Agenda

Meeting:	JPACT & Metro Council RTP Workshop 5
Date:	Thursday November 10th, 2022
Time:	7:30 a.m. to 9:30 a.m.
Place:	Fully remote via Zoom-https://us06web.zoom.us/j/83111107022
Purpose:	The workshop will focus on hearing discussion around updates to the Climate Smart Strategy in the RTP.
Outcome(s):	Direction on desired approach to the Climate Smart Strategy.

7:30 a.m. **Welcome & Introductions**
- Councilor Craddick, JPACT Chair

7:40 a.m. **Context and Background**
- TBD Community Representative *(10 min)*
- Top 10 Things to know about Climate Smart, Kim Ellis & Eliot Rose, Metro (*25 min*)

8:15 a.m. **Discussion**
- Questions, polls, and discussion, Facilitated by Brandy Steffen, JLA Public Involvement

9:25 a.m. **Next Steps & Adjourn**
- Councilor Craddick, JPACT Chair

2023 Regional Transportation Plan Update
Climate Smart Strategy: Background on greenhouse gas emissions targets, policies, and analytical tools

Prepared for Metro Council, JPACT members and interested parties

The Portland region's climate targets

Climate change is the defining global challenge of the 21st century. And as the recent increase in climate-induced wildfires and extreme weather events has demonstrated, it is likely to have significant impacts on the Portland region.

In 2009, the Oregon Legislature set goals to reduce greenhouse gas (GHG) emissions 10 percent below 1990 levels by 2020 and at least 75 percent below 1990 levels by 2050.[1] More recently, Executive Order 20-04 set new emissions reduction goals that call for the State of Oregon to reduce its GHG emissions at least 45 percent below 1990 emissions levels by 2035 and at least 80 percent below 1990 levels by 2050.[2] These updated goals are consistent with the reductions that climate scientists now believe are necessary to avoid catastrophic climate change impacts.

The transportation sector is the largest contributor to greenhouse gas emissions in Oregon. It is therefore a key focus of the state's greenhouse gas reduction efforts. And the State, recognizing the role that regional transportation plans (RTPs) play in influencing transportation policies, projects, and outcomes, has relied on RTPs to help reduce transportation emission. Beginning in 2012, the State set GHG reduction targets for Oregon's metropolitan areas to meet, and has continued to update these targets since. For the 2023 RTP update, the Portland region's targets are:

- A 20 percent reduction in per capita greenhouse gas emissions by the year 2035
- A 25 percent reduction by 2040
- A 30 percent reduction by 2045
- A 35 percent reduction by 2050
- Targets for the years 2041-2049 steadily increase from 26 to 34 percent in order to maintain progress toward the 2050 target.[3]

It is important to note that **these targets focus on per capita reductions achieved by reducing light vehicle trips and travel which includes passenger vehicles (cars, pickup trucks and SUVs) and commercial trucks with a** vehicle weight rating of 10,000 pounds or less. Only certain kinds of reductions count toward these targets:

Regional targets are focused on reducing vehicle use, not on making fuels and vehicles cleaner and more efficient. Regional transportation plans have typically focused on providing sustainable travel options, coordinating transportation and land use, and other actions that allow people to drive less.

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[1] Oregon Department of Environmental Quality, Oregon Greenhouse Gas Emissions, https://www.oregon.gov/deq/aq/programs/Pages/GHG-Oregon-Emissions.aspx
[2] https://www.oregon.gov/gov/Documents/executive_orders/eo_20-04.pdf
[3] Oregon Administrative Rule 660-044-0020, https://secure.sos.state.or.us/oard/displayDivisionRules.action?selectedDivision=3093 https://www.oregon.gov/lcd/LAR/Documents/2022-01_Div44.pdf

The State is the primary regulator of vehicles and fuels sold in Oregon. Oregon's climate rules recognize this division of responsibilities, and require that RTPs primarily focus on reducing GHG emissions by reducing vehicle miles traveled (VMT) per person. Regional targets are designed to "fill the gap" between the State's overall GHG reduction goals and the reductions that are expected to be achieved through State-level policies and actions identified in the Statewide Transportation Strategy (STS), which aim to advance Oregon's transition to cleaner, low-carbon fuels and zero and low-carbon emissions vehicles. Metropolitan areas can only take credit for GHG reductions from making vehicles and fuels cleaner if they can demonstrate that they are taking actions that go above and beyond the STS. This means that in most cases, the GHG reduction targets above are functionally the same as VMT per capita reductions.

Regional targets only apply to emissions from light-duty passenger and commercial vehicles, and reductions in emissions from heavy-duty vehicles (e.g., freight trucks with a gross vehicle weight rating greater than 10,000 pounds) **do not count** toward these targets.

Population growth is accounted for in progress toward regional targets. All things being equal, a region with a higher population will produce more total greenhouse gas emissions than one with a lower population, because more people means more driving and therefore more emissions. To control for the influence of growth, and to focus instead on the influence of transportation policies and investments, the targets above apply to per capita GHG emissions, not total emissions.

The greater Portland region's climate strategy

In 2014, the Joint Policy Advisory Committee on Transportation (JPACT) and the Metro Council adopted the Climate Smart Strategy[4] with broad regional support from community, business and elected leaders. The Strategy, which was approved by the Land Conservation and Development Commission in 2015, was based on extensive stakeholder and public input, scenario planning and analysis. As part of the process, Metro conducted detailed modeling and analysis of various GHG scenarios and estimated the potential for a variety of strategies to reduce transportation-related GHG emissions, and identified the most effective strategies. These GHG reduction strategies are summarized below in Figure 1.

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[4] https://www.oregonmetro.gov/climate-smart-strategy

Figure 1: Climate Smart Strategy (Policies and Investments by potential GHG reduction impact)

Climate Smart Strategy | Largest potential carbon reduction impact*

Vehicles and Fuels (Investment)
- Newer, more fuel efficient vehicles
- Low- and zero-emission vehicles
- Reduced carbon intensity of fuels

Pricing (Policy)
- Carbon pricing
- Gas taxes
- Per-mile road usage charges (e.g., OReGO)
- Parking management and pricing
- Pay-as-you-drive private vehicle insurance

Community Design (Policy with Investment)
- Walkable communities and job centers facilitated by compact land use in combination with walking, biking and transit connections

Transit (Investment)
- Expanded transit coverage
- Expanded frequency of service
- Improvements in right-of-way to increase speed and reliability of buses and MAX

Climate Smart Strategy | Moderate potential carbon reduction impact*

Active Transportation (Investment)
- New biking and walking connections to schools, jobs, downtowns and other community places

Travel Information and Incentives (Investment)
- Commuter travel options programs
- Household individualized marketing programs
- Car-sharing and eco-driving techniques

System Management and Operations (Investment)
- Variable message signs and speed limits
- Signal timing and ramp metering
- Transit signal priority, bus-only lanes, bus pull-outs
- Incident response detection and clearance

Climate Smart Strategy | Low potential carbon reduction impact*

Street and Highway Capacity (Investment)
- New lane miles (e.g, general purpose lanes, auxiliary lanes)

Source: Understanding Our Land Use and Transportation Choices Phase 1 Findings (January 2012), Metro.

The Climate Smart Strategy and related policies (see Appendix B) were adopted in the 2018 Regional Transportation Plan and will be reviewed and updated in 2023 to ensure ongoing compliance with Oregon's GHG emissions reduction targets. The monitoring report that was included as part of the 2018 RTP concluded that the Portland region was making satisfactory progress implementing the Climate Smart Strategy, but was not able to directly compare the GHG emissions from the RTP to the state-mandated targets because different tools were used to set the targets than were used to analyze performance of the RTP (see the GHG forecasting tools section).

In order to help stakeholders gauge progress toward climate targets, the RTP also reported on the implementation of individual strategies and assumptions from the climate strategy. It found that the

RTP met or exceeded targets for expanding transit service, locating housing in compact communities, managing parking, and increasing bicycle travel. However, the RTP fell short of targets for reducing VMT per capita, building bicycle and pedestrian infrastructure, and tripling walk, bike and transit mode share.

The 2023 RTP update will include an update to the Climate Smart Strategy and supporting RTP policies and investments, as needed, to meet the region's state-mandated greenhouse gas emissions reduction targets. The update will consider how best to account for more recent changes to federal and state climate-related policies and updated regional congestion pricing-related policies, and whether the strategies and key assumptions underlying the region's Climate Smart Strategy are being implemented and continue to be realistic, including:

- **Federal climate rulemaking**[5] is underway that would require State departments of transportation (State DOTs) and metropolitan planning organizations (MPOs) to establish declining carbon dioxide (CO_2) targets for on-road motor vehicle emissions. As proposed, the draft rule does not mandate the level of reduction the targets should achieve. Rather, State DOTs and MPOs would have flexibility to set targets that are appropriate for their communities and given their respective climate policies and other policy priorities - so long as the targets would reduce emissions over time and align with the Biden Administration's target of net-zero emissions, economy-wide, by 2050.[6] Comments are due by Oct. 13, 2022.

- New **Climate-Friendly and Equitable Communities land use and transportation rules** that support implementation of the Climate Smart Strategy. Adopted by the Land Conservation and Development Commission in July 2022, the new rules require cities and counties to designate walkable, compact mixed use areas[7] that are served by transit and other sustainable transportation options, reform parking management, plan for high quality pedestrian, bicycle and transit infrastructure, prioritize and select projects meeting climate and equity outcomes and demonstrate that land use and transportation system plan updates reduce per capita vehicle miles traveled.

- State updates to the STS that are expected to account for **new policies and programs to support the transition to cleaner, low carbon vehicles and fuels**. Since 2018, the State has adopted new policies and programs to support clean vehicles and fuels in response to Executive Order 20-04.[8] See Appendix A for an overview of these and other state policies and programs are under development.

- Updates to **congestion pricing policies** in the RTP. Research suggests that pricing can be very effective at reducing GHG emissions, and pricing is the only high-effectiveness strategy in Climate Smart Strategy that has not yet been implemented in the region.

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[5] https://www.federalregister.gov/documents/2022/07/15/2022-14679/national-performance-management-measures-assessing-performance-of-the-national-highway-system
[6] Executive Order 13990 (https://www.federalregister.gov/documents/2021/01/25/2021-01765/protecting-public-health-and-the-environment-and-restoring-science-to-tackle-the-climate-crisis) and Executive Order 14008 (https://www.energy.gov/sites/default/files/2021/02/f83/eo-14008-tackling-climate-crisis-home-abroad.pdf)
[7] For the Portland region, these areas are the 2040 Centers, including the Portland Central city and regional and town centers
[8] https://www.oregon.gov/gov/Documents/executive_orders/eo_20-04.pdf

- The **impact of the COVID-19 pandemic on travel behavior and the transportation system** - in particular the significant loss of transit riders due to health concerns and the resulting cuts in service, which have been exacerbated by an ongoing shortage of transit drivers.

GHG forecasting tools

Since 2010, ODOT and Metro have been developing, testing, and refining tools to measure and forecast transportation-related GHG emissions. There are three main tools that have been used to develop GHG reduction targets and assess regions' progress toward these targets.

The regional travel model

The regional travel model has been the primary tool that Metro uses to evaluate the impact of transportation projects and policies. It is a complex model that simulates travel behavior based on surveys detailing individuals' tripmaking and on a detailed representation of the regional transportation system. Metro also uses a land use and economic model and various off-model tools (including MOVES, which is a tool developed by the EPA that is required in clean air analysis, and is used to convert travel model outputs into GHG emissions) in concert with the travel model when developing the RTP.[9] The term "travel model" is used in this memorandum as a shorthand way of referring to this entire suite of tools.

The travel model will likely remain the primary tool for quantifying greenhouse gas reductions, as well as other performance measures, for the 2023 RTP. There are three reasons for this. First, it is a detailed and nuanced tool that takes into account the complex interrelationships between land use, trip cost, the availability of different travel options, congestion, socioeconomic characteristics, and other factors that determine how people travel in the region. Second, the travel model has been widely used to assess regional plans and projects, which makes it easier for stakeholders to interpret results. Third, federal regulations require the use of a travel model in developing an RTP.

That said, there are two important limitations to the regional travel model. First, it is a complex tool that is labor-intensive to program and run, so it is not the best tool for quickly assessing the relative effectiveness of different GHG reduction strategies or for conducting "what if" assessments that explore how different combinations of strategies could impact emissions. Second, results from the travel model are not directly comparable to those from VisionEval (see below), which is the tool that the State used to set regional GHG reduction targets – an issue that the State noted when reviewing GHG results from the 2018 RTP. As described in the following section, Metro has been developing and testing a regional-scale version of VisionEval to support the 2023 RTP update. One of the goals of this work is better understand how VisionEval works at the regional scale and improve our understanding of the differences in results between VisionEval and the regional travel model and to be able to estimate greenhouse gas emissions from the 2023 RTP and directly compare forecasted emissions and corresponding VMT per capita to the region's state-mandated targets.

VisionEval and GreenSTEP

VisionEval is a scenario planning tool that examines how people respond to changes in the transportation system based on aggregate inputs about the transportation system (e.g., factors like lane-miles and transit service), detailed assumptions about current and future travel options and costs, research on the impact of different changes on travel behavior, detailed demographic and socioeconomic data, and other information.

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[9] Modeling 101 Workshop, May 23, 2022. Information available: https://www.oregonmetro.gov/modeling-services

VisionEval is designed to allow users to evaluate large numbers of scenarios and explore how different combinations of future conditions might affect performance measures like VMT and GHG emissions. It is also the tool that the State uses to set regional greenhouse gas reduction targets (which it does by using VisionEval to assess progress toward state GHG reduction goals due to state-level clean vehicle and fuel strategies, determining the gap between the results of these strategies and the targets, and identifying the reductions in VMT per capita that may be needed to fill this gap). As such, **VisionEval is well-suited for assessing progress toward the GHG reduction target and estimating potential reductions from many of the additional strategies that may be needed to meet these targets**. In addition, **Metro may recommend using VisionEval to demonstrate compliance with GHG reduction targets if staff find that technical differences between VisionEval and the travel model make it challenging to compare results and targets that are based on two different tools**.

However, VisionEval is not as detailed of an analysis tool as the travel model. The model forecasts people's behavior based on the destinations that they typically travel to and on the specific travel time, options, and conditions between their origin and destination, whereas VisionEval looks at fleet changes and aggregate effects of policies on GHG and VMT.

GreenSTEP is a scenario planning tool, similar to VisionEval, that the State used to set regional GHG reduction targets prior to 2017. The State has since promoted VisionEval as a replacement for GreenSTEP in setting and assessing progress toward state and regional targets. GreenSTEP and VisionEval are broadly similar, but they use different inputs and calculations, so **GHG targets and results from one RTP cycle are not directly comparable to those from other cycles or development of the Climate Smart Strategy in 2014.**

Different tools for different uses

GHG analysis is complex, and must speak to a variety of audiences – including the public, decision-makers, state and federal regulators, and partner agency staff. As reinforced by the Climate Expert Panel convened by Metro in June 2022[10], **there is no single best tool for the job, all of the available tools have their limitations, and the results are only as sound as the assumptions behind each tool. All of these tools are only useful insofar as they support Metro and its partner agencies in taking action** to reduce carbon emissions and protect people from the impacts of climate change.

Though VisionEval and the travel model have their differences, **they share many of the same strengths and limitations**. Both are generally well-suited to capture how land use, population change, roadway capacity, transit service, transportation costs, and travel time affect travel behavior. Both are capable of accounting in detail for how changes to fuels and vehicles affect GHG emissions. Both are also limited when it comes to analyzing induced demand, pedestrians' and bicyclists' behavior, or how people respond to travel demand management strategies (other than those that involve pricing). However, **the strengths of these tools generally align with the strategies that research suggests are most effective at producing significant long-term VMT reductions** (or avoiding further increases) – including implementing pricing, expanding and improving transit service, and limiting new roadway capacity.[11]

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[10] https://www.oregonmetro.gov/events/climate-and-transportation-expert-panel/2022-06-22
[11]For examples of research highlighting the impact of these strategies, see: Handy et al., State-Level Strategies for Reducing Vehicle Miles of Travel (2017); CDC, Strategies for Health-Oriented Transportation Projects and Policies: Reduce Vehicle Miles Traveled (VMT); Salon, The Effect of Land Use Policies and Infrastructure Investments on How Much we Drive (2015), Gately and Reardon, The Impacts of Land Use and Pricing in Reducing Vehicle Miles Traveled (2021).

VisionEval is better suited to evaluate and compare the relative effectiveness of different packages of GHG reduction strategies. It is also responsive to state climate policies. The travel model is better suited to conduct the final analysis of the RTP, and its use is required by federal regulations. Technically, the main question that Metro and its partner agencies face in using these two separate tools in the RTP update is how to compare and translate results between the two, so that the initial VisionEval analysis of GHG scenarios leads to a final RTP that meets GHG reduction targets.

Initial Climate Smart Strategy review: preliminary findings and considerations for the 2023 RTP update

In preparation for updating the 2023 RTP, Metro staff is creating a **Climate Smart Strategy (CSS) Scenario**[12] **in VisionEval** that represents the 2014 Climate Smart Strategy as currently adopted in the 2018 RTP, but with the updated growth forecast (households and jobs) adopted in 2020 for use in the 2023 RTP update. This scenario will be based on adopted policies and plans, including regional assumptions about implementation of VMT-reducing strategies in the 2018 RTP and State assumptions about Oregon's transition to cleaner, low carbon fuels and more fuel-efficient vehicles from the 2013 Statewide Transportation Strategy.[13]

Table 1 summarizes how Metro staff is using the inputs in VisionEval to represent some of the key strategies[14] adopted in the Climate Smart Strategy. **This is designed to help build understanding of how the current Climate Smart Strategy is represented in VisionEval.**

At the workshop, Metro staff will be asking for input on whether the assumptions underlying the region's Climate Smart Strategy are realistic, how certain assumptions should be updated, and if new or updated policies and additional GHG reduction strategies that are not currently included in Climate Smart Strategy should be reflected in the updated strategy. Initial feedback from agency partners on these questions is provided in the packet.

Table 1 does not include any recommendations on how strategies should be updated, but it does include notes on current values and/or trends for many inputs. This information should be considered when updating Climate Smart Strategy assumptions as part of the 2023 RTP update. The table also distinguishes between regional assumptions that are set by Metro and its partner agencies through the RTP and assumptions that are set by the State.

