3:23pm** [Comment ID: 81] - Link
> *Agree: 0, Disagree: 0*
> This action needs to be more ambitious: Reduce transportation-caused emissions by any Washington State resident by 20% by 2030, and by 95% by 2050. Now is not the time to pretend that replacing government-owned vehicles will solve the problem. Much more is needed. For an example, consider Norway.

#012

Posted by **John (Spark Northwest, Seattle)** on **10/23/2025** at **11:15am** [Comment ID: 91] - Link
Agree: 0, Disagree: 0
Emphasize solutions that preserve affordable housing and reduce energy bills for low & moderate income folks. Ensure upgrade costs are not passed on to tenants.

#013

Posted by **Nick Maxwell** on **10/21/2025** at **3:27pm** [Comment ID: 83] - Link
Agree: 0, Disagree: 0
These programs need their expected CO2e reductions. For example, someone might miss that weatherization has a much smaller impact on CO2e than replacing natural gas appliances with heat pumps and electric stoves.

#014

Posted by **Veena Prasad** on **10/22/2025** at **8:17am** [Comment ID: 88] - Link
Agree: 0, Disagree: 0
Along with tree planting and green stormwater infrastructure, promote planting of trees and other greenery to reduce the urban heat island effect, improve air quality, and ultimately reduce energy bills.

#015

Posted by **Kyla Wilson** on **10/24/2025** at **11:14am** [Comment ID: 103] - Link
Agree: 0, Disagree: 0
Including the word "offset" here makes it sound like we are planting 1 tree for every tree cut down or using trees as a carbon sequestration offset for continued emissions in another sector. I recommend removing the word "offset" and just increasing tree planting generally.

#016

Posted by **Nick Maxwell** on **10/21/2025** at **3:29pm** [Comment ID: 84] - Link
Agree: 1, Disagree: 0
An offset tree will not sequester as much carbon as a mature tree for another 20 years. Stop the cutting of mature trees.

#017

Posted by **Nick Maxwell** on **10/21/2025** at **3:29pm** [Comment ID: 85] - Link
Agree: 0, Disagree: 0
As above, we need no-emitters. Low-emitters are not a solution.

#018

Posted by **Kyla Wilson** on **10/24/2025** at **10:59am** [Comment ID: 101] - Link
Agree: 0, Disagree: 0
Consider adding examples of "off-road equipment." Are these stationary diesel generators or landscaping equipment?

#019

Posted by **Nick Maxwell** on **10/21/2025** at **3:30pm** [Comment ID: 86] - Link
Agree: 0, Disagree: 0

Please cut "low- or "

#020

Posted by **Ryan Kellogg (PHSKC)** on **10/17/2025** at **9:15am** [Comment ID: 50] - Link
Agree: 2, Disagree: 0
Suggest "Provide education and outreach, and develop policy for landfill diversion..."

#021

Posted by **Veena Prasad** on **10/22/2025** at **8:20am** [Comment ID: 89] - Link
Agree: 0, Disagree: 0
Education of residents? How about reducing packaging. Too many things come in plastic or other packaging that cannot be recycled or reused.

#022

Posted by **Alicia J.S.** on **10/19/2025** at **9:29am** [Comment ID: 72] - Link
Agree: 0, Disagree: 0
Are education and encouragement of landfill diversion for the general public or the landfill companies? Does this include policies that would increase landfill diversion or make incentives for hospitals/businesses/general public to follow this?

The following five strategies are likely to result in air quality and public health co-benefits, especially in Overburdened Communities. Overburdened Communities, shown in **Figu** are geographic areas where vulnerable populations face combined, multiple environmental harms and health impacts. The strategies are ranked approximately highest to lowest according to their likely benefit for air quality and public health including impacts on ambient air quality and exposure, indoor air quality, urban livability, and home heating and cooling. Diesel particle pollution from diesel engines is the top air quality toxics risk in the region (driving 85% of the potential cancer risk from air pollution) and remains a top priority for public health, especially for Overburdened Communities. Some built environment strategies can lead to improvements in indoor environments, where people spend a majority of their time.

Table ES-2: Top 5 Climate Strategies with the Greatest Air Quality and Public Health Co-Benefits with a Focus on Overburdened Communities

Sector	Strategy	Summary of Actions
Transportation	2.3 Electrify or Reduce the Carbon Intensity of On-Road Medium- and Heavy-Duty Freight and Service Vehicles	Support the electrification of government and privately medium- and heavy-duty fleets; Support Advanced Clean Trucks and Advanced Clean Fleet Rules; Support medium- and heavy-duty charging infrastructure build-out; Require low-carbon alternatives for medium- and heavy-duty government fleets
Transportation	2.5 Electrify or Reduce the Carbon Intensity of Off-Road Equipment	Phase-out new sales of gas- and diesel-powered off-road equipment; Promote low-carbon fuels for off-road equipment
Transportation	2.2 Increase Sales and Use of On-Road Passenger Electric Vehicles and Promote Low-Carbon Fuel Alternatives	Support charging infrastructure build-out and develop a regional charging infrastructure plan; Electrify government fleets and high-emitting vehicles; Support electric vehicle car sharing programs; Provide electric vehicle purchase incentives and support the State's Zero-Emission Vehicle Standard
Built Environment	1.3 Electrify or Decarbonize Existing Buildings	Electrify appli ces; Develop renewable electricity generation and battery storage s ; Develop building emissions performance standards and building decarbonization plans; Promote low-carbon fuels
Transportation	2.1 Reduce Vehicle Miles Traveled of On-Road Passenger Internal Combustion Engine Vehicles	Implement transit-oriented, compact growth and development; Develop vehicle use/congestion pricing programs; Expand biking and walking networks and prioritize transit access; Provide education and outreach to encourage mode-shift and car trip reduction

This regional climate plan complements the statewide climate plan developed by the Was n Climate Partnership (Washington State Departments of Commerce and Ecology). While many strategies and actions detailed in this plan can be implemented effectively at different scales and levels of government, based on preliminary analysis the following five strategies are well-positioned for collaboration and implementation at the local or regional level or have the potential to scale across the four-county Puget Sound region.

#023

Posted by **Kyla Wilson** on **10/24/2025** at **11:03am** [Comment ID: 102] - Link
Agree: 0, Disagree: 0
Where is figure 1? I'm not seeing a Figure 1 in this chapter.

#024

Posted by **Addison Houston** on **10/17/2025** at **9:05am** [Comment ID: 47] - Link
Agree: 1, Disagree: 0
Similar comment as Table ES-1, suggest including score or metric indicating GHG reductions potential to aid rational as to why strategies don't appear to be listed sequentially.

#025

Posted by **Carrie Lee - King County Exec Climate Office** on **10/26/2025** at **5:00pm** [Comment ID: 132] - Link
Agree: 0, Disagree: 0
Staff in Public Health and Building Energy teams encourage adding Built Environment 1.2 here. Often programs to improve indoor air quality combine efforts to electrify and energy eff/weatherization. These are implemented together. Often improving weatherization and air sealing is one of the most effective local govt actions to improve indoor air quality now for residents. Consider making this a list of top 10 or combining both to list in this table.

#026

Posted by **John (Spark Northwest, Seattle)** on **10/23/2025** at **11:16am** [Comment ID: 92] - Link
Agree: 1, Disagree: 0
Needs to include weatherization and associated home repairs (roof fixes, mold remediation, etc.). Needs to happen in a way that protects tenants from rent hikes

#027

Posted by **Ryan Kellogg (PHSKC)** on **10/17/2025** at **9:19am** [Comment ID: 51] - Link
Agree: 1, Disagree: 0
Unsure if this is in PSCAA's planning domain, but wondering if built environment should include strategies or actions to improve resilience in existing buildings including homes.

#028

Posted by **John (Spark Northwest, Seattle)** on **10/23/2025** at **11:17am** [Comment ID: 93] - Link
Agree: 0, Disagree: 0

PS repairs under weatherization plus health are very much a pub. health solution with climate co-benefits and should thus be included here

#029

Posted by **Veena Prasad** on **10/22/2025** at **8:23am** [Comment ID: 90] - Link

Agree: 0, Disagree: 0

I hope this includes weatherization? Electrifying buildings (especially older ones) without weatherizing may increase energy bills for too many people.

#030

Posted by **Typo** on **10/08/2025** at **1:39pm** [Comment ID: 28] - Link

Agree: 0, Disagree: 0

Missing a g

Table ES-3: Top 5 Climate Strategies Well-Positioned for Implementation at the Regional or Local Level		
Sector	**Strategy**	**Summary of Actions**
Built Environment	1.2 Reduce Energy Use in Existing Buildings	Weatherize existing buildings; Upgrade appliances for efficiency, and upgrade lighting; Support utility demand response programs; Develop efficiency standards
Built Environment	1.3 Electrify or Decarbonize Existing Buildings	Electrify appliances; Develop renewable electricity generation and battery storage systems; Develop building emissions performance standards and building decarbonization plans; Promote low-carbon fuels
Transportation	2.1 Reduce Vehicle Miles Traveled of On-Road Passenger Internal Combustion Engine Vehicles	Implement transit-oriented, compact growth and development; Develop vehicle use/congestion pricing programs; Expand biking and walking networks and prioritize transit access; Provide education and outreach to encourage mode-shift and car trip reductio
Transportation	2.2 Increase Sales and Use of On-Road Passenger Electric Vehicles and Promote Low-Carbon Fuel Alternatives	Support charging infrastructure build-out and develop a regional charging infrastructure plan; Electrify government fleets and high-emitting vehicles; Support electric vehicle car sharing programs; Provide electric vehicle purchase incentives and support the State's Zero-Emission Vehicle Standard
Land Use	4.1 Steward Natural Lands to Reduce Tree Loss	Increase offset tree planting and stewardship; strengthen zoning requirements to protect trees; Promote tree retention and planting and increase green stormwater infrastructure

Considerations for Successful Implementation

Turning climate strategies and actions into effective programs and policies requires thoughtful, context-sensitive and community-centered approaches. While specific program design for each climate strategy isn't yet known, several high-level considerations can help ensure successful implementation:

1. **Community Engagement**: Implementing the strategies in this climate plan will require ongoing, deep collaboration with communities to inform equitable program and policy design, build trust, and avoid unintended consequences, particularly at the local level. Program design should center equitable community engagement. Refer to Appendix D for more information.
2. **Utilities**: Many of the challenges associated with the state's clean energy transition largely fall upon electric and natural gas utilities to address. Our region's utilities must remain involved in strategy implementation, electrification, and grid modernization planning at all levels of government to meet the region's near- and long-term climate goals. Refer to the Utility Considerations section for more information.
3. **Geographic Disparities & Health Equity**: The impacts of climate change can have long-term, amplifying effects on social inequalities that already exist in communities. Data like the Washington Environmental Health Disparities Map and the Agency's Overburdened Communities Map show how environmental benefits and burdens are distributed unevenly across communities in the Puget Sound. Implementers should leverage this data and develop new modeling and geospatial analyses to quantify the public health impacts of climate strategies in a way that maximizes benefits for overburdened communities. Refer to the Benefits Analysis section for more information.

#031

Posted by **Addison Houston** on **10/17/2025** at **9:07am** [Comment ID: 48] - Link

Agree: 1, Disagree: 0

Encouragement of remote work options or opportunities should be added here as a method of reducing vehicle miles traveled similar to how "increase use of virtual meetings" is included in action 2.6

4. **Workforce Development**: Implementing the actions in this climate plan will require accelerated job growth in important sectors like building electrification, electric vehicle production, infrastructure, and maintenance, renewable fuel production, energy transmission, storage, and distribution, and others. We must address known workforce challenges, including a just transition for fossil fuel workers, to support this job growth in our region. Refer to the Workforce Development Analysis section for more information.
5. **Ongoing Coordination:** The climate strategies in this plan must scale across jurisdictional borders to maximize their impact. The Puget Sound Clean Air Agency can serve as a backbone organization, bringing transparency to implementation activities and highlighting opportunities for necessary collective action.

Addressing the climate crisis will require urgent action that is supported by strong coordination at all levels of government. Many jurisdictions in the region have demonstrated bold climate leadership, yet meeting the challenge of climate change requires bolder actions, new examples of local leadership, deeper commitments to collaboration, and a willingness to take action whenever possible.

Acronyms and Glossary

Action	Policy, program, or project that reduces greenhouse gas emissions
Agency	Puget Sound Clean Air Agency
C-PACER	Commercial Property Assessed Clean Energy and Resilience: County-administered program for commercial property owners to access long-term financing to implement energy, water, and resilience upgrades in buildings
CAFE	Corporate Average Fuel Economy: National Highway Traffic Safety Administration's requirements for the fuel-efficiency of passenger cars and light-duty trucks
CETWAC	Clean Energy Technology Workforce Advisory Committee: State committee responsible for research and policy recommendations about workforce needs for clean energy technologies
Climate plan	Comprehensive Climate Action Plan
Co-benefit	Social, environmental, or economic benefit associated with an action to reduce greenhouse gas emissions
CPRG	Climate Pollution Reduction Grant: The Environmental Protection Agency grant program through which the Comprehensive Climate Action Plan development is funded
EPA	U.S. Environmental Protection Agency: The federal Agency from which the Puget Sound Clean Air Agency receives authority for enforcement of the federal Clean Air Act. EPA also funds the CPRG program.
Greenhouse gas	Gas that traps heat in the atmosphere, including carbon dioxide, methane, nitrous oxide, and fluorinated gases
Green hydrogen	Hydrogen that is produced by splitting water into hydrogen and oxygen using renewable electricity. No fossil fuels are used in the production of green hydrogen.
GWP	Global warming potential: A measure of the potency of a greenhouse gas (i.e. how much it warms the atmosphere)
HCFC, HFC, CFC	Hydrochlorofluorocarbon, hydrofluorocarbon, or chlorofluorocarbon: Chemicals often used as refrigerants that are also potent greenhouse gases
Health Equity	The state in which everyone has a fair and just opportunity to attain their highest level of health.
IPCC	Intergovernmental Panel on Climate Change: The United Nations body that creates regular reports on climate change science, impacts, and mitigation strategies
LEED	Leadership in Energy and Environmental Design: A rating system by the U.S. Green Building Council to recognize green building accomplishments
K4C	King County Cities Climate Collaboration: Partnership of 24 local governments in King County collaborating to advance climate action and resilience

MSA	Metropolitan statistical area: Geographic definition used by the federal government to identify a group of communities around a shared urban center(s) with a collective population of at least 50,000
ODP	Ozone depletion potential: A measure of a substance's impact on depleting the stratospheric ozone layer
ORCA	One Regional Card for All: Shared fare payment system across multiple transit agency jurisdictions in the Puget Sound region
Overburdened	Overburdened communities are geographic areas where vulnerable populations face combined, multiple environmental harms and health impacts, and includes, but is not limited to, highly impacted communities as defined in RCW 19.405.020. [RCW 70A.02]
Priority climate plan	Priority Climate Action Plan
PSREA	Puget Sound Regional Emission Analysis: In 2022, a 2019–based regional greenhouse gas emissions inventory was led by King County. During development of this Climate Plan, Agency staff updated the PSREA using more recent data from 2022.
RCW	Revised Code of Washington State: The compilation of all permanent laws now in force in Washington State
Sector	The various parts of the economy that generate emissions
SOC	Standard occupational classification: Statistical classification standard used by the federal government to describe occupations
Strategy	A group of similar or interrelated greenhouse gas reduction actions

Introduction

The Puget Sound Clean Air Agency (Agency) collaborated with multiple local partners across the four-county region (including the Seattle-Tacoma-Bellevue Metropolitan Statistical Area (MSA) and the Bremerton-Silverdale-Port Orchard MSA) to produce this Comprehensive Climate Action Plan (referred to as "climate plan"). This document represents the first comprehensive, region-wide climate plan for the Puget Sound in over a decade. It is built on a strong foundation of climate planning work already underway across the region and state, and is designed to synergize, complement and reinforce the state, tribal, and local climate planning efforts. Its overarching goal is to support the implementation of policies and programs that reduce greenhouse gas emissions, improve public health and air quality, spur green job growth, and enhance the quality of life for all residents of the Puget Sound.

This project has been funded wholly or in part by the United States Environmental Protection Agency (EPA) under assistance agreement #5D - 02J38301. The contents of this document do not necessarily reflect the views and policies of the EPA, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

Developing this Climate Plan

This climate plan is the second major deliverable of the EPA's Climate Pollution Reduction Grant (CPRG) program. The first major deliverable, the Seattle-Tacoma-Bellevue MSA's Priority Climate Action Plan (priority climate plan), was submitted to EPA in March 2024. The priority climate plan focused on near-term, high-priority, implementation-ready actions to reduce greenhouse gas pollution by 2030. Led by King County, the region was awarded a $4 Implementation Grant for specific actions described in the priority climate plan. This climate plan builds off the priority climate plan, as well as the numerous other local climate planning processes underway in the region.

How Community Input Shaped the Climate Plan

Meaningful community and stakeholder engagement and feedback were critical to the development of this climate plan. The Agency and partners across the Puget Sound region hosted four in-person workshops where community members shared their concerns and input on the climate plan's draft greenhouse gas emission reduction strategies and their implementation. While feedback heard at these workshops and through other engagement methods is interwoven throughout this climate plan, common themes included:

- The importance of educating and raising community awareness around climate strategies and actions.
- The need to increase engagement opportunities for community members to provide feedback on actions and their implementation.
- The importance of tracking and reporting progress on emission reduction actions to hold implementors accountable.

#032

Posted by **Graham** on **10/14/2025** at **11:27am** [Comment ID: 38] - Link
Agree: 0, Disagree: 0
Is it possible for the EPA to revoke any current plans and funding?
In other words, could the EPA's current administration block any progress, or are there legal protections?

#033

Posted by **Kyla Wilson** on **10/24/2025** at **11:27am** [Comment ID: 104] - Link
Agree: 0, Disagree: 0
Can you link out to the King County program webpage here? https://kingcounty.gov/en/dept/executive/governance-leadership/climate-office/focus-areas/building-decarbonization/pollution-reduction-grant

#034

Posted by **Kyla Wilson** on **10/24/2025** at **11:27am** [Comment ID: 105] - Link
Agree: 0, Disagree: 0
Can you link out to the King County program here? https://kingcounty.gov/en/dept/executive/governance-leadership/climate-office/focus-areas/building-decarbonization/pollution-reduction-grant

"Feedback" by Lyn Tampi

Creative Climate Action Art Contest

As part of our outreach and engagement efforts for this climate plan, the Agency sponsored a **Creative Climate Action Art Contest**. Bringing people together in new and unique ways, the art contest helped us to reach members of the public who might not otherwise engage in climate topics.

This concept was inspired by the Art x Climate art gallery featured in the 5th National Climate Assessment: "The US Global Change Research Program issued a call for art with the understanding that, together, art and science move people to greater understanding and action."

Submissions are featured throughout this climate plan, as well as on the Agency's web site and social media channels, and in presentation materials. We are grateful to all the artists who shared their interest and passion for climate and our environment through art.

Youth Winners: Ansh Kumar, Elise Robison, Sally T., Tanisha Manna

Adult Winners: Lyn Tampi, Randy Bott

Photography: Sherene

The Agency also used other methods to reach different segments of the community, allowing community members to engage in the ways most accessible to them. These included two virtual climate plan meetings, an online survey (available in six languages), and an online engagement hub using Konveio, a web-based platform allowing members of the public to review and comment on the draft climate plan. For more details on public engagement, please see **Appendix D**, Engagement Summary.

Prior to developing this climate plan, all counties and many cities in the region had already conducted climate-focused community engagement. The Agency reviewed results from these past engagement efforts to inform this climate plan. Jurisdictions often used best practices for engagement to reach overburdened communities, including providing translation and interpretation services, compensation for input received, and childcare to remove barriers to participation. The Agency implemented these same best practices for community engagement workshops on this climate plan.

Community members can often experience engagement burnout when they are asked the same questions multiple times, especially without seeing immediate or appreciable change in their communities. To avoid this dynamic and build upon past efforts, the Agency worked with city and county partners to compile the results of past climate-focused engagement. Recurring themes from past engagement helped Agency staff to identify initial community priorities and concerns, and to plan content for the community engagement workshops.

How Environmental Justice Is Embedded into this Climate Plan

Environmental justice is the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Environmental justice can be achieved by acknowledging existing disparities among communities and implementing climate strategies that work to address these inequities. A primary goal of this climate plan is to identify equitable climate strategies that not only reduce greenhouse gas emissions but also prioritize social, environmental, or economic co-benefits in the region's overburdened communities. Environmental justice principles were incorporated throughout the development of this climate plan, including in the design and implementation of community engagement opportunities, and in the analysis of the greenhouse gas reduction strategies themselves.

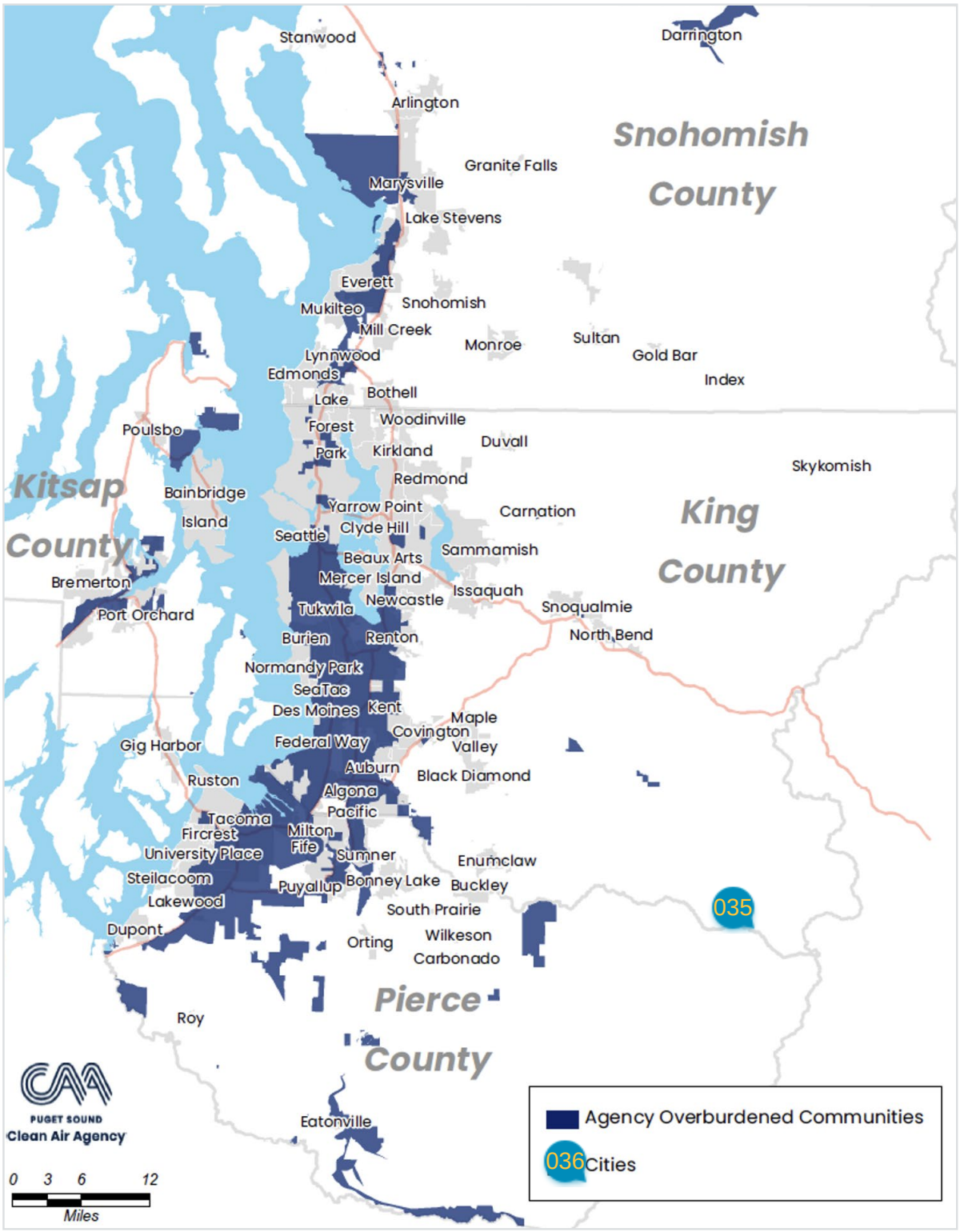
We know well that pollution in the region impacts some communities more than others. This plan aims to understand major environmental health disparities in our region and identify climate strategies that maximize co-benefits and environmental justice outcomes for overburdened communities. The anticipated benefits and impacts of the greenhouse gas reduction strategies in the region's overburdened communities are summarized throughout this document and in the Benefits Analysis section. For more information on data used, please refer to **Appendix C**, Benefits Analysis.

EPA previously required meaningful engagement and benefits analysis for "low income and disadvantaged communities" or "LIDAC" for CPRG planning grantees. For the purposes of this climate plan, we will use the term "overburdened communities" as defined in RCW 70A.02.010 (11) of the Washington State Healthy Environment for All (HEAL) Act, in alignment with state law.

As shown in **Figure 1**, the Agency has adopted a map defining "overburdened communities" within the four-county Puget Sound region.[1] The map overlays other environmental justice maps including the Washington State Environmental Health Disparities Map, Ecology's Climate Commitment Act Overburdened Communities, and the Agency's Community Air Tool. The Agency will continue to update this map as new information and data becomes available, including forthcoming updates to the State's Environmental Health Disparities Map.

[1]https://pscleanair.gov/382/Overburdened-Communities

Figure 1: Agency Map of the Region's Overburdened Communities



#035

Posted by **Patrick Babbitt** on **10/24/2025** at **1:59pm** [Comment ID: 107] - Link

Agree: 0, Disagree: 0

Perhaps as an appendix item, a table of zip codes/Census areas by City/County would be useful for readers and practitioners trying to make use of lessons from the document

#036

Posted by **Kyla Wilson** on **10/24/2025** at **3:35pm** [Comment ID: 119] - Link

Agree: 0, Disagree: 0

This shade of gray doesn't match the shade of gray on the map.

How Qualitative and Quantitative Analysis Informed this Climate Plan

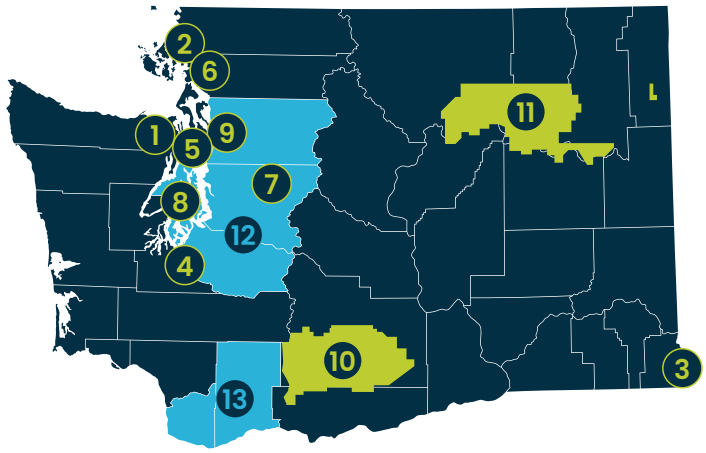
Both qualitative and quantitative data informed the development of this climate plan. This plan relied on subject matter expert analysis to identify the greenhouse gas reduction actions that will support us in reaching the region's climate targets, while simultaneously highlighting the co-benefits that will improve the overall well-being of our region's residents and ecosystems. For more information on the data and assumptions behind the greenhouse gas action analyses in this climate plan, please refer to **Appendix B**, Quantified Emission Reductions.

Qualitative stakeholder and community input and storytelling allows us to highlight the pathways that can help our region to meet our targets most effectively and equitably. Community input on this climate plan can be found in **Appendix D**, Engagement Summary.

Partners for Climate Plan Development

The Agency collaborated with numerous partners across the state and region to develop this climate plan. The Agency coordinated closely with State partners from the Washington Climate Partnership (Departments of Commerce and Ecology), which is simultaneously developing the State's climate plan under the CPRG grant. Agency and state staff met regularly to ensure that both plans align with and complement each other where feasible. In addition to collaborating with the Washington Climate Partnership, the Agency also attended the State's monthly CPRG Tribal Workgroups and collaborated with other CPRG grantees in EPA Region 10 through regular meetings. **Figure 2** illustrates the 14 CPRG grantees, including state, regional, and tribal governments , who are developing climate plans in Washington State.

Figure 2: CPRG Grantees in Washington State



Tribes and Tribal Consortiums:

1. Jamestown S'Klallam Tribe
2. Lummi Nation
3. Nez Perce Tribe
4. Nisqually Tribe
5. Port Gamble S'Klallam Tribe
6. Samish Indian Nation
7. Snoqualamie Tribe
8. The Suquamish Tribe of the Port Madison Reservation
9. Tulalip Tribe
10. Yakama Nation
11. Upper Columbia United Tribes
* Affiliated Tribes of Northwest Indians (ATNI)

Metropolitan Statistical Areas:

12. Seattle-Tacoma-Bellevue MSA
13. Portland-Vancouver Metro Area MSA

*ATNI is a 501(c)(3) tribal consortium supporting 57 member Tribes that reside in Oregon, Washington, Idaho, Alaska, California, Montana, and Nevada.

The Agency is grateful to the members of the regional Steering Committee who helped to guide and shape the development of this climate plan, as well as the members of six Technical Workgroups, including equity, built environment, transportation, consumption and waste, utilities, workforce development. A list of Steering Committee and Technical Workgroup members can be found in **Appendix E**. The Agency also partnered with Cascadia Consulting Group as well as numerous community-based organizations for communications, outreach, and engagement.

Through the Utility Workgroup, the Agency partnered closely with the four largest utilities in the region: Puget Sound Energy, Seattle City Light, Snohomish Public Utility District, and Tacoma Public Utilities. Utilities are critical partners in planning for a fully electrified future, and each have their own strategies and programs to assist in the energy transition. For more information, please refer to the Utility Considerations section.

Figure 3 illustrates the many partners we worked with to develop this regional climate plan.

Figure 3: State, Regional, and Community Partners for Climate Plan Development

#037

Posted by **Addison Houston** on **10/17/2025** at **9:33am** [Comment ID: 53] - Link

Agree: 0, Disagree: 0

What were the subject areas of the technical workgroups?

About the Climate Plan

How to Navigate this Document

This climate plan examines all major sources and sinks of greenhouse gas emissions for the four-county Puget Sound region and outlines recommended climate actions to achieve our 2030 and 2050 climate targets. This climate plan is organized into three main sections:

Part I. Where we are now: A greenhouse gas emissions inventory for the four-county region, the current climate policy landscape, and a summary of existing and planned large-scale greenhouse gas reduction projects.

Part II. Where we need to go: A summary of regional and state greenhouse gas reduction targets and greenhouse gas emissions projections for 2030 and 2050.

Part III. How we will get there: A climate pollution reduction plan for all sectors of the regional economy (consisting of 25 strategies and 106 actions), and a discussion of important considerations for equitable implementation, including potential funding sources, and which entities might best be positioned to implement proposed actions. This plan also includes analyses of potential benefits and impacts of proposed climate actions, with a focus on overburdened communities, as well as workforce development needs to implement the proposed actions, and information about next steps.

Who This Plan is For

This climate plan is designed as a roadmap for regional climate action. It is designed with decision-makers in mind, whether they are at the local, county, or regional level. It can also serve as a guide for other entities in the region, including utilities, ports, transit agencies, industry leaders, private businesses, climate advocacy groups, community-based organizations, non-profits, and others with a desire to implement climate actions. This regional climate plan is also designed to help Washington achieve its commitment to reducing greenhouse gas emissions by 95% by 2050. It serves as a resource to help state decision-makers understand regional priorities, identify synergies, and leverage resources to maximize climate benefits.

Climate Plan Goals

This climate plan focuses on greenhouse gas reduction actions that can be implemented by local and county municipalities, as well as ports, transit agencies, utilities and others within the Puget Sound region. It presents climate actions that will impact over half of the state's population and approximately 47% of the state's total emissions.

EPA has identified the following goals for entities in developing climate plans:

- Improve understanding of current and future greenhouse gas emissions so that state and local governments can prioritize actions to reduce them.
- Adopt and implement ambitious policies and programs to reduce greenhouse gas emissions and accelerate decarbonization across multiple sectors.
- Collaborate closely with other entities in their state, region, municipality, and/or air district to develop coordinated plans.

- Stimulate innovative technologies and practices to reduce greenhouse gas emissions and co-pollutants.
- Prioritize actions and policies that will be durable, replicable, and provide certainty in pollution reductions.
- Reduce climate pollution while building the clean energy economy in a way that benefits all Americans and provides new workforce training opportunities.
- Adopt robust metrics and reporting programs to track emission reductions and important benefits throughout their jurisdiction.

As the first region-wide climate plan in over a decade, this plan highlights common challenges faced by many of our region's communities and identifies collective actions that have the potential to drive greenhouse gas emission reductions at scale. The goal of this climate plan is to identify and facilitate high-impact regional actions to reduce climate emissions through coordinated efforts. Development of this plan was guided by the following principles:

- Regional planning will align with and complement state and local policies and plans, and support jurisdictions at all stages of planning.
- Identified actions will be developed into funding-ready strategies that are more competitive for future funding opportunities, providing a clear path to implementation.
- Collaborative relationships will benefit jurisdictions through leveraging collective resources and aligning priorities to maximize impacts for emissions reductions, workforce development, and equitable distribution of resources.

Intersection with Other Climate Policies and Plans

State Climate Policies and Plans

Washington continues to establish itself as a state leader in climate action. Washington's largest climate policies and plans all work towards one goal: reducing climate pollution 95% below 1990 levels by 2050. This climate plan builds on existing state policies and plans, including:

- Clean Energy Transformation Act: Requires elimination of coal-fired electricity after 2025, greenhouse gas neutral supplies by 2030, and 100% clean electricity by 2045.
- Climate Commitment Act: Sets a declining annual cap on climate pollution from Washington's top sources, enabling businesses to find the most efficient path to lower carbon emissions.
- Clean Fuel Standard: Reduces the carbon intensity of transportation fuels to cut vehicle emissions.
- Clean Buildings Act: Requires existing large commercial buildings (floor area exceeds 50,000 square feet) to implement Clean Buildings Performance Standard requirements. The 2022 expansion bill added a second tier of buildings (floor area exceeds 20,000 square feet), including multifamily buildings.
- Vehicle emissions standards: Reduces pollution from new gas- and diesel-powered vehicles sold in state and increases the availability of new clean vehicles for sale (Advanced Clean Cars II, and Advanced Clean Trucks).
- Move Ahead Washington: A state transportation funding package that provides $3 billion for public transportation over the next 16 years.
- Hydrofluorocarbon transition: Transitions refrigerants and other products and equipment away from potent greenhouse gases known as hydrofluorocarbons (HFC).
- Organics management law: Diverts organic materials away from landfills through prevention, food rescue, and organics management facilities.

#038

Posted by **Jay Tavarez-Brown** on **10/24/2025** at **9:55am** [Comment ID: 96] - Link
Agree: 0, Disagree: 0
Could this be generalized to include all regional residents?

#039

Posted by **Patrick Babbitt** on **10/24/2025** at **2:07pm** [Comment ID: 109] - Link
Agree: 0, Disagree: 0
HB1589 (2024) regarding the utility transition?

#040

Posted by **Patrick Babbitt** on **10/24/2025** at **2:06pm** [Comment ID: 108] - Link
Agree: 0, Disagree: 0
Might be informative to add that CCA revenues fund state/local investments in key GHG emissions sectors

- Landfill methane emissions law: Requires certain landfills to monitor and reduce methane emissions.
- Growth Management Act Climate Goal and Element: A new Climate Change and Resiliency goal was added to the Growth Management Act, which requires local governments to integrate climate change into their comprehensive plan.
- Transit-Oriented Development: State law (HB 1491) sets minimum standards for increased density within high-frequency transit station areas and affordability requirements for new residential buildings in those areas.
- Healthy Environment for All (HEAL) Act: Embeds environmental justice considerations into state policies and programs and aims to reduce environmental and health disparities. 041
- 2021 State Energy Strategy: Washington's blueprint for achieving comprehensive decarbonization across all economic sectors that depend on clean energy.
- Transportation Electrification Strategy: A plan to ensure electric vehicle incentives and infrastructure are accessible and available to all people in Washington.
- Transportation Carbon Reduction Strategy: A plan that focuses on ways to reduce transportation greenhouse gas emissions in Washington.
- Washington State Climate Resilience Strategy: A strategy that addresses the greatest climate risks facing our state and proposes actions for resilience.

Regional Climate Plans

The Puget Sound region has a strong history of climate planning, with numerous regional, county, and city plans already adopted and underway. This includes regional growth plans, transportation planning, ports strategies and initiatives, utility plans and programs, city and county climate plans, and comprehensive plans with climate elements both inform and build on this reginal climate plan.

The Puget Sound Regional Council (PSRC) is the region's Metropolitan Planning Organization, designated with developing policies and coordinating decisions about regional growth, transportation, and economic development across the four-county region. PSRC, in collaboration with its member jurisdictions, developed VISION 2050, the region's long-range framework for how and where the region grows through 2050. VISION 2050's multi-county planning policies, actions, and regional growth strategy guide growth towards centers and near high-capacity transit.

Tracking Progress on Regional Transportation Plan Goals

The Regional Transportation Plan **Performance Dashboard** is a resource to help the region understand how well it is meeting long range goals and desired outcomes identified in the plan. The Dashboard is updated each Fall as various census and transportation-related data sources are released.

The Regional Transportation Plan is the long-range transportation element of VISION 2050, and contains a Four-Part Greenhouse Gas Strategy, which recognizes that decisions and investment in land use, transportation choices, pricing, and technology are the primary factors that influence on-road transportation emission in the region. An analysis of the region's Four-Part Greenhouse Gas Strategy is conducted every four years with development of each Regional Transportation Plan.

PSRC is currently developing the next Regional Transportation Plan to be adopted in 2026, which includes plans to:

- Expand regional and local transit systems, including light rail, buses, and ferries.
- Increase bicycle and pedestrian infrastructure.
- Improve and expand access to transit.
- Support state and federal policies that advance transportation technology and reduce emissions, such as electric vehicles and related innovations.

#041

Posted by **Patrick Babbitt** on **10/24/2025** at **2:08pm** [Comment ID: 110] - Link

Agree: 0, Disagree: 0

Recycling Reform Act (2025)?

Ports also play a key role in achieving regional and state-wide clean air, climate, and environmental justice goals. The Northwest Ports Clean Air Strategy is a collaborative framework for clean air and climate action across the three largest ports in the Puget Sound Region: Port of Seattle, Port of Tacoma, and Northwest Seaport Alliance. It establishes the goal of phasing out all seaport-related emissions by 2050 or sooner, including those from ocean going vessels, harbor vessels, drayage trucks, and cargo-handling equipment.

County Climate Plans

Puget Sound counties are leading the way for climate action at the local level. **Table 1** summarizes key climate plans and their major focus areas for each county in the region:

Table 1: County Climate Plans and Major Focus Areas

County	Plan	Major Focus Areas
King County	Strategic Climate Action Plan (2025)	• Countywide greenhouse gas policy and leadership 042 • Transit and transportation • Building energy and green building • Circular economy • Forest and agriculture • Enterprise leadership and accountability • Sustainable county infrastructure • Zero-emission county fleets
Kitsap County	Comprehensive Plan Climate Chapter and Greenhouse Gas Reduction Element (2024)	• Transportation • Transit and land use • Off-road equipment • Built environment • Forests
Pierce County	Sustainability 2030 Plan (2025)	• Energy and buildings • Transportation • Waste reduction • Nature-based climate solutions • Education and outreach • Growing community capacity • County Actions (buildings & fleet, commute trips, waste system, natural lands & resources, employee education & equitable practices)

#042

Posted by **Vicky Raya, King County ECO Climate Equity Manager** on **10/24/2025** at **2:19pm** [Comment ID: 114] - Link

Agree: 0, Disagree: 0

Major focus areas are not all represented in this GHG-focused list. Please include all 24 focus areas across the 2025 SCAP. See below.

A total of 25 focus areas appear throughout the Strategic Climate Action Plan. Each focus area describes a critical area of the Reducing GHG Emissions, Sustainable and Resilient Frontline Communities (SRFC), and Climate Preparedness sections.

GHG Reduction Focus Areas
-Countywide GHG Policy and Leadership
-Transit and Transportation
-Building Energy and Green Building
-Circular Economy
-Forest and Agriculture
-Enterprise Leadership and Accountability
-Sustainable County Infrastructure
-Zero-Emission County Fleets

SRFC Focus Areas
-Community Leadership and Community-Driven Policymaking
-Building Capacity with Frontline Communities and Youth
-Climate and Economic Opportunity
-Community Health and Emergency Preparedness
-Food Systems and Food Security
-Housing Security and Anti-Displacement
-Energy and Justice and Utilities Affordability
-Transportation Access and Equity

Climate Preparedness Focus Areas
-Sea Level Preparedness
-River Flood Management
-Extreme Precipitation and Drought Mitigation
-Extreme Heat Adaptation
-Forest Resilience and Urban Tree Canopy Expansion
-Wildfire Risk Reduction
-Salmon Recovery and Habitat Connectivity
-Climate-Ready Capital Projects
-Regional Capacity Across Climate Hazards

> Reply by **Carrie Lee - King County Exec Climate Office** on **10/26/2025** at **5:03pm** [Comment ID: 133] - Link
>
> *Agree: 0, Disagree: 0*
>
> SRFC - Sustainable Resilient Frontline Communities

County	Plan	Major Focus Areas
Snohomish County	Climate Change and Resiliency Element of the 2024-2044 Comprehensive Plan Urban Core Subarea Plan Element Communitywide Climate Resiliency Plan (currently drafting)	• Reductions in vehicle miles traveled via improved multi-modal infrastructure. • Light Rail Communities Plan: Planning for two light rail stations and high-capacity bus service in the southwest urban growth area, includes Light Rail Community zone to support high-density residential, commercial, office, and community services. • Urban Tree Canopy Policies and urban tree retention regulations. • Land use: Areawide rezoning; protection and enhancement of natural areas, shorelines, estuaries, nearshore habitats. Increased coordinated efforts for land conservation of priority habitats and strategic green and open spaces. • Increasing energy efficiency in County-owned buildings and operations, transition of County fleets to zero emission by 2050, • Continue weatherization and energy assistance programs including C-PACER. • Increase coordination on decarbonizing / energy efficiency upgrades for community anchor institutions/ community based organizations.

Local Climate Plans

Currently, 37 cities across the Puget Sound region have adopted climate plans or included climate elements in their comprehensive plans, and many more are in the process of adding them. In total, approximately 53% of the four-county Puget Sound region's population is covered by a finalized climate plan.

Washington State's Growth Management Act includes fifteen planning goals to guide counties, cities, and towns in the Puget Sound region in the development and adoption of their comprehensive plans and development regulations. The Growth Management Act Climate Change and Resiliency Element is the result of a state law (HB 1181) that requires the inclusion of greenhouse gas emission reduction and climate resilience sub-elements for all jurisdictions in the region with a population over 6,000. Cities and counties are required to set goals and design transportation, land use, buildings and energy actions to meet them. By the end of the decade, all municipalities in the region will be required by the Growth Management Act to incorporate climate change mitigation and adaptation into their comprehensive plans.

This climate plan is designed to energize, reinforce, synergize, and complement local climate planning efforts. The Agency views overlap in local, regional, and state plans as an advantage, strengthening the case for implementation of similar priority climate actions across government levels. For more information on local jurisdictions' climate action plans in the region, please refer to **Appendix F**, Jurisdictions with Climate Action Plans and Climate Change/Resiliency Projects.

#043

Posted by **Ryan Kellogg (PHSKC)** on **10/17/2025** at **9:25am** [Comment ID: 52] - Link

Agree: 0, Disagree: 0

Link available?

Part I. Where We Are Now

"The future depends on what we do in the present." – Mahatma Gandhi

This section describes the foundations already in place for meaningful climate action in the Puget Sound region. It provides an overview of the most recent updates to the greenhouse gas emissions inventory for our four-county region, and identifies existing and planned large-scale climate mitigation projects.

By understanding our emissions profile and leveraging coordinated policy and investment, we can accelerate the transition to a cleaner, healthier, and more resilient future for all.

Greenhouse Gas Inventories included in the Climate Plan

A greenhouse gas inventory provides information about emissions by economic sector, which can be used to guide the scope and scale of reduction strategies needed in each sector.

2019 Puget Sound Regional Emissions Analysis

In 2022, King County led the Puget Sound Regional Emissions Analysis (PSREA), which analyzed greenhouse gas emissions from the 2019 calendar year. The project was developed in close partnership with the King County-Cities Climate Collaboration (K4C), Kitsap County, Pierce County, the Agency, PSRC, the City of Seattle, and Snohomish County.

The 2019 geographic inventory identified that nearly 40% of total emissions were produced by transportation sources including cars, trucks, ships, trains, and planes. The building energy sector, which includes electricity and natural gas use in residential and commercial buildings, contributed 39% of total emissions. Information in the PSREA allows jurisdictions to track progress toward climate goals, identify priority areas for emission reductions, and coordinate strategies across local governments.

2022 Greenhouse Gas Inventory

During development of this climate plan, Agency staff updated the PSREA using more recent data from 2022. At the same time, numerous other agencies were also updating their emissions inventories. The Agency worked closely with the Washington Department of Commerce and King County to ensure consistency in methodologies and scopes, where feasible.

The Agency's analysis aligned closely with Commerce's 2022 inventory for King, Kitsap, Pierce, and Snohomish Counties.

Emissions inventories referenced during the development of this climate plan include:

- Washington Department of Commerce inventory for 2022 for the 11 most populous counties in the state, including King, Kitsap, Pierce, and Snohomish Counties.
- King County inventory update for 2022, and efforts to create sub-inventories for King County municipalities.
- Puget Sound Clean Air Agency update of the PSREA for the year 2022.

#044

Posted by **Kay P** on **10/20/2025** at **8:51am** [Comment ID: 73] - Link

Agree: 1, Disagree: 0

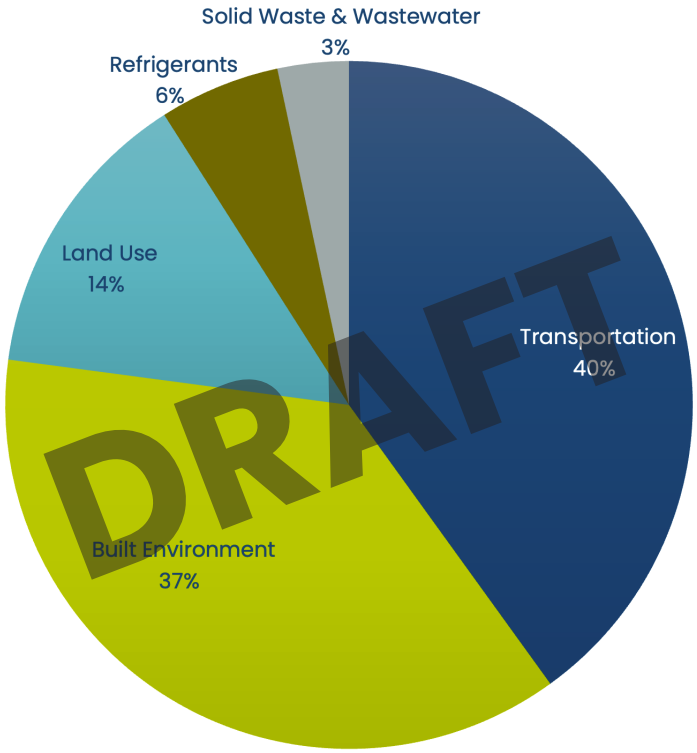
Quote suggestion: "What you do makes a difference, and you have to decide what kind of difference you want to make." - Jane Goodall

> Reply by **Kyla Wilson** on **10/24/2025** at **3:45pm** [Comment ID: 120] - Link
>
> *Agree: 0, Disagree: 0*
>
> I like Kay's quote suggestion above. I would prefer to see quotes from community members who participated in the workshops.

045

Figure 4 shows the main sources of greenhouse gas emissions by sector in our four-county region for model year 2022. Transportation (40%) and the built environment (37%) are the two largest sources of emissions, together accounting for more than three-quarters of the region's total emissions. The remaining sectors, land use (14%), refrigerants (6%), and solid waste and wastewater (3%), contribute a much smaller share. These sector results are similar to the emissions estimates from the 2019 PSREA.

Figure 4. Main Sources of Greenhouse Gas emissions in the Puget Sound in 2022



Some emissions in the 2022 inventory were placed in different subcategories compared to the 2019 inventory to align with the Department of Commerce's inventory. For example, in the 2022 inventory emissions from industrial use of fuels like distillate fuel oil were moved from the industrial processes category to the fuel oil category within the built environment sector. The 2019 inventory had included only residential fuel oil in the fuel oil category, so this change helps group all fuel oil emissions together for better consistency. This reclassification does not change the total emissions, but simply places them in the more appropriate category.

Additionally, the 2022 inventory reclassified landfill emissions, moving them from the industrial processes category within the built environment sector to the solid waste sector. Unlike the fuel oil reclassification, landfill emissions were double counted in the 2019 inventory because they appeared in both categories. These updates help ensure greater consistency and clarity across all sectors, and improve alignment with the Department of Commerce's inventory. The 2019 aviation emissions estimates were updated based on data received from the Port of Seattle. These methodological differences are described in more detail in **Appendix A**.

Figure 5 provides a more detailed breakdown of estimated greenhouse gas emissions by subsector. On-road vehicles contribute the largest share, accounting for approximately 24% of the region's total emissions. Natural gas (18%), electricity (15%), and tree loss (13%) follow. Other notable sources include aviation (10%), refrigerants (6%), and off-road equipment (5%).

#045

Posted by **Kyla Wilson** on **10/24/2025** at **3:47pm** [Comment ID: 121] - Link

Agree: 0, Disagree: 0

What do you mean by "model" year 2022?

Figure 5. Sources of Greenhouse Gas Emissions by Subsector in the Puget Sound in 2022

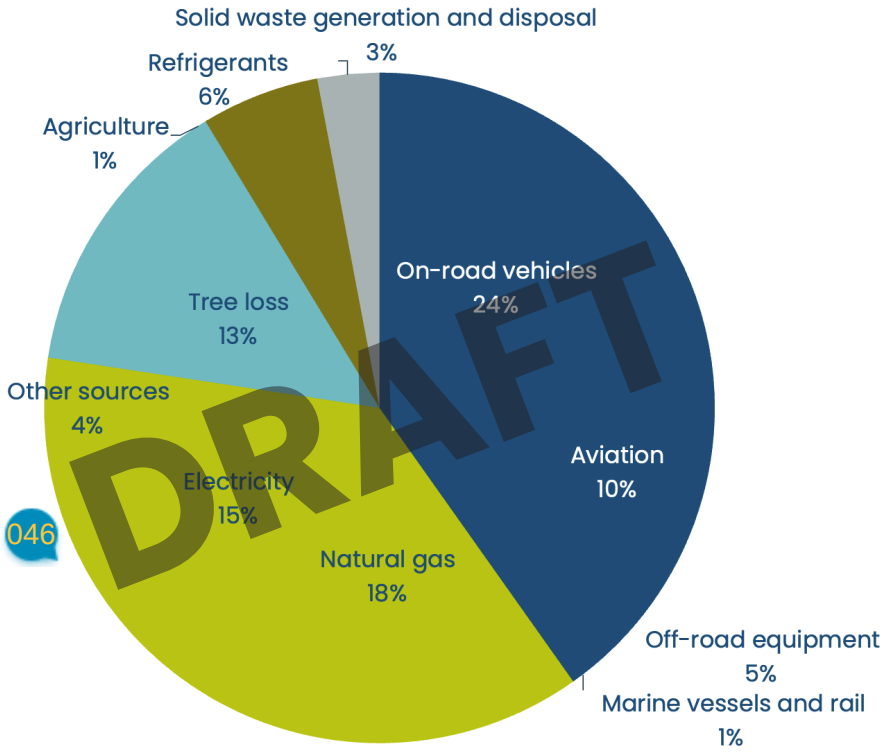
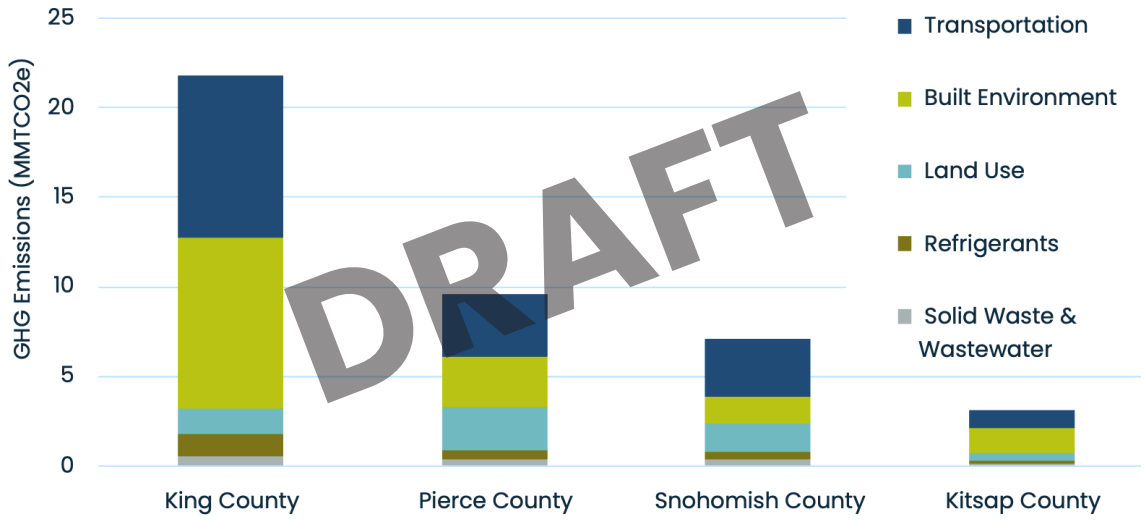


Figure 6 shows the breakdown of greenhouse gas emissions by county. In every county, transportation and built environment are the largest emissions sources. King County, the most populous county in the region, produces the highest total emissions, which are driven largely by these two sectors. Emissions in Pierce and Snohomish Counties are somewhat more evenly distributed among sectors, with land use also contributing a significant share. Kitsap County, while reporting the lowest overall emissions, follows the regional pattern, with the built environment and transportation remaining its primary sources.

