Agenda
Rogue Valley Metropolitan Planning Organization
Public Advisory Council

Special Meeting

Date: *Tuesday, February 16, 2016*
Time: *5:30 p.m.*
Location: *Rogue Valley Council of Governments*
Jefferson Conference Room
155 N. First Street, Central Point
Transit: served by RVTD Route #40
Phone: *541-423-1360 (Sue Casavan, RVCOG)*
RVMPO website: *www.rvmpo.org*

1. Call to Order/Introductions ..... Justin Hurley, Chair

Action Item:

2. Strategic Assessment Final Report ..... Scott Turnoy, ODOT/Cody Meyer, DLCD

Background: ODOT and DLCD finished work on the Strategic Assessment Final Report. Staff will provide an overview of the key findings, and ask the PAC to make a recommendation to the Policy Committee for next steps and to accept the final report.

Attachment: #1 - Strategic Assessment Final Draft Report

Action Requested: Forward recommendation to Policy Committee.

3. Public Comment ..... Chair

4. Next Meeting ..... Chair

** The next Public Advisory Council meeting is scheduled for March 15, 2016,
at 5:30 p.m. at Rogue Valley Council of Governments, Jefferson Conference Room **

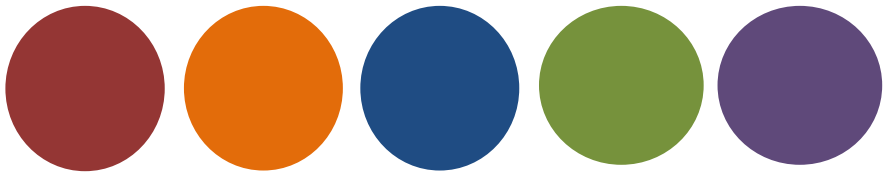
5. Adjourn ..... Chair

Other RVMPO meetings	**Technical Advisory Committee:** 1:30 p.m., Wednesday, March 9th, Rogue Valley Council of Governments, Jefferson Conference Room. **Policy Committee:** 2:00 p.m., Tuesday, February 23rd, Rogue Valley Council of Governments, Jefferson Conference Room.

IN COMPLIANCE WITH THE AMERICANS WITH DISABILITIES ACT, IF YOU NEED SPECIAL ASSISTANCE TO PARTICIPATE IN THIS MEETING, PLEASE CALL SUE CASAVAN, 541-423-1360. REASONABLE ADVANCE NOTICE OF THE NEED FOR ACCOMMODATIONS PRIOR TO THE MEETING (48 HOURS ADVANCE NOTICE PREFERABLE) WILL ENABLE US TO MAKE REASONABLE ARRANGEMENTS TO ENSURE ACCESSIBILITY TO THIS MEETING.

Attachment #1
(Agenda Item 2)

Strategic Assessment of Transportation and Land Use Plans - DRAFT



Rogue Valley Metropolitan Planning Organization

February 2016

About This Report

This report was prepared by staff from the Rogue Valley Metropolitan Planning Organization (RVMPO), working with staff from the Oregon Department of Transportation (ODOT) and the Department of Land Conservation and Development (DLCD) with input from the RVMPO Technical Advisory Committee. The report summarizes the purpose, scope, and key findings from an analysis of the region's adopted land use and transportation plans prepared using ODOT's Regional Strategic Planning Model. The report is intended to help inform the region's decision-makers and the public as they consider how to update the region's land use and transportation plans.

The Rogue Valley Metropolitan Planning Organization (RVMPO) coordinates regional transportation planning and programming for the Rogue Valley metropolitan area, which includes the cities of Ashland, Central Point, Eagle Point, Jacksonville, Medford, Phoenix, and Talent as well as the unincorporated area of White City and portions of Jackson County.

Further information about RVMPO is available on the web at: http://www.rvmpo.org

Please note that this report is for informational purposes only and is not intended to make or express policy decisions by either the metropolitan planning organization or its member local governments.