As of November 2022, ODOT is in the process of updating the latter based on several new policies and programs described in Appendix A, and intends to provide these updated assumptions for use in the 2023 RTP update. **Though State assumptions are not set through the RTP process, they are included in this document to help improve understanding of key factors behind VMT and GHG results more thoroughly**.

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[12] Though the assumptions used in creating this scenario mirror those used for the 2018 RTP as closely as possible, neither the assumptions nor the results are identical because of the differences between GreenStep, VisionEval and the regional travel model discussed in the previous section.

[13] https://www.oregon.gov/odot/Planning/Pages/STS.aspx. In 2018, the Oregon Transportation Commission adopted an amendment to incorporate the STS as part of the Oregon Transportation Plan (https://www.oregon.gov/odot/Planning/Pages/Plans.aspx). The 2013 STS assumptions do not reflect recent updates to State clean vehicle and fuel policies (see Appendix A). As of August 2022, ODOT staff are working to develop VisionEval assumptions that reflect these updates.

[14] VisionEval is a complex tool with hundreds of detailed inputs. Table 1 focuses only on inputs that reflect key strategies adopted in the CSS. Information on all VisionEval inputs can be found at https://visioneval.org/docs/model-inputs.html.

The Climate Smart Strategy was incorporated in the 2018 RTP in 2018, and meeting the region's targets depends in large part upon implementing the policies and investments in the RTP. However, recent data suggests that some of the assumptions underlying the Climate Smart Strategy may need to be updated, and that these revisions may impact the region's progress toward meeting its targets. Table 1 highlights some of the key assumptions in the Climate Smart Strategy that may need to be updated, and that could have a significant impact on how we meet our GHG targets.

Table 1: Key transportation assumptions in Climate Smart Strategy Scenario

Assumption	Climate Smart Strategy Scenario in VisionEval for 2035	Notes on recent[15] data and trends
Climate Smart Strategy Assumptions		
Transit Service	Transit service grows roughly in proportion with the region's population.	Between 2010 and 2019, transit service hours grew by 4%, roughly half the rate of population growth.[16] The region plans to increase transit service significantly,[17] but agencies have cut service during the COVID pandemic and that have continued due to challenges hiring drivers.
Employer-based Travel Options Programs	30% of workers receive regular travel options programming.	Based on data from the Regional Travel Options program, 5.5% of workers currently receive regular travel options programming.
Household-based Travel Options Programs	45% of households receive regular travel options programming.	Based on data from the Regional Travel Options program, less than 1% of households currently receive regular travel options programming.
Parking pricing and management	Consistent with the 2018 RTP, most of the region's 2040 centers and many of its frequent transit corridors include managed parking, and parking is priced in central Portland and at selected other destinations throughout the region.[18]	The new Climate-Friendly and Equitable Communities rules call for increasing the use of parking management and pricing in 2040 centers and within proximity of frequent transit service.
Pay-As-You-Drive (PAYD) Insurance	40% of the region uses PAYD insurance.	Some insurers offer PAYD insurance, but usage of PAYD insurance in Oregon is not increasing as envisioned in the STS.[19] The STS envisioned 20% of Oregon households had PAYD insurance by 2020 and almost 100% of households by 2035.
Fleet and technology assumptions from the State at the time of adoption of the Metropolitan GHG Reduction Target Rule in 2011		
Gas Prices	Gas prices are $6.75 per gallon[20]	

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[15] As of April 2022.

[16] TriMet, TriMet Service and Ridership Statistics, November 30, 2021. https://trimet.org/about/pdf/trimetridership.pdf.

[17] Metro, Regional Transit Strategy, 2018 Regional Transportation Plan, December 6, 2018.

[18] See the 2018 RTP, Figure 6.30, p. 6-44 and 2018 RTP Appendix M, p. 20 to p.25. https://www.oregonmetro.gov/sites/default/files/2020/07/29/2018-RTP-Appendix_M-Regional-Analysis.pdf

[19] ODOT, STS Implementation Monitoring Report, p. 26. https://www.oregon.gov/odot/Planning/Documents/STS-2018-Monitoring-Report.pdf.

[20] This price is in 2010 dollars and approximates the STS Vision inputs and was provided by the State for use during development of the Climate Smart Strategy. This equates to $9.17 per gallon in 2022 dollars.

Assumption	Climate Smart Strategy Scenario in VisionEval for 2035	Notes on recent[15] data and trends
Electricity Prices	Electricity prices are $0.23 per kWh[21]	
Commercial Fleet Age	The average lifetime of commercial vehicles is 7.6 years.	Commercial vehicle lifetimes currently average 14.2 years and are increasing.[22]
Fleet Electrification	24% of commercial light-duty trucks are hybrid or electric.	Currently, less than 1% of heavy-duty vehicles are hybrid or electric. One recent forecast[23] estimates that 7% of the heavy-duty fleet will be hybrid/electric by 2030, rising to 49% in 2040. This does not account for state policies promoting clean heavy-duty vehicles.
Commercial Fleet Share	20% of light-duty commercial vehicles are trucks/SUVs and 80% are cars.	58% of light-duty commercial vehicles are trucks, and that percentage has been increasing.[24] The STS Vision assumed 35% are trucks/SUVs and 65% are cars.
Household Fleet Share	20% of light-duty passengers vehicles are trucks/SUVs and 80% are cars.	80% of new U.S. vehicle sales are trucks, and that percentage has been increasing.[25]
Household Vehicle Fleet Age	The average lifetime of passenger cars is 7 years and 7.7 years for trucks/SUVs.	Passenger vehicle lifetimes currently average 11.9 years and are increasing.[26]

Potential strategies to produce additional VMT per capita and related GHG reductions

In support of the 2023 RTP update, Metro staff proposes to use VisionEval to conduct a preliminary analysis of VMT per capita and related GHG reductions under the 2018 RTP (as a next step), and will update regional technical and policy advisory committees and the Metro Council on the results at future meetings, including whether the updated RTP seems likely to meet its VMT per capita and related GHG reduction targets. Staff also proposes to evaluate the draft 2023 RTP project list using VisionEval as part of the system analysis conducted following the Call for Projects in Spring 2023.

Below are some of the strategies that are likely to produce significant additional reductions – focusing on the strategies identified in the Climate Smart Strategy (See Figure 1) with the greatest potential carbon reduction potential, as well as on strategies that are well-represented in the GHG analysis tools discussed above – if additional action is needed to meet the region's targets.

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[21] This price is in 2010 dollars approximates the STS Vision inputs and was provided for use during development of the climate Smart Strategy. This equates to $0.23 per kWh in 2022 dollars.
[22] Brusseau, D., Aging Trucks Create More Service Opportunities, NTEA News, https://www.ntea.com/NTEA/Member_benefits/Industry_leading_news/NTEANewsarticles/Aging_trucks_create_more_service_opportunities.aspx?fbclid=IwAR3mkimdcKilEbdqwvYYSwODX5Hop5g6odQWuQdIt9cJ37I30kwxgv209PU
[23] Ledna, C., et. al., Decarbonizing Medium- & Heavy-Duty On-Road Vehicles: Zero-Emission Vehicles Cost Analysishttps://www.nrel.gov/docs/fy22osti/82081.pdf
[24] Bureau of Transportation Statistics, U.S. Automobile and Truck Fleets by Use, https://www.bts.gov/content/us-automobile-and-truck-fleets-use-thousands
[25] FRED Blog, Long-term trends in car and light truck sales, March 15, 2021. https://fredblog.stlouisfed.org/2021/03/long-term-trends-in-car-and-light-truck-sales/
[26] Bureau of Transportation Statistics, Average Age of Automobiles and Trucks in Operation in the United States, https://www.bts.gov/content/average-age-automobiles-and-trucks-operation-united-states

Pricing: Multiple agencies, including ODOT, Metro and the City of Portland, are currently working on plans to price roadways in the Portland region in order to both manage demand and raise revenues for future transportation investments. The 2023 RTP update is anticipated to include updated policies and new projects that expand the region's approach to pricing. **Pricing presents a major opportunity to reduce GHG emissions since pricing is the only high-impact strategy identified in Climate Smart that has not yet been implemented at scale**. The Regional Congestion Pricing Study analyzed a variety of potential approaches to pricing and found that all of them reduced VMT, ranging from a minor reduction to a 7.6 percent decrease.[27] This analysis focused on pricing's potential to help manage travel demand, and does not account for additional VMT per capita and related GHG reductions that could result from reinvesting a share of the resulting revenues in other climate strategies such as those discussed below.

Increasing transit service: Increasing transit service has long been a focus of Metro and its partners' efforts to implement the 2040 Growth Concept, expand travel options, improve air quality and reduce GHG emissions. This strategy also has significant potential benefits for equity and mobility. The 2018 RTP exceeded Climate Smart Strategy targets for increasing transit service, both in general and in the region's housing and job centers. However, the COVID-19 pandemic reduced transit ridership and necessitated cuts to transit service that weren't anticipated in the 2018 RTP. As a result, it may take additional funding to achieve the level of transit service – and corresponding per capita VMT and GHG reductions – envisioned in the 2018 RTP, and even more to increase transit-related GHG reductions beyond what was expected in 2018. Some resources may be available through pricing (though constitutional restrictions on how revenue raised from vehicles and fuels can be spent may limit how pricing revenues can be spent on transit); others may be available through the new funding programs created as part of the Bipartisan Infrastructure Law.

Expanding parking management and pricing: Managing and pricing parking can have a similar impact on VMT and GHG emissions as road pricing. In addition, parking pricing can also be applied in a more targeted fashion to destinations that are easy to reach by modes other than driving. Currently, very few places in the region have managed or priced parking, and in most cases the rules and fares that are in place are not designed to manage demand and encourage the use of transit and other modes instead of driving. The new Climate Friendly and Equitable Communities (CFEC) rules seek to change this by requiring the implementation of managed/priced parking in designated regional centers and station communities. The RTP is generally aligned with the CFEC rules, which calls for significantly expanding the use of managed parking in the region in 2040 centers and in areas near frequent transit service. However, the RTP currently anticipates a modest level of parking management in most communities that implement it. This means that there is an opportunity for local governments to implement parking management and pricing in a coordinated fashion that is guided by best practices in managing demand, and implement the new CFEC rules in a way that maximizes GHG reductions.

Plan and build compact and multimodal communities: Coordinating land use and transportation planning has been a core focus of Metro and its partners' efforts for decades. In the context of the RTP, this has meant building a multimodal transportation system that connects the

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[27] Metro, Regional Congestion Pricing Study, p. xiii and Appendix D.i.
https://www.oregonmetro.gov/sites/default/files/2021/10/05/Regional%20Congestion%20Pricing%20Study%20-%20final%20report%20-%20Metro.pdf

centers and communities identified in the 2040 Growth Concept.

Take additional action to accelerate the adoption of clean vehicles and fuels: Oregon's climate regulations generally direct Metro, cities and counties to focus on reducing GHG emissions by reducing VMT per capita. They require Metro to assume that complementary State clean vehicle and fuel programs and policies will be implemented, and to use assumptions provided by the State that account for these programs and policies when calculating progress toward GHG reduction targets. However, the State also allows Metro to take credit for GHG reductions from clean vehicle and fuel strategies as long as they can demonstrate that these strategies are additive to State policies and programs.

Given how high interest in clean vehicles and fuels is in the Portland region – zero-emission vehicle (ZEV) ownership rates in each of the region's three counties exceed those in any other Oregon county by 50% or more, and collectively Multnomah, Washington and Clackamas Counties account for three-fifths of the state's registered ZEVs – there may be opportunities to implement unique and innovative programs. However, the State already assumes a high level of ZEV penetration in the Portland region, and agencies in the region have so far generally focused on greening their own fleets instead of increasing consumer usage of ZEVs. It will likely take detailed analysis and coordination between local, regional and State agencies to identify what, if any, additional actions that the RTP could take to significantly increase adoption of clean vehicles and fuels and that are not duplicative of State policies and programs.

As noted above, the recommendations above are focused on implementing strategies that are identified by the Climate Smart Strategy as having a high impact on GHG reductions. It may also be possible to increase GHG reductions from the medium-impact strategies shown in Figure 1 above.

Next steps

Metro staff recommend that Metro Council and regional policy and technical advisory committees first identify what assumptions may need to be updated or revised to account for new information and changes to policies, strategies and other assumptions since 2018 and then identifying which high-impact and medium-impact strategies that have the greatest potential to reduce GHG emissions should be focused on in the update the Climate Smart Strategy.

Next steps include:

- Engaging JPACT and the Metro Council in updating the Climate Smart Strategy at a joint workshop on November 10 to build a shared understanding of the Climate Smart Strategy and state requirements to reduce per capita VMT as the way to demonstrate meeting GHG emissions reduction targets. **At the workshop, Metro staff will be asking for input on whether the assumptions underlying the region's Climate Smart Strategy are realistic, how certain assumptions should be updated, and if new or updated policies and additional GHG reduction strategies that are not currently included in Climate Smart Strategy should be reflected in the updated strategy**. Initial feedback from agency partners on these questions is provided in the packet in Appendix C.

- Working with a consultant team to support greenhouse gas analysis in the 2023 RTP update, including some of the tasks listed below:
  - o Estimating likely VMT per capita and related GHG reductions under the 2018 RTP and 2023 RTP using VisionEval, to help assess whether the RTP is on track to meet its targets for 2040 and 2045.
  - o Conducting a sensitivity analysis of the additional VMT per capita and related GHG reductions that could result from increasing implementation of certain carbon reduction strategies.
  - o Mapping how household-based VMT per capita varies across the region, which will help identify communities with higher and lower levels of per person transportation-related GHG emissions, as well as support the implementation of the Climate-Friendly and Equitable Communities rules and the updated Regional Mobility Policy.

3.2.3 Climate leadership policies

Climate change may be the defining challenge of this century. Global climate change poses a growing threat to our communities, our environment and our economy, creating uncertainties for the agricultural, forestry and fishing industries as well as winter recreation. The planet is warming and we have less and less time to act. Documented effects include warmer temperatures and sea levels, shrinking glaciers, shifting rainfall patterns and changes to growing seasons and the distribution of plants and animals.
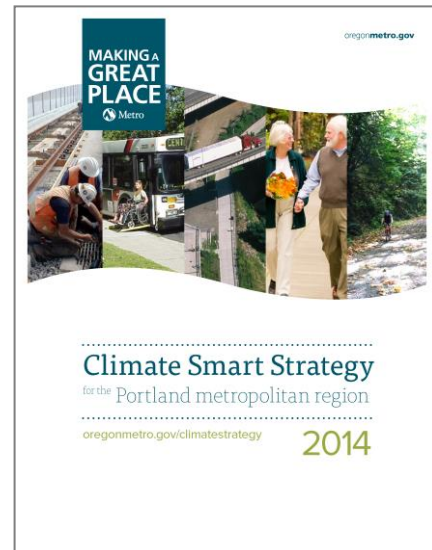
Warmer temperatures will affect the service life of transportation infrastructure, and the more severe storms that are predicted will increase the frequency of landslides and flooding. Consequent damage to roads and rail infrastructure will compromise system safety, disrupt mobility and hurt the region's economic competitiveness and quality of life. Our ability to respond will have unprecedented impacts on our lives and our survival.

The 2018 Regional Transportation Plan is a key tool for the greater Portland region to implement the adopted Climate Smart Strategy.

For more information, visit www.oregonmetro.gov/climatesmart

Transportation sources account for 34 percent of greenhouse gas emissions in Oregon, largely made up of carbon dioxide (CO_2). Since 2006, the state of Oregon has initiated a number of actions to respond including directing the greater Portland region to develop and implement a strategy for reducing greenhouse gas emissions from cars and small trucks.

3.2.3.1 Climate Smart Strategy (2014)

The Regional Transportation Plan is a key tool for the greater Portland region to implement the adopted Climate Smart Strategy and achieve greenhouse gas emissions reduction targets adopted by the Land Conservation and Development Commission in 2012 and 2017.

As directed by the Oregon Legislature in 2009, the Metro Council and the Joint Policy Advisory Committee on Transportation (JPACT) developed and adopted a regional strategy to reduce per capita greenhouse gas emissions from cars and small trucks by 2035 to meet state targets. Adopted in December 2014 with broad support from community, business and elected leaders, the Climate Smart Strategy relies on policies and investments that have already been identified as local priorities in communities across the greater Portland region. Adoption of the strategy affirmed the region's shared commitment to provide more transportation choices, keep our air clean, build healthy and equitable communities, and grow our economy – all while reducing greenhouse gas emissions.

The analysis of the adopted strategy demonstrated that with an increase in transportation funding for all modes, particularly transit operations, the region can provide more safe and reliable transportation choices, keep our air clean, build healthy and equitable communities and grow our economy while reducing greenhouse gas emissions from light-duty vehicles as directed by the Legislature. It also showed that a lack of investment in needed transportation infrastructure will result in falling short of our greenhouse gas emissions reduction goal and other desired outcomes. The Land Conservation and Development Commission approved the region's strategy in May 2015.

3.2.3.2 Climate Smart Strategy policies

The Climate Smart Strategy is built around nine policies to demonstrate climate leadership by reducing greenhouse gas emissions from cars and small trucks while making our transportation system safe, reliable, healthy and affordable. The policies listed below complement other RTP policies related to transit, biking and walking, use of technology and system and demand management strategies.

Climate Smart Policies

Policy 1   Implement adopted local and regional land use plans.

Policy 2   Make transit convenient, frequent, accessible and affordable.

Policy 3   Make biking and walking safe and convenient.

Policy 4   Make streets and highways safe, reliable and connected.

Policy 5   Use technology to actively manage the transportation system and ensure that new and emerging technology affecting the region's transportation system supports shared trips and other Climate Smart Strategy policies and strategies.

Policy 6   Provide information and incentives to expand the use of travel options.

Policy 7   Make efficient use of vehicle parking spaces through parking management and reducing the amount of land dedicated to parking

Policy 8   Support Oregon's transition to cleaner fuels and more fuel-efficient vehicles in recognition of the external impacts of carbon and other vehicle emissions.

Policy 9   Secure adequate funding for transportation investments that support the RTP climate leadership goal and objectives.

