Climate Change

Goal: *The region substantially reduces emissions of greenhouse gases that contribute to climate change in accordance with the goals of the Puget Sound Clean Air Agency (50% below 1990 levels by 2030 and 80% below 1990 levels by 2050) and prepares for climate change impacts.*

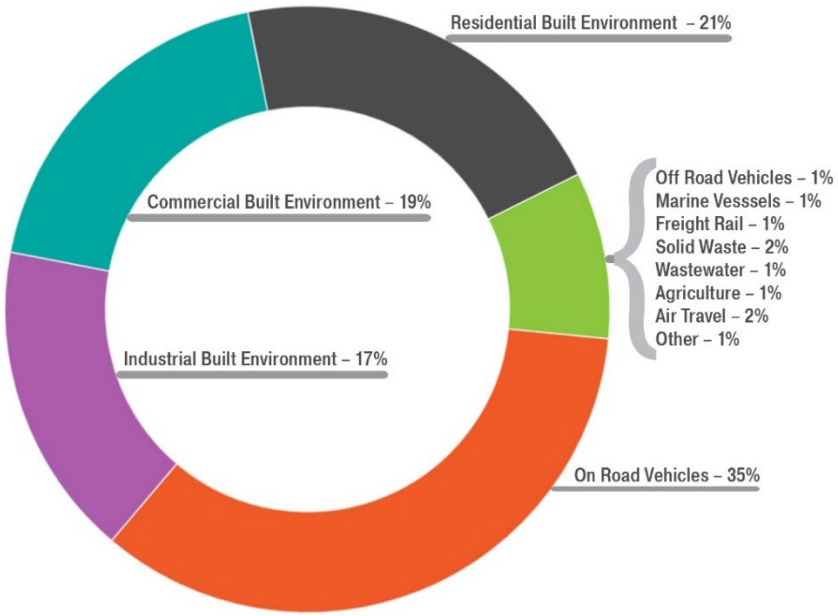
Climate change is an urgent environmental, economic, health, and equity threat being addressed at all levels, from the local to an international scale. Caused by an increase in greenhouse gases trapping heat in the atmosphere, climate change is a significant cross-cutting issue throughout VISION 2050.

Climate change influences human health in numerous ways. The potential health effects include increased respiratory and cardiovascular diseases, injuries and premature deaths related to extreme weather events, food- and water-borne illnesses and other infectious diseases, and threats to mental health. Vulnerable populations may be disproportionately impacted by climate change.

A 2018 Intergovernmental Panel on Climate Change (IPCC) report found that human activities are estimated to have caused approximately 1.0˚ Celsius of global warming above pre-industrial levels. Global warming is likely to reach 1.5˚ Celsius between 2030 and 2052 if it continues to increase at the current rate. These levels of warming are expected to cause long-term changes to the climate, resulting in risks and impacts such as increasing temperatures, rising sea levels, changes in precipitation and snow pack, increases to size and duration of wildfires, and other effects. While climate change is an urgent global issue, local governments play a crucial role in reducing and adapting to its impacts.

In the Puget Sound region, the largest sources of greenhouse gases come from transportation and the built environment, including residential, commercial, and industrial activities.

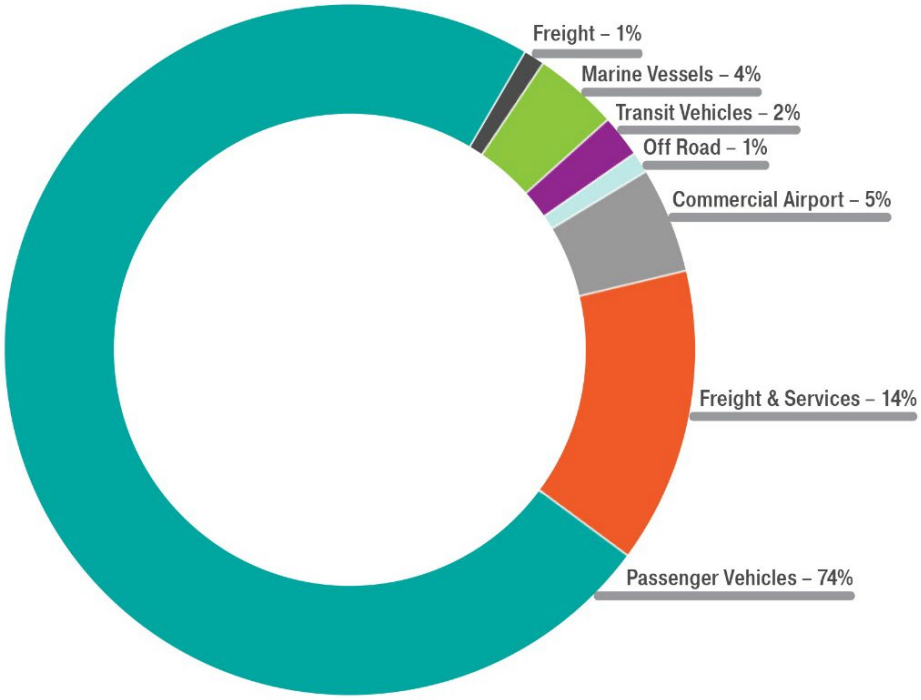
Figure 20 – Sources of Regional Greenhouse Gas Emissions