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Executive Summary

Background

The Rogue Valley Metropolitan Planning Organization (RVMPO), working with staff from the Oregon Department of Transportation (ODOT) and the Department of Land Conservation and Development (DLCD), conducted a strategic assessment of adopted local and regional land use and transportation plans. The assessment was prepared using the Regional Strategic Planning Model, developed by ODOT, to estimate the likely outcomes of adopted plans and current trends over the next 20+ years – to the year 2038. The assessment estimates important outcomes of regional interest, including mobility, livable communities, air quality, transportation costs, and public health. It also assesses how close the region's existing plans come to meeting the state's greenhouse gas emissions reduction target.

This report outlines how the strategic assessment was prepared and presents the associated findings. In addition to estimating outcomes from adopted plans, the report identifies potential actions that the region may choose to consider to achieve outcomes that are important to the region. The report is intended to inform local officials and policy makers as they update land use and transportation plans, and to help evaluate whether to conduct additional work, such as more detailed scenario analysis, or scenario planning.

Key Findings

By 2038, regional population growth, coupled with expected growth in household income will increase the demand for automotive travel in the Rogue Valley. Under the adopted plans scenario, the region is likely to see a significant increase in traffic delay resulting from this population growth, even though vehicle miles traveled per capita increases only slightly. Sensitivity tests show that a combination of enhanced transit, intelligent transportation systems, and pricing policies are effective solutions to limit the increase in travel delay. However, current adopted plans show that implementing some of these actions may be challenging. For example, current and projected levels of transit investment are likely to result in a decrease in transit service miles per capita, rather than allowing for enhanced transit service.

Relative to land use, results from the strategic assessment suggest that providing more compact-livable communities with more housing units planned in mixed-use areas, will provide a richer mix of housing options and increase biking and walking, thus leading to overall public health improvements. Regional targets call for increased mixed-use development currently, and more work will be needed to encourage additional mixed-use development.

Household costs are another important outcome to consider when assessing transportation strategies. The Regional Strategic Planning Model evaluates the share of household income spent on transportation, including vehicle purchase, maintenance, fuel and permit expenditures. Results show that household transportation operating costs are expected to decrease over time as more people switch over to newer, more fuel-efficient vehicles. However, these vehicles will be more expensive to purchase, which leads to an increase in ownership costs. For auto dependent households, keeping auto operating costs down with strategies such as shifting to new more fuel efficient vehicles or even slowing vehicle turnover will present challenges for low income households as ownership costs increase. Pricing strategies similarly increase the cost of

transportation for households and impact those with limited incomes particularly hard. However, these strategies can improve affordability if they reduce vehicle miles traveled (VMT) or enable households to own one less automobile where affordable alternative modes (transit, bike, walk) are available. Retaining affordable housing in mixed-use areas that provide more affordable travel options can also help households retain accessibility. Promotion of car sharing programs can also increase the affordability of new more efficient vehicles, while mixed-use and transit-accessible housing continues to develop.

Air quality in the Rogue Valley is expected to improve as a result of adopted plans, as well as federal and state-led actions on vehicles and fuels; both greenhouse gases and criteria air pollutants, such as carbon monoxide, particulate matter, ozone, sulfur dioxide, nitrogen dioxide and lead, are expected to decline. By implementing adopted plans alone, greenhouse gas emissions are expected to decrease 0.6% by 2038, but when considered in combination with state and federal improvements to vehicles and fuels, the overall per capita GHG reduction in the region is expected to be 64% from 2005 levels. When combined with potential state-led actions implemented at the local level (e.g. ambitious policies addressing pay-as-you-drive insurance, eco-driving, low-roll-resistant tires, or a carbon tax), RVMPO can expect a 16% GHG reduction by 2038. However, much more work will be needed at the state and local level to reach the 19% GHG reduction target for the region. While no one policy on its own achieves the target, sensitivity testing results include over 200 scenarios with policy bundles (beyond state-led vehicle and fuel related strategies) that help the region achieve 19% GHG reduction. In addition, criteria air pollutants emitted from light duty vehicles are expected to drop over 50% from 2010 levels, primarily as a result of cleaner vehicles. The resulting air quality provides a key health benefit for all residents. The improved fuel efficiency of future vehicles also results in lower annual fuel consumption and energy use.