3.2.3.3 Climate Smart Strategy toolbox of potential actions

The responsibility of implementation of these policies and the Climate Smart Strategy does not rest solely with Metro. Continued partnerships, collaboration and increased funding from all levels of government will be essential. To that end, the Climate Smart Strategy also identified a comprehensive toolbox of more than 200 specific actions that can be taken by the state of Oregon,

Metro, cities, counties, transit providers and others to support implementation. These supporting actions are summarized in the *Toolbox of Possible Actions (2015-2020)* adopted as part of the Climate Smart Strategy. The actions support implementation of adopted local and regional plans and, if taken, will reduce greenhouse gas emissions and minimize the region's contribution to climate change in ways that support community and economic development goals. The Climate Smart Strategy's *Toolbox of Possible Actions* was developed with the recognition that existing city and county plans for creating great communities are the foundation for reaching the state target and that some tools and actions may work better in some locations than others. As such, the toolbox does not mandate adoption of any particular policy or action. Instead, it emphasizes the need for many diverse partners to work together to begin implementation of the strategy while retaining the flexibility and discretion to pursue the actions most appropriate to local needs and conditions.

Local, state and regional partners are encouraged to review the toolbox and identify actions they have already taken and any new actions they are willing to consider or commit to in the future. Updates to local comprehensive plans and development regulations, transit agency plans, port district plans and regional growth management and transportation plans present ongoing opportunities to consider implementing the actions recommended in locally tailored ways.

3.2.3.4 Climate Smart Strategy monitoring

The Climate Smart Strategy also contained performance measures and performance monitoring targets for tracking implementation and progrss. The purpose of the performance measures and targets is to monitor and assess whether key elements or actions that make up the strategy are being implemented, and whether the strategy is achieving expected outcomes. If an assessment finds the region is deviating significantly from the Climate Smart Strategy performance monitoring targets, then Metro will work with local, regional and state partners to consider the revision or replacement of policies and actions to ensure the region remains on track with meeting adopted targets for reducing greenhouse gas emissions.

APPENDIX J
2018 Regional Transportation Plan
Climate Smart Strategy implementation and monitoring
December 6, 2018   oregonmetro.gov/rtp

Appendix J reports on implementation progress since 2014. The analysis found the 2018 RTP makes satisfactory progress towards implementing the Climate Smart Strategy, but more investment, actions and resources are needed to ensure the region achieves mandated greenhouse gas emissions reductions.

Appendix J reports on implementation progress since 2014, and found the 2018 Regional Transportation Plan makes satisfactory progress towards implementing the Climate Smart Strategy and, if fully funded and implemented, can reasonably be expected to meet the state-mandated targets for reducing per capita greenhouse gas emissions from passenger cars and small trucks (light-duty vehicles) for 2035 and 2040.

The analysis also found that more investment, actions and resources will be needed to ensure the region achieves the mandated greenhouse gas emissions reductions defined in OAR

660-044-0060. In particular, additional funding and prioritization of Climate Smart Strategy investments and policies that substantially reduce greenhouse gas emissions will be needed.

3.2.3.5 Transportation preparedness and resilience

The topic of preparedness and resilience has broad implications across all sectors of the economy and communities throughout the region. Natural disaster can happen anytime, affecting multiple jurisdictions simultaneously. The region needs to be prepared to respond quickly, collaboratively and equitably, and the transportation system needs to be prepared to withstand these events and to provide needed transport for fuel, essential supplies and medical transport. Advance planning for post-disaster recovery is also critical to ensure that communities and the region recover and rebuild important physical structures, infrastructure and services, including transportation – it can make communities and the region stronger, healthier, safer and more equitable.

What are the risks we face?

Climate change, natural disasters, such as earthquakes, urban wildfires and hazardous incidents, and extreme weather events present significant and growing risks to the safety, reliability, effectiveness and sustainability of the region's transportation infrastructure and services. Flooding, extreme heat, wildfires and severe storm events endanger the long-term investments that federal, state, and local governments have made in transportation infrastructure. Changes in climate have intensified the magnitude, duration and frequency of these events for many regions in the United States, a trend that is projected to continue. There is much work going on locally, regionally, statewide and across the country to address these risks.
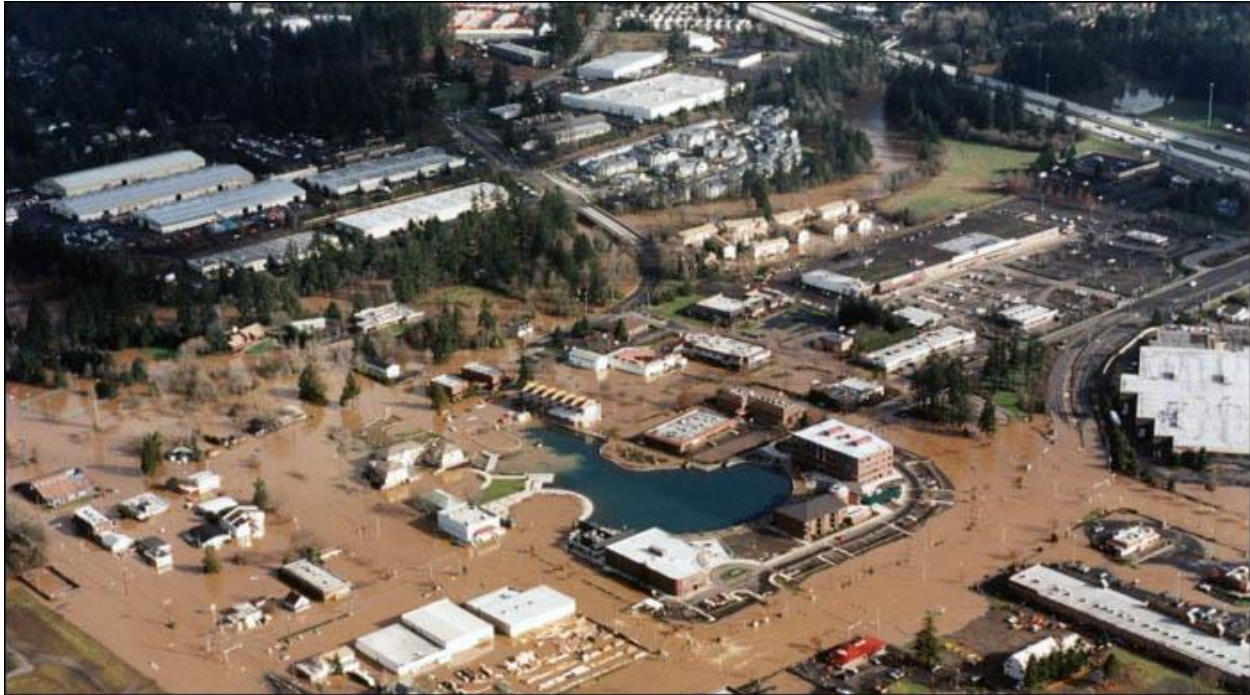
Regional collaboration and disaster preparedness

The Regional Disaster Preparedness Organization (RDPO) is a partnership of government agencies, non-governmental organizations, and private-sector stakeholders in the Portland metropolitan area collaborating to increase the region's resilience to disasters. RDPO's efforts span across Clackamas, Columbia, Multnomah, and Washington counties in Oregon and Clark County in Washington.

According to the 2013 Oregon Resilience Plan, Oregon's buildings and lifelines (transportation, energy, telecommunications, and water/ wastewater systems) would be damaged so severely that it would take three months to a year to restore full service in areas such as the Portland region. More recently, a 2018 report from the Oregon Department of Geology and Mineral Industries (DOGAMI) on the Portland region describes significant casualties, economic losses and disruption in the event of a large magnitude Cascadia subduction zone earthquake.

The Regional Disaster Preparedness Organization (RDPO) is a partnership of government agencies, non-governmental organizations, and private-sector stakeholders in the Portland metropolitan area collaborating to increase the region's resilience to disasters. For more information, visit www.rdpo.net.

While transportation infrastructure is designed to handle a broad range of impacts based on historic climate patterns, more planning and preparation for climate change, earthquakes and other natural disasters and extreme weather events is critical to protecting the integrity of the transportation system and improving resilience for future hazards.

Potential opportunities for future regional collaboration in support of transportation preparedness and resilience include:

- Partner with the RDPO to update the region's designated Emergency Transportation Routes (ETRs) for the five-county area, which were last updated in 2006. These routes are designated to facilitate all-hazards emergency response activities, including those of medical, fire, law enforcement and disaster debris removal in the immediate aftermath of an earthquake or other major event. The project will use data from the DOGAMI study to apply a seismic lens to determine whether the routes have a high likelihood of being damaged or cut-off during an earthquake and determine whether other routes may be better suited to prioritize as ETRs as a result. Some considerations for emergency recovery will also be incorporated into the updated ETR criteria and recommendations for future work. See Chapter 8 (Section 8.2.3.10) for more information.

- Consider climate and other natural hazard-related risks during transportation planning, project development, design and management processes.

- Conduct a vulnerability assessment for the region, documenting climate and other natural hazard-related risks to the region's transportation system and vulnerable populations, and potential investments, strategies and actions that the region can implement to reduce the vulnerability of the existing transportation system and proactively increase the transportation system's resiliency.

- Optimize operations and maintenance practices that can help lessen impacts on transportation from extreme weather events and natural disasters. Examples include more frequent cleaning of storm drains, improved plans for weather emergencies, closures and rerouting, traveler information systems, debris removal, early warning systems, damage repairs and performance monitoring.

- Integrate green infrastructure into the transportation network when practicable to avoid, minimize and mitigate negative environmental impacts of climate change, natural disasters and extreme weather events.

- Protection and avoidance of natural areas and high value natural resource sites, especially the urban tree canopy and other green infrastructure, in slowing growth in carbon emissions from paved streets, parking lots and carbon sequestration and addressing the impacts of climate change and extreme weather events, such as urban heat island effects and increased flooding.

- Avoidance of transportation-related development in hazard areas such as steep slopes and floodplains that provide landscape resiliency and which are also likely to increase in hazard potential as the impacts of climate change increase.

Appendix B: New State clean vehicle and fuel strategies since 2018

Since 2018, the State has adopted new policies and programs to support clean vehicles and fuels in response to Executive Order 20-04.[1] The Every Mile Counts Program and its coordinated STS Multi-Agency Implementation Work Plan are focused on reducing greenhouse gas emissions and implementing the STS.

Recent actions include the formation of climate offices within ODOT and ODEQ and the statewide CFEC rulemaking by the LCDC and the Department of Land Conservation and Development (DLCD). In addition, several Oregon vehicles and fuels legislative actions and Environmental Quality Commission (EQC) rules are expected to be in place by the end of 2022 that will help greatly advance the STS goals to "clean up every mile" and associated air quality impacts:

1. Clean Car Standards Program (ZEV1) (EQC adopted in 2005)
2. Clean Fuels Program (CFP1) (HB2186, 2009)
3. Clean Electricity Standard (HB2021, 2021)
4. Advanced Clean Truck Rules (ACT) (EQC adopted in November 2021)
5. Climate Protection Program (CPP) (EQC adopted in December 2021)
6. Clean Fuels Program Expansion (CFP2) (EQC expected adoption in 2022)
7. Clean Car Standards Program Expansion (ZEV2) (EQC expected to initiate rulemaking mid-2022)

The first three are expected to achieve by 2026 a roughly 10 percent reduction in state GHG emissions. The Climate Protection Program is an overarching policy that will restrict sales of fossil fuel sales in the state across multiple sectors increasingly each year starting in 2022. The latter programs are critical to implementing that policy to ease the transition to a low carbon future for all vehicle groups. Some credit trading is allowed prior to 2030, which makes it hard to predict exact forecasts in the near term. The ZEV programs when fully implemented should roughly conform to the goals set out in SB1044.

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[1] https://www.oregon.gov/gov/Documents/executive_orders/eo_20-04.pdf

2023 Regional Transportation Plan Update

Climate Smart Strategy Update
Jurisdictional Partner Comments

October 2022

092722 Clackamas County Staff Comments on Climate Smart Strategies

1. **Do you have specific feedback on the assumptions identified in Table 1** of the staff memo:

    Transit Service – Use updated information from TriMet on assumptions on return of service. Document.

    Employer Based Travel Options Programs – why are only 5.5% of workers receiving regular travel options programming? Why would we assume that it is more? How does this change with increased work from home options?

    Household Based Travel Options Programs – The assumptions on this should change because they are dramatically different that they are today. The Climate Smart Plan should be clear on what specific actions / programs are needed to change the "trend" to the "assumption."

    Parking and Pricing Management – No recommended changes to the assumptions.

    Pay As You Drive Insurance – The assumption should be reduced since PAYD insurance is not being used as was envisioned.

    No Comment on **- Gas Prices; Electricity Prices; Commercial Fleet Age; Fleet Electrification; Commercial Fleet Share; Household Fleet Share**

    Household Vehicle Age – Since vehicles are so expensive, it seems that 7 years is too low of a number.

2. **Are there new or updated policies and additional carbon reduction strategies that are not currently included in the Climate Smart Strategy that should be reflected in the updated strategy?**

    Pricing – Can both Roadway Pricing, as being implemented by ODOT and Road User Charge Fee / VMT Fee across the region be "tested" for their impact on reducing VMT?

    Increased Transit Service – How can Climate Smart discuss not just "more transit service" but type and where? What are the actions that need to be taken to get people to use the transit service?

    Expanding Parking Management and Pricing – The assumptions for this do not need to be changed. The CFEC rules that limit mandated parking may create more demand for parking (since there is less available parking), which then will result in a greater need to manage the demand through pricing.

    Plan and Build Multimodal Communities – There is a need to take actions to create jobs closer to where people live so that it will be easier for people to use multimodal options (which are better for shorter trips)

    Take additional action to accelerate the adoption of clean vehicles and fuels – Create a high tax for environmental damage on internal combustion engine vehicles

3. **What issues and policy questions are you interested in exploring as we update our strategy** during this time of change and uncertainty?

    1. Better understanding of how the ODOT Roadway Pricing will reduce VMT verses a VMT Fee/Road User Charge in the Metro area. Build the understanding of the laying of Roadway Pricing and its effectiveness on reducing VMT.

    2. How the Climate Strategy could be influenced by taxes and incentives, instead of voluntary adoption of the strategies. Often the most successful strategies for bringing about real change

are those based on taxes and incentives. Driving and greenhouse gas emissions is currently incentivized in many ways. For example, increasing the cost of greenhouse gas emissions and providing a very large incentive for driving zero or low emitting vehicles.

3. Land use –The current land use pattern is one of the most significant drivers of greenhouse gas emissions because our land use pattern relies upon driving far distances to get to jobs and services and limiting reduces walking and biking because facilities do not exist and the distances may be too far. The CFEC rules to parking minimums are a potential good start.

    a. How can land use codes incentivize high density residential uses within ½ mile of fixed route transit or employment locations? Lower parking standard, higher allowable residential densities?

    b. How can we quantify the benefit of implementing the new CFEC rules, such as the requirement to have capacity for EV charging.

4. Using VisionEval to assess different approaches to GHG reductions sounds like a good idea.

5. How can different vehicle registration fees, such as a very large vehicle registration fee on internal combustion vehicles, and no vehicle registration fee for no emission vehicles, influence the Climate Smart Strategies?

6. Impact of a VMT+EMISSIONS Charge – Assessing a VMT charge for internal combustion engines vehicles for the basis of cost of road improvements/maintenance/enforcement AND a very large greenhouse gas emissions charge. Low emission vehicles could be charged a fee bases on the cost of road improvements/maintenance/enforcement, and receive a large credit for the greenhouse gases that are not emitted.

4. **What opportunities do you see for the region to move forward should our analysis show we need to do more** to meet our VMT per capita reduction targets and climate goals?

While local land use changes to development codes are almost entirely under local control – that is the place to start, there also needs to be a better understanding of how to incentive builder/developers so places are built to their planned densities.

Depending on the outcomes of the analysis, local governments could consider adopting higher vehicle registration fees.

5. **Other comments or suggestions you would like to share?**

While the Climate Smart Strategies are all reasonable actions, Table 1 demonstrates that more needs to be done to achieve the various goals. What tools are needed to achieve effective change before it is too late? Incentives are needed for the implementation of measures that reduce greenhouse gas emissions and disincentives (carbon tax?) for existing approaches that result in production of greenhouse gases.

It would be helpful to know if the changes to the Transportation Planning Rule related the Climate Friendly and Equitable Communities will make an impact on the regions potential of achieving the goals set forth in the Climate Smart Strategies.

PBOT Comments to Kim on 9/12 RTP CSS presentation questions
September 26, 2022

PBOT Comments on Climate Smart Scenario memo from 9/14 TPAC-MTAC Workshop

Overall

We're concerned with the slow pace of Climate Smart Strategy (CSS) work, especially since so much of the work creating a revised Reference Case has already been done and could begin to be validated with TPAC. Failing to share an updated Reference Case undermines our ability to understand the magnitude of the VMT Gap in a timely manner and thus impedes discussion of scenario development reflective of the policies, programs and projects the RTP will need to prioritize to eliminate the gap. We are increasingly concerned that TPAC, MPAC, Metro Council, and JPACT will have inadequate time for the challenging conversations around road and parking pricing, parking reform, and TDM implementation that are likely necessary to close the VMT/capita gap and ensure compliance with 660-44-0020 requirements.

To help us and the other regional partners and their policymakers understand how and when these important issues will be discussed and our ability to iteratively deliberate and decide on key emergent questions and additional evaluation, please share at your earliest possible convenience with TPAC a specific process and schedule for discussion of:

- Assumption changes and a revised Reference Case
- VMT/capita Gap and any other assumptions (e.g., fuel and electricity prices and STS implementation, or lack thereof, especially around fleet transition and state pricing)
- Scenario development
- Scenario results discussion
- Metro's plan to use "best available science" to evaluate induced demand (i.e., what beyond-the-model tools will Metro use to address the induced demand weaknesses in the RTDM?)
- Use of scenario results in project evaluation

Assumptions in Table 1

We do not believe the transit service levels, PAYD insurance, and employee and household travel options participation rates are realistic given trends to date and should be revised to create a new draft Reference Case for TPAC review as soon as possible. Much of the work needed to support revising the assumptions has already been done by Metro staff, as provided the packet produced for the Expert Panel in June.

In addition, gas and electricity price, commercial fleet age, fleet electrification, commercial fleet share, household fleet share, and household vehicle age assumptions should be updated for the 2023 RTP to reflect more realistic number based on the best available data. For example, gas prices assumed by the STS and CSS for 2022 are more than double current gas prices, and the share of light duty passenger vehicles that are SUV's is four times the STS/CSS assumption. Recognizing that the state has some responsibility for updating these assumptions, the region should also be engaging with the state agencies to ensure any updated assumptions are reasonable.