Source: Puget Sound Clean Air Agency Greenhouse Gas Emissions Inventory

Within the residential and commercial built environment, electricity consumption represents the largest share of emissions. Within the transportation sector, passenger vehicles represent the largest share (74%), followed by freight and service vehicles (14%).

Figure 21 – Sources of Regional Transportation Greenhouse Gas Emissions



Source: Puget Sound Clean Air Agency Greenhouse Gas Emissions Inventory

State, Regional, and Local Activities

State

Washington state has long recognized the threat climate change poses to economic well-being, public health, natural resources, and the environment. In 2008 the Washington State Legislature set the following limits on Washington's greenhouse gas emissions. Revised, more protective, targets were adopted in 2020 and went into effect on June 11th, 2020:

- By 2020, reduce total greenhouse gas emissions to 1990 levels.
- By 2030, reduce total greenhouse gas emissions to 45% below 1990 levels.
- By 2040, reduce total greenhouse gas emissions to 70% below 1990 levels.
- By 2050, reduce total greenhouse gas emissions to 95% below 1990 levels and achieve net zero emissions.

The state has enacted numerous strategies and actions to provide a statewide framework for achieving these limits, including the Clean Energy Transformation Act passed in 2019, which transitions the state to 100% clean electricity over the next 25 years. Other initiatives and rules have addressed emissions from state agencies, renewable energy targets, clean vehicles, green buildings, and responding to the impacts from climate change.

Region

In February 2017, the board of the Puget Sound Clean Air Agency adopted the following economy-wide greenhouse gas emission reduction targets for the four-county central Puget Sound region:

- By 2030, reduce overall greenhouse gas emissions in the region to 50% below 1990 levels.
- By 2050, reduce overall greenhouse gas emissions in the region to 80% below 1990 levels.

Since transportation is the largest single source of greenhouse gas emissions in the region, the agency identified candidate actions and strategies to reduce transportation-related emissions and support achievement of the targets. These include supporting the policies and strategies included in PSRC's regional plans, as well as accelerating zero-emission vehicle adoption and pursuit of a clean fuel standard, among other strategies.

Local

Many cities, counties, and other organizations in the region have also adopted greenhouse gas emission reduction targets, which vary in breadth and timeframes. For example, King County adopted targets to reduce greenhouse gas emissions 25% by 2020, 50% by 2030, and 80% by 2050, from a 2007 baseline. Tacoma has a goal of reducing emissions 40% from 1990 levels by 2020. Snohomish County's goal is to reduce emissions from county operations 20% from 2000 levels by 2020. Many other jurisdictions are also addressing climate change and the reduction of greenhouse gas emissions. Some examples of actions being taken at the local level include a resolution passed by the Everett City Council to include in their Climate Action Plan a target to run on 100% renewable energy by 2045, and Bainbridge Island's Housing Design Demonstration Project program, which incentivizes green building certifications.

Efforts at all levels of government have been implemented to both mitigate climate change and prepare for its impacts. PSRC supports the efforts of partner agencies and member jurisdictions in their efforts to address climate change and meet their respective goals. This includes VISION 2050 policies and the Four-Part Greenhouse Gas Strategy included in the Regional Transportation Plan.