Possible Next Steps for the Region

This report is intended to help RVMPO and its member jurisdictions have important conversations about policy implications. Future planning and decision-making efforts may require more in-depth and specific analysis to assess policy options and regional goals. Through scenario planning the region can more fully evaluate which combination of policies and actions will best meet regional needs and objectives.

Financial support is available from ODOT, and both ODOT and DLCD are prepared to provide technical support for scenario analysis and scenario planning efforts should the region have interest in conducting additional analysis. If the region chooses to move ahead with scenario planning, local staff, officials, stakeholders, and the public would work together to evaluate a more detailed set of land use and transportation actions and programs that address greenhouse gas reduction targets and other important regional goals. Recognizing the multiple planning efforts currently being undertaken in the region, ODOT and DLCD would work with the region to determine how such additional analysis could be incorporated with and complement these other efforts.

Chapter 1: Strategic Assessment Purpose

The strategic assessment was conducted to estimate the outcomes of adopted land use and transportation plans and current trends in the Rogue Valley metropolitan area. The assessment estimates travel, emissions, household transportation costs, energy use, health-related impacts, and other outcomes. Overall, the assessment provides a picture of what the area may look like given plans, recent trends and information about future conditions.

The results of the assessment will help local governments better understand issues and options as they review and update the area's transportation plans and make investment decisions. In addition, the information provided in the assessment is intended to help local officials decide whether to pursue a more comprehensive analysis of land use and transportation options through scenario planning.

In short, this strategic assessment evaluates the region's adopted plans, assesses how far those plans help to reach the region's identified goals over the next 20+ years, and identifies alternative paths to achieve future goals. Largely a technical exercise, the assessment provides information to help inform decisions about next steps, such as a decision about scenario planning, or about how best to update or implement existing land use and transportation plans, including local transportation system plans, and the Rogue Valley Metropolitan Planning Organization (RVMPO) Regional Transportation Plan (RTP).

Changing Circumstances, New Challenges

While RVMPO's strategic assessment is triggered by the state's interest and efforts to reduce greenhouse gas emissions, it is intended to provide information about a range of other important regional issues. For example, the strategic assessment also evaluates household spending on transportation; mobility measures such as vehicle miles traveled and delay; and public health indicators, such as air quality, and trips made by walking and biking. This information, provided by the analysis, can help the region evaluate how well existing plans prepare the region and its residents for a changing future.

The issue areas considered in the strategic assessment, including output measures and key outcomes from the analysis, in many cases align with the proposed goal areas and performance indicators from RVMPO's 2017-2042 RTP update. Table 1 below identifies the strategic assessment issue areas and proposed RTP goals addressed by the strategic assessment.

Assuring Adequate Transportation Funding

Maintaining and expanding the transportation system will require more revenue than current funding arrangements generate. Over the last 10 years, state and federal transportation funding has been flat. Recent trends also show that people are driving less and driving more fuel-efficient vehicles, which reduce transportation revenue from gas taxes. While driving and efficient vehicle trends may reduce infrastructure needs per person, population forecasts indicate demand on the roadways will remain strong, and the gap between available funding and the improvements called for in transportation plans will continue to grow over time. Public support for increased fees or taxes is also uncertain; in short, there is a perfect storm of declining revenues and increasing costs, at the same time that plans call for more resources.

Adopting a vehicle-miles-traveled fee would help stabilize transportation revenues. Additionally, land use and transportation planning can help make the case for increased public investment in transportation. Carefully integrating planning for land use with planning for streets and transit allows for land use patterns that make efficient use of existing investment in the transportation system. Land use and transportation plans that make communities more livable by improving public health and keeping transportation affordable may help to make a business case that expanded transportation funding will generate a high return on investment.