It will also be essential to be updating and strengthening assumptions around the demand management roadway pricing and parking management mechanisms being deployed in the region and reflected in the

RTP, given what the RCPS and other analyses from around the nation and industry have demonstrated (including our previous work on VisionEval) is likely needed to meet ambitious VMT/capita reduction targets.

We have questions about this language on pdf p. 160 in the September 14 TPAC packet:
> "In support of the 2023 RTP update, Metro staff proposes to use VisionEval to conduct a preliminary analysis of VMT per capita and related GHG reductions under the 2018 RTP (as a next step), and will update TPAC and MTAC on the results at a future meeting, including whether the updated RTP seems likely to meet its VMT per capita and related GHG reduction targets."

We would like to confirm that this is referring to the development of a new Reference Case? The "Climate Smart Proxy" is based on dramatically outdated assumptions; it's critical that Metro share the evaluation based on a Reference Case using updated assumptions for each of the items in Table 1. Otherwise, the results are likely to be misleading. Also, conducting this "preliminary analysis" as soon as possible is highly desirable to give the region a sense of the VMT gap needing to be closed by the RTP to inform our other RTP workplan elements during the remainder of the update.

We also have concerns that VisionEval may not be the right tool to evaluate a project list, given its insensitivity to induced demand and VE's inability to show changes in bicycle and pedestrian mode share outputs. Rather, it is likely better suited for use in framing up key policy and program approaches needed to be applied in conjunction with projects that will be generate a higher utilization of multimodal infrastructure investments and help manage demand for low and no occupancy automobile trips.

New or Updated Policies

The 2023 RTP will need updated policies to reflect CFEC requirements, including a focus on VMT reduction and new parking reforms. Stronger road pricing, parking pricing, parking management, and mixed-use development requirements may be needed to put us on track to achieve targets, especially by 2030 which is when the scientific community is pointing to the need for significant reductions to avoid the most catastrophic outcomes from climate change.

The current language of the climate policies is not outcome oriented. We recommend revising the policies to focus on outcomes rather than process. Please see our comments on page 164 of the 9/14/22 TPAC packet, attached to the email.

Additional Carbon Reduction Strategies

As noted, the primary missing strategy in CSS is pricing, including demand management tolling, a regional and/or local Road User Charge to manage demand in the region above the gas tax replacement RUC, and parking pricing in centers and corridors across the region.

Several strategies will also need to be significantly expanded. The relatively weak household and employer travel options programs will need to be significantly expanded, with significant financial incentives provided by employers, residential property managers, Metro, and local governments.

For transit service to be more effective, an evaluation of needed transit-supportive strategies is necessary. Investing in additional transit service without additional regional and local transit-supportive actions would likely continue to produce marginal outcomes for transit ridership.

Metro should also evaluate strategies being implemented in California and Colorado to mitigate for VMT increases from adding SOV capacity to highways and arterials. We can't have one part of the boat rowing forward while the other part rows back.

Issues and Policy Questions to Explore

AS we update the climate smart Scenario for the region, it will be important not only to be understanding and addressing how to ensure maximum efficacy of emission reduction strategies is identified and implemented, but also ensuring that we are understanding and addressing the risk of potential VMT and GHG increasing policies, practices and investments that we are continuing to undertake or considering doing. From that perspective, we think the following questions are crucial for the region to also be exploring through this RTP update, and other CFEC implementation efforts:

- How do CSS policies and strategies connect with, and support, the RTFP policies 3.08.220 on Transportation Solutions and 3.08.230 on Performance Targets and Standards and the "significant SOV capacity language?"

- How do CSS policies and strategies connect with, and support, the region's Congestion Management Process? When and how will the Congestion Management Process be updated to reflect VMT reduction requirements?

- How is/will OHP Policy 1.G.1 be operationalized and implemented within the Metro region?

- How will "best available science" tools to evaluate induced demand be implemented in the 2023 RTP in time for the call for projects and scenario evaluation (e.g., a scenario reflecting travel demand needs after implementing VMT reduction strategies sufficient to achieve 660-044 requirements)?

Opportunities to Move Forward

There's a strong correlation between strong Regional Congestion Pricing policies and actions and achieving our climate, mobility, safety, and equity goals and objectives. Ensuring that we are linking the development of regional congestion pricing policy and parking management with the financial and system management assumptions and our performance evaluation relative to priority RTP outcomes is a key opportunity to ensure this key tool is used as effectively as possible.

Other Comments

In conclusion, timeliness is of the essence in order that scenarios that meet VMT reduction targets are used to inform the Needs Analysis and the Call for Projects. We need to move Climate out of first gear to sync with the other elements of the RTP workflow in a way that will enable the technical analyses and policymaker consideration needed to develop understanding and consensus around the important new moves that the region must take to address the multiple crises and associated opportunities we face.

Appendix A: 2018 Regional Transportation Plan - Climate Leadership Policies

The analysis of the adopted strategy demonstrated that with an increase in transportation funding for all modes, particularly transit operations, the region can provide more safe and reliable transportation choices, keep our air clean, build healthy and equitable communities and grow our economy while reducing greenhouse gas emissions from light-duty vehicles as directed by the Legislature. It also showed that a lack of investment in needed transportation infrastructure will result in falling short of our greenhouse gas emissions reduction goal and other desired outcomes. The Land Conservation and Development Commission approved the region's strategy in May 2015.

3.2.3.2 Climate Smart Strategy policies

The Climate Smart Strategy is built around nine policies to demonstrate climate leadership by reducing greenhouse gas emissions from cars and small trucks while making our transportation system safe, reliable, healthy and affordable. The policies listed below complement other RTP policies related to transit, biking and walking, use of technology and system and demand management strategies.

Climate Smart Policies

Policy 1	Implement adopted local and regional land use plans.
Policy 2	Make transit convenient, frequent, accessible and affordable.
Policy 3	Make biking and walking safe and convenient.
Policy 4	Make streets and highways safe, reliable and connected.
Policy 5	Use technology to actively manage the transportation system and ensure that new and emerging technology affecting the region's transportation system supports shared trips and other Climate Smart Strategy policies and strategies.
Policy 6	Provide information and incentives to expand the use of travel options.
Policy 7	Make efficient use of vehicle parking spaces through parking management and reducing the amount of land dedicated to parking
Policy 8	Support Oregon's transition to cleaner fuels and more fuel-efficient vehicles in recognition of the external impacts of carbon and other vehicle emissions.
Policy 9	Secure adequate funding for transportation investments that support the RTP climate leadership goal and objectives.

3.2.3.3 Climate Smart Strategy toolbox of potential actions

The responsibility of implementation of these policies and the Climate Smart Strategy does not rest solely with Metro. Continued partnerships, collaboration and increased funding from all levels of government will be essential. To that end, the Climate Smart Strategy also identified a comprehensive toolbox of more than 200 specific actions that can be taken by the state of Oregon,

TriMet comments on Climate Smart Strategy Memo from 9/13/22

- **Do you have specific feedback on the assumptions identified in Table 1** of the staff memo:

- Are the key transportation assumptions underlying the region's Climate Smart Strategy realistic?

  In reviewing the assumptions, and how far off we are from the objectives set, perhaps they are too aspirational vs. actual based on available funding.

  We do support the assumptions regarding service growth in this decade, but are uncertain about whether future assumptions are achievable or too aspirational. TriMet is currently projecting 38% service growth over current levels through 2027 (assuming operator hiring progresses), but have yet to identify funding sources to support 4% growth through 2045. Beyond 2027, our current estimates may cover slight annual increases in service hours (can share more details if needed) to address reliability and capacity issues, but no more major service increases unless additional revenue is committed. There will also be additional costs to factor in to support service growth, including expansion of facilities, new bus garages and the higher costs of zero emission fleet, which need to be accounted for to reflect the true costs of service expansion.

- Should certain assumptions be updated?

  Strategies that reduce VMT and those that are most likely to lead to modeshift are those that will make the most impact in achieving our climate goals.

    o Transit Service growth – see above

    o Parking pricing and availability makes a big impact on mode choice. It is still often cheaper to pay for parking for a family rather than multiple transit passes if families do not already participate in any discounted monthly pass programs. Should the pricing assumption be updated to include more forms of pricing beyond parking?

    o Travel options programming assumptions– it seems that we are quite far off on achieving these assumptions. Is there a way to instead/in addition measure the expansion of fare discount programs rather than just employer-based vs. household-based RTO outreach? It seems as though "received information about RTO programs" is not the best metric to measure whether behavior is actually changing. Perhaps there are ways to track expansion of fare (or other travel option) discount programs and availability of those to higher percentages of the population instead of employer-based program outreach? Employer-based travel options programs are only one of the fare discount programs.

- Are there new or updated policies and additional carbon reduction strategies that are not currently included in Climate Smart Strategy that should be reflected in the updated strategy?

    o Prioritizing transit speed (specifically in-roadway transit priority treatments) and travel time over parking makes an impact in people choosing to ride transit. Could we include and track growth in number of transit priority improvements or transit travel time savings growth?

- o In the long term - urban design to support transit and increased housing and employment density are critical to be able to support transit service growth that will actually lead to increased ridership. Interested in if there is a way to include any assumptions regarding transit-supportive design and land use to ensure that transit has a competitive advantage.

- o Affordable housing along transit and access to opportunity. Is there a way to include increased access to opportunity via transit? Seems like one of the greatest opportunities to regain ridership will be to expand affordable multi-family housing closer to jobs and regional centers, which will reduce travel times and increase availability of high capacity transit to more people.

- **What issues and policy questions are you interested in exploring as we update our strategy** during this time of change and uncertainty?
  - o Focus on the best strategies to achieve mode shift to transit and how we double-down on those investments.

- **What opportunities do you see for the region to move forward should our analysis show we need to do more** to meet our VMT per capita reduction targets and climate goals?

  - E-bikes seem to be growing as a car replacement as their price and technology is improving. Is that adequately accounted for in this strategy? It is a small segment compared to transit mode shift but an important piece to reflect.

Washington County comments on TPAC 9/14/2022 Climate Smart Strategy presentation and memo dated 9/7/22

Washington County comments in italic

Do you have specific feedback on the assumptions identified in Table 1 of the staff memo:

- Are the key transportation assumptions underlying the region's Climate Smart Strategy realistic?

- Should certain assumptions be updated?

- Are there new or updated policies and additional carbon reduction strategies that are not currently included in Climate Smart Strategy that should be reflected in the updated strategy?

Yes, the assumptions should be updated.

Transit service funding and projects: *Consider assuming transit service increases with wage growth at least for the share tied to local employer and employee payroll tax revenue. Looking at past trends, consider growth in federal transit revenue as well. Assume HCT expansion per project list in 2023 RTP (hopefully include TV Hwy and SW Corridor, which were not in 2018) and other transit speed and reliability projects if they prove to provide realistic travel time savings. A tougher challenge will be to estimate transit service levels per increased cost/hour.*

Employer-based travel options and household based options*: Revisit this assumption with updated data on the share of employers offering incentives – I do not know where the 5.5% is based for employers or 1% the household-based is based on and evaluate how effective these incentives have been.*

Parking pricing and management*: Consider parking availability and management into this factor. Parking requirements have changed since Climate Smart was initiated. This should be updated data on pricing and availability as part of travel demand model.*

PAYD:- *drop unless more new programs are established (see Road User Charge below)*

Fleet and technology assumptions*: Assume a higher share of EV in the metro area – tied to the higher average income than statewide and greater share of EV purchases.*

What issues and policy questions are you interested in exploring as we update our strategy during this time of change and uncertainty?

Investment, policy and density. *Explore how past investments and policies are supporting increased density and reduced VMT/capita compared to w/out investments and policy. Some of this analysis may be required by CFEC but be open to different methods. Document what tools/incentives are most effective. Support increased density through transportation investments and other subsidies/tax credits for housing, commercial and employment development in centers, corridors, employment areas and equity focus areas. Be open to supporting development in new centers and corridors not previously identified in the original 2040 concept that support higher job and housing growth.*

Washington County comments on TPAC 9/14/2022 Climate Smart Strategy presentation and memo dated 9/7/22

Neighbor counties VMT. *Consider effect of increased VMT in our region due to increased commuting/traffic from adjacent counties and consider effect of improved transit and travel options to meet this small but growing share of the region's VMT.*

What opportunities do you see for the region to move forward should our analysis show we need to do more to meet our VMT per capita reduction targets and climate goals?

EV Charging- *Support increased EV charging and other policies that make it easier to shift to EV use.*

Broaden EV use. *Support schools, transit, trucks to take advantage of new truck and bus fuel reduction incentives at federal level with Inflation Reduction Act and at State level if available.*

Telecommute. *Revise assumptions in travel demand model to assume a higher work from home percentage and related VMT/capita changes. With a greater share of white collar jobs, the Portland region should be above statewide averages which can affect VMT and GHG in the region.*

Pricing/tolling/RUC and cost of driving overall. *Better understand cost elasticity of owning and operating a vehicle to reducing VMT and adjust policies to encourage higher EV use and other travel options.*

Road User Charge. *When implemented by the State, consider increased fees (over gas tax revenue levels) to support needed multimodal transportation investments with GHG benefits.*

Other comments or suggestions you would like to share?

The memo describes the differences and challenges between using the Eval and the results of the Regional Travel Demand Model to estimate GHG. Continue to track work at federal level and elsewhere, that improve tools for consistent GHG analysis across the country to develop a consistent method of assessing effectiveness. Having two different approaches to estimating GHG reductions could be an advantage in being able to estimate ranges of effectiveness or success for now.

Do not try to measure GHG impact on a project by project basis. Projects tend to be multi-factored – added turn lane capacity and sidewalks can improve auto times and make it easier to access transit, walk and bike for example. Look at the Transportation Plan as a whole at the 20-year time, not near term.

Evaluate policy strategies and their effectiveness on reducing GHG. VMT will be come less important of a measure as EV use increases.

Analysis of the effectiveness of the Climate Friendly Equitable Communities requirements would be helpful to help shape how to focus efforts in the Metro area and any revisions from statewide approach.

ODOT Region 1 and Climate Office comments on
9/13/22 TPAC Climate Smart Strategy Materials

Do you have specific feedback on the assumptions identified in Table 1 of the staff memo:
Are the key transportation assumptions underlying the region's Climate Smart Strategy realistic? Should certain assumptions be updated?

Are there new or updated policies and additional carbon reduction strategies that are not currently included in Climate Smart Strategy that should be reflected in the updated strategy?

ODOT Climate Office comments on Table 1:
- Several assumptions are based on "Allowed state actions and conditions at time of GHG target rule adoption". This may explain what appears to be $6.75 price, vehicle age, and other assumptions in the CSS (first) column. This should be noted. Some footnotes are missing.
- High levels of transit service is a key CSS assumption to meet the target, trends are pointing away from those assumptions.
- Key local policy actions are missing; transit vehicles & fuels, active transportation.
- One state-led value does not match STS Vision: Commercial Fleet Share 35% are trucks/SUVs and 65% are cars.
- Recommend adding other State-led actions, such as those related to laws on veh/fuels regulations, e.g. HD Trucks vehicle mix, Fuel and Electricity carbon intensities by vehicle group. These actions have made significant progress with the Advance Clean Trucks (ACT) & HB 2021 legislation on electricity carbon intensity.
- Note what year the RTP assumptions are for – 2035? 2040?
- Make sure to use/note correct year dollars for monetary units (looks like 2005$).

ODOT Region 1 Comments:
- The OTC's Strategic Action Plan includes increasing the rate of vehicle fleet electrification. The State is now actively investing to help kick-start that transition.
- The Climate-Friendly Equitable Communities rulemaking will both reduce parking and result in increased housing density in areas with good multi-modal transportation choices.
- HB 2001 provides for more infill housing in previously developed areas where there are more likely to be good transit and multi-modal choices than in green-field development.

What opportunities do you see for the region to move forward should our analysis show we need to do more to meet our VMT per capita reduction targets and climate goals?

The planned 2040 Refresh should provide an avenue with which to investigate land use changes that can be supported with fewer and shorter vehicular trips.

If you picnic at Blue Lake or take your kids to the Oregon Zoo, enjoy symphonies at the Schnitz or auto shows at the convention center, put out your trash or drive your car – we've already crossed paths.

So, hello. We're Metro – nice to meet you.

In a metropolitan area as big as Portland, we can do a lot of things better together. Join us to help the region prepare for a happy, healthy future.

Stay in touch with news, stories and things to do.
oregonmetro.gov/news

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Climate Smart Strategy: assessment of greenhouse gas reduction strategies

The Climate Smart Strategy identified a set of high- and medium-impact greenhouse gas reduction strategies for the region to meet its climate targets. As the region prepares to update the Climate Smart Strategy as part of the 2023 Regional Transportation Plan update, Metro staff revisited the research on these strategies and reviewed how they are currently being implemented in the region. The table below summarizes two important aspects of each strategy:

- Greenhouse gas (GHG) reduction potential: This describes the effectiveness of each strategy in reducing emissions that contribute to climate change. For the most part, the information in this column is consistent with the exhaustive assessment of potential strategies that was part of the development of the original Climate Smart Strategy. Metro staff have reviewed recent research on these strategies. This research is largely consistent with the original Climate Smart assessment, but staff updated the assessment in the table below where appropriate.
- Regional Transportation Plan (RTP) implementation potential: In order to meet targets, the region needs to not only focus on effective greenhouse gas reduction strategies, but also on strategies that can be implemented broadly throughout the Portland region. This column assesses the potential to implement (or, in the case of the many strategies that are already underway in the region, to implement more broadly) different strategies, based on outreach to partner agencies and a review of the status of regional programs that support Climate Smart.

Strategy	GHG reduction potential[1]	RTP implementation potential
Congestion pricing (including tolling, cordons, and road usage charges)	**High.** Pricing that is designed to manage demand is one of the most effective strategies for reducing GHG emissions from transportation. All types of congestion pricing can reduce GHG emissions, but the effectiveness depends on: • the cost of a driving trip • how many driving trips are priced • how prices are adjusted to reflect demand • how revenues are reinvested in transit and active transportation[2]	**High.** The region has committed to including pricing policies in the 2023 RTP update, and multiple agency partners have pricing-related work underway.

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[1] Unless otherwise noted, this assessment relies on the analysis of the impact of different GHG reduction strategies that was part of the development of the Climate Smart Strategy. Since state guidance clarifies that regional GHG reduction targets are equivalent to VMT reduction targets, some of the information in this column is based on assessments of the VMT impacts of different strategies.