Figure 6. Greenhouse Gas Emissions by County and Main Sector for 2022



#046

Posted by **Kyla Wilson** on **10/24/2025** at **3:50pm** [Comment ID: 122] - Link

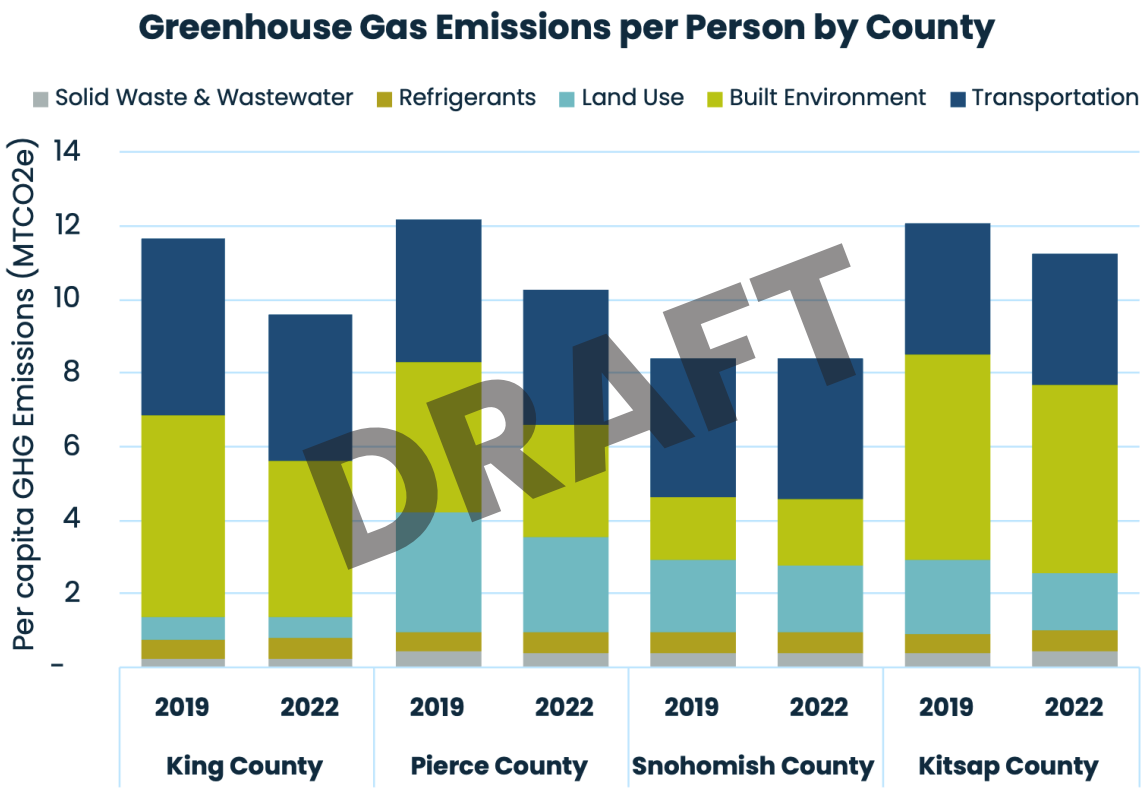
Agree: 0, Disagree: 0

Include lines on the pie chart separating these sub-category sections.

047 **Figure 7** shows the per person greenhouse gas emissions by county for both 2019 and 2022.

Transportation and built environment remain the largest sources of emissions per person across all counties. Generally, emissions per person have decreased across all counties between 2019 and 2022, except for Snohomish County which remained steady. The reductions in the three counties are primarily due to reductions in the built environment category. Built environment emissions 048 per person are also notably lower in Snohomish County for both 2019 and 2022, likely due to the county benefiting from a cleaner energy grid. Per person emissions from other categories have either declined slightly or remained relatively steady over this period. The net emissions from each county for 2019 and 2022 are also presented in **Appendix A**.

Figure 7. Per Person Greenhouse Gas Emissions by County and Main Sector for 2019 and 2022



#047

Posted by **Kyla Wilson** on **10/24/2025** at **3:52pm** [Comment ID: 123] - Link
Agree: 0, Disagree: 0
Move this to under the graph

#048

Posted by **Kyla Wilson** on **10/24/2025** at **3:56pm** [Comment ID: 124] - Link
Agree: 0, Disagree: 0
This sentence about Snohomish County's built environment emissions is confusing. From the graph it doesn't look like built environment emissions declined. Are you saying that built environment emissions for SnoCo in 2019 and 2022 were lower than 2015?

Table 2 provides the specific emissions amounts in metric tons of carbon dioxide equivalent (MTCO2e) by sector and county. See Appendix A for further information.

Table 2. Estimated 2022 Greenhouse Gas Emissions by County and Sector (rounded to the nearest thousand)

Greenhouse Gas Emissions by Sector (MTCO2e)	King	Pierce	Snohomish	Kitsap	Sum
Transportation & Other Mobile Sources	**9,004,000**	**3,424,000**	**3,234,000**	**993,000**	**~16,655,000***
On-road vehicles	TBD	TBD	TBD	TBD	TBD*
Freight and service vehicles	1,002,000	362,000	354,000	66,000	1,784,000
Passenger vehicles	4,239,000	1,776,000	1,607,000	468,000	8,090,000
Transit vehicles	120,000	24,000	38,000	19,000	201,000
Aviation	TBD	TBD	TBD	TBD	TBD*
Off-road equipment	1,074,000	392,000	361,000	102,000	1,929,000
Marine vessels and rail	212,000	116,000	61,000	99,000	488,000
Built Environment	**9,616,000**	**2,824,000**	**1,564,000**	**1,415,000**	**15,419,000**
Natural gas	4,158,000	1,600,000	1,296,000	499,000	7,553,000
Commercial	1,437,000	461,000	379,000	114,000	2,391,000
Industrial	551,000	417,000	199,000	217,000	1,384,000
Residential	2,170,000	722,000	719,000	168,000	3,779,000
Electricity	4,395,000	937,000	109,000	828,000	6,269,000
Commercial	1,963,000	275,000	38,000	253,000	2,529,000
Industrial	234,000	68,000	8,000	3,000	313,000
Residential	2,198,000	594,000	64,000	572,000	3,428,000
Other sources	1,063,000	287,000	159,000	88,000	1,597,000
Fuel oil	421,000	72,000	51,000	39,000	583,000
Industrial processes	370,000	133,000	-	-	503,000
Residential propane	101,000	47,000	82,000	41,000	271,000
Commercial propane - 1	171,000	34,000	26,000	8,000	239,000
Land Use	**1,378,000**	**2,418,000**	**1,537,000**	**432,000**	**5,765,000**
Agriculture	84,000	32,000	182,000	5,000	303,000
Tree loss	1,294,000	2,386,000	1,355,000	428,000	5,463,000
Refrigerants	**1,243,000**	**508,000**	**461,000**	**152,000**	**2,364,000**
Refrigerants	1,243,000	508,000	461,000	152,000	2,364,000
Solid Waste & Wastewater	**551,000**	**380,000**	**331,000**	**131,000**	**1,393,000**
Solid waste generation and disposal	480,000	344,000	299,000	112,000	1,235,000
Compost	47,000	20,000	1,000	1,000	69,000
Landfill	433,000	323,000	298,000	112,000	1,166,000
Wastewater process emissions	71,000	36,000	32,000	19,000	158,000
Grand Total	**21,790,000**	**9,554,000**	**7,127,000**	**3,124,000**	**41,595,000**

**We are currently working on revisions with partners for methodology consistency; there may be changes to final version for these and other categories.*

#049

Posted by **Nick Maxwell** on **10/21/2025** at **3:39pm** [Comment ID: 87] - Link

Agree: 0, Disagree: 0

For electricity, you're using the emissions of the Western Interconnection region. Snopud reports 95% of their electricity is generated with renewable methods. The problem with ignoring that is that it makes gasoline and diesel look like less of a problem. The electricity grid will go renewable. That's what we're seeing from Lazard and the build out of batteries. Funding residential interventions as much gasoline/diesel interventions is a mistake. It is not lining up our investments with our opportunities.

#050

Posted by **John (Spark Northwest, Seattle)** on **10/23/2025** at **1:35pm** [Comment ID: 95] - Link

Agree: 1, Disagree: 0

We need to have a distinct category for data centers in here whenever the next projections are made

#051

Posted by **Patrick Babbitt** on **10/24/2025** at **2:11pm** [Comment ID: 111] - Link

Agree: 0, Disagree: 0

If not somewhere else, it may be helpful for decision makers to understand what causes the emissions within a sector in a practical sense. For built environment, for example, this is fossil fuels used for space/water heating, in particular, and possibly embodied carbon in a building's materials.

Existing and Planned Large-Scale Projects and Programs

Many large-scale climate mitigation projects and programs are currently underway in the region as of 2025, demonstrating existing momentum and hard-won achievements. **Table 3** highlights specific planned and existing climate action projects and programs for each county and across the region, organized by sector.

Table 3. Existing and Planned Large-Scale Climate Projects and Programs in the Region

Built Environment Projects	
King County	• In In 2023, Seattle Mayor Harrell introduced new Building Emissions Performance Standards aimed at reducing emissions from existing large buildings (over 20,000 square feet). The goal is a 27% reduction from the 2008 baseline by 2050, with compliance measured in five-year intervals. The first compliance deadline is set for 2031. • By 2030, local or regional programs to support building retrofits will be available to residential and commercial building owners in a[052]g County jurisdictions and unincorporated King County. • King County's Energize Program installs[053]t pumps and other home efficiency upgrades in low- and moderate-income homes in King County. Seattle's Clean Heat Program reduces utility costs for eligible residents by converting oil furnaces to electric.[054] • King County and Seattle continue to enact progressive commercial energy codes that ensure new buildings, renovations, and equipment replacements meet evolving high-performance standards. • King County established the C-PACER (Commercial Property Assessed Clean Energy and Resiliency) program with $80 million of project financing for energy efficiency and water conservation.
Kitsap County	• Kitsap County's 2024 comprehensive plan update includes a Commercial Property Assessed Clean Energy and Resiliency (C-PACER) Program to ensure lower-cost financing options are accessible and affordable to building owners for higher-efficiency electrified systems and resiliency improvements.
Pierce County[055]	• In 2025, Pierce County received a Silver designation from the national SolSmart program due to exemplary work by the Planning & Public Works Department. They continue to strive for higher SolSmart designations, like Gold or Platinum, making it faster, easier, and more affordable for residents, businesses, and non-profit organizations to install solar. • In 2024, Pierce County was awarded a $2.3M Commerce grant to construct a community solar array on the closed Purdy landfill. The project will be operational in 2026. • Tacoma's 2024 Community Building Decarbonization Strategy outlines a comprehensive plan to phase out fossil-fuel appliances and decarbonize residential and commercial buildings by 2050. • In 2025, the Orange Grove Foundation in Tacoma was awarded a $135,993 state Clean Energy Communities Grant for installation of a solar microgrid and heat pump.

#052

Posted by **Patrick Babbitt** on **10/24/2025** at **2:14pm** [Comment ID: 113] - Link
Agree: 0, Disagree: 0
A number of entities across King County run clean building accelerator or incentive programs: Bellevue, Issaquah, Seattle/SCL, PSE...

#053

Posted by **Carrie Lee - King County Exec Climate Office** on **10/26/2025** at **5:04pm** [Comment ID: 134] - Link
Agree: 0, Disagree: 0
Add Energy Smart Eastside: https://www.energysmarteastside.org/

#054

Posted by **Patrick Babbitt** on **10/24/2025** at **2:12pm** [Comment ID: 112] - Link
Agree: 0, Disagree: 0
Bellevue and Eastside cities' Energy Smart Eastside program is another good example, similar to the Energize program.

#055

Posted by **Kyla Wilson** on **10/24/2025** at **4:00pm** [Comment ID: 125] - Link
Agree: 0, Disagree: 0
Since King and Kitsap have included C-PACER, Pierce County's C-PACER program should also be included here.

Snohomish County	• Snohomish County adopted Green Building Requirements requiring Leadership in Energy and Environmental Design (LEED) Gold certification for new County buildings and major remodels and completion of a life cycle cost assessment. • Snohomish County's C-PACER Program helps commercial, industrial, agricultural and multi-family buildings become more efficient. • Snohomish County administers the state's weatherization program helping low-income households with energy efficiency and decarbonizing upgrades. • Snohomish PUD provides several rebate programs for heat pumps, heat pump water heaters, weatherization, and qualifying Level 2 ENERGY STAR® certified connected electric vehicle chargers.
Puget Sound Energy	• Puget Sound Energy now provides the Port of Seattle and Sea-Tac Airport with renewable natural gas supply sourced from landfill methane, cutting about 1,291 metric tons of carbon emissions annually. • Launched in 2023, Puget Sound Energy's Home Electrification Pilot provided free energy assessments gas-using homes, including income-qualified households receiving full subsidization for heat pump installations. The program ended in 2024.
Cross-county and Statewide	• In 2024, EPA awarded King County $50 million to decarbonize buildings across the four-county region as part of the CPRG program. Key targets include: ◇ Electrify and weatherize 600+ affordable housing units, 150 home-based care centers, and 55 community buildings ◇ Replace 300 gas water heaters with heat-pump models ◇ Update building codes for new construction • King and Pierce County participated in a cross-county home electrification campaign, Switch Is On, from January 2024-June 2025. • In 2019 the Clean Buildings Act was signed into law (expanded in 2022 and augmented in 2023), with the objective of lowering costs and pollution from fossil fuel consumption in the state's commercial and multifamily buildings, and campus district energy systems. The law also provides incentives to encourage building owners to make energy efficiency improvements earlier than required. • In 2022, the State passed legislation to update its three existing appliance standards with the objective of reducing long-term operating costs and cutting greenhouse gas emissions. • The Washington State Weatherization Assistance Program offers eligible residents cost-effective energy efficiency and related repairs to reduce energy bills and increase home health, safety and durability. • The State Home Electrification and Appliance Rebates Program (HEAR) facilitates the adoption of high-efficiency electric equipment among low- and moderate-income households and adult family homes in King and Pierce Counties.

Transportation Projects	
King County	• Implemented Free Youth Transit Pass, launched RapidRide H and G lines, improved connections to Link light rail, expanded flexible transit services such as MetroFlex and implemented spot improvements for transit speed and reliability. • By 2030, King County Metro will launch two new RapidRide bus lines, and plan for two additional lines as well as expanded trails for walking, biking, and rolling. • By 2030, King County will have 2000 Level 2 and 1800 direct current fast charge public charging ports. • Invested significant resources to support a transition to a zero-emission Metro bus fleet. Secured over $40 million of Federal Transit Administration funding to procure battery electric buses for Metro in South King County and put 40 battery electric buses into service with over 1.5 million miles traveled through the end of 2024.
Pierce County	• In 2024, Pierce Transit was awarded a $14.8M grant from the Federal Transit Authority grant to purchase new battery electric buses and install new charging equipment in line with its Zero Emission Bus Strategy. • The City of Tacoma launched its E-bike Rebate Pilot Program in Spring 2025 with the goal of supporting access to e-bikes and e-bike education.
Snohomish County	• Community Transit is testing a 40-foot battery-electric bus (BEB) and a 40-foot hydrogen fuel cell electric bus for comparison and aim to convert their fleet to 100% zero-emissions by 2044. • Everett Transit has made great strides in electrifying their bus fleet and installing enroute charging equipment in line with their Fleet Electrification Transit Plan. • By 2044, Snohomish County will transition its fleet of passenger cars and light duty pickups to zero-emissions vehicles, such as electric or renewably produced hydrogen, as feasible. • Snohomish County developed a subarea plan for areas that include two planned and one provisional Link Light Rail station. The County will make key transportation investments to ensure multimodal infrastructure supports connectivity to and from the light rail stations, as well as within the subarea. It will also implement land use changes and rezonings encouraging higher density development near the stations, promoting mixed-use development, and increasing walking and biking while reducing long-distance vehicle trips.

Cross-county and Ports	• Sound Transit is building 13 new and expanded light rail stations with service across the region, including: ◇ 1 Line extension to Federal Way with three new light rail stations (Kent Des Moines, Star Lake and Federal Way Downtown, anticipated by the end of 2025); ◇ 2 Line extension across Lake Washington (anticipated in early 2026); ◇ West Seattle (anticipated 2032) and Ballard (anticipated 2037-2039) extensions; ◇ T-line extension to add six new stations including Tacoma Community College (anticipated 2039); and ◇ New Stride S1, S2 and S3 bus rapid transit service. • In 2025, the Port of Seattle, the Northwest Seaport Alliance, and Seattle City Light released the Seattle Waterfront Clean Energy Strategy to expand electrical infrastructure to meet growing demands for shore power and other clean-energy equipment. Port of Seattle and Northwest Seaport Alliance are installing infrastructure on cruise and cargo ship terminals to allow ships to plug into the local electricity grid while docked. Port of Tacoma's South Harbor Electrification Roadmap similarly outlines plans and priorities for decarbonizing port activities in South Harbor. • Port of Seattle, Port of Tacoma, Northwest Seaport Alliance, and Vancouver Fraser Port Authority in British Columbia developed the 2024 Progress Report to the Northwest Ports Clean Air Strategy to reduce air and greenhouse gas emissions from shipping and port operations in the ports' shared airshed. Ongoing projects include increasing shore power use, adding cleaner cargo handling equipment, and improving building efficiency across port facilities. • Northwest Seaport Alliance's Zero Emission Drayage Program is facilitating a just and equitable transition to zero-emission drayage trucking for the 5,000 or so heavy-duty trucks that provide cargo-hauling services in and out of port terminals in Seattle and Tacoma. The program consists of a Zero Emission Drayage Incentive Program and the Decarbonizing Drayage Roadmap, a shared regional vision and strategy for zero-emission drayage developed by the Puget Sound Zero Emission Truck Collaborative. • Washington State Ferries will expand the fleet by converting six existing vessels to hybrid-electric power, building 16 new hybrid-electric vessels and adding shore charging to 16 terminals. They are actively building new hybrid diesel-electric vessels and planning for a full electric fleet by 2050, with a contract awarded in 2025 to build three new hybrid-electric ferries. The conversion of the Wenatchee ferry to hybrid-electric was completed in 2025 and the ferry is back in service. A new hybrid-electric ferry currently runs between Seattle and Bainbridge. • Ecology continues to fund zero-emission transportation projects across the region through Volkswagen settlement funds including for electric buses, ferries, forklifts, charging infrastructure and more. • The Agency's EPA-funded yard truck electrification project offers incentives to replace diesel-powered yard trucks with all-electric models, and has replaced 20 yard trucks since 2019, with seven more trucks scheduled to be replaced by the end of 2026.

Solid Waste and Wastewater Projects	
King County	• Launched King County's Re+ Strategic Plan–an ambitious effort to reach zero waste and create a circular economy. Since then, several Re+ actions have been implemented including to establish the Re+ Community Panel; fund Re+ City Grants and Circular Economy Grants; collaborate to help pass impactful statewide organics legislation; and sign King County cities on to support the Re+ campaign. • By 2030, King County will provide food waste and organics curbside collection services to 75% of its unincorporated single-family customers. Additionally, all businesses generating at least 0.25 cubic yards of food waste per week will receive this service.
Pierce County	• In 2024, all Pierce County residents gained access to food waste composting through their yard waste bin. Previously, this service was limited to City of Tacoma residents.
Snohomish County	• In addition to the state-mandated requirements for monitoring and managing methane emissions from the closed landfills, and diverting organics from the waste stream, the County's Comprehensive Solid and Hazardous Waste Management Plan includes climate change and sustainability goals and policies. The Capital Facilities and Utilities Element of the Snohomish County Comprehensive plan adopted a policy requiring the County to implement measures to reduce greenhouse gas emissions and air pollution from its solid waste management operations.
Cross-county and Statewide	• In 2025, the state enacted the Recycling Reform Act, updating the state's recycling system, funding statewide collection services, reducing unnecessary packaging, and requiring the establishment of a producer responsibility organization, funded by manufacturers and consumer brands.

Land Use and Sequestration Projects	
King County	• King County will plant, protect, and prepare 5 million trees between 2020 and 2030. Additionally, the County will work to prevent any net loss of forest cover in major watersheds in King County between 2025 and 2030. Through accelerated restoration of county-owned forest and natural areas, King County is on track to restore 2,000 acres by 2030. • King County056ected 4,480 acres of forests, natural areas, and urban greenspace from 2016– 2024. • In 2021, King County developed the 30-year Forest Plan, including pilot projects and expanded capacity to focus on urban forests. • King County manages a unique program offering certified carbon credits for protecting urban and rural forests, making it the first government-led carbon-credit system of its kind. Over the past five years, this initiative has expanded tree canopy, sequestered carbon, enhanced wildlife habitat, and improved local water quality. • In 2023, Seattle enacted a tree protection ordinance with the goal of protecting tree canopy citywide and addressing inequities in tree canopy distribution in historically underserved communities. Seattle also won a $12.9M U.S. Forest Service grant to plant and maintain trees, combat extreme heat and climate change, improve access to nature, and support green careers for young people.

#056

Posted by **Jay Tavarez-Brown** on **10/24/2025** at **10:13am** [Comment ID: 97] - Link

Agree: 0, Disagree: 0

Can you be more specific? Does this refer to purchasing land, conservation futures, or other programs?

Land Use and Sequestration Projects	
Kitsap County	• Kitsap County's 2024 comprehensive plan update includes a tree loss prevention strategy, calling on the County to develop and implement tree canopy regulations, standards, and incentives to protect existing tree canopy cover. These measures will also require replacing removed trees in areas slated for development, while addressing best management practices for wildfire prevention.
Pierce County	• In 2023-2024, Pierce County coordinated a steering committee of land conservation practitioners from local agencies and partners to create a Land Conservation Plan. The plan outlines the history of land use change in Pierce County, identifies conservation priorities, and explores funding and program opportunities to conserve high-priority lands. The plan was adopted by the Pierce County Council on June 24, 2025. 057 • In the 2024 Comprehensive Plan Update, Pierce County set a goal to conserve up to 100,000 areas by 2044 and achieve a tree canopy cover of 40%.
Snohomish County	• Snohomish County's Healthy Forest and Land Conservation Strategy projects help to recruit and train volunteer stewards to lead forest restoration projects in priority parks, and protect high-conservation-value lands. • Snohomish County completed the Land Conservation Initiative to identify and conserve ecologically significant and strategic land areas that promote co-benefits.
Cross-county	• Puget Sound Info, a collaborative funded by Puget Sound Partnership, hosts the 2022-2026 Action Agenda Explorer which includes lists of strategies including sequestration of greenhouse gas emissions through ecosystem restoration (Strategy 19).
Refrigerants Projects	
Cross-county and Statewide	• Washington State passed two laws to address refrigerant emissions: ◇ House Bill 1112 (2019) banned new equipment using hydrofluorocarbons (HFC), directed Ecology to explore strategies for phasing out high-global warming potential (GWP) refrigerants, and required the state to prioritize low-GWP equipment in its purchasing decisions. ◇ House Bill 1050 (2021–2022) built on House Bill 1112 by setting maximum GWP thresholds for refrigerants, adding residential air conditioners and heat pumps to the list of regulated equipment, and establishing programs to reduce leaks and promote refrigerant recovery from large systems.

#057

Posted by **Graham** on **10/14/2025** at **11:42am** [Comment ID: 39] - Link
Agree: 1, Disagree: 0
Is there a link to this plan, please?

> Reply by **Kyla Wilson** on **10/24/2025** at **4:04pm** [Comment ID: 126] - Link
> *Agree: 0, Disagree: 0*
> https://www.piercecountywa.gov/8371/Land-Conservation

Part II. Where We Need to Go

"Life is like riding a bicycle. To keep your balance, you must keep moving." – Albert Einstein

The Puget Sound region is on the leading edge of climate action in the United States, but more work must be done to ensure a rapid and just transition to a zero-emissions future where all residents benefit. This section includes a summary of state and regional greenhouse gas reduction targets and goals, as well as greenhouse gas emission projection scenarios for 2030 and 2050. Every step we take to reduce climate impacts makes for stronger and healthier communities across the Puget Sound.

Greenhouse Gas Reduction Targets

Washington State Targets

In 2020, the Washington Legislature set new science-based greenhouse gas emission limits to combat climate change. Under the law, the state is required to reduce emissions in line with the following targets:

2020
reduce to 1990 levels.

2030
45% below 1990 levels.

2040
70% below 1990 levels.

2050
95% below 1990 levels and achieve net zero emissions.

Puget Sound Region Targets

The following science-based goals are established in the region. While there are small differences, they are all similar in their scale, ambition, and urgency:

Agency (and VISION 2050)
Reduce the region's greenhouse gas emissions to 50% below 1990 levels by 2030 (and ensure the region is on a trajectory to achieve the state goal of 95% below 1990 levels by 2050).

King County and King County Cities
Reduce greenhouse gas emissions, compared to a 2007 baseline, by 50% by 2030, 75% by 2040, and 95%, including net-zero emissions through carbon sequestration and other strategies, by 2050.

Kitsap County
Reduce greenhouse gas emissions to 80% below 1990 levels by 2050.

Pierce County
Reduce countywide greenhouse gas emissions as well as the County's operational emissions 45% below 2015 levels by 2030.

Snohomish County
Reduce greenhouse gas emissions to 50% below 1990 levels by 2030 and 80% below 1990 levels by 2050.

Greenhouse Gas Emissions Projections & Analysis

A core activity of the Puget Sound Regional Emissions Analysis was to project emissions to target years, compare projected emissions to the target levels, and evaluate options for addressing any gaps. This process involved three scenarios:

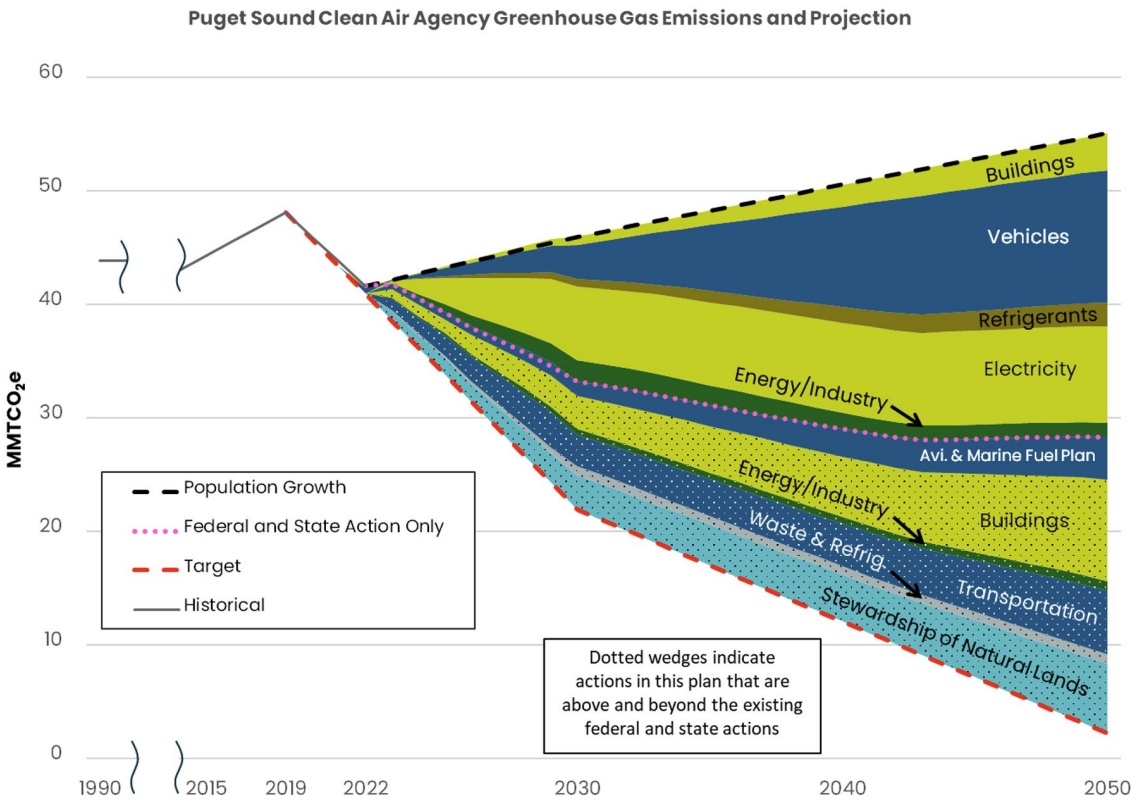
i) Calculating a "population growth only future" where current emissions rates and activities are held constant except for changes with forecasted population growth.

ii) Applying anticipated emissions reductions due to existing federal, state, and regional policies. This includes federal vehicle regulations, multiple state policies and regulations covering vehicles and energy, and regional transportation and land-use policies. These existing policies bring projected regional greenhouse gas emissions down to about 24% below 1990 levels in 2030, and about 35% below 1990 levels in 2040 and 2050.

iii) Identifying the target levels. Additional effort that would be needed in each sector to reach the state's greenhouse gas goals in 2030, 2040, and 2050.

The regional emissions projections and King County's climate targets are shown in **Figure 8**. The dotted areas with shades of green, blue, and orange show the gap that must be filled with additional hypothetical actions to reach the goals, and do not represent actual forecasted values for any specific actions.

Figure 8. Forecasted regional greenhouse gas emissions and reductions under three scenarios.



Part III. How We Will Get There

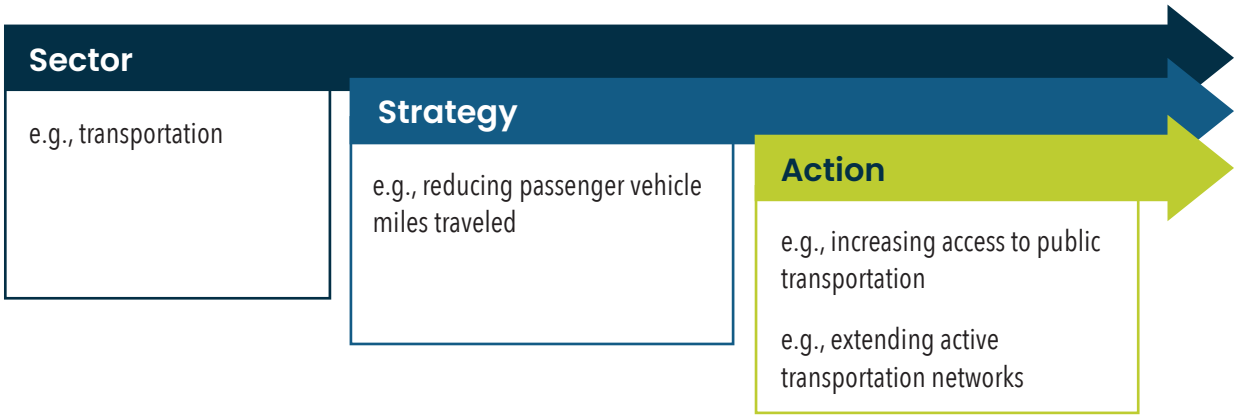
"Energy and persistence conquer all things." –Benjamin Franklin

Addressing the climate crisis will require urgent action that is supported by strong coordination at all levels of government. Many jurisdictions in the region have demonstrated bold climate leadership, yet meeting the challenge of climate change requires bolder actions, new examples of local leadership, deeper commitments to collaboration, and a willingness to take action whenever possible.

How to Read this Section

In the following analysis, greenhouse gas reduction activities are classified by *sector, strategy, and action*. These terms are defined as follows:

- **Sector:** The parts of the economy that generate greenhouse gas emissions. This climate plan includes six sectors:
  - Built Environment
  - Transportation
  - Solid Waste and Wastewater
  - Land Use and Sequestration
  - Refrigerants
  - Consumption
- **Strategy:** a group of similar or interrelated greenhouse gas reduction actions that relate to a common topic.
- **Action:** a policy or program that reduces greenhouse gas emissions and/or enhances carbon sinks



For each sector we present the following information:

- Sector Overview: Presents a high-level description of the sector.
- Major Greenhouse Gas Emitting Activities and Reduction Opportunities: Identifies the major sources of greenhouse gas emissions and general opportunities for reducing emissions.
- Existing Policies and Efforts to Reduce Greenhouse Gas Emissions: Identifies the major policies and efforts to reduce emissions in the region.
- Cost-Benefits and Co-Pollutant Considerations: Identifies major co-benefits and other high-level considerations for decision-making.

- **Summary of Feedback Heard at Community Workshops:** Presents a summary of public input heard at workshops regarding implementation of climate strategies.

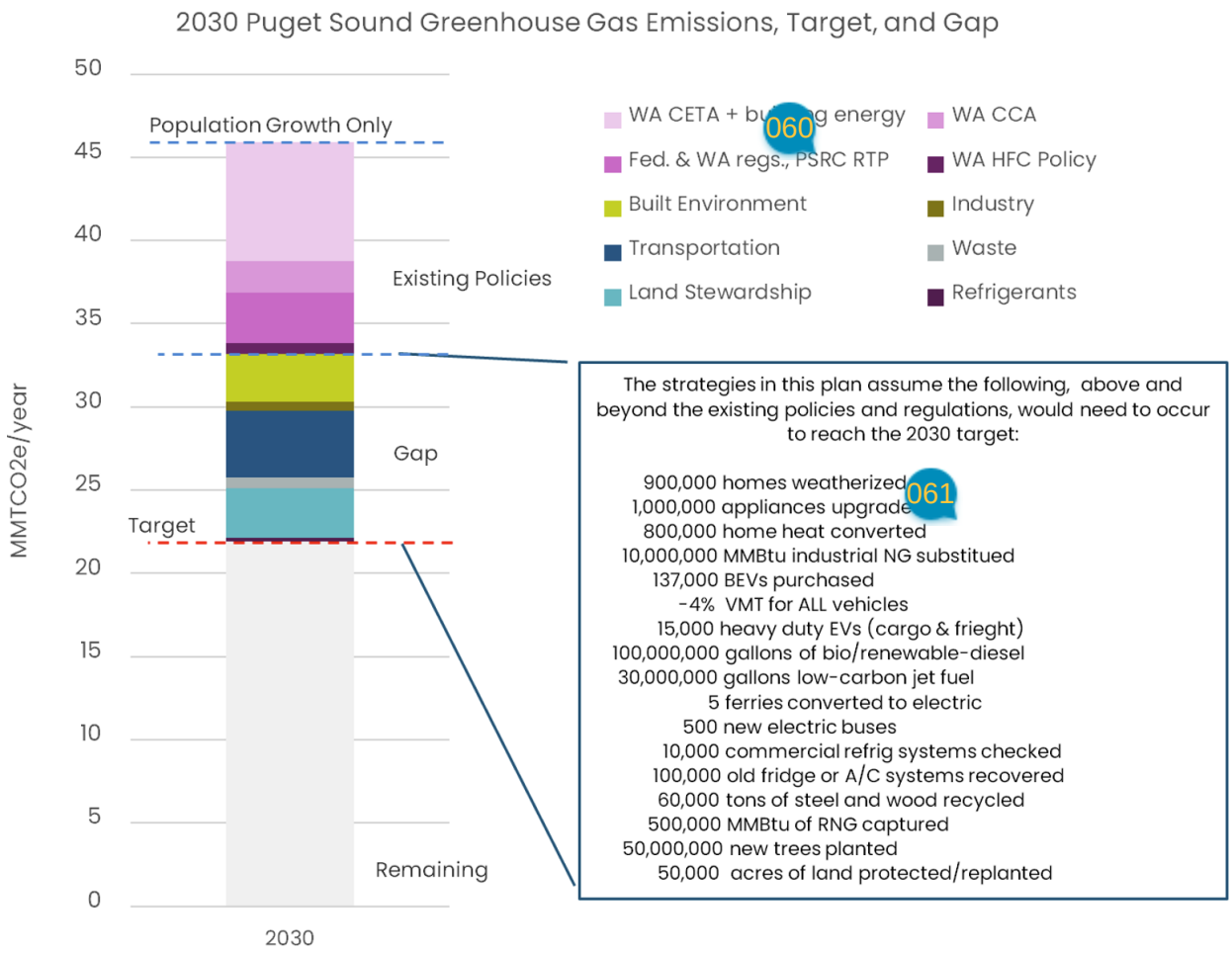
For each strategy, we describe the main actions that reduce greenhouse gas emissions. We then present tables containing data on the following four elements. Where it is not possible to accurately quantify data or costs, values have been labeled "unknown."

1. **Emission Reduction Potential:** The remaining greenhouse gas emissions that may need to be reduced to meet the proportional 2030 target for the respective sector (see additional information below).
2. **$/ton:** The total cost per ton of greenhouse gas emissions reduced if the strategy were implemented.
3. **Authority to Implement:** Identifies what level of government would have authority to implement a particular strategy.
4. **Co-benefits:** Identifies the types of co-benefit(s) expected from implementation of each strategy.

Understanding the Emission Reduction Potential of Strategies

The "Emission Reduction Potential" (Gap) is the difference between current greenhouse gas emissions and the 2030 reduction targets for a sector. We estimated the maximum potential impact of each strategy by assuming the largest realistic scale of action. These estimates are not plans or predictions and don't guarantee results. They simply help decision-makers see which strategies could contribute most to meeting climate goals. **Figure 9** uses the assumptions for potential strategies from each sector to help meet the 2030 climate target.

Figure 9. Potential Strategies and Assumptions to Meet the 2030 Climate Target



#058

Posted by **Carrie Lee - King County Exec Climate Office** on **10/26/2025** at **5:11pm** [Comment ID: 135] - Link
Agree: 0, Disagree: 0
Appreciate reframe on emission reduction potential. Continue to be interpreted as an estimate of scale of emission reductions that could be achieved by activities, when no approach, policy tool, or means of doing so is identified. Consider pivot to level of ambition required. The implementation of actions will need to be designed to hit this level of ambition to have meaningful impact.

#059

Posted by **Kyla Wilson** on **10/24/2025** at **4:11pm** [Comment ID: 127] - Link
Agree: 0, Disagree: 0
I think it would make more sense to refer to this as the 2030 (or 2050) GHG reduction target throughout the plan to avoid confusion with climate adaptation and resilience plans and actions at the state and local level.

#060

Posted by **Ryan Kellogg (PHSKC)** on **10/17/2025** at **9:34am** [Comment ID: 54] - Link
Agree: 0, Disagree: 0
Condider spelling out acronyms in this chart.

#061

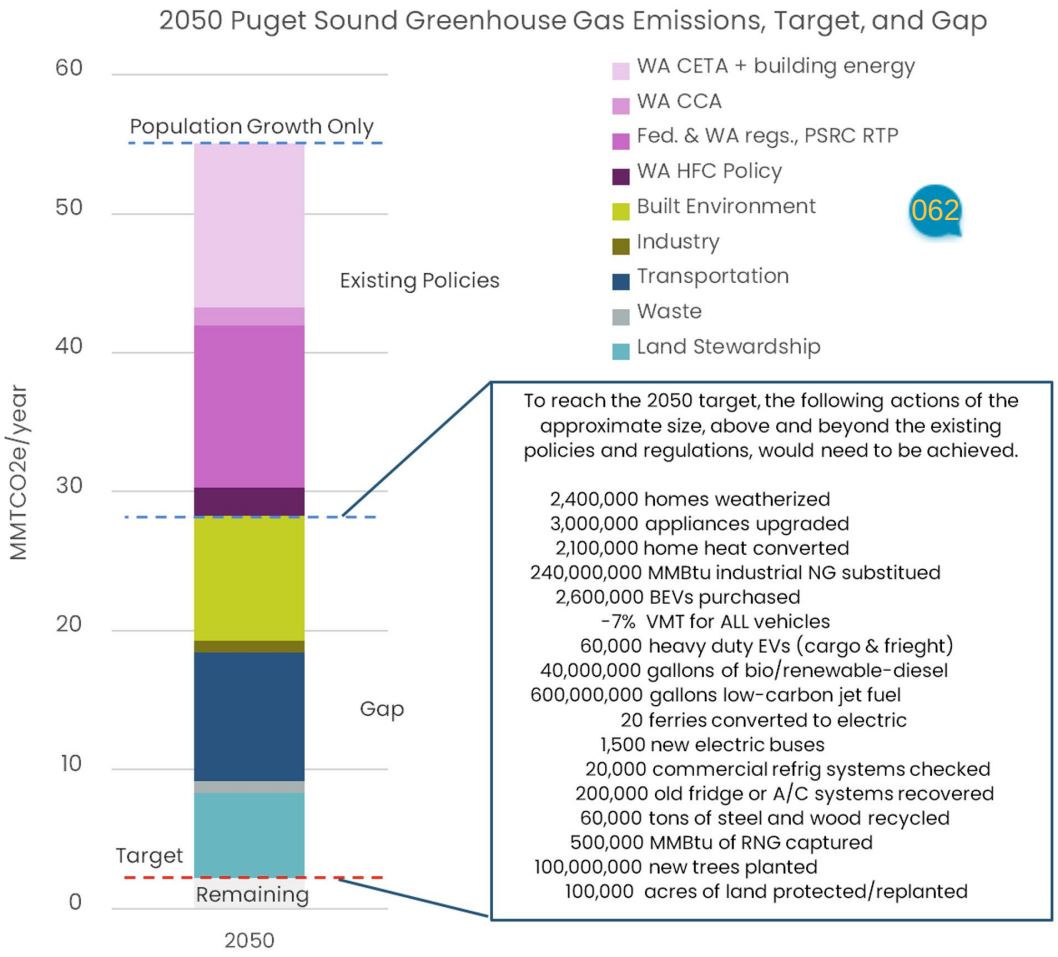
Posted by **Kyla Wilson** on **10/24/2025** at **4:14pm** [Comment ID: 128] - Link
Agree: 0, Disagree: 0
Consider making "appliance upgrade" more specific such as "1,000,000 appliances replaced with high-energy efficiency alternative" or "1,000,000 gas furnaces replaced with efficient heat pumps" if that's what was used for the calculation.

Our Pathway to 2050

Our region is progressing on an achievable and bold course to 2050. With just four years left, we recognize our 2030 target is challenging to reach without extraordinary acceleration. However, our estimates for 2030 lay the foundation for moving forward now to reach the 2050 target. Through collaboration, focus, and innovation, we can create a cleaner future.

Like the figure above, **Figure 10** shows our 2050 target, the emission reductions we expect from current policies, and the additional impact of potential new projects. Many of these actions are scaled up versions of what we included above. As a result, using our 2030 estimates as a starting point helps us shape projects that can bring the 2050 target within reach.

Figure 10. Potential Strategies and Assumptions to Meet the 2050 Climate Target



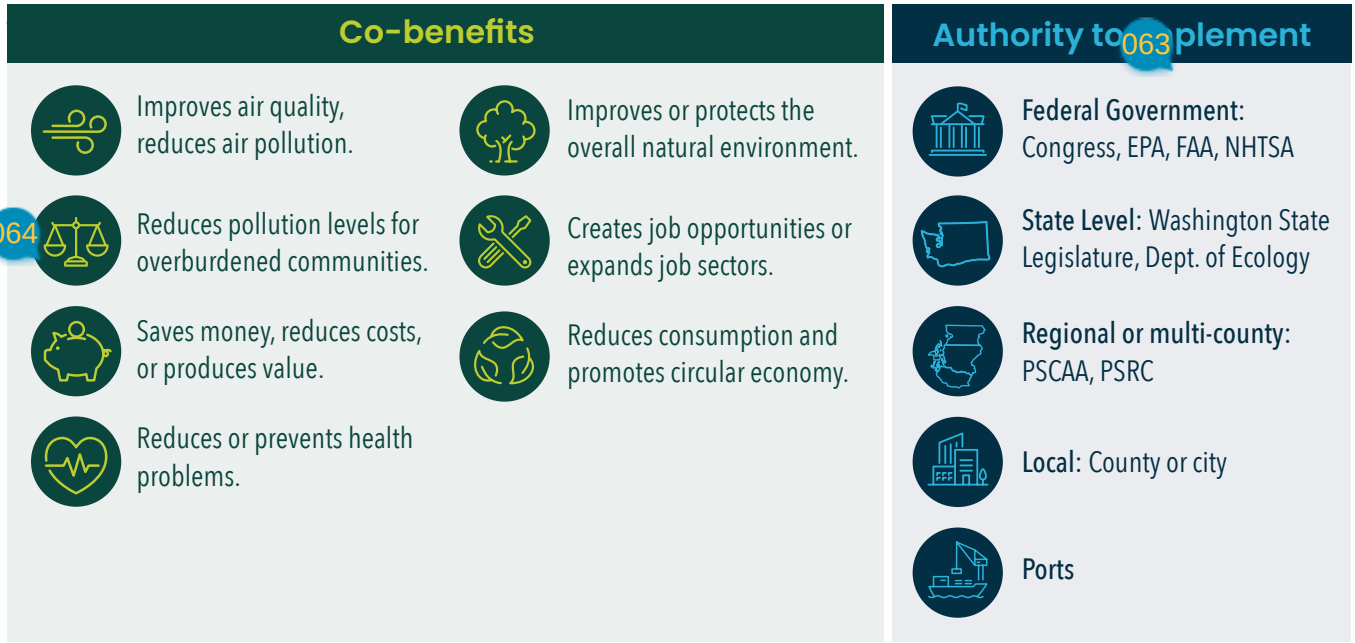
#062

Posted by **Patrick Babbitt** on **10/24/2025** at **2:23pm** [Comment ID: 115] - Link

Agree: 0, Disagree: 0

For this chart and above, is it detailed somewhere in this document what existing policies translates to in terms of expected accomplishments by 2030 and 2050? i.e., # of homes weatherized or appliances upgraded due to established policy and market response?

Table 4 defines the icons used throughout this section to indicate Authority to Implement and Co-benefits:



It should be noted that "authority to implement" can include the need to obtain future authority. For example, some of the actions that list the State Level as having the authority to implement could require authority to be granted by the State Legislature. For more information on obtaining authority, please refer to **Appendix G**.

Emission Reduction Strategies and Actions

This section compiles a comprehensive list of greenhouse gas reduction strategies and actions for all sectors of the economy, including estimates for the amount of emissions reductions they could achieve. We also include additional information to help jurisdictions make informed decisions about their climate planning efforts. Information on potential funding sources, implementation milestones, and metrics for tracking progress for strategies in each sector can be found in **Appendix G**.

Sector 1: Built Environment

Sector Overview

The built environment sector covers activities that take place in buildings as well as activities that support building operations. We divide this sector into three categories: residential, commercial, and industrial.

1. Residential includes single-family homes, duplexes, multiplexes, apartment buildings, and condominiums.
2. Commercial covers most other building types, many of which are not businesses. These include government buildings, schools, hospitals, community centers, retail stores, shopping centers, offices, hotels, gyms, grocery stores, restaurants, and warehouses.
3. Industrial includes buildings and facilities used for manufacturing, assembly, refrigerated storage, warehousing, refining, bulk storage, maintenance, and power or heat generation and distribution.

#063

Posted by **Ryan Kellogg (PHSKC)** on **10/17/2025** at **9:36am** [Comment ID: 55] - Link
Agree: 0, Disagree: 0
Curious how the private sector should be referenced as a key player in achieving objectives.

#064

Posted by **Kyla Wilson** on **10/24/2025** at **4:17pm** [Comment ID: 129] - Link
Agree: 0, Disagree: 0
Consider using a different icon to represent environmental justice.

#065

Posted by **Ryan Kellogg (PHSKC)** on **10/17/2025** at **9:38am** [Comment ID: 56] - Link
Agree: 0, Disagree: 0
Suggest "hospitals and health care facilities", and putting that first as the largest built env sector source.

Major Greenhouse Gas Emitting Activities and Reduction Opportunities

Greenhouse gas emissions from this sector come from three primary types of activities:

1. Process heating, mostly for industry
2. Space heating and cooling
3. Residential water heating

Process heating primarily relies on natural gas combustion, or the combustion of other fossil fuels, mainly heavier oils, and some electricity.

Opportunities for greenhouse gas reduction in this sector generally come from reducing energy consumption, lowering the carbon intensity of heat sources, and upgrading to more energy-efficient, electric-powered appliances.

Existing Policies and Efforts to Reduce Greenhouse Gas Emissions

For industry, climate actions tend to vary more and are process-specific. In the short-term, industries can lower greenhouse gas emissions by switching from fossil fuels to renewable natural gas or bio-derived fuels. Long-term strategies may involve redesigning processes to electrify or use cleaner fuels, such as green hydrogen.

Many local jurisdictions implement programs and policies that reduce energy use and emissions in residential and commercial buildings. Major regional utilities (Puget Sound Energy, Seattle City Light, Tacoma Power and Snohomish Public Utility District) offer incentives for energy audits and appliance upgrades. Federal programs like the Low-Income Home Energy Assistance Program provide heating and weatherization assistance for low-income households. Local governments, including King County and the cities of Seattle, Tacoma, and Everett, also support related initiatives, including heat pump rebate programs for households converting from natural gas or oil. Likewise, Northwest Seaport Alliance and Port of Tacoma have set the goal of net-zero emissions from port-owned buildings and facilities by 2040.

At the state level, existing policies help shape future emissions reductions. The Clean Energy Transformation Act mandates that electricity provided to customers reaches net-zero emissions by 2030 and non-emitting by 2045. After 2030, electricity will not be contributing to greenhouse gas sources in the built environment sector, including industry.

The Climate Commitment Act sets a declining emissions cap for natural gas providers and those industries who use natural gas. While the current trajectory under the Climate Commitment Act likely falls short of meeting the state and regional 2030 and 2050 climate goals, it marks an important starting point.

It is unclear how natural gas providers will meet their greenhouse gas reduction targets. To get there, they would likely need a mix of renewable natural gas substitution, energy efficiency improvements, fuel switching, and offset purchases. However, without more information available or new policies, we cannot predict specific actions or whether they can achieve the required reductions.

Cost-Benefits and Co-Pollutant Considerations

Costs and co-benefits vary for the built environment sector. Generally, purchasing newer, more efficient appliances and weatherization improvements have an upfront cost, but typically pay for themselves through reduced energy consumption, resulting in a small or in some cases a negative net cost/benefit ratio. The costs to decarbonize industrial process emissions vary widely based on the process. Some industrial process improvements may be able to recover their costs with lifetime fuel cost savings but for some processes the capital costs are currently much higher.

066 Most residential projects offer several benefits: lifetime energy cost savings, better appliance performance, enhanced indoor comfort, and, in many cases, the added benefit of cooling from heat pumps during hot weather. Weatherization and affordable utilities have important public health benefits: decreased risk of mold and improved indoor air quality, fire and flooding; electricity for heating, cooling, cooking, and food safety; and pr[067]tion from increased extreme heat and cold events due to climate change. Switching from natural gas cooking stoves to electric can improve indoor air quality by reducing nitrogen oxides and fine particle pollution. Changing appliances that already vent to the outside does not result in a substantial change in indoor air quality[068] Residential projects are impactful for co-benefits because people spend the majority of their time in indoor environments.

Ambient air quality co-benefits from industrial greenhouse gas reductions vary widely based on location and process. Facilities that switch from fossil to low carbon fuels can reduce fine particle pollution, nitrogen oxides, and air toxics emissions.

Summary of Feedback Heard at Community Workshops

- Education and Outreach: Participants noted that educating the public about financial incentives, energy cost savings, and opportunities to reduce emissions at the neighborhood level was seen as essential to increasing participation in building decarbonization efforts. Participants recommended engaging with building owners and managers for multifamily homes and apartments to ensure improvements beyond single-family homes.
- Incentives: Participants recommended providing incentives for solar panel installations and battery storage systems to support residential and commercial clean energy use.
- [069]echnical Assistance: Participants recommended creating "one-stop-shops" for technical support on building weatherization and appliance upgrade programs. They also recommended support for training and workforce [070]development for building material reuse and recycling programs.
- Improved Standards: Participants recommended improving standards for construction and building materials to reduce the amount of repair and remodeling needed and ensure new buildings are more durable. They also recommended streamlined permitting processes, including pre-approved accessory dwelling unit (ADU) designs and modular "plop-on" homes.

#066

Posted by **Graham** on **10/14/2025** at **12:00pm** [Comment ID: 40] - Link
Agree: 0, Disagree: 0
When will the residential project applications be available to the public? I have read it is on a 1st come, 1st serve basis? It would be a massive relief to me and my family, and our health to decommission our ancient gas/oil furnace!

#067

Posted by **Ryan Kellogg (PHSKC)** on **10/17/2025** at **9:40am** [Comment ID: 57] - Link
Agree: 1, Disagree: 0
Be more declarative here? "will" rather than "can"

#068

Posted by **Graham 1** on **10/20/2025** at **6:45pm** [Comment ID: 74] - Link
Agree: 0, Disagree: 0
Except, on a windless day, the noxious fumes from our ancient gas oil furnace do not easily disperse. and are noticeable around our property. :(A heat pump will certainly combat that! :)

#069

Posted by **Graham 1** on **10/20/2025** at **7:07pm** [Comment ID: 75] - Link
Agree: 0, Disagree: 0
Agreed... After researching all the Washington State programs, HEAR, HOMES, HARP, Weatherization... (and no doubt, there are others?) I am finally coming to terms with all the terms... But, it is a confusing undertaking?! I certainly wish you, and your administrators and service personnel the best of luck with the upcoming processes and procedures!!! A one-stop shop would undoubtedly be welcomed by many... but, obviously a hard ask?! :)

#070

Posted by **Addison Houston** on **10/17/2025** at **10:12am** [Comment ID: 63] - Link
Agree: 0, Disagree: 0
Improving supply chain capacity for reuse of building materials should also be added here.

Built Environment Strategies and Actions

Strategy 1.1: Build Low-Carbon New Buildings 071

Strategy 1.1	Build Low-Carbon New Buildings
	Major Emitting Activities • Space and water heating • Other appliances
	Existing Policies and Effects • Washington State Energy Code (SM 5854) 072 • Building Emissions Performance Standards (e.g. Seattle)
	Actions a. Strengthen building codes b. Provide education and outreach for new commercial construction c. Provide education and outreach for new residential construction
Strategy Total	074 **Emission Reduction Potential (MTCO2e)*** 073 420,000 075
	$ per ton** 300
	Authority to Implement

Co-benefits	Other Considerations
	• Less combustion reduces air pollution • Less pollution can reduce health impacts • Efficiency standards can reduce ongoing and lifetime costs

* Quantification assumes vast majority of new housing units built in the four-county jurisdiction (165,000) between now and 2030 have fully non-greenhouse gas emitting space and water heating

** Considers only the capital cost assuming $15,000 marginal cost per house. Doesn't count reduced heating and cooling costs.

#071

Posted by **Stephanie Gowing** on **10/07/2025** at **10:58am** [Comment ID: 27] - Link
Agree: 0, Disagree: 0
..buy using low carbon materials ...opportunity here or elsewhere to add visual material lifecycle strategies and make it clear that the building sector is responsible for 40% global emissions (not sure what % is for PSCAA counties). Perhaps leverage the EPD map of manufactures in WA on Building Transparency page to help build attention to important need from our manufactures partners to market LCA benefits.

#072

Posted by **Stephanie Gowing** on **10/07/2025** at **10:51am** [Comment ID: 26] - Link
Agree: 0, Disagree: 0
buy clean buy fair (Embodied carbon)

#073

Posted by **Carrie Lee - King County Exec Climate Office** on **10/26/2025** at **5:15pm** [Comment ID: 136] - Link
Agree: 0, Disagree: 0
As formatted these tables continue to convey that if the strategy/actions listed above are taken than this is the emission reduction potential to be achieved. Perhaps if intent is to serve as a quantification tool to guide actions provide average per project data (e.g. for every 100 homes built with zero-emissions space/water heating = X reductions). This could then be general rules of thumb to quantify proposed investments.

#074

Posted by **Addison Houston** on **10/17/2025** at **10:15am** [Comment ID: 64] - Link
Agree: 0, Disagree: 0
Suggest adding these Emissions Reduction Potential metrics upfront in the summary tables ES-1 & ES-2 to clarify ranking of lists.

#075

Posted by **Stephanie 1** on **10/21/2025** at **10:53am** [Comment ID: 77] - Link
Agree: 0, Disagree: 0
Suggestion to add UTC's social costs of carbon here to reflect fanatical "savings" of reducing these impacts

Action Descriptions

076

- **Action 1.1a.** Strengthen building codes: Strengthen and revise commercial building codes to require/limit installed equipment, construction materials, or construction methods such that greenhouse gas emissions would be reduced overall. Examples include code revision that requires, for new construction, some amount of space or water heating supplied from non-greenhouse gas emitting devices, and employing electric appliance replacement requirements at end of life in existing buildings.
- **Actions 1.1b-c:** Provide education and outreach for new commercial and residential construction: Provide education and outreach for developers and builders of new construction, apart from code revisions. Examples include promoting ease of use, versatility, or cost savings for changing to lower emitting methods or equipment. Incentives for voluntary installation of high efficiency equipment that is above code could help pave the way for subsequent code cycles requirements. Embodied construction emissions (from producing the materials) are addressed in Strategy 1.6.