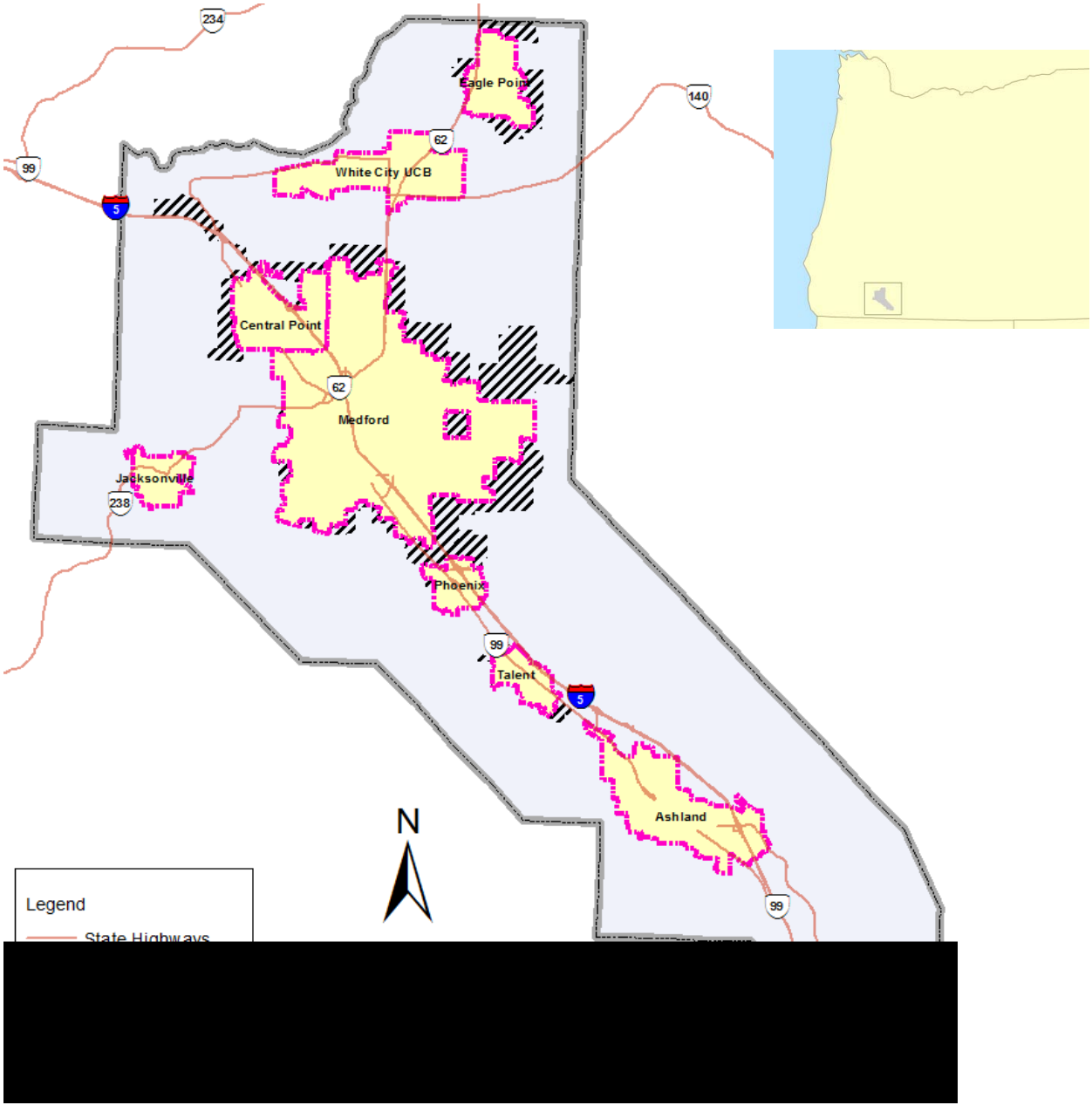
Table 1. Strategic Assessment Issue Areas and RVMPO RTP Goals