[2] Metro Regional Congestion Pricing Study: https://www.oregonmetro.gov/regional-congestion-pricing-study. See table ES-1.

Strategy	GHG reduction potential[1]	RTP implementation potential
Parking management and pricing	**Variable.** As with congestion pricing, parking pricing can be very effective when it is designed to manage demand. However, managed parking (e.g., limiting available spaces, setting time limits) has less of an impact on GHG emissions than pricing does.[3] The impact of parking management pricing depends on the same factors listed above for congestion pricing.	**Medium.** Current local and regional plans show potential to significantly expand managed parking in the region and limited opportunities to expand parking pricing in inner Portland and at selected transit and employment centers.[4] Though CFEC requires local agencies manage parking in 2040 centers,[5] few local partners have clarified how they will implement this requirement.[6]
Pay-as-you-drive (PAYD) vehicle insurance	**High.** In theory, PAYD insurance works similarly to other forms of mileage-based pricing, like road usage charges.	**Low.** Insurance companies must expand and promote PAYD products to customers to implement this strategy. Usage of PAYD insurance in Oregon has not been increasing as envisioned by the State.[7]
Community design	**High.** People who live and work in compact, mixed-use communities typically drive less, and these communities also create opportunities to expand high-quality transit.	**Low.** The RTP implements the current 2040 Growth Concept by prioritizing transit and active transportation investments in designated centers, but it does not alter land uses to meet regional goals. Following the RTP, the region will be updating the Growth Concept, and will have the opportunity to design communities in a way that reduces GHG emissions and meets other regional goals.

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[3] ODOT, Mosaic assessment of Parking Demand Management and Pricing, https://www.oregon.gov/odot/Planning/Documents/Mosaic-Parking-Demand-Management-Pricing.pdf.

[4] 2018 Regional Transportation Plan, Figure 3.31, Areas assumed to have parking management in the region (2040). This map is based on then-current input from local agency partners.

[5] Through discussions with DLCD, Metro staff have clarified that designated 2040 Growth Centers will serve as Climate-friendly Communities for the purposes of CFEC implementation in the Portland region.

[6] Metro staff asked local agency partners about plans to increase implementation of parking strategies when updating the base year travel networks for the 2023 RTP update.

[7] ODOT, STS Implementation Monitoring Report, p. 26. https://www.oregon.gov/odot/Planning/Documents/STS-2018-Monitoring-Report.pdf.

Strategy	GHG reduction potential[1]	RTP implementation potential
Increased (expanded, higher-frequency, speedier, more reliable) **transit service**	**Medium-high.** Transit is the most useful alternative to driving for the many longer-distance trips that people in the region take. However, recent transit investments in the region have not led to the same ridership increases as in the past.[8]	**Medium-high.** The RTP dedicates significant resources to increasing frequent transit service, and Metro is working to identify long-term investments through the High Capacity Transit Strategy update. However, the region has not been expanding transit at the rate envisioned in the RTP,[9] and operator shortages may make it challenging to expand transit service in the short term.
New active transportation connections	**Medium.** Biking and walking are often useful options for shorter trips.	**High.** The RTP highlights opportunities to complete gaps in the regional bike/ped networks, and funding to do so is available through the Regional Flexible Funds Allocation and other processes.
Travel information and incentives	**Medium.** Travel information and incentives can have a significant influence on travel choices for people who have access to good transit service and bicycle/pedestrian facilities. However, the uneven availability of these options and the fact that driving continues to be relatively affordable and convenient limits the impact of information and incentives alone.	**Medium**. The Regional Travel Options program[10] funds projects to deliver travel information and incentives throughout the region. The potential to grow these strategies depends upon available funding, partner capacity, and the availability of complimentary travel options. Travel information and incentives will be most effective if combined with congestion pricing, increased transit service, and other high-impact strategies.
System management and operations	**Medium-low**. System management can help transit and private vehicles operate more efficiently and improve safety for bicyclists and pedestrians. Making transit faster and more reliable can reduce VMT and GHG emissions, but other aspects of system management do not have a quantifiable impact on VMT, and therefore do not count toward regional GHG targets.	**Medium**. The Regional Transportation System Management and Operations program[11] funds the implementation of this strategy across the region. Opportunities to expand the transit-related aspects of this strategy that contribute to regional GHG targets depend on creating new enhanced or high-frequency transit. Implementing pricing would also create significant new opportunities to implement climate smart system management, such as adjusting prices based on demand or streamlining the operations of the pricing system.

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[8] See TriMet Service and Ridership Statistics, https://trimet.org/about/pdf/trimetridership.pdf. Regional transit ridership (TriMet carries roughly 90 percent of transit trips in the region) rose steadily between 2002 and 2012, and then fell steadily through 2019, even though the region added more transit service during this same time frame. This is consistent with national trends; ridership has been falling across the U.S. since 2014, even though service increased over that same time frame. National trends can be explored at https://insights.transitcenter.org/.

[9] See TriMet Service and Ridership Statistics, https://trimet.org/about/pdf/trimetridership.pdf. Between 2010 and 2019, transit service hours grew by 4%, which is roughly half the rate that was envisioned in the RTP.

[10] https://www.oregonmetro.gov/tools-partners/grants-and-resources/regional-travel-options-program

[11] https://www.oregonmetro.gov/public-projects/regional-tsmo-strategy

Strategy	GHG reduction potential[1]	RTP implementation potential
Adding road capacity	**Low**. In some cases, strategically adding new lanes to a road can produce short-term GHG reductions because it allows vehicles operate more efficiently until the new capacity is consumed. However, this approach has no impact on VMT (in fact, it may increase VMT in the long term by inducing additional demand for driving[12]), and therefore does not count toward regional GHG targets.	**Low.** State and regional policies require agencies to exhaust other approaches to managing congestion and safety issues before increasing capacity.[13]

[12] For a summary of the research behind induced demand, see: https://www.vtpi.org/gentraf.pdf.
[13] 2018 RTP Motor Vehicle Network Policy 12, Oregon Highway Plan Policy 1G.

Climate and transportation expert panel summary

On June 22, 2022 Metro hosted a panel to learn from national experts about the best practices and tools being used nationally to assess and monitor climate impacts of transportation.

The attached materials capture the panel discussion and provide an easy guide for those interested in learning what was discussed. A full video recording of the panel discussion is available: https://vimeo.com/manage/videos/723107656/16bc305fea

1. Agenda

2. A discussion guide with timestamps from the video recording indicating when specific questions were asked of the panelists.

3. A summary of the panel discussion

4. Background materials:

   o Background on Climate Action in Oregon and the Greater Portland Region's Climate Smart Strategy

   o Background on Use of Vision Eval and Key Transportation Assumptions for Climate Smart Strategy Proxy

   o Metro Modeling Overview

Agenda

Metro
600 NE Grand Ave.
Portland, OR 97232-2736

Meeting: Climate and transportation expert panel

Date: June 22, 2022

Time: 7:30 am – 10:00 a.m.

Place: Zoom webinar. Register:
             https://us02web.zoom.us/webinar/register/WN_BYx9mF6gTWymXUr1Q-vqdA

Objectives:
- Learn from national experts about the best practices and tools they are using to assess and monitor climate impacts at the system, corridor and project levels, including the known strengths and limitations of the tools being used to inform VMT and GHG reduction strategies and monitor progress toward adopted VMT and GHG reduction targets.
- Ask for feedback and gain insight on modeling and monitoring practices currently being used and considered by Metro, including the opportunities to improve Metro's current approach.
- Build a shared understanding of what the 2023 RTP is expected to demonstrate in terms of VMT and GHG performance in response to Executive Order 20-04 and the statewide Climate-Friendly and Equitable Communities rulemaking.
- Set the foundation for a collaborative regional approach to reducing transportation's impact on climate change by convening agency and community partners to inform how Metro works with state, regional and local partners to meet adopted VMT and GHG reduction targets.

Panelists
- Kyung-Hwa Kim, Performance Analysis and Monitoring Manager at the Atlanta Regional Commission
- Eric Sundquist, Sustainability Advisor; SB 743 Program Manager, California Department of Transportation
- Shoshana M. Lew, Executive Director, Colorado Department of Transportation
- Rebecca White, Director, Division of Transportation Development, Colorado Department of Transportation
- Susan Handy, Professor of Environmental Science and Policy and Director of the National Center for Sustainable Transportation at the University of California, Davis
- Dan F.B. Flynn, Data Scientist, U.S. Department of Transportation Volpe Center

AGENDA

7:30 – 8:10 a.m.   **Welcome and introductions**
- Welcome (Margi Bradway, Moderator)
- Opening remarks (Metro Councilor Gonzalez)
- Presentation: Overview of state and regional climate policies and strategies and Metro's modeling and monitoring toolbox (Metro staff)
- Panelist introductions (Panelists)

8:10 – 9:05 a.m.   **Expert panel discussion**

The moderator will facilitate a discussion with the expert Panel focused on using climate analysis tools for strategy development, evaluation and monitoring and assumptions for the future of electric vehicle technology.

9:05 – 9:10 a.m.   **Break**

9:10 – 9:40 a.m.   **Facilitated Q&A with Metro Council and JPACT members**

Metro Council and JPACT members will be promoted to "panelists" to ask the panelists questions.

9:40 – 10 a.m.   **Expert Panel Final Thoughts & Closing**

Climate and transportation expert panel discussion guide

Date: June 22, 2022
Time: 7:30 – 10:00 a.m. PT
Place: Zoom webinar

Webinar link:
https://vimeo.com/manage/videos/723107656/16bc305fea
Numbers below indicate the time stamp from the webinar.

Panelists and presenters:
Director Shoshana Lew, Executive Director, Colorado Department of Transportation
Director Rebecca White, Division of Transportation Development Director, Colorado Department of Transportation
Erik Sabina, Colorado Department of Transportation
Eric Sundquist, Sustainability Advisor; SB 743 Program Manager, California Department of Transportation
Susan Handy, Professor of Environmental Science and Policy and Director of the National Center for Sustainable Transportation at the University of California Davis
Kyung-Hwa Kim, Performance Analysis and Monitoring Manager at the Atlanta Regional Commission
Dan F.B. Flynn, Data Scientist, U.S. Department of Transportation Volpe Center

Metro Council and JPACT members:
Councilor Juan Garcia Gonzalez
Councilor Christine Lewis
Councilor Shirley Craddick
Councilor Gerritt Rosenthal
Mayor Steve Calloway, City of Hillsboro
Councilor Kathy Hyzy, City of Milwaukie

Presenters and moderator:
Thaya Patton, Senior Researcher and Lead Climate Modeler
Kim Ellis, Principal Transportation Planner, Metro
Margi Bradway, Deputy Director, Planning, Research & Development, Metro; moderator

Expert panel discussion
Margi Bradway, Metro, facilitated a discussion with the panelists. The questions that were asked of panelists answered are noted below.

Timestamp 43.00 What are your processes for conducting the EMTR analysis? What are the tools you are using, and how are they accounting for different factors?
Timestamp 49.00 How does California measure GHG or VMT?
Timestamp 55.20 How does what California is doing contrast with the Colorado approach?
Timestamp 58.28 How does each model help with decision-making?

Timestamp 1.02.23 What are Atlanta's processes and tools and how do they help with decision-making?

Timestamp 1.12.21 How do fleet assumptions fit into analysis at region, state or project level? Where do fuels fit, or don't fit into induced demand analysis? In the study of induced demand, are fleet assumptions held solid or is focus solely on the VMT?

Timestamp 1:18:25 Do MPOs use different approaches and assumptions in modeling related to GHG emissions?

Timestamp 1.23.26 How do you monitor progress?

Metro Council/JPACT discussion

Timestamp 1.36.22 Councilor Hyzy said there is tension around induced demand – what is the best response? What does modelling show that induced demand will do in terms of addressing climate issues and reducing GHGs? How do we, as a region, most effectively think about it?

Timestamp 1.46.24 Margi asked Colorado panelists if they are taking into account induced demand.

Timestamp 1.49.00 Councilor Lewis asked about the effectiveness of modeling GHG at the project level. Are we diverting GHG emissions from a highway to a neighborhood street?

Timestamp 1.54.02 Councilor Lewis asked about getting a level of granularity in a project, or is it only possible once it has gone through NEPA?

Timestamp 1.57.10 Councilor Rosenthal asked if models have been used to identify the impacts of the increase of gas prices. How much GHG reduction could we get if gas prices continue to rise to European rates? Will the increase in gas prices be a significant factor in decreasing GHG?

Timestamp 2.04.57 Mayor Steve Calloway asked at what point is there benefit to adding an auxiliary lane or widening, to increase efficiency and decrease GHG?

Timestamp 2.11.00 Councilor Gonzalez asked if climate modeling is at point as a performance tool where it has done enough to change/alter projects across the country, or is it too new to really model for, so projects that were going to happen, happen anyway? As climate modeling is advancing across the country, how is it impacting, improving or stopping projects?

Summary Notes: Climate and transportation expert panel

Date: June 22, 2022
Time: 7:30 – 10:00 a.m. PT
Place: Zoom webinar

Webinar link:
https://vimeo.com/manage/videos/723107656/16bc305fea
Numbers below indicate the time stamp from the webinar.

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Presenters and moderator:
Thaya Patton, Senior Researcher and Lead Climate Modeler
Kim Ellis, Principal Transportation Planner, Metro
Margi Bradway, Deputy Director, Planning, Research & Development, Metro; moderator

Welcome and Introductions

00.00: Metro Planning, Development and Research Deputy Director Margi Bradway welcomed panelists, guests and Councilor Juan Garcia Gonzalez. She said Metro is working on modeling and policy development for the 2023 Regional Transportation Plan. She began the event by referencing Oregon's state goals on climate and Governor Kate Brown's executive order directing agencies to reduce climate pollution even further. She reviewed the agenda and ground rules.

02.20: Councilor Gonzalez gave opening remarks, noting that over 110 people (this later increased to 156) are in the audience and expressing gratitude to the panelists. He noted that in Oregon, transportation is one of the largest contributors to greenhouse gas emissions. The Regional

Transportation Plan (RTP) outlines all transportation planning over the next 25 years. Metro's climate modeling work is a cornerstone, and the Metro region has a history of collaboration.

Margi invited the panelists to introduce themselves and give a short overview of their work.

05.24: Director Shoshana Lew, Executive Director, Colorado Department of Transportation, began with a history of their policy rulemaking as a requirement. Senate Bill 260 focused on combining traditional investment in roads and bridges while broadening the way they think about it. The bill specifically directs them to think about greenhouse gas emissions and vehicle miles travelled. She stressed the importance of having a big tent to include everyone in the conversation. They held 10 public meetings plus many small meetings, including technical meetings that included modelers. She recommended having regulators be very aware of policy making. They tried to create a rule - conformity policy framework for greenhouse gases related to infrastructure. There have a couple of opportunities to hit the target, and if that doesn't work, there are opportunities for mitigation. It includes all Colorado MPOs and the state. She talked about mitigations. All projects have built into them some form of VRT. Director Rebecca White and Erik Sabina are also in attendance.

14.24: Eric Sundquist, Sustainability Advisor; SB 743 Program Manager, California Department of Transportation said he focuses on implementing legislation as a result of Senate Bill 743,which forces them to look at induced demand in their projects. He showed a slide on induced demand, saying it is unintuitive. He listed three motivations. 1. It is bad for congestion. Studies that review road widenings show they become just as congested as before widening. 2. The impacts - environmental/emissions, safety, noise, equity 3. Widening roads puts a huge burden on maintaining and operating the system. Like other impacts, traffic congestion is measured under California Environmental Quality Act (CEQA). They have to assess project impact, then make changes to the project scope or provide mitigation. They try to avoid the latter as it is costly. Consider a benefit cost ratio.

18.47: Susan Handy, Professor of Environmental Science and Policy and Director of the National Center for Sustainable Transportation at the University of California, Davis works with the state and CalTran to implement its AB 32 policy which puts in place reduction of GHG and also a Senate Bill to reduce Vehicle Miles Traveled (VMT) in urban areas. Strategies include investments in transit, land use policies and bike/pedestrian policies. She mentioned their induced travel calculator and the benefits of active travel projects. She said key themes are to look at empirical evidence and extract from that. Most of work is project level.

21.44: Kyung-Hwa Kim, Performance Analysis and Monitoring Manager at the Atlanta Regional Commission talked about the role of planner and modeler. She uses facts and performance measures. Modelers can provide date to planners explaining if a project is achievable. Modeling describes how to get there but one model will not answer all questions and multiple scales are needed.

25.30: Dan F.B. Flynn, Data Scientist, U.S. Department of Transportation Volpe Center, said he supports the VisionEval tool which evaluates the impacts of potential policies and looks at performance metrics such as GHG from transportation. It can be used at a higher strategic level.

27.00: Margi introduced Metro's Kim Ellis, Principal Transportation Planner and Thaya Patton, Senior Researcher and Lead Climate Modeler. Kim presented on Metro's Climate Smart Strategy.

34.50: Thaya Patton presented on Metro's Climate Analysis Toolbox.

Expert Panel Discussion

43.00: Margi opened the discussion with two questions:
What are your processes for conducting the EMTR analysis?
What are the tools you are using, and how are they accounting for different factors?

Daniel Flynn said he develops and promotes the modeling tools at the Volpe Center, which is part of the US Department of Transportation. Volpe Center is a fee for service in-house consultancy that works with the Federal Highway Administration Office of Planning that developed the GreenSet model, which then was developed into VisionEval. He supports users of the model. It is in between more detailed models and has components that interact with land use at regional levels and has the features of a sketch model, for example determining the range of uncertainty given policy choices. It is good at estimating VMT at the regional level and at a more granular level, including within census tracks. It is not a project level analysis tool. He showed a slide illustrating VisionEval.

49.00: Margi turned to Eric Sundquist, asking how they measure GHG or VMT. He explained the GHG measurement comes out of the conformity setting. With VMT, they use other tools such as …He talked about VMT and where it departs from GHG. If demand models were great, it is laborious, project by project and for some, impossible. There are no transportation land use models. If area was big enough, he said you would still have to create a new no-build land use area. Doing project by project is very laborious. They have opted for a more targeted assessment that uses models to a lesser extent.

NCSD calculations take a big step up. More lane miles equals more VMT. It is straightforward, but does not cover everything, for example, a new interchange. Assessment of VMT is moving forward. The NCSD calculator allows interpolation of results with the demand model. It does not work with looking at transit or VMT reduction and mitigations. GHG goes through a conformity type process, though MOVES. They are looking at the fleet mix and emissions per mile from different vehicles. An example of a conflict: a road diet can look bad in GHG or conformity because the cars are going slower, while it looks great in VMT because cars are going slower or idling. Also, the BC model does not have feedback loop in terms of induced demand.