Four-Part Greenhouse Gas Strategy

PSRC provides planning and policy guidance that can help the region achieve significant reductions of greenhouse gas emissions from transportation and land use, as well as supporting efforts to prepare for the impacts from climate change.

VISION 2050's Regional Growth Strategy, multicounty planning policies and actions promote compact growth patterns, low-carbon travel choices, forest and open space protection, and other sustainability strategies that help mitigate greenhouse gas emissions and prepare for the impacts from climate change.

The Regional Transportation Plan is the long-range transportation element of VISION 2050, providing the path for a sustainable, multimodal transportation system to accommodate the needs of a growing population. Subsequent to the adoption of VISION 2040, a Four-Part Greenhouse Gas Strategy was adopted as part of the Regional Transportation Plan consisting of land use, user fees, choices and technology.

The Regional Transportation Plan, which is updated every four years, includes programs and investments that encompass all four of the elements of the strategy. In the last decade many actions have been taken at the federal, state and regional level to advance implementation of the strategy, which is designed to support and complement statewide, regional, and local efforts to achieve meaningful emission reductions.

An analysis of the region's Four-Part Greenhouse Gas Strategy is conducted as part of every plan update. The analysis of the 2018 plan resulted in potential emission reductions from the combined categories within a range of 24% to 75% below 2006 base year levels. This broad range is primarily reflective of the varying degrees of effort within each category, with the lower end of the range encompassing the VISION 2040 growth strategy adopted at the time and the investments and policies in the 2018 Regional Transportation Plan. The higher end of the range of emission reductions reflects aggressive electrification of the transportation system, as well as additional opportunities as described below.

Land Use

Over the last decade, many land use actions, programs, and planning activities have been advanced. Examples include local adoption of growth targets within each county in the region and continued work on transit-oriented development. As part of the VISION 2050 Regional Growth Strategy, growth will be further concentrated around transit stations throughout the region, which will help the region continue to reduce emissions. Additional reductions could be achieved at the local level through

changes to development patterns that create attractive, compact, and walkable environments, and that encourage location of new residential and commercial construction close to services and amenities, lessening the need for driving.

User Fees

User fee systems are in place on several facilities in the region, including State Route 167, Interstate 405, State Route 520, the Tacoma Narrows Bridge and the State Route 99 tunnel through downtown Seattle. The Regional Transportation Plan's financial strategy assumes a transition from traditional pricing mechanisms to a user fee system, including selected facility tolls and a road usage charge system, after 2025. User fees charge drivers for when and how much they use the system, rather than by gallon of gasoline.

Research suggests that increasing the rates of these fees could result in a change in travel behavior and demand, moving more trips away from single occupant vehicles. VISION 2050 calls for further pursuit of alternative transportation financing mechanisms.

Transportation Choices

Significant investments have been made over the last decade to provide multimodal transportation improvements, including new trails, bus rapid transit and light rail services, and high occupancy vehicle lanes. The Regional Transportation Plan includes a coordinated network of regional and local transit investments, resulting in significant improvements in frequent transit service throughout the region. Improvements are still needed, however, to ensure residents have safe and convenient access to these frequent transit networks, particularly through nonmotorized and high occupancy modes. Local jurisdictions play an important role by including these investments in their capital planning. VISION 2050 further supports the development of an integrated multimodal transportation system that supports all modes and ensures equitable access to goods, services, and amenities.

Technology

Significant federal actions have been taken over the last decade to improve the fuel economy of vehicles and reduce emissions from fuels. These include updated fuel economy standards and improvements to the fuel efficiency of heavy-duty vehicles. Significant strides have also been made in advancing the transition to electric vehicles. Ongoing coordination among a variety of agencies and stakeholders throughout the region is accelerating this transition. A wide array of electric vehicle choices are coming into the market now and into the future. These include not only electric passenger vehicles but will include pickup trucks, delivery vans and electric shuttle vehicles, and further advancements and technologies continue to be pursued in these and other sectors. Manufacturers are introducing heavy duty medium and long-haul trucks and electric transit and school buses to the market, and local transit agencies are committed to increased purchases of electric and other alternative fueled transit buses. In the maritime sector, the Washington State Ferries has committed to electrification of several ferries operating within the Puget Sound region and the Port of Seattle has made cruise ship cold ironing capability available at the Terminal 91 facility. Further, in a joint effort with the Northwest Seaport Alliance (NWSA), the Port of Seattle is developing a new cruise and cargo terminal with cold ironing capability for both cargo and cruise operations. To reduce emissions from drayage activities, the NWSA Clean Truck Program now ensures that all 4,000 trucks entering international marine terminals have a 2007 or newer engine or a certified equivalent emission control system. Because the electricity available in the Puget Sound region is largely produced from hydro-electric and renewable resources and it will be replacing fossil fuels in each of the sectors identified above, there is high potential for significantly reducing greenhouse gas emissions from transportation in a variety of modes.

