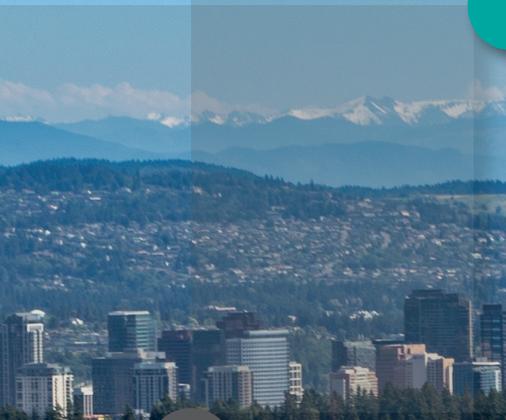


The Regional Transportation Plan — 2018

Appendix E Climate Change Analysis



May 2018

Funding for this document provided in part by member jurisdictions, grants from U.S. Department of Transportation, Federal Transit Administration, Federal Highway Administration and Washington State Department of Transportation. PSRC fully complies with Title VI of the Civil Rights Act of 1964 and related statutes and regulations in all programs and activities. For more information, or to obtain a Title VI Complaint Form, see <https://www.psrc.org/title-vi> or call 206-587-4819.

Americans with Disabilities Act (ADA) Information:

Individuals requiring reasonable accommodations may request written materials in alternate formats, sign language interpreters, physical accessibility accommodations, or other reasonable accommodations by contacting the ADA Coordinator, Thu Le, at 206-464-6175, with two weeks' advance notice. Persons who are deaf or hard of hearing may contact the ADA Coordinator, Thu Le, through TTY Relay 711.

Additional copies of this document may be obtained by contacting: Puget Sound Regional Council
Information Center
1011 Western Avenue, Suite 500
Seattle, Washington 98104-1035
206-464-7532 • info@psrc.org • psrc.org

APPENDIX E: Climate Change Analysis

Background

The Regional Transportation Plan, originally adopted in 2010 as Transportation 2040, established a Four-Part Greenhouse Gas Strategy, consisting of:

- **Land Use:** implement VISION 2040, further the goal of balancing jobs and housing, focus growth in centers and provide for efficient communities;
- **User Fees:** transition the region over time to a user fee/roadway pricing system;
- **Choices:** continue to provide travelers alternatives to the single-occupant vehicle;
- **Technology:** support development of technology to dramatically reduce tailpipe emissions.

The plan includes programs and investments that encompass all four of these strategies, and since 2010 many actions have been taken at the federal, state and regional level to advance implementation of the Strategy. Of particular note is the adoption of federal fuel economy and greenhouse gas standards for passenger vehicles and trucks, which generate significant emission reductions.

Technical inputs underlying the analysis of the Strategy's performance have been updated to reflect the most current information from the 2018 Regional Transportation Plan, including the following:

- Updated investments in the 2018 plan, including the regional integrated transit network;
- Updated fuel economy and greenhouse gas standards;
- Updated PSRC travel, land use and economic forecasting models to better reflect current and forecast conditions;
- A change in the motor vehicle emissions software from the Environmental Protection Agency.

The sections below describe the overall state and regional framework for the reduction of greenhouse gas emissions; the current status of implementation actions within each of the four elements within the Strategy, including investments and policies in the 2018 Regional Transportation Plan; and discussion of additional actions that could garner further emissions reductions.

State Framework

Washington State has established statewide limits to emissions of greenhouse gases, across all sectors of the economy:

- By 2020, reduce emissions to 1990 levels;
- By 2035, reduce emissions to 25% below 1990 levels; and
- By 2050, reduce emissions to 50% below 1990 levels.

Washington's emissions have been relatively flat the last several years, and the state appears to be on track to meet the 2020 limits¹. Given the state's reliance on hydropower, the largest contributors of greenhouse gas emissions are the transportation sector, followed by residential, commercial and industrial heating.