Creative Climate Action Art Contest Winner

"Seastack Glow" by Randy Bott Photography

Estimating Emissions

Reductions from this strategy are represented by the number of new housing units that have zero-emission space and water heating systems.

- The Emission Reduction Potential for 2030 assumes the vast majority of new housing units built in the four-county jurisdiction (165,000) between now and 2030 have fully non-greenhouse gas emitting space and water heating. The Strategy Total was calculated using:
  - The assumed number of houses built that are non-greenhouse gas emitting (for space and water heating), multiplied by the average energy use per housing unit.
- Emission Reduction Potential for 2050: Forthcoming.

#076

Posted by **Addison Houston** on **10/17/2025** at **10:16am** [Comment ID: 65] - Link

Agree: 0, Disagree: 0

how does this account for embodied carbon in building materials?

Strategy 1.2 Reduce Energy Use in Existing Buildings

Strategy 1.2 Reduce Energy Use In Existing Buildings

Major Emitting Activities

- Space and water heating
- Other appliances

Existing Policies and Effects

- Seattle Commercial Energy Codes
- Clean Buildings Act (HB 1257)
- Building Emissions Performance Standards (e.g. Seattle)

Actions

a. Weatherize existing buildings 077
b. Upgrade appliances
c. Upgrade lighting
d. Provide training, coaching, audits and advisors
e. Support utility demand response programs
f. Develop residential point-of-sale energy disclosures and performance standards
g. Develop Building Emissions Performance Standards

Strategy Total	Emission Reduction Potential (MTCO2e)*	$ per ton**	Authority to Implement
	580,000	<0	

Co-benefits

Other Considerations

- Can reduce pollution in overburdened communities
- Efficiency can produce net lifetime savings and lower costs for low-income households
- Improved indoor air quality resulting from upgrading natural gas appliances can reduce health impacts

***** Quantification assumes that 900,000 homes are weatherized, 1.0 million appliances are upgraded, and 5 million lightbulbs are changed out.

** Includes ongoing cost savings which typically exceed upfront costs (net negative).

#077

Posted by **Ryan Kellogg (PHSKC)** on **10/17/2025** at **9:46am** [Comment ID: 58] - Link

Agree: 0, Disagree: 0

What additional policy actions are needed? Also wondering if incentives and financing should be included.

> Reply by **Kyla Wilson** on **10/24/2025** at **4:29pm** [Comment ID: 130] - Link
>
> *Agree: 0, Disagree: 0*
>
> Could include renter rights policies and protections to ensure landlords are making building upgrades like heat pumps that also provide cooling. Financial tools could include loan loss reserve programs or other financing mechanisms that make it easier for middle income homeowners to make upgrades.

Action Descriptions

- **Action 1.2a.** Weatherize existing buildings: Implement weatherization and weatherization plus health programs, with measures including sealing leaks, replacing windows, upgrading wall, ceiling/attic, crawlspace insulation, or other minor upgrades to reduce heat loss.
- **Action 1.2b.** Upgrade appliances: Implement appliance electrification programs for residential and commercial buildings, particularly appliances using natural gas, heating oil, and propane, with energy-efficient electric equipment (induction cooktops, clothes washers and dryers, heat-pump space heating and cooling systems, heat pump water heaters).
- **Action 1.2c.** Upgrade lighting: Replace older light bulbs with long-life LED bulbs with equivalent light output.
- **Acton 1.2d.** Provide training, coaching, audits, and advisors: Develop public training sessions, "train the trainer" webinars, free energy audits for homes and businesses, web-based apps to assist in estimating costs and savings, and others.
- **Acton 1.2e.** Support utility demand response programs: Support utility demand response programs to lower residential and commercial energy use in existing buildings.
- **Action 1.2f.** Develop residential point-of-sale energy disclosures and performance standards: Develop information disclosures and performance standards at the time of sale for residential appliances to increase transparency around energy efficiency features and encourage the purchase of more efficient appliances.
- **Action 1.2g.** Develop building emissions performance standards: Develop building performance standards for commercial and multi-family buildings to reduce energy use and greenhouse gas emissions from building operations.

Estimating Emissions

Reductions from this strategy are represented by summing three elements: weatherization, appliance upgrades, and lighting upgrades.

- The Emission Reduction Potential for 2030 assumes that 900,000 homes are weatherized, 1 million appliances are upgraded, and assumes 5 million lightbulbs are changed out. The Strategy Total was calculated using:
  - Weatherization assumes 18% reduction in natural gas use per house.
  - Conversion to higher efficiency appliances is based on Energy Star prediction of annual savings per appliance for refrigerator, dishwasher, clothes dryer.
- Emission Reduction Potential for 2050: Forthcoming.

#078

Posted by **Graham** on **10/14/2025** at **12:08pm** [Comment ID: 41] - Link

Agree: 0, Disagree: 0

This is a major priority to my family! I hope to participate in this program at the earliest opportunity, from a health and wellbeing point of view for my family, and the climate! I hope the projects are broadcast loud and clear to the public?

#079

Posted by **Patrick Babbitt** on **10/24/2025** at **2:29pm** [Comment ID: 116] - Link

Agree: 0, Disagree: 0

Improving building controls might fit into 1.2 and can be no/low cost. More broadly, equipment commissioning (making sure systems are running as manufacturer intended) is also good O&M

Strategy 1.3 Electrify or Decarbonize Existing Buildings

Strategy 1.3 Electrify or Decarbonize Existing Buildings

Major Emitting Activities

- Space and water heating
- Other appliances

Existing Policies and Effects

- Seattle Commercial Energy Codes
- Clean Buildings Act (HB 1257)
- Building Emissions Performance Standards (e.g. Seattle)

Actions

a. Upgrade appliances
b. Support market development and promotion for electric appliances
c. Develop renewable electricity generation and storage systems
d. Support battery storage systems and technologies
e. Provide education, outreach, and ambassadors for appliances and coordination around natural gas options
f. Develop Building Emissions Performance Standards
g. Develop building decarbonization plans

Strategy Total	Emission Reduction Potential (MTCO2e)*	$ per ton**	Authority to Implement
	1,900,000	350	

Co-benefits

Other Considerations

- Can significantly lower costs for low-income households
- Less combustion reduces indoor and outdoor air pollution
- Efficiency can produce net lifetime savings

* Quantification assumes 800,000 residential dwelling units and 100,000 residential water heaters are converted to electric, along with the entire commercial water heater sector, which is estimated to be 43 million therms per year, scaled from national averages.

** Considers only the capital cost, assuming $20,000 marginal cost per housing unit. Doesn't include reduced heating and cooling costs.

Action Descriptions

080

- **Action 1.3a.** Upgrade appliances: Implement appliance electrification programs for residential and commercial buildings, particularly appliances using natural gas, heating oil, and propane, with energy-efficient electric equipment (induction cooktops, clothes washers and dryers, heat-pump space heating and cooling systems, heat pump water heaters).
- **Action 1.3b.** Support market development and promotion for electric appliances: Support market development strategies to increase desirability of electric appliances and reduce purchasing hesitancy in order to drive increased adoption.
- **Action 1.3c.** Develop renewable electricity generation and storage systems: Develop smaller scale (e.g. building solar) electricity generation and storage systems to reduce grid electricity need and make electrification cheaper.
- **Action 1.3d.** Support battery storage systems and technologies: Support emerging battery storage technologies to create a resilient grid including small modular reactors, bioenergy, and hydrogen.
- **Action 1.3e.** Provide education, outreach, and ambassadors for appliances and coordination around renewable natural gas options: Provide education and outreach programs to promote electric devices or renewable natural gas options such as subsidizing renewable natural gas injection or other future approaches for commercial and residential buildings.
- **Action 1.3f.** Develop building emissions performance standards: Develop building performance standards for commercial and multi-family buildings to reduce energy use and greenhouse gas emissions from building operations.
- **Action 1.3g.** Develop building decarbonization plans: Develop state- or municipal-owned building decarbonization plans and fund capital improvements and electrification upgrades to meet plan outcomes.

Estimating Emissions

Reductions from this strategy are represented by summing two elements: replacement of residential natural gas space and water heating with electric heating, and replacement of commercial natural gas water heating with electric heating.

- The Emission Reduction Potential for 2030 assumes 800,000 residential dwelling units and 100,000 residential water heaters are converted to electric, along with the entire commercial water heater sector, which is estimated to be 43 million therms per year, scaled from natural averages. The Strategy Total was calculated using:
  - Replacement of existing natural gas space heating and water heating with electric powered heating for residential buildings, which assumes 365 and 175 therms (of natural gas/dwelling unit/year), respectively.
  - No basis or subunit (e.g. per person, per building, per square foot) has been identified to scale this action for scenario exploration for commercial buildings, so it is assumed to be 0.
- Emission Reduction Potential for 2050: Forthcoming.

#080

Posted by **Patrick Babbitt** on **10/24/2025** at **2:30pm** [Comment ID: 117] - Link

Agree: 0, Disagree: 0

Weatherization, lighting, controls, and commissioning can be valuable for existing buildings as well

Strategy 1.4 Increase Solar Adoption

Strategy 1.4 Increase Solar Adoption

Major Emitting Activities

- Electricity generation, especially during peak demand

Existing Policies and Effects

- WA Clean Energy Transformation Act (SB 5116)
- WA Climate Commitment Act (SB 5126)

Actions

a. Promote solar for government buildings, public schools, covered surface parking, etc.
b. Promote solar for brownfields
c. Promote solar for affordable housing buildings
d. Promote solar for warehouses or commercial buildings
e. Reduce net metering barriers

Strategy Total	Emission Reduction Potential (MTCO2e)*	$ per ton**	Authority to Implement
	24,000	<60	

Co-benefits

Other Considerations

- Solar with storage increases resilience and supports the grid
- Can improve ecological health of brownfields
- Creates demand for solar installation and maintenance jobs
- Can reduce electricity costs

* Quantification of emissions assumes 5,000 kW of new installed solar. Because of the Clean Energy Transition Act (CETA), it is unclear if this value is above-and-beyond existing regulations or is simply fulfilling it.

** Only the upfront costs. Ongoing cost savings could exceed upfront costs (net negative).

Action Descriptions

- **Action 1.4a.** Promote solar for government buildings, public schools, covered surface parking, etc.: Target government buildings, public schools and unused open or public spaces for installation of solar and energy storage systems to increase renewable power supply and reduce reliance on electricity from fossil fuels.
- **Action 1.4b.** Promote solar for brownfields: Target brownfields (former/current contaminated sites) for installation of solar and energy storage systems to increase renewable power supply and reduce reliance on electricity from fossil fuels.
- **Action 1.4c.** Promote solar for affordable housing buildings: Target affordable housing buildings for solar projects to increase renewable power supply and reduce reliance on electricity from fossil fuels.
- **Action 1.4d.** Promote solar for warehouses or commercial buildings: Target warehouses or commercial buildings with roof area greater than a given threshold for solar projects to increase renewable power supply and reduce reliance on electricity from fossil fuels.
- **Action 1.4e.** Reduce net metering barriers: Reduce or eliminate state barriers for access to net metering by electricity customers, leveraging net metering benefits to encourage the adoption of renewable solar power.

Estimating Emissions

Reductions from this strategy are represented by estimating the amount (kW) of new solar installed.

- The Emission Reduction Potential for 2030 assumes 5,000 kW of new installed solar. Because of the Clean Energy Transition Act, it is unclear if this value is above-and-beyond existing regulations or is simply fulfilling it. The Strategy Total was calculated using:
  - Assumed nominal kW of the new solar installed and scaling it by an annual kWh production factor from NREL (see Appendix B for details).
  - The kWh produced is converted to grams of carbon dioxide equivalent emitted based on the current emission factors of electricity delivered to the plug in Washington (Ecology GREET model).
- Emission Reduction Potential for 2050: Forthcoming.

Strategy 1.5 Reduce Industrial Emissions

Strategy 1.5 Reduce Industrial Emissions

Major Emitting Activities

- Process heating

Existing Policies and Effects

- WA Climate Commitment Act (SB 5126)
- Northwest Ports Clean Air Strategy and associated 5-Year Clean Air Implementation Plan

Actions

a. Support low-emission technology upgrades
b. Establish greenhouse gas auditors/consultants
c. Create low-emission ratings/awards for businesses
d. Require governments to use low-carbon businesses
e. Provide education, outreach, and ambassadors for appliances and coordination around renewable natural gas options

Strategy Total	Emission Reduction Potential (MTCO2e)*	$ per ton	Authority to Implement
	530,000	~50**	

Co-benefits	Other Considerations
	• Less air pollution • Lower pollution can reduce health impacts • Can lower pollution in overburdened communities

*Quantification of emissions assumes 10 million MMBtu (10 trillion Btu) of natural gas are converted to non-emitting power.

**For lower temperature processes, which are close to net payback at current conditions due to fuel savings. Cost per ton could be substantially higher for some industrial processes.

Action Descriptions

- **Action 1.5a.** Support low-emission technology upgrades: Support low-emission technology upgrades for industrial sources to accelerate transitions and drive emission reductions.
- **Action 1.5b.** Establish greenhouse gas auditors/consultants: Establish greenhouse gas auditors and consultants who work with industrial sources to develop strategies for reducing emissions, costs, and co-pollutants.
- **Action 1.5c.** Create low-emission ratings/awards for businesses: Create or adopt a greenhouse gas rating award to identify low-emitting businesses and increase their appeal to environmentally conscious consumers.
- **Action 1.5d.** Require governments to use low-carbon businesses: Require government purchasing and contracting to seek out businesses and suppliers with the best emission profiles, or better than a threshold, to reduce supply chain emissions.
- **Action 1.5e.** Provide education, outreach, and ambassadors for appliances and coordination around renewable natural gas options: Provide education and outreach programs to promote electric devices or renewable natural gas options such as subsidizing renewable natural gas injection or other future approaches for industrial buildings and processes.

Estimating Emissions

Reductions from this strategy are represented by estimating the amount (MMBtu) of natural gas converted to non-emitting power.

- The Emission Reduction Potential for 2030 assumes 10 million MMBtu (10 trillion Btu) are converted to non-emitting power. This strategy assumes that most industrial greenhouse gas emissions are due to the combustion of natural gas or other fossil fuels for process heating. These fuels are replaced with electricity or other zero (or near-zero) emissions energy sources. The Strategy Total was calculated using:
  - Assumed total MMBtu of energy from fossil fuels (natural gas or other liquid fuels) and multiplying the appropriate greenhouse gas emissions factor per MMBtu. See Appendix C for more details.
- Emission Reduction Potential for 2050: Forthcoming.

#081

Posted by **Ryan Kellogg (PHSKC)** on **10/17/2025** at **9:53am** [Comment ID: 59] - Link

Agree: 1, Disagree: 0

Develop model purchasing policies? Should this also be encouraged in the private sector, or could gov's also require or prioritize private sector contracts with companies that have low carbon policies?

Strategy 1.6 Reduce Embodied Carbon From Building Materials

Strategy 1.6 Reduce Embodied Carbon From Building Materials

Major Emitting Activities

- Steel production fro[illegible]re
- Concrete production
- Manufacturing other materials (gypsum, brick, etc.)

Existing Policies and Effects

- None available

Actions

a. Develop building codes
b. De[illegible]p environmental product declarations

Strategy Total	Emission Reduction Potential (MTCO2e)*	$ per ton	Authority to Implement
	60,000	170**	

Co-benefits

Other Considerations

- Can reduce pollution in communities near producers

*Quantification assumes that 30,000 tons of low-carbon steel and 30,000 tons of low-carbon concrete are used annually in 2030.

** Based in industry estimates of carbon capture with existing processes.

Actions Descriptions:

- **Action 1.6a.** Develop building codes: Develop building codes that would require or promote obtaining materials from low-emissions producers, primarily steel and concrete.
- **Action 1.6b.** Develop environmental product declarations: Develop environmental product declarations that include greenhouse gas emissions from material production to inform purchasing decisions with a focus on low-emission materials.

#082

Posted by **Ryan Kellogg (PHSKC)** on **10/17/2025** at **9:54am** [Comment ID: 60] - Link
Agree: 0, Disagree: 0
Suggest including healthcare and hospitals as a major emitter

#083

Posted by **Stephanie 1** on **10/21/2025** at **10:55am** [Comment ID: 78] - Link
Agree: 0, Disagree: 0
Buy clean buy fair-Commerce

#084

Posted by **Stephanie 1** on **10/21/2025** at **10:56am** [Comment ID: 79] - Link
Agree: 0, Disagree: 0
Support material transparency (i.e. EPDs) to support market comparisons (leverage Building Transparency's EPD map)

Estimating Emissions

Reductions from this strategy are represented by estimating the amount of steel and concrete that is replaced by (or sourced from) low-carbon sources (i.e., uses carbon capture or a low-carbon energy source).

- The Emission Reduction Potential for 2030 assumes that 30,000 tons of low-carbon steel and 30,000 tons of low-carbon concrete are used annually in 2030. The Strategy Total was calculated using:
  - Tons of steel replaced, scaled by the difference in emission factors (per ton) for conventional steel vs low-carbon steel.
  - Tons of conventional concrete replaced with concrete that is produced with a full carbon capture method. Emissions are the median emission factor for concrete scaled by the amount of concrete.
  - Note: Since this strategy was not part of our previous inventory as it is Scope 3, we don't have a clear framework to scale the size of the activity.
- Emission Reduction Potential for 2050: Forthcoming.

Strategy 1.7 Cross-Cutting Built Environment Actions

Strategy 1.7 **Cross-Cutting Built Environment Actions**

Actions

a. Develop financing programs for decarbonization 085
b. Streamline permitting for construction of electric generation, transmission and storage projects
c. Develop air quality standards for appliances

Strategy Total	Emission Reduction Potential (MTCO2e)*	$ per ton	Authority to Implement
	unknown	unknown	

***** The actions in this strategy help to support or enable other strategies in the built environment sector. We are not able to quantify emission reductions from this strategy.

Action Descriptions

- **Action 1.7a.** Develop financing programs for decarbonization: Develop or support financing mechanisms (e.g. C-PACER) that would make it easier for builders or building owners to finance emission reduction projects.
- **Action 1.7b.** Streamline permitting for construction of electricity generation, transmission and storage projects: Implement new policies to reduce permitting delays for the construction of clean energy generation and transmission capacity, long-duration battery storage and other emission reduction projects.
- **Action 1.7c.** Develop air quality standards for appliances: Develop health, safety, and air quality standards for appliances including space and water heating, kitchen appliances, and cooking appliances to reduce public health risk and incentivize non-natural gas devices or increased efficiency.

#085

Posted by **Ryan Kellogg (PHSKC)** on **10/17/2025** at **9:57am** [Comment ID: 61] - Link

Agree: 0, Disagree: 0

(for all "cross-cutting" areas) Consider building out more and include some transformative ideas. What new or expanded organizational structures/collaborations are needed to support implementation, community engagement, progress reporting and evaluation, etc.

Estimating Emissions

The actions in this strategy help to support or enable other strategies in the built environment sector. We are not able to quantify emission reductions from this strategy.

Sector 2: Transportation

Sector Overview

The transportation sector covers activities involved in the service of moving people or goods, as well as developing the associated infrastructure needed to do so. We divide this sector into two categories: on-road sources and off-road/non-road sources of emissions.

- On-road sources consist primarily of passenger vehicles and small trucks, medium-duty vehicles and heavy-duty freight trucks, along with a smaller number of buses, motorcycles, and other miscellaneous vehicles.
- Off-road and non-road sources cover mobile equipment, aviation, and marine transport. 086
  - Mobile equipment includes construction machinery, farm vehicles, logging equipment, lawn and garden equipment, portable generators, and movable industrial machines such as forklifts and saws.
  - Aviation is dominated by commercial passenger flights from Sea-Tac Airport, but also includes general aviation, private aircraft, and smaller volumes of commercial passenger traffic from Seattle Paine Field International Airport in Everett, and King County International Airport in south Seattle and Tukwila.
  - Marine sources include passenger ferries and cruise ships, cargo ships, tugs, harbor vessels, and the cargo-handling equipment used at port berths.

Major Greenhouse Gas Emitting Activities and Reduction Opportunities

The transportation sector produces greenhouse gas emissions primarily through the combustion of petroleum-based fuels.

- On road sources:
  - On-road vehicles, such as passenger cars and small trucks, medium-duty vehicles and heavy-duty freight trucks, generate almost all their greenhouse gas emissions by burning gasoline and diesel. A small number of vehicles use natural gas, with an even smaller subset that use landfill gas.
- Off road/non road sources:
  - Mobile equipment–including construction machinery, farm and logging vehicles, lawn and garden tools, portable generators, and industrial machines like forklifts and saws–relies mainly on diesel and heavier petroleum fuels. Gasoline use is more common in lawn and garden tools, while natural gas and propane use remains minimal.
  - Aviation emissions come almost entirely from petroleum-derived jet fuel, with general aviation (using aviation gasoline or "avgas") contributing a smaller share.
  - Marine sources–passenger and cargo ships, tugs, harbor vessels, and cargo-handling equipment at ports–also rely heavily on fossil fuels.

Opportunities for greenhouse gas reductions in this sector generally come from replacing or upgrading on- and off-road vehicles and equipment to electric or renewable fuels (to reduce or eliminate fossil fuel use), replacing petroleum-based fuels with low-carbon alternatives, and mode shift towards low-carbon transportation alternatives.

#086

Posted by **Ryan Kellogg (PHSKC)** on **10/17/2025** at **9:58am** [Comment ID: 62] - Link

Agree: 0, Disagree: 0

Should heavy rail be included here.?

Existing Policies and Efforts to Reduce Greenhouse Gas Emissions

Several policies already target greenhouse gas reductions in the transportation sector:

- For on-road vehicles, federal Corporate Average Fuel Economy (CAFE) standards continue to improve fuel efficiency in light-duty and heavy-duty vehicles. These improvements will persist as fleets turn over. Washington State has adopted California's more stringent vehicle emission standards and Zero-Emission Vehicle mandate. The Zero-Emission Vehicle mandate requires an increasing fraction of new vehicles sold in the state each year to be zero-emission vehicles, reaching 100% by 2035. The state also adopted (and recently strengthened) a low-carbon fuel standard that requires fuel suppliers to lower the carbon intensity of fuels over time.
- At the state level, the Clean Fuel Standard program reduces greenhouse gas emissions pollution from transportation by reducing emissions from the production and supply of transportation fuels.
- At the regional level, the Regional Transportation Plan and VISION 2050 outline actions to support sustainable growth while reducing greenhouse gas emissions. Key strategies include:
  - Expanding transit infrastructure (light rail, commuter rail, passenger only ferry, bus rapid transit and local bus systems) and safe infrastructure for biking and walking.
  - Aligning land use and growth patterns to encourage transit use and active transportation to reduce vehicle miles traveled.
  - Investing in charging infrastructure to accelerate the transition to electric vehicles.
- For off-road, marine, and aviation sectors, few existing regulations match the scope of federal and state on-road standards. However, international bodies have set non-binding greenhouse gas reduction targets: the International Maritime Organization for marine, and the International Civil Aviation Organization for aviation. While not enforceable, these targets guide national-level action. Federal New Source Performance Standards also help limit off-road emissions.
- The Northwest Ports Clean Air Strategy has a goal of phasing out all emissions from seaport activities by 2050 or sooner. Through the five-year Clean Air Implementation Plans they are working systematically, in partnership with a wide array of partners and stakeholders, to advance that goal. Port activities include transiting and docked ships, cargo handling equipment, and local freight haulers.
- The Sustainable Advanced Fuels program is an outgrowth of Sustainable Aviation Fuels Northwest (SAFN), a process created by The Boeing Company, Alaska Airlines, Portland International Airport, Seattle-Tacoma International Airport, Spokane International Airport, Washington State University, and Climate Solutions to develop sustainable and economically viable aviation biofuels in the Northwest. The SAFN initiative consisted of biofuel producers, non-profit advocacy organizations, research institutions, government agencies, agricultural producers and other entities representing the biofuel supply chain, and ultimately resulted in the Sustainable Aviation Fuels Northwest (SAFN): Powering the Next Generation of Flight report (published on May 25, 2011).
- The Growth Management Act Climate Change and Resiliency Element (HB 1181) requires the inclusion of greenhouse gas emission reduction and climate resilience sub-elements in the comprehensive plans for large local governments. A key change to the transportation element is the requirement to incorporate active transportation facilities and multimodal levels of service, consistent with environmental goals.

- New state transit-oriented development policy (HB 1491) sets minimum standards for increased density within high-frequency transit station areas and adds affordability requirements for new residential buildings in those areas. The deadline for cities in King, Kitsap, Pierce, and Snohomish counties to comply with these requirements is December 31, 2029, in line with the next comprehensive plan update.

Cost-Benefits and Co-Pollutant Considerations

Costs and co-benefits vary across subsectors and actions in the transportation sector:

- On-road vehicle electrification eliminates harmful tailpipe emissions, including particulate matter, diesel exhaust, and other criteria pollutants and air toxics, while also cutting fuel and maintenance costs by roughly 50%. Moving to renewable hydrogen or other low or no-carbon fuels can also provide a similar benefit.
- Transit investments reduce vehicle emissions, improve mobility, lower transportation costs, and expand access to housing–especially benefiting low-income households.
- Land-use and growth strategies support mass transit, lower transportation costs, and increase housing options while reducing vehicle-related emissions.
- Living with more density and access to transit can increase public health (e.g., through reduced chronic disease from increased physically activity) and increase economic benefits for historically marginalized communities.
- Off-road and non-road equipment electrification and other alternative fuel opportunities are emerging, particularly for construction machinery. However, these transitions offer slower turnover and smaller cost savings compared to on-road electric vehicles. Electrification still reduces diesel particulate matter, volatile organic compounds, and other air pollutants.
- Fuel substitution for non-road diesel equipment, especially with biodiesel and renewable diesel, offers immediate greenhouse gas reduction benefits. These fuels, produced in Washington, Oregon, and California, can cut greenhouse gas emissions by 40–60%. Biodiesels can reduce harmful diesel particulate matter emissions by up to 50%, depending on the blend (% biodiesel and renewable diesel) and the engine's pollution control technology. The air pollution co-benefits of renewable diesel can be substantially less than biodiesel and vary according to feedstock and processing.
- Aviation has fewer near-term reduction options. The primary strategy involves scaling up sustainable aviation fuel, which emits less greenhouse gas than conventional jet fuel. Sustainable aviation fuel remains more expensive, and researchers are still evaluating whether it significantly reduces other pollutants like particulate matter and air toxics. Early results suggest some improvement in fine particulate emissions.

Summary of Feedback Heard at Community Workshops

- **Education and Outreach**: Participants noted that educating the public about the long-term cost savings and co-benefits associated with electric vehicles is a key strategy to increasing their adoption. They also recommended ongoing outreach to expand electric vehicle carshare programs across the region.
- **Transit Accessibility**: Participants expressed support for making transit more convenient, accessible, and reliable to increase overall transit use and reduce emissions. Increasing public transit usage could be supported by providing school-issued transit passes, subsidizing fares or providing free ORCA cards, expanding service hours, offering transit for large events, and improving the overall convenience and accessibility of transit options.
- **Commuting**: Participants presented ideas for addressing and reducing emission associated with commuting including partnering with major regional employers and unions to encourage/allow remote work, subsidizing or incentivizing transit, and promoting shared transportation options like carpooling, vanpooling, and car sharing.

- **Active Transportation:** Participants recommended expanding the region's active transportation network and suggested that upgrades to the network should prioritize crash or accident "hot spots." They suggested piloting one-way and complete streets programs to prioritize multimodal transportation and safety.
- **Funding:** Participants suggested that the State address overall funding deficits for transportation while also increasing funding for medium- and heavy-duty electric vehicles that travel through neighborhoods, like garbage trucks and school buses.

Strategy 2.1 Reduce Vehicle Miles Traveled of On-Road Passenger Internal Combustion Engine Vehicles

Strategy 2.1	Reduce Vehicle Miles Traveled of On-Road Passenger Internal Combustion Engine Vehicles
	Major Emitting Activities • Gas- and diesel-powered passenger vehicles/light trucks
	Existing Policies and Effects • VISION 2050 and Regional Transportation Plan • WA Commute Trip Reduction Program (468-63 WAC) • Growth Management Act Climate Change and Resiliency Element (HB 1181) • Transportation Oriented Development (HB 1491)
	Actions a. Implement transit-oriented, compact growth and development b. Develop vehicle use/congestion pricing programs c. Expand biking/walking networks and prioritize transit access d. Reduce single occupant driving and increase public transit service and ridership e. Provide education and outreach to encourage mode-shift and car trip reduction f. Review parking minimums
Strategy Total	**Emission Reduction Potential (MTCO2e)*** 320,000 | **$ per ton**** unknown | **Authority to Implement**
Co-benefits	**Other Considerations**
	• Reduces air pollution near major roadways • Reduces health impacts near major roadways • Improves transportation options and access to services

* Quantification assumes vehicle miles traveled each year were reduced by 1.1 billion miles, which is about 4% of the annual total.
** Due to the range and complexity of items in this strategy, it is not possible to calculate a representative $/ton.

Action Descriptions

- **Action 2.1a.** Implement transit-oriented, compact growth and development: Implement transit-oriented, compact growth and development consistent with adopted growth targets.
- **Action 2.1b.** Develop vehicle use/congestion pricing programs: Develop and implement vehicle use and/or congestion pricing programs to encourage use of alternative transportation options.
- **Action 2.1c.** Expand biking/walking networks and prioritize transit access: Expand biking and walking networks with prioritization for access to transit and advocate for every city to adopt a complete streets policy.
- **Action 2.1d.** Reduce single occupant driving and increase public transit service and ridership: Continue ongoing work to reduce single occupant driving and increase public transit service and ridership by extending and completing the high-capacity transit network, expanding transit services in supportive density areas, and expanding transportation demand management and promotion.
- **Action 2.1e.** Provide education and outreach to encourage mode-shift and car trip reduction: Provide education and outreach programs to encourage mode shift and car trip reduction including information on employer-paid commuter benefit programs and other congestion management strategies.
- **Action 2.1f.** Review parking minimums: Reduce or eliminate requirements for minimum number of parking spaces for buildings and properties to discourage driving passenger vehicles.

Estimating Emissions 087

Reductions from this strategy are represented by estimating the total annual vehicle miles traveled reduced in the region due to expansion of transit, transit-oriented development, and enabling of transit usage through increased bike and pedestrian paths, trails, or lanes.

- The Emission Reduction Potential for 2030 assumes 1.1 billion vehicle miles traveled were reduced each year, which is about 4% of the annual total. The Strategy Total was calculated using the following:
  - For the scenario exploration tool (Excel worksheet), the total annual vehicle miles traveled reduced due to expansion of transit and development is an input that is assumed and isn't calculated or estimated from some other action.
  - The vehicle miles traveled reduction due to expansion of bike and pedestrian paths is calculated from the total miles of paths, multiplied by a usage factor that has been estimated by PSRC, to obtain the vehicle miles traveled reduced.
  - The vehicle miles traveled reduction is multiplied by the average greenhouse gas emission per mile (for passenger vehicles) in the Puget Sound.
- Emission Reduction Potential for 2050: Forthcoming.

#087

Posted by **Carrie Lee - King County Exec Climate Office** on **10/26/2025** at **5:19pm**
[Comment ID: 137] - Link
Agree: 0, Disagree: 0
Clarify how the emission reductions and actions compare, relate to, or are above and beyond Vision 2050

Strategy 2.2 Increase Sales and Use of On-Road Passenger Electric Vehicles and Promote Low-Carbon Fuel Alternatives

Strategy 2.2 Increase Sales and Use of On-Road Passenger Electric Vehicles and Promote Low-Carbon Fuel Alternatives

Major Emitting Activities

- Gas- and diesel-powered passenger vehicles/light trucks

Existing Policies and Effects

- WA Zero Emission Vehicle Standards (SB 5974)
- WA Clean Fuel Standard (HB 1091)
- VISION 2050 and Regional Transportation Plan

Actions

a. Build out charging infrastructure
b. Develop a regional charging infrastructure plan
c. Revise building codes to support charging infrastructure
d. Electrify government fleets and promote the use of low-carbon fuels
e. Provide outreach ambassadors for electric vehicles
f. Support electric vehicle car sharing programs
g. Support the electrification of high-emitting vehicles
h. Provide electric vehicle purchase incentives
i. Support Zero-Emission Vehicle standards

Strategy Total	Emission Reduction Potential (MTCO2e)*	$ per ton**	Authority to Implement
	460,000	84	

Co-benefits	Other Considerations
	• Reduces air pollution near major roadways • Reduces health impacts near major roadways • Can make transportation and electric vehicles more affordable • Creates demand for electric vehicle-related installation and maintenance jobs

* Quantification assumes that the electric vehicle adoption rate occurs one year ahead of the current projected ramp. This is about 137,000 additional electric vehicles on the road (~780,000 total), above and beyond the state Zero-Emission Vehicle mandate.

** Assumes $3,000 per vehicle (in an unspecified method such as an incentive, credit, etc.) is required, but doesn't include reduced lifetime cost of ownership, which could result in an overall net savings and $/ton < 0.

Action Descriptions

- **Action 2.2a.** Build out charging infrastructure: Develop programs and streamline permitting and siting processes to support increased availability of public and private charging infrastructure.
- **Action 2.2b.** Develop a regional charging infrastructure plan: Develop a region-wide electric vehicle charging infrastructure plan to provide local governments with clear steps for charging infrastructure deployment to meet the region's electrification targets and provide a roadmap for regionally-aligned infrastructure development.
- **Action 2.2c.** Revise building codes to support charging infrastructure: Revise building codes to facilitate an increase in available public and private charging infrastructure.
- **Action 2.2d.** Electrify government fleets and promote the use of low-carbon fuels: Develop requirements to transition government fleets to electric vehicles or low-carbon fuels as soon as is practicable. This could include prohibiting the purchase of new light-duty internal combustion engine vehicles without waiver approval and using alternative fuels when zero-emission vehicles are unavailable. This may require expanding the purchase of low-carbon fuels such as renewable diesel.
- **Action 2.2e.** Provide outreach ambassadors for electric vehicles: Provide outreach ambassadors to the public and car dealerships to help promote electric vehicles.
- **Action 2.2f.** Support electric vehicle car sharing programs: Support the development or expansion of electric vehicle car sharing programs.
- **Action 2.2g.** Support the electrification of high-emitting vehicles: Develop programs that support and prioritize electrification of high-emitting vehicles.
- **Action 2.2h.** Provide electric vehicle purchase incentives: Advocate for increased state and federal incentives for electric vehicle purchases, preferably at the point of purchase and with a focus on benefits to lower-income individuals.
- **Action 2.2i.** Support Zero-Emission Vehicle standards: Support, protect, and advance the state's Zero-Emission Vehicle standards.

Estimating Emissions

Reductions from this strategy are represented by estimating electric vehicle adoption rates in the region.

- The Emission Reduction Potential for 2030 assumes the electric vehicle adoption rate occurs one year ahead of the current projected ramp. This is about 137,000 additional electric vehicles on the road (~780,000 total), above and beyond the state Zero-Emission Vehicle mandate. The Strategy Total was calculated using:
  - The total number of electric vehicles sold before (and on the road in) 2030, which are presumed to occur in place of a conventional gasoline vehicle sale.
  - The number of electric vehicles is multiplied by the number of annual miles per vehicle in the Puget Sound, and the greenhouse gas emissions per mile from PSRC recommendations.
- Emission Reduction Potential for 2050: Forthcoming.

#088

Posted by **Carrie Lee - King County Exec Climate Office** on **10/26/2025** at **5:21pm**
[Comment ID: 138] - Link
Agree: 0, Disagree: 0
One-year ahead of the ZEV adoption rates?

Strategy 2.3 Electrify or Reduce the Carbon Intensity of On-Road Medium- and Heavy-Duty Freight and Service Vehicles

Strategy 2.3	Electrify or Reduce the Carbon Intensity of On-Road Medium- and Heavy-Duty Freight and Service Vehicles

Major Emitting Activities

- Diesel-powered freight and service trucks

Existing Policies and Effects

- WA Zero Emission Vehicle Standards (SB 5974)
- WA Clean Fuel Standard (HB 1091)
- VISION 2050 and Regional Transportation Plan

Actions

a. Support the electrification of medium-duty and heavy-duty vehicle fleets and installation of charging infrastructure
b. Provide education and outreach to encourage privately-owned medium- and heavy-duty fleets to electrify
c. Support Advance Clean Fleet Rules
d. Support Washington's Alternative Fuel corridors and medium- and heavy-duty charging network
e. Require low-carbon alternatives for government medium- and heavy-duty fleets

Strategy Total	Emission Reduction Potential (MTCO2e)*	$ per ton	Authority to Implement
	590,000	120**	

Co-benefits	Other Considerations

- Reduces air pollution near major roadways
- Reduces health impacts near major roadways
- Can make transportation and shipping/service cheaper
- Reduces pollution in overburdened communities

* Quantification assumes 15,000 heavy-duty electric vehicles are on the road and 15 million gallons of lower-carbon fuels are used by 2030.

** Is an average of electric vehicles and biofuels. For electric medium- and heavy-duty vehicles, this assumes $40,000 marginal cost per vehicle upfront, but doesn't count net fuel cost savings over life of the vehicle. For biofuels assumes a marginal cost of $0.50 per gallon.

Action Descriptions

- **Action 2.3a.** Support the electrification of medium- and heavy-duty vehicle fleets and installation of charging infrastructure: Provide education and incentive programs to support electrification of medium- and heavy-duty vehicle fleets and installation of charging infrastructure, with a focus on government, schools, and large medium- and heavy-duty fleet operators.
- **Action 2.3b.** Provide education and outreach to encourage privately-owned medium- and heavy-duty fleets to electrify: Develop education and outreach programs to encourage private fleets to convert to electric vehicles.
- **Action 2.3c.** Support Advance Clean Fleet Rules: Support and advocate for adoption of Advanced Clean Fleets rules to require fleet owners to purchase near- and zero-emission medium- and heavy-duty vehicles as existing vehicles are replaced.
- **Action 2.3d.** Support Washington's Alternative Fuel Corridors and medium-duty and heavy-duty charging network: Support the installation of medium-duty and heavy-duty chargers through the West Coast Collaborative and Washington's Alternative Fuel Corridors to make it possible for electric and alternative fuel vehicles to transit through the region.
- **Action 2.3e.** Require low-carbon alternatives for government fleets: Require government-owned medium- and heavy-duty fleets to use the maximum amount of low-carbon fuels possible (e.g., renewable diesel and biodiesel) until the vehicles can be electrified.

Estimating Emissions

Reductions from this strategy are represented by estimating two major elements: adoption of heavy-duty electric vehicles and use of low-carbon fuels.

- The Emission Reduction Potential for 2030 assumes 15,000 heavy-duty electric vehicles are on the road and 15 million gallons of lower-carbon fuels are used. The Strategy Total was calculated using:
  - The assumed number of heavy-duty electric vehicles on the road in 2030, which are presumed to take the place of diesel heavy-duty vehicles.
  - The number of heavy-duty vehicles is multiplied by the assumed miles per work day (100), the days per week (5), and the weeks per year (50).This vehicle miles traveled per year is then multiplied by the average/typical greenhouse gas emissions per mile for electric heavy-duty vehicles.
  - Reductions from the use of low-carbon fuels are calculated first by estimating the number of gallons of conventional diesel substituted with low-carbon fuels. This is multiplied by the difference in the average carbon intensity of the conventional vs low-carbon fuel.
- Estimating Emissions Potential for 2050: Forthcoming.

Strategy 2.4 Electrify or Reduce the Carbon Intensity of Heavy-Duty Transit Vehicles and Ferries

Strategy 2.4	Electrify or Reduce the Carbon Intensity of Heavy-Duty Transit Vehicles and Ferries

Major Emitting Activities

- Diesel powered buses and ferries

Existing Policies and Effects

- WA Zero Emission Vehicle Standards (SB 5974)
- WA Clean Fuel Standard (HB 1091)
- VISION 2050 and Regional Transportation Plan

Actions

a. Pursue bulk/collective vehicle purchasing
b. Pilot alternative vehicles or fuels
c. Prepare for, and leverage, funding for low- and zero emission vehicles and fueling infrastructure
d. Deploy zero-emissions ferries and ferry terminal infrastructure

Strategy Total	Emission Reduction Potential (MTCO2e)*	$ per ton	Authority to Implement
	120,000	<0**-1200***	

Co-benefits	Other Considerations
	• Can lower pollution for communities near transit • Electrification can produce net lifetime savings

* Quantification assumes an additional 500 buses have been electrified, 3 million gallons of low-carbon diesel fuel have been used, and five ferries have been electrified by 2030.

** For ferries, including the reduced cost of ownership from fuel and maintenance over the lifetime.

*** For buses and the hardest to electrify heavy-duty vehicles.

Action Descriptions:

- **Action 2.4a.** Pursue bulk/collective vehicle purchasing: Coordinate to pursue bulk/collective purchases of vehicles to reduce costs and work with manufacturers to understand and plan for delays in vehicle availability resulting from supply chain or manufacturing disruptions.
- **Action 2.4b.** Pilot alternative vehicles or fuels: Pilot or test alternative vehicles and fuels for heavy-duty transit vehicles to advance technology development and adoption.
- **Action 2.4c.** Prepare for, and leverage, funding for low- and zero-emission vehicles and fueling infrastructure: Help transit agencies leverage and stack multiple funding sources including federal and state grants to purchase low- and zero-emission vehicles and fueling infrastructure.
- **Action 2.4d.** Deploy zero-emissions ferries and ferry terminal infrastructure: Support electrification of the ferries and terminals as quickly and efficiently as possible.

Estimating Emissions

Reductions from this strategy are represented by estimating three major elements: electrifying buses, substituting low-carbon fuels, and converting ferries to electric.

- The Emission Reduction Potential for 2030 assumes an additional 500 buses have been electrified, 3 million gallons of low-carbon diesel fuel has been used, and five ferries were electrified. The Strategy Total was calculated using:
  - The number of buses assumed to be replaced by electric vehicles, multiplied by the assumed daily or annual miles per bus (150/day, 5 days/week, 50 weeks/year), multiplied by the average greenhouse gas emissions per mile for heavy-duty vehicles.
  - The number of gallons of conventional diesel substituted with low-carbon fuels, multiplied by the difference in the average carbon intensity of the conventional vs low-carbon fuel.
  - The number of ferries assumed to be converted to electric. The average fuel consumption for a ferry is taken as the fleet average. The baseline carbon intensity of the diesel that is being displaced is assumed to be a 50:50 blend of petroleum diesel and renewable diesel. The emission reduction is the average fuel consumption multiplied by the blended carbon intensity.
- Emission Reduction Potential for 2050: Forthcoming.

Strategy 2.5 Electrify or Reduce the Carbon Intensity of Off-Road Equipment

Strategy 2.5 Electrify or Reduce the Carbon Intensity of Off-Road Equipment

Major Emitting Activities

- Construction equipment, generators,
- Portable landscaping and forestry equipment

Existing Policies and Effects

- WA Clean Fuel Standard (HB 1091)

Actions

a. Phase-out new sales of off-road gas- and diesel-powered equipment
b. Support the decarbonization of off-road equipment
c. Electrify off-road equipment for governments and schools
d. Provide education and outreach to encourage the use of electric landscaping equipment
e. Provide education, outreach, and ambassadors for off-road electric equipment

Strategy Total	Emission Reduction Potential (MTCO2e)*	$ per ton	Authority to Implement
	520,000	167**	

Co-benefits	Other Considerations
	• Can reduce pollution for nearby communities and workers

* Quantification assumes 4 million hours of heavy equipment use are substituted with electric equipment, 10,000 pieces of small gas equipment are replaced with electric, and 80,000,000 gallons of lower-carbon fuels are used.

** Is an average of electric vehicles and biofuels. For electric equipment, assumes $50,000 marginal cost per vehicle upfront, but doesn't count net fuel cost savings over life of the vehicle. For biofuels assumes a marginal cost of $0.50 per gallon.

Action Descriptions

- **Action 2.5a.** Phase-out new sales of off-road gas- and diesel-powered equipment: Require sales of new combustion-powered equipment to be phased-out by a certain date.
- **Action 2.5b.** Support the decarbonization of off-road equipment: Develop programs to electrify or support the use of low-carbon fuels in off-road equipment as well as associated charging or fueling infrastructure.
- **Action 2.5c.** Electrify off-road equipment for governments and schools: Develop requirements for governments and schools to switch to electric off-road equipment as soon as possible.
- **Action 2.5d.** Provide education and outreach to encourage the use of electric landscaping equipment: Develop education and outreach programs to encourage increased use of electric lawn and garden equipment.
- **Action 2.5e.** Provide education, outreach, and ambassadors for off-road electric equipment: Provide education and outreach programs to promote electric off-road equipment.

Estimating Emissions

Reductions from this strategy are represented by estimating three major elements: electrification of small non-road equipment, electrification of large construction equipment, and use of low-carbon fuels.

- The Emission Reduction Potential for 2030 assumes 4 million hours of heavy equipment use are substituted with electric equipment, 10,000 pieces of small gas equipment are replaced with electric, and 80,000,000 gallons of lower-carbon fuels are used. The Strategy Total was calculated using:
  - The total number of pieces of small non-road equipment that are replaced with (battery) electric equipment, multiplied by the typical number of hours per year of use for residential law equipment, the fuel consumption rate for typical engines and use, and the emission factor for gasoline.
  - The total number of hours of large electric construction equipment used, multiplied by the typical fuel consumption rate, and the fuel emission factor.
  - The volume of low-carbon fuel replaced, multiplied by the difference in the carbon intensities of the conventional vs lower-carbon fuel.
- Emission Reduction Potential for 2050: Forthcoming.

Strategy 2.6 Electrify or Reduce the Carbon Intensity of Aviation Vehicles and Equipment and Reduce Air Travel

Strategy 2.6 Electrify or Reduce the Carbon Intensity of Aviation Vehicles and Equipment and Reduce Air Travel

Major Emitting Activities

- Passenger and freight aircraft burning jet fuel
- Ground support equipment using gasoline or diesel

Existing Policies and Effects

- WA Clean Fuel Standard (HB 1091)

Actions

a. Require the use of low-carbon fuel for government-related travel
b. Research low-carbon materials, fuels, and ground support equipment
c. Support the electrification of non-road vehicles and equipment
d. Develop stronger fuel efficiency and emissions standards for aircraft
e. Support alternative options to air travel
f. Increase the use of virtual meetings

Strategy Total	Emission Reduction Potential (MTCO2e)*	$ per ton	Authority to Implement
	500,000	500**	

Co-benefits	Other Considerations
	• Non-air travel could be less expensive • Non-air travel can encourage more local travel, contributing to local economies

*Quantification assumes that an additional 30 million gallons of low-carbon aviation fuel are substituted and the overall volume of aviation fuel is reduced by 34 million gallons.

** For the low-carbon fuel portion only and assumes current estimates of $3.00/gallon marginal cost for jet fuel. Does not consider alternative travel options.

Action Descriptions

Decarbonize aviation fuels and airports:

- **Action 2.6a.** Require the use of low-carbon fuel for government-related travel: Develop requirements for government to collectively purchase (with competitive bidding) low-carbon aviation fuel equivalent to the expected volumes needed for its travel.
- **Action 2.6b.** Research low-carbon materials, fuels, and ground support equipment: Support research into low-carbon fuels, materials, and equipment to support market development and increase access to low-carbon options.
- **Action 2.6c.** Support the electrification of non-road vehicles and equipment: Develop programs to support the aviation industry transition to electric ground equipment and other non-road support vehicles.
- **Action 2.6d.** Develop stronger fuel efficiency and emissions standards for aircraft. Develop stronger requirements for fuel efficiency and emission standards for aircraft and engines.

Reduce air travel by supporting non-air travel options:

- **Action 2.6e.** Support alternative options to air travel: Support planning for alternative modes of travel such as existing Amtrak service, (ultra) high-speed rail, or the study currently underway for the Cascadia High-Speed Rail Program.
- **Action 2.6f.** Increase the use of virtual meetings: Develop requirements for governments to hold virtual meetings, workshops, and conferences whenever possible, or invest in advanced virtual meeting technology that improves the user experience.

Creative Climate Action Art Contest Winner

"Untitled" by Ansh Kumar

Estimating Emissions

Reductions for this strategy are represented by estimating two elements: substitution of conventional petroleum aviation fuel with low-emission aviation fuel; and a reduction in air travel which is replaced by train travel, low-carbon vehicle travel, or virtual meetings.

- The Emission Reduction Potential for 2030 assumes that an additional 30 million gallons of low-carbon aviation fuel are substituted and the overall volume of aviation fuel is reduced by 34 million gallons. The Strategy Total was calculated using:
  - The total number of gallons of aviation fuel that are being replaced with low-carbon fuels, multiplied by the difference in carbon intensity of the conventional vs low-carbon fuel.
  - The overall reduction in aviation fuel used multiplied by the emission factor for aviation fuel.
- Emission Reduction Potential for 2050: Forthcoming.

Strategy 2.7 Electrify or Reduce the Carbon Intensity of Off-Road Marine and Rail Vessels, Vehicles, and Equipment

Strategy 2.7 Electrify or Reduce the Carbon Intensity of Off-Road Marine and Rail Vessels, Vehicles, and Equipment

Major Emitting Activities

- Ocean going vessels, harbor craft, private boats
- Regional rail and switchers, cargo handling equipment

Existing Policies and Effects

- WA Clean Fuel Standard (HB 089 1)

Actions

a. Support low-carbon marine fuels
b. Support low-carbon fuel handling systems
c. Encourage the use of shore power
d. Support shore power with grid upgrades
e. Support low-carbon or electric port and rail equipment and vehicles
f. Support shore power policy
g. Support charging infrastructure zero-emissions vessels
h. Research zero- and near zero-emission cruise ships by 2032

Strategy Total	Emission Reduction Potential (MTCO2e)*	$ per ton	Authority to Implement
	100,000	80-400**	

Co-benefits

Other Considerations

- Reduces pollution in overburdened communities near ports
- Reduces pollution near ships and cargo handling equipment

* Quantification assumes an additional 15 million gallons of low-carbon marine fuels are used, about 9 million kWh hours of electricity are supplied, and 200 pieces of cargo handling equipment are electrified

** Represents the range from low-carbon fuels at $0.50/gallon marginal cost to replacement with electric equipment based on current marginal cost for cargo handling equipment.

#089

Posted by **Carrie Lee - King County Exec Climate Office** on **10/26/2025** at **5:24pm**
[Comment ID: 139] - Link
Agree: 0, Disagree: 0
Suggest citing the RCW vs the legislative bill

Action Descriptions

Expand and support access to, and the use of, alternative fuels:

- **Action 2.7a.** Support low-carbon marine fuels: Develop programs to encourage new facilities to produce low-carbon marine fuels and encourage ship operators to use the low-carbon marine fuels.
- **Action 2.7b.** Support low-carbon fuel handling systems: Develop programs to support the construction of new handling and distribution systems for large quantities of low-carbon fuels for marine and rail needs.

Expand shore power at all major berths:

- **Action 2.7c.** Encourage the use of shore power: Encourage vessel operators to use shore power in a manner that does not significantly impact ports' ability to move cargo.
- **Action 2.7d.** Support shore power with grid upgrades: Upgrade the electrical grid to facilitate broad use of shore power.

Support low-carbon or electric alternatives:

- **Action 2.7e.** Support low-carbon or electric port and rail equipment and vehicles: Develop programs to support the transition of off-road port and rail equipment and vehicles to low-carbon or electric alternatives.
- **Action 2.7f.** Support shore power policy: Support national and international efforts to transition ocean-going and harbor vessels to shore power.
- **Action 2.7g.** Support charging infrastructure for zero-emissions vessels: Develop programs and streamline permitting and siting processes to support charging equipment for ships and boats.
- **Action 2.7h.** Research zero- and near zero-emission cruise ships: Research the feasibility of alternative fuels for powering cruise ships including green methanol, green ammonia, renewable natural gas, and biofuels with the goal of identifying viable alternatives for implementation.

Estimating Emissions

Reductions from this strategy are represented by summing three elements: substituting low-carbon fuels, expanding shore power availability and use, and electrifying cargo handling equipment.

- The Emission Reduction Potential for 2030 assumes an additional 15 million gallons of low-carbon marine fuels are used, about 9 million kWh hours of electricity are supplied, and 200 pieces of cargo handling equipment are electrified. The Strategy Total was calculated using:
  - The volume of conventional marine fuel being replaced with low-carbon marine fuel, multiplied by the difference in their carbon intensities.
  - The reductions from shore power are calculated from the assumed or reported kWh of electricity provided multiplied by the typical amount of diesel fuel that would have been required to generate the electricity (from onboard generators), multiplied by the emission factor for the diesel fuel.
  - For cargo handling equipment, the reduction is the number of pieces of equipment multiplied by the average annual fuel consumption per piece, multiplied by the emission factor for diesel fuel.
- Emission Reduction Potential for 2050: Forthcoming.

Strategy 2.8 Cross-Cutting Transportation Actions

Strategy 2.8	Cross-Cutting Transportation Actions		
	Actions a. Permitting for construction of electric generation, transmission and storage projects		
Strategy Total	**Emission Reduction Potential (MTCO2e)*** unknown	**$ per ton** unknown	**Authority to Implement**

* The actions in this strategy help to support or enable other strategies in the transportation sector. We are not able to quantify emission reductions from this strategy.

Action Descriptions

- **Action 2.8a.** Streamline permitting for construction of electricity generation, transmission and storage projects: Implement new policies to reduce permitting delays for the construction of clean energy generation and transmission capacity, long-duration battery storage and other emission reduction projects.

Estimating Emissions

The actions in this strategy help to support or enable other strategies in the transportation sector. We are not able to quantify emission reductions from this strategy.

Sector 3: Municipal Solid Waste and Wastewater

Sector Overview

The municipal solid waste sector includes waste that specialized trucks regularly collect from residences and businesses (curbside pickup) as well as waste that individuals or businesses drop off at transfer stations. In some collection areas, people separate a large portion of this waste for recycling, and it is collected separately curbside. Individuals, contractors, and businesses also drop off a significant amount of waste material at transfer stations. This material often includes a significant recyclable volume, but most of it typically ends up in landfills.

The wastewater subsector handles waste that sewer systems carry to city, county, or other treatment facilities.

Major Greenhouse Gas Emitting Activities and Reduction Opportunities

Municipal Solid Waste

In the solid waste sector, most greenhouse gas emissions come from organic materials degrading in landfills. Organic matter, such as paper, wood, vegetation, and food scraps, decomposes slowly until microbes consume much of the carbon. Landfills are covered to deplete oxygen levels and create an anaerobic environment, and this anaerobic environment allows methane-producing bacteria to consume the carbon. These bacteria release a significant amount of methane before operators fully cover the landfill and begin methane collection for flaring or energy use. Methane that escapes into the atmosphere has approximately 30 times (over 100 years) or 85 times (over 20 years) more climate-warming potential than carbon dioxide.

#090

Posted by **Caitlin** on **10/09/2025** at **2:35pm** [Comment ID: 30] - Link

Agree: 0, Disagree: 0

Waste isn't covered to delete oxygen levels and create an anaerobic environment; that's simply a result of covering and compacting.

#091

Posted by **Caitlin** on **10/09/2025** at **2:43pm** [Comment ID: 31] - Link

Agree: 0, Disagree: 0

Not exactly. Landfills leak, even with gas capture. https://www.epa.gov/lmop/basic-information-about-landfill-gas#methane

Opportunities for greenhouse gas reduction in this sector generally come from methane collection at landfills, and diverting or recycling organic and non-organic materials before they reach landfills. Recycling reduces greenhouse gas emissions by offsetting the need to produce new materials (e.g., recycling metals uses far less energy than mining, refining, and processing metal ores).