Strategic Assessment Issue Areas and Outcome Measures	RTP Goals and Indicators Related to Strategic Assessment Issue Areas
• **Meeting mobility and accessibility needs** - Congestion - Transportation options • **Providing housing options for a changing population** - Single-family and multi-family housing mix - Population in mixed-use areas or activity centers • **Keeping transportation affordable** - Household travel costs • **Improving public health and reducing health care costs** - Walking, biking, and transit use - Improved air quality • **Air Quality and Greenhouse Gas Emissions** - Criteria air pollutant - Greenhouse gas emissions • **Improving energy efficiency and reducing energy use** - Fuel consumption - Vehicle miles per gallon • **Assuring adequate transportation funding**	• **Goal 1:** *Design, develop, and sustain a balanced multi-modal transportation system which will address existing and future needs* - Improve the accessibility, connectivity, efficiency and viability of the transportation system for all modes and users including freight • **Goal 2:** *Develop, optimize, and coordinate current and ongoing procedures for the Safety and Security of the Transportation System* • **Goal 3:** *Identify, design and invest in transportation improvements that foster compact, livable unique communities* - Improved Air Quality through projects that reduce CO, PM10 and GHG - Measure changes in mixed-use and downtown development • **Goal 4:** *Develop a plan that can be funded and reflects responsible stewardship of public funds* • **Goal 5:** *Identify, plan and develop transportation infrastructure which maximizes the efficient use for all users and modes* • **Goal 6**: *Identify, develop and support diverse strategies to lessen dependence upon single-occupant vehicles* • **Goal 7**: *Develop, coordinate, and administer an open and balanced process for planning and developing the regional transportation system* • **Goal 8:** *Evaluate, plan and develop regional transportation investments to foster economic opportunities locally and regionally* - Freight Mobility

Chapter 2: Regional Context

The Rogue Valley, also known as the Bear Creek watershed, is located in the upper Rogue River basin in southwestern Oregon. The area has long been a center for lumber and agriculture. It is also famous for its temperate climate and access to outdoor recreational activities. In the last 20 years, the area's population has grown by over 20 percent. With a 2010 household population of 168,000 the RVMPO region encompasses the urbanized areas of Jackson County and includes the cities of Ashland, Central Point, Eagle Point, Jacksonville, Medford, Phoenix, and Talent, along with the unincorporated area of White City and surrounding areas of Jackson County. Under current adopted plans, the RVMPO region's household population is expected to grow 47% to 247,000 by 2038.

Figure 1. RVMPO Strategic Assessment Study Area



Regional Plan

The Greater Bear Creek Valley Regional Plan (Regional Plan), also known as Regional Problem Solving, resulted from a multi-year broad stakeholder process and establishes a system to guide long-term land use planning for a doubling of the population in the Greater Bear Creek Valley. The plan designates approximately 8,529 acres of urban reserves for the cities of Central Point, Eagle Point, Medford, Phoenix, and Talent to accommodate urban growth to the year 2060. Urban reserves are the highest priority for inclusion in the urban growth boundary when cities seek to expand, typically providing a 10 to 30 year supply of developable land outside the current urban growth boundary.

Efficient Development

Recognizing the benefits of efficient development, the Regional Plan incorporated local requirements for minimum residential densities and the amount of dwelling units and employment to occur in mixed-use/pedestrian-friendly areas. The Regional Plan also allows urban reserve residential density offsets by increasing density within existing city limits.

Air Quality

The U.S. Environmental Protection Agency (EPA) has established health-based National Ambient Air Quality Standards (NAAQS) for six air pollutants: carbon monoxide (CO), particulate matter (PM10 and PM2.5), ozone (O3), sulfur dioxide (SO2), nitrogen dioxide (NO2) and lead (Pb). Areas that fail to meet the standards are designated “non-attainment” and are required to develop plans to come into compliance with the standards. Once compliance is achieved, a maintenance plan is developed to ensure that air quality will not be compromised in the future. Two air pollutants are of particular concern in the Rogue Valley: carbon monoxide (CO) in Medford, and particulate matter less than 10 microns in diameter (PM10) across the RVMPO planning area. The area encompassed by the Medford urban growth boundary was re-designated from nonattainment to attainment by the EPA in 2002, and the RVMPO planning area was re-designated from nonattainment to attainment in 2006. Previous analysis by the RVMPO found that through the horizon of the current RTP (2038), emissions from transportation will not exceed emission budgets.