Technological improvements to vehicles and fuels have the potential to significantly reduce greenhouse gas emissions. However, a variety of strategies will be required to help achieve this outcome, particularly related to electric vehicles. These include mechanisms to support charging infrastructure in buildings and in public rights of way, expanding education and incentives on electric vehicles, encouraging electric vehicles in private and public fleets, and other local, regional, and state actions.

Other strategies to address climate change, outside the scope of the region's Four-Part Greenhouse Gas Strategy, include sequestering and storing greenhouse gases through additional actions to protect and restore carbon sinks such as forests, soils, wetlands, estuaries, and urban trees. The IPCC special report on strategies to stay below an increase in temperatures of 1.5 degrees Celsius indicates that it is very likely that carbon capture and sequestration technologies will need to be further developed and deployed. In addition, building energy emissions are being reduced through conservation and green building practices such as incorporating solar panels, using efficient materials, and monitoring and managing energy consumption. Strides are also being made with alternative fuels for other sectors. For example, the Port of Seattle has set aggressive goals for the implementation of sustainable aviation fuels. VISION 2050 supports acceleration of these varied climate solutions.

Monitoring and Evaluation

The Four-Part Greenhouse Gas Strategy is evaluated and refined every four years as part of the update of the Regional Transportation Plan. During this monitoring cycle, the combined results from VISION 2050 and the planned regional transportation system will be analyzed for the potential to achieve meaningful emission reductions. While both the state limits and the Puget Sound Clean Air Agency targets encompass all sectors of the economy – and PSRC's analysis focuses on the combined effects of land use and on-road transportation – these will be used as benchmarks against which the Regional Transportation Plan analysis will be compared. In addition, PSRC's analysis will be incorporated into the full spectrum of climate strategies to demonstrate impact and progress, an effort also known as a climate wedge analysis. Further, implementation of the Four-Part Greenhouse Gas Strategy will be monitored and reported, including continued improvements and further potential gains.

Climate Change Impacts in the Central Puget Sound Region

In addition to reducing emissions contributing to climate change, the region is actively working towards resilience and preparing for current and future climate change impacts. The University of Washington's Climate Impacts Group published State of Knowledge: Climate Change in Puget Sound in 2015, describing expected impacts from climate change in the Puget Sound region. Changes are expected to temperature, precipitation, sea level, ocean acidification, and natural variability. These changes will affect snowpack, streamflow, landslides, flooding, species and habitat, forests, and agriculture. In addition, impacts from climate change will have many effects on people and communities, including the built environment, human health, and the economy. Communities of color, Indigenous people, and people with lower incomes are at higher risk due to greater exposure to hazards and often have fewer resources to respond to those hazards.

Planning for adaptation and resilience will include identifying the local implications of the full range of climate impacts and actions to address these hazards. Examples of actions being taken at the state and local levels include incorporating resilience (to climate, seismic, and other risks) in comprehensive plans and hazard mitigation plans, changing the design of bridges and other capital infrastructure to withstand more extreme weather events, and developing transportation evacuation plans for hospitals in emergency events. VISION 2050 supports planning and action for resilience and adaptation, particularly for vulnerable populations.

Since climate change is a cross-cutting topic across a variety of regional planning issues, VISION 2050 provides guidance in all policy sections of the plan for reducing emissions and protecting the climate. The Regional Growth Strategy, as described in the preceding chapter, is a core element of the Four-Part Greenhouse Gas Strategy and achieving compact growth patterns to reduce the need for single occupant vehicles. Additional policies throughout VISION 2050 also address important climate-related activities, such as protecting forest lands and tree canopy, promoting a multimodal transportation system and encouraging use of alternative modes, advancing electrification of public and private vehicles, increasing energy efficiency and renewable energy sources, and addressing resilience of infrastructure and communities. The primary climate related policies and actions are identified below.