Margi commented that California has found a way to do both; use a VMT calculator and travel demand model.

55.20: Margi asked Colorado panelists to contrast what California is doing with the Colorado approach.

Erik Sabina said he heads the travel demand forecasting group at Colorado DOT and led the development of the activity based model project. He said that a couple of years ago they had the only fully desegregate activity based models at the state level in the U.S. After that, his focus switched to GHG. He agreed with Eric Sundquist, saying the activity based machines took a lot of crank turning to get an answer out and that small projects cannot be seen in that type of model. They worked with the FTA and now make use of two models: a large desegregate model, and EERPAT. They also mine studies around the country for elasticity and reasonable relationships around input and output.

58.28: Margi said Colorado has done great work on GHG goals. She asked the Colorado panelists how each model helps with decision-making.

Erik Sabina said when GHG rules were created, they developed a set of three scenarios, using the terms aggressive but feasible, using a combination of EERPAT and the statewide model. They came up with low, medium and high estimates with groups of measures that were attached to each. This way people could see what they did and how it related to each outcome.

Rebecca added that they used the model tools to develop the GHG standard. Colorado is now implementing the standard and using the tools to determine if they are meeting it. They use the travel model to look at their ten year long range plan. If they cannot meet the goals with the mix of projects, they will look at mitigation tools. They will use EERPAT. They have a spreadsheet of expected GHG reductions when looking at different options. This is based on a lot of literature review. To reiterate, it is an art and a science. We are dealing with the limitation of MOVES and complete streets. When you run a complete street through MOVES, it shows a worse outcome, yet complete streets meet our goals. Should we move away from MOVES and adopt more of a spreadsheet model? Colorado is right in the middle of this process now.

Margi said this is timely given the federal infrastructure bill and the focus on complete streets.

1.02.23: Margi invited Kyung-Hwa Kim to talk about their processes and tools and how they help with decision-making in the Atlanta region. Kyung-Hwa shared slides describing models and modelling. She made several points including that there are many factors that impact travel demand including economic, but what is measured are accessibility and mobility. Travel modelling cannot reflect the full reality. She reviewed MPO modeling history. She said we need separate models to understand. She said they use the activity based model and also the three-based model for the purpose of analyzing. She concluded saying TIP project evaluation and prioritization are important.

1.12.21: Margi noted that no one has talked about how fleet assumptions fit into their analysis, at region, state or project level. She asked Professor Handy to weigh in on where fuels fit, or don't fit into the induced demand analysis.

Susan Handy said the California Air Resources Board (CARB), in its efforts to meet targets to reduce GHG, concluded that even a very aggressive effort to convert to electric vehicles is not enough; it is also necessary to reduce vehicle miles traveled. They are coming out with a new scoping plan. Regardless of what happens to the fleet, we need to reduce how much people are driving. There is a life cycle of emissions attributed to driving. It is not just about what comes out of the tailpipe; it is also about manufacturing the car and tires, building the roads. 2022 Scoping Plan Documents | California Air Resources Board

Margi asked, in their study of induced demand, do they hold fleet assumptions solid or do they focus solely on the VMT aspect?

Susan responded that she uses the term induced travel. Aside from inducing changes in land use or promoting growth in a region, shifts in travel will occur when there is change in the capacity of the highway system. They created the estimator for change in VMT and for change in highway capacity and it doesn't look at fleet mix.

1.16.18: Margi asked Erik Sabina about Colorado's inputs on fleet. He said that Colorado's energy office developed a target of 940,000 light duty EVs on the road by the year 2030, compared to about 5 million total vehicles on the road. It has been challenging with stakeholders to communicate that this number is more impactful now than it will be in the future. For example by 2050, they hope that 100% of light duty vehicles will be EV. They use these numbers in the background for other analysis.

1:18.25:   Margi asked Daniel if MPOs use different approaches and assumptions in modeling related to GHG emissions. He replied that at Metro, they asked if they could isolate the assumptions about EV growth in households versus all other vehicles on the road. New York State has used the VisionEval model to look at impacts on the EV market and growth of GHG emissions.

1.20.35: Eric Sundquist said they are in VMT and less in fleet mix. We will not know the exact answer. Various uptakes of EVs usually leave us behind, rather than ahead of whatever the scenario is. He suggested estimating conservatively and go from there. On SB 375, they are not meeting their goals and Portland is not meeting their goals.

 1.22.01: Kyung-Hwa said it is complicated. It is related to economics, the demand and consumption. A crucial question is, what is our uncertainty? Narrow the uncertainty through assumptions.

1.23.26: Margi asked if anyone was monitoring progress. How do you monitor progress? Rebecca replied that it is not as simple as putting up an air quality monitor. They have committed to doing annual reports and every three years, a comprehensive look. It is challenging to detect how much change is occurring when looking at issues like land use. Margi asked, is progress based on specific strategies to reduce GHG or is it actual numbers compared to planning goals? Rebecca replied they would generate a CO2 equivalent number for the light duty fleet and compare that to the goal. The rule for 2030 would reduce 1.5 million metric tons.

1.25.38: Eric Sundquist said they monitor at a gross level and that they are going in the wrong direction. They've legislatively required analysis. The SB 150 report, AB 285 talk about why they are getting bad results. There is the GHG, VMT, what are is being built and why, where is the money going, what are the financial/policy/legal/institutional/educational constraints that are pushing in the wrong direction? He mentioned there are two recent reports that could be helpful. Margi said Molly Cooney Mesker will send out these reports. Reports:
- California Transportation Assessment Report - Pursuant to AB 285
- DRAFT 2022 PROGRESS REPORT (ca.gov)

1.28.18 – 1.36.21: **Break**

Facilitated Q&A between panelist experts and Metro Council and JPACT members

1.36.22: Margi invited Metro Council and JPACT members to ask questions of the panel.
Councilor Hyzy thanked the panelists and noted how useful this context and modeling information is for her as an elected official. She said she wants to do the climate work right and well and not in a way that feels imposed, but that invites everyone in. There is tension around induced demand – what is the best response? What does modelling show that induced demand will do in terms of addressing climate issues and reducing GHGs? How do we, as a region, most effectively think about it? There are multiple mega projects coming up. She said she advocates for true solutions for problems, not the usual, not necessarily comprehensive solutions.

Susan said there are great resources that explain how induced travel works, including her lecture through the National Center for Transportation and videos on YouTube. She said it is a basic economic principle. If you expand highways, you reduce the price of driving. If you reduce the price, people will do or consume more of it. With driving, decisions revolve around destinations, mode and over the longer term, live/work locations and what kind of land development happens where. All impact VMT. Travel demand models do not do a good job of measuring these factors, hence the need for the induced travel calculator. If the goal is to reduce VMT, we should not expand the capacity of the highway or roadway system. All of the evidence shows this. We are overselling to the public that highway expansion is a solution to congestion. It may reduce congestion in the short run, but the highway capacity will fill up again.

1.43.50: Eric Sundquist added that there is a vicious cycle effect - as there is more auto-centric development, it undercuts work on other modes: transit, walking, biking. There is not enough money for transit to serve low density development and employment sites that occur alongside highways. Auto-centric development causes a mode shift away from transit, walking and biking.

1.45.11: Kyung-Hwa noted uncertainties include not knowing the future location of housing and types of land use. Autonomous vehicles are coming and people are teleworking. Despite people moving to the suburbs in Atlanta, there is still congestion. There are no good predictions, but scenario testing provides a glimpse of what might or might not happen.

1.46.24: Margi asked Colorado panelists if they are taking into account induced demand.
Erik Sabina said the virtue of their large activity-based model list is that it covers 6 elements of induced demand. The activity-based models covers 5 of them; they illuminate inter-relationships and effects. If driving is so dominant, it pushes other modes to the sidelines. A difficulty remains with the land use effect, which is very complex. Land use is one of the six elements. They do scenarios that include land use to illustrate a range of possibilities to policy makers.

1.49.00: Councilor Lewis asked about the effectiveness of modeling GHG at the project level. She mentioned diversionary impact – shifts of modality but also shifts of corridor. Are we diverting GHG emissions from a highway to a neighborhood street?

Kyung-Hwa said the Atlanta Regional Commission has a very detailed way of understanding and modeling the pollutants at a link level, using a tool consistent with the travel demand model to understand the impact the diversion will create. They also have a project level model, a simple spreadsheet to demonstrate air quality impact. She said sometimes they need to do a comprehensive model to get a result on the network fatalities but some can be dealt with at a smaller, project scale.

Eric Sundquist said with GHG it doesn't where it's emitted, but particulate emissions do matter. For example, a highway widening diverts traffic from a neighborhood, reducing safety and other impacts but raising GHG. Under the statute, they need to weigh impacts and mitigate. Models are really about distributing traffic on the network. To the extent that the model is granular enough to show neighborhood effects, they would look at that as well as countervailing effects. They can look at different project alternatives, scope the project, and decide if it can go forward or how to mitigate.

1.54.02: Councilor Lewis asked about getting a level of granularity in a project, or is it only possible once it has gone through NEPA? Eric Sundquist replied that it is possible to do it sooner but because NEPA kicks in after the alternatives have been selected, it is kind of backwards. They are trying to switch the order by redoing purpose and need statements to encompass the environmental outcomes.

Margi noted that in California, the California Environmental Quality Act (CEQA) is the state equivalent of NEPA.

Erik Sabina added that the tools are available to do project level analysis. It takes a multi set of tools including the larger models we've been discussing. Larger level models will measure the effects of diversion. Simulation models can look at things like road design elements.

1.57.10: Councilor Rosenthal said the price of gas is key factor in the choice to drive, yet there is also pent up demand due to the pandemic. Have models been used to identify the impacts of the increase of gas prices? How much GHG reduction could we get going forward if gas prices continue to rise to European rates? Will the increase in gas prices be a significant factor in decreasing GHG?

Kyung-Hwa replied that we can estimate people's propensity of how they will react to gas price increases before the prices go up. We observe their behaviors through household surveys or transit board surveys; they provide historical information and help us estimate their propensity for choice of travel mode and time of travel. The model will not predict correctly on this question, but if we change sensitivity to high prices, the result will change. No one knows if gas prices will stay up and if this will be a significant factor in decreasing GHGs.

Eric Sundquist added that this question is more along the lines what Susan shared on induced travel and short and long term elasticities. There has been research on travel outcomes based on gas prices. This can be added to the model, but it is a lot of work leading to a false outcomes. You might look at doing something literature or broad based.

Susan added that there is a lot of research that indicates that elasticity is smaller than you would think; people don't change their behaviors and often, because many don't have a choice. They have to drive so they adapt to the higher price. Research has been done on the range of price changes that have occurred in the American reality. We don't know what the impact of extreme changes will be.

2.04.00: Margi mentioned that Metro completed a congestion pricing study using scenarios which compared tolling to VMT tax to other tools.

2.04.57: Mayor Steve Calloway said we have hours of congestion that creates GHG. At what point is there benefit to adding an auxiliary lane or widening, to increase efficiency and decrease GHG?

Kyung-Hwa asked if this would be more an engineering level analysis, a micro-simulation.

Margi said that you could run into a conflict looking at the travel demand model versus NEPA analysis, which uses a more granular model. How do you reconcile these?

Susan said there is a tradeoff between traffic flow and the induced travel. Travel speed will increase immediately after construction, but do we account for the extra congestion and emissions caused by construction? Traffic flow will speed up but this will induce additional driving. There is a need to take into account both, but there is not a good net assessment of benefits.

Rebecca said she appreciated the question. Colorado is a rapidly growing state with a lot of people sitting in traffic. She said it depends on the corridor. They are working on lane balancing, where two lanes increase to three then drop back to two lanes. In other corridors, they widen the highway and the traffic levels initially improve, then come back to congested levels five years later. For this reason, in the metro areas they look at managed lanes or improving transit.

Margi recalled that Director Shoshana Lew, in her introduction, talked about bus rapid transit as a mitigation that is used by Colorado DOT.

2.11.00: Councilor Gonzalez said projects and mega projects take a life of their own because of legislative mandate or the DOT. Are we at a point where climate modeling as a performance tool has done enough to change/alter projects across the country, or is it too new to really model for, so projects that were going to happen, happen anyway? As climate modeling is advancing across the country, how is it impacting, improving or stopping projects?

Kyung-Hwa said that at the Regional Commission they adopted a regional evaluation performance measure that includes GHG. For every project, they look for a quantified GHG benefit. It is hard to move the needle but they try to account for or understand the impact of large and small projects.

Eric Sundquist added that the tools are there but that this group is the outlier. Most of country is not doing this, so there are no outcomes but where it is being done, there are some good outcomes. There is increasing counterweight to institutional pressure to widen highways. There are project examples. It is not for lack of technical tools; it is lack of political will.

2.15.54: Margi asked panelists for lessons learned, advice for Metro or takeaways.

Dan said that given the interest in induced demand, project level analysis and work at the regional level, there is a need more than one tool.

Erik Sabina said using better modeling tools will pay dividends. For policy, aim for clear discussions to help know what the limitations are. Do not be paralyzed by lack of perfect analysis. You can make a lot of progress with less than 100% perfect numbers. Rebecca added that they took the leap and are seeing results. Keep the tent broad and the stakeholder group diverse. They had a lot of people who were upset, they took a lot of time talking to them, and they have made progress as a state.

Eric Sundquist reiterated that a lack of precision exists in all older tools. Given the uncertainties and lack of precision, assume that any highway widening will be eaten up by new demand in 5-10 years with a net increase in VMT and GHG, plus bring back all congestion and include impacts on adjacent neighborhoods. Have people who advocate for capacity improvements tell you why it is not true. Have them prove; be more skeptical.

Susan said we do modeling for statutory requirements and to make decisions but the modeling tools are imperfect and have limitations. There has been much false precision historically. They don't tell us what to do. We should be deciding what kind of future we want and work towards that future.

Kyung-Hwa wrapped up, saying we are all facing the same challenges. There is a need to work together and not re-invent the wheel. Go forward to the future we want, knowing modeling cannot solve all issues. When we work together we make a better region and society.

Margi thanked the panel for their time and sharing of resources, and thanked the audience.

2023 Regional Transportation Plan Update
Background on Climate Action in Oregon and the Greater Portland Region's Climate Smart Strategy

Prepared for members of the Transportation and Climate Expert Panel

Introduction

Climate change is the defining global challenge of the 21st century. And as the recent increase in climate-induced wildfires and extreme weather events has demonstrated, it is likely to have significant impacts on the Portland region.

The transportation sector is the largest contributor to greenhouse gas emissions in Oregon.[1] It is therefore a key focus of the greenhouse gas reduction efforts statewide and in the greater Portland region. Metro and the Oregon Department of Transportation (ODOT) each have a history of climate planning and an established "carbon reduction strategy" to reduce greenhouse gas (GHG) emissions from the transportation sector.

In 2007, the Oregon Legislature first set statewide climate change goals to reduce emissions by at least 10 percent below 1990 levels by 2020 and at least 75 percent below 1990 levels by 2050.[2] The goals apply to all emissions sectors – energy production, buildings, solid waste and transportation. More recently, Executive Order 20-04 set new greenhouse gas emissions reduction goals that call for the State of Oregon to reduce its GHG emissions at least 45 percent below 1990 emissions levels by 2035 and at least 80 percent below 1990 levels by 2050.[3] These updated goals are consistent with the reductions that climate scientists now believe are necessary to avoid catastrophic climate change impacts.

In 2009, the Oregon Legislature enacted HB 2001 directing Metro to develop and adopt a climate plan to reduce GHG emissions from light duty vehicles. The Legislature further directed the Land Conservation and Development Commission (LCDC) to adopt GHG emissions reduction targets for light duty vehicles for all of Oregon's metropolitan areas, although the Portland region was the only region with a mandated GHG reduction target. In 2010, the Oregon Legislature directed the ODOT to work with Metro and other metropolitan planning organizations, other state agencies and local governments to adopt a statewide transportation strategy on GHG emissions aimed at achieving the goals adopted by the Legislature in 2007.

In 2014, the Joint Policy Advisory Committee on Transportation (JPACT) and the Metro Council adopted the Climate Smart Strategy[4] with broad regional support from community, business and elected leaders. Approved by LCDC in 2015, the strategy was based on extensive stakeholder and public input, scenario planning and analysis. As part of the process, Metro conducted detailed modeling and analysis of various greenhouse gas scenarios and identified the types of transportation-related mitigation strategies that would have the greatest potential for reducing greenhouse gas emissions in the long term. This informed the Climate Smart Strategy that was ultimately adopted and continues to guide the region's response to the climate crisis today.

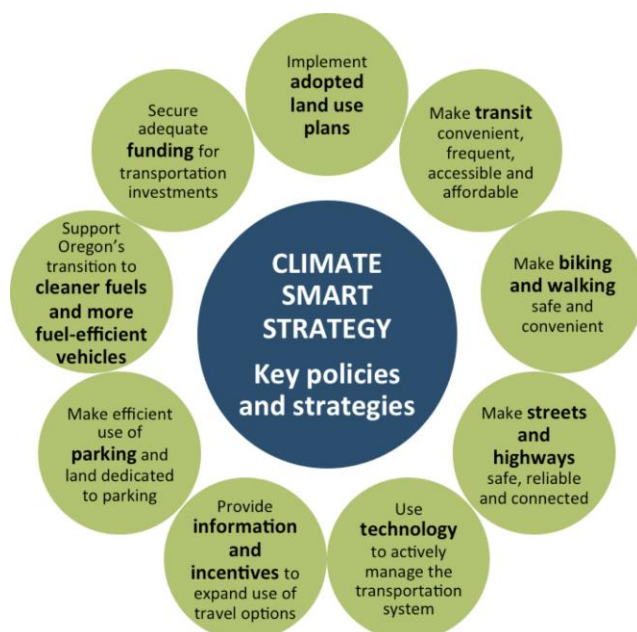[1] https://www.oregon.gov/deq/aq/programs/Pages/GHG-Oregon-Emissions.aspx
[2] House Bill 3543, enacted on August 7, 2007.
https://www.oregonlegislature.gov/bills_laws/lawsstatutes/2007orLaw0907.html
[3] https://www.oregon.gov/gov/Documents/executive_orders/eo_20-04.pdf
[4] https://www.oregonmetro.gov/climate-smart-strategy

Adopted in 2014, Metro's Climate Smart Strategy is grounded in Metro's land use goals and adopted 2040 Growth Plan. The Regional Transportation Plan is a key tool for the greater Portland region to implement the adopted Climate Smart Strategy and achieve the GHG reduction targets adopted for the region by the Land Conservation and Development Commission.