Alternative Fuels

The Rogue Valley Clean Cities Coalition is comprised of public agencies and businesses working together to promote programs in the Rogue Valley that advance the U.S. Department of Energy’s economic, environmental and energy security objectives of reducing dependence on foreign oil. The coalition has a stakeholder membership of 200, with about 25 active public and private agencies and businesses including Oregon Department of Transportation, Oregon Department of Energy, Department of Environmental Quality, Rogue Valley Transportation District (RVTD), Avista and Jackson County. Since 1994, RVTD has used clean-burning natural gas in 15 of its 23 fleet buses (80% of RVTD service miles). RVTD is Oregon’s only transit district with a dedicated compressed natural gas (CNG) fleet. Rogue Disposal and Recycling has two CNG garbage trucks and plans to continue moving toward a CNG fleet. Avista Utilities is converting 150 fleet vehicles to natural gas, and has plans for 1 private and 3 public CNG fueling stations. Avista donated

CNG fleet vehicles to Eagle Point and Phoenix and serves as a resource for RVTD's CNG fueling station.

RVTD recently received funding to upgrade and increase the capacity of its CNG fueling station, improving the range of the 15 RVTD buses and the Rogue Disposal garbage trucks that use the station. In addition, Jackson County and Rogue Disposal recently received funding to study the conversion of methane to mobile fuel "renewable" natural gas (RNG) at Dry Creek Landfill for a local fleet fuel supply with lower carbon intensity than traditional CNG.

Multimodal Transportation

Transit

The Rogue Valley Transportation District (RVTD) provides public transportation to the cities of Ashland, Talent, Phoenix, Medford, Jacksonville, Central Point, and unincorporated White City. According to RVTD's Ten-Year Long Range Plan, revenues will continue to lag behind capital, operating, and maintenance costs to sustain transit service levels unless new funding sources are identified. The plan identifies the need for service expansions to meet current and future demand in east Medford, south Ashland, Central Point (i.e. future development in the Twin Creeks Transit-Oriented-Development (TOD) area), and the corridor between Jacksonville and south Medford. In addition, service enhancements, such as increased route frequency, express routes connecting Medford to Ashland and White City, as well as weekend and evening service are needed to sufficiently meet regional travel demand.

Transportation Options

RVTD runs the Way to Go Program, a regional transportation options program. The Way to Go Program includes education programs in local schools, such as an interactive bus program, bicycle safety classes, Safe Routes to School, and Walk and Bike to School Day. RVTD conducts community outreach at events throughout the region and provides specialized programs for employers such as vanpool coordination, fare discounts and subsidies, and information on tax credits for providing commuter benefits. In 2015, RVTD partnered with Southern Oregon University (SOU) to establish an individualized marketing program to inform students about their commute options to campus in an effort to reduce single-occupancy vehicle trips. SOU has since adopted the program and dedicated staff to administer the program moving forward.

Bike Share

In 2015, "Bike Share for the People of Jackson County" opened with 28 bikes in 5 locations in downtown Medford, White City and Ashland. The bike share was designed to provide transportation for low-income individuals, older adults, and students to access employment, education and social services more easily.

Livable Communities

In 2002, the RVMPO adopted seven performance measures to meet the Oregon Transportation Planning Rule (TPR) requirements. The adopted measures with benchmarks and targets related to housing options from the RVMPO 2013-2038 Regional Transportation Plan are listed in Table 2 below. Alternative measures related to housing options are intended to demonstrate progress towards creating mixed-use, pedestrian-friendly, and transit accessible developments

in the region. Progress towards meeting the benchmarks and targets for these measures is determined by monitoring development after the appropriate land use and development regulations have been adopted. Mixed-use, pedestrian-friendly development occurring within downtown areas in Ashland, Talent, Phoenix, Jacksonville, Medford, Central Point, White City and Eagle Point, as well as within activity centers, count towards meeting the benchmarks and targets.