¹ Washington Greenhouse Gas Emissions Reduction Limits, Washington State Department of Ecology, December 2016

The state has enacted numerous strategies and actions to provide a statewide framework for meeting these limits, including most recently the Clean Air Rule which is a “cap and reduce” mechanism for reducing carbon emissions from the state’s largest emitters. PSRC’s Four-Part Greenhouse Gas Strategy is designed to complement and support the state’s framework for reducing carbon emissions.

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. In 2017, the Puget Sound Clean Air Agency adopted regional targets for reducing greenhouse gas emissions:

- By 2020, reduce emissions to 1990 levels;
- By 2030, reduce emissions to 50% below 1990 levels; and
- By 2050, reduce emissions to 80% below 1990 levels.

PSRC continues to work with federal, state and regional partners to make meaningful progress on reducing greenhouse gas emissions, to achieve shared goals and support the vision for the region’s transportation system.

Current Status of the Four-Part Greenhouse Gas Strategy

Advancements within each of the four categories of PSRC’s Four-Part Greenhouse Strategy are described below, including a summary of elements contained within the current version of the plan. Following those summaries is identification of potential additional steps the region could take to both advance implementation of the Strategy and achieve even greater reductions of greenhouse gas emissions.

Land Use

Since 2010, many land use actions, programs and planning activities have been advanced. These include:

- Local adoption of growth targets within each county in the region, to begin implementation of VISION 2040’s Regional Growth Strategy;
- The Growing Transit Communities Partnership, including the adoption of transit corridor development action strategies, a regional equity network, an affordable housing strategy, and demonstration projects; more information on the Growing Transit Communities program may be found on PSRC’s website at <https://www.psrc.org/growing-transit-communities>;
- PSRC’s Housing Innovations Program, providing resources to promote housing affordability and Smart Growth, such as a housing toolkit and survey;
- New regional centers designation procedures approved by the PSRC Board in 2011;
- The Transfer of Development Rights Program, including the adoption of Regional TDR Allocations under the Landscape Conservation and Local Infrastructure Program, as well as grant funding awarded to cities for planning and program development;
- An updated analysis of industrial lands in 2015;
- Updates to Countywide Planning Policies as part of the 2015-16 Comprehensive plan update process;
- A process to begin updating the Regional Centers Framework in 2017; and

Vehicle Miles Traveled Reductions

In addition to the state’s greenhouse gas emissions reduction limits, Washington State has established benchmarks for reducing per capita vehicle miles traveled (VMT). The benchmark as passed in law is based on a statewide forecast of 75 billion VMT by 2020; trucks over 10,000 pounds gross vehicle weight are exempted. The statutory benchmarks are to decrease annual per capita VMT 18% by 2020, 30% by 2035 and 50% by 2050.

The results of the RTP are consistent with the downward trend as called for by these statewide benchmarks. Please refer to Appendix K for additional information.

- Continued work on Transit Oriented Development, including ongoing work with a Regional TOD Advisory Committee.

User Fees

User fee systems are in place on several facilities in the region, including High Occupancy Toll, or Express Toll, lanes on State Route 167 and Interstate 405, and full tolls on State Route 520 and the Tacoma Narrows Bridge. Additional facilities are expected to include tolls or express toll lanes, including State Route 99 through downtown Seattle, and managed lanes are being evaluated on Interstate 5 and other facilities. The 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. These user fee pricing systems have the potential to provide both revenue generation as well as managing travel demand.

Transportation Choices

Many multimodal investments have been completed or funded over the last decade, including new trails, transit lines such as bus rapid transit and light rail, strategic roadway expansions and many other examples. With the passage of funding mechanisms such as Connecting Washington, Sound Transit 3, Kitsap Transit Fast Ferries and other local initiatives, many of the investments in the Regional Transportation Plan are funded or under construction.

Perhaps the most significant component of providing choices over the next 22 years is the adoption of long-range transit plans by each of the region's transit agencies, and the resulting integrated regional transit network. With these coordinated investments, significant gains are made to provide access to frequent transit service throughout the region. In addition, the plan includes an update to the region's Active Transportation Plan including a new regional bicycle network, an update to the Coordinated Transit and Human Services Plan, and an update to the Regional TDM Action Plan.