Climate Change Policies

MPP-CC-1

Advance the adoption and implementation of actions that substantially reduce greenhouse gas emissions in support of state, regional, and local emissions reduction goals, including targets adopted by the Puget Sound Clean Air Agency.

MPP-CC-2

Reduce building energy use through green building and retrofit of existing buildings.

MPP-CC-3

Reduce greenhouse gases by expanding the use of conservation and alternative energy sources, electrifying the transportation system, and reducing vehicle miles traveled by increasing alternatives to driving alone.

MPP-CC-4

Protect and restore natural resources that sequester and store carbon such as forests, farmland, wetlands, estuaries, and urban tree canopy.

MPP-CC-5

Pursue the development of energy management technology as part of meeting the region's energy needs.

MPP-CC-6

Address impacts to vulnerable populations and areas that have been disproportionately affected by climate change.

MPP-CC-7

Advance state, regional, and local actions that support resilience and adaptation to climate change impacts.

MPP-CC-8

Increase resilience by identifying and addressing the impacts of climate change and natural hazards on water, land, infrastructure, health, and the economy. Prioritize actions to protect the most vulnerable populations.

MPP-CC-9

Identify and address the impacts of climate change on the region's hydrological systems.

MPP-CC-10

Address rising sea water by siting and planning for relocation of hazardous industries and essential public services away from the 500-year floodplain.

MPP-CC-11

Support achievement of regional greenhouse gas emissions reduction goals through countywide planning policies and local comprehensive plans.

MPP-CC-12

Prioritize transportation investments that support achievement of regional greenhouse gas emissions reduction goals, such as by reducing vehicle miles traveled.

Climate Change Actions

Regional Actions

CC-Action-1

Greenhouse Gas Strategy. PSRC will work with local governments and other key agencies and stakeholders to advance the development and implementation of the region's Greenhouse Gas Strategy to equitably achieve meaningful reductions of emissions toward achievement of the region's greenhouse gas reduction goals. The strategy will:

- Build on the Four-Part Strategy in the Regional Transportation Plan
- Address emissions from transportation, land use and development, and other sources of greenhouse gases
- Promote effective actions to reduce greenhouse gases, such as vehicle miles traveled (VMT) reduction, conversion to renewable energy systems in transportation and the built environment (e.g. electrification), and reduction in embedded carbon in new infrastructure and development
- Explore options for PSRC to further emission reductions in the aviation sector
- Be guided by principles of racial equity
- Include a measurement framework to inform the evaluation of transportation investments and local comprehensive plans
- Develop guidance and provide technical assistance to local jurisdictions to implement climate change strategies, including a guidebook of best practice policies and actions

Regular evaluation and monitoring will occur, at least every four years, as part of the development of the Regional Transportation Plan, with reports to PSRC policy boards.

CC-Action 2

Resilience and Climate Preparedness: PSRC will engage in regional resilience planning and climate preparedness, including development of a regional inventory of climate hazards, assistance to member organizations, and continued research and coordination with partners such as the Puget Sound Climate Preparedness Collaborative and tribes. Climate resilience actions will focus on equitable outcomes, particularly for historically marginalized communities, at greater risk and with fewer resources.

Local Action

CC-Action-3

Policies and Actions to Address Climate Change: Cities and counties will incorporate emissions reduction policies and actions that contribute meaningfully toward regional greenhouse gas emission goals, along with equitable climate resiliency measures, in their comprehensive planning. Strategies include land uses that reduce vehicle miles traveled and promote transit, biking, and walking consistent with the Regional Growth Strategy, developing and implementing climate friendly building codes, investments in multimodal transportation choices, and steps to encourage a transition to cleaner transportation and energy systems.

CC-Action-4

Resilience: Cities and counties will update land use plans for climate adaptation and resilience. Critical areas will be updated based on climate impacts from sea level rise, flooding, wildfire hazards, urban heat, and other hazards. The comprehensive plans will identify mitigation measures addressing these hazards including multimodal emergency and evacuation routes and prioritizing mitigation of climate impacts on highly impacted communities and vulnerable populations.