Wastewater

Like the solid waste sector, wastewater emits greenhouse gases primarily through the decomposition of organic materials. Organic matter in sewer water decomposes continuously at treatment facilities, generating substantial methane emissions. Opportunities for greenhouse gas reduction in this sector generally come from methane collection at treatment facilities.

Existing Policies and Efforts to Reduce Greenhouse Gas Emissions

For organic or compostable waste, Washington State law (HB 2301 and 1497) mandates separate organic waste collection for single- and multi-family residences and qualifying businesses. These laws require cities to offer dedicated organic waste disposal services. The collected materials will be composted or otherwise processed to avoid methane emissions during decomposition.

Before 2025, Washington State had enacted limited legislation that directly addressed the recyclable content in waste streams or recycling overall. Senate Bill (SB) 5022 restricted certain types of food carryout containers, limited restaurant service item distribution, and required recycled content in some packaging. These measures had minimal impact on total greenhouse gas emissions, since they addressed relatively small portions of the landfill stream and involved limited recyclable material.

Washington passed the Recycling Reform Act in 2025 (HB 5284) to expand recycling efforts statewide, improve recycling infrastructure, and reduce landfill waste. The law increases producer responsibility by requiring fees from manufacturers of waste-producing products. The state will use these fees to fund better collection systems and public education, and to incentivize reduced packaging and increased recyclability. Curbside recycling already covers 88% of households in Washington, and King County has one of the highest recycling rates in the country. While the Recycling Reform Act may not significantly increase the number of households participating in recycling in the Puget Sound region, it will establish a uniform statewide list of materials accepted for recycling, thereby drastically reducing the confusion about what materials should and should not be recycled.

For salvage and demolition waste, Washington adopted Appendix P (Construction and Demolition Material Management) from the International Building Code, giving local governments the option to integrate these requirements into their own codes. Appendix P requires applicants to submit a salvage assessment before receiving a demolition permit, provide separate containers for non-recyclable materials on-site, and submit a final waste diversion report before obtaining an occupancy permit. The assessment must estimate the quantity of salvageable and recyclable materials in the building, and the diversion report must document total materials, amounts diverted and amounts sent to landfills, the hauler, and material destinations.

Cost-Benefits and Co-Pollutant Considerations

For organic and compostable waste, materials sent to landfills emit methane before operators can begin effective gas capture. Organic material also generates emissions during its production and distribution, requiring energy for fertilization, irrigation, harvesting, processing, and transport. Emissions vary depending on local practices and energy sources, but often include a mix of greenhouse gases and air toxics. Avoiding waste of organic materials can also provide important local co-benefits. For example, food recovery programs reduce emissions while increasing food security for community members.

#092

Posted by **Caitlin** on **10/09/2025** at **2:49pm** [Comment ID: 34] - Link
Agree: 0, Disagree: 0
This typeface is very difficult to read. Use a more accessible typeface.

#093

Posted by **Caitlin** on **10/09/2025** at **2:45pm** [Comment ID: 32] - Link
Agree: 0, Disagree: 0
Only some single-family residents will be mandated. See Ecology's ORCA map. No multi-family mandates, yet.

#094

Posted by **Caitlin** on **10/09/2025** at **2:49pm** [Comment ID: 33] - Link
Agree: 0, Disagree: 0
Only some cities. See ORCA map. Also includes some counties.

#095

Posted by **Caitlin** on **10/09/2025** at **2:51pm** [Comment ID: 35] - Link
Agree: 0, Disagree: 0
Fees are collected by the PRO, not the state.

#096

Posted by **Caitlin** on **10/09/2025** at **2:52pm** [Comment ID: 36] - Link
Agree: 0, Disagree: 0
comma

#097

Posted by **Hannah Ljunggren, Suquamish Tribe** on **10/24/2025** at **1:22pm** [Comment ID: 106] - Link
Agree: 0, Disagree: 0
It would be beneficial to have an elaboration on how this would increase food security.

For general recyclables (non-organic and non-compostable materials), the greatest greenhouse gas benefits come indirectly from avoiding emissions associated with producing materials from raw resources. Recycling most metals avoids the high emissions from harvesting, mining, smelting, and refining. These upstream processes also generate significant co-pollutants, including particulate matter from mining vehicles and activities, and particulates and air toxics from smelting and refining. When these activities occur near communities, reducing them provides substantial public health benefits. To a smaller extent, recycling also reduces emissions from processing and transporting waste, including traffic into landfills. The increasing cost of recycling remains relatively low and can often be offset by the resale value of recovered materials. When including benefits from reduced greenhouse gas emissions and air toxics, recycling often delivers a clear net environmental and economic gain.

Construction and demolition materials focus more on wood products (e.g., dimensional lumber, flooring, furniture), metals, concrete, and gypsum. As with general recyclables, avoiding the need for new raw material production yields significant benefits. In particular, diverting wood from landfills prevents methane emissions during decomposition. Many recovered materials hold resale value that approaches cost-neutral levels. Strategies to reduce construction and demolition waste often result in a strong net benefit when other climate and environmental benefits are considered.

Summary of Feedback Heard at Community Workshops

- Education and Outreach: Participants recommended creating programs to educate residents about proper waste disposal and organizing public tours of local composting, recycling, and landfill facilities. They recommended new and expanded workshops and internship opportunities focused on waste and recycling to educate and employ young people in sustainability fields. They also recommended expanding existing community events, such as Styrofoam and recycling workshops, to promote sustainable behaviors.
- Diversion through Recycling and Reuse: Participants supported producer responsibility policies that require manufacturers to make products more durable, repairable, and recyclable. They also supported the creation of new markets for recyclable materials to strengthen the local recycling economy, such as recycling diesel- and gas-powered equipment and materials to create new electric equipment. Participants also suggested investment in additional staff for waste sorting and recycling in order to improve waste diversion rates.
- Organic Waste: Participants encouraged the development of new and expanded food rescue and donation efforts (e.g., home-grown produce donations), to reduce food waste and support community needs. They also suggested developing new programs to encourage food composting at restaurants and in multifamily apartment buildings.

Strategy 3.1 Divert Construction and Demolition Materials from Landfills

Strategy 3.1 Divert Construction and Demolition Materials from Landfills

Major Emitting Activities

- Decomposition of wood in landfills
- Production of new materials from raw resources

Existing Policies and Effects

- Washington Building code Appendix P

Actions

a. Develop codes, permitting, or planning to maximize material reclamation
b. Support new and existing markets for salvaged and recycled materials
c. Train and provide auditors to maximize material diversion
d. Provide or facilitate physical locations for processors, manufacturers, or resellers of diverted materials

Strategy Total	Emission Reduction Potential (MTCO2e)*	$ per ton	Authority to Implement
	80,000	unknown	

Co-benefits

Other Considerations

- Reduc[099]neral consumption, grows circular economy
- Produces stream of lower cost materials
- Creates demand for solid w[100]diversion-related jobs

* Quantification assumes 30,000 additional tons of both steel and wood are being diverted.

Actions Descriptions

[101]

- **Action 3.1a.** Develop codes, permitting, or planning processes to maximize material reclamation: Develop or revise building codes, permitting processes, and planning processes to encourage the maximum amount of building materials be reclaimed and diverted from landfills.
- **Action 3.1b.** Support new and existing markets for salvaged and recycled materials: Support the development or expansion of markets for salvaged construction materials to encourage re-use and reduce waste.
- **Action 3.1c.** Train and provide auditors to maximize diversion: Develop programs to support the training of workers to conduct audits and reviews to help builders and developers maximize diversion of construction materials from landfills.
- **Action 3.1d.** Provide or facilitate physical locations for processors, manufacturers, or resellers of diverted materials: Provide or facilitate physical locations for businesses that focus on processing, using, or resell[102]f diverted construction materials.

#098

Posted by **Stephanie Gowing** on **10/07/2025** at **10:13am** [Comment ID: 20] - Link
Agree: 0, Disagree: 0
I assume your emissions are from EPA's Warm Calculator? Although not perfect, it is what many General Contractor's use to track their jobsite waste and recycled material. We (absher co) use the social costs of carbon to quantify impacts- from WA UTC-I would think a consistent standard for all emissions should be used: https://www.utc.wa.gov/regulated-industries/utilities/energy/conservation-and-renewable-energy-overview/clean-energy-transformation-act/social-cost-carbon.

#099

Posted by **Stephanie Gowing** on **10/07/2025** at **10:18am** [Comment ID: 22] - Link
Agree: 0, Disagree: 0
Reduces natural resources consumption (by growing the circular economy). I'm not sure "general consumption" is the right word/phrase.

#100

Posted by **Stephanie Gowing** on **10/07/2025** at **10:16am** [Comment ID: 21] - Link
Agree: 0, Disagree: 0
supports market for industry sorting innovation.

#101

Posted by **Stephanie Gowing** on **10/07/2025** at **10:22am** [Comment ID: 24] - Link
Agree: 0, Disagree: 0
Consider integrating and supporting manufacturing take back programs into this actions. for example carpet and ceiling tiles.

#102

Posted by **Stephanie Gowing** on **10/07/2025** at **10:21am** [Comment ID: 23] - Link
Agree: 0, Disagree: 0
Need to add storage and logistics to list. This is what is missing in the marketplace.

Estimating Emissions

Reductions from this strategy are represented by estimating total tons of wood and of steel diverted from landfills.

- The Emission Reduction Potential for 2030 assumes 30,000 additional tons of both steel and wood are being diverted. The Strategy Total was calculated using:
  - Tons of wood or steel that are being diverted multiplied by the emission reduction per ton, which was obtained from the WARM model.
- Emission Reduction Potential 2050: Forthcoming.

Strategy 3.2 Divert Other Recyclable and Compostable Materials from Landfills

Strategy 3.2	Divert Other Recyclable and Compostable Materials from Landfills

Major Emitting Activities

- Decomposition of organics in landfill produces methane

Existing Policies and Effects

- WA Organics Management Laws (HB 2301 and 1497) mandating separate organics collection
- WA Recycling Reform Act (HB 5284)

Actions

a. Provide education and outreach to encourage landfill diversion
b. Improve the processing and handling of compostable organic waste
c. Reduce food waste
d. Support new and existing markets for compost
e. Increase methane capture in farming
f. Research non-direct-combustion power

Strategy Total	Emission Reduction Potential (MTCO2e)*	$ per ton	Authority to Implement
	440,000	unknown	

Co-benefits	Other Considerations

- Reduces general consumption, grows circular economy
- Produces stream of lower cost materials
- Nutrient recycling with compost reduces the need for fossil fuel-based fertilizers

* Quantification assumes 156,000 additional tons of general waste and 90,000 tons of organic waste are being diverted.

#103

Posted by **Caitlin** on **10/09/2025** at **3:00pm** [Comment ID: 37] - Link
Agree: 0, Disagree: 0
Only in some areas

Action Descriptions

- **Action 3.2a.** Provide education and outreach to encourage landfill diversion: Develop education and outreach programs to encourage the public to properly sort waste, and educate waste collectors to better collect, separate, and divert recyclable and compostable materials from landfills.
- **Action 3.2b.** Improve the processing and handling of compostable organic waste: Develop programs to help waste management companies improve the processing and handling of compostable organic waste.
- **Action 3.2c.** Reduce food waste: Develop programs to reduce and prevent food waste in food production, distribution, and use systems.
- **Action 3.2d.** Support new and existing markets for compost: Support the development or expansion of markets for composted materials.
- **Action 3.2e.** Increase methane capture in farming: Provide incentives and develop outreach and education programs for farmers to capture more methane from their organic wastes.
- **Action 3.2f.** Research non-direct-combustion power: Research and pilot alternative uses for organic waste such as biodigesters.

Estimating Emissions

Reductions from this strategy are represented by estimating the total amount of general recyclables and organics diverted from landfills.

- The Emission Reduction Potential for 2030 assumes 156,000 additional tons of general waste and 90,000 additional tons of organic waste are being diverted from landfills. The Strategy Total was calculated using:
  - The tons of general recyclables and organics being diverted, multiplied by the emission reduction per ton, which was obtained from the WARM model.
- Emission Reduction Potential for 2050: Forthcoming.

Strategy 3.3 Increase Methane Capture at Landfills

Strategy 3.3 Increase Methane Capture at Landfills

Major Emitting Activities

- Methane produced from decomposing organics
- Gas collection is delayed years after material is deposited

Existing Policies and Effects

- WA Clean Fuel Standard (HB 1091)
- WA Climate Commitment Act (E2SSB 5126)

Actions

a. Increase methane capture from landfills

Strategy Total	Emission Reduction Potential (MTCO2e)*	$ per ton	Authority to Implement
	53,000	<30**	

Co-benefits

Other Considerations

- Can cheaply produce natural gas that can displace petroleum diesel and fossil natural gas

*Quantification assumes 500,000 MMBtu of methane are captured and used each year.

** Based on production cost for large volumes in WSU Biomethane for Transportation study (2012).

Action Descriptions

- **Action 3.3a.** Increase methane capture from landfills: Provide incentives and develop outreach and education programs to encourage more methane capture from landfills.

Estimating Emissions

Reductions from this strategy are represented by assuming the otherwise emitted (escaped) methane would be used as a fuel substitute for diesel fuel.

- The Emission Reduction Potential for 2030 assumes 500,000 MMBtu of methane are captured and used each year. The Strategy Total is calculated using:
  - The MMBtu of methane collected, converted to kg of methane, and multiplied by its 20-year global warming potential (GWP, 85).
- Emission Reduction Potential for 2050: Forthcoming.

Strategy 3.4 Cross-Cutting Waste Actions

Strategy 3.4	Cross-Cutting Waste Actions		
	Major Emitting Activities • Unnecessary production of new materials • Handling and transporting current waste stream		
	Existing Policies and Effects • WA Senate Bill 5022 • King County Waste per capita target		
	Actions a. Support markets and infrastructure for additional recycled materials. b. Reduce emissions from other waste handling processes c. Reduce per capita waste disposed of in landfills		
Strategy Total	**Emission Reduction Potential (MTCO2e)*** unknown	**$ per ton** unknown	**Authority to Implement**

* The actions in this strategy help to support or enable other strategies in the waste sector. We are not able to quantify emission reductions from this strategy.

Action Descriptions

- **Action 3.4a.** Support markets and infrastructure for a range of additional recycled materials: Promote market development for a range of recycled materials and infrastructure to support reuse.
- **Action 3.4b.** Reduce emissions from other waste handling processes: Reduce emissions from other waste handling processes such as waste infrastructure, handling equipment, and facilities.
- **Action 3.4c.** Reduce per capita waste disposed of in landfills: Reduce per capita waste disposed of in landfills by encouraging reduced consumption, and working with waste handlers to increase recycling and diversion.

Estimating Emissions

The actions in this strategy help to support or enable other strategies in the transportation sector. We are not able to quantify emission reductions from this strategy.

Sector 4: Land Use and Sequestration

Sector Overview

The land use and sequestration sector includes activities that cause land or biomass to either release or absorb (sequester) greenhouse gas emissions. This sector does not cover emissions from using or burning biomass, which are accounted for in other sectors.

Major Greenhouse Gas-Emitting Activities and Reduction Opportunities

The most significant greenhouse gas emissions in this sector result from removing biomass, primarily trees for timber harvesting and, to a lesser extent, land development. Cutting trees for timber harvesting triggers carbon releases from soils as roots decompose and organic matter loses inputs from living trees. In addition to releasing carbon, cutting trees reduces future sequestration potential by eliminating living biomass. Land conversion for development permanently decreases sequestration capacity. Changes in drainage, streamflow, and agricultural practices can positively and negatively impact land's ability to retain carbon, depending on the scale and scope of changes.

When harvesting trees for lumber or pulp, foresters can reduce emissions by managing the extent of thinning and preserving older trees. Research shows that thinning about 30% of a forest, while preserving mature, second-growth and old-growth trees, stimulates growth in the remaining vegetation and restores soil carbon sequestration to pre-thinning levels within 20 years. In contrast, heavy thinning that includes old-growth trees may take over 100 years to recover equivalent biomass and soil carbon. Foresters can minimize emissions and maximize future sequestration by adjusting thinning levels and protecting older trees.

When developers clear trees for construction, they typically cannot replant enough biomass on the same land to restore its original sequestration potential. To offset this loss, planners and developers can replant equivalent biomass on nearby or comparable land, ideally planting as close to the development site as possible to preserve co-benefits such as shade and cooling.

To enhance carbon sequestration, land managers can use replanting, agricultural practice changes, and soil amendments. They can protect and restore forestlands, wildlands, parks, and open spaces to support natural vegetation growth. Farmers can adopt techniques such as cover cropping, optimized fertilization, and crop rotation to increase soil carbon. These methods not only store carbon but also improve soil health, productivity, and local water quality. Land managers can also apply carbon-rich soil amendments like biochar to farmlands, forests, and open spaces. Biochar can store carbon long-term and enhance soil quality, making it a potential tool for sequestration.

Existing Policies and Efforts to Reduce Greenhouse Gas Emissions

Washington State has enacted few policies that directly regulate greenhouse gas emissions from land use or soils, primarily because most relevant activities occur on private land.

House Bill 1181 (2023) requires cities and counties to integrate climate mitigation and adaptation into their comprehensive plans. This law focuses on land use, transportation, and environmental justice but does not give local governments authority to regulate tree canopy, forest harvesting, or agricultural practices related to greenhouse gas emissions.

Washington also passed Senate Bill 5961 (now RCW 43.19A.140) in 2022, which requires public works projects to assess whether they can use biochar. The choice to use biochar for this legislative directive should include consideration of the source of the biochar and methods of production to ensure that it is consistent with the climate goal. If feasible under defined criteria, projects must incorporate it.

Cost-Benefit and Co-Pollutant Considerations

In timber harvesting, the primary mitigation tactic involves the extent of thinning and adopting sustainable forest management practices. While specific cost data is limited, the dominance of clear-cutting suggests that it may drive current practices. Since most forests are located far from population centers, changes in co-pollutant emissions from these areas likely have negligible public health impacts.

For land development, local governments and planners can reduce greenhouse gas emissions by discouraging tree removal and requiring replanting to achieve carbon neutrality for both soil and biomass carbon. Replanting with seedlings and young plants can be relatively inexpensive; however, the carbon benefit takes years or decades to materialize and must be accompanied by stewardship. In urban settings, mature vegetation delivers additional co-benefits such as shade, reduced cooling costs, lower heat stress, and better moisture retention. Replanting far from development displaces these benefits.

In agriculture, land managers can choose from a wide range of sequestration practices with highly variable costs and outcomes depending on crop type, soil conditions, and location. While most co-benefits affect farmers and farm workers more than the general population, some practices reduce costs or boost productivity. Other strategies may not directly benefit operations but can generate revenue under broader greenhouse gas policies such as the Clean Fuel Standard or Climate Commitment Act.

Summary of Feedback Heard at Community Workshops

- Education and Outreach: Participants recommended expanding programs to educate the public about the importance of wetlands and the benefits of natural ecosystem functions. They also recommended new programs to educate the public about local trail systems and outdoor spaces to promote physical activity and environmental stewardship. Local organizations, such as native plant groups, should be engaged in land and park stewardship efforts.
- Zoning: Participants recommended that all major zoning changes support the development of walkable neighborhoods to reduce reliance on vehicle travel.
- Funding: Participants recommended that tax revenue be redirected to improve sidewalks and bike lanes, especially in neighborhoods where property owners cannot afford to upgrade the public right of way. Participants emphasized the importance of improving maintenance of existing parks and ensuring that people have equitable access to a range of recreational uses.
- Subsidies and Incentives: Participants recommended that subsidies be offered to businesses willing to locate in walkable areas, helping to connect land use and transportation planning more effectively. Incentives for rain garden installations in new developments could improve stormwater management and increase urban green space.

#104

Posted by **Jay Tavarez-Brown** on **10/24/2025** at **10:37am** [Comment ID: 98] - Link

Agree: 0, Disagree: 0

I would say that cost is a factor, but also the logistics of getting equipment in and out of a site can necessitate cutting more trees than might be ideal. This also depends on one's definition of clear-cutting. In my forestry program, I was trained to recognize cuts of 40 acres or more as clear cuts. A lot of cutting in the PNW are not true clear cuts, but patch cuts. I can't speak to the harms to carbon sequestration in areas harvested with patch cuts, but I hope this provides some insight into how foresters are trained.

#105

Posted by **Jay Tavarez-Brown** on **10/24/2025** at **10:41am** [Comment ID: 99] - Link

Agree: 0, Disagree: 0

If more trees are desired in urban areas for the benefits described above, more funding needs to be made available for the maintenance of those trees, preventing sidewalk/roadway damage by roots, and repairing sidewalks and roadways when they are damaged by trees. In Snohomish County, we've found that the impacts of street trees are important for public health, but that funding is desperately needed to ensure that right-of-ways are safe for pedestrians and bikers to travel.

Strategy 4.1 Steward Natural Lands to Reduce Tree Loss

Strategy 4.1 Steward Natural Lands to Reduce Tree Loss

Major Emitting Activities

- Tree cutting for harvesting & land development
- Roots and soil of cut trees release carbon

Existing Policies and Effects

- WA House Bill 1181 (2023) (comp plans to assess land use)
- WA Senate Bill 5961 (2022) (public works to assess biochar)

Actions

a. Increase offset tree planting, stewardship, and monitoring
b. Strengthen zoning and permitting to protect trees
c. Promote tree retention and planting
d. Increase green stormwater infrastructure

Strategy Total	Emission Reduction Potential (MTCO2e)*	$ per ton	Authority to Implement
	500,000	70**	

Co-benefits

Other Considerations

- Can reduce heat island effects
- Improves overall ecological health
- Improves air quality and supports other public health benefits

* Quantification assumes 50 million new trees would be planted 106

** Assumes cost from middle of range for afforestation in significant programs from Pew Center estimates (2005).

Action Descriptions

- **Action 4.1a.** Strengthen zoning and permitting to protect trees: Strengthen local zoning and permitting requirements to protect existing trees and require compensation planting for tree losses. 107
- **Action 4.1c.** Promote tree retention and planting: Develop programs to support tree retention and new tree planting.
- **Action 4.1d.** Increase green stormwater infrastructure: Develop programs to support increased installation of green stormwater infrastructure projects that use vegetation and soil to simultaneously manage runoff and increase the carbon sequestration potential of natural lands.

#106

Posted by **Carrie Lee - King County Exec Climate Office** on **10/26/2025** at **9:54pm**
[Comment ID: 140] - Link
Agree: 0, Disagree: 0
Is there data on per acre land conversion, that could be referenced here? What is the basis for supporting that 50 million trees could be realistically planted?

#107

Posted by **Carrie Lee - King County Exec Climate Office** on **10/26/2025** at **9:55pm**
[Comment ID: 141] - Link
Agree: 0, Disagree: 0
This seems better suited in next strategy, which is quantified based on acres protected.

Estimating Emissions

Reductions for this strategy are represented by the number of trees that would be planted. The planted trees would not, strictly speaking, reduce carbon emissions, but rather would increase carbon sequestration, offsetting the emissions from the cut trees.

- The Emission Reduction Potential for 2030 assumes 50 million new trees would be planted. The Strategy Total is calculated using:
  - The assumed number of trees to be planted multiplied by the average carbon uptake per tree per year.
- Emission Reduction Potential for 2050: Forthcoming.

Strategy 4.2 Steward Natural Lands to Increase Carbon Sequestration and Reduce Emissions

Strategy 4.2	Steward Natural Lands to Increase Carbon Sequestration and Reduce Emissions

Major Emitting Activities

- Agricultural practices that release stored carbon
- Public and open lands with carbon storage potential

Existing Policies and Effects

- WA House Bill 1181 (2023) (comp plans to assess land use)
- WA Senate Bill 5961 (2022) (public works to assess biochar)

Actions

a. Increase soil carbon sequestration on farms
b. Steward forests, farmland, and open spaces
c. Promote de-paving to restore natural vegetation

Strategy Total	Emission Reduction Potential (MTCO2e)*	$ per ton	Authority to Implement
	2,500,000	100**	

Co-benefits	Other Considerations
	• Improves overall ecological health

* Quantification assumes 50,000 hectares of land are protected, replanted, or otherwise enhanced to stop carbon loss or increase uptake.

** Based on published estimates from Austin, et al. (2020) Nat Commun, ttps://doi.org/10.1038/s41467-020-19578-z

Action Descriptions

- **Action 4.2a.** Increase soil carbon sequestration on farms: Develop education and outreach programs for farmers to increase soil carbon stocks on farms and encourage biochar use, where appropriate.
- **Action 4.2b.** Steward forests, farmland, and open spaces: Steward natural and working lands, pursue land acquisition, or develop easements to increase the carbon sequestration potential of forests, farmland and open spaces.
- **Action 4.2c.** Promote de-paving to restore natural vegetation: Support or promote de-paving programs to restore natural vegetation.

Estimating Emissions

Reductions from this strategy are represented by the amount of land that would be protected or otherwise enhanced to increase its carbon sequestration, as compared to unprotected land, which has a carbon loss (based on models).

- The Emission Reduction Potential for 2030 assumes 50,000 hectares of land are protected, replanted, or otherwise enhanced to stop carbon loss or increase uptake. The Strategy Total is calculated using:
  - The assumed number of hectares that are being protected multiplied by the emissions per hectare.
- Emission Reduction Potential for 2050: Forthcoming.

Sector 5: Refrigerants

Sector Overview

The refrigerants sector includes the chemicals used as working fluids in systems that transfer heat, such as air conditioners, refrigerators, freezers, and heat pumps. In the 1920s, engineers developed chlorofluorocarbons (CFCs) as safer, less toxic, and more effective alternatives to earlier refrigerants. However, scientists later discovered that CFCs severely damaged the ozone layer, which protects the planet from harmful ultraviolet radiation.

In response, manufacturers shifted to hydrochlorofluorocarbons (HCFCs) and hydrofluorocarbons (HFCs), which had lower ozone-depleting potential and became the industry standard by around 2000. Unfortunately, most HFCs and HCFCs have high GWPs, making them significant climate pollutants. Regulators designated them as transitional chemicals and planned phase-outs for HCFCs by roughly 2020, and HFCs by roughly 2030.

Despite the phase-out plans, many older systems still use CFCs because of the high cost of replacement and the continued availability of CFCs through illegal production and distribution. While manufacturers have stopped using HCFCs in new equipment, many existing systems still contain them and remain in operation.

Although most refrigerant use occurs in buildings, a significant share also comes from mobile sources, primarily vehicle air conditioning systems. Some inventories classify refrigerants under the broader built environment sector, but we treat them separately due to distinct inventory methods and mitigation strategies. Unlike the main built environment emission sources (i.e., combustion of natural gas and petroleum), this sector focuses on chemical leakage and refrigerant management.

We categorize the refrigerants sector into three main sub-sectors:

- Commercial: Large refrigeration systems in facilities like warehouses, cold storage centers, and grocery stores.
- Residential: Household systems, including air conditioners, heat pumps, and kitchen refrigerators/freezers.
- Mobile: Air conditioning in most passenger vehicles and trucks, along with refrigeration units in delivery trucks and train cars.

Major Greenhouse Gas Emitting Activities and Reduction Opportunities

Greenhouse gas emissions in this sector primarily occur when equipment releases HFCs or HCFCs into the atmosphere. These releases can occur through small, continuous leaks during normal operation, sudden equipment failures, or when owners or scrappers dispose of equipment without recovering the refrigerants, either due to lack of awareness or willful neglect.

Leak detection and repair is often easiest in large commercial systems where continuous operation matters more, monitoring is easier, and equipment replacement costs are higher. Surveys show that most commercial systems leak very little, but a small number of systems account for the majority of refrigerant emissions due to large, unchecked leaks. In contrast, small systems, like window air conditioners, household refrigerators, or ductless heat pumps, pose a challenge. These systems are more prone to undetected small leaks, and fixing them often costs more than the value of the refrigerant lost.

Low- or zero-GWP refrigerant alternatives can reduce impacts even when small leaks occur, which are an unavoidable issue with millions of pieces of equipment in use. However, because these refrigerants have different chemical and physical properties, manufacturers must design entirely new systems to use them (they cannot serve as "drop-in" replacements). Manufacturers are currently developing many new systems that use low- or zero-GWP refrigerants, but these alternatives likely won't reach widespread availability for another decade.

Opportunities to reduce greenhouse gas emissions from this sector generally come from recovering HFCs and HCFCs from scrapped equipment in the short term, and transitioning to low- or zero-GWP refrigerants in the longer term.

Common Refrigerant Acronyms: As a reminder, the following acronyms are commonly used when discussing refrigerants and ways to reduce their climate impact

- CFC (chlorofluorocarbons) were developed starting in the late 1920s as less-toxic and more effective alternatives to the first refrigerants
- HCFCs (hydrochlorofluorocarbons) and HFCs (hydrofluorocarbons), are refrigerants that have lower ozone-depleting potential than CFC alternatives
- GWP (global warming potential) refers to the potency of a greenhouse gas (i.e. how much it warms the atmosphere)
- ODP (ozone depletion potential) refers to a substance's impact on depleting the stratospheric ozone layer

Existing Policies and Efforts to Reduce Greenhouse Gas Emissions

Washington State passed two laws to address refrigerant emissions. House Bill 1112 (2019) banned new equipment using HFCs, directed Ecology to explore phase-out strategies for high-GWP refrigerants, and required the state to prioritize low-GWP equipment in its purchasing decisions. HB 1050 (2021–2022) expanded on House Bill 1112 by setting maximum GWP thresholds for refrigerants, adding residential air conditioners and heat pumps to the list of regulated equipment, and establishing programs to reduce leaks and promote refrigerant recovery from large systems.

Cost-Benefits and Co-Pollutant Considerations

Most refrigerants do not produce co-pollutants that affect local air quality, so reducing leaks will not significantly improve local health outcomes related to ambient air pollution. However, CFCs and many HCFCs also damage the ozone layer. Recovering these high ozone depletion potential (ODP) refrigerants and repairing or replacing leaking systems can help prevent global ozone depletion, especially in polar regions.

Since industry originally adopted CFCs and HCFCs for their low cost and high performance, most low-GWP and zero-ODP alternatives come with higher upfront costs. Few existing systems can accommodate drop-in replacements, so owners must upgrade or replace systems to adopt alternatives. Current estimates suggest that equipment using low-GWP refrigerants may cost 10–40% more upfront.[2] However, newer systems often improve efficiency and reduce maintenance, leading to potential long-term savings or at least cost neutrality.[3]

Federal law requires certified technicians to recover CFCs and HCFCs from equipment being scrapped using EPA-approved equipment and methods.[4] However, compliance appears inconsistent. For example, King County charges a fee to recycle refrigerators, which may reduce the number of refrigerators recycled. To improve recovery rates, policymakers could implement incentive programs or impose deposit/recovery fees at the point of sale, though these programs and fees would likely shift costs to consumers or the public sector.

[2] https://bellomyims.com/the-shift-to-eco-friendly-refrigerants-and-its-impact-on-costs/
[3] https://www.epa.gov/sites/default/files/2015-10/documents/deca_commercial_refrigeration_case_study.pdf
[4] https://www.epa.gov/sites/default/files/documents/ConstrAndDemo_EquipDisposal.pdf

Strategy 5.1: Reduce Use of High-GWP Devices and Increase Recovery of High-GWP Refrigerants

Strategy 5.1	Reduce Use of High-GWP Devices and Increase Recovery of High-GWP Refrigerants

Major Emitting Activities

- Small refrigerant leaks through normal operation
- Large refrigerant leaks through failure or improper disposal

Existing Policies and Effects

- Washington House Bill 1112 (2019)
- Washington House Bill 1050 (2021-22)

Actions

a. Replace existing high-GWP refrigerant devices
b. Support governments' and schools' transition to low-GWP refrigerant devices
c. Increase good device disposal practices
d. Increase the purchase of low-GWP devices
e. Subsidize proper disposal of high-GWP devices

Strategy Total	Emission Reduction Potential (MTCO2e)*	$ per ton	Authority to Implement
	100,000	unknown	

Co-benefits	Other Considerations

- Newer equipment with low-GWP refrigerants can lower energy costs for residents
- Incentives or subsidies may increase compliance for individuals

* Quantification assumes that 100,000 devices have been replaced with zero- or low-GWP devices, and 100,000 old devices with high-GWP refrigerants have had their refrigerant recovered.

Action Descriptions

- **Action 5.1a.** Replace existing high-GWP refrigerant devices: Replace older devices containing high-GWP refrigerants with newer, more efficient equipment containing low-GWP refrigerants.
- **Action 5.1b.** Support governments' and schools' to transition to low-GWP refrigerant devices: Develop programs to support governments and schools to transition from high-GWP devices to low-GWP devices.
- **Action 5.1c.** Promote good device disposal practices: Develop education and outreach programs to increase public awareness of good disposal practices for devices containing refrigerants to encourage proper disposal.
- **Action 5.1d.** Increase the purchase of low-GWP devices: Develop education and outreach programs to consumers to promote the purchase and use of low- or no-GWP refrigerant devices in homes and businesses.
- **Action 5.1e:** Subsidize proper disposal of high-GWP devices: Develop incentive programs to subsidize or eliminate disposal fees for high-GWP devices to encourage proper disposal.

Estimating Emissions

Reductions from this strategy are represented by estimating two elements: the number of high-GWP devices that are removed from use and have their refrigerant recovered, and the number of zero-GWP or low GWP refrigerant devices that are purchased instead of conventional high-GWP devices.

- The Emission Reduction Potential for 2030 assumes that assumes that 100,000 devices have been replaced with zero- or low-GWP devices, and 100,000 old devices with high-GWP refrigerants have had their refrigerant recovered. The Strategy Total was calculated using:
  - The number of devices, multiplied by the grams of refrigerant and the effective carbon intensity of the refrigerant (median value from the range).
  - All devices are assumed to have 100 grams of refrigerant that would have otherwise been emitted (leaked).
- Emission Reduction Potential for 2050: Forthcoming.

Strategy 5.2 Reduce Refrigerant Leaks from Commercial and Industrial Systems

Strategy 5.2	Reduce Refrigerant Leaks from Commercial and Industrial Systems		
	Major Emitting Activities • Small refrigerant leaks through normal operation • Large refrigerant leaks through malfunctions		
	Existing Policies and Effects • Washington House Bill 1112 (2019) • Washington House Bill 1050 (2021-22)		
	Actions a. Support commercial and industrial leak detection and repair*		
Strategy Total	**Emission Reduction Potential (MTCO2e)*** 84,000	**$ per ton** unknown	**Authority to Implement**
Co-benefits	**Other Considerations**		
	• Reduced leaks can reduce energy costs		

* Quantification assumes 10,000 systems are inspected.

Action Descriptions

- **Action 5.2a.** Support commercial and industrial leak detection and repair: Develop programs to increase requirements for leak inspection, monitoring, repair, and recovery of refrigerants from larger commercial and industrial systems.

Estimating Emissions

Reductions from this strategy represented by the number of inspections that result in the fixing of leaks based on current estimates of leak rates. Estimates are developed for three industrial system sizes and uses.

- The Emission Reduction Potential for 2030 assumes that 10,000 systems are inspected. The Strategy Total was calculated using:
  - The number of systems inspected; the typical split of small, medium, and large systems (with a ratio of sizes of 16:4:1); and system coolant volumes and leak rates.
  - The number of systems is multiplied by the leak rate. Emissions are summed for all three industrial system sizes.
- Emission Reduction Potential for 2050: Forthcoming.

What is the difference between geographic and consumption-based inventories?

A geographic inventory accounts for the greenhouse gas emissions resulting from activities that occur within the boundaries of a specific region, in this case the Puget Sound region. A consumption-based inventory accounts for the greenhouse gas emissions required to support the activities of all residents, businesses, and organizations within the region, regardless of where those emissions occur. For example, a consumption-based inventory includes emissions from growing food, manufacturing furniture, or mining raw materials, even if those processes happen outside the Puget Sound region. A geographic-based inventory would not account for these emissions.

Because consumption-based and geographic-based inventories follow different scopes, consumption-based inventories are less useful for identifying overall emissions trends or determining progress in meeting greenhouse gas reduction targets. However, they serve as a valuable foundation for future work and deeper exploration of regional emissions responsibility.

Sector 6: Consumption

Sector Overview

Historically, greenhouse gas inventories for the Puget Sound region have not directly included emissions from a consumption perspective. This was due to standard inventorying conventions (which were geographic) and the complexity of tracking emissions from consumption. However, the recently completed 2022 PSREA inventory included a companion consumption-based inventory, which now enables a more comprehensive understanding of regional greenhouse gas emissions.

Many actions that reduce emissions in a geographic inventory also influence a consumption-based inventory. However, because it is difficult to define the precise scope of consumption-based actions, this plan does not quantify the strategies for this sector. This sector is grouped into two subsectors: food, including strategies for addressing emissions from food handling, storage, use and waste; and general goods, including strategies encouraging the reuse, recycling, or repair of general household goods at the end of their useful life if possible.

Major Greenhouse Gas Emitting Activities and Reduction Opportunities

The consumption-based approach accounts for the full lifecycle greenhouse gas emissions of goods and services used within a geographic region. This includes emissions from producing consumable and durable goods, providing services, and supporting transportation and housing. Geographic inventories already include emissions from transportation and home heating, so one of the main differences lies in capturing the emissions from producing food and goods imported from outside the region.

In the food subsector, significant greenhouse gas emissions come from food production, including, handling, storage and use. Reductions in greenhouse gas emissions from food production include producing protein sources with lower climate impacts (i.e., plant-based proteins have the lowest emissions, followed by fish and poultry, with pork and beef having the highest) and reducing food waste, both before and after purchase, especially waste driven by cosmetic standards rather than safety or nutritional quality.

Many household general goods are recyclable, repairable, or reusable, but most people lack the tools or information necessary to assess an item's reparability, locate recycling options, or find repurposing opportunities. In many cases, people purchase tools or equipment they only need temporarily, which then sit unused for years before being discarded, despite having much of their useful life remaining. To address this, a growing number of community-based centers, such as tool libraries and material reuse facilities, have begun to offer alternatives. These centers recover and redistribute salvaged materials, rent or loan tools and equipment, and help individuals repair or refurbish personal items.

Existing Policies and Efforts to Reduce Greenhouse Gas Emissions

Washington State does not currently have legislation that directly targets consumption or its associated greenhouse gas emissions associated. However, several Extended Producer Responsibility laws address lifecycle emissions for specific types of consumer goods. These laws apply to products such as electronics, paint, mercury-containing lights, solar panels, and consumer packaging and paper products.

In addition, the State Department of Ecology has taken a leadership role in launching the NextCycle Washington program and the Center for Sustainable Food Management. The NextCycle program supports businesses and organizations that promote circular economy practices, such as salvaging, reclaiming, recycling, and repairing materials. While these efforts do not directly reduce consumption, they help lower emissions by reducing the need to produce new goods. By extending product lifespans and increasing material reuse, these programs indirectly reduce the greenhouse gas emissions associated with manufacturing and disposal. Ecology's Center for Sustainable Food Management established five key focus areas to prevent food waste, as informed by the Use Food Well Washington Plan.

The Recycling Reform Act established a Reuse Financial Assistance Fund to direct investments into the reuse sector. The Fund will open at $5 million (minimum) in 2029 and must grow if reuse targets are not met.

Cost-Benefits and Co-Pollutant Considerations

The costs of actions within the consumption sector vary widely, and it can be difficult to isolate specific expenditures or directly attribute greenhouse gas reductions to them.

For food-related choices and handling, public education, outreach, and messaging are the primary tools for encouraging change. These efforts can differ significantly in both scope and cost, depending on the target audience and delivery methods.

Recycling, reuse, and repair programs often operate with little or no need for public funding. Many of these initiatives sustain themselves through the resale of materials, rental or membership fees, or community partnerships.

Residents pay for recycling services because there are significant costs for collecting and sorting recyclables. The Recycling Reform Act may result in shifts to the total ratepayer costs.

Beyond greenhouse gas reductions, most of these actions offer a major co-benefit of reduced costs for individuals and households. By minimizing waste, lowering unnecessary consumption, and providing affordable alternatives to new products, these actions help both the environment and household budgets.

Strategy 6.1 Reduce Food Waste and Promote Low-Emission Dietary Choices

Strategy 6.1 Reduce Food Waste and Promote Low-Emission Dietary Choices

Major Emitting Activities

- Consumption of food and products with high associated greenhouse gas emissions
- Production and decomposition of unused and wasted food

Existing Policies and Effects

- Extended Producer Responsibility laws
- NextCycle Washington program and Center for Sustainable Food Management

Actions

a. Promote low-emission diets and dietary choices
b. Reduce food waste from over-purchasing and improve storage use for purchased food more completely
c. Improve food rescue and donation practices
d. Increase repurposing of leftovers for other products

Strategy Total	Emission Reduction Potential (MTCO2e)*	$ per ton	Authority to Implement
	unknown	unknown	

Co-benefits	Other Considerations
	• Efficiency can produce net lifetime cost savings

* We are not able to quantify emission reductions from this strategy.

Action Descriptions

- **Action 6.1a.** Promote low-emission diets and dietary choices: Develop education and outreach programs with partners (e.g., the Sustainable Food Center) to support adoption of plant-based and low-emission diets.
- **Action 6.1b.** Reduce food waste from over-purchasing and improve storage: Identify ways to reduce over-purchasing and associated food waste, improve food storage to prevent spoilage, and identify ways to use food products more completely.
- **Action 6.1c.** Improve food rescue and donation practices: Identify ways to improve food rescue and encourage food donation programs and practices to reduce waste of unspoiled food.
- **Action 6.1d.** Increase repurposing of leftovers for other products: Develop programs targeted at commercial-scale operations to encourage repurposing of leftovers to produce other food products (e.g., drying, grinding, fermenting, etc.) to reduce waste and over-production.

Estimating Emissions

We are not able to quantify emission reductions from this strategy.

#108

Posted by **Carrie Lee - King County Exec Climate Office** on **10/26/2025** at **9:59pm**
[Comment ID: 142] - Link
Agree: 0, Disagree: 0
Encourage discussion of how these actions/strategy can reduce emissions. King County is about to release updated consumption based emissions inventory, can be a guide for magnitude of emissions from food, with assumptions around food waste, could offer potential emission reduction from reducing food waste and improved food rescue

Strategy 6.2 Promote a Circular Economy for General Goods

Strategy 6.2 Promote a Circular Economy for General Goods

Major Emitting Activities

- Manufacturing and selling goods with a single or limited use
- Manufacturing new items for purchase rather than consumers borrowing or fixing existing items

Existing Policies and Effects

- Extended Producer Responsibility laws
- NextCycle Washington program

Actions

a. Extend producers' responsibilities to end-of-life and recycling
b. Promote reuse and repair of general goods
c. Support organizations that encourage reuse, repair, renting, and borrowing

Strategy Total	Emission Reduction Potential (MTCO2e)*	$ per ton	Authority to Implement
	unknown	unknown	

Co-benefits

Other Considerations

- Promotes less consumption and growth of a circular economy
- Efficiency can produce net lifetime cost savings

* We are not able to quantify emission reductions from this strategy.

Actions Descriptions

- **Action 6.2a.** Extend producers' responsibility to end-of-life and recycling: Require producers to take responsibility for the full lifecycle of the materials and goods they produce.
- **Action 6.2b.** Promote reuse and repair of general goods: Develop education and outreach programs to support and increase the reuse and repair of general goods.
- **Action 6.2c.** Support organizations that encourage reuse, repair, renting, and borrowing: Support and promote businesses and organizations that encourage reuse, repair, renting and borrowing of general goods.

Estimating Emissions

We are not able to quantify emission reductions from this strategy.

#109

Posted by **Carrie Lee - King County Exec Climate Office** on **10/26/2025** at **9:59pm**
[Comment ID: 143] - Link
Agree: 0, Disagree: 0
Suggest adding some discussion - data from consumption based inventory 2019 or soon to be released King Co inventory can provide sense of scale

Utility Considerations

The Puget Sound region is fortunate to be relatively well-poised to transition to an electrified future given our non-emitting hydroelectric resources and the passage of major laws and strategies to decarbonize the transportation and built environment sectors including the Clean Energy Transformation Act, Clean Fuel Standard, and State Transportation Electrification Strategy, among others. However, this energy transition will require thoughtful planning and implementation, taking into account energy challenges in production and transmission that largely fall to electric utilities to address. Decision-makers in the region should keep in mind the following considerations:

Utility Involvement in Electrification Planning Efforts 110

Whether implementing jurisdiction-wide electrification policies or identifying project-specific needs, local and regional governments must involve utilities in their electrification planning conversations early and often to identify utility constraints and to ensure projects stay on track.

While local government regulations, policies and incentives to encourage electrification are necessary to achieving our greenhouse gas reduction targets, they also have significant implications for utilities. To meet the region's energy goals, utilities must find new and improved ways to generate, supply, store, and transmit electricity load across and beyond their service territories, while simultaneously managing ratepayer costs and significant lead times for infrastructure build-out. The process of planning, permitting, and constructing new storage, transmission, and distribution infrastructure can take over a decade. This process can take even longer when utilities require interconnection with regional power systems like Bonneville Power Association, when permitting processes take longer than expected, or when there is local opposition to a critical energy infrastructure project, such as a proposed transmission-line pathway. For these reasons, utility involvement in planning efforts is critical.

Building on Regional Conservation Successes

Just as our region is fortunate from clean energy supply and policy standpoints, we also have a rich and successful history of conservation leadership. This thoughtful leadership has resulted in energy development over the last several decades that has avoided high costs and negative environmental impacts. Building on the successes and lessons learned from this history can help to mitigate demand from increased electrification.

Our history of energy conservation has set a precedent for utilities partnering with customers and communities to collaborate on energy and environmental goals. These partnerships often have far-reaching benefits beyond energy conservation (i.e., improved health, comfort, safety, and financial outcomes). Opportunities to continue to partner with customers and communities to achieve smart and beneficial electrification goals include:

1. Increased emphasis on energy efficiency and conservation, particularly as consumers purchase and install electrified equipment in homes and businesses.
2. Transportation electrification planning that results in managed and bi-directional electric vehicle charging strategies.
3. Expanded implementation of demand-response programs, including rate design, that encourages energy consumption at times of low demand.
4. Expansion of local distributed energy resources, including solar installations paired with battery energy storage.
5. Development of public-private partnerships to implement innovative load management projects in concert with electrification to optimize grid operations.

#110

Posted by **Addison Houston** on **10/17/2025** at **4:50pm** [Comment ID: 66] - Link

Agree: 0, Disagree: 0

Is it possible to add links to utility portfolios to show the dominant sources from which the major utilities obtain their power from?

> Reply by **Addison Houston** on **10/17/2025** at **4:52pm** [Comment ID: 67] - Link
>
> *Agree: 1, Disagree: 0*
>
> This would help improve understanding as to why some counties (e.g., Snohomish) has a lower GHG emissions contribution from its built environment sector and also may help identify additional pathways GHG emissions could further be reduced by utility transition towards renewable sources.

6. Broad stakeholder engagement to ensure electrification opportunities are accessible across all demographics and to avoid system-wide cost-shifts to overburdened households and communities.
7. Broad access to funding, technical resources, grant administrative assistance, and installer networks to decrease barriers to implementation.

Cost-Effective Decision-making

Utilities must balance the need for more cost-effective efficiency investments with the up-front costs of new generation sources in their long-term planning decisions, and ensure replacement sources are established before eliminating energy sources (e.g., natural gas).

Promoting energy efficiency measures through incentive programs and energy code changes continues to be a low-cost way for our region to reduce electricity demand. However, as the market transforms and code changes are implemented, the energy savings from many common low-cost measures, such as energy-efficient lighting, are not as readily available as they once were.

Awareness Around Utility Incentive Programs

Local and regional governments should ensure they understand the rules and eligibility requirements associated with utility programs to help their residents make clean energy choices.

Utilities in the region have developed various incentive programs with the intent of creating an inclusive and equitable energy transition for communities. Examples of utility incentive programs include:

- Puget Sound Energy Up & Go Electric Program
- Tacoma Public Utilities Community Electric Vehicle Charging Rebate
- Seattle City Light Fleet Electrification Program
- Seattle City Light Multifamily Electric Vehicle Charging Program

Utilities and local government should work together to raise awareness and communicate the benefits of these programs to communities, and identify how these programs can complement and bolster existing climate action.

Opportunities for Local Government to Incentivize Electrification

Local governments can work with their utilities to develop solutions to ensure all residents, especially low-income residents, can benefit from electrification incentives programs (see Seattle's Clean Heat Program).

Washington State law prohibits most utilities from using incentives to promote fuel switching, with an exception for cooperative utilities, investor-owned utilities, or utilities that provide two or more types of fuel (e.g., electricity and natural gas). In our region, Seattle City Light, Tacoma Power, and Snohomish Public Utility District are subject to this requirement, meaning that, for example, a resident that relies on heating oil is ineligible to receive assistance from these utilities to switch to electric appliances. Incentives from local governments could help with this transition.

Local government should also work with utilities to ensure incentive programs are implemented in the correct order to ensure maximum effectiveness (e.g., weatherization incentive programs should always be implemented before appliance replacement incentive programs).

Partnering with Utilities to Meet Growing Energy Needs and Decarbonization Goals

Local governments can encourage the development of clean energy sources, including small modular reactors, bioenergy, long-duration battery storage, and hydrogen, to create a resilient electric grid that can support decarbonization strategies at the local level. Additional transmission capacity to deliver clean energy to utility customers will require transmission expansion across multiple segments. Local governments can advocate for new policies to reduce permitting delays for the construction of clean energy generation and transmission capacity. Local governments can also advocate with state policy makers to explore new mechanisms and governance structures for increasing transmission capacity

The 2025 Northwest Regional Forecast from the Pacific Northwest Utilities Conference projects electricity demand in the region could grow by more than 30% in the next 10 years. The report also projects rising demand for power during the hottest and coldest times of the year, with summer peak demand growing at a faster rate, mostly because of hotter weather driving increased need for air conditioning.

The transition to cleaner energy means that reliable, dispatchable sources of energy that have traditionally provided baseload power, such as coal, will no longer be available. Replacement of these resources with renewable resources requires substantial additional capacity to offset the intermittent nature of these resources. Investments in generation and transmission will help enhance our energy resilience and enable a robust clean energy pathway for the future.

Benefits Analysis

In addition to the reduction of greenhouse gas emissions, many of the strategies proposed in this plan have additional benefits. This section summarizes these benefits at a high level. For specific calculations and values for benefits that we can quantify, and for a qualitative description of those we can't, please refer to **Appendix C**, Benefits Analysis.

For the purposes of this analysis, benefits are grouped into three categories: reductions in air pollutants and improvements in public health, financial and economic gains, and environmental and ecological benefits. Co-benefits from air pollution reductions are easier to quantify. For the other co-benefits, quantification remains challenging, so we describe these co-benefits qualitatively.

Understanding Geographic Disparities in Pollution

Environmental health disparities refer to the unequal distribution of environmental health risks and outcomes among different populations. Many strategies and actions in this plan aim to reduce pollution across broad areas or sectors, and they may affect neighborhoods, locations, or demographic groups unevenly. Pollution impacts certain communities more than others, and recognizing and understanding these unequal impacts is essential for effective planning and implementation. This climate plan aims to understand major environmental health disparities in our region and identify climate strategies that can help reduce them in a way that maximizes environmental justice outcomes for overburdened communities.

Since we cannot predict with high certainty how, or to what extent, this climate plan's strategies will be carried out, we face uncertainty when estimating their indirect effects and the resulting disparities. Broadly, implementation of the strategies in this climate plan could lead to several important benefits:

- **Reduced vehicle pollution**: Communities living near roadways would likely experience lower levels of air pollution from strategy implementation.
- **Lower built environment emissions: through strategy implementation, neighborhoods with older housing stock can realize improved indoor air quality and air pollution exposure benefits; neighborhoods near industrial sources may see limited improvements in air quality.**

#111

Posted by **Stephanie Gowing** on **10/07/2025** at **10:31am** [Comment ID: 25] - Link

Agree: 0, Disagree: 0

Consider expedient and affordable temp power permit processes to reduce temp power on construction by diesel.

#112

Posted by **Addison Houston** on **10/17/2025** at **4:54pm** [Comment ID: 68] - Link

Agree: 0, Disagree: 0

Does this account for growing power demands from tech sector associated with AI and data centers?

#113

Posted by **Addison Houston** on **10/17/2025** at **4:59pm** [Comment ID: 69] - Link

Agree: 0, Disagree: 0

Suggest adding mention that some strategies in this plan may however work to reduce pollution levels in indoor environments (e.g., electrification of appliances) and efforts to improve energy efficiency may reduce infiltration of pollution into indoor environments (e.g., weatherization).

- **Improved public transit:** Strategies to expand and enhance transit options would especially benefit people who cannot drive or struggle to afford car ownership.
- **Tree planting and retention:** Strategies to enhance and retain greenspace would support neighborhoods with fewer existing trees, improving aesthetics, livability, and reducing heating and cooling costs.

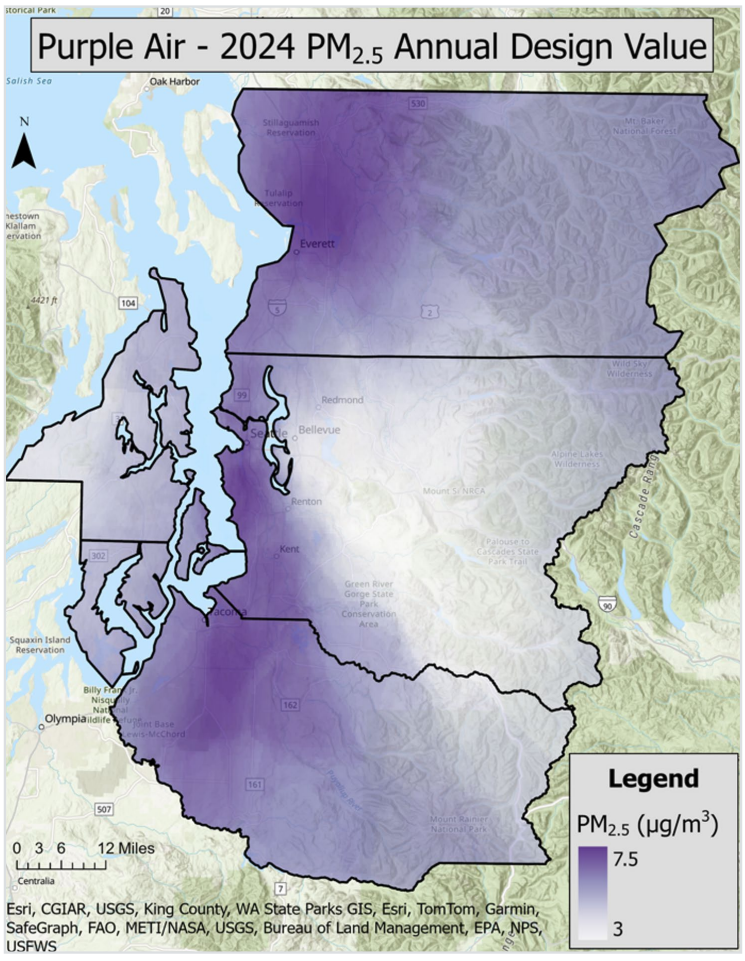
Reductions in Air Pollutants and Improvements in Public Health

Many processes emitting greenhouse gases from combustion of petroleum-based fuels also emit other air pollutants that impact human health, particularly for heart and lung disease and potential cancer risk. Due to the potential for adverse impacts to public health and the environment, regulations help control many air pollutants. These regulations may include limits on maximum acceptable ambient air concentrations, requirements for emission-reduction technologies, or risk thresholds (e.g. Washington State Acceptable Source Impact Levels).