The 2010 benchmark for new dwelling units in mixed-use, pedestrian-friendly areas is 26%. An analysis completed in 2014 shows that 22% of the dwelling units - meeting the density requirements - constructed since 2000 are located within mixed-use, pedestrian-friendly areas (RVMPO activity centers). The analysis shows that while the region is making progress on increasing the overall percentage of mixed-use housing, more work will be needed to continue encouraging more mixed-use development in order to meet the 49% target for 2020. The region's activity centers represent prime target areas for this development to build on existing and planned multi-modal investments.

Table 2. RVMPO Alternative Measures Related to Housing Options

Measure	2000	2005	Benchmark 2010	Benchmark 2015	Target 2020
% Dwelling units (DU's) within ¼ mile walk to 30- min. transit service	12%	20%	30%	40%	50%
% Mixed-use DU's in new development	0%	9%	26%	41%	49%
% Mixed-use employment in new development	0%	9%	23%	36%	4%

Source: RVMPO 2013-2038 Regional Transportation Plan

Chapter 3: Analysis

Regional Strategic Planning Model

The strategic assessment analysis relies on ODOT's Regional Strategic Planning Model (RSPM). RSPM is the metropolitan version of the GreenSTEP[i] model, which was developed by ODOT in a peer-reviewed process during work on the 2011 Statewide Transportation Strategy to evaluate state-level policies and actions to reduce greenhouse gas (GHG) emissions. RSPM enables smaller geographic areas, like metropolitan areas, to evaluate the potential effects of existing or new policies. This modeling tool is strategic, that is, it supports long-range planning when there are a number of unknowns about the future. It can help Metropolitan Planning Organizations (MPOs) develop a regional vision informed by a new understanding of the impacts of existing plans and future trends. RSPM can help MPOs identify actions needed to meet greenhouse gas emissions reduction targets, as well as meet the RTP goals on multi-modal mobility and livable communities previously listed in Table 1. RSPM estimates how different factors affect household travel and the resulting emissions. It can also be used to test the relative impact of specific policies, which is discussed further in the Findings section on Sensitivity Testing and *Appendix 1: Sensitivity Tests*.

Figure 2. Regional Strategic Planning Model

[i] The GreenSTEP and RSPM models have proven to be successful in providing modeling support for several high profile state and metropolitan area planning applications. In addition, the GreenSTEP model has been adapted for use by other states in the form of the Federal Highway Administration's (FHWA) Energy and Emissions Reduction Policy Analysis Tool, and portions of the model became the underlying basis of the SHRP2 C16 Rapid Policy Assessment Tool (RPAT, formerly SmartGAP). A partnership with ODOT, FHWA and other users of the tool is underway to merge the related tools into a common framework called VisionEval, which will ease sharing of model updates and facilitate collaboration on using the tool to support performance-based planning efforts across the country.

RSPM is a household-based model. As shown in Figure 2, after inputs are collected the model generates synthetic households in the metropolitan area and assigns specific attributes to each household, which influence travel behavior. For example, the model identifies the household's income, size, ages, auto ownership, and participation in transportation options programs. The model also identifies the household's land use characteristics, such as density and mixed-use character. Areas with higher densities and access to services reduce the distances people need to drive and make walking, cycling, and transit more convenient. Using this detailed information, the model estimates vehicle miles traveled. Unlike urban travel models, RSPM does not estimate the number of trips and does not include a roadway network. Instead, household attributes determine travel. A household's travel is then assigned to specific vehicles to determine GHG emissions. The household's choice of how many and what type of vehicles influences travel costs and the amount of driving. For instance, when gas prices increase, driving frequency decreases and when a more fuel-efficient vehicle is purchased, travel budget used towards fuel goes further and driving increases. Additionally, given the existing range limitations of electric vehicles, households in compact, mixed-use areas, who make shorter trips, are more likely to buy an electric vehicle. To reflect these important effects, an iterative loop in the model balances travel costs with the amount of travel. When complete, the model forecasts GHG emissions and other outcomes, such as total fuel consumption, walk trips, and household travel costs.