The strategy outlined how the Portland metropolitan region will reach targets to reduce transportation-related greenhouse gas emissions from light duty vehicles. The regional Climate Smart Strategy includes a set of policies, strategies and near-term actions to guide how the region moves forward to integrate reducing greenhouse gas emissions with ongoing efforts to create the future we want for our region. It is grounded in Metro's land use goals and adopted 2040 Growth Plan and implemented through the Regional Transportation Plan.

The Climate Smart Strategy includes a wide-range of strategies for reducing GHG emissions from light duty vehicles, many of which are not funded or are underfunded. The Climate Smart Strategy was updated in 2018 as part of the Regional Transportation Plan update and will be updated again in 2023 to ensure ongoing compliance with Oregon's GHG emissions reduction targets.

Targets for the year 2035 were first set by the LCDC for each of Oregon's metropolitan areas in 2011. LCDC set additional targets for each metropolitan area through the year 2050 in 2017, and recently adopted temporary rules to support achievement of these targets through the statewide Climate Friendly and Equitable Communities (CFEC) rulemaking. The targets adopted for the Portland region are to reduce greenhouse gas emissions from light vehicle travel (from 2005 levels) as follows:

- A 20 percent reduction for the year 2035
- A 25 percent reduction for the year 2040
- A 35 percent reduction for the year 2050
- Targets for the years 2041-2049 steadily increase from 26 to 34 percent in order to maintain progress toward the 2050 target.[5]

These targets reflect additional greenhouse gas emissions reductions needed beyond what was expected to be achieved through State-level policies and actions identified in the Statewide Transportation Strategy (STS) that aim to advance Oregon's transition to cleaner, low-carbon fuels and zero and low-carbon emissions vehicles. At the state level, the Oregon Transportation Commission formally adopted the STS into the Oregon Transportation Plan in 2018. The STS resulted from a state-level scenario planning effort that examined all aspects of the transportation system, including the movement of people and goods, and identified a combination of strategies to GHG emissions. The STS identified a variety of effective emissions reduction strategies at the statewide level in transportation systems, changes in vehicle and fuel technologies, and compact urban land use patterns served by transit, walking and biking connections in the state's eight metropolitan areas.

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[5] Oregon Department of Land Conservation and Development, Climate-Friendly and Equitable Communities Proposed Amendments to OAR 660-044 (Division 44), May 5, 2022, p. 6. https://www.oregon.gov/lcd/Commission/Documents/2022-05_Item_3_CFEC_Attachment_E_Draft-Rules-for-Division-44.pdf

GHG Forecasting and Monitoring

Since 2010, ODOT and Metro have been developing, testing, and refining tools to measure and forecast transportation-related GHG emissions. Formally called GreenSTEP and Metropolitan GreenSTEP, the VisionEval Framework includes both a statewide (VE-State) and a metropolitan (VE-RSPM) version that is used in Oregon.[6] These are essentially the same suite of tools that the State of Oregon used to set the region's greenhouse gas reduction targets in 2012 and continues to be used to help monitor progress towards Oregon's legislatively mandated GHG reduction goals and implementation of the Statewide Transportation Strategy.

In 2018, ODOT reviewed and prepared a monitoring report on progress to date in implementing Oregon's STS, which sets a vision for meeting the State's transportation-related GHG reduction targets.[7] According to the report, "Oregon is on track to reduce GHG emissions by 15-20 percent below 1990 levels by 2050, which falls far short of the STS vision."[8] The report also evaluated the state's progress on different types of GHG reduction strategies and found that:

- implementation of all transportation options and land use strategies was on track or moving in the right direction.
- progress on intelligent transportation systems, pricing, and clean fuels strategies was mixed, with some strategies moving in the right direction and others making no progress or trending in a negative direction.
- vehicle technology strategies are "not making a lot of progress in the direction of the STS vision;"[9] the STS found that there has been slightly more negative change than progress in this category.

Metro conducted a similar review of the Climate Smart Strategy in 2018 as part of the update to the Regional Transportation Plan (RTP). Appendix J to the 2018 RTP showed that Metro is implementing the actions called for in the Climate Smart Strategy, as required by OAR 660 Division 44, and found that our region was making satisfactory progress implementing the Climate Smart Strategy and was on track to meet its targets for 2035 and 2040.[10] Greenhouse gas emissions analysis conducted for the 2018 RTP relied on use of the regional travel demand model (RTDM) and MOVES – the Environmental Protection Agency (EPA) approved model for forecasting on-road mobile source greenhouse gas emissions in the region. Significant methodological differences in how VisionEval and MOVES estimate on-road vehicle emissions do not allow for direct comparison of forecasted on-road vehicle emissions results. As a result, while the RTDM and MOVES analysis forecasted GHG emissions, the analysis could not be used to demonstrate progress toward the GHG reduction targets defined in OAR 660-044-0060. Finally, Metro's review found that more investment, actions and resources are needed to ensure the region achieves the mandated greenhouse gas emissions reductions. In particular, additional funding and prioritization of Climate Smart Strategy investments and policies that substantially reduce greenhouse gas emissions will be needed.

While ODOT analysis tools are focused at the state level, Metro is working with ODOT to build upon ODOT's VisionEval suite of tools to allow analysis at the regional level in support of the 2023 RTP update. The focus of this work is to allow a more detailed evaluation at the regional scale using transportation

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[6] https://www.oregon.gov/odot/Planning/Pages/Technical-Tools.aspx#GreenSTEP
[7] ODOT, Oregon Statewide Transportation Strategy, 2018 Monitoring Report, April 19, 2018. https://www.oregon.gov/odot/Planning/Documents/STS-2018-Monitoring-Report.pdf
[8] ODOT 2018, p. 26.
[9] ODOT 2018, p. 22.
[10] Metro, Climate Smart Strategy implementation and monitoring, 2018 Regional Transportation Plan Appendix J, December 6, 2018. https://www.oregonmetro.gov/sites/default/files/2019/04/02/RTP-Appendix_J_Climate_Smart_Strategy_Monitoring181206.pdf

networks and behavioral models to better understand and manage the impacts of transportation policies and investments on GHG emissions and determine if the 2023 RTP is meeting GHG reduction targets. This work is intended to complement the state-level analysis tools currently available, and advance ongoing efforts to integrate GHG outcomes into the regional transportation planning process.

Looking Ahead

Much has changed since 2018. Metro is now beginning the 2023 RTP update amid increasing evidence of our changing climate and its impacts. Major climate studies have found that changes are stronger and are happening more rapidly than expected, and that emissions need to fall dramatically by 2030 to prevent irreversible global damage.[11] Oregon did not meet its 2020 goal to reduce emissions to 10 percent below 1990 levels; at last count emissions were roughly 10 percent above 1990 levels.[12] And though our region demonstrated it was on track to meet our greenhouse gas reduction targets in 2018, the global pandemic and other urgent challenges suggest we may now be falling behind implementing some of the policies and investments called for in the Climate Smart Strategy. In addition, the region is contemplating new and updated policies that should be considered for inclusion in an updated Climate Smart Strategy.

Since 2018, the State has adopted new policies and programs to support clean vehicles and fuels in response to Executive Order 20-04.[13] The Every Mile Counts Program and its coordinated STS Multi-Agency Implementation Work Plan are focused on reducing greenhouse gas emissions and implementing the STS. Recent actions include the formation of climate offices within ODOT and ODEQ and the statewide CFEC rulemaking by the LCDC and the Department of Land Conservation and Development (DLCD). In addition, several Oregon vehicles and fuels legislative actions and Environmental Quality Commission (EQC) rules are expected to be in place by the end of 2022 that will help greatly advance the STS goals to "clean up every mile" and associated air quality impacts:

1. Clean Car Standards Program (ZEV1) (EQC adopted in 2005)
2. Clean Fuels Program (CFP1) (HB2186, 2009)
3. Clean Electricity Standard (HB2021, 2021)
4. Advanced Clean Truck Rules (ACT) (EQC adopted in November 2021)
5. Climate Protection Program (CPP) (EQC adopted in December 2021)
6. Clean Fuels Program Expansion (CFP2) (EQC expected adoption in 2022)
7. Clean Car Standards Program Expansion (ZEV2) (EQC expected to initiate rulemaking mid-2022)

The first three are expected to achieve by 2026 a roughly 10 percent reduction in state GHG emissions. The Climate Protection Program is an overarching policy that will restrict sales of fossil fuel sales in the state across multiple sectors increasingly each year starting in 2022. The latter programs are critical to implementing that policy to ease the transition to a low carbon future for all vehicle groups. Some credit trading is allowed prior to 2030, which makes it hard to predict exact forecasts in the near term. The ZEV programs when fully implemented should roughly conform to the goals set out in SB1044.

Metro continues to explore opportunities to evolve and enhance its capabilities and approach to forecasting GHG emissions and monitoring progress implementing the Climate Smart Strategy. To further advance that work in support of the 2023 RTP update, Metro is hosting an Expert Review Panel on Transportation and Climate Planning and Modeling on June 22, 2022.

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[11] Intergovernmental Panel on Climate Change (IPCC), Climate Change 2021: The Physical Science Basis, Summary for Policymakers, October 2021.
https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf
[12] Oregon Department of Environmental Quality, Oregon Greenhouse Gas Sector-Based Inventory Data.
https://www.oregon.gov/deq/aq/programs/Pages/GHG-Inventory.aspx
[13] https://www.oregon.gov/gov/Documents/executive_orders/eo_20-04.pdf

2023 Regional Transportation Plan Update
Background on Use of VisionEval and Key Transportation Assumptions for Climate Smart Strategy Proxy

Prepared for members of the Transportation and Climate Expert Panel

Background on VisionEval

In order to ensure that the 2023 Regional Transportation Plan makes meaningful and measurable progress in reducing greenhouse gas emissions, Metro and the Oregon Department of Transportation (ODOT) Climate Office collaborated to adapt the state-level VisionEval to operate at a regional-level. Formally called GreenSTEP and Regional Strategic Planning Model (RSPM), VisionEval is the essentially the same suite of tools that the State of Oregon has used to set the region's greenhouse gas reduction targets in 2012 and 2017, and monitor progress implementing the Statewide Transportation Strategy since 2013.

Since 2013, ODOT has used a state-level version of VisionEval that uses county-level data as inputs. To support the 2023 RTP Update, the ODOT and Metro team developed a regional-scale version of VisionEval that uses regional, sub-regional, and census tract level data as inputs. The goals of this effort are to:

- Adapt the state-level version of VisionEval to create a regional-scale VisionEval to inform local and regional GHG planning efforts in the Portland region.
- Evaluate the potential effectiveness of new and emerging strategies to reduce GHG emissions that were not adopted in the 2014 Climate Smart Strategy or 2018 RTP – especially congestion pricing, a proven emissions reduction strategy that is moving forward in our region.
- Examine what reductions in vehicle miles traveled (VMT) per capita are necessary to meet our greenhouse gas emissions reduction targets, assuming different rates of transition to cleaner, low and zero carbon fuels and more fuel-efficient vehicles.
- Provide an updated reality check on the assumptions underlying in the Climate Smart Strategy by comparing them to ongoing developments in clean fuels, clean vehicles, and RTP implementation during the 8 years since the strategy was adopted, and particularly during the 4 years since ODOT and Metro last assessed the implementation of their respective climate strategies.
- Better understand how the tools used to analyze GHG emissions account for different policies and strategies to help ensure that emissions reductions that are forecast in the RTP actually occur.
- Inform how best to forecast GHG emissions in the 2023 RTP update, recognizing limitations in the various tools available.
- Frame a regional discussion on what changes to the Climate Smart Strategy may be needed to stay on track, and even accelerate achieving the region's greenhouse gas emissions reduction targets.

Climate Smart Strategy: review of key transportation assumptions

The first phase of this work focused on examining whether the region and state are making progress toward the many milestones that must be met for Climate Smart Strategy to be a success. Staff developed two scenarios in VisionEval – a proxy of the adopted Climate Smart Strategy, slightly updated to be consistent with the more detailed inputs in the new regional-scale version of VisionEval, and a scenario that extrapolates current trends, and compared these two scenarios order to analyze progress in implementing the Climate Smart Strategy as reflected in the 2018 Regional Transportation Plan.

Through the 2023 Regional Transportation Plan update, future tasks will assess whether the assumptions underlying the Climate Smart Strategy need to be updated based on more recent information, estimate the change in GHG reductions due to changing assumptions, and if needed, to explore additional actions that can help the region stay on track to meet its GHG reduction targets.

The two scenarios developed for the first task of the analysis are:

Reference Case Scenario which assumes that current trends in Oregon's transition to cleaner fuels, more fuel-efficient vehicles (as assumed in the 2013 Statewide Transportation Strategy), and transportation demand management continue into the future, and does not account for future actions to reduce GHG emissions. The Climate Smart Proxy Scenario (described below) will be compared to this scenario in order to assess whether the Climate Smart Strategy as adopted in the 2018 RTP is on track to meeting the region's GHG reduction targets.

A **Climate Smart Strategy Proxy Scenario** representing the 2014 Climate Smart Strategy as currently adopted in the 2018 RTP.[1] This scenario is based on adopted policies and plans, including:

- assumptions about Oregon's transition to cleaner, low carbon fuels and more fuel-efficient vehicles from the 2013 Statewide Transportation Strategy[2] and
- assumptions about implementation of VMT-reducing strategies in the 2018 RTP.

This scenario produces greater GHG reductions than the Reference Case because it assumes that policies and plans that have yet to be fully implemented will drive emissions downward in the future. We also analyzed each component of this strategy, estimating the potential GHG emissions reduction from each individual change in assumptions between the Climate Smart Strategy proxy scenario and the Reference Case. This analysis will allow an evaluation of whether the key assumptions underlying the Climate Smart Strategy (as reflected in the 2018 RTP) are still reasonable, and to better understand the impact

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[1] The Climate Smart Strategy scenario is a "proxy" because the analysis used a different tool that draws on different assumptions and data to estimate GHG assumptions than were used when analyzing GHG emissions during development of the 2014 Climate Smart Strategy and subsequent analysis conducted during the 2018 RTP update. During development of the Climate Smart Strategy, Metro worked in partnership with ODOT to develop and use the Metropolitan GreenStep tool to forecast GHG emissions reductions from light duty vehicles. During the 2018 RTP update, Metro used a separate, more detailed set of network-based tools, including the regional travel demand model in conjunction with the federally-approved Environmental Protection Agency (EPA) tool, MOVES, to forecast greenhouse gas emissions reductions. Due to significant methodological differences in how GreenStep/VisionEval and MOVES estimate on-road vehicle emissions, the results of the 2018 RTP GHG analysis could not be compared directly with GHG analysis conducted during development of the Climate Smart Strategy. Though the assumptions used in creating this scenario mirror those used for the 2018 RTP (Climate Smart Proxy) as closely as possible, neither the assumptions nor the results are identical because of significant underlying differences between GreenStep, VisionEval and our travel model which do not allow for direct comparison of forecasted on-road vehicle emissions results from each GHG modeling tool.
[2] https://www.oregon.gov/odot/Planning/Pages/STS.aspx. In 2018, the Oregon Transportation Commission adopted an amendment to incorporate the STS as part of the Oregon Transportation Plan (https://www.oregon.gov/odot/Planning/Pages/Plans.aspx)

2023 Regional Transportation Plan Update: Background on Use of VisionEval and Key Transportation Assumptions for Climate Smart Strategy Proxy

June 2, 2022

that changing individual policy assumptions would have on achieving the region's GHG reduction targets. **Table 1** describes how the key assumptions underlying state and regional climate plans vary between the reference case and the climate smart strategy proxy scenarios.

Table 1: Key transportation assumptions, by scenario

VisionEval Input	Reference case – 2035 assumptions	Climate Smart Strategy Proxy – 2035 assumptions	Notes on current assumptions
Gas Prices	Gas prices are $2.47 per gallon[3]	Gas prices are $6.75 per gallon	
Electricity Prices	Electricity prices are $0.14/kWh	Electricity prices are $0.23/kWh	
Commercial Fleet Age	The average lifetime of commercial vehicles is 9 years	The average lifetime of commercial vehicles is 7.6 years	Commercial vehicle lifetimes currently average 14.2 years and are increasing.[4]
Fleet Electrification	7% of commercial trucks are hybrid or electric	50% of commercial trucks are hybrid or electric	
Commercial Fleet Share	80% of light-duty commercial vehicles are trucks/SUVs and 20% are cars	20% of light-duty commercial vehicles are trucks/SUVs and 80% are cars	58% of light-duty commercial vehicles are trucks, and that percentage has been increasing.[5]
Household Fleet Share	42% of light-duty passenger vehicles are trucks/SUVs and 58% are cars	20% of light-duty passengers vehicles are trucks/SUVs and 80% are cars	80% of new U.S. vehicle sales are trucks, and that percentage has been increasing.[6]
Household Vehicle Fleet Age	The average lifetime of passenger cars is 10.7 years / 11.54 years for trucks/SUVs	The average lifetime of passenger cars is 7 years / 7.7 years for trucks/SUVs	Passenger vehicle lifetimes currently average 11.9 years and are increasing.[7]
Transit Service	Transit service hours continue to grow at current rates.	Transit service hours grow at the rate envisioned in the RTP, leading to ~20% more	Between 2010 and 2019, transit service hours grew at roughly half the rate of the

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[3] Vision Eval uses 2010 dollars for price inputs.
[4] Brusseau, D., Aging Trucks Create More Service Opportunities, NTEA News, https://www.ntea.com/NTEA/Member_benefits/Industry_leading_news/NTEANewsarticles/Aging_trucks_create_more_service_opportunities.aspx?fbclid=IwAR3mkimdcKilEbdqwvYYSwODX5Hop5g6odQWuQdIt9cJ37I30kwxgv209PU
[5] Bureau of Transportation Statistics, U.S. Automobile and Truck Fleets by Use, https://www.bts.gov/content/us-automobile-and-truck-fleets-use-thousands
[6] FRED Blog, Long-term trends in car and light truck sales, March 15, 2021. https://fredblog.stlouisfed.org/2021/03/long-term-trends-in-car-and-light-truck-sales/
[7] Bureau of Transportation Statistics, Average Age of Automobiles and Trucks in Operation in the United States, https://www.bts.gov/content/average-age-automobiles-and-trucks-operation-united-states

VisionEval Input	Reference case – 2035 assumptions	Climate Smart Strategy Proxy – 2035 assumptions	Notes on current assumptions
		service than under the Reference case	population.[8] The region plans to increase transit service significantly,[9] but agencies have cut service during the COVID pandemic.
Pay-As-You-Drive Insurance	18% of the region uses pay-as-you-drive (PAYD) insurance	40% of the region uses PAYD insurance	Both scenarios assume that 6% of drivers use PAYD in 2020.
Employer-based Travel Options Programs	5.5% of workers receive regular travel options programming	40% of workers receive regular travel options programming	
Household-based Travel Options Programs	<1% of households receive regular travel options programming	45% of households receive regular travel options programming	

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[8] TriMet, TriMet Service and Ridership Statistics, November 30, 2021.
https://trimet.org/about/pdf/trimetridership.pdf.
[9] Metro, Regional Transit Strategy, 2018 Regional Transportation Plan, December 6, 2018.