Monitoring Air Quality in the Puget Sound

The Agency monitors air pollution across King, Kitsap, Pierce, and Snohomish Counties and creates tools to help residents and communities check levels of air pollution in our region. These tools provide the most recent pollution levels, air quality summaries, and historical information, helping residents understand health risks and make clean air choices. **Figure 11** displays an example image of annual average fine particle levels for 2024 from an Agency analysis of regional air sensors.

Figure 11: Annual Average PM2.5 levels for 2024 from regional air sensors.



The most important air pollutant in the region is fine particulate matter ($PM_{2.5}$), as it drives the majority (90%) of cardiac and respiratory risk from air pollution. Its subset, diesel particulate matter, is also important, as it drives potential cancer risk from air pollution. We also describe pollutants nitrogen oxides and volatile organic compounds.

Fine Particulate Matter ($PM_{2.5}$) and diesel particulate matter:

- Particulate matter is emitted during fuel combustion. In the Puget Sound region, fine particulate matter is responsible for about 90% of respiratory and cardiovascular health risks.[5] Particulate matter from diesel exhaust is responsible for about 85% of the potential cancer risk from air pollution. A major source of total particulate matter is residential woodburning.
- In Washington, fine particulate matter causes hundreds of early deaths each year and contributes to other health problems including non-fatal heart attacks, asthma attacks, strokes, respiratory infections, and reduced quality of life.
- The transportation sector offers the greatest potential for reducing particulate matter, particularly through measures that reduce diesel fuel use. Replacing diesel-powered trucks and equipment with electric alternatives can eliminate emissions from diesel particulate matter entirely.

Nitrogen Oxides:

- Nitrogen oxide is emitted by any process that burns fossil fuels. A major source in the region is transportation (e.g., gas- and diesel-powered vehicles and equipment, trains, and ships), which contributes about two-thirds of the nitrogen oxide emissions. Other notable sources are natural gas combustion, residential appliances (e.g., home ranges, stoves, furnaces, water heaters, etc.), industrial furnaces and processes, and space heating for many commercial buildings.
- Exposure to nitrogen oxides can adversely affect the respiratory system. In the region, concentrations of nitrogen oxides are higher in urban, near-roadway and overburdened communities.

Volatile Organic Compounds:

- Volatile Organic Compounds are found in a wide range of products and materials, including fossil fuels, solvents, cleaning agents, paints, and others. The major sources in the region include vehicle exhaust and industrial processes.
- Volatile Organic Compounds generally have a smaller health impact in our region. Concentrations of Volatile Organic Compounds are higher in near-roadway and overburdened communities.

To fully assess the public health impacts of air pollutant reductions, researchers estimate the typical costs of medical treatment, the societal losses from these events, and the societal value placed on preventing early deaths, commonly referred to as the "value of a statistical life". Among all health outcomes, early death, measured through the value of a statistical life, represents the greatest cost, both individually and collectively. As a result, the overall societal cost of air pollution is largely driven by the number of early deaths from cardiovascular issues caused by particulate matter. While other health outcomes, such as non-fatal heart attacks, lung cancer, strokes, asthma attacks, and respiratory infections, carry lower total costs from a societal perspective, they can still be severe for individuals.

Implementing strategies that reduce emissions and air pollutants also results in improvements in public health. Benefits include but are not limited to lower risk of respiratory and cardiovascular disease, decreased incidence of premature deaths, reduced exposure to harmful air pollutants, and reduced risk of cancer. Appendix C provides additional details by sector and health outcome.

[5] From an Agency analysis using EPA's COBRA model.

Using Data Modeling to Maximize Benefits

Prior to implementation, decision-makers can use data modeling to quantify the public health impacts of climate strategies in a way that maximizes benefits for overburdened communities. For example, local governments and public health departments could work together to develop modelling that reveals the public health costs and co-benefits of interventions like transportation planning or appliance upgrade programs.

Best practices for data modelling and geospatial analysis include:

- Determining a regional baseline to show spatial variability in pollution exposures;
- Conducting assessments and future state modeling to understand how each climate strategy reduces or exacerbates existing health disparities; and
- Developing a health equity profile for each strategy with information on exposures, harms, and co-benefit opportunities, based on potential mechanisms for implementation (e.g., requirement, enforcement, guidance, technical assistance, education and outreach, etc.)

Financial & Economic Gains

Many of the strategies in this climate plan change the fuel type, technology, or energy use in key processes, which leads to changes in operating costs. We describe the financial and economic gains from implementing the strategies qualitatively by sector.

In the transportation sector, the primary shift involves replacing gasoline- and diesel-powered vehicles and equipment with electric-powered alternatives, primarily using batteries for energy storage. Most battery electric vehicles offer significantly lower costs for fuel, maintenance, and upkeep compared to gas powered vehicles. Although battery electric vehicle technology has only been in mainstream production for about 10–15 years, many battery electric vehicles already have a lower total cost of ownership (20-30%) than comparable gasoline or diesel vehicles. For heavy-duty applications, particularly short-range trucking and shipping, battery electric vehicles also tend to offer lower total ownership costs. [114]

In the built environment, many strategies in this plan reduce heating needs through improved insulation or more efficient systems. These strategies directly lower fuel consumption, often yielding net savings or a positive return on investment over the life of the equipment or building. Similarly, solar installations either supply electricity directly to buildings or feed it into the grid, reducing owners' overall utility costs. In industrial and commercial sectors, fuel costs often far exceed equipment costs. As a result, investments in energy efficiency typically deliver strong return on investment, although the high upfront infrastructure or capital investment required can be a barrier.

In the waste sector, many materials can be reclaimed or recycled at costs comparable to producing items from raw resources. When factoring in pollution-related externalities, recycled products often become cheaper than newly manufactured ones. Many discarded items can be repaired with minimal effort or salvaged for parts, avoiding unnecessary landfill use. Repaired items usually cost much less than new ones, offering savings to users or resale opportunities at lower prices.[115]

In the refrigerant sector, newer equipment such as air conditioners, freezers, and refrigerators operate far more efficiently than older models. These improvements significantly reduce electricity use, lowering both energy costs and associated greenhouse gas emissions from power generation.

In the consumption sector, financial benefits closely align with those in the waste sector. Improving the efficiency of food production, handling, and purchasing lowers costs at every stage. Repurposing food waste into animal feed or other organic products creates additional value streams from materials that would otherwise be discarded.

#114

Posted by **Addison Houston** on **10/17/2025** at **5:06pm** [Comment ID: 70] - Link

Agree: 0, Disagree: 0

Suggest adding mention of alternative fuels as well as that is a component included in many of the transportation actions. Suggest outlining what current alternative fuel types exist and associated costs with scaling necessary production of alternative fuels and creating the necessary supporting infrastructure to accommodate alternative fuels.

#115

Posted by **Addison Houston** on **10/17/2025** at **5:09pm** [Comment ID: 71] - Link

Agree: 0, Disagree: 0

Reference upfront costs of creating the supply chain systems necessary for recycling and circular economy reuse of materials. E.g., operational costs for collection, sorting, cleaning, and reuse.

Environmental & Ecological Benefits

Many strategies in this plan provide indirect benefits by improving environmental and ecological health. We describe these benefits qualitatively by sector.

In the built environment and transportation sectors, any action that reduces the combustion of fossil fuels will lower emissions of other air pollutants and reduce their harmful environmental effects. For example, reducing fossil fuel use decreases the deposition of organic compounds that can adversely impact nearby water bodies, and lowers ground-level ozone formation, which lessens ozone damage to vegetation.

Strategies to reduce emissions from the waste and consumption sector also offer significant ecological benefits. Diverting materials from landfills reduces the land area required for waste disposal and lowers the risk of groundwater contamination and air pollution. Additionally, reducing waste decreases the demand for manufacturing new products, along with the associated environmental impacts of mining, harvesting, or extracting raw materials.

Strategies in the refrigerant sector also provide another key opportunity to improve ecological health. Older refrigerants, such as CFCs, severely damaged the stratospheric ozone layer, particularly over the Antarctic, but also in mid-latitudes. While their interim replacements, HCFCs and HFCs, had lower ozone-depleting effects, they remained potent greenhouse gases. Today, manufacturers have developed refrigerants that are both ozone- and climate-friendly. As the industry transitions to these alternatives, we can expect benefits not only for the climate but also for the ozone layer, and in turn, for both human and ecological health.

Workforce Planning Analysis

As the region's investment in clean technology grows, so will the need for a future clean technology workforce. Existing employment reports and data are provided in this section to identify workforce development needs in the Puget Sound region to successfully implement climate actions.

Clean Energy Employment

The region is experiencing job growth in clean energy sectors as a result of the state's climate policies and recent federal investments. Key areas of growth include occupations related to electrification and building efficiency upgrades (e.g., heating, ventilation and air conditioning technicians), clean fuels (e.g., biofuel producers), and energy generation, transmission and distribution (e.g., electrical workers, engineers and line technicians). 116

Identifying clean energy industries and occupations is not straightforward. While some occupations are obviously related to clean energy (e.g., electrical power-line installers), the connection is less direct for others (e.g., mechanics and service technicians). Government agencies use Standard Occupational Classifications (SOC) codes to classify workers into occupational categories for the purposes of collecting or disseminating data[6] This section categorizes clean energy occupations into four industry groups, mirroring those used in the State's 2024 Clean Energy Employment Preliminary Report:

1. Clean energy generation and energy grid occupations include nuclear engineers and technicians, power plant operators, wind turbine service technicians, power distributors and dispatchers, and electrical power-line installers and repairers.
2. Energy efficiency occupations are occupations in construction trades involved with energy efficiency or weatherization. These include electricians, insulation workers, plumbers, pipefitters and steamfitters, roofers, and miscellaneous construction and related workers.

[6] There is currently no established consensus on which SOC codes constitute clean energy.

#116

Posted by **John (Spark Northwest, Seattle)** on **10/23/2025** at **1:30pm** [Comment ID: 94] - Link

Agree: 0, Disagree: 0

Might also include managerial and educational jobs in the government and NGO sectors, as well as scientific research in private and government sectors

3. Engine maintenance and repair occupations include mechanics and service technicians who focus on engine-based transportation.
4. Fossil fuel occupations include petroleum engineers and petroleum pump system operators.

Table 5 presents 2024 employment and wage data for the region's clean energy occupations based on the Washington Employment Security Department's occupational employment and wage statistics estimates, utilizing the SOC codes used in the State's 2024 Clean Energy Employment Preliminary Report[7]

[7] Data provided for the Seattle-Tacoma-Bellevue and Bremerton-Silverdale MSAs. OEWS does not provide Washington State estimates for SOC 47-2231, solar photovoltaic installers.

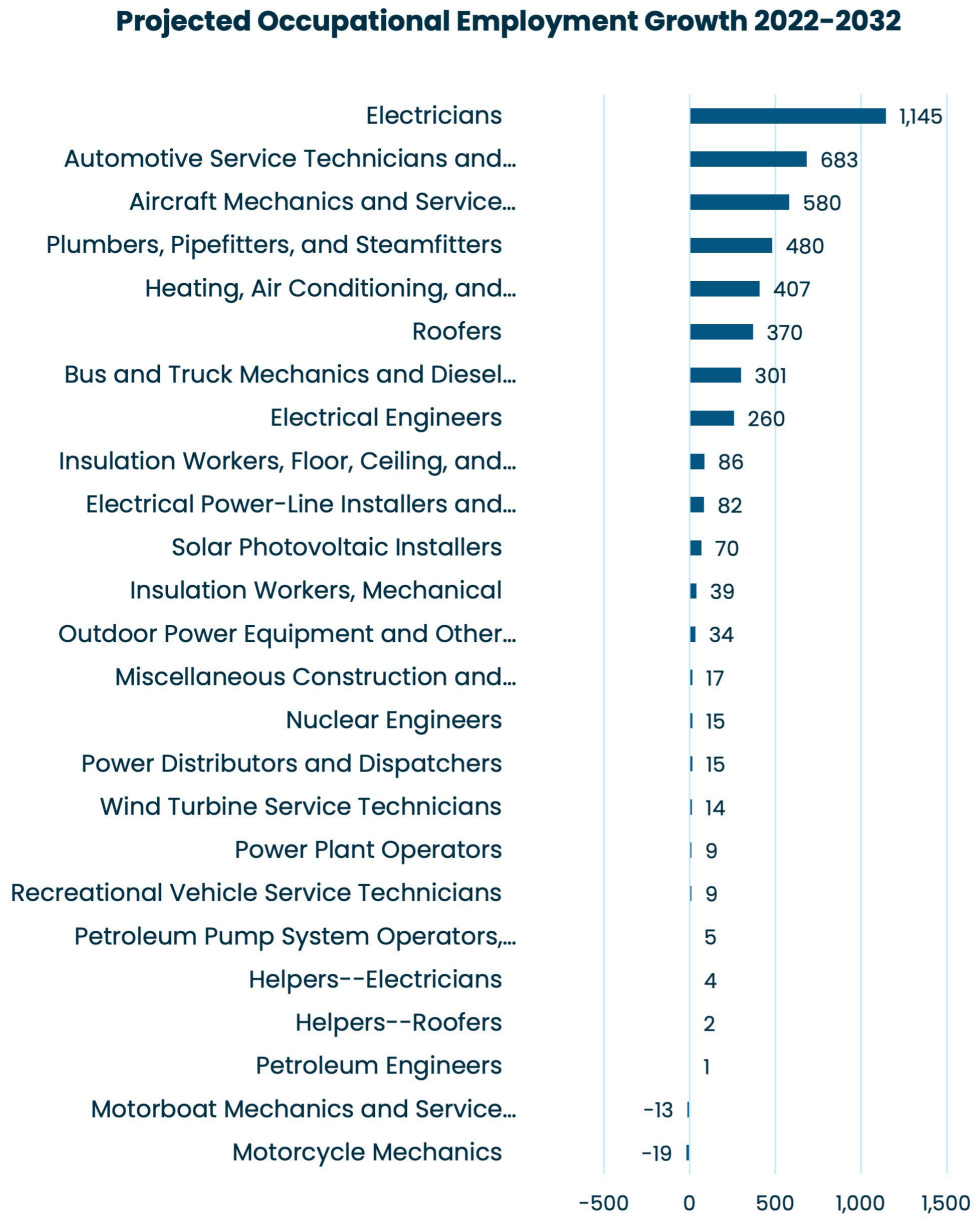
Table 5: Regional Employment and Wage Data for Clean Energy Occupations

Industry Category	SOC code	Occupation	Est. 2024 Employ.	Avg. hourly wage	Avg. annual wage
Clean Energy Generation and Energy Grid	47-2111	Electricians	10,790	$41.07	$85,424
	49-9051	Electrical Power-Line Installers and Repairers	1,350	$52.40	$108,986
Energy Efficiency	47-2132	Insulation Workers, Mechanical	340	$41.39	$86,083
	47-2152	Plumbers, Pipefitters, and Steamfitters	6,870	$39.84	$82,863
	47-2181	Roofers	3,070	$33.57	$69,831
	49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	4,310	$36.55	$76,016
	47-2131	Insulation Workers, Floor, Ceiling, and Wall	620	$31.40	$65,310
	47-3013	Helpers--Electricians	450	$33.05	$68,752
	47-4090	Miscellaneous Construction and Related Workers	190	$31.34	$65,196
Engine Maintenance and Repair	49-3023	Automotive Service Technicians and Mechanics	6,910	$30.04	$62,475
	49-3031	Bus and Truck Mechanics and Diesel Engine Specialists	3,680	$37.64	$78,285
	49-3051	Motorboat Mechanics and Service Technicians	460	$32.42	$67,429
	49-3053	Outdoor Power Equipment and Other Small Engine Mechanics	390	$27.07	$56,315
	49-3011	Aircraft Mechanics and Service Technicians	3,530	$41.34	$85,988
	49-3052	Motorcycle Mechanics	240	$27.20	$56,567
	49-3092	Recreational Vehicle Service Technicians	270	$29.65	$61,674
Fossil Fuels	51-8013	Power Plant Operators	120	$61.15	$127,196
	51-8093	Petroleum Pump System Operators, Refinery Operators, and Gaugers	100	$46.33	$96,362

Clean Energy Employment Projections

Figure 12 shows the 10-year projections (2022-2032) for total growth in energy-related occupations by job type for King, Pierce and Snohomish counties based on state employment projections data.[8] In total, clean energy occupations are projected to grow by 4,590 jobs over the 2022-2032 period. The occupation with the highest expected job growth is electricians, which is expected to add 1,145 jobs over the decade. This is followed by automotive service technicians and mechanics (683), aircraft mechanics (580), plumbers, pipe fitters, and steamfitters (480), heating, air conditioning and refrigeration mechanics (407), roofers (370) and bus and truck mechanics and diesel engine specialists (301). Occupations expecting jobs losses are motorcycle mechanics (-19) and motorboat mechanics and service technicians (-13).

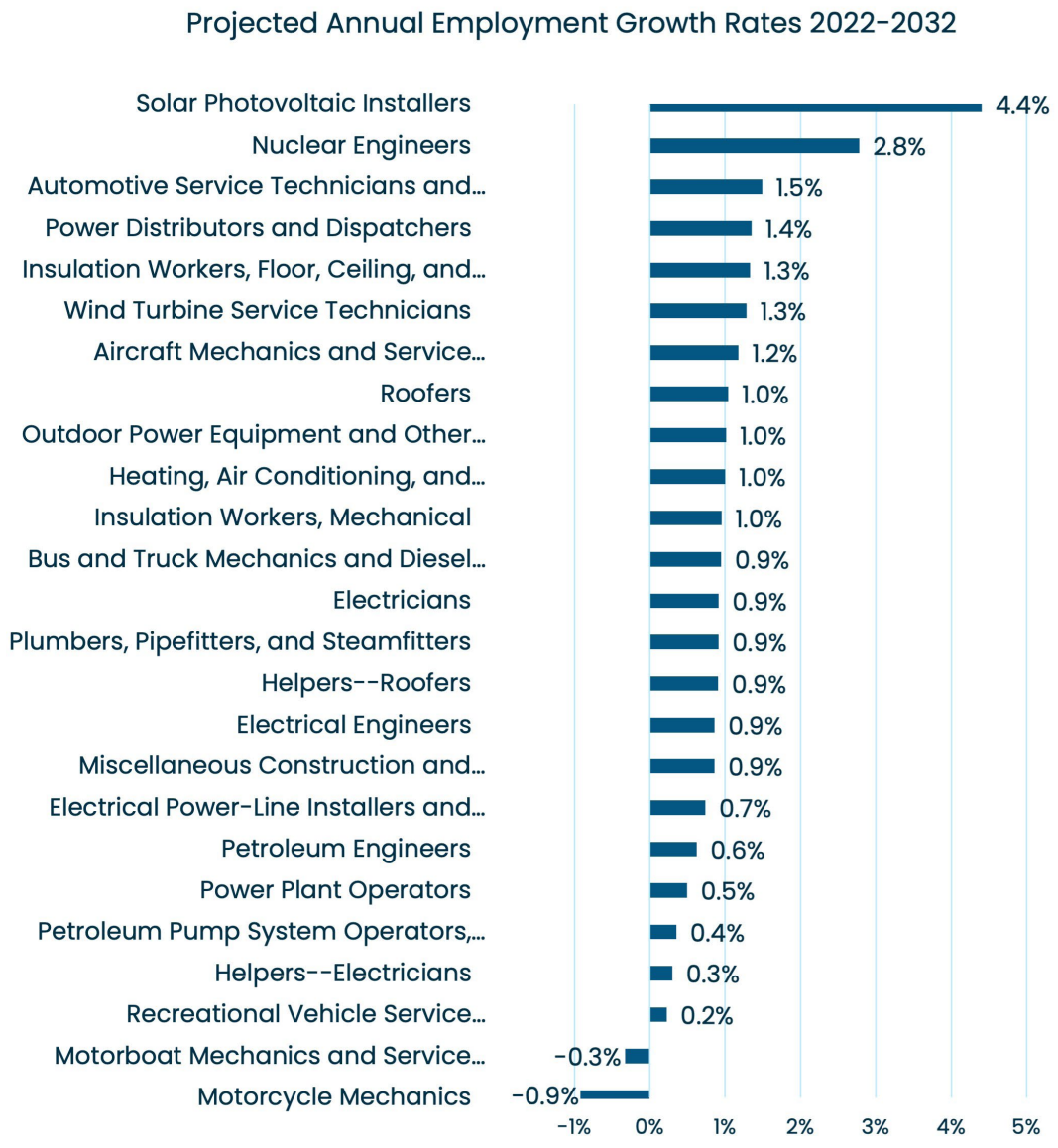
Figure 12: Projected Occupational Employment Growth 2022-2032 for King, Pierce, and Snohomish counties.



[8] Projections are provided for Washington's 12 Workforce Development Areas. Kitsap county is included in the Olympic WDA, alongside Jefferson and Callum counties. Because Kitsap County data could not be isolated, only King, Pierce and Snohomish counties are included.

Figure 13 shows the10-year projections (2022-2032) for average annual growth rates for the same clean energy occupations as Figure 7 for King, Pierce and Snohomish Counties. As shown, average annual growth rates for clean energy occupations are between -0.92% and 4.4% per year. The fastest growing occupation is solar photovoltaic installers (4.4%), followed by nuclear engineers (2.78), automotive service technicians and mechanics (1.49%), power distributors and dispatchers (1.35%), insulation workers, floor ceiling and wall (1.33%), wind turbine service technicians (1.28%), and aircraft mechanics and service technicians (1.18%).

Figure 13: Projected Occupational Annual Employment Growth Rate 2022-2032 for King, Pierce, and Snohomish Counties.



Existing Climate and Energy Workforce Development Programs

State Programs and Plans

The State's Workforce Training and Education Board (Workforce Board) is a Governor-appointed partnership of members from business, labor, and government. Created by the Washington Legislature in 1991, the Workforce Board is dedicated to helping Washington residents obtain and succeed in family-wage jobs and meeting employers' needs for skilled workers. The Workforce Board's activities are guided by the Talent and Prosperity for All Plan (2024-2028), a strategy that guides state and federal investments that help workers access living wage jobs and provides employers with a skilled workforce.

Washington is categorized into 12 regional Workforce Development Areas, each of which is overseen by a Workforce Development Board. Of these, four Workforce Development Boards cover counties located in the Puget Sound region:

- Workforce Development Council of Seattle-King County (serving King County)
- Olympic Workforce Development Council (serving Kitsap, Callum and Jefferson Counties)
- Workforce Central (serving Pierce County)
- Future Workforce Alliance (serving Snohomish County)

In 2023, the Legislature passed the Climate and Clean Energy Service Workforce Programs bill under the Climate-Ready Communities Act, establishing both the Washington Climate Corps Network and Clean Energy Technology Workforce Advisory Committee (CETWAC). CETWAC focused on research and recommendations for the workforce needs of growing clean energy technology sectors.

In response to the state's anticipated job growth in clean energy and climate-related fields, CETWAC is collaborating with workforce development and training partners across the state to advance training opportunities to ensure Washington's workforce is prepared to lead in the clean energy transition. Programs include, but are not limited to: Washington Climate Corps Network, Washington Conservation Corps, Ecology Youth Corps, Student Conservation Association, Career Connect Washington, King County JumpStart, King County NextGen Climate Internship Program, Emerald Cities Collaborative HVAC/R Training and Career Preparation Academy, Smart Buildings Center, and The Building Efficiency and Clean Operations Network (BEACON) Fellows program.

Regional Programs and Plans 117

The Coalition for Climate Careers (C3), sponsored by King County, the City of Seattle, and the Port of Seattle, brings together workforce development organizations from across the four-county area. C3 is committed to building an inclusive and prosperous green workforce in the region. It prioritizes frontline communities and workers most affected by the transition to a green economy by offering policy guidance, funding for workforce partnerships, promoting green career pathways, and fostering cross-community collaboration. As part of King County's Climate Pollution Reduction Grant (CPRG), C3 is actively supporting a regional workforce development strategy for decarbonization projects, and promotes green job campaigns through public convenings and outreach efforts.

Beginning in 2026, the Puget Sound Zero Emission Truck Collaborative will be developing a regional workforce development strategy focused on the transition to zero-emission trucking in the region and state. Collaboration with C3 and state-wide programs will help ensure regional activities are coordinated and synergistic.

#117

Posted by **Carrie Lee - King County Exec Climate Office** on **10/26/2025** at **10:05pm**
[Comment ID: 144] - Link
Agree: 0, Disagree: 0
King County staff have reviewed and strong thumbs up to how this workforce development section represents the current partnerships and opportunities.

Snohomish County is in the process of conducting an economic impact analysis focused on the Sustainable Aviation Fuel Research and Development Center in Snohomish County, as part of a larger study that will also contain a separate analysis focused on the potential commercial terminal expansion at Paine Field Airport. The study will identify the types of jobs needed to implement and maintain the Center, and an analysis of how those jobs stand to impact the county economy.

Workforce Development Challenges and Gaps

Racial and Gender Diversity in Clean Energy Occupations

Advancements in zero-emission technology are bringing sustainable, living-wage career opportunities to the region, and it is essential that all communities have access to those benefits. While opportunities in the region's clean energy sector have great potential, this sector often lacks racial and gender diversity compared to other sectors. Supporting equitable pathways to finding and retaining clean energy talent will require continued collaboration between industry, government, educational institutions and community-based organizations. Regional partners can work together to build capacity among organizations within the workforce development ecosystem to ensure all communities can benefit from access to climate careers with living wage jobs and growth potential.

Worker and Trainee Support

For many vulnerable populations, including low-income and minority communities, finding and keeping a high-quality job, training course, or apprenticeship can be difficult without adequate logistical support. Wraparound services can provide comprehensive and coordinated support to help individuals become job-ready and stay employed. Examples of wraparound services include direct support like transportation vouchers, stipends, and tuition reimbursement, as well as other types of support such as access to affordable childcare, housing assistance, help navigating government benefits and non-profit resources, and financial coaching.

Work-Based Learning

As our region works to address systemic barriers and capacity gaps in the climate action workforce, accessible and practical solutions are essential to create opportunities for emerging workers to gain experience on projects central to decarbonization and clean energy deployment. These opportunities span skilled trades such as HVAC, electrical work, plumbing, and weatherization.

Historically, pre-apprenticeship programs have struggled to support graduates in securing competitive apprenticeship placements. Establishing paid work-based learning opportunities for graduates of registered pre-apprenticeship programs can provide real-world experience while simultaneously improving workers' competitiveness for future apprenticeship slots. More clarity is needed for contractors across trades on how to incorporate paid work-based learning into their projects, as well as how to utilize workforce development tools such as on-the-job training.

Success Story:

King County's JumpStart Program

King County's JumpStart program partners with local pre-apprenticeship initiatives to connect graduates directly with contractors across various fields, resulting in successful placements. JumpStart's growing network of over 20 local employers, eight education and training providers, and community partners connects youth ages 18-24 with paid, work-based learning and employment opportunities in the clean energy sector, providing a good model for additional work-based learning programs in the region.

Success Story: BUILT Cluster

Led by The CleanTech Alliance, the Buildings, Utilities, and Infrastructure Living Together – or the BUILT Cluster – leverages Washington State's social and intellectual capital transform the built environment equitably and decarbonize related infrastructure materials and operations. The BUILT Cluster also supports cradle-to-career education and training opportunities for related industries and the trades including K-12 STEM pipeline, continuous education for the trades, internships/apprenticeships, and recruitment and talent acquisition.

Public-Private Partnerships

Public-private partnerships like C3 play a pivotal role in shaping a workforce development landscape that responds to the evolving needs and gaps across our region. Expanding access to public-private partnerships can catalyze private investment and scale successful workforce development models across counties. These efforts are essential to addressing existing workforce gaps and securing long-term partnerships that prepare our region for the demands of climate action.

Federal and State Funding

Recent reductions in federal and state funding for workforce development initiatives mean less funding for programs that provide training, upskilling, and employment support. Regional partners must find new ways to establish long-term funding streams and resource networks to advance skills training and workforce development in climate- and energy-related capital projects.

Workforce Development Recommendations

1. **Support Equitable Pathways to Finding and Retaining Talent:** Industry, government and educational institutions all have a role to play in building community capacity to support a diverse and equitable workforce in the region. Regional partners can work together through the C3 collaborative to explore new ways to increase awareness and perception of green jobs and skillsets with a focus on youth, and connect frontline communities to economic opportunity in the regional green economy.
2. **Enhance Employee and Trainee Support Services:** Local employers, education and training providers, schools, community colleges, labor partners, and national and community-based organizations all have opportunities to provide support for employees and trainees. These entities can connect with programs like C3 to identify and support consistent, regional guidelines and programs for wraparound services that eliminate employment barriers and promote long-term career aspirations.
3. **Scale Work-Based Learning Opportunities:** Leveraging coalitions like C3 and successful models like Jumpstart, regional partners across trades can work together to establish more paid work-based learning opportunities for graduates of registered pre-apprenticeship programs. Regional partners should work with the Washington State's Department of Labor and Industries to establish clear guidance around contractor participation and ratio requirements to ensure paid work-based learning is effectively implemented and scaled across the region.

Ideas for Success: 1% for Workforce Program

Inspired by existing "1% for Arts" programs in the region, King County is exploring a "1% for Workforce" program to create a funding stream to weave skills training, workforce development, minority- and women-owned business engagement, and living-wage career on-ramps into applicable County capital projects. This program can create a much-needed long-term funding source for workforce development and training activities to help fill gaps in state and federal funding.

4. **Leverage Public-Private Partnership to Support Innovation:** Public-private partnerships play a pivotal role in shaping a workforce development landscape that responds to the evolving needs and gaps across our region. Local and regional governments and employers can connect with coalitions like C3 and the BUILT Cluster to expand access to public-private partnerships and catalyze private investment to scale successful workforce development models across the region.
5. **Fill Gaps in Federal and State Workforce Development Funding:** Leveraging coalitions like C3 and potential models like the "1% for Workforce" program, industry, government and educational partners can work together to identify and establish durable public-private funding streams to support the region's climate workforce development needs. These same partners can support legislation to scale-up innovative workforce development programs and explore developing regional applications to state funding opportunities to enhance competitiveness (e.g., Green Jobs Grant Program).

The successful transition to a clean energy economy relies on a workforce that is trained to meet the region's evolving energy demands. Ongoing and expanded investments in workforce development programs and partnerships throughout implementation of this climate plan will help ensure our region's residents and communities are poised to meet the challenge and can benefit from access to the region's climate careers well into the future.

Next steps

While the magnitude of climate change is daunting, we have seen firsthand how collective action in the Puget Sound can turn ideas into meaningful, community-driven solutions. This region has realized a 5% percent reduction in the emissions (below 1990 levels) that are damaging our climate, but we have a long way to go to achieve the state and region's commitment to 50% below 1990 levels by 2030.

Our region is progressing on an achievable and bold course to 2050. Our current momentum towards reaching our 2030 target will lay the foundation for reaching our 2050 target. Through the many examples of collaboration and dedication we have highlighted in this plan, we can continue to work together to create a cleaner future for our region's communities.

The climate strategies in this plan represent concrete steps to support greenhouse gas emission reductions in our region, and will be especially impactful for overburdened communities. The climate strategies also reinforce and complement the suite of policies and programs already underway at the State level which, together, will help us to meet our collective near- and long-term greenhouse gas reduction targets while centering social justice and equity.

Maintaining momentum from the collaborative partnerships developed during this climate planning process, decision-makers can use this plan as a starting point to determine which strategies and actions to pursue. Leveraging partnerships for action, the Agency can serve as a coordinating body to support jurisdictions as they identify initial strategies and help us make progress towards emissions reduction goals. Implementation considerations may include technology readiness, emissions reduction and co-benefit potential, and community and partner interest in proposed actions.

This climate plan will provide valuable information as the next Regional Transportation Plan is developed. The Regional Transportation Plan and VISION 2050 both address climate change and the reduction of greenhouse gas emissions from on-road transportation. PSRC Boards will consider how to incorporate this climate plan's transportation strategies into the next Regional Transportation Plan.

To be successful, implementation of strategies and actions must be accompanied by ongoing community engagement. The Agency, alongside regional and state partners, may develop a plan for future community engagement to ensure frontline and overburdened communities are centered in ongoing climate planning efforts.

The Agency may also consider developing a companion guide to this climate plan to help local jurisdictions prioritize and select strategies to implement. This guide may further explore which entity or organization is best situated to lead implementation. As non-federal funding becomes more important for climate action, this climate plan could also be used to guide coordinated regional applications to state funding opportunities, such as Climate Commitment Act, and identify opportunities to pursue innovative public-private funding sources.

Updates to this Climate Plan

After the fall 2025 public input period for the draft climate plan, we will capture and consider all the comments and feedback received. We will edit and complete the climate plan, along with additional technical and communication materials, for publication by December 2025.

The next grant deliverable is a Status Report, due to EPA on July 1, 2027. This report should include:

- the implementation status of the quantified greenhouse gas reduction measures included in the climate plan,
- relevant updated analyses or projections supporting climate plan implementation, and
- next steps and future budget/staffing needs to continue climate plan implementation.

Appendix A: Greenhouse Gas Emission Inventory

Methodologies used in 2019 and 2022 Emission Inventories

Key methodological differences between the current 2022 inventory and the previous 2019 inventory (PSREA) are described in Table A-1 below. These updates enhance consistency and clarity across all sectors and improve alignment with the Washington State Department of Commerce's 2022 inventory.

Table A-1. Brief methodological outline of 2019 and 2022 Inventories

Sector	Methodology for PSREA 2019 Inventory	Methodology for 2022 Inventory
Transportation		
On-road vehicles	PSRC activity-based travel model applied to MOVES model	Uses Washington State Department of Transportation's (WSDOT) Highway Performance Monitoring System (HPMS) at the county-level, combined with estimated vehicle and fuel type breakdowns to estimate emissions.
Aviation	SeaTac jet fuel usage downscaled to jurisdiction through passenger survey data; other airports jet fuel and aviation gas usage	SeaTac jet fuel usage downscaled to jurisdiction through passenger survey data; other airports jet fuel and aviation gas usage. Addition of small regional airports
Non-road vehicles and equipment	MOVES3 model	MOVES4 model
Freight and passenger rail	PSEI inventory, scaled to years/jurisdictions by tonnage	Uses emissions reported by the National Emissions Inventory at the county level.
Marine vessels	PSEI inventory, scaled to years/jurisdictions by tonnage and vessel calls. Ferry fuel consumed by route.	Uses emissions reported by the National Emissions Inventory at the county level.
Building Energy		
Electricity	kWh consumed and utility-specific emissions factors calculated or pulled from utility emissions reports	kWh consumed and utility-specific emissions factors calculated using WA Dept of Ecology methodology with Fuel Mix Disclosure reports
Natural Gas	Therms consumed and EPA natural gas emissions factor	
Steam	Steam emissions assumed to be already accounted for by commercial and industrial natural gas consumption and industrial processes	

Fuel oil	EIA sales data downscaled using ACS house heating data	EIA consumption data downscaled using ACS house heating data and commercial employee counts. Until 2019, this category included only residential fuel oil. In 2022, commercial and industrial fuel oil was also added here. In turn, industrial processes and commercial categories reduced in 2022
Propane	EIA sales data downscaled using ACS house heating data	EIA consumption data downscaled using ACS house heating data and commercial employee counts.
Industrial processes	Calculated emissions from individual King County facilities	Three major differences from 2019: 1. Industrial emissions were sourced from EPA FLIGHT data instead of ECY's database. 2. Landfill emissions were previously double counted under both industrial and solid waste categories; for 2022, they were removed from industrial processes. 3. Commercial fuel oil emissions were reclassified from industrial processes to the fuel oil category.
Solid Waste & Wastewater		
Solid waste generation & disposal	Applied standard emission factors from EPA WARM v15 to tonnage estimates	
Wastewater process emissions	Included biogas emissions, BOD_5 emissions, and septic systems	Used emission estimates provided by each County's Wastewater Treatment Division.
Refrigerants		
Substitution of ozone-depleting substances (ODS)	National EPA value scaled to region by population	
Switchgear insulation (SF_6)	SF_6 emissions from PSE and SCL	Assumed to be estimated using Ecology's emission factor methodology.
Land Use		
Agriculture	Enteric fermentation and manure management from U.S. Community Protocol	
Tree cover loss	Global Forest Watch estimates	

Revisions to 2019 Aviation and Transportation

We revised the 2019 aviation emissions estimates based on updated information provided by the Port of Seattle. In the original 2019 inventory, passenger survey results were allocated to total fuel usage at Sea-Tac Airport among counties. However, the Port recently identified an error in the survey data initially provided and supplied corrected results. Using this updated data, we recalculated the 2019 aviation emissions accordingly. Table A-2 below shows the original and updated county-level proportions of Sea-Tac fuel use, based on passenger survey data.

Table A-2. County-Level Allocation of Sea-Tac Airport Fuel Use: 2019 Inventory vs. Updated Port of Seattle Survey Results

County	2019 Inventory Proportions (Sea-Tac Fuel)	Updated Proportions from Port of Seattle Survey
King	82.0%	64.1%
Kitsap	2.2%	3.2%
Pierce	6.5%	9.8%
Snohomish	7.1%	8.6%

These revised 2019 estimates have been applied to both the aviation and transportation sectors for the purpose of ensuring consistency in any comparisons made between 2019 and 2022 within this report.

Additional comparisons between 2019 and 2022 GHG emission estimates for each county

Figure Y. Greenhouse gas emissions by county and sector for 2019 and 2022.

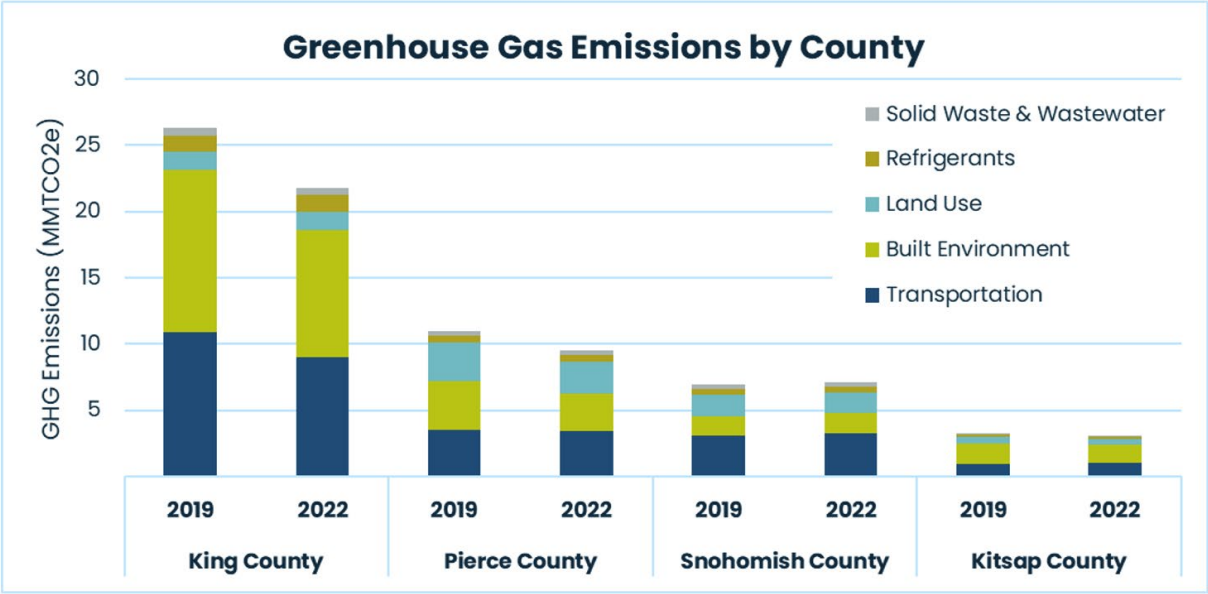
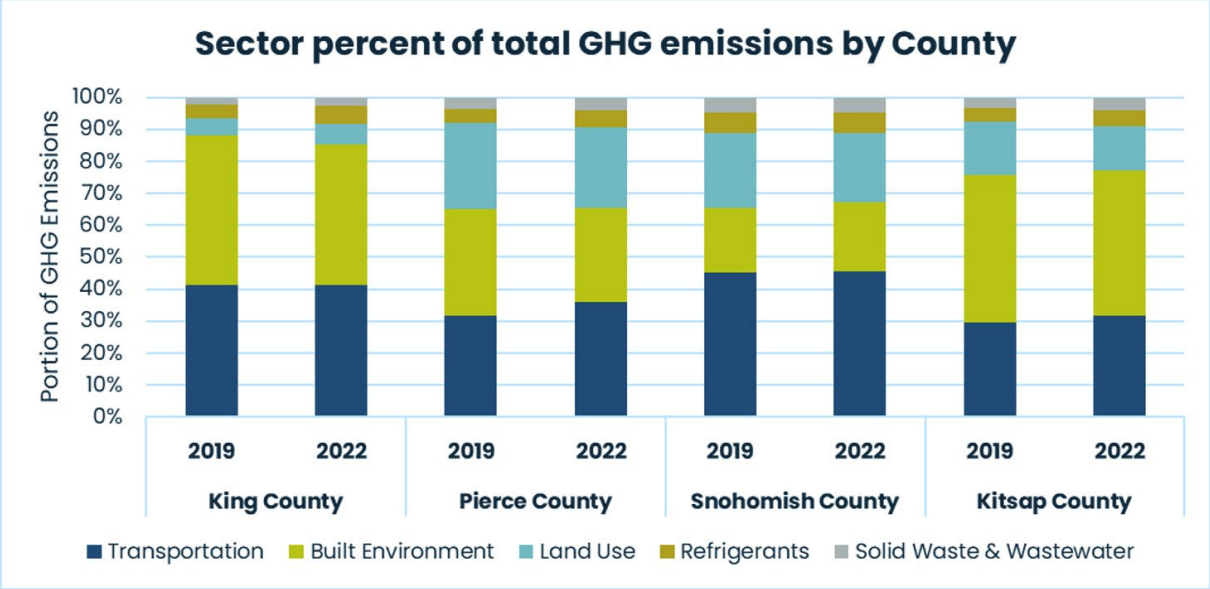


Figure Z. Sector percent of total GHG emissions, by county for 2019 and 2022.



Appendix B: Quantified Emission Reductions

Strategy 1.1: Electrify or decarbonize new buildings.

This strategy assumes that at least some amount of housing and commercial space are being constructed with non-renewable natural gas to fuel space heating and domestic water heating. Under this strategy, developers/builders/owners would be incentivized to install non-fossil-fuel heating such as heat pumps or electric resistance heating. Since new residential construction is much larger than new commercial construction in terms of square footage and energy, and because commercial square footage is harder to predict, new commercial construction is omitted for this calculation.

The basis for the calculation is:

- The full action sum is residential space heating + domestic water heating.
- The average amount of annual energy used in a new housing unit is about 299 therms average for domestic water heating per household is about 18 therms.
- Therms are converted directly to carbon dioxide equivalent (CO_2e) emissions.

118 Strategy 1.2: Reduce energy use in existing buildings.

This strategy assumes that the energy need of existing buildings (residential and commercial) can be reduced through basic weatherization and more efficient lights and appliances. Greenhouse gas (GHG) emissions reductions will occur because of decreased use of GHG emitting fuels (natural gas) and reduced electricity consumption. Weatherization includes replacing windows, sealing leaks, adding insulation, and adding weather stripping. More efficient lights and appliances means replacing incandescent bulbs with LED bulbs, replacing appliances such as refrigerators, dishwashers with more efficient devices, and replacing cooking stoves with electric devices.

The basis for the calculation is:

- The action sum is the weatherization + appliances + lights.
- Weatherization assumes the house was using natural gas with the average annual consumption that would be replaced with electric powered heating.
- Average natural gas use per house is assumed to be 299 therms/year.
- Weatherization assumes an average of 18% reduction in annual energy consumption per house.
- Appliance upgrades assume an average kilowatt (kWh)/year saved per appliance, applied to the total number of appliances. The average per appliance is the average of the four main device types (refrigerator, dishwasher, clothes washer, clothes dryer). The average value is 256 kWh/year saved.
- Light bulb savings described in references.
- Savings from appliances and light bulbs is the reduction in emissions from the electricity that would have been needed to power them. We use the current electric grid carbon intensity of Washington (Note: electricity reductions are conservatively treated as coming from a larger grid (e.g., Pacific Northwest grid) because the marginal production resources are generally limited and shared in this regional grid).
- To simplify and reduce the chances of double counting, water heating (residential and commercial) is calculated as part of Strategy 3. Domestic appliances are all included in this strategy (Strategy 2).

#118

Posted by **Graham** on **10/14/2025** at **12:18pm** [Comment ID: 42] - Link

Agree: 0, Disagree: 0

These are the most important personal goals for my family, and I thank you for all your hard work with regard to saving our climate!

Strategy 1.3: Electrify or decarbonize existing buildings.

This strategy assumes GHG emissions from existing buildings (residential and commercial) can be reduced by 1) changing the space heating to electricity or non-fossil fuel, and by 2) converting the domestic water heating (bathrooms, showers, wash sinks, clothes washing) to electricity for both residential and commercial buildings.

The basis for the calculation is:

- Average house uses 365 therms/year of natural gas for space heating.
- Average house uses 175 therms/year of natural gas for water heating.
- For commercial water heating, we used national averages for commercial buildings and calculated a per-capita annual use. For the maximum scenario, the total (100% of the per-capita scaled up to PSCAA population) was set as the amount converted. The range of heating devices, buildings, and equipment is too large to model (bottom up) on a per heater or per building basis.
- Other domestic appliances (natural gas stoves and dryers) are not included in Strategy 3 to reduce the potential of double counting. Instead, they are included in Strategy 2.

Strategy 1.4: Increase local solar.

This strategy assumes GHG emissions reductions would occur by decreasing the amount of fossil fuel (high GHG emitting) power generation needed. Current state law Clean Energy Transformation Act (CETA) requires that the state's electricity production be net-zero by 2030 (offsets allowed) and zero-carbon by 2045. For the purposes of an overall GHG emissions inventory, it is unclear how to define this action so that it is above-and-beyond CETA for net GHG emissions after 2030.

The basis for the calculation is:

- The assumed, nominal kW of new solar installed on the buildings.
- The installed kW is converted to an annual kWh produced through a factor calculated by NREL.
- The kWh produce is converted to grams CO2e emitted based on the current emission factors of electricity delivered to the plug in Washington (Ecology GREET model).

Strategy 1.5: Reduce industrial emissions.

This strategy assumes that most industrial greenhouse gas emissions result from combustion of natural gas or petroleum-derived fuels such as fuel oils, or heavy oils. We consider natural gas to be a suitable proxy for general greenhouse gas reduction approaches and calculations, given three key factors–(1) natural gas is the dominant fuel type in this sector, (2) other petroleum fuels have similar thermal properties per BTU of energy delivered, and (3) emissions reduction actions vary across industries.

We model this sector by assuming industries can reduce their GHG emissions through three actions: (a) reducing the amount of natural gas they need to use (efficiency), (b) replacing some amount of fossil natural gas with renewable natural gas, or (c) electrifying or using a low-/no-GHG energy source (e.g. green hydrogen, sustainable biomass, etc.). Since the Climate Commitment Act (CCA) requires these actions, defining them as "above-and-beyond" what the CCA mandates remains unclear. The CCA already includes a significant number of emission credits that will decline over time. However, some actions may plausibly drive additional reductions beyond the levels the CCA would achieve alone.

The basis for the calculation is:

- Beginning with the total energy content of the natural gas of fossil fuels that are being replaced with renewable natural gas, electricity, or other low-carbon energy sources.
- The total energy content is then multiplied by carbon/GHG emissions factor from known references.

Strategy 1.6: Reduce embodied carbon in building materials.

This strategy counts the carbon emissions needed to produce the most common building materials: steel and concrete. Emissions reductions can occur by obtaining steel and concrete manufactured with low-carbon methods. Since these actions were not considered to be part of the geographic emission inventory and wedge analysis, it is unclear how they could be included in a wedge analysis.

The basis for calculation is:

- The number of tons of low-carbon steel or substitute used.
- The number of tons of low-/zero-carbon cement used.
- The emissions per ton of low-carbon steel using manufacturers values.
- Current cost for carbon capture from concrete production.
- The emissions reduction is the total tons of the material multiplied by the respective emission/reduction factor.

Strategy 1.7: Cross-strategy actions.

This strategy cannot be quantified.

Strategy 2.1: Reduce single occupant internal combustion engine (ICE) vehicle miles traveled (VMT).

This strategy aims to reduce internal combustion engine (ICE) vehicle miles traveled (VMT) by reducing the number of miles and trips needed or required by ICE vehicle owners. This is enacted by promoting and enabling non-vehicle transit such as walking, biking, and mass transit, and through better or more bicycle and pedestrian paths. This strategy also aims to reduce the distance needed to travel or reach transit (growth, land-use, and housing density). Conceptually, replacing ICE vehicles with zero-emission vehicles (ZEV) would produce the same result; however, to keep the actions simpler and reduce the risk of double counting, this action is included in Strategy 9. Significant development of transit and growth/land-use are a core part of existing regional planning efforts.

The basis for the calculation of general transit expansions and land-use planning:

- The baseline total annual VMT for passenger vehicles in the Puget Sound.
- The assumed reduction in total VMT for those vehicles.
- Emissions for the reduced VMT come from average GHG per mile for the Puget Sound.

For active transportation (walk/bike/scoot) enhancements:

- The number of people living within ½ mile of new bike and pedestrian paths.
- Emissions reductions for bikes/pedestrians come from daily VMT reduction per 1000 people, using rates published by PSRC.

Strategy 2.2: Increase zero emission vehicle (ZEV) sales and use.

This strategy aims to reduce emissions by replacing ICE vehicles with ZEVs, and increasing their use, or preference, over ICE vehicles. Since increasing ZEV sales is required by the ZEV mandate, it is not clear if this strategy should be considered above-and-beyond what would have already been required. If ZEV sales do meet or exceed the targets of the ZEV mandate, then any additional effort would be above-and-beyond.

The basis for the GHG reduction calculation is:

- The assumed number of new ZEVs sold and into regular use.
- The average number of miles driven per vehicle per year.
- The average gCO2e/mile per ICE vehicle in the Puget Sound.
- The total emissions is the product of ZEVs * miles/ZEV * gCO2/mile.

Strategy 2.3: Electrify or reduce the carbon-intensity (CI) for on-road freight/service vehicles (apart from transit and ferries).

This strategy aims to reduce emissions from the heavy duty on-road sector. The actions in this strategy include: a) increased heavy-duty EV sales and the number in use, and b) substitution of low-CI fuels for petroleum fuels. Similar to other sectors, both the ZEV mandate (slower/delayed ramp compared to light duty) and the Washington low-carbon fuel standard (CFS) require that these actions occur. Thus, it is unclear if these actions would be above-and-beyond the regulations, unless the activity levels have reached or exceeded the targets.

The basis of the GHG reduction calculation for a) is:

- The assumed number of heavy-duty EVs purchased and put into use instead of an ICE powered vehicle.
- The typical number of miles driven per day for heavy-duty EVs.
- Average gCO2/mile based for heavy duty vehicles based on BTS statistics.
- The total GHGs reduced is the product of # EVs * miles/EV * gCO2/mile.

The basis of the GHG reduction calculation for b) substituting low-CI fuels is:

- The volume and carbon intensity (CI) of petroleum fuel that is being replaced with a low-CI fuels.
- The median CI of renewable diesel currently verified in California's CFS.
- The net (%) reduction in carbon, CI(petroleum) – CI(low-CI RND).
- The total GHGs are then the product of the net % reduction and fuel volume.

Strategy 2.4: Electrify or reduce the carbon-intensity (CI) for transit and ferries.

This action primarily refers to buses, trains, and ferries for passenger travel within the Puget Sound. These are owned and operated by government agencies and can be targeted for replacement or upgrade in response to funding and priorities. There are two main activities in this strategy: 1) replacing combustion engines/vehicles (overwhelmingly diesel) with battery electric vehicles, or 2) substituting petroleum diesel with lower CI fuel such as biodiesel and renewable diesel. While ferries have the same two options for technology/equipment changes, their use is sufficiently different from on-road buses that are quantified separately.

The basis for the GHG calculations for 1) buses converting to (battery) electric:

- number of buses assumed to be replaced.
- assumed daily or annual miles per bus.
- estimated average gCO2e/mile for heavy duty diesel vehicles.
- the total is then the product of the number of buses * miles * gCO2e/mile.

The basis of the GHG reduction calculation for 2) substituting low-CI fuels is:

- The volume and CI of petroleum fuel that is being replaced with a low-CI fuel.
- The median CI of renewable diesel currently verified in California's CFS.
- The net (%) reduction in carbon, CI(petroleum) – CI(low-CI RND).

The basis for ferries is similar to the EV conversion and fuel substitution:

- The number of ferries.
- The average annual fuel used per ferry is calculated from data provided by the State Ferries system.
- The baseline carbon intensity is assumed to be from a 50:50 split of petroleum diesel and renewable diesel. This means assuming the entire ferry system otherwise reaches a 50% blend of renewable/petroleum diesel for their entire annual fuel use.
- The total GHG reduction is then the baseline carbon intensity * volume of fuel per ferry * number of ferries

Strategy 2.5: Electrify or reduce CI for offroad equipment.

This strategy refers to a broad range of equipment that is off-road. This includes small residential lawn and garden equipment such as tillers, mowers, trimmers; larger commercial equipment, mowers, chainsaws, chippers, mixers, yard carts, golf carts, generators; and large construction and industrial equipment such as bulldozers, excavators, backhoes, fork lifts, cranes, etc.

GHG reduction activity in this sector relies on replacing equipment with electric equipment and substituting low carbon-intensity (CI) fuels for petroleum fuels. The reductions due to substitution of low-CI fuels are identical to the calculations in Strategy 11 and are not repeated here. For replacing equipment with electric equipment, the fuel use across the full range of equipment is not readily available, so we treat the sector as being represented by: 1) generic mid-sized construction equipment with median fuel usage and 2) small equipment/engines such as mowers.

For the mid-sized construction equipment:

- The typical number of hours used per piece of equipment per year varies greatly, with very little data. There are reasonable reports of fuel use per hour, and so the total hours is made the independent (assumed) value. This also allows emissions to be evaluated on a construction project basis, rather than limiting it to just equipment owners. For example, a construction project could estimate that they'll need 1000 hours of combined time for backhoe, bull dozers, graders, and compactors. The GHG reductions of specifying they be with electric equipment could be evaluated.
- The typical fuel use per hour comes from the median of hourly fuel use reported by Caterpillar (CAT) from their telematics for current equipment in the field.
- The GHG emissions per gallon of (presumed) petroleum diesel fuel.
- The total GHG reduction is then the number hours of equipment use that will be electric * the average fuel use per hour * emissions factor.
- The emissions from the electricity generation could also be subtracted from this, however the carbon intensity in 2030 will be low enough that for most estimation purposes it rounds to zero.

For small equipment/engines:

- The total number of pieces of equipment that are replaced with (battery)electric equipment.
- The average emissions per hour, which is a function of the fuel consumption and closely related to the engine size. The engine size is assumed to be mid-sized for the residential market.
- The average number of hours is assumed to be the typical hours for mowing per household each year.
- The total emissions are the total number of pieces of equipment * average emissions/hour * average number of hours per equipment.

Strategy 2.6: Aviation.

This strategy refers to the fuel consumed by aircraft, primarily commercial passenger aircraft at Sea-Tac Airport. There are two primary actions in this strategy: 1) reduce the total amount of aviation travel, and 2) substitute conventional petroleum derived aviation fuel with renewable jet fuel that has a lower carbon intensity.