Technology

Significant federal actions have been taken over the last several years to improve the fuel economy of vehicles and reduce emissions from fuels. These include updated Corporate Average Fuel Economy (CAFÉ) standards, improvements to the fuel efficiency of heavy duty vehicles, and further implementation of the national Renewable Fuel Standard. The regional vehicle fleet is represented in the plan, based on the most current information provided by the Washington State Department of Licensing and the Washington State Department of Ecology. Research on the region's fleet indicates an average vehicle age of 10 years. Based on the age distribution of the regional fleet and the currently adopted national fuel economy standards, PSRC expects the regional fleet by 2040 to perform at 38.5 miles per gallon – this represents an increase of 16.5 miles per gallon from today's fleet, including all vehicle types. In addition, much work has happened, and continues to unfold, to electrify the region's transportation system, including private, freight and transit vehicles.

Plan Results and Next Steps

Initial modeled performance of the Four-Part Greenhouse Gas Strategy, based on the policies and investments in the plan as described above, result in a reduction in carbon dioxide equivalents (CO₂e) of 24% below 2006 levels by 2040.² It is important to note that these reductions are the result of significant investments such as a regional integrated transit network that provides 80% of the region's population access to transit service, from 47% today, while at the same time accommodating a million more people in the region. This also represents an expected change in the region's vehicle

² 2006 is the earliest year for which PSRC has an equivalent modeling framework for comparison purposes of the plan

fleet to an average of 38.5 miles per gallon, based on currently adopted fuel economy standards and historic trends in the turnover of the regional fleet.

Discussions at PSRC's Transportation Policy Board provided direction to continue working to reduce emissions even further. As such, each element of the Strategy was evaluated for additional steps the region could pursue that might achieve even greater emission reductions.

Land Use

As mentioned earlier, many efforts have been underway to advance transit-oriented development throughout the region, including the work of an ongoing regional advisory committee. Based on the work of PSRC's Growing Transit Communities program, the baseline assumption for growth around transit stations in the region by 2040 is approximately 30%. If that new growth were focused even further – such that 50-75% of growth by 2040 is concentrated around transit stations – it is anticipated that emissions could be reduced an additional 2-4%. These estimates are based on preliminary analyses conducted as part of PSRC's TOD work, but data from the last five years has shown this growth trend to be already underway.

With the adoption of local comprehensive plan updates in 2015-2016, cities and counties are now planning for increased growth in designated centers and in high capacity transit areas. It is also important to note that PSRC will soon begin to plan for growth out to 2050 as part of the upcoming update to the regional VISION process, which will provide an opportunity to continue evaluating the reduction of greenhouse gas emissions through more focused and efficient land use patterns for the expected growth into the future.

User Fees

Appendix P of the plan provides details on the financial strategy for funding the planned transportation investments throughout the region by 2040. The strategy includes transitioning the region from the gas tax in the latter part of the plan to a user fee system such as a road usage charge. The strategy also assumes express toll lanes on certain facilities, parking fees in certain areas, and other pricing mechanisms. Research, such as that conducted as part of the work of the Transportation Futures Task Force (2015-2016), suggests that increasing the price lever could result in a change in travel behavior and demand, moving more trips away from single occupant vehicles. Modest changes in the current plan assumptions, for example increasing the price per mile by \$.05, have the potential to generate an additional 5% in greenhouse gas emissions reductions.

To achieve the gains possible from this component of the Four-Part Greenhouse Gas Strategy, the region should continue to support implementation of pricing mechanisms and further study such as the Washington State Transportation Commission's Road Usage Charge Pilot Study, to be conducted in 2018.