Metro transportation modeling

Transportation modeling is an essential component of planning for regional infrastructure improvements, such as highway and transit projects. The process of travel demand forecasting uses what we know about the existing world to predict what conditions will be like in the future. It is not a guess or an estimate, but a projection based on empirical data and foreseeable circumstances. The transportation modeling used in the Portland metro region is peer-reviewed and validated against observed data. Past model performance on project forecasts is another relevant indicator for model validation.

To understand how people will make trips, modelers look at the reasons why people travel. The model takes into consideration the real choices made by residents in our region. This information is collected from rigorous surveys. Metro's last survey--the Household Travel Behavior Study--tracked 6,000 households to understand how factors such as age, income, children, car ownership, and transportation infrastructure characteristics affect travel choices.

Data input into the transportation model includes population and employment, both existing conditions and forecast, in a way that is consistent with local comprehensive plans as well as roadway and transit routes.

In the model, our region is divided into over 2,000 discrete geographic areas called transportation analysis zones. Census data, land characteristics, economic factors and accessibility measurements feed into land use models that project the number of households and jobs located in each zone.

Metro uses a standard four-step modeling process for travel demand forecasting. This four-step process consists of the following parts:

1. Trip generation
2. Trip distribution
3. Mode choice
4. Trip assignment

Trip generation:
Do I want or need to take a trip?
The first step in the modeling process forecasts the number and types of trips generated from each transportation analysis zone. The projection is based on the number and demographic profiles of households and employment in each zone.

Households are separated into 64 profiles stratified by size, income and age. Employment is categorized into nine types, ranging from service sector and retail, to finance and agriculture. Using behaviors identified in the Household Travel Behavior Study, the model forecasts the likelihood of households to make certain types of trips based on household type and employment mixes in each zone. Trip types are classified as work, shopping, recreation, college, school, and other.

Trip distribution:
Where do I want to go?
Next, the model predicts where the trips produced in the first step are destined. Each zone's availability of attractions—work, shopping, recreation and other opportunities—and the accessibility (access to auto networks and transit) from the zones where trips are produced determines where trips are likely to go.

continued

For more information on transportation modeling in the Portland Metro region, contact the Metro Research Center at 503-797-1915.

Metro, 600 NE Grand Ave., Portland, OR 97232-2736

Metro

Clean air and clean water do not stop at city limits or county lines. Neither does the need for jobs, a thriving economy and good transportation choices for people and businesses in our region. Voters have asked Metro to help with the challenges that cross those lines and affect the 25 cities and three counties in the Portland metropolitan area.

A regional approach simply makes sense when it comes to protecting open space, caring for parks, planning for the best use of land, managing garbage disposal and increasing recycling. Metro oversees world-class facilities such as the Oregon Zoo, which contributes to conservation and education, and the Oregon Convention Center, which benefits the region's economy

Metro Council President

Lynn Peterson

Metro Councilors

Shirley Craddick, District 1

Christine Lewis, District 2

Gerritt Rosenthal, District 3

Juan Carlos González, District 4

Mary Nolan, District 5

Duncan Hwang, District 6

Auditor

Brian Evans

Mode choice:
How will I get there?

As in the real world, travelers in the model have many transportation choices, including walking, biking, driving alone or with others, and walking or driving to transit. For the model to forecast travel demand with a reasonable degree of confidence, it must account for why people make those decisions.

The model considers the following factors when determining mode choice:

- Cost - What are the expenses of operating and maintaining a car? Are there parking expenses? How much does transit cost? Are there tolls?
- Travel time - Is it faster to drive, take transit, walk or bike?
- Auto availability - Do I have access to a car?
- Transit access - Can I get to transit easily?
- Urban design - Am I in a high-density, mixed-use area where I'm more likely to walk or bike?
- Socio-economic relationships - What is my household income? Are there as many cars as employed people in my household?

Trip assignment:
What route should I take?

The model uses data from the previous three steps to simulate the way people will travel. For auto trips, the model assigns traffic to streets in specified time periods. The model assumes the availability of multiple routes between origins and destinations, accounting for congestion.

The base year assignment of vehicle trips is validated against actual traffic counts to ensure that the model is performing well. To forecast the transit trips route, the model considers the time segments of the journey, including walk time, wait time and time in vehicle. Again, the results of a model run are validated to actual transit boarding counts.

Model review

Transportation modeling plays a crucial role in funding and implementing transit projects. Therefore, the Federal Highway Administration and Federal Transit Administration require regular reviews of the travel demand model to ensure that it meets federal guidelines. Metro's transportation model and its outputs are regularly peer-reviewed by modeling professionals from academia, consulting firms, and metropolitan planning organizations, as well as the Federal Transit Administration.

For more information on transportation modeling, visit Metro's Transportation Research and Modeling Services program:

www.oregonmetro.gov/transportationmodeling

2023 Regional Transportation Plan Update
Climate and Transportation Expert Panel
June 22, 2022

History of reducing climate pollution from transportation in Oregon

Regional Greenhouse Gas Targets
per capita light vehicle greenhouse gas emissions reduction below 2005 levels
(in addition to reductions anticipated from changes to fleet and technology)

OAR 660-044 adopted by the Oregon Land Conservation and Development Commission in 2011 and amended in 2017

Metropolitan area	2035 Target	2040 Target	2050 Target
Portland Metro[1]	20%	25%	35%
Albany	--	20%	30%
Bend	18%	20%	30%
Corvallis	21%	20%	30%
Eugene-Springfield[2]	20%	20%	30%
Middle Rogue	--	20%	30%
Rogue Valley	19%	20%	30%
Salem-Keizer	17%	20%	30%

[1] Required scenario planning, adoption and implementation
[2] Required scenario planning

2040 Growth Concept is our platform for local and regional climate action

Implemented through adopted community and regional plans

Adopted in 1995

Building toward six desired outcomes

Climate Smart Strategy
Regional policies and strategies for reducing emissions

Adopted in 2014 and approved by LCDC in 2015

Extensive, inclusive engagement built the Climate Smart Strategy

More than 15,000 individual touch points from 2011-14

How were we doing in 2018?

We were making **satisfactory progress** if we fully implement the **2018 RTP,** but recognized more work and funding needed

We **exceeded** Climate Smart targets for:
- land use and growth in 2040 mixed-use centers
- transit service hours
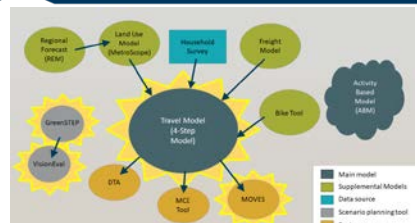- households served by frequent transit service

We **fell short** of RTP targets for:
- sidewalk and biking system completion
- tripling walking, biking and transit mode share
- reduced per capita vehicle miles traveled by 10 percent by 2040

oregonmetro.gov/rtp
7

Metro's Climate Analysis Toolbox

8

2040 Growth Concept (1995)

Region's first scenario planning effort

Travel Demand Model (early version)

MOBILE6 (air quality)

9

What is GreenSTEP?

A strategic planning tool that **estimates VMT and GHG emissions** based on demographic, roadway, fuel, and vehicle characteristics

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Climate Smart Strategy Approach (2014)

Tested 144 combinations

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oregonmetro.gov/climatestrategy

Climate Smart Strategy Scenarios

144 scenarios narrowed to 3

3 scenarios narrowed to our preferred scenario

Source: GreenSTEP
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What is the travel model?

aka "the regional travel demand model"
aka "the 4-Step model"
aka "the trip based model"
aka "the federally mandated model"

A network-based simulation of the ground transportation system

A tool for testing future transportation alternatives

A behavioral model based on observed choices

The tool we must use for all regional transportation plans and NEPA activities

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Emissions Modeling with MOVES
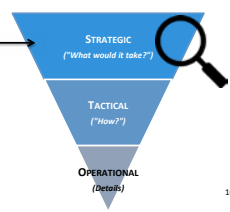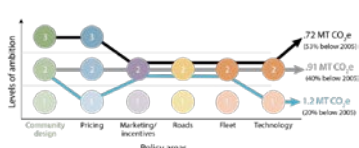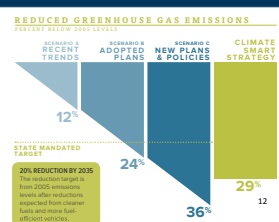
MOVES

+

Regional Travel
Demand Model

=

Estimates emissions
(GHGs, criteria pollutants and air toxics)

STRATEGIC
("What would it take?")

TACTICAL
("How?")

OPERATIONAL
(Details)

14

Comparing apples and oranges

Results vary greatly depending on how you define the target and what you measure (e.g., year, household, on-road, per capita, vehicles, etc.)

≠

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What we learned from the 2018 Regional Transportation Plan

We can expect to meet our climate goals if:

• we fund and implement our plan

• funding of projects and programs in the plan are prioritized based on their potential carbon reduction

We should continue to improve our tools to measure and track carbon emissions

- 46 percent
expected reduction in per capita greenhouse gas emissions from passenger vehicles by 2040 (compared to 2015 levels)

Source: Metro regional travel demand model and Metro regional emissions model (MOVES)

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Evolution of VisionEval Suite of Tools

GreenSTEP->EERPAT->RSPM

VisionEval

VE-State

VE-RSPM
(Regional Strategic Planning Model)

STRATEGIC
("What would it take?")

TACTICAL
("How?")

OPERATIONAL
(Details)

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What we've done since 2018

Developed regional VE-RSPM in partnership with ODOT and the City of Portland

Used by the City of Portland to support GHG planning

Can be used in 2023 RTP

Consistent with State level target setting tools

Partnerships

Planning

Implementation

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Where do we go from here?

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oregonmetro.gov/rtp

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June 22, 2022 Climate Smart Expert Panel Registrant List

Adams	Steve	City of Milwaukie
Albrecht	Gary	Clark County Public Works
Alfred	Roger	Metro
Amiton	David	Oregon Department of Transportation
Andersen	Michael	Sightline Institute
Anderson	Jovi	Bend Metropolitan Planning Organization
Appanaitis	Garth	DKS Associates
Appenbrink	Nadine	
Armstrong	Tom	City of Portland
Ayers	Connor	Metro
Barker	Ken	volunteer
Barrett	Andrew	Wilsonville
Bassok	Alon	Washington State Department of Transportation
Bates	Jordan	Representative Maxine Dexter
Bayer	Maureen	Jordan Ramis
Bell	Katherine	Oregon DOT
Benoit	Emily	City of Vancouver
Berry	Jessica	Multnomah County
Bettinardi	Alex	Oregon DOT
Bezner	Mike	Clackamas County
Blackhorse	Summer	Metro
Bolen	Glen	ODOT
Bosa	Peter	Oregon Metro
Boyd	Allison	Multnomah County
Boylan	Kevin	City of Beaverton
Bradway	Margi	Oregon Metro
Breakstone	Aaron	Metro
Brey	Hailey	
Bruun	Scott	Oregon Business & Industry
Buchanan	Paul	
Buehrig	Karen	Clackamas County
Callaway	Steve	City of Hillsboro
Campos	Jennifer	RTC
Carlson	Suzanne	ODOT
Celentano	Andrea	Metro
Cheek	Maddie	City of Tualatin
Cho	Grace	Metro Planning and Development
Christopher	Basil	
Clarke	Kelly	Lane Council of Governments
Collins	Tim	Metro
Cooney-Mesker	Molly	Metro
Cooper	Colin	City of Hillsboro
Craddick	Shirley	Metro Council/JPACT Chair
Cunningham	William	City of Portland Bureau of Planning and Sustainability
Daleo	Sharon	City of Portland
Dartnell	Camilla	
David	Lynda	RTC

Dea	John	City of Gresham
Deffebach	Christina	Washington County
Degner	Andrew	Portland Metro Regional Water Consortium
Deke	Tyler	Bend MPO
DeMarco	Lyndsey	Air Sciences Inc
DePriest	Patrick	ODOT
DePriest	Patrick	ODOT
Dill	Jennifer	Portland State University
DiLoreto	Greg	
Dirks	Greg	City of Wood Village
Dobson	Cassandra	Parametrix
Dolata	Mat	WSP
Dorfman	Rachel	Lane Council of Governments
Drake	Markley	Happy Valley
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Ellis	Kim	Metro
Engelmann	Jessica	City of Beaverton
Farwell	Tracy	Better Energy LLC
Fenton	Kellie	
Flynn	Dan	U.S. Department of Transportation Volpe Center
Francis	Carley	WSDOT
Freels	Michael	Oregon Department of Energy
Frohning	Rebecca	
Fryer	Barbara	City of Cornelius
Garber	Sorin	Sorin Garber & Associates
Gonzalez	Juan Carlos	Metro Regional Government
Gregor	Brian	Oregon Systems Analytics LLC
Gudman	Jeff	
Hackett	Sarah	Oregon Department of Transportation
Hampton	Matthew	Metro
Handy	Susan	UC Davis
Hardesty	Jo Ann	Portland City Commissioner
Hesse	Eric	PBOT
Higgins	Jay	City of Gresham
Hogg	Mel	Portland Bureau of Transportation (PBOT)
Holmqvist	Ally	Metro
Holmstrom	Bill	State of Oregon
Holthoff	Michael	Oregon Department of Transportation
Hoover	Sylvan	Oregon Department of Transportation
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Hurley	Peter	Portland Bureau of Transportation
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Hyzy	Kathy	JPACT
Iannarone	Sarah	The Street Trust

Ibrahim	Idris	
Isbell	Grayson	ODOT
Jackson	Raymond	MWVCOG
Jefferson	Dwight	City of Portland Oregon
John	Jennifer	Interstate Bridge Replacement Program - Parametrix
Johnson	Chris	Metro
Kaempff	Daniel	Metro
Kelley	Steve	Washington County
Kelly	Katherine	CITY OF VANCOUVER
Kennedy	Rebecca	City of Vancouver WA
Kim	Kyung-Hwa	Atlanta Regional Commission
Kloster	Tom	Metro
Knudson	Becky	Oregon DOT
Knudson	Anthony	Oregon DOT
Koper	Steve	City of Tualatin
Kransky	Gerik	Oregon Department of Environmental Quality
KRINKE	MARA	Parametrix
Krueger	Monica	Metro
KUBEJA	LUKAS	CJTN
Labbe	Ted	Urban Greenspaces Institute
Lacy	Cassie	City of Bend
Lalonde	Ginette	WSP USA
Lee	Tammy	PSU
Lem	Lewis	Port of Portland
LEPROWSE	RYAN	
Lew	Shoshana	Colorado Department of Transportation
Lewis	Christine	Metro
Lightsey-Walker	André	The Street Trust
Liljenwall	Sharon	Oregon DOT
Lorenzini	Jaimie	City of Happy Valley
Lyman	Kate	TriMet
Mai	Chi	Oregon Department of Transportation
Main	Eric	Oregon Health Authority
Mangle	Katie	Alta Planning + Design
Marchant	Bret	Greater Portland Inc
Martin	Shannon	City of Gresham
McTighe	Lake	Oregon Metro
Melson	Christopher	Louisiana Transportation Research Center
Mermin	John	Metro
Meyer	Cody	DLCD
Milam	Ronald	Fehr & Peers
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Morgan	Brett	1000 Friends of Oregon
Morrison	Hannah	Portland Bureau of Transportation
Mros-O'Hara	Elizabeth	Metro

Murshed	Delwar	WSDOT
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Ocken	Julie	
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Orman	Michael	Oregon Department of Environmental Quality
Pagenstecher	Gary	City of Tigard
Patton	Thaya	Metro
Paykar	Victoria	Climate Solutions
Pederson	Cindy	Metro
Pepper	Amy	City of Wilsonville
Pepple	Karl	US EPA R10
Perrault	Ramona	Metro
Peters	Sarah	Fehr & Peers
Peters	Bill	Oregon DEQ
Prior	Garet	ODOT
Ramirez	Lucia	Oregon DOT
Ramos	Eduardo	Metro
Ransom	Matt	Southwest Washington Regional Transportation Cou
Rice	Carly	City of Gresham
Richardson	Carole	Plangineering LLC
Roberts	Stephen	Washington County
Roll	Josh	Oregon DOT
Rosenthal	Gerritt	Metro
Roth	Dave	City of Tigard
Routh	Steph	Sightline Institute
Royce	Francie	npGreenway
Ruen	Cameron	Clackamas County
Ruenjinda	Piyawee	
Sapunar	Kim	MWVCOG SKATS
Schlosshauer	Kari	City of Portland
Schuytema	Peter	Oregon DOT
Sherman	Brett	City of Happy Valley
Shoaf	Syd	Lane Council of Governments
Skiles	Michaela	Metro
Small	Rebecca	City of Vancouver
Smith	Chris	Portland Transport
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Takushi	Theresa	State of Colorado - Department of Transportation
Thomasson	Catherine	Dpo

Todd	Kendra	
Tracy	Morgan	City of Portland-BPS
Tritsch	Emily	City of Tigard
Tsongas	Theodora	
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Wilhelmsen	Zoë	Colorado Department of Transportation
Williamson	Tonia	North Clackamas Parks & Recreation District
Wills	Heather	WSP
Wilson	Kate	LCOG
Winans	Kiara	DEQ
Wind	Cory-Ann	Oregon DEQ
Windsheimer	Rian	Oregon Dept. of Transportation
Winter	Caleb	Metro
Wolff	Emily	WSP
Wright	Sara	