The GHG reductions from 1) are calculated by:

- Identify/assume the total number of gallons of aviation fuel that have been reduced from previous years.
- The emission factor for aviation fuel at the Sea-Tac Airport.
- The total GHGs are the product of the total number of gallons and the emission factor.

For 2), the calculation is similar but the difference in fuel CIs must be calculated. The calculation uses:

- The total volume of petroleum-based jet fuel to be substituted with renewable (low carbon) jet fuel.
- The median carbon intensity of the jet fuel obtained from the currently verified pathways in California.
- The total GHG reduction is the difference in carbon intensities * the volume of jet fuel being substituted.

Strategy 2.7: Marine and Rail.

This strategy refers to fuel consumed (diesel) by ocean going vessels (cargo ships and cruise ships), harbor vessels (tugs and miscellaneous boats), cargo rail in rail yards and trains passing through the region, and by cargo handling equipment in the terminals. For ocean going vessels, the primary method for reducing emissions in the short- to medium-term (5-10 years) is to replace the fuel with a lower carbon intensity (CI) "drop-in" fuel. Longer-term (10-30 years) activities will likely bring more significant changes (e.g., battery electric for some harbor vessels, and hydrogen or alternative power generation and fuels for ocean going vessels). Additionally, many vessels produce a significant amount of emissions when they are docked, so supplying electric power to the vessels through shore-power is also an important tactic. For rail, there is currently limited interest in battery-electric conversion, so the primary tactic is substitution of low-carbon fuels. For cargo handling, many pieces of equipment can and are being electrified. The three actions for this strategy are: 1) substitution of low-carbon fuels, 2) expanding shore-power availability and use, 3) replacement of cargo handling equipment with battery electric equipment.

For substituting low-carbon fuels, the calculation is similar to other sectors:

- The assumed volume of petroleum-based fuel that will be substituted with low carbon-intensity fuel.
- The median carbon intensity of the low carbon-intensity fuel.
- The reduction is then the product of the volume of petroleum-based fuel that will be substituted with low carbon intensity fuel and the net reduction in carbon intensity.

For expanding shore-power availability and use:

- The number of kilowatt hours for which shore power is being substituted.
- A typical number of kilowatt hours generated per gallon of diesel fuel burned.
- From this calculate the equivalent gallons of diesel fuel burned.
- The GHG emission factor for petroleum diesel.
- The total GHG emissions are then the product of the equivalent gallons of diesel fuel burned and the GHG emission factor.

For the replacement of cargo handling equipment with battery electric equipment:

- The assumed number of pieces of equipment replaced.
- The average fuel consumed per piece of equipment comes from Port of Seattle estimates.
- The total GHG reduction is then the product of the number of pieces of equipment replaced and the average fuel consumed per piece of equipment.

Strategies 3.1–3.4: Waste sector activities.

This sector includes solid and liquid wastes that are ultimately sent to landfills or sewage treatment facilities. In the solid waste subsector, we consider construction and demolition (C&D) waste separately from waste material collected at residences and businesses (curbside) and waste material taken to transfer stations by commercial or residential parties. The important solid wastes to note are organic materials and other recyclable materials such as paper, plastics, and metals. Liquid waste is solely referring to emissions from the sewage treatment facilities from processing the organic matter in the sewage.

Strategy 3.1: Divert construction and demolition materials

For C&D, the reduction calculations uses a unit factor that comes from the EPA WARM v16. For these scenarios:

- Use national defaults and typical values.
- A convenient input value (such as 1000 tons) is entered for Construction Materials, Dimensional Lumber, and for Structural Steel.
- The net change (Alt – Base) is obtained from the Summary Report page.
- The change is divided by the respective input value to obtain a reduction per unit (ton) input.
- The unit factor is then multiplied by the assumed tons of dimensional lumber or structural steel.

Strategy 3.2: Divert other recyclable and compostable materials

For general solid waste, most of the GHG emissions are due to the anaerobic breakdown of organic matter that produces methane. In most landfills, the deposited waste remains in place for many months to years before it is covered and the gases are collected for energy production or use in other applications. So, the net effect of several actions can be represented by reducing the amount of organic matter that is sent to be landfilled.

This calculation uses:

- Similar to C&D, except the Material is Food Waste, under the Material Type, Food Waste.

For recyclable materials, the steps are the same as C&D, except Material is Mixed Recyclables under the Material Type, Mixed Materials.

Strategy 3.3: Increase methane capture at landfills

For liquid waste and solid waste, methane emissions could potentially be collected and used as a substitute fuel. The GHG reduction is calculated as follows:

- The assumed MMBTU of natural gas collected.
- Convert the MMBTU to MJ using standard factor.
- Use gCO2e/MJ factor to convert the energy to CO2e emissions.

Strategy 3.4: Other waste sector actions

Reduce emissions due to other (non-organic) recyclable materials. This strategy cannot be quantified.

Strategies 4.1–4.2: Land use sector activities.

This sector describes the CO2e emissions from land use and land-use changes, and other potential sequestration activities on and in lands. The largest contributors to this sector in our region are emissions from soil, both after harvesting trees and from land-use changes such as the removal of tree and plant cover and covering over soils with organic matter in the top layers.

Two strategies in this sector can be described sufficiently well to be quantified. Since these are also the two largest actions in this sector, they are considered sufficient to represent it.

Strategy 4.1: Reduce tree loss

Tree planting is not a reduction in CO2e emissions, but rather an increase in sequestration. The sequestration from planting trees is quantified using:

- The assumed number trees to be planted.
- The average CO2 uptake per tree per year .
- The total GHG sequestered is the number of trees * average uptake per year per tree.

Strategy 4.2: Reduce soil emissions and protect and grow land carbon sinks

For protecting from deforestation, the calculation uses:

- The number of hectares (ha) that are being protected.
- A representative central value of total emissions per ha from this area from the last 20 years.
- The total amount of emissions reduced (emissions loss from soils) is then the product of the number of acres and the emission factor for protected lands.

Strategy 5.1–5.3: Refrigerants sector activities.

This sector addresses the key working fluid hydrochlorofluorocarbons ((H)(C)FC) for a range of devices that move heat, including air conditioners, heat pumps, and freezers. These are found in many stationary sites and in mobile sources like cars, trucks, and some refrigerated trailers and train cars. While many refrigerant devices are located in the built environment, refrigerant strategies are categorically different from the overwhelming majority of other strategies in the built environment. Thus, we group refrigerants in a separate category.

The primary action causing CO2e emissions is the release, either accidental or through small leaks during normal use, of the refrigerant into the atmosphere.

Strategy 5.1: Reduce the use of high-GWP potential devices and increase recovery of high-GWP potential refrigerants

Emissions reductions are calculated as:

- The number of devices being replaced.
- The number of grams of refrigerant from typical refrigerators/freezers.
- The average carbon intensity per unit mass from recent IPCC inventories.
- The emissions are then product of devices * grams/device * CO2e/gram.

Strategy 5.2: Regulations and support to check and fix commercial and industrial systems

For monitoring and fixing leaks on large commercial and industrial systems, the calculation is:

- The number of systems identified and being fixed.
- An approximate ratio of the distribution of small:medium:large commercial/industrial systems.
- The range of values of coolant load(charge/content) for small, medium, and large systems, from which we calculate the center of the range. We assume this is sufficiently representative of the average.

- The average annual leak rate of commercial systems is multiplied by each range's central value.
- The average leak for small, medium, and large systems is then multiplied by a weighted fraction of the total number of systems repaired.
- The total is the sum of the three size bins.

Strategy 5.3: Promote, subsidize, and enable recovery of high GWP refrigerants from old devices

For increasing the collection of refrigerants from old devices (CFC-12) being scrapped, the calculation is:

- The number of old devices that were recovered
- The average refrigerant load per device
- The GWP/coolant mass for CFC-12 (10,200)
- The total CO2e reduction is then the product of the number of devices, the average coolant per device, and the GWP ratio.

Strategies 6.1-6.2: Consumption sector activities.

This sector includes all the GHG emissions that are indirectly caused by the people and organizations within the region, but that aren't included in any of the sectors above. We divide it into two subsectors: food and general goods.

In terms of general emissions accounting practices, we consider consumption emissions to be Scope 3, while all other sectors above are mostly Scope 1 (with some Scope 2 and Scope 3 in the waste sector). Depending on how (or if) other regions, states, and countries are conducting emission inventories, or promoting GHG emissions reductions, a consumption-based analysis (Scope 3) may be double-counting or catching emissions that were otherwise missing. Since our most recent comprehensive GHG inventory (2019) was geographic and not consumption, we don't have benchmarks to track future progress made on consumption emissions. Thus, it is not possible to include consumption-based activities in our projections (wedge analysis), and it is unclear how much they overlap with the items described above.

Strategy 6.1: Reduce food waste, promote lower GHG choices

For the food-focused subsector, GHG emissions from the decomposition of discarded food are included in the waste sector, while GHG emissions from growth, processing, and shipping would remain in this sector. We could not identify any actions in this subsector that directly resulted in reduced emissions, such as reduced food production or delivery.

Strategy 6.2: Promote circular economy for general goods

For the general goods and circular economy subsector, there are two basic modes of action: a) reducing the need to purchase new items to replace old ones by extending the life or repairing existing items, and b) increasing the amount of materials that are recycled thereby reducing the amount of raw material that needs extracting. We did not identify any actions that would be considered additional to the actions in the waste sector for mode a). Actions for mode b) that are aimed at increasing recycling and reducing landfilling are included in the waste sector.

Appendix C: Benefits Analysis

The actions in this climate plan will result in many co-benefits. Some co-benefits can be readily quantified. For others, quantification remains challenging for three main reasons: a) the action can't be separated from several other actions, b) the uncertainty is too large, or c) there is very little or no data on one or more components of a calculation.

For actions where co-benefits are quantified, considerable range exists in the resulting values due to uncertainties in the specifics of the action (e.g., location, normal ranges in use, efficiency, capability of alternatives/replacements, etc.) or changes or variability in the base rate/background/context. As a result, all co-benefit values are intended to be illustrative or representative of a range; smaller or more isolated actions may have very different values.

The key co-benefits that can be quantified are:

1. Air pollutant reductions:
    - Reducing fine particulate matter ($PM_{2.5}$), which contributes about 90% of the cardiovascular risk from air pollution. Additionally, $PM_{2.5}$, particularly from diesel exhaust, contributes about 85% of the potential cancer risk from air pollution.
    - Reducing other air pollution types. For our analysis, we focus on volatile organic compounds (VOCs) as they also contribute to potential cancer risk.
2. Fiscal health benefits from reduced pollution.
3. Reduced operating costs.

The key co-benefits that are not as easily quantified are:

1. Pollution reductions for demographics that are currently experiencing the highest pollution or risk levels.
2. Protection or improvement of the natural environment.
3. Creating job opportunities or expanding demand for high-quality jobs.
4. Reducing natural resource consumption and support for a circular economy.
5. Improving indoor air quality and reducing combustion safety hazards (carbon monoxide poisoning, reducing impacts of gas cooking)
6. Reducing energy burden
7. Improving climate adaptation/resilience through HVAC cooling, weatherization

Section 1 describes how co-benefits 1-3 are quantified. Section 2 includes a semi-quantitative or qualitative discussion of the remaining co-benefits.

Section 1: Quantified Co-Benefits

Air pollutant reductions

BUILT ENVIRONMENT

The calculation for the $PM_{2.5}$ reduction is generally as follows:

(1) $PM_{2.5}$ reduction (kg, lb, or ton) =
reduction in fuel (kg, lb, gal, ton, MMBtu) × $PM_{2.5}$ emissions per unit of fuel

For natural gas-based actions (e.g., space heating, water heating, industrial process heating), we use the EPA's emission factor for stationary gas turbines[1]: 6.6 × 10^{-3} lb/MMBtu (EPA Table 3.1-2a), which aligns with AP-42 values for residential furnaces[2]. This factor is assumed to represent broader natural gas combustion, though it may underestimate emissions from older or poorly controlled systems.

Volatile organic compound emissions reductions from built environment natural gas reductions follow the same equation as the $PM_{2.5}$ reductions, except they use a volatile organic compound emission factor and use the same source documents.

For the building materials strategy (steel) in the Built Environment, the baseline $PM_{2.5}$ emissions factor comes from EPA documents that describe typical process emissions for steel production from raw materials (iron ore and coal)[3]. We assume that green steel production has a higher recycled content, reducing the need for raw ore and coal (for coking). As a result, the $PM_{2.5}$ emissions reductions are just the baseline $PM_{2.5}$ emissions of producing the steel from raw materials, which is primarily from making and burning the coke. The volatile organic compound emissions make the same assumption and use the same emission factor source documents.

TRANSPORTATION

In the transportation sector, $PM_{2.5}$benefits from actions that reduce GHGs from internal combustion engines are calculated through their reduction in the number of miles driven. The calculation is generally:

(2) $PM_{2.5}$ reduction (kg, lb, or ton) =
$PM_{2.5}$/mile × total number of miles (not driven by gasoline/diesel vehicle)

The emission factor ($PM_{2.5}$/mile) comes from the total $PM_{2.5}$ currently emitted by the passenger vehicle fleet from EPA's CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA), and from the total miles driven by passenger vehicles. The total passenger miles driven in the Puget Sound comes from the 2019 PSREA which reported annual passenger vehicle mileage for King County. Since the four-county jurisdiction is close to twice the population of King County, the King County annual mileage is scaled up by a factor of 2.

The volatile organic compounds are calculated similarly, with the emissions from the EPA COBRA model. The ratio of their emissions is applied to the $PM_{2.5}$ reduction:

(3) VOC reduction (kg, lb, or ton) =
$PM_{2.5}$ reduction (kg, lb, or ton) × ratio of VOC emissions to $PM_{2.5}$ emissions (from COBRA)

[1] https://www.epa.gov/sites/default/files/2020-10/documents/c03s01.pdf
[2] https://www3.epa.gov/ttnchie1/ap42/ch01/final/c01s04.pdf
[3] https://www.epa.gov/sites/default/files/2020-11/documents/b12s0501.pdf

For actions that increase the number of electric vehicles (EVs) on the road, emissions reductions are assumed to be due to an EV substituting for the combustion engine vehicle, and the resulting tailpipe emissions for that vehicle being zero. Emissions are calculated from the combustion engine per mile, times the average annual mileage per car. The average number of miles per vehicle comes from Kelly Blue Book report of WA state average[4]. In equation form:

$$(4)\ PM_{2.5}\ reduction = PM_{2.5}\ reduction\ per\ EV \times number\ of\ EVs \times average\ mileage\ per\ vehicle$$

The VOC reduction is calculated by scaling the $PM_{2.5}$ emissions reduction by the VOC:$PM_{2.5}$ ratio as described above.

For the heavy-duty sector where diesel engine vehicles are replaced with EV (transit EV buses and ferries), we assume all the $PM_{2.5}$ emissions of the diesel vehicle are eliminated, so only need to calculate the $PM_{2.5}$ emissions. For this, we use the GHG emissions calculated based on the activity and apply a ratio of $PM_{2.5}$ to carbon dioxide equivalent (CO2e). For the ratio, we use Bureau of Transportation Statistics table of $PM_{2.5}$ and CO2e emissions[5] obtained from MOVES5. From these data we calculate a ratio of g $PM_{2.5}$:MT CO2e. In equation form:

$$(5)\ PM_{2.5}\ (heavy\ duty\ truck)\ reduction = MT\ CO2e\ reduction \times g\ PM_{2.5} / MT\ CO2e$$

The VOCs reduction is calculated with a ratio, like above, with the VOC:$PM_{2.5}$ ratio obtained from EPA's COBRA[6] model of emissions in the four-counties.

For the heavy-duty sector where biodiesel (BD) and renewable diesel (RD) are used instead of petroleum diesel, the $PM_{2.5}$ reduction is about 29% of the volume of RD blended in (used). There is a range in reduction based on the blend percentages of each and the pollution control technology of the engine and can range from none to a bit over 50%.[7] Since the range is large and an aggregate number is difficult to predict, we use a central value, 29%, from an analysis for California[8]. The $PM_{2.5}$ reduction calculation is similar to above, except the reduction is 29% rather than (implicitly) 100%. In equation form:

$$(6)\ PM_{2.5}\ (heavy\ duty\ truck)\ reduction = MT\ CO2e\ reduction \times g\ PM_{2.5} / MT\ CO2e \times 0.29$$

For ferries, we similarly assume that GHGs reduced are due to electrification, so the calculation is identical to that for the electrification of formerly diesel buses.

OFF-ROAD/NON-ROAD

The off-road and non-road sectors include a wide range of equipment, vehicles, and uses that make it impractical to calculate emissions by individual inventory subsectors. Instead, we assume that we can represent emissions by two proxies that are both large and conceptually representative:

- Non-road heavy duty equipment (backhoes, bulldozers, forklifts, cranes, etc.)
- Small equipment (lawn care equipment like mowers, trimmers, edgers, etc.).

Further details are provided in Appendix B: Action Emissions Reductions.

[4] https://www.kbb.com/car-advice/average-miles-driven-per-year/#average-mileage-by-state
[5] https://www.bts.gov/content/estimated-national-average-vehicle-emissions-rates-vehicle-vehicle-type-using-gasoline-and
[6] https://cobra.epa.gov/
[7] https://ww2.arb.ca.gov/sites/default/files/2021-12/Low_Emission_Diesel_Study_Final_Report_12-29-21.pdf
[8] Gladstein, Neandross & Associates (2017), Renewable Diesel as a Major Transportation Fuel in California: Opportunities, Benefits and Challenges

Construction equipment

We assume reductions result from replacing diesel-powered equipment with electric (battery-powered) alternatives, many of which are already commercially available. The $PM_{2.5}$ reduction is then calculated as in previous examples [equation (5)] by calculating the full $PM_{2.5}$ emissions and assuming that this is being eliminated. The VOCs are scaled from the $PM_{2.5}$ using the same approach and ratio as other equipment [equation (3)].

Smaller equipment

We assume the performance and emissions of small engines are representative of a larger group of equipment used in landscaping, construction, and forestry. The overall approach is the same as equation (5), but the emission factor (per MT CO2e) is calculated from EPA[9] emission factors, using a central value for small spark ignition engines. These factors are likely an underestimate for the subsector of gasoline 2-stroke chainsaws used for forestry. However, this underestimation is not significant for this plan, as most of that equipment operates far from population centers and has limited direct human impact. Additionally, the volatile organic compounds are calculated by scaling from the $PM_{2.5}$ emissions as in equation (3), with the hydrocarbon (HC):$PM_{2.5}$ ratio coming from the same emission factor reference.

AVIATION

For the aviation sector, evidence suggests that bio-derived jet fuel (Sustainable Aviation Fuel or SAF) produces significantly less $PM_{2.5}$ emissions compared to the petroleum-based standard fuel. Since there are no accepted standard value for the reduction, we note that literature reports 20-80% reductions, as a function of the SAF fuel volume blended in, depending on the throttle setting, etc. Therefore, we assume a 50% reduction (of the blended volume) is sufficiently representative for this plan. The $PM_{2.5}$ reduction can therefore be calculated similar to equation (6) except the reduction is 50% rather than 29%.

MARINE & RAIL

In this subsector, we have three proxy actions: 1) substitution of lower carbon-intensity biofuels, 2) installation and use of shore power at ports, and 3) electrification of cargo handling equipment (CHE) at terminals. The low-GHG biofuels could be used by train engines, ships at port, or cargo handing equipment, For the substitution of low-GHG biofuels, the diesel fuel is similar to diesel used in other on-road and off-road applications, so we apply the same calculation approach as in equation (5), and the emission factor is assumed to be the same as for on-road and off-road diesel used previously. For the installation and use of shore power, the metric of the action is the number of kWh delivered to ships using shore power, which would then displace power that would have been generated by diesel engines. The kWh delivered is converted to a number of gallons of diesel that would needed to generate that electricity, using a fuel consumption per kWh delivered factor from a commercial generator manufacturer.[10] From the equivalent fuel consumed, we apply the same approach as equation (5). For the electrification of cargo handling equipment, we assume that the equipment was powered by diesel and therefore the previous approach can be used (equation (5)) but with the appropriate amount of diesel fuel consumed by the CHE, assuming 6,000 gallons per year per vehicle. From the diesel fuel consumption being displaced we calculate the MTCO2e and proceed with the equation (5) using the same $PM_{2.5}$:CO2e emission factor.

[9] EPA (2010), Exhaust Emission Factors for Nonroad Engine Modeling – Spark-Ignition, NR-010f, EPA-420-R-10-019, July 2010.
[10] https://www.generatorsource.com/Diesel_Fuel_Consumption.aspx

WASTE

For the waste sector, we have both solid waste and wastewater. For solid waste there are three actions that are quantified but only one has air pollution co-benefits that we can calculate. The first is diverting construction and demolition (C&D) materials from landfilling, with steel and wood being the two largest materials that can be quantified. The second action for solid waste is the reduction of compostable material being landfilled, which produces methane. The third action, which is the capture of methane, will be addressed below with wastewater.

For recycled steel, we assume that the recycled material displaces steel that would otherwise be produced from raw materials. In the production of steel from ore, coal is consumed to produce coke. The production of coke, and then its combustion to reduce the ore, results in the majority of $PM_{2.5}$ emissions. $PM_{2.5}$ emissions are calculated from an emission factor that is the sum of emissions from the coking and combustion steps, obtained from EPA AP-42, selecting moderate to low-end values when possible.[11] The supplied factors are per mass of coal input, which we convert to CO2e. In equation form:

$$(7)\ PM_{2.5}\ (steel\ production\ from\ ore)\ reduction = MT\ CO2e\ reduction \times g\ PM_{2.5} / MT\ CO2e (from\ coke\ production\ and\ combustion)$$

Where the emission factor is:

$$(8)\ g\ PM_{2.5}/MTCO2e\ (coke\ production\ \&\ combustion) = \Sigma\ of\ gPM_{2.5}/Mg\ (coal\ input)\ for\ 7\ steps \times C\ content\ of\ bitumous\ coal\ (67\%) \times CO2{:}C\ ratio$$

For wood reclamation from C&D, there was no clear step where $PM_{2.5}$ or air pollution reductions would occur, apart from reduction in landfill methane gas, which is addressed in the following section.

Reclaiming C&D wood would reduce the need for harvesting trees, resulting in a reduction in $PM_{2.5}$ because fewer new trees would be cut down and shipped to a lumber mill. However, any reclaimed wood would likely need to be shipped to one or more processing centers to sort, evaluate, clean/prep, or reprocess the wood. Since there is a broad range of materials that can be reclaimed (structural/dimensional, boards/decking, flooring, cabinets and furniture), and their lifecycles are unknown, we are not able to identify a clear or net $PM_{2.5}$ or volatile organic compound reduction from this action.

The third action, reduction in compostable materials going to landfill, does not have a clear air pollution benefit because its GHG impact is primarily the methane emissions from landfill before collection.

WASTEWATER

For both wastewater and solid waste (landfills), the breakdown process naturally produces significant amounts of methane. Methane can be captured, processed into renewable natural gas (RNG), and used to fuel a range of natural-gas powered vehicles or processes, including trucks and buses, industrial or commercial heaters, and others. Here we assume that the RNG is used to displace diesel in trucks or equipment. The $PM_{2.5}$ emission factor for newer (2008+) diesel and NG are close enough that it is not clear that this application would produce a net reduction in $PM_{2.5}$ emissions. Thus, we assume there is no net $PM_{2.5}$ reduction for these applications.

[11] https://www3.epa.gov/ttnchie1/old/ap42/ch12/s02/final/c12s02.pdf

LAND USE, REFRIGERANTS, and CONSUMPTION

These sectors have actions for which we could not identify a mechanism where a criteria or toxic pollutant would have a clear net reduction.

Fiscal health benefits from reduced pollution

The most significant health benefit from reduced air pollution comes from avoiding premature mortality caused by fine particulate matter ($PM_{2.5}$). This impact is quantified using the Value of a Statistical Life (VSL)–an estimate derived from epidemiological and economic analyses that reflects the value society places on preventing a single early death. VSL typically exceeds all other quantified health impacts by a factor of ten.

We estimate the total health value of $PM_{2.5}$ reductions using benefit factors from the EPA's BENMAP model, which summarizes average national-scale benefits across sectors in tables[12]. For each action, we multiply the amount of $PM_{2.5}$ reduced by the corresponding benefit factor:

$$(9)\ PM_{2.5}\ related\ health\ valuation = PM_{2.5}\ reduced\ (kg/ton) \times PM_{2.5}\ benefit\ per\ kg/ton$$

Sector-Specific Valuation Assumptions

In the built environment, we use the oil & natural gas sector value ($98,000/ton) for actions where natural gas combustion is being prevented, such as replacing space heating, water heating, cooking, drying, along with industrial process in which NG consumption is being reduced.

For solar panel installation, since this is assumed to displace peaker plant use of natural gas electricity production, we use the value from electrical utility generation ($113,000/ton).

For the mobile sector, we use values shown in Wolf et al. (2018)[13] which is broken out regionally. All from directly emitted $PM_{2.5}$, for the west.

Sector	$PM_{2.5}$ Benefit $/ton
light-duty gas cars and trucks	$1,200,000
heavy duty diesel	$580,000
aircraft	$570,000
lawn and garden (residential)	$660,000
all other non-road $PM_{2.5}$	$710,000

Reduced operating costs

For several of the actions, reducing GHG emissions will also result in a reduction in ongoing costs. Reduced ongoing costs are primarily due to: A) a reduction in the amount of fuel (NG) needed due to increased insulation (or weatherization), B) an reduction in electricity needed to power an equivalent piece of equipment, and C) a change in power method to electricity (e.g. EVs), which is cheaper than the higher-GHG emitting power method (gas or diesel vehicles) on a basis of desired activity produced (e.g. miles driven, a unit of process completed).

[12] https://www.epa.gov/benmap/sector-based-pm25-and-ozone-benefit-ton-estimates
[13] https://pmc.ncbi.nlm.nih.gov/articles/PMC7259328/

Effects A and B are primarily observed in the built environment where improvement in a building's insultation will reduce the heat needed, and thus the amount of NG consumed. Changing to higher efficiency appliances or more efficient light bulbs will reduce the electricity costs.

For effect A, we use average cost savings per house ($280) reported by a U.S. Dept. of Energy Weatherization Assistance Program fact sheet[14]. For the action total this is multiplied by the total number of houses.

Effect B is the savings from improved efficiency of appliances and light bulbs. For appliances, we estimate the annual savings from an average of four appliance types (fridge(*fr*), dishwasher(*dw*), clothes washer(*cw*), clothes dryer(*cd*)) for middle-of-the-road sized and priced devices listed on the energy star website[15]. For light bulbs we calculate the savings of an assumed common bulb as 90% of a 60 watt bulb used for an average of three hours per day. The appliances and bulbs are assumed to last for 20 years. So, in equation form this is:

(10) Lifetime cost reduction for appliance savings =
(kWh saved/year for fr + dw + cw + cd)/4 × # of appliances × 20 years

(11) Lifetime cost reduction for light bulb savings =
(60 watts × 0.9 × 3 hours × 365) × # of bulbs × 20 years

Each can be divided by the number of appliances or bulbs to calculate the per device savings.

Effect C applies to the number of vehicle types/fleets being electrified, including gasoline light-duty vehicles, diesel medium-duty and heavy-duty trucks and buses, diesel off-road equipment, and ferries.

For gas cars, we assume the EV replaces a gas car being driven 8,000 miles/year, with fuel economy of 30 mpg, and an average gasoline cost of $4.00/ gallon and will survive 15 years. In equation form the savings per car is then:

(12) Operating savings per EV = 8,000 miles/year /30 mpg × $4.00/gallon × 50% × 15 years

For diesel medium-duty and heavy-duty trucks converting to EV, the equation and assumptions are:

(13) Operating savings per EV =
(100 miles/day × 5 days/week × 50 weeks/year)/7.83 mpg × $4.40/gallon × 50% × 10 years

The equation and assumptions are similar for transit EVs, but with 150 miles/day and 15 year life.

For ferries, the average annual fuel consumption per ferry comes from PSRC. The fuel cost savings is calculated similar to equation (12) and (13), but with the total fuel from the coming from supplied data, and the life of the ship is assumed to be 50 years. For each ferry's life, the batteries would likely need to be replaced several times, so we assume the following:

- Replacement interval of 10 years
- Average 8,000 hp per ship
- Need 1 hour of full power capacity between charges
- $100 per kWh for batteries
- Installation and supporting equipment about $100 per installed kWh
- Approximately $1.2 million, 4 times, for each 10 year interval after commissioning, so at years 10, 20, 30, 40 is about $5 million additional costs

[14] https://www.energy.gov/sites/prod/files/2021/01/f82/WAP-fact-sheet_2021_0.pdf
[15] https://www.energystar.gov/products/

It is expected that the electrified ferries will have significantly less maintenance costs, due to the lack of diesel engines. We currently don't have any data from which we could quantify the size of this impact, so we conservatively assume it is zero.

For off-road equipment, we quantify larger construction equipment, and smaller residential/commercial equipment separately. For larger construction equipment, our metric of activity is the number of hours of use of electrified equipment compared to diesel equipment. This is because hours-of-use and gallons-per-hour are common metrics in the industry. Based on the gallons used/replaced (calculated from the hours of use, see Appendix B for further details), the lifetime fuel savings cost is:

(14) Operating savings = diesel fuel used/replaced (gallons)/year ×$4.4/gallon × 50% × 15 years

For small equipment, the calculation from gasoline used/replaced is similar, but uses $4/gallon for gasoline, and assumes lifespan of 10 years for the equipment.

For Aviation, GHG emissions are reduced by substituting sustainable aviation fuel (SAF) for petroleum fuel, which has a net cost. The current premium on SAF is around 2x the cost of petroleum fuel or about $3/gallon. The total cost is then the number of gallons substituted multiplied by this premium.

Similarly, for low-GHG marine fuel, we assume its cost is similar to renewable diesel. The cost premium of petroleum diesel is quite variable and can be negative. Therefore, we conservatively assume it is $0.50/gallon. The total cost is then the number of gallons times the premium per gallon.

For shore power, the calculation is the same as equation (14), except we don't apply a year term (i.e., set the year to 1 or omit the term) and consider this on an annual basis because the shore power infrastructure would have a very long lifetime compared to the equipment that would be using it (and equipment is not considered in this action).

For the electrification of CHE, we estimate gallons of fuel used/replaced each year per piece of equipment and then follow equation (14).

Section 2: Qualitative Description of Co-Benefits

Many of the strategies in this plan have the potential to reduce pollution across large areas and sectors; thus, it's possible that certain neighborhoods, locations, or demographics could be unevenly impacted. Understanding and addressing these disparities through climate action is a key element of this plan. The following discussion presents a qualitative analysis of the potential direct and indirect impacts resulting from climate strategy implementation, with a focus on higher-risk populations.

The groups which experience the greatest environmental disparities tend to be those that are considered disadvantaged according to one or more criteria. These criteria generally include, but are not limited to:

- Household income
- Education
- General English proficiency
- Race and/or ethnicity
- Access to health care

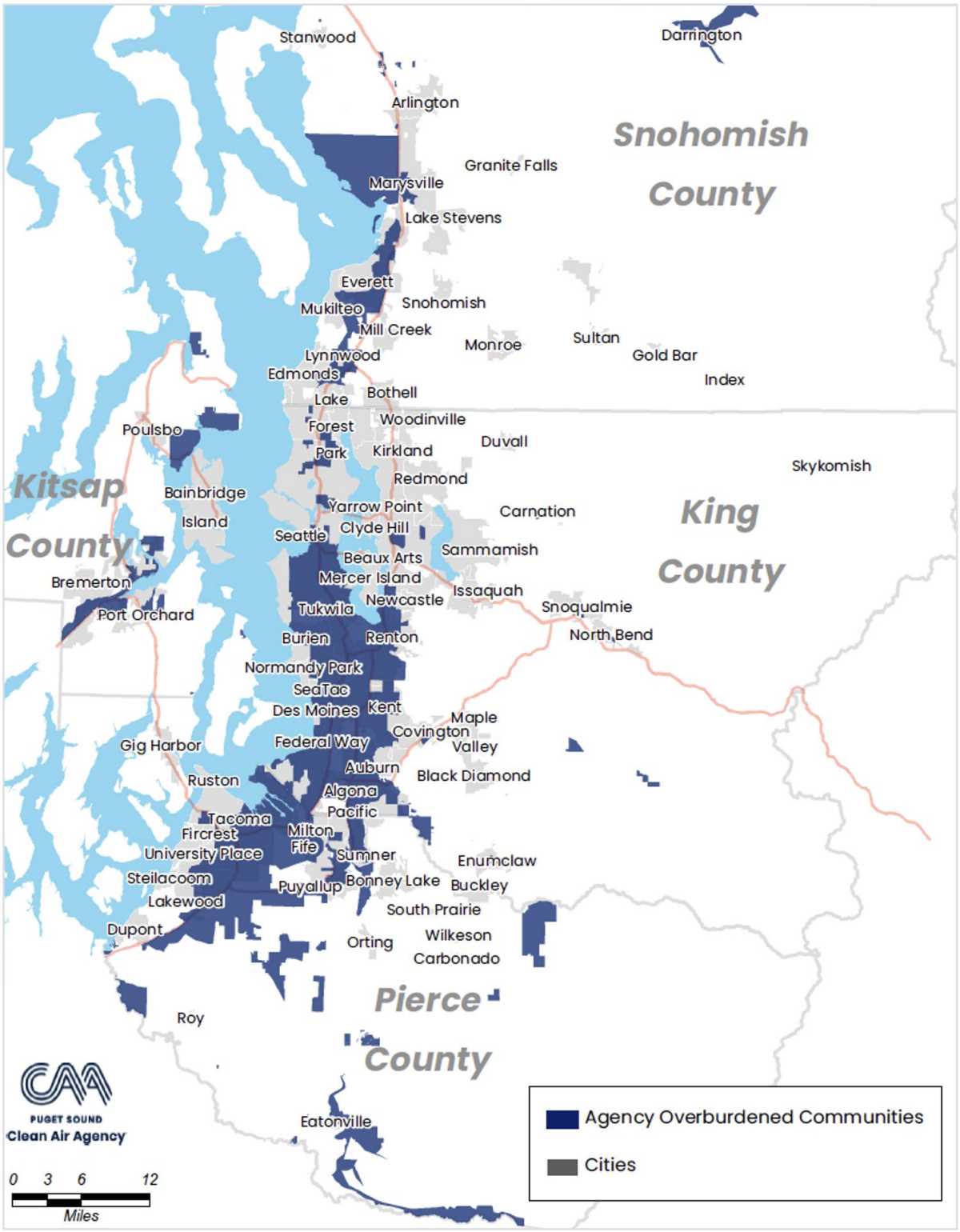
Washington State law defines overburdened communities as a geographic area where vulnerable populations face combined, multiple environmental harms and health impacts, and includes, but is not limited to, highly impacted communities as defined in RCW 19.405.020. Washington developed the Environmental Health Disparities Map to identify environmental and health disparities across communities and help decision-makers understand where more attention is needed to address specific inequalities. Similarly, the Agency developed the Community Air Tool (CAT) to identify the communities in our region that may have disparate exposures to air pollution.

We can qualitatively analyze climate strategies by their general impact and benefit. Most actions will have impacts that are location dependent. For example, neighborhoods that are located downwind of major emissions sources will benefit more than those that are located upwind. Likewise, neighborhoods or demographics that are closer to emissions sources will benefit more from climate action when compared neighborhoods that are located farther from these sources.

Climate actions near major pollution sources will deliver the greatest benefits to overburdened communities. Reducing greenhouse gases also generally reduces other types of harmful air pollution like fine particles. In the region, the most significant benefits would come to areas near major roads, especially with heavy diesel truck traffic. Actions resulting in industrial sources reducing fuels would also benefit adjacent populations. Neighborhoods considered overburdened—such as those along I-5 from south Seattle through Tacoma, in the industrial Duwamish Valley, around the Tacoma Tideflats, and near industrial facilities in Everett, stand to gain from the implementation of these actions.

Figure C-1 shows areas identified as overburdened by the Washington State Department of Ecology and the Puget Sound Clean Air Agency.

Figure C-1. Map of Puget Sound Overburdened Communities[16]



[16] https://pscleanair.gov/382/Overburdened-Communities

Appendix D: Community Engagement Workshops Summary

Comprehensive Climate Action Plan Community Workshops Summary

PUGET SOUND REGION | SPRING 2025

PUGET SOUND CLEAN AIR AGENCY & CASCADIA CONSULTING GROUP

PUGET SOUND
Clean Air Agency

CASCADIA
CONSULTING GROUP

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Introduction

The Puget Sound Clean Air Agency ("Agency") is creating a Comprehensive Climate Action Plan (CCAP), funded by U.S. Environmental Protection Agency's Climate Pollution Reduction Grant (CPRG) program. The CCAP will guide regional and local efforts to significantly reduce greenhouse gas (GHG) emissions and air pollution in Puget Sound communities.

Community and stakeholder feedback is fundamental to the development of a robust CCAP. As outlined in the CPRG program guidance, the CCAP should be informed by engaging communities to understand their concerns and ideas for solutions that reduce harmful pollution in places where people live, work, play, and go to school. To meaningfully engage communities around the Puget Sound, the Agency hosted a series of four in-person workshops where community members were invited to provide input on the draft emission reduction measures and their implementation.

This summary describes workshop outcomes and synthesizes the feedback shared by workshop participants. Community member and stakeholder feedback will also be integrated into the final CCAP, due in December 2025.

Methodology

The Agency and Cascadia Consulting Group, an engagement and facilitation consultant, (collectively "the Agency team"), hosted four (4) in-person workshops in March and April 2025, one in each of the Puget Sound counties: King, Kitsap, Snohomish, and Pierce. The workshops were two hours long, and included both an introductory presentation on greenhouse gas emissions in the Puget Sound region and facilitated small group discussions where participants provided input on a draft list of emission reduction measures. See Appendix A. Workshop Agenda for full workshop agenda and discussion guide.

County of Focus	Workshop Date	Workshop Venue	Workshop Location
Snohomish County	March 13, 2025, 5:30 – 7:30pm	Everett Community College	Everett, WA
Kitsap County	March 20, 2025, 5:30 – 7:30pm	Bremerton Government Center	Bremerton, WA
King County	April 3, 2025, 5:30 – 7:30pm	El Centro de la Raza	Seattle, WA
Pierce County	April 15, 2025, 5:30 – 7:30pm	Clover Park Technical College	Lakewood, WA

Workshop Objectives

- Gather community input to inform the LIDAC and community benefits analysis sections of the CCAP.
- Identify co-benefits and impacts of GHG emission reduction measures within local communities.
- Understand community perspectives on how actions can be implemented to maximize benefits and minimize unintended consequences.

Accessibility Considerations

The Agency team strove to reduce or eliminate common barriers to community participation throughout the workshop design and implementation process, taking several steps to ensure that workshops were accessible, particularly for overburdened community members. Accessibility measures included:

- **Workshop Time:** Hosting workshops after typical working hours (from 5:30 – 7:30 PM) to ensure people who work could attend.
- **Free, Locally Prepared Food:** Providing a free dinner for each participant at the workshops, catered by a local caterer or restaurant.
- **Activities for Children:** Creating a kid-friendly area at each workshop with activity bags, so children were engaged while parents/guardians participated in the workshop.
- **Interpretation and Translation in Multiple Languages:** Offering translated materials and simultaneous interpretation of presentations and discussions for any languages requested by participants during registration. See Language Access section for more information.
- **Participant Background Knowledge:** Emphasizing that no background knowledge about climate action was needed to participate in the workshops and distilling technical content.
- **Compensation:** Participants were each compensated $50 for their participation, unless they were already paid by an employer or other source to participate in the workshop.
- **Community Centers:** Hosting workshops at community centers or local convening spaces in each of the four counties. Each location was ADA accessible and had easy access to public transportation.
- **Promotional Materials and Networks:** Translating promotional materials into the region's top five languages other than English and collaborating with community-based organizations and other trusted partners to promote the workshops.

Agency staff presenting at the Pierce County workshop.

Participation

The workshops were attended by the following number of participants:

Workshop	Number of Participants
Snohomish County	6
Kitsap County	18
King County	43
Pierce County	31
TOTAL	**98**

Several county and/or city staff representatives attended each workshop to give a short presentation on climate action at the local level. These attendees are not reflected in the total participation counts above.

Language Access

Simultaneous interpretation and translated materials were provided for participants when requested. As part of the registration process, participants were able to select their preferred language and request interpretation services. King County was the only workshop where participants requested interpretation. King County registrants requested the following languages: Cantonese (17 requests), Spanish (5 requests), Arabic (1 request), and Korean (1 request). The

Agency team contracted with professional simultaneous interpreters in all four languages, along with fluent facilitators and notetakers in Spanish and Cantonese to conduct the small group discussions. Simultaneous interpreters interpreted the presentation content live, and then fluent facilitators and notetakers led the small group discussion with their respective attendees.

Promotion

The Agency promoted the workshops through a variety of methods and channels. See Appendix C. Promotional Materials for example materials. A packet of promotional materials was shared with outreach partners via email for co-promotion. Workshops were promoted through the following channels:

- Agency's social media channels
- Agency's Climate Pollution Reduction Grant email list
- Agency's webpage
- Agency press release
- Agency's Board of Directors and Advisory Committee
- Climate Pollution Reduction Grant Steering Committee and technical working groups
- Local jurisdictions' climate-related committees and forums
- Local jurisdictions' newsletters, social media, and websites
- Local event calendars
- Community-based organizations
- Other personal networks

Participants attending the Snohomish County workshop.

Key Takeaways Across Counties

This section summarizes key takeaways across all four workshops. For summaries of takeaways from each individual workshop, please see the Takeaways by Individual County.

Feedback on Emission Reduction Measures

At each workshop, the project team asked participants to evaluate the draft GHG emission reduction measures, organized into strategies and actions. Strategies were broader categories of measures, and actions were more specific steps to reduce emissions that fell within the broader strategies. Participants selected up to three strategies and actions they felt would have the **most benefit** to their community, and up to three strategies and actions that would have the **least benefit** to their community. This section summarizes workshop participants' feedback on the draft strategies and actions. For the full list of draft emissions reduction measures provided during the workshops, see Appendix B. Emissions Reduction Measures – Workshop Draft.

The project team learned from each workshop and integrated changes where possible for future workshops. Based on our learning in earlier workshops, the team elected to de-emphasize the "least benefit" strategies to increase clarity and efficiency in the small discussion groups. Thus, a direct comparison of the actions that participants identified as having the most benefit and least benefit is not possible.

Strategies

Table 1 lists the top three strategies that participants at all four workshops identified as having the **most benefit** for their communities.

Table 1. Top three most beneficial strategies as voted on by workshop participants, across all workshops.

STRATEGIES		
Sector	**Strategy**	**Number of Votes**
Transportation	Reduce the region's total vehicle travel	27
Buildings	Efficient, all-electric existing buildings (upgrades & weatherization)	26
Buildings	Reduce industrial emissions	17

As mentioned above, there were significantly fewer votes for strategies of least benefit across all workshops. Of the strategies that did receive votes for least beneficial, **Table 2** lists the top three strategies participants identified as having the least benefit for their communities:

Table 2. Three least beneficial strategies as voted on by workshop participants, across all workshops.

STRATEGIES		
Sector	**Strategy**	**Number of Votes**
Buildings	Local solar energy and battery storage	6
Buildings	Efficient, all-electric existing buildings (upgrades & weatherization)	5
Transportation	Electrify passenger vehicles	3

Figure 1 (on next page) summarizes the total participant votes for most and least beneficial strategies. Green shows the number of "most beneficial" votes each strategy received, and yellow shows the number of "least beneficial" votes across all workshops.

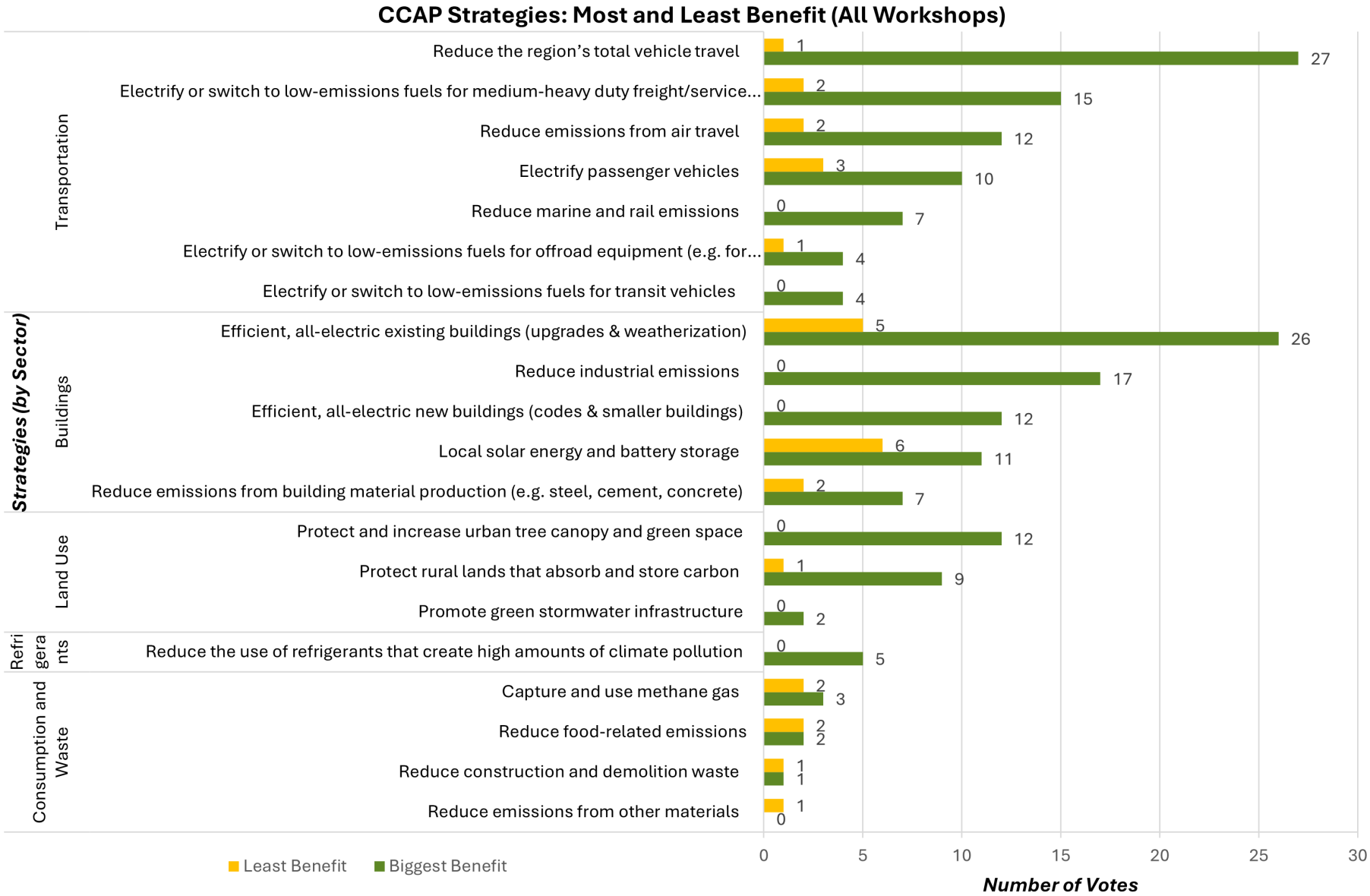


Figure 1. Total participant votes for strategies of most (green) and least benefit (yellow), across all four workshops.

Actions

Actions are more specific steps within the broader emission reduction strategies. **Table 3** lists the top three actions that participants at all four workshops identified as having the most benefit for their communities.

Table 3. Three most beneficial actions as voted on by workshop participants, across all workshops.

ACTIONS		
Sector	**Action**	**Number of Votes**
Transportation	Increase transit use	12
Transportation	Improve walking and cycling networks	9
Land Use	Protect existing forests and wetlands	8

Table 4 lists the top actions that participants at all four workshops identified as having the least benefit for their communities.

Table 4. Least beneficial actions as voted on by workshop participants, across all workshops.

ACTIONS		
Sector	**Action**	**Number of Votes**
Transportation	Consider vehicle usage pricing programs like congestion pricing or road usage pricing	8
Consumption and Waste Sector	Increase composting of non-edible food waste	4
Buildings	Promote smaller buildings with shared walls (reduces energy use)	4
Consumption and Waste Sector	Discourage unnecessary purchasing	4

Figure 2 shows the participant votes for most beneficial actions, and **Figure 3** shows the participant votes for least beneficial actions. Both figures only show the actions that received one or more votes. Actions that received zero votes are not included in these two figures.

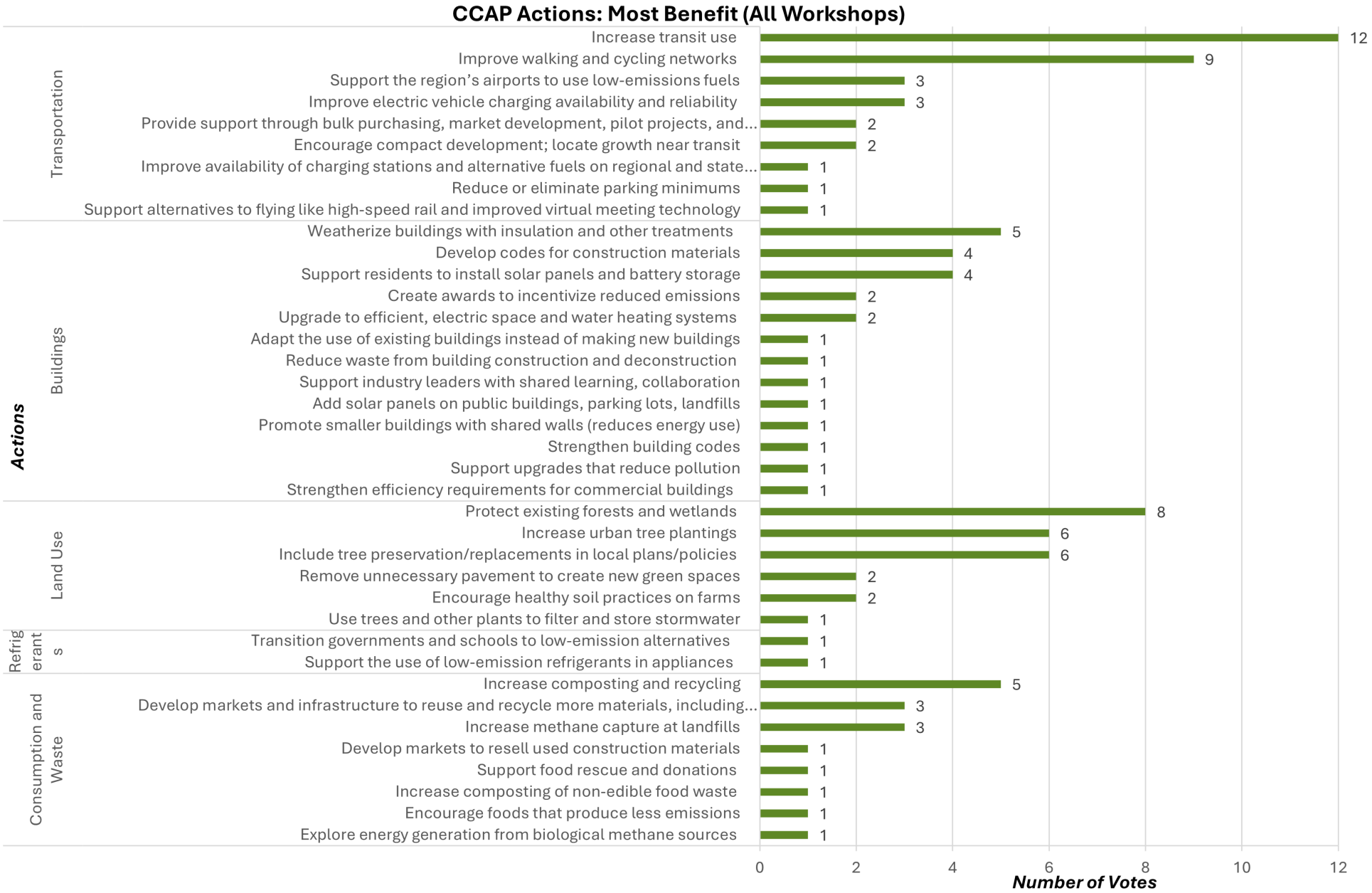


Figure 2. Total participant votes for actions of most benefit, across all four workshops. Only displaying actions that received one or more votes.

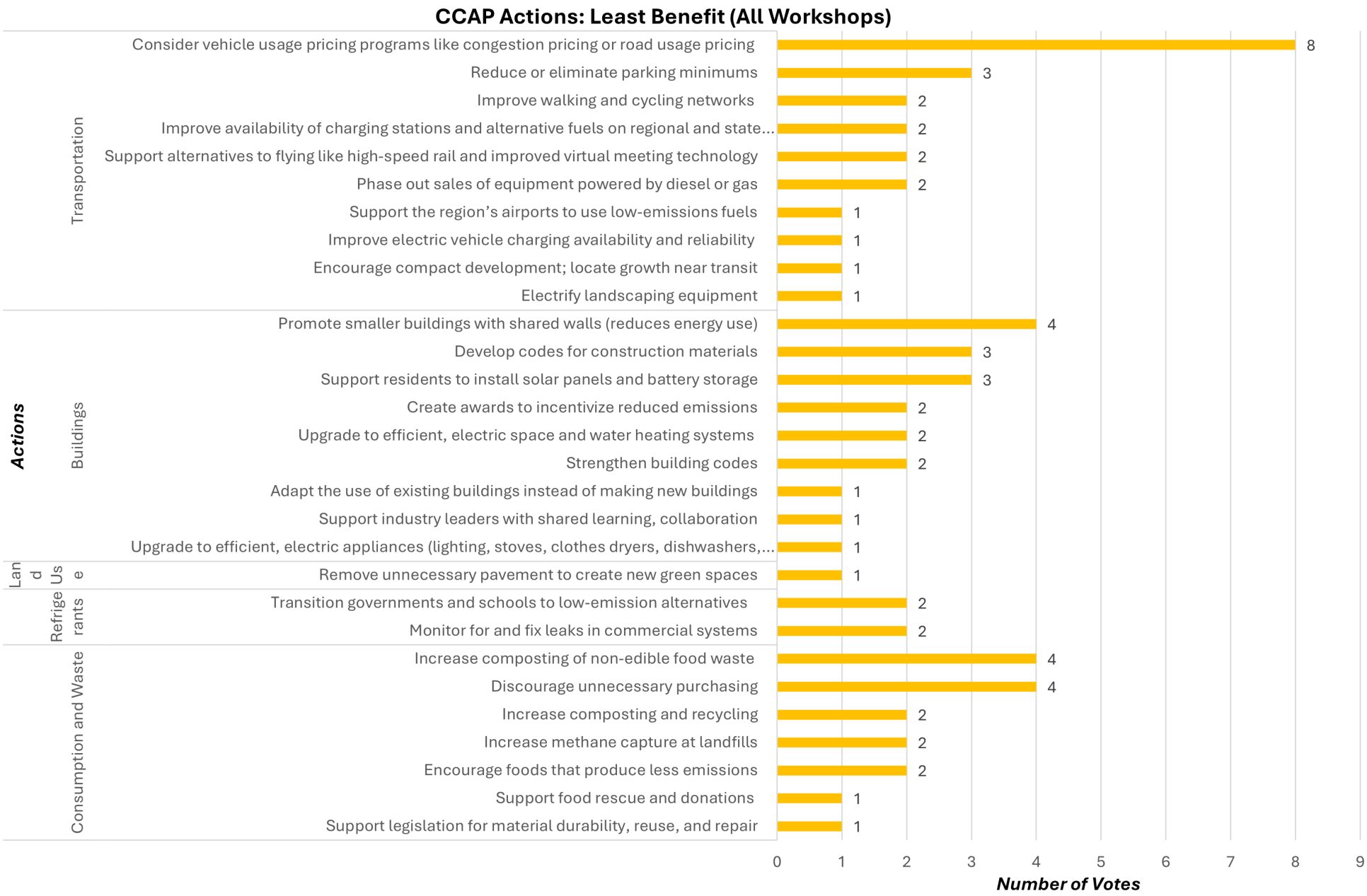


Figure 3. Participant votes for actions of least benefit, total from all four workshops. Only displaying actions that received one or more votes.