Transportation Choices

As stated earlier, the Regional Transportation Plan contains a variety of multimodal investments aimed at providing a sustainable and efficient transportation system, including a regional integrated transit network providing extensive access to frequent transit service. PSRC's models (refer to Appendix R for a description of modeling tools) are robust and comprehensive, but not all policies and investments can be captured at the regional scale. Examples of additional steps that could be taken to further reduce emissions include the expansion of the pedestrian network, particularly to transit stops, and greater usage of alternative work schedules, lowering the burden on the system during peak commute hours. Based on national and regional data, these types of activities could provide an additional 1-2% reduction in emissions.

These are estimates only, based on existing data and state of the practice. For example, pedestrian scale improvements generally do not replace longer vehicle trips, and therefore produce lower emissions reductions. However, providing greater pedestrian access to transit and greater connectivity of the overall system can increase these figures. The region does not have a comprehensive inventory of pedestrian facilities, so improved data collection would also be valuable.

Technology

Significant strides have been made to improve the fuel economy of new vehicles over the last several years, including the performance of heavy trucks. In addition, the transition to electric vehicles has been advancing steadily, and the central Puget Sound region is a growth hub for this activity. In addition to strategies such as the West Coast Green Highway and state and regional green fleets policies, electric charging infrastructure has significantly expanded in the region, with more investment coming soon. In the last year, the region has seen a 37% growth in electric vehicle (EV) sales³, and according to the U.S. Department of Energy there are 475 electric charging stations in the region.⁴ More and more car companies are producing EVs, and the battery range continues to expand – for example, the Chevy Bolt has an estimated 238-mile range on a single charge. Vehicle charging infrastructure is also expected to see great advancements in the region and around the country. For example, Electrify America (<https://www.electrifyamerica.com>) is planning on an \$11 million investment over the next several years for charging infrastructure in a variety of locations throughout the region.

The analysis of the RTP reflects the vehicle fleet by 2040 with currently adopted fuel economy standards. With a higher level of EVs in the fleet by 2040, along with additional modest improvements to medium and heavy trucks, greenhouse gas emissions could be further reduced between 20-40%, depending on the assumptions – the higher percentage EVs are in the fleet, the greater the emissions reductions.

A variety of tools and actions will be required to help advance this transition to EVs. These may include zoning and other mechanisms to support charging infrastructure; support for incentives, rebates and education for EV ownership; policies and support of EVs in shared ride and carsharing services; continued engagement with companies bringing this infrastructure to the region; and ongoing collaboration with state, regional and local partners.

Summary

With the significant policies and investments in the RTP - designed to provide a safe and sustainable transportation system for the 5 million people and 3 million jobs expected in the region by 2040 - greenhouse gas emissions are expected to be reduced 24% below 2006 levels. However, there are additional steps the region could pursue for even greater emissions reductions, among all four categories of the Four-Part Greenhouse Gas Strategy. Together with the investments in the RTP, these more aggressive actions have the potential to reduce emissions 52-75% below 2006 levels.

As mentioned earlier, in February 2017 the Puget Sound Clean Air Agency (PSCAA) adopted regional greenhouse gas emissions targets. PSRC has been coordinating with PSCAA on their analysis of strategies to support these targets, including the development of a regional greenhouse gas emissions inventory. Many of the potential strategies being reviewed by PSCAA to help achieve their targets are similar to, and consistent with, those contained in the RTP and as outlined above. For example, PSCAA is evaluating concepts such as Zero Emission Vehicle sales, lower carbon fuels,

³ Western Washington Clean Cities, <http://www.pscleanair.org/471/Why-Drive-Electric>

⁴ USDOE Alternative Fuels Data Center, https://www.afdc.energy.gov/fuels/electricity_locations.html

and transportation choices and user fees beyond those contained in PSRC's plan, among other strategies. PSRC will continue to collaborate with PSCAA, and as their analysis advances in early 2018, additional information will be provided to PSRC's Boards on opportunities to further coordinate to achieve regional emissions reductions.

PSRC will also continue to coordinate and collaborate with other state, regional and local agencies to advance this work, and monitor the state of the practice and emerging actions and needs.