Themes Across All Workshops

The following discussion themes were shared across all four workshops.

Co-Benefits

Participants commented on the co-benefits that might result from the GHG reduction strategies and actions. Participants identified the following co-benefits:

- **Public health:** Across all four workshops, participants emphasized the public health benefits of some emissions reduction measures. They noted that several of the strategies and actions would improve air quality, increase green space and tree canopy, encourage more walking, biking, rolling, and playing, and create more livable, connected communities. All of these were considered to have physical and mental health benefits for community members. Participants, especially in Pierce and King Counties, noted that increased urban tree canopy reduces urban heat islands and cools down communities.

- **Safe and accessible transit:** Participants frequently expressed support for making transit more convenient, accessible, and reliable to increase overall transit use. They noted that these changes would result in safer and more comfortable trips on transit.

- **Building sense of community:** Beyond health benefits, participants in all four workshops noted that multiple emissions reduction measures would help foster community connections and sense of place and identity.

- **Cost savings:** Participants in all four workshops commented on cost-savings created by some of the emission reduction measures. Kitsap County participants noted that transitioning to electric vehicles helps eliminate the cost burden of gas, while Pierce County participants shared that upgrading and making buildings more efficient reduces utility costs.

- **Climate resilience:** Participants in the Pierce and Snohomish County workshops expressed that some strategies and actions would help build climate resilience in their communities and help them better withstand future impacts of climate change. Participants from Kitsap County shared that implementing certain strategies could help them prepare for future emergencies.

- **Job creation and workforce development:** Participants from the Pierce and King County workshops discussed green job creation and workforce development, noting the economic benefits and job opportunities for their communities. Participants in the King County workshop added that encouraging compact development near transit hubs could benefit local and small businesses.

- **Enhanced biodiversity:** Participants from both Kitsap and Pierce Counties commented on the benefits to biodiversity and ecological health that come from preserving forests, wetlands, and other Pacific Northwest ecosystems.

Implementation Ideas

Participants shared many suggestions for implementing the emission reduction measures, which are summarized for each workshop in the "Implementation Ideas" sections of Takeaways by County. Across all four workshops, several common themes around implementation emerged, including:

- **Education, outreach, and increased community engagement opportunities:** Participants in all workshops shared that educating and raising community awareness of climate action was essential to the success of the emission reduction measures. Participants also advocated for increased engagement opportunities for community members to provide feedback, be involved with implementation, and better understand climate actions happening in their community.

- **Transparency, tracking impact, and reporting to communities:** Participants emphasized the importance of tracking progress on the emission reduction measures, holding implementors accountable to meet emission reduction targets, and regularly reporting out to Puget Sound communities about tangible impacts and benefits of the measures.

- **Encouraging remote work (telework) and creating transit and carpool incentives:** Commuting, and the impact of commuting on overall vehicle miles traveled (VMT), came up in all four workshops. Participants discussed various ideas for addressing and reducing commuting, including partnering with major regional employers and unions to encourage/allow remote work, subsidizing or incentivizing transit (such as offering free ORCA cards), and enhancing or incentivizing vanpool, carpool, and ride share options for commuting.

- **One-stop-shop technical assistance:** Several participants across the workshops suggested "one-stop-shops" for technical subjects like building upgrades. Participants envisioned centralized hubs where people can easily access information, hands-on assistance, education, and financial opportunities, whether for building upgrades, vehicle electrification, or others.

- **Revenue programs:** Several participants across the workshops suggested utilizing revenue from programs like the Climate Commitment Act to implement strategies and actions like walking and biking infrastructure improvements.

Challenges to Implementation

Participants across the workshops identified the following common challenges to implementation:

- Lack of community and consumer buy-in due to misinformation, lack of education and understanding of benefits, and high upfront costs.

- High level of coordination is needed between governments and jurisdictions.

Emissions Reduction Measures Missing

Participants suggested that the Agency add the following strategies and actions to the draft emissions reduction measures list (organized by workshop):

- Snohomish
  - Hydrogen fuel cell as a low-emission fuel for transit and medium/heavy-duty vehicles. (Though other participants raised concerns about using hydrogen fuel as an alternative to electrification).
  - Promoting and creating local jobs, as well as encouraging remote work, to reduce commuting traffic.
- Kitsap
  - Reduce clothing and textile waste and consumption. Encourage manufacturers and consumers to purchase local goods to reduce emissions associated with the clothing supply chain. Encourage the purchase of clothing made from non-synthetic (petroleum-based) fabrics to reduce emissions and benefit public health.
  - Reduce incineration: People burn trash; there are concerns around air pollution and fire risk.
- Pierce
  - Geothermal heating/cooling solutions for residential buildings.
  - Producer responsibility that requires manufacturers to make products more durable, repairable, and recyclable.
- King
  - Fund the completion of ADA Transition Plans for rights of way. Ensure that these technical requirements are being completed, since they include curb ramps, ADA accessibility, and first/last mile connections to transit.
  - Accountability measures for industrial producers and private sector.

Takeaways by Individual County

Snohomish

Total number of Snohomish County workshop participants: **6 people**

Summary

While discussing the emission reduction measures, Snohomish County participants noted the measures that reduce car dependency would have the most benefit for their community. They shared that transit in Snohomish County needs to be more convenient, fast, and accessible to ensure it's a viable alternative to driving a personal car. Several participants also recommended electrifying medium- and heavy-duty vehicles, particularly freight, or enhancing rail options to reduce the dependence on trucks, as these were seen by participants as having substantial reductions in emissions. A few participants discussed their concerns about over-relying on vehicle electrification to reduce emissions, as a reliable and resilient electricity grid is needed to ensure these benefits are realized, which may become strained with other electrification efforts. A few participants also shared that increased solar panels could be beneficial for Snohomish County but needed to better understand the effectiveness of solar in a cloudy location and the cost of installation.

Feedback on Emission Reduction Measures

As mentioned above, the project team asked participants to select up to three strategies or actions they felt would have the **most benefit** to their community, and up to three strategies or actions that would have the **least benefit** to their community.

MOST BENEFICIAL STRATEGIES AND ACTIONS

Table 5 lists the top **strategies** that Snohomish County participants identified as having the most benefit for their communities. **Table 6** lists the top **action** that Snohomish County participants identified as having the most benefit for their communities. Nine other actions received one vote each and are not shown in the table.

Table 5. The most beneficial strategies as voted on by Snohomish workshop participants.

STRATEGIES		
Sector	**Strategy**	**Number of Votes**
Transportation	Electrify or switch to low-emissions fuels for medium-heavy duty freight/service vehicles	3
Buildings	Reduce emissions from building material production (e.g. steel, cement, concrete)	3
Buildings	Local solar energy and battery storage	2

Table 6. The most beneficial action as voted on by Snohomish workshop participants. Nine other actions received one vote each and are not shown here.

ACTIONS		
Sector	**Action**	**Number of Votes**
Transportation	Increase transit use	3

LEAST BENEFICIAL STRATEGIES AND ACTIONS

Table 7 lists the top **strategies** that Snohomish County participants identified as having the least benefit for their communities. Two participants noted that efficient, all-electric existing buildings were the least beneficial for their community, due to perceived lack of grid resiliency and redundancy against natural disasters in the more rural areas. **Table 8** lists the top **actions** that Snohomish County participants identified as having the least benefit for their communities.

Table 7. The least beneficial strategies as voted on by Snohomish workshop participants.

STRATEGIES		
Sector	**Strategy**	**Number of Votes**
Buildings	Efficient, all-electric existing buildings (upgrades and weatherization)	2
Land Use	Protect rural lands that absorb and store carbon	1

Table 8. The least beneficial actions as voted on by Snohomish workshop participants. Six other actions received one vote each and are not listed here.

ACTIONS		
Sector	**Action**	**Number of Votes**
Transportation	Consider vehicle usage pricing programs like congestion pricing or road usage pricing	2
Buildings	Promote smaller buildings with shared walls (reduces energy use)	2

Discussion Takeaways

CO-BENEFITS

Snohomish participants identified the following co-benefits:

- Improving public health, both mental and physical.

- Reducing homelessness and ensuring people are housed.
- Short- and long-term cost savings of upgrades and efficiency measures.
- Resilience to climate impacts.

UNINTENDED CONSEQUENCES

Participants acknowledged the following unintended consequences:

- There is already high demand for electricity, and demand is growing. Electricity demand can have other consequences, like the impacts of dams (for hydroelectricity production) on salmon populations.
- The cost of electric vehicles makes the transition to EVs challenging.
- EVs are heavy, which wears down tires faster. Tire wear produces 6PPD-Q, a toxic pollutant in our waters which has negative impacts on salmon populations.
- An all-electric system may lack resiliency against disasters or hazards, especially in rural locations.

IMPLEMENTATION IDEAS

Snohomish participants shared the following ideas for implementing the strategies and actions:

- Collaborate with labor unions to incentivize remote work and increased transit options for commuting.
- Develop limits on the size of cars and vehicles.

Kitsap

Total number of Kitsap County workshop participants: **18 people**

Summary

Kitsap County workshop participants identified the transportation and buildings sectors as offering the greatest potential benefits for emissions reduction, with strategies like reducing vehicle travel, electrifying transportation, and improving building efficiency receiving the most support. The action to increase transit use stood out as the highest-rated for community benefit. Participants also expressed support for preserving forests and wetlands, while vehicle usage pricing and food waste composting were viewed more skeptically. Co-benefits discussed frequently included improved air quality, physical health, and community livability, while concerns were raised about the relevance of some strategies and potential cost barriers. Attendees offered a wide range of implementation ideas, including transit and solar incentives, zoning changes, and expanded outreach. However, a key challenge identified was engaging a broad enough audience to drive meaningful action.

Feedback on Emission Reduction Measures

As mentioned above, the project team asked participants to select up to three strategies or actions they felt would have the **most benefit** to their community, and up to three strategies or actions that would have the **least benefit** to their community.

MOST BENEFICIAL STRATEGIES AND ACTIONS

Table 9 lists the top **strategies** that Kitsap County participants identified as having the most benefit for their communities. **Table 10** lists the top **actions** that Kitsap County participants identified as having the most benefit for their communities.

Table 9. The most beneficial strategies as voted on by workshop participants in Kitsap County. There was a four-way tie between strategies for first place.

STRATEGIES		
Sector	**Strategy**	**Number of Votes**
Transportation	Reduce the region's total vehicle travel	2
Transportation	Electrify passenger vehicles	2
Buildings	Efficient, all-electric new buildings (upgrades & weatherization)	2
Buildings	Local solar energy and battery storage	2

Table 10. The most beneficial actions as voted on by workshop participants in Kitsap County. There was a two-way tie between actions for third place.

ACTIONS		
Sector	**Action**	**Number of Votes**
Transportation	Increase transit use	6
Land Use	Protect existing forests and wetlands	4
Consumption and Waste	Increase composting and recycling	3
Buildings	Develop codes for construction materials	3

LEAST BENEFICIAL STRATEGIES AND ACTIONS

Table 11 lists the top **strategy** that Kitsap County participants identified as having the least benefit for their communities (only one strategy received votes for least benefit). **Table 12** lists the top **actions** that Kitsap County participants identified as having the least benefit for their communities.

Table 11. The least beneficial strategy as voted on by workshop participants in Kitsap County. Only one strategy received votes for least benefit.

STRATEGIES		
Sector	**Strategy**	**Number of Votes**
Transportation	Electrify or switch to low-emissions fuels for medium-heavy duty freight/service vehicles	1

Table 12. The least beneficial actions as voted on by workshop participants in Kitsap County.

ACTIONS		
Sector	**Action**	**Number of Votes**
Transportation	Consider vehicle usage pricing programs like congestion pricing or road usage pricing	5
Consumption and Waste	Increase composting of non-edible food waste	4
Consumption and Waste	Discourage unnecessary purchasing	3

Discussion Takeaways

CO-BENEFITS

Participants identified the following co-benefits:

- Participants shared that reducing private passenger vehicle use offers co-benefits such as improved air quality and enhanced physical health. Additionally, participants frequently noted the broader community benefits of reducing vehicle travel, including making neighborhoods more livable, improving safety, strengthening walking and cycling networks, and fostering stronger community connections. Preventing sprawling development also reduces traffic and pollution from cars.
- Transitioning to EVs was seen as a quieter, healthier alternative that removes the cost burden of gasoline.
- Several participants expressed that preserving forests and rural lands supports better air quality, wildlife habitat, and emotional well-being.
- Participants noted that many of the strategies discussed could also improve emergency preparedness. For example, battery storage systems can provide power during outages.

UNINTENDED CONSEQUENCES

Participants acknowledged the following unintended consequences:

- Participants expressed that reducing or eliminating parking minimums may not be as relevant or impactful in Kitsap.
- Concerns were raised that strengthening codes for buildings and construction materials may increase construction costs and as a result, hinder development.

IMPLEMENTATION IDEAS

Participants shared the following implementation ideas:

Transportation

- Participants suggested recycling diesel- and gas-powered equipment materials to create new electric equipment, which would also help prevent unnecessary landfill waste.
- Increasing public transit usage could be supported by providing school-issued transit passes, subsidizing fares, expanding service hours, offering transit for large events, and improving the overall convenience and accessibility of transit options.
- Promoting the long-term cost savings associated with EVs was identified as a key strategy to increase EV adoption.
- Participants recommended building a walking and biking trail in Kitsap similar to the Burke-Gilman Trail to support low-carbon transportation and recreation.
- Teleworking should be incentivized as a way to reduce commuting-related emissions.
- Staggering work hours was suggested to alleviate peak-hour traffic congestion.
- ORCA cards could be distributed to commuters to increase transit use.

Buildings

- Participants recommended providing incentives for solar panel installations and battery storage systems to support residential and commercial clean energy use.
- Educating the public about financial incentives, energy cost savings, and opportunities to reduce emissions at the neighborhood level was seen as essential to increasing participation in building decarbonization efforts.

Land Use

- Zoning changes should support the development of walkable neighborhoods to reduce reliance on vehicle travel.
- Subsidies could be offered to businesses willing to locate in walkable areas, helping to connect land use and transportation planning more effectively.
- Participants emphasized the importance of improving maintenance of existing parks and ensuring that people have equitable access to a range of recreational uses.
- Local organizations, such as native plant groups, should be engaged in land and park stewardship efforts.
- Incentives for rain garden installations in new developments could improve stormwater management and increase urban green space.

- Educating the public about local trail systems and outdoor spaces to promote physical activity and environmental stewardship.

Consumption and Waste

- Participants called for the creation of new markets for recyclable materials to strengthen the local recycling economy.
- Investing in additional staff for waste sorting and recycling was seen as a necessary step to improve waste diversion rates.
- Workshops and internship opportunities focused on waste and recycling could help educate and employ young people in sustainable fields.
- Existing community events, such as Styrofoam and recycling workshops, should be expanded to promote sustainable behaviors.

Overarching

- Participants viewed increasing education and outreach efforts as a critical need.
- Community pledges were proposed as a way to encourage peer-to-peer education and accountability.
- Leveraging school networks could help engage both youth and families in climate action.
- Participants suggested using local celebrities—such as musicians, artists, and athletes—to attract broader interest in climate initiatives.
- PSCAA should consider hosting booths at local fairs and events to increase visibility and engagement.
- A large banner on a ship was proposed as a high-visibility tactic to raise public awareness about air quality and climate action.
- Establishing local information hubs could help share success stories, foster neighborhood-level engagement, and guide residents on how to implement proven climate strategies.
- Messaging should focus on motivation and practical actions, emphasize who bears the cost, and highlight real, tangible benefits rather than symbolic gestures.
- Participants expressed support for increasing the number of climate-focused workshops in the region.
- Climate initiatives should be aligned with emergency preparedness planning, as many of the co-benefits of climate strategies also enhance disaster readiness.

CHALLENGES TO IMPLEMENTATION

Participants identified the following challenges to implementation:

- Difficulty of reaching a broad enough audience to motivate meaningful action and engagement.

King

Total number of King County workshop participants: **43 people**

Summary

King County workshop participants identified upgrading buildings (both existing and new) and reducing total vehicle travel as the most beneficial strategies for their community. They also expressed that actions to improve walking, cycling, and transit would positively impact their community. However, participants emphasized that improvements to walking, cycling, and transit need to prioritize safety and comfort for users. King County workshop participants shared many ideas for implementation, but a clear theme was making sure that these strategies and actions prioritize and center community members – through engagement opportunities, technical assistance, and a focus on anti-gentrification and anti-displacement.

Feedback on Emission Reduction Measures

As mentioned above, the project team asked participants to select up to three strategies or actions they felt would have the **most benefit** to their community, and up to three strategies or actions that would have the **least benefit** to their community.

MOST BENEFICIAL STRATEGIES AND ACTIONS

Table 13 lists the top **strategies** that King County participants identified as having the most benefit for their communities. **Table 14** shows the top **actions** that King County participants identified as having the most benefit for their communities.

Table 13. The most beneficial strategies as voted on by workshop participants in King County.

STRATEGIES		
Sector	**Strategy**	**Number of Votes**
Buildings	Efficient, all-electric existing buildings	19
Transportation	Reduce the region's total vehicle travel	13
Buildings	Efficient, all-electric new buildings	11

Table 14. The most beneficial actions as voted on by workshop participants in King County. There was a three-way tie between actions for second place.

ACTIONS		
Sector	**Actions**	**Number of Votes**

ACTIONS		
Transportation	Improve walking and cycling networks	3
Transportation	Increase transit use	2
Buildings	Weatherize buildings with insulation and other treatments	2
Land Use	Include tree preservation/replacements in local plans and policies	2

LEAST BENEFICIAL STRATEGIES AND ACTIONS

Table 15 lists the top **strategies** that King County participants identified as having the least benefit for their communities. **Table 16** lists the top **actions** that King County participants identified as having the least benefit for their communities.

Table 15. The least beneficial strategies as voted on by workshop participants in King County. There was a four-way tie between strategies for second place.

STRATEGIES		
Sector	**Strategy**	**Number of Votes**
Buildings	Local solar energy and battery storage	6
Consumption and Waste	Capture and use methane gas	2
Transportation	Electrify passenger vehicles	2
Buildings	Efficient, all-electric existing buildings (weatherization & upgrades)	2
Consumption and Waste	Reduce food-related emissions	2

Table 16. The least beneficial actions as voted on by workshop participants in King County. There was a three-way tie between actions for first place.

ACTIONS		
Sector	**Actions**	**Number of Votes**
Transportation	Improve walking and cycling networks	2
Transportation	Improve availability of charging stations and alternative fuels on regional and state transportation corridors	2
Consumption and Waste	Increase compost and recycling	2

Discussion Takeaways

CO-BENEFITS

Participants identified the following co-benefits:

- Making communities more walkable, bikeable, and transit-friendly improves community connectivity and health.
- Focusing on enhancing transit connections, comfort, cleanliness, and safety will improve people's experiences on transit overall. Increased safety, particularly for immigrants, people of color, and women.
- Opportunities for small and local businesses to grow when compact development is planned near transit hubs.
- Protecting and increasing urban green space and tree canopy results in improved mental and physical health for community members.
- Building upgrades can protect people from old, toxic materials and improve public health.

UNINTENDED CONSEQUENCES

Participants acknowledged the following unintended consequences:

- If encouraging people to walk and bike more, there need to be substantial safety upgrades to the walking and cycling network to protect people from vehicles. Walking and biking areas need to be protected and separated from the road.
- Increasing transit use may not be feasible for people with disabilities; for example, they might need to drive in wheelchair-accessible vehicles rather than take transit.
- Concerns about relying on electricity that is still generated using fossil fuels. Electricity needs to be clean and renewably generated for electrification to have the intended positive impact on GHG emissions. (NOTE: Washington's Clean Energy Transformation Act is designed to address this concern.)
- There are barriers to charging EVs for people who live in apartments, condos, or multifamily buildings. Many multifamily buildings do not provide charging.
- Upgrading buildings, increasing transit connections, and enhancing green space, among other actions here, often increase gentrification in neighborhoods that were predominately populated by people of color. Gentrification and rising costs push people of color and overburdened communities out of their homes and out of the city.
- Concerns about the burden of these actions falling on the most vulnerable or overburdened communities, rather than forcing wealthier people and businesses, and/or major polluters, to reduce their consumption or change their actions. Investment in solutions by manufacturers, industry, government (those with power and influence) would be more impactful than putting the burden for change on individuals and residents.
- Environmental impacts of materials required for EV batteries, and limited options for recycling batteries.

- Concerns about the costs required to electrify buildings and vehicles.

IMPLEMENTATION IDEAS

Participants shared the following implementation ideas:

Transportation

- Focus on increasing transit connections/transfers and reliability, particularly outside of large urban centers like Seattle and Bellevue.
- Prioritize crash or accident "hot spots" for upgrades to the walking and cycling network.
- Incentivize transit by providing free ORCA cards for certain groups.
- Utilize Climate Commitment Act funding for projects to reduce emissions in medium and heavy-duty vehicles.
- Create EV sharing programs, particularly in south King County.
- Focus on electrification opportunities for medium- and heavy-duty vehicles that travel through neighborhoods, like garbage trucks and school buses.
- Address state funding deficits for transportation and educate the public about the benefits of transportation funding.

Buildings

- Creating one-stop-shops for technical support on building weatherization and upgrades (Energy Smart is a good model/example).
- Engage with building owners and managers for multifamily homes and apartments; don't just incentivize improvements to single-family homes occupied by owners.
- Improve standards for construction and building materials to reduce the amount of repair and remodeling needed. Currently, new homes are not built for durability.

Consumption and Waste

- Incentivize food composting at restaurants.
- Work with multifamily/apartment building owners and managers to ensure that compost and recycling are available to tenants.

Overarching

- Ensure financial aid and incentives, particularly for highly impacted and underserved communities.
- Provide advisory and technical assistance to help people navigate programs or opportunities.
- Create a community-led model for implementation. Provide funding to community-based organizations (CBOs) and trusted partners to lead the implementation.
    - Promote community-ownership models in land use (such as urban tree canopy and green space).

  - Ensure funding for implementation of community ideas.
- Increase the opportunities for community advocacy and engagement. Provide clear opportunities for people to provide their feedback and input.
  - Show people how their feedback influenced a policy or plan through clear feedback loops and celebrate wins.
- Educate the public to increase awareness of GHG emissions and how to reduce them. Engage people in their preferred language.
- Local governments should circulate monthly newsletters about climate action so community members better understand what is happening and how to stay involved.
- Prioritize language access to ensure non-English speaking communities understand how to access programs or opportunities, and have opportunities to participate. All materials should be translated into multiple languages.
- Implement penalties for polluters and require them to pay for harm caused. Utilize carbon tax/penalties to implement actions in the CCAP. Invest in solutions for manufacturers and industry to maximize reductions in GHG emissions, rather than putting the burden on individuals.

Pierce

Total number of Pierce County workshop participants: **31 people**

Summary

During the Pierce County workshop, participants identified the transportation and buildings sectors as offering the greatest potential for climate benefits, with top strategies including reducing vehicle travel and increasing urban tree canopy. Land use actions like protecting forests and enhancing walking and cycling networks were also highly rated. Co-benefits emphasized included improved health, stronger communities, economic opportunities, and environmental justice. However, participants also flagged potential unintended consequences, such as increased housing costs or inequitable impacts, if strategies are not implemented carefully. Suggestions for implementation included incentives, public education, cross-agency coordination, and pilot projects. Key challenges raised included high costs, limited funding, political barriers, and community resistance.

Feedback on Emission Reduction Measures

As mentioned above, the project team asked participants to select up to three strategies or actions they felt would have the **most benefit** to their community, and up to three strategies or actions that would have the **least benefit** to their community.

MOST BENEFICIAL STRATEGIES AND ACTIONS

Table 17 lists the top **strategies** that Pierce County participants identified as having the most benefit for their communities. **Table 18** lists the top **actions** that Pierce County participants identified as having the most benefit for their communities. Five actions received two votes each.

Table 17. The most beneficial strategies as voted on by workshop participants in Pierce County. There was a two-way tie between strategies for third place.

STRATEGIES		
Sector	**Strategy**	**Number of Votes**
Transportation	Reduce the region's total vehicle travel	11
Land Use	Protect and increase urban tree canopy and green space	8
Buildings	Reduce industrial emissions	5
Buildings	Efficient, all-electric existing buildings (upgrades & weatherization)	5

Table 18. The most beneficial actions as voted on by workshop participants in Pierce County. There was a two-way tie between actions for first place and a five-way tie between actions for second place.

ACTIONS		
Sector	**Action**	**Number of Votes**
Land Use	Protect existing forests and wetlands	3
Transportation	Improve walking and cycling networks	3
Land Use	Encourage healthy soil practices on farms	2
Consumption and Waste	Develop markets and infrastructure to reuse and recycle more materials, including supporting businesses and organizations	2
Buildings	Support residents to install solar panels and battery storage	2
Buildings	Weatherize buildings with insulation and other treatments	2
Land Use	Include tree preservation/replacements in local plans/policies	2

LEAST BENEFICIAL STRATEGIES AND ACTIONS

Table 19 lists the top **strategies** that Pierce participants identified as having the least benefit for their communities (each of these strategies only received one vote). **Table 20** lists the top **actions**

that Pierce participants identified as having the least benefit for their communities (each action only received one vote).

Table 19. The least beneficial strategies as voted on by workshop participants in Pierce County. There was a five-way tie between strategies for first place.

STRATEGIES		
Sector	**Strategy**	**Number of Votes**
Buildings	Efficient, all-electric existing buildings (upgrades & weatherization)	1
Buildings	Reduce emissions from building material production (e.g. steel, cement, concrete)	1
Transportation	Electrify or switch to low-emissions fuels for medium-heavy duty freight/service vehicles	1
Transportation	Electrify passenger vehicles	1
Transportation	Reduce emissions from air travel	1

Table 20. The least beneficial actions as voted on by workshop participants in Pierce County. There was a seven-way tie between actions for first place.

ACTIONS		
Sector	**Action**	**Number of Votes**
Buildings	Strengthen building codes	1
Buildings	Promote smaller buildings with shared walls (reduces energy use)	1
Buildings	Develop codes for construction materials	1
Consumption and Waste	Increase methane capture at landfills	1
Transportation	Consider vehicle usage pricing programs like congestion pricing or road usage pricing	1
Transportation	Reduce or eliminate parking minimums	1
Transportation	Support the region's airports to use low-emissions fuels	1

Discussion Takeaways

CO-BENEFITS

Participants identified the following co-benefits:

- Expanding regional transit and enhancing walking and biking infrastructure supports physical health, fosters community connections, improves safety, and creates jobs.
- Increasing the urban tree canopy helps reduce the urban heat island effect, improves quality of life, and provides cooling benefits for communities.
- Preserving wetlands, forests, and open space protects biodiversity, supports salmon recovery, and maintains the natural systems we rely on for clean air and water.
- Strengthening local food systems supports the immune system and gut health.
- Developing smaller, more energy-efficient buildings can lower utility costs, improve indoor air quality, and make housing more affordable and healthier.
- Efforts to reduce emissions can help communities build climate resilience and better withstand future climate impacts.
- Mental health resilience, safety, and a strong sense of place and community are all positively impacted by climate strategies that emphasize community design, green space, and social connection.
- Promoting green job pathways and workforce development creates economic opportunities and supports a just transition to a clean energy future.
- Cost savings from efficient appliances and sustainable infrastructure.
- Prioritizing environmental justice ensures that frontline communities, who are most impacted by pollution and climate change, receive targeted support to build resilience and reduce harm.

UNINTENDED CONSEQUENCES

Participants acknowledged the following unintended consequences:

- Concern that climate policies could disproportionately impact vulnerable communities if not paired with adequate support systems or equity-centered implementation.
- Pricing programs that penalize emissions, such as congestion or road usage fees, may be perceived as punitive if implemented before providing viable, affordable transportation alternatives.
- Eliminating parking minimums or strengthening building codes without sufficient alternatives or support may increase costs or cause delays, particularly in housing development.
- Reducing air travel emissions may currently lack feasible alternatives, and policies could inadvertently raise travel costs or limit access.
- Participants noted the need to ensure that well-intended building regulations do not unintentionally worsen housing affordability.
- Retrofitting older buildings can be costly and may unintentionally result in the loss of historic or aesthetic value if not carefully managed.

IMPLEMENTATION IDEAS

Participants shared the following implementation ideas:

Transportation

- Incentivize EV adoption through rebates and support for infrastructure upgrades like electric panel improvements.
- Expand and integrate public transit systems across the region with coordinated payment systems (e.g., a region-wide ORCA card), shorter wait times, and weekend service.
- Improve accessibility of public transit in rural communities and reduce barriers to public transit ridership.
- Promote shared transportation options like carpooling, vanpooling, and car sharing, and increase investment in high-speed rail and light rail.
- Pilot one-way streets and complete streets to prioritize multimodal transportation and safety.
- Partner with institutions like Joint Base Lewis-McChord and local businesses to support alternative fuels and sustainable commuting options.

Buildings

- Require or incentivize local power systems (nano grids) for industrial facilities and support renewable energy solutions like geothermal heating and cooling.
- Reduce construction barriers through streamlined permitting, including pre-approved accessory dwelling unit (ADU) designs and modular “plop-on” homes.
- Support training and workforce development for building material reuse and recycling programs.

Land Use

- Redirect tax revenue to improve sidewalks and bike lanes, especially in neighborhoods where property owners cannot afford to upgrade the public right of way.
- Expand public education on the importance of wetlands and the benefits of natural ecosystem functions.

Consumption and Waste

- Educate residents about proper waste disposal and organize public tours of local composting, recycling, and landfill facilities.
- Encourage food rescue and donation efforts, including gleaning and home-grown produce donations, to reduce food waste and support community needs.
- Support producer responsibility policies that require manufacturers to make products more durable, repairable, and recyclable.
- Shift the burden of product end-of-life management from individuals to producers.

Overarching

- Provide incentives and community-wide education to promote sustainable behaviors.
- Ensure coordinated action across agencies and governments to align climate action plans.

- Track progress, use adaptive management, and maintain transparency and accountability.
- Design communications that resonate with all demographics, including renters and older adults, and highlight health benefits as a key motivator.
- Engage community members through accessible outreach at events, places of worship, schools, and public spaces, using tools like murals, freeway signs, and mobile apps.
- Inspire participation through art and storytelling and encourage residents to advocate for change.
- Pilot small-scale demonstration projects to showcase the benefits of climate strategies and build public support.
- Allocate funding to assess the long-term consequences of proposed solutions, such as the environmental impact of EV batteries and solar panels, alongside funding for implementation.

CHALLENGES TO IMPLEMENTATION

Participants identified the following challenges to implementation:

- High upfront costs for EVs and home upgrades can limit participation.
- Government coordination remains a challenge.
- Insufficient federal funding and competing priorities (e.g., emergency response vs. traffic calming) can delay or derail implementation.
- Community and consumer buy-in may be limited by misinformation, fear of change, or a lack of understanding about the benefits of proposed actions.
- Developers may push to build on green spaces, undermining conservation efforts and reducing access to nature.
- Corporate lobbying and lack of political will were noted as significant obstacles to transformative climate policy.

Conclusion

The four climate action planning workshops brought together approximately 100 community members from the Puget Sound region. Participants from all four counties joined the workshops, reviewed the draft emission reduction strategies and actions, and engaged in meaningful conversations with the Agency team and representatives from local jurisdictions about emission and climate pollution reduction in their communities. Overall, participants expressed eagerness to learn about the climate action already taking place in the region, and enthusiasm to have an opportunity to provide feedback for the region's CCAP. While each county and community differed in its experiences of climate change and greenhouse gas emissions, many participants shared visions of healthy, connected communities who have access to clean air and water, accessible transit, walking, and cycling, thriving business districts, and ample green space.

The Agency will evaluate the feedback received from the community workshops and incorporate the feedback into the CCAP. The Agency plans to publish a draft CCAP in fall 2025 for a final round of community input, before publishing the final CCAP in December 2025.

Appendix A. Workshop Agenda

See next page.

Community Workshop on Reducing Climate Pollution: Snohomish County

Time	Agenda Item *Opportunities for participant discussion and/or questions **italicized**.*	Presenters
5:00 PM	**Arrival and Settle-In** • Free time: Please sign in, explore the community resources table, participate in a welcome activity, and eat some food! • Kids' area and activities available	N/A
5:30 PM	**Welcome** • Agenda overview • Land acknowledgement & ground rules • Interpretation instructions	Cascadia Consulting Group
5:45 PM	**Intro to the Comprehensive Climate Action Plan & Climate Pollution Reduction Grant** • Intro to the Clean Air Agency • Overview of the Comprehensive Climate Action Plan and Climate Pollution Reduction Grant • Emissions reduction strategies and actions • ***Participant questions & answers (10 min)***	Puget Sound Clean Air Agency
6:10 PM	**Discussion Overview** • Overview of discussion format • Transition to breakout groups	Cascadia Consulting Group
6:15 PM	**Discussion #1: Community Benefits & Impacts of Strategies** • ***Small group discussion and activities.*** *See guide on page 2.*	Discussion Groups
7:03 PM	**5 Minute Break**	
7:08 PM	**Discussion #2: Your Implementation Ideas** • ***Small group discussion questions.*** *See guide on page 2.*	Discussion Groups

7:25 PM	**Wrap Up & Next Steps**
	• Overview of next steps and ways to stay involved:
	  ○ If you have any outstanding questions, email CPRG@pscleanair.gov.
	  ○ Visit website at: pscleanair.gov/CPRG
		Puget Sound Clean Air Agency

Discussion Guide

Discussion #1: Community Benefits and Impacts of Strategies

DISCUSSION QUESTIONS & STICKY NOTE ACTIVITY

1. Are there any crucial strategies missing and/or do you have new ideas for strategies not currently reflected here? Is there anything we can clarify about the strategies before we dive into discussion?
2. **Sticky note activity:** Add up to **five green** sticky notes to the strategies or actions you feel would have the biggest benefits. Add up to **five yellow** sticky notes to the strategies or actions you feel would have the least benefit.
3. Reflection & discussion by sector: We will go sector by sector, starting with transportation, to discuss the strategies and actions you selected.
    a. **Green** stickies share: Why/how would these strategies benefit your community?
    b. **Yellow** stickies share: Why/how would these strategies have less benefit for your community? Would any of these strategies have unintended consequences in their community?
    c. Everyone shares: Are there other benefits created by a strategy that you think are particularly important for your community, such as improved public health, increased mobility, cost savings, new green jobs, or more?

    [Questions A-C will be repeated for each sector.]

Discussion #2: Your Implementation Ideas

Return to your small group for this second discussion, focused on implementing the strategies.

DISCUSSION QUESTIONS

1. Looking at the strategies you identified as most beneficial, what are your ideas for the best way to implement these strategies in your neighborhood or community?
2. Looking at the strategies you identified as most beneficial, individually or in your community, what would keep a strategy from moving forward? Are there any challenges or barriers you foresee?
3. Now thinking about the full list of strategies, do you have any ideas or thoughts for implementation that we haven't yet talked about?

Community Workshop on Reducing Climate Pollution: Pierce County

Time	Agenda Item *Opportunities for participant discussion and/or questions **italicized**.*	Presenters
5:00 PM	**Arrival and Settle-In** • Free time: Please sign in, explore the community resources table, participate in a welcome activity, and eat some food! • Kids' area and activities available	N/A
5:30 PM	**Welcome** • Agenda overview • Land acknowledgement & ground rules • Interpretation instructions	Cascadia Consulting Group
5:40 PM	**Intro to the Comprehensive Climate Action Plan & Climate Pollution Reduction Grant** • Intro to the Clean Air Agency • Overview of the Comprehensive Climate Action Plan and Climate Pollution Reduction Grant • Emissions reduction strategies and actions • Pierce County & Tacoma climate planning efforts • ***Participant questions & answers (5-10 min)***	Puget Sound Clean Air Agency
6:10 PM	**Discussion Overview** • Overview of discussion format • Transition to breakout groups	Cascadia Consulting Group
6:15 PM	**Discussion #1: Community Benefits & Impacts of Strategies** • ***Small group discussion and activities.*** *See guide on page 2.*	Discussion Groups
6:45 PM	**Discussion #2: Your Implementation Ideas** • ***Small group discussion questions.*** *See guide on page 2.*	Discussion Groups

7:15 PM	**Wrap Up & Next Steps**
	• Overview of next steps and ways to stay involved:
	  ○ If you have any outstanding questions, email CPRG@pscleanair.gov.
	  ○ Visit website at: pscleanair.gov/CPRG
		Puget Sound Clean Air Agency

Discussion Guide

Discussion #1: Community Benefits and Impacts of Strategies

DISCUSSION QUESTIONS & STICKY NOTE ACTIVITY

1. Are there any crucial strategies missing and/or do you have new ideas for strategies not currently reflected here? Is there anything we can clarify about the strategies before we dive into discussion?
2. Sticky note activity: Place up to three green sticky notes on the strategies you feel would have the biggest benefits to your community.
3. Other than reducing greenhouse gas emissions and air pollution, are there other benefits created by a strategy that you think are particularly important for your community, such as improved public health, increased mobility, cost savings, new green jobs, or more?

Discussion #2: Your Implementation Ideas

DISCUSSION QUESTIONS

1. Looking at the strategies you identified as most beneficial, what are your ideas for the best way to implement these strategies in your neighborhood or community?
2. Looking at the strategies you identified as most beneficial, individually or in your community, what would keep a strategy from moving forward? Are there any challenges or barriers you foresee?
3. Now thinking about the full list of strategies, do you have any ideas or thoughts for implementation that we haven't yet talked about?

CPRG Community Workshop Agenda

FACILITATOR VERSION

PUGET SOUND REGION (SEATTLE-TACOMA-BELLEVUE MSA)

WINTER/SPRING 2025 | PUGET SOUND CLEAN AIR AGENCY

1 Overview

The Puget Sound Clean Air Agency is creating a Comprehensive Climate Action Plan, funded by the Climate Pollution Reduction Grant program. This Plan will guide regional efforts to significantly reduce greenhouse gas (GHG) emissions and air pollution.
The Agency is hosting workshops in four counties around Puget Sound to collect community experiences and concerns about climate pollution in the region. Input from these workshops will help inform how actions that reduce climate pollution can best be designed and implemented.

Workshop Schedule

- **Snohomish County**
  - Thursday, March 13, 2025, 5:30-7:30PM at Everett Community College
- **Kitsap County**
  - Thursday, March 20, 2025, 5:30 – 7:30 PM at Bremerton Government Center
- **King County**
  - Thursday, April 3, 2025, 5:30-7:30PM at El Centro de la Raza
- **Pierce County**
  - Tuesday, April 15, 2025, 5:30-7:30PM at Clover Park Technical College

2 Workshop Objectives

- Gather community input to inform the LIDAC and community benefits analysis.
- Identify co-benefits and impacts of greenhouse gas emission reduction measures within local communities.
- Understand community perspectives on how actions can be implemented to maximize benefits and minimize unintended impacts.

3 Materials to Bring

Cascadia Materials	Amount	PSCAA Materials	Amount
Flip charts	7 (5 needed, 2 back-up)	Printed sign-in sheets	3 (2 sets for clipboards,1 back-up)
Easels	7 (5 needed, 2 back-up)	Printed CPRG materials	45 copies
Small sticky notes for discussion activity	Green and yellow sticky note pads	Kid activities	
Printed facilitators' packets: • Agenda • Facilitator table of measures	6	Community resources (from utilities and local governments)	
Printed participant agenda + discussion questions	Total # of participants	Printed sheets of measures table (posterboard size)	5 (1 per breakout group)
Printed participant table of measures	Total # of participants		
Printed copy of slideshow + speaker notes	1		
Felt-tip markers + sharpies	20	Foam core poster boards (clip measures to)	5 (1 per breakout group)

Cascadia Materials	Amount	PSCAA Materials	Amount
Extra pens	20	Food & drinks	
Computer (for slideshow)	1	Napkins, plates, cutlery, cups	
Extra connection cables (HDMI, USB adapter, extension cord)	2	Trash bag + compost bag	
Clipboards for sign-in sheets	2	Agency name tags	
Bluetooth speaker for music			
Extra binder clips for posterboards	30		
Sticky back name tags (for participants)	50		
Index cards for Q+A	50		
Printed name tags for CCG staff	3		
Rolling cart for materials	1		

4 Workshop Agenda

Time	Agenda Item	Presenters	Facilitation Notes

5:00 PM
30 mins
	Arrival and Settle-In
	• Participants begin to arrive
	• Food available, participants can mingle, sign in
	• When checking in, point out the kids' area and activities
	• Participants can browse available resources from utilities, local governments (community table)
	• Welcome activity: posterboard question(s)
	  ○ What makes you hopeful about the future of your community?
	  ○ What climate actions do you already see happening in your community?
		N/A	• Sign-in area includes: sign-in sheets, any CPRG materials, and printed meeting agendas
			• 2-3 people staffing sign-in table
			• Show kid area & activities
			• Community table with resources available
			• Music playing from 5 – 5:30 PM
			• Welcome reel slides play

Time	Agenda Item	Presenters	Facilitation Notes

5:30 PM
15 mins
	Welcome and Agenda Overview
	• Land acknowledgement
	• Logistics for in-person space
	• Interpretation available & expectations around interpretation
	• Workshop staff intro
	• Agenda overview – note times for questions and discussion
	• Participation guidelines
	• Interactive question:
	  ○ Why did you choose to come to this workshop?
	  ○ *Please share your answer with your table or a neighbor.*
		Cascadia:
		Alle/Gretchen
			• Logistics:
			  ○ Bathrooms
			  ○ Kid area & activities
			  ○ Emergency exits
			  ○ Food available!
			  ○ Ground rules of participation
			• Interpretation
			• Ground rules
			• Team members stand up during logistics slide

5:45 PM
25 mins
	Introduction to the Comprehensive Climate Action Plan & Climate Pollution Reduction Grant
	• Presentation (15 min)
	  ○ Introduction to the Agency
	  ○ Overview of CPRG + CCAP
	  ○ Timeline of the process
	  ○ Overview of GHG emissions and sector
	• Menu of GHG reduction measures
	• Question & Answer Session (10 min)
	  ○ Do you have any questions about what you just heard on the CCAP or the CPRG program to prepare for the upcoming discussion?
		Agency:
		Sara/Erica
			For Q&A (2 options to participate):
			• People can write down their questions on index cards – we collect that during presentation and go through questions.
			• Or people can raise hands and ask their question verbally.
			Clarify how much time we have for Q&A. For questions we don't have time to answer, people can email questions to CPRG@pscleanair.gov.
			
			CCG Staff take note of verbal questions.

6:10 PM *5 mins*	**Discussion Overview** • Overview of discussion format (2 min) ○ How your input will be used	Cascadia: Alle/Gretchen	Discussion format:

Time	Agenda Item	Presenters	Facilitation Notes

	• Transition to breakout groups (3 minutes)		• Small group discussions – stick with the same small group the whole workshop
			• Facilitator will either count people off or split the room by tables
			• Two discussion sections:
			  ○ First section is focused on community benefits & impacts of the emission reduction strategies
			  ○ Second section is focused on ideas for implementation

6:15 PM *30 min*	**Discussion #1: Community Benefits & Impacts of Strategies** • Small group discussion questions and activities. See guide: ○ Discussion Guide #1	Facilitator for each group (full PSCAA + CCG team)	• Up to 5 small groups • Supplies needed: Large flip charts for notes, small sticky notes, easels, markers • Printed discussion guide + measures sheet
6:45 PM *30 min*	**Discussion #2: Your Implementation Ideas** • Small group discussion questions and activities. See guide: ○ Discussion Guide #2	Facilitator for each group (full PSCAA + CCG team)	• Up to 5 small groups • Supplies needed: Large flip charts for notes, small sticky notes, easels, markers • Printed discussion guide + measures sheet
7:15 PM *15 min*	**Wrap Up & Next Steps** • Overview of next steps and timing	Agency	• Next steps:

Time	Agenda Item	Presenters	Facilitation Notes
	• Ways to stay involved and next opportunity to engage ○ If any outstanding questions, participants can email CPRG@pscleanair.gov.		○ Reviewing community feedback ○ Draft CCAP • Stay involved: ○ Listserv sign-up ○ Website ○ Comment on draft CCAP!

5 Discussion Guide

Discussion Group Structure

- **Discussion #1: Community Benefits and Impacts of Strategies (30 minutes)**
  - Give participants 5 minutes to review the menu of measures
  - Ask question #1 (clarifying or adding any missing strategies)
  - Complete the sticky activity (considering all sectors/full menu of measures) and ask participants individually to share why they made their choices. Call on participants one by one.
- **Discussion #2: Your Implementation Ideas (30 min)**
  - Roundtable discussion on discussion questions.

Discussion #1: Community Benefits and Impacts of Strategies

FACILITATOR INTRODUCTION

[Facilitator]: During this first discussion section, we're going to focus on the greenhouse gas emission reduction strategies that will be included in the CCAP. As we shared during the presentation, these are strategies we can take to reduce emissions in the Puget Sound region. We want to hear your feedback on these strategies, particularly focusing on how these strategies might benefit your local community. For the discussion, we'll start with any initial questions you may have, then we'll complete a sticky note activity using these poster boards, and then we'll discuss your sticky note selections.

Before we start, we'll give you 5 minutes to review the Emissions Reduction Strategies & Actions Handout. The handout is organized by sector (transportation, buildings, land use, refrigerants, and consumption & waste). The strategies refer to overarching approaches or key directions aimed at achieving emissions reductions. Actions are the specific, tangible steps taken to implement those strategies. In general, the strategies are ordered in the table based on how much emissions reduction they would achieve, from most reduction in greenhouse gas emissions to least reduction. The Clean Air Agency and partners around the region have already conducted engagement related to climate action. That includes community input on *which* actions should be included as well as *how* those actions should be implemented. In each sector of emissions, you'll see some of the key themes from past engagement processes.

[Facilitator gives group 5 minutes to review handout]

Now, we'll dive into our discussion questions on the strategies. As a reminder, we'll be talking about how actions can be implemented later on.

DISCUSSION QUESTIONS

1. Are there any crucial strategies missing and/or do you have new ideas for strategies not currently reflected here? Is there anything we can clarify about the strategies before we dive into discussion?
2. **Participant sticky note activity:** People add up to three **green** sticky notes to the strategies and actions they feel would have the biggest benefits (pre-written/printed on boards). People may add up to three **yellow** sticky notes to the strategies or actions they feel would have the least benefit or could cause unintended consequences (pre-written/printed on boards).
    a. **Participants share out**: Ask each person to explain why they chose the strategies/actions they did.

- **Green** stickies: Why/how would these strategies benefit their community?
- **Yellow** stickies: Why/how would these strategies have less benefit or unintended consequences for their community? *Examples if needed: Displacement, higher costs, higher electricity demand, impacts to jobs dependent on or using fossil fuels*.

3. **Group discussion**: Other than reducing greenhouse gas emissions and air pollution, are there other benefits created by a strategy that you think are particularly important for your community, such as improved public health, increased mobility, cost savings, new green jobs, or more?
    a. *Examples of potential benefits (can prompt people with these if they aren't sure): Better air quality on more days of the year, increased ridership on transit, less cases of asthma or other health issues exacerbated by poor air quality, cost savings, comfort, health, safety, resilience to climate impacts, improving air/water/soil quality, creating jobs, promoting equity and environmental justice*.

Discussion #2: Your Implementation Ideas

FACILITATOR INTRODUCTION

[Facilitator]: Now we're going to think about implementation, focusing on the strategies you identified as most beneficial. Implementation means putting these strategies into action in our region and working on these programs and projects. We're interested in hearing your ideas about how these strategies might be implemented in your community.

As we discussed earlier, past community engagement included input on how actions can best be implemented. Some of the cross-cutting themes that community members shared include *[facilitator shares list of cross-cutting themes]*.

DISCUSSION QUESTIONS

1. Looking at your top strategy (the strategy you identified as most beneficial), what are your ideas for the best way to implement these strategies in your neighborhood or community?
    a. *As needed: Examples include outreach, education, hands-on technical support, financial incentives, ambassadors to community*.

2. Looking at your top strategy, individually or in your community, what would keep a strategy from moving forward? Are there any challenges or barriers you foresee?
3. Now thinking about the full list of strategies, do you have any ideas or thoughts for implementation that we haven't yet talked about?

Roundtable discussion, with facilitator/notetaker capturing comments on board.

Appendix B. Emissions Reduction Measures – Workshop Draft

See next page.

Emissions Reduction Strategies & Actions

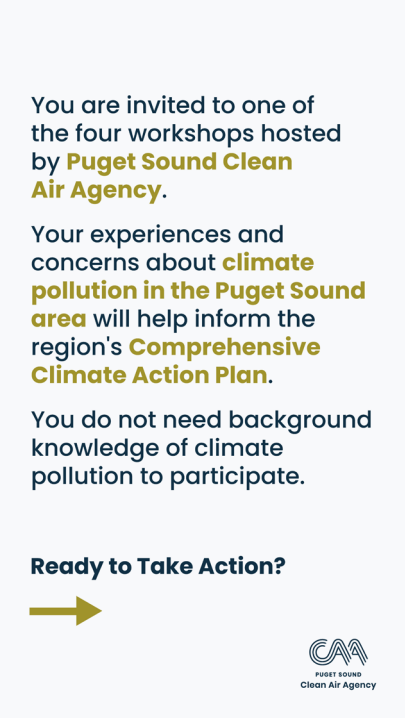
Transportation Sector: 40% of Regional Emissions	
Previous community input heard: • Reduce car dependency by making it easier and safer to walk, bike, and use transit • Support access to shared vehicles, especially near transit and dense development • Prevent sprawling development • Make electric vehicles more affordable and improve charging access • Electrify other polluting vehicles like trucks, planes, ferries, and landscaping equipment • Prioritize high-mileage and high-polluting vehicles in the switch to electric vehicles	
Strategies	**Actions**
Electrify passenger vehicles	Improve electric vehicle charging availability and reliability
	Support electric vehicle sharing programs
Reduce emissions from air travel	Support the region's airports to use low-emissions fuels
	Support alternatives to flying like high-speed rail and improved virtual meeting technology
Reduce the region's total vehicle travel	Consider vehicle usage pricing programs like congestion pricing or road usage pricing
	Increase transit use
	Improve walking and cycling networks
	Encourage compact development; locate growth near transit
	Reduce or eliminate parking minimums
Electrify or switch to low-emissions fuels for medium-heavy duty freight/service vehicles	Improve availability of charging stations and alternative fuels on regional and state transportation corridors
	Plan for low-emissions government and school vehicles
Electrify or switch to low-emissions fuels for offroad equipment (e.g. for construction and agriculture)	Phase out sales of equipment powered by diesel or gas
	Transition governments to low-emissions equipment or fuels
	Electrify landscaping equipment
Reduce marine and rail emissions	Support ports and railroad operators to switch to low-emissions fuels and technology
Electrify or switch to low-emissions fuels for transit vehicles	Provide support through bulk purchasing, market development, pilot projects, and collaborative funding applications
Buildings Sector: 39% of Regional Emissions	
Previous community input heard: • Make it easier to install solar panels • Make homes more efficient and comfortable through weatherization and appliance upgrades • Improve access to incentives and hands-on support for home efficiency and appliance upgrades	
Strategies	**Actions**
Efficient, all-electric existing buildings	Upgrade to efficient, electric space and water heating systems
	Upgrade to efficient, electric appliances (lighting, stoves, clothes dryers, dishwashers, refrigerators, etc.)
	Weatherize buildings with insulation and other treatments

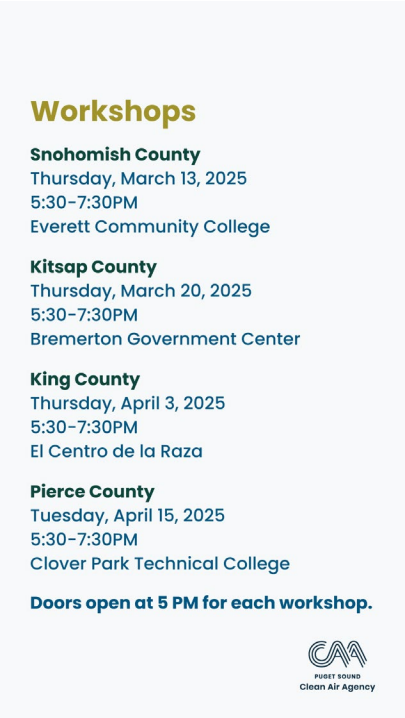
	Strengthen efficiency requirements for commercial buildings
Reduce industrial emissions	Support upgrades that reduce pollution
	Create awards to incentivize reduced emissions
Efficient, all-electric new buildings	Strengthen building codes
	Promote smaller buildings with shared walls (reduces energy use)
Local solar energy and battery storage	Add solar panels on public buildings, parking lots, landfills
	Support residents to install solar panels and battery storage
Buildings Sector (continued)	
Reduce emissions from building material production (e.g. steel, cement, concrete)	Develop codes for construction materials
	Promote sustainable purchasing and contracting
	Support industry leaders with shared learning, collaboration
	Reduce waste from building construction and deconstruction
	Adapt the use of existing buildings instead of making new buildings
Land Use Sector: 13% of Regional Emissions	
Previous community input heard: • Preserve forests and rural lands • Partner with tribal organizations on preservation projects • Increase urban tree canopy and green spaces, focusing on equity • Consider responsibility for the maintenance of urban trees when planting • Use green infrastructure for stormwater management, roofs, roadsides, and others • Support small, family-owned growers using healthy soil practices	
Strategies	**Actions**
Protect rural lands that absorb and store carbon	Protect existing forests and wetlands
	Encourage healthy soil practices on farms
Protect and increase urban tree canopy and green space	Include tree preservation/replacements in local plans/policies
	Increase urban tree plantings
	Remove unnecessary pavement to create new green spaces
Promote green stormwater infrastructure	Use trees and other plants to filter and store stormwater
Refrigerants Sector: 5% of Regional Emissions	
Strategies	**Actions**
Reduce the use of refrigerants that create high amounts of climate pollution	Monitor for and fix leaks in commercial systems
	Recover harmful refrigerants and remove them from use
	Support the use of low-emission refrigerants in appliances
	Transition governments and schools to low-emission alternatives
Consumption & Waste Sector: 3% of Regional Emissions (Waste Only)	
Previous community input heard: • Increase recycling and composting • Reduce food waste • Use story-based education to show current successes and promote change	

Strategies	Actions
Capture and use methane gas	Increase methane capture at landfills
	Capture methane from agricultural and farming operations
	Explore energy generation from biological methane sources
Reduce food-related emissions	Encourage foods that produce less emissions
	Increase composting of non-edible food waste
	Support food rescue and donations
Reduce emissions from other materials	Increase composting and recycling
	Develop markets and infrastructure to reuse and recycle more materials, including supporting businesses and organizations
	Support legislation for material durability, reuse, and repair
	Discourage unnecessary purchasing
Reduce construction and demolition waste	Develop building codes for construction and deconstruction
	Develop markets to resell used construction materials

Appendix C. Promotional Materials

Social Media: Story Posts for Facebook, LinkedIn, and X





Social Media: Feed Posts for Facebook, LinkedIn, and X

Flyer

See next page.

Share your experiences and input about climate pollution in the Puget Sound region!

Join one of our workshops and influence the region's Comprehensive Climate Action Plan

Snohomish County
Thursday, March 13, 2025
5:30-7:30PM
Everett Community College

Kitsap County
Thursday, March 20, 2025
5:30-7:30PM
Bremerton Government Center

King County
Thursday, April 3, 2025
5:30-7:30PM
El Centro de la Raza

Pierce County
Tuesday, April 15, 2025
5:30-7:30PM
Clover Park Technical College

Doors open at 5 PM for each workshop.

Scan the QR code to register

or by going to pscleanair.gov/workshops

Your input will help inform how actions that reduce climate pollution within our neighborhoods can best be designed and implemented. You do not need previous knowledge of climate pollution to participate.

Live interpretation is available; please add your preferred language when registering.

The Comprehensive Climate Action Plan is funded by the Climate Pollution Reduction Grant. Learn more at pscleanair.gov/CPRG

PUGET SOUND Clean Air Agency

Appendix E: Steering Committee and Technical Workgroups

Steering Committee Members

City of Bellevue	Patrick Babbitt
City of Bellevue	Jennifer Ewing
City of Bremerton	Katie Ketterer
City of Everett	Jennifer Gregerson
City of Everett	Karen Schraven
City of Seattle	Christine Bunch
City of Seattle	Michelle Caufield
City of Tacoma	Kristin Lynett
King County	Carrie Lee
King County	Terence Sullivan
Kitsap County	Christopher Piercy
Pierce County	Ryan Dicks
Pierce County	Kyla Wilson
Puget Sound Regional Council	Kelly McGourty
Snohomish County	Eileen Canola
Snohomish County	Molly Beeman

Technical Workgroup Members

Built Environment	
City of Bellevue	Patrick Babbitt
City of Bremerton	Katie Ketterer
City of Everett	Jennifer Gregerson
City of Seattle	Christine Bunch
City of Tacoma	Kristi Lynett
Climate Solutions	Megan Larkin
King County	Nicole Sanders
King County	Riley Lynch
King County	Andrew Larson
King County	Carrie Lee
King County	Jenny Cooper
King County	Terry Sullivan
Kitsap County	Kirvie Yobech
Pierce County	Kyla Wilson
Snohomish County	Alex Pidduck
Snohomish County	Eileen Canola

Transportation Workgroup	
City of Bellevue	Colin Munson
City of Bellevue	Patrick Babbitt
Climate Solutions	Leah Missik
Puget Sound Regional Council	Kelly McGourty

Consumption & Waste	
King County	Andy Smith
King County	Matt Kuharic
King County	Nina Olivier
King County	Kelsey Bailey
Kitsap County	Chris Piercy
Pierce County	Ryan Dicks
Pierce County	Kyla Wilson
Seattle Public Utilities	Ashima Sukhdev
Seattle Public Utilities	Katie Kennedy
Snohomish County	Jon Greninger

Equity Workgroup	
Climate Solutions	Altinay Karasapan
King County	Vicky Raya
King County	Bradley Kramer
King County PH	Richard Gelb
Kitsap PH	Adrienne Hampton
Pierce County	Nicole Avendano
Puget Sound Regional Council	Charles Patton
Snohomish County	Eileen Canola
Snohomish County	Molly Beeman
Snohomish Public Health Department	Christina Ciupitu-Plath
Tacoma-Pierce County Health Department	Erika Bartlett

Workforce Development Workgroup	
City of Seattle	Vin Valentino
City of Seattle	Gus Williams
King County	Michael Carter
Snohomish County	Eileen Canola
WA Department of Commerce	Stephanie Scott
WA Department of Commerce	Dina Geiszler
WorkForce Central	Katie Condit
WorkForce Central	Teresa Delicino
Workforce Central	Josh Stovall
WorkForce Central	Samantha Paxton
WorkForce Central	Trudy Soriano

Appendix F: Jurisdictions with Climate Action Plans and Climate Change/Resiliency Projects

Appendix A: MSA Jurisdictions with CAPs and Climate Change/Resiliency Projects

Jurisdiction	Population	CAP?	Climate Component	Equity	Goal 2030	Buildings and Energy						Transportation					Green Space			Waste and Services		
						Electrification & Efficiency	Mixed-use	Design Stands.	Middle Housing	Renew. Energy	Charging	Transit Investment	Complete Streets	Micromobility	Parking Reform	Telework	TDM	Sequestration/Urban Canopy	Green Government	Offsets	Green/Circular Economy	Waste Reduction	Local Food Production
King County	2,266,789	Yes	Yes	Yes	70%	Yes	Yes	Yes		Yes	Yes	Yes	Yes					Yes	Yes		Yes	Yes	Yes
Pierce County	927,380	Yes	Yes	Yes	45%	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes			Yes	
Snohomish County	840,079	No	Yes (2024 Comp. Plan)		N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Seattle	749,256	Yes	Yes	Yes	58%	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes				Yes			Yes	
Kitsap County	277,673	No			N/A	Yes	Yes			Yes		Yes	Yes				Yes						
Tacoma	221,776	Yes	Yes	Yes	33%	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes	Yes		Yes	Yes	Yes
Bellevue	152,767	Yes	Yes	Yes	50%	Yes	Yes	Yes		Yes	Yes	Yes	Yes					Yes	Yes			Yes	
Kent	134,392	No			N/A	Yes	Yes		Yes	Yes			Yes				Yes					Yes	
Everett	111,337	Yes	Yes	Yes	50%	Yes	Yes				Yes	Yes	Yes	Yes				Yes	Yes	No	Yes	Yes	
Renton	104,047	No		Yes	N/A		Yes						Yes				Yes	Yes				Yes	
Federal Way	97,863	No	Yes		N/A		Yes		Yes				Yes				Yes	Yes					
Kirkland	92,151	Yes	Yes	Yes	50%	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes			Yes	Yes		Yes	Yes	Yes
Auburn	84,858	No			N/A		Yes		Yes		Yes	Yes	Yes				Yes					Yes	
Redmond	76,732	Yes	Yes	Yes	50%	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Marysville	72,275	No	Yes		N/A		Yes		Yes				Yes				Yes	Yes	Yes				
Sammamish	65,845	Yes	Yes		50%	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes		Yes	Yes	Yes	Yes	Yes	
Lakewood	62,572	No	Yes		N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes				Yes	Yes	Yes			Yes	
Shoreline	59,690	Yes	Yes	Yes	50%	Yes	Yes	Yes			Yes	Yes	Yes	Yes	Yes			Yes	Yes			Yes	
Burien	50,806	Yes	Yes	Yes	50%	Yes	Yes		Yes	Yes	Yes	Yes	Yes					Yes	Yes		Yes	Yes	
Bothell	49,017	No	Yes		N/A		Yes					Yes	Yes				Yes	Yes					
Bremerton	45,415	No	Yes		N/A	Yes	Yes		Yes				Yes					Yes	Yes				
Lynnwood	43,212	No	Yes	Yes	N/A		Yes			Yes		Yes	Yes				Yes	Yes	Yes			Yes	Yes
Edmonds	42,593	Yes	Yes	Yes	50% 2035		Yes				Yes	Yes	Yes	Yes				Yes	Yes	Yes	No		
Puyallup	42,452	No	Yes		N/A	Yes	Yes						Yes					Yes					
Lake Stevens	39,848	Yes		Yes	N/A	Yes	Yes				Yes	Yes	Yes					Yes	Yes		Yes	Yes	
Issaquah	39,344	Yes	Yes	Yes	50%	Yes	Yes	Yes	Yes	Yes	Yes	Yes				Yes		Yes	Yes			Yes	
University Place	34,634	No	Yes		N/A	Yes	Yes		Yes		Yes	Yes	Yes		Yes		Yes	Yes	Yes				
Des Moines	32,408	No			N/A		Yes		Yes		Yes		Yes				Yes		Yes			Yes	
SeaTac	30,525	No	Yes		N/A		Yes		Yes	Yes	Yes		Yes				Yes	Yes	Yes			Yes	
Maple Valley	28,220	No			N/A	Yes							Yes				Yes					Yes	
Mercer Island	25,172	Yes	Yes	Yes	50%	Yes				Yes	Yes	Yes	Yes	Yes				Yes	Yes		Yes	Yes	
Bainbridge Island	24,494	Yes	Yes	Yes	65% 2035	Yes	Yes		Yes	Yes	Yes	Yes			Yes	Yes		Yes	Yes			Yes	
Kenmore	23,478	Yes	Yes	Yes	50%	Yes	Yes		Yes	Yes	Yes		Yes			Yes		Yes	Yes		Yes	Yes	

Seattle-Tacoma-Bellevue MSA

Priority Climate Action Plan

Jurisdiction	Population	CAP?	Climate Component	Equity	Goal 2030	Buildings and Energy						Transportation					Green Space			Waste and Services		
						Electrification & Efficiency	Mixed-use	Design Stands.	Middle Housing	Renew. Energy	Charging	Transit Investment	Complete Streets	Micromobility	Parking Reform	Telework	TDM	Sequestration/Urban Canopy	Green Government	Offsets	Green/Circular Economy	Waste Reduction	Local Food Production
Bonney Lake	22,885	No	Yes		N/A		Yes		Yes		Yes	Yes	Yes				Yes	Yes				Yes	Yes
Mountlake Terrace	21,543	No			N/A	Yes	Yes		Yes		Yes	Yes	Yes				Yes	Yes					
Tukwila	21,377	No	Yes		N/A	Yes	Yes		Yes		Yes	Yes	Yes	Yes			Yes	Yes	Yes			Yes	Yes
Covington	21,374	No	Yes		N/A		Yes		Yes			Yes	Yes				Yes	Yes	Yes			Yes	
Mukilteo	21,096	No			N/A		Yes					Yes	Yes				Yes	Yes				Yes	
Arlington	21,059	No			N/A	Yes	Yes		Yes	Yes		Yes	Yes	Yes				Yes					
Mill Creek	20,828	No			N/A		Yes					Yes	Yes										
Monroe	19,243	No			N/A		Yes						Yes										
Port Orchard	17,089	No			N/A		Yes		Yes		Yes		Yes				Yes						
Snoqualmie	13,621	No	Yes		50%	Yes	Yes		Yes	Yes	Yes	Yes	Yes				Yes	Yes	Yes			Yes	Yes
Woodinville	13,261	Yes	Yes	Yes	50%	Yes	Yes				Yes		Yes	Yes				Yes	Yes		Yes	Yes	
Lake Forest Park	13,186	No	Yes		N/A	Yes	Yes		Yes	Yes			Yes				Yes	Yes	Yes			Yes	
Newcastle	12,902	No			N/A		Yes						Yes				Yes	Yes				Yes	
Edgewood	12,896	No			N/A		Yes		Yes				Yes					Yes					
Enumclaw	12,721	No			N/A		Yes		Yes			Yes	Yes				Yes						
Gig Harbor	12,484	Yes	Yes	Yes	45%	Yes	Yes			Yes	Yes	Yes	Yes					Yes	Yes			Yes	
Poulsbo	12,039	No			N/A		Yes		Yes	Yes			Yes				Yes	Yes	Yes				
Fife	10,809	No			N/A								Yes				Yes	Yes					
Sumner	10,595	No	Yes		N/A	Yes	Yes		Yes	Yes			Yes				Yes	Yes	Yes			Yes	
Snohomish	10,150	No			N/A	Yes	Yes		Yes		Yes	Yes	Yes					Yes	Yes			Yes	
DuPont	9,884	No	Yes		N/A	Yes	Yes	Yes			Yes	Yes	Yes				Yes	Yes					
Orting	8,954	No			N/A		Yes						Yes				Yes						
Stanwood	8,804	No			N/A		Yes		Yes				Yes				Yes					Yes	Yes
Milton	8,768	No			N/A	Yes	Yes		Yes			Yes	Yes				Yes						
Duvall	8,434	No			N/A		Yes		Yes			Yes	Yes				Yes	Yes				Yes	
North Bend	7,902	No	Yes		N/A		Yes		Yes	Yes	Yes		Yes				Yes	Yes				Yes	
Pacific	7,022	No			N/A	Yes	Yes		Yes	Yes		Yes	Yes					Yes	Yes				
Fircrest	6,998	No			N/A		Yes		Yes		Yes		Yes				Yes						
Steilacoom	6,727	No	Yes		N/A		Yes						Yes					Yes					
Normandy Park	6,607	No			N/A		Yes				Yes	Yes	Yes				Yes						
Brier	6,463	No			N/A							Yes	Yes			Yes	Yes	Yes					
Black Diamond	6,336	No	Yes		N/A	Yes	Yes	Yes	Yes	Yes		Yes	Yes				Yes	Yes				Yes	
Sultan	6,205	No			N/A		Yes		Yes			Yes	Yes				Yes					Yes	
Buckley	5,295	No			N/A		Yes		Yes			Yes	Yes									Yes	Yes
Granite Falls	3,364	No			N/A		Yes		Yes			Yes	Yes				Yes	Yes					
Algona	3,220	No	Yes		N/A		Yes		Yes				Yes					Yes					
Clyde Hill	3,110	No			N/A														Yes			Yes	

Seattle-Tacoma-Bellevue MSA

Priority Climate Action Plan

Jurisdiction	Population	CAP?	Climate Component	Equity	Goal 2030	Buildings and Energy						Transportation					Green Space		Waste and Services			
						Electrification & Efficiency	Mixed-use	Design Stands.	Middle Housing	Renew. Energy	Charging	Transit Investment	Complete Streets	Micromobility	Parking Reform	Telework	TDM	Sequestration/Urban Canopy	Green Government	Offsets	Green/Circular Economy	Waste Reduction	Local Food Production
Medina	2,920	No			N/A								Yes					Yes					
Eatonville	2,845	No			N/A		Yes			Yes	Yes		Yes					Yes					
Gold Bar	2,403	No			N/A		Yes		Yes				Yes										
Carnation	2,158	No			N/A		Yes		Yes			Yes	Yes				Yes	Yes					Yes
Darrington	1,460	No			N/A	Yes			Yes	Yes			Yes				Yes	Yes					Yes
Woodway	1,320	No			N/A								Yes				Yes	Yes					Yes
Yarrow Point	1,130	No			N/A																		
Ruston	1,055	No	Yes		N/A		Yes		Yes				Yes										
Roy	816	No			N/A		Yes		Yes		Yes		Yes				Yes						
Carbonado	734	No			N/A	Yes	Yes		Yes				Yes				Yes	Yes					
Wilkeson	499	No			N/A																		
Hunts Point	457	No			N/A																		
South Prairie	373	No			N/A																		
Beaux Arts Village	317	No			N/A																		
Skykomish	158	No			N/A	Yes						Yes	Yes										
Index	155	No			N/A	Yes						Yes	Yes						Yes				

Appendix G: Potential Funding Sources, Implementation Milestones, and Metrics for Tracking Progress by Sector

Sector 1. Built Environment

Potential Funding Sources

Local	State	Federal
• City of Bellevue Clean Buildings Incentive Program • City of Seattle Building Emissions Navigator • City of Seattle Clean Heat Program • King County's Energize Program • Puget Sound Energy Up & Go Electric Program • Tacoma Public Utilities Community Electric Vehicle Charging Rebate • Seattle City Light Fleet Electrification Program • Seattle City Light Multifamily Electric Vehicle Charging Program 120	• Multifamily Building Efficiency Grants Program • Clean Building Performance Standard Incentive Program (Tier 1) • Early Adopter Incentive Program (Tier 2) • Small District Energy Assessment Grant • Community Development Block Grants 119 State Home Electrification and Appliance Rebate Program	• Credit for Builders of New Energy-Efficient Homes • Energy Efficiency and Conservation Loan Program • Distributed Generation Energy Project Financing • Title 17 Clean Energy Financing Program • Electric Infrastructure Loan & Loan Guarantee Program • Distributed Energy Resources Interconnection Solutions Collaboratives • Electric Infrastructure Loan & Loan Guarantee Program • Energy Efficient Home Improvement Credit (expires 12/31/2025) • Energy Efficient Commercial Buildings Deduction (no longer available to projects that begin construction after 6/30/2025) • Investment Tax Credit for Energy Property (no longer available to projects that begin construction after 7/4/2025) • Residential Clean Energy Credit • Home Electric Panel Upgrade • Residential Clean Energy Credit: Home Battery Storage

#119

Posted by **Graham** on **10/14/2025** at **4:20pm** [Comment ID: 43] - Link
Agree: 0, Disagree: 0
It seems that the application process has ended for the initial program, and that the new round is due sometime soon.... ?
Is there a chance we may get a heat pump for Christmas? :)

#120

Posted by **Patrick Babbitt** on **10/24/2025** at **2:37pm** [Comment ID: 118] - Link
Agree: 0, Disagree: 0
Eastside Cities' Energy Smart Eastside program (similar to Energize)

Local	State	Federal
		• Residential Clean Energy Credit: Home Battery Storage • Elective Pay and Transferability • Tribal Energy Financing • Clean Energy Tax Incentives for Businesses & Other Entities • Low-Income Energy Assistance Program • Tax Credit for Heat Pumps and Heat Pump Hot Water Heaters (expires 12/21/2025) • Rural Energy Savings Program • Energy Resource Conservation • Geothermal Heat Pump Tax Credit

Implementation Milestones

Most strategies in the built environment would require hiring new staff to provide program oversight, and the execution of one or more contracts for services. General milestones for the first five years include:

- Year 1:
  - Task 1: Hire staff
  - Task 2: Retain contract services
- Year 2:
  - Task 3: Program outreach
- Year 3:
  - Task 4: Program development
- Year 4-5, ongoing:
  - Task 5: Program activation and administration, tracking, monitoring and reporting

Authority to Implement

Some of the strategies and actions in this sector may require additional steps to obtain implementation authority. Specific timelines will depend on the time when the authorization is initiated, and progress through the relevant governing body.

For state policy action, Washington State legislature meets annually, and alternates between short and long sessions. In odd-numbered years, the legislative session is 105 days; in even-numbered years, the legislative session is 60 days. Bills are first introduced into session by legislators and then referred to a committee for hearing; committees may pass the bill (with or without changes), create a new version of the bill, reject the bill, or take no action. If a bill is approved by both the House and Senate, it goes to the Governor for consideration and signature into law.

Local and regional governments (cities, counties, and other regional governing bodies) have the authority to develop and adopt ordinances, and/or rules or regulations that deal with matters of local concern and/or are authorized by statute. Local governments in Washington are generally prohibited from passing ordinances or adopting a rule or regulation that conflict with state law. The specific processes for passing a local ordinance may vary slightly depending on the jurisdiction and local government structure; however, the general steps include proposing the ordinance, introducing the ordinance during a council or commission meeting, holding public hearings, and voting on adoption. When an entity adopts a rule or regulation the process is similar, including opportunity for public input and voting by the entity. Once the ordinance or rule or regulation is adopted, local government agencies are responsible for implementation and enforcement.

Metrics for Tracking Progress

- Percent reduction in energy use for existing residential, commercial, and industrial buildings by 2030
- Percent electrification of existing residential, commercial, and industrial buildings by 2030
- Megawatts of local solar developed by 2030 (for PSE areas)
- Percent reduction of residential, commercial, and industrial GHG emissions by 2030
- Percent of salvaged lumber reused by 2030
- Percent increase in whole building, and building material, reuse by 2030
- Percent increase in commercial buildings designed for disassembly by 2030
- Program enrollment numbers including number of rebates provided, total equipment swapped/replaced, etc.
- Number of individuals and buildings reached through outreach and technical assistance program

Sector 2: Transportation

Potential Funding

State	Federal
• Pedestrian and Bicycle Program • Charge Where You Are: Level 2 Charging • Charging Program Grant	• Vehicle Technology Office Program Wide • Advanced Technology Vehicles Manufacturing Loan Program • Community Energy Innovation Prize Round 2 • Transportation Alternatives Program • Used Clean Vehicle Tax Credit (expires 9/30/2025) • Clean Vehicle Tax Credits (expires 9/30/2025) • Commercial Clean Vehicle Credit (expires 9/30/2025) • Electric Vehicle Charging Equipment (Alternative Fuel Vehicle Refueling Infrastructure Property Credit-Commercial/Public Charging Stations) • Clean Bus Planning Awards • NEVI?

Implementation Milestones

Successful implementation of transportation strategies will involve partnerships between PSRC, the State, Ports, transit agencies, equipment manufacturers, and various other stakeholders across the region. The timeline for different projects will vary; a high-level timeline for the first five years is as follows:

- Year 1:
  - Task 1: Legal, engineering, and technical review of project designs
  - Task 2: Site design and utility consultation
- Year 2:
  - Task 3: Equipment purchases
  - Task 4: Installation of infrastructure
- Year 3-5, ongoing:
  - Task 6: Program administration, tracking, and monitoring

Authority to Implement

Some of the strategies and actions in this sector may require additional steps to obtain implementation authority. Specific timelines will depend on the time when the authorization is initiated, and progress through the relevant governing body.

For state policy action, Washington State legislature meets annually, and alternates between short and long sessions. In odd-numbered years, the legislative session is 105 days; in even-numbered years, the legislative session is 60 days. Bills are first introduced into session by legislators and then referred to a committee for hearing; committees may pass the bill (with or without changes), create a new version of the bill, reject the bill, or take no action. If a bill is approved by both the House and Senate, it goes to the Governor for consideration into law.

Local and regional governments (cities, counties, and other regional governing bodies) have the authority to develop and adopt laws, ordinances, and regulations that deal with matters of local concern. Local governments in Washington are generally prohibited from passing ordinances that conflict with state law. The specific process for passing a local ordinance may vary slightly depending on the jurisdiction and local government structure; however, the general steps include proposing the ordinance, introducing the ordinance during a council or commission meeting, holding public hearings, and voting on adoption. Once the ordinance is adopted, local government agencies are responsible for implementing and enforcing the new law.

Metrics for Tracking Progress

- Percent VMT reduction and GHG reduction for passenger vehicles by 2030
- Updates on investments and commitments made in the regional pedestrian and bicycle transportation networks
- Percent VMT reduction for freight and service vehicles by 2030
- Percent of new passenger vehicles sold as EVs by 2030Amount of funding invested in EV charging infrastructure for passenger vehicles, particularly for disadvantaged communities.
- Percent of new freight and service vehicles sold as EVs by 2030
- Percent increase of new transit fleet vehicles to ZEV, including buses, ferries, streetcars, vanpools, specialized transportation vehicles, light rail, and commuter rail, etc.
- Percent reduction in GHGs from offroad equipment by 2030

- Percent increase of the region's medium and heavy-duty vehicle fleet transitioned to ZEV, including port drayage trucks and other seaport and airport vehicles and infrastructure
- Percent reduction in fuel carbon intensity for aviation fuels
- Percent reduction in aviation fuel use

Consumption & Waste

Potential Funding Sources

State	Federal
• Local solid waste financial assistance program grants • Waste reduction and recycling education grants	• The Circular Supply Chains Accelerator

Implementation Milestones

Successful implementation of measures in the consumption and waste sector will involve partnerships between the State, counties, cities, and public health agencies across the region. A high-level timeline for the first five years is as follows:

- Year 1:
  - Task 1: Project and program design
  - Task 2: Site design and engineering review
  - Task 3: Outreach to cities, public health agencies
  - Task 4: Outreach to high impact establishments
- Year 2:
  - Task 5: Pilot program development
  - Task 6: Facility upgrades and construction
- Year 3:
  - Task 7: Continued program design based on pilot programs
- Year 4-5, ongoing:
  - Task 8: Program administration, tracking, and monitoring

Metrics for Tracking Progress

- Percent of construction and demolition materials diverted from landfills by 2030
- Percent of other recyclable and compostable waste diverted from landfills by 2030
  - Tonnage diverted (reduction in food waste in garbage)
- Percent decrease of household food waste by 2030 and 2050
  - Tonnage (reduction in tonnage of food waste in garbage and increased compost production and use)
- Tonnage of food purchased shifting from higher to lower-carbon intensity foods, agricultural processes, and sources

Land Use and Sequestration

Potential Funding Sources

State	Federal
• Financial Assistance for Wildfire Resilience and Forest Health • National Coastal Wetlands Conservation Grant Program • Community Forests Program	• National Coastal Wetlands Conservation Grant Program

Implementation Milestones

The implementation of measures for land use and sequestration can vary significantly based on factors such as project complexity, regulatory requirements, and community engagement. The natural carbon cycle, which includes natural disturbances and other ecosystem processes, must also be taken into account and is best considered at broad scales during land management planning. A high-level timeline for the first five years is as follows:

- Year 1
  - Task 1: Pre-permitting and site design
  - Task 2: Community outreach
  - Task 3: Environmental review and compliance
- Year 2:
  - Task 4: Construction
- Year 3-5, ongoing
  - Task 4: Program administration, tracking, and monitoring

Metrics for Tracking Progress

- Percent gain/loss in tree canopy by 2030
- Percent of land carbon sinks protected by 2030

Refrigerants

Potential Funding Sources

Potential funding sources were not identified for this sector.

Implementation Milestones

Most strategies in the refrigerants sector would require hiring new staff to provide program oversight, and the execution of one or more contracts for services. General milestones include for the first five years include:

- Year 1:
  - Task 1: Hire staff
  - Task 2: Retain contract services

- Year 2:
  - Task 3: Program outreach
- Year 3:
  - Task 4: Program development
- Year 4-5, ongoing:
  - Task 5: Program activation and administration, tracking, and monitoring

Metrics for Tracking Progress

- Program enrollment numbers including the number of rebates provided, total equipment replaced, etc.
- Number of organizations, manufacturers, distributers, governments, and schools reached through outreach and technical assistance programs

PUGET SOUND
Clean Air Agency

Sara Hetrick
Puget Sound Clean Air Agency
1904 Third Avenue, Suite 105
Seattle, WA 98101
Submitted via email: CPRG@pscleanair.gov

Re: Puget Sound Clean Air Agency (PSCAA) Draft Comprehensive Climate Action Plan

October 23, 2025

Dear Sara Hetrick and PSCAA Program Staff:

Thank you for the opportunity to provide input on the Draft Comprehensive Climate Action Plan (Draft CCAP). The comments are submitted on behalf of Outreach to Transform Lives, Duwamish River Community Coalition, and Front and Centered. We are environmental, climate, environmental justice, and community-led social justice organizations representing the interests of members and supporters across Washington State who want to ensure that climate resilience and planning processes are equitable and accessible for frontline communities.

Front and Centered is a climate justice coalition of organizations led by and serving communities of color in Washington. Our mission is to advocate for the interests of frontline communities, who are first and worst impacted by the climate crisis, in advocating for a just transition from an extractive to a regenerative economy. **Outreach to Transform Lives** is a community nonprofit in South King County. We work with African immigrant families and youth on clean air, staying safe in heat and wildfire smoke, recycling, and sharing stories across generations. The **Duwamish River Community Coalition** has long been a community steward for environmental justice in the Duwamish Valley, which is one of the most polluted areas in the entire Pacific Northwest following 100 years of industrial dumping of toxic waste and historic disinvestment in the community. DRCC has worked tirelessly alongside community groups and neighbors for more than 20 years to clean up the water, land, and air while fighting to eliminate ongoing industrial pollution that makes our communities among the least healthy in the County.

When climate resilience policies are co-developed with the communities who are already experiencing the brunt of extreme heat, flooding, and sea-level rise caused by greenhouse gas emissions, local and regional governments have the opportunity to create more equitable, efficient, and multi-beneficial programs. Frontline communities have unique perspectives that are invaluable to decision-makers, and ensuring their priorities are solicited at the outset of

planning and development processes can save local and regional jurisdictions time, money, and other resources by identifying both issues and solutions early on.

In this letter, we seek to identify areas where environmental justice considerations can be more thoroughly assessed to aid in this type of equitable resilience planning with the goal of making it easier for local and regional governments to adopt the most effective climate policies that are centered around principles of equity and collaboration. This can be better achieved by (1) integrating environmental justice analyses throughout the various strategies and actions, (2) provide clearer guidance on which types of governing bodies have the ability to implement different strategies, (3) explicitly prioritize strategies that have the most impact on GHG reductions proportional to the relevant sector's emissions, (4) providing a more robust industrial emissions reduction strategy, and (5) accounting for barriers to meaningful engagement that prevent communities who are the most impacted from participating in the creation of a final Comprehensive Climate Action Plan (CCAP).

I. Environmental justice concerns.

Environmental justice considerations must be integrated into all strategies and actions rather than as a stand alone Benefits Analysis. It is important to integrate environmental justice issues within each strategy because potential harms and benefits are highly dependent on localized issues such as proximity to polluting industries, local zoning laws, and access to green spaces. More detailed information can be provided related to relevant considerations for specific strategies without being overly prescriptive or making some actions inapplicable for certain jurisdictions. This is particularly true for some of the suggested actions with clearly identified potential environmental harms. The Benefits Analysis is not useful as a standalone section because unless an overview of the geographic disparities is applied to the actual strategies or actions being presented, there is no meaningful way to connect how certain initiatives should be prioritized in specific areas of the region.

A. Established potential harms and benefits should be included within individual strategies to provide additional context rather than in an Appendix.

We appreciate the effort taken to identify potential co-benefits for each strategy, which include environmental justice considerations such as reducing pollution in overburdened communities, reducing or preventing health problems, protecting the natural environment, or reducing consumption and promoting a circular economy.[1] However, these benefits are so broad that they do not provide a helpful level of analysis that could guide government bodies to prioritize certain strategies based on an assessment of potential impacts or benefits for frontline communities.

For example, a listed consideration for Strategy 1.1 Building Low-Carbon New Buildings is "less pollution can reduce health impacts."[2] It is difficult to apply that co-benefit to the relevant actions without further detail. While we understand that the Draft CCAP is not intended to outline

[1] Puget Sound Region Draft Comprehensive Climate Action Plan (Draft CCAP), Puget Sound Clean Air Agency (2025) at 40.
[2] Draft CCAP at 43.

specific policies given the geographic and issue scope of the plan, it is difficult to imagine how the provided information could provide helpful guidance to entities seeking to implement climate actions. Even providing slightly more information could help local governments decide which actions will have the most impact on their specific communities. This could include the type of pollutants most commonly emitted from appliances and heaters and the types of health impacts associated with these types of pollution. Connecting this information to the proposed strategies and actions will make it much easier for those hoping to use this plan to guide and inform their climate priorities.

Another such example is the action related to streamlining permitting processes for clean energy.[3] Frontline communities have continuously expressed concern over expediting permitting processes when existing requirements and timelines already make meaningful engagement incredibly difficult. It would also be helpful to clearly state known concerns with the actual strategy rather than in an appendix. It is not clear how many of these concerns were accounted for when drafting these strategies, and identifying known concerns upfront can save local governments time and resources during their planning and development.

Concerns around vehicle use or congestion pricing programs, are mentioned in the CCAP Community Workshop Summary.[4] This concern is based on the fear that low-income households typically experience disproportionate burdens due to less affordable transit options and are already spending higher proportions of their income on transportation costs.[5] This additional context tailored to strategies is specific enough to provide entities with a way to account for environmental justice concerns early on in the planning process, but still general enough to be relevant to a wide range of governmental bodies. Having the concern buried towards the end of the document rather than as part of the relevant strategy makes it likely to be overlooked. All relevant concerns and feedback should be paired with relevant strategies and actions to make implementation simpler.

The same should be done for strategies with clear ways to maximize benefits by uplifting environmental justice through the prioritization of actions within frontline communities. For example, Action 2.1c is described as expanding active transit networks and prioritizing transit access.[6] While this type of action would create benefits in most communities, emission reductions would be maximized if frontline communities were prioritized during implementation. When accounting for general trends that indicate that low-income people and people of color are less likely to have safe and affordable transportation options,[7] local governments can decide to prioritize active and public transit resources in their most vulnerable neighborhoods.

B. <u>The Final CCAP should emphasize the importance of explicitly prioritizing emission reduction policies and investments in frontline communities to address disproportionate</u>

[3] Draft CCAP at 54.
[4] Draft CCAP, Appendix C: Comprehensive Climate Action Plan Community Workshops Summary at 29.
[5] The Household Cost of Transportation: Is it Affordable, Bureau of Transportation Statistics, United States Department of Transportation (Sept. 19, 2023).
[6] Draft CCAP at 59.
[7] The Unequal Commute, The Urbanist, https://www.urban.org/features/unequal-commute (Oct. 6, 2020).

health disparities when creating and implementing climate and pollution reduction policies.

Air pollution in the region is concentrated in communities like South King County and the Duwamish Valley, where communities experience higher rates of asthma and respiratory disease. To address these health disparities, the Final CCAP should include a strategy that recommends the development of implementation principles for climate and pollution reduction policies. This could include a commitment to spend 40% of funds related to these policies specifically in vulnerable populations in overburdened communities such as South King County, and an additional 10% to be prioritized for youth stipends and programs.

Strategies within the Transportation sector should also focus on truck routes, ports, and busy roads in South King County with actions aimed at helping small truckers switch to cleaner vehicles, enforce no-idling, and clean up construction equipment. For the Built Environment sector, strategies should include actions that state that new building projects, especially those in frontline communities, should include better air filtration (MERV-13+ or portable HEPA) and protect renters with landlord compliance checks.

Finally, the CCAP should include proposed metrics that can be adopted by local governments to ensure that progress is being made to reach climate and emission reduction goals. Metrics should include more dollars going to impacted neighborhoods and community groups, number of HEPA filters given out, rooms upgraded with air filtration systems, lower indoor smoke levels, more youth in paid, jobs and training programs, less idling, more clean trucks on the road, and metrics related to language access including number of languages used for translations, number of people reached, and response rates.

C. Add actions and strategies that promote direct community benefits.

In addition to organizing potential policies for local governments to reduce emissions, strategies should also include initiatives that can be adopted to mitigate some of the impacts experienced by communities living in areas with disproportionately high rates of pollution. This can include heat and smoke action kits, alerts of low air quality in culturally relevant ways including translations, cooling centers that are reachable by public transit, air filter distribution events with a priority for public spaces like libraries, community centers, and childcare centers. For communities with higher rates of diesel and fine particulate matter exposure, Clean Air Rooms and renter-safe Indoor Air Quality upgrades should also be recommended actions. The Final CCAP should also contain ways that local governments can create direct benefits for these communities by providing stipends for organizations providing education programs on clean air and transit vouchers.

D. Strategies should include actions that utilize community leadership during policy development and implementation.

Many community based organizations, such as OTL, are willing and able to do meaningful community engagement by using existing relationships with their communities. This type of input would be incredibly valuable to PSCAA during the development of the Final CCAP, as frontline communities and their personal lived experiences with the impacts of lower air quality should be at the heart of considerations for program and policy development for all levels of

government working to reduce emissions. Existing programs at networks through organizations like OTL could leverage community education spaces, youth leadership, intergenerational knowledge, and on the ground projects like distributing HEPA air filters, doing internal air quality checks, and tree care work. The CCAP should encourage local governments to work with groups like OTL and invest in community and youth stipends to compensate groups for the wide range of outreach work they are capable of doing.

E. Explicit recommendations should be made to prioritize green job development and youth workforce development as part of the strategies.

Given the CCAP's commitment to supporting a just transition for fossil fuel workers through workforce development,[8] we are supportive of green job workforce development, particularly for local youth. While this is mentioned as a priority in the CCAP Community Workshop Summary and as part of the stand alone Workforce Planning Analysis, it is not explicitly included as a strategy or action.[9] Considerations of workforce development at all levels must prioritize green jobs and youth development

F. Guidance for local governments must be paired with improved resources and data accessibility by PSCAA.

As part of PSCAA's efforts to create guidance on climate planning and emissions reduction for the region, they must pair resources like the CCAP with more accessible community monitoring and incident reporting to allow communities to share their experiences and allow their concerns to shape PSCAA's priorities in recommending strategies and actions.

Many frontline communities express frustration with a lack of streamlined reporting processes and transparency around air permit violations and subsequent responses by PSCAA. In order to assess whether local governments are implementing strategies put forth in the Final CCAP, PSCAA should create an accessible portal where violations, enforcement measures, mitigation requirements, and relevant reports are publicly available. Current processes requiring information requests are burdensome for PSCAA and inquiring parties, and information often cannot be provided in a way that is timely and responsive.

II. Authority to Implement should be applied to each action rather than each strategy.

Identifying which entity can implement each strategy is critical to making the Draft Plan applicable, particularly given that climate and greenhouse gas emission policies can be created by and for any level of government from federal to local. However, current application to strategies rather than to each action makes this analysis significantly less useful. This is compounded by the way authority classifications were designated in a way that included "the need to obtain future authority."[10] This makes it very unclear whether particular actions can be implemented by different levels of government. The Final CCAP should provide a narrower

[8] Draft CCAP at 10.
[9] Draft CCAP, Appendix C: Comprehensive Climate Action Plan Community Workshops Summary at 11. Draft CCAP at 100.
[10] Draft CCAP at 40.

application of implementation authority by focusing on actions. There should also be clear notation of whether authority has yet to be obtained by an entity.

III. Additional information is needed to make it more feasible to prioritize strategies in relation to a sector's proportion of total regional emissions.

Much of the introduction to the Draft Plan focuses on the different sources of greenhouse gas emissions based on sector. This is important given the varying degree of contribution to total regional emissions with the highest emitting sector, Transportation, accounting for 40% of total emissions while the lowest emitting sector, Solid Waste and Wastewater, only accounting for 3% of total regional emissions.[11] It is also important because depending on the county, certain sectors account for larger proportions of emissions. In King County, Transportation emissions far outweigh emissions from Land Use, but in Pierce County, they contribute similar quantities of emissions.[12]

However, the Draft CCAP does not make it easy to prioritize strategies or actions based on their feasibility to implement and ability to reduce regional emissions. Some sectors also have more guidance despite accounting for less total state emissions. If Land Use accounts for 14% of regional emissions and Solid Waste and Wastewater for a mere 3%, why would the plan provide double the amount of both actions and strategies for Solid Waste than they do for Land Use?[13] It would be more helpful to develop more strategies for sectors that correspond to higher regional emission rates to provide local governments with more options, making it easier to improve resilience and reduce emissions.

Additionally, natural gas is the second highest emission source accounting for 18% of total regional emissions when Transportation and Built Environment are broken down into more specific categories.[14] Yet it is not always clear which strategies and actions can be prioritized to specifically reduce consumption of natural gas. It is also not easy to compare emission reduction potential of strategies within the same sectors. Creating a table that includes emission reduction potential for each strategy within a sector would make prioritization much easier. It would also be helpful to have a table that has this information to compare strategies across different sectors to see if the actions being recommended could create benefits proportional to current emission rates.

Ultimately, Puget Sound Clean Air Authority is uniquely positioned to provide this type of analysis given their expertise and the work that has already been done as part of the Draft Plan. If the purpose of the Draft CCAP is to make climate resilience a priority on the local and regional level, the strategies being proposed must be further contextualized with their relation to different sectors and potential to reduce emissions in comparison to other strategies. This addition would

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[11] Figure 4,Draft CCAP at 25.
[12] Draft CCAP at 26.
[13] Sector 3: Municipal Solid Waste and Wastewater includes four strategies and 13 associated actions while Sector 4: Land Use and Sequestration includes only two strategies and 7 associated actions.
[14] Figure 5, Draft CCAP at 26.

not require much additional work but would make prioritizing which actions to implement much easier.

IV. The Final CCAP should include more robust analysis to improve strategies and actions related to industrial emission reductions.

More information is needed to make strategies and actions related to industrial emissions feasible to adopt. For example, Strategy 1.5 lists process heating as the only major emitting activity.[15] Given the way industrial pollution has a disproportionate impact on overburdened communities, we urge PSCAA to expand upon other emitting activities and include increased mitigation measures as an emission reduction action.

Additionally, in Figure 4, industrial emissions are included in the 37% of emissions from the Built Environment sector, which ignores industrial emissions that are caused by diesel emissions from industrial facility owned vehicles who must make trips as part of their operations. This minimizes the impact of industrial pollutants as a whole.[16] It is also confusing to have "Energy/Industry" listed as separate from the sectors that are used throughout the rest of the Draft CCAP.[17]

Further, in the existing policies section, transitioning from fossil fuels to renewable natural gas is stated as a way industries can lower greenhouse gas emissions. This is misleading, as both renewable natural gas and bio-derived fuels release greenhouse gases like nitrous oxide. Recommendations aimed at industries should not promote false solutions that will create the same harms currently being experienced by frontline communities.

Industrial pollution has been inconsistently categorized throughout the CCAP, and should thus be identified as a stand alone sector. This will allow for deeper analysis that can provide a better sense of the true emission reduction potential for industries and provide a clearer picture of the impact that industrial pollution has relative to other emission sources in the region. Making a clear distinction for industrial emissions would also allow for more specific strategies and actions that can be taken on a regional level, given PSCAA's authority to approve new and modified permit applications.

V. Community engagement for the Draft CCAP is not sufficient to facilitate meaningful feedback from communities who are being most impacted by climate change and air pollution.

The following comments reflect feedback from frontline communities and should be implemented for the release of the Final CCAP to make information accessible, even if PSCAA is not seeking public comment.

A. <u>Summaries of the Draft CCAP should have been produced (best practice: sector- or interest-based themes).</u>

[15] Draft CCAP at 51.
[16] Figure 4,Draft CCAP at 25.
[17] Figure 8-9, Draft CCAP at 36-8.

Given the technical and extensive nature of the CCAP, summaries of the recommendations should have been produced. Specifically, authors of the CCAP should have developed sector-based one-pagers, such as: separate summaries of each greenhouse gas reduction measure (i.e., one-pagers on economy-wide, electric power, buildings, industry, transportation, agriculture, natural and working lands, and waste and management strategies). Further, interest-based one-pagers should have been developed, such as "Impacts of CCAP on Frontline communities," and/or "The Environmental Justice Focus of the CCAP." Once this information is available, community members will be better equipped to learn about the CCAP and provide meaningful feedback.

B. Materials must be translated into multiple languages to facilitate meaningful engagement.

The Draft CCAP was not translated into other languages, like Spanish, Vietnamese, or Khmer (predominately spoken in the Duwamish Valley), or Amharic, Arabic, or Swahili (languages predominately spoken in broader South King County). Community members should not have to request materials in their preferred language, which can inhibit participation by reducing the amount of time available to submit comments, Rather, PSCAA should provide these materials upfront to reduce access hurdles. At the very least, summary documents and comment portals should be translated ahead of time and be easily accessible. Additionally, Google translate is not an acceptable substitute for professional, culturally-relevant translations.

VI. Additional points for consideration.

A. It would be helpful to understand how the "largest realistic scale of action"[18] was determined for each strategy as they are foundational to assessing the feasibility of different actions. For example, an assumption for Strategy 4.1 is that 50,000,000 new trees are planted.[19] While it is clear that the number was chosen based on existing gaps between current emissions and future targets, the Draft Plan provides no additional context as to how feasible it would be to achieve the assumptions that underlie the proposed strategies. Providing more details on these assumptions including who should be implementing these policies, which parts of the region are more suited for the type of initiative, and how close we are to meeting these targets will make it more possible to prioritize strategies and actions. This applies for both the 2030 and 2050 targets.

B. Strategy 2.2 includes building out charging infrastructure for EVs as a proposed action. Given that the number of public charging points would need to increase by 327% and 340% for Level 2 and Level 3 chargers to meet the State's 2035 target of 3 million charging ports needed to make charging universally available, this is not likely to have the intended emission reduction events.[20] It is also unlikely that Washington will meet this goal given the current revenue environment.[21] Implementation feasibility should be considered when proposing

[18] Draft CCAP at 38.
[19] Draft CCAP at 82.
[20] EV Council, 2024 Annual Report at 19.
[21] EV Council, 2024 Annual Report at 12.

actions, and at the very least provided with this additional context to help local governments determine if they should spend already strained resources on this type of project.

C. Strategy 6.1 should not include actions that place the responsibility of emission reductions on individual citizens, especially since the stated purpose of the plan is to provide a guide for local and regional governments.[22] Shifting the focus this way perpetuates false solutions that do not address the systemic causes of climate change, protects those with the greatest ability and responsibility to create real change, and places the burden of emissions reductions on those who are already being most harmed. As a governmental agency, PSCAA has the singular ability to shape policies on a regional level and protect Washingtonians in the Puget Sound area from pollution. Given its power and positionality, it is irresponsible for PSCAA to suggest that local and regional governments should create policies to educate communities to adopt "plant-based and low-emission diets" when a whole array of food waste reduction policies exist that are both more effective and well within the authority of local governments.

D. We are supportive of Strategy 2.4 that recommends initiatives to support electrification for Medium and Heavy Duty Vehicles (MHDV) given their contribution to diesel and fine particulate matter pollution. Yet efforts to electrify must be concentrated in frontline communities where people are already living with the impacts of this type of pollution. Addressing where these harms are experienced first and worst is not only most equitable, but more efficient and lowering emissions. This must also be coupled with better enforcement of anti-idling laws that often go ignored.

E. We urge the Agency to develop a companion guide to this plan to help prioritize strategies to implement and a plan for future community engagement to ensure frontline communities are centered in climate plans.[23] Both of these supplementary resources are necessary to ensure that the CCAP is utilized when entities create policies and allocate resources for climate resilience. In its current state, meaningful application of the strategies and actions presented is incredibly limited.

When environmental justice principles and community leadership are at the core of decisions made around the creation and implementation of climate and greenhouse gas emission reduction policies, there is potential for regional and local government entities to create equitable and impactful change for communities who need it the most.

In order to fully experience the benefits of the CCAP, we recommend that PSCAA: (1) integrating environmental justice analyses throughout the various strategies and actions, (2) provide clearer guidance on which types of governing bodies have the ability to implement

[22] Draft CCAP at 5.
[23] Draft CCAP at 108-9.

different strategies, (3) explicitly prioritize strategies that have the most impact on GHG reductions proportional to the relevant sector's emissions, (4) providing a more robust industrial emissions reduction strategy, and (5) accounting for barriers to meaningful engagement that prevent communities who are the most impacted from participating in the creation of a final Comprehensive Climate Action Plan (CCAP).

We appreciate the opportunity to provide comments. Please do not hesitate to contact us if you have any questions.

Sincerely,

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Page	Item	Comment / Question
	Table ES-1: Top 10 Strategies with the Highest Greenhouse Gas Emission Reduction Potential by 2030* s-1	Under the row for Land Use: is the intent to use the word "offset"? – is tree planting meant to "offset" carbon emissions?
	Table ES-1	Under the row for Transportation: Shouldn't we find a stable alternative to gas and diesel-powered off-road equipment prior to phasing out the gas- and diesel-powered versions of off-road equipment?
	Table ES-1	Under the Built Environment row, should we add that the low or zero emissions building materials be structurally sound?
	Table ES-1	Under the Solid Waste row, the actions only cover composting and organic material, but the Strategy includes recycling. Do we mean recycling materials other than organics?
	Page 22	Port of Everett was not included in this – the NW SeaPort Alliance does not include the Port of Everett
	Top of Page 23	Please review the box for Snohomish County to ensure we covered the big items relative to GHG emissions
	Page 26, Figure 5	The category of "Tree Loss" really needs to be explained with a footnote. As was explained to us, it is land use conversion, and it is the GHG emission embodied in the land us conversions. Also, the tree loss in working lands (DNR owned land) commercial forest, etc. This can be shocking if not put into perspective.
	Page 27, Figure 7	Snohomish County GHG emissions from 2019 to 2022 remain the same? HUH? Well, not sure, if I agree with this, PSCAA performed our analysis.
	Page 30	Top – I think we highlight some good work; the Clean Buildings Act is covered in the Cross-county and statewide actions. The Transportation section covers the County's fleets transition to ZEV.
	Page 32	The Port of Everett is not included in the Ports Section!
	Page 34	For Snohomish County – we could add our Tree canopy policies and tree retention code. Also add the Work that Conservation District does in the county? Tree plantings: all the restoration work too, especially in estuaries.
	Strategy 1.1 – Under Actions	By Strengthening Building Codes – do we mean collectively strengthening the Washington State Building Codes – through the TAG's? Many jurisdictions just adopt the State Building Codes and implement them. Seattle and a few other jurisdictions have "reach" codes and their own energy code.
	Page 44, Action 1.1a	It seems like this is suggesting strengthening the state's "Building Code" not "Residential Code"? Would these amendments to the State Building Code by guided under: **WAC 51-04-030** "Policies for consideration of proposed local government residential amendments. (1) All amendments to the building code, as adopted by cities and counties for implementation and enforcement in their respective jurisdictions, that apply to single and multifamily buildings as defined by RCW 19.27.015, shall be submitted to the council for approval…"
	Page 51, Strategy 1.5 – Reduce Industrial Emissions	Is the Puget Sound Maritime Air Forum (for which the Port of Everett was a member) still active? If so, this might be a good addition to the list of Existing Policies and Effects - ongoing efforts. https://pugetsoundmaritimeairforum.org/2016-puget-sound-maritime-air-emissions-inventory/
	Action 1.5b	"Establish greenhouse gas auditors/consultants…" – this action seems a good fit at the state or regional level where there is some authority given to specific agencies for air quality.
	Action 1.5d	Think that **requiring** local governments to use low carbon businesses- might not be feasible. Perhaps changing the language to "Local governments should seek to use low carbon businesses" may be helpful. Further, there would need to be a certified list of low carbon businesses from which to draw.
	Action 1.6a.	I'm guessing that developing "building codes" would involve the State Building Code process for amendments?

	Page 53	I suggest adding to the "Existing Policies", the Washington's **Buy Clean and Buy Fair bill** was signed into law in 2024. This applies to state government agencies and higher education facilities, but local governments in the Puget Sound can see how it is working for the state and glean ideas from state agencies.
	Page 56	The row regarding, The Sustainable Advanced Fuels program – fails to mention Snohomish County's role. **Perhaps add:** **The Sustainable Aviation Fuels (SAF) Research & Development Center,** located at Paine Field Airport, is led by Snohomish County and supported by Washington State University to find alternatives to advance sustainable aviation fuel technologies.
	Page 61	Action 2.2B - Perhaps captured under the regional electrification plan effort but should we also seek to stabilize the Third-Party EV charging landscape. By this I mean that companies like ChargePoint fold or move out of our area, which leaves a gap. Additionally, some of the choke points in getting EV chargers hooked up, is the time to schedule a visit from an electrical engineer – this seems to be in short supply.
	Page 71	Action 2.7a Hoping the Port of Everett is included in these efforts and those of the Sustainable Maritime Fuels Collaborative https://maritimeblue.org/sustainable-maritime-fuels/
	Page 72	Permitting of transmission lines seems to be a topic of high importance from the state and there is a State Workgroup involved: https://www.youtube.com/watch?v=ZXyRmzT4zDk&list=PLs1HLt6iMML3pCv__bswXgsNeoejgpucj&index=13
	Page 76	3.2 Divert Organic Food Waste – Action A: I think a co-benefit of this could be redirecting edible food from the landfill, that could help address food insecurity. This is the model for places like Grocery Outlet
	Page 82	Strategy 4.1 Steward the land for tree retention – It would be helpful to add in the actions, that the planting the right tree in the right place is important, for public health and safety and property, but also to ensure that the trees are able to mature and enjoy a healthy life.

From:	Winter, Manuela
To:	PSCAA Climate Program
Subject:	Comments on Draft Comprehensive Climate Action Plan
Date:	Monday, October 27, 2025 9:13:50 AM

Hi –

Thank you for all the efforts to develop the referenced Plan. Unfortunately, we could not complete our review until Friday last week, and I attempted to enter comments on Saturday but was unable to get the document to accept the comments. I couldn't figure out if the issue was on your end or my end. I tried again this morning, and it looks closed for comments. If at all possible for PSCAA to still consider these, the following are Snohomish County Public Works comments to the Draft Plan:

1. Pg. 30, Snohomish County Public Works supports focusing on strategic planning and scheduling to reach 2050 goals.
2. Sector 2, Transportation, pg. 57, regarding non-road diesel equipment such as generators: it's difficult to use biofuels in generators due to short shelf life of biofuels.
3. Sector 2, Transportation, Strategy 2.2, Action 2.2d, pg. 61, regarding electrifying fleets and use of low-carbon fuels: Use of EVs in heavy industrial uses is often difficult to implement due to reduced payloads (battery weight).
4. Sector 2, Transportation, Strategy 2.3, pgs.62-63, regarding electrify or reduce carbon intensity of freight and service vehicles: same comment as for Action 2.2d.

Sincerely,
Manuela

Manuela Winter I Sustainability and Special Projects Coordinator
Snohomish County Department of Public Works **I** Administrative Operations **I** 3000 Rockefeller Ave, M/S 607, Everett, WA 98201 **I** O: (425) 388-3927 **I** C: (425) 754-6010 **I** F: (425) 388-6674 **I** manuela.winter@snoco.org **I** www.snoco.org **I** Telecommuting most days, in office periodically
NOTICE: All emails, and attachments, sent to and from Snohomish County are public records and may be subject to disclosure pursuant to the Public Records Act (RCW 42.56)

From: Vic Kave
To: PSCAA Climate Program
Cc: Robert Feldstein; jbrown@psrc.org
Subject: Comment for the Draft Comprehensive Climate Action Plan
Date: Thursday, October 16, 2025 12:35:41 PM

I wish to comment on the *Draft Comprehensive Climate Action Plan*.

First, I do not understand how the city of Pacific does not qualify as a Low-Income & Disadvantaged Community (LIDAC). We are far from containing affluent demographics within our community. We have Hwy 167 and two railroads the run through our town along with a manufacturing/industrial center that makes up over 25% of our land mass. I find it hard to argue that we are not a low income community who is also as diverse as any community in our region. My sales tax figures are proving this point as the collections have been decreasing since the end of 2022 and not just slowing like the rest of the region, proving that our community has been hit extremely hard by the state and King county's increasing desire to raise taxes attacking our communities discretionary income, reducing what is left for goods and services. This along with the increased cost of living, our community is the shining example of folks living paycheck to paycheck.

Second, there is a focus on incentivizing the reduction of greenhouse gasses (GHG's) through an expensive process of replacing old technologies but no emphasis on incentivizing the natural means of sequestration. This plan attacks the use of natural gas and praises the elimination of any use of this product when the by-product of using this form of fuel is water and carbon dioxide. It praises electrification of many forms of energy use to include battery operated vehicles all while ignoring the detrimental effect these vehicles have on the environment through their means of production that get these vehicles in our system. The larger the vehicles, the larger the batteries needed to make them work and, therefore, the greater the adverse impact on the environment and release of GHG's in the atmosphere that will take years to offset and balance out the damage done. That damage is front loaded. We have the best means of offsetting carbon dioxide emissions in our region by growing trees and encouraging (incentivizing) large tract land owners to grow trees. We see our forests to continually be leveled and replaced by buildings. Why, it is more profitable to use the land in this manner than to grow trees. The climate commitment act (CCA) provides little if any funds for this purpose. Douglas firs, the primary tree in our local forests, can sequester around 250 tonnes of carbon over their lifespan and releasing clean oxygen back into the atmosphere. The UN identifies this evergreen species as "one of the best trees for carbon capture, particularly the Tall Douglas fir with its larger trunk". We are seeing the large timber companies sell their lands after harvest for development rather than replant them in trees. We can get to carbon neutral much faster when we have an all or whole of the problem/solution approach rather than the one sided one presented in this plan. Anyone with 5 acres or more of land can not only offset their carbon foot print but provide surplus carbon sequestration if given the proper incentives. A portion of CCA funds should be used to pay people and businesses to grow trees. The damage to the environment from natural gas production is far less than the electrification approach and we have the ability to offset the harmful impacts its use has on global warming with tree production (a much more common sense approach).

I have not had time to read and digest this entire plan and reserve the right to comment further.

Respectfully,

Vic Kave
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