Process

There are three main steps to the strategic assessment process:

1. Establishing the study area and districts;
2. Collecting input data for the base year and future year; and
3. Interpreting the RSPM outputs.

Figure 1 outlines the study area used for the RVMPO strategic assessment, which defines the extent of the area that is included in the model. While many RSPM inputs utilize values that are applicable to the entire region, several RSPM inputs require more localized information about households. The RVMPO service area was segmented into 39 districts, each containing a cluster of Traffic Analysis Zones (TAZ) from the region's travel demand model. The districts also align within the eleven zones delineated in the Regional Plan and capture the mix of demographic and land use conditions across the region.

RSPM Inputs

Inputs and assumptions for the RSPM are drawn from a number of sources, including:

- 2010 Census data
- Jackson County Comprehensive Plan population forecast (adopted 2007)
- Adopted local plans, including:
    - Comprehensive Plans and zoning from Ashland, Central Point, Eagle Point, Jacksonville, Medford, Phoenix, Talent, White City and Jackson County
    - 2013-2038 RVMPO Regional Transportation Plan
    - Greater Bear Creek Valley Regional Plan
- Southern Oregon University Office of Institutional Research
- RVMPO's regional travel demand model, 2013-2038 RTP scenarios
- Rogue Valley Transportation District

Assumptions about future state and federal policies and conditions are drawn from state-level sources including DLCD's Metropolitan Greenhouse Gas Reductions Target Rule (2011) and ODOT's Statewide Transportation Strategy (STS) (2012).

Where adopted plans were unclear about future policies or conditions, RVMPO staff consulted with local jurisdiction staff to estimate likely future conditions and expected funding levels. For example, the region's long-term plans for transit do not reflect likely expansion of transit service. See Table 3 below for the RSPM inputs used for the financially constrained adopted plans analysis. More detailed information on the inputs and assumptions is included in *Appendix B. Explanation of Key RSPM Adopted Plans Inputs and Assumptions*.

Table 3. Summary of RSPM Inputs for Financially Constrained Adopted Plans

Category		Measure	2010	2038
Regional Context		MPO population, including group quarters	168,000	247,000
		Average household size / % single-person household	2.41 / 29%	2.41 / 29%
		Average annual per capita income	$21,900	$29,500
Vehicles & Fuels		Light truck share of household vehicles	45% (MPO DMV)	34% (MPO Rule)
		Vehicle turnover (years)	10.5	9
		Plug-in hybrid/all electric vehicles (by sales year)	0%	6% (5% stock)
		Fuel economy for autos (miles per gallon)	24	57
		Bus fuels (%CNG/bio-diesel in transit fuel usage)	80%/0%	80%/0%
		CNG fuel for commercial fleets (gasoline-gallons equivalent)	115 (0.2% LDV/0.9% HDV)	3,400 (17.0% LDV/ 4.4% HDV)
Pricing		Fuel price (dollars per gallon)	$2.43	$5.53
		Electricity costs (dollar per kilowatt-hour)	$0.08	$0.21
		Federal/State Gas taxes (dollar per gallon)	$0.424	$0.48
Community Design	Parking	Share of workers subject to parking fee	0.59%	0.64%
		Share of non-work trips subject to parking fee	0.38%	0.38%
		Avg. daily parking fee (MPO)	$3.14	$7.00
	Land Use	Acres of Mixed Use place type / Population in Urban Mixed Use Areas	1.9% / 9.4%	2.6% / 12.9%
		Single-family attached and multi-family (2-4 units) units – 34% of new units	9,500	21,900 (total) 12,300 (new)
	Infra-structure	Single occupant vehicle trips diverted to bicycles	3.9% (OHAS)	5.0%
		Transit service miles per capita	3.59	2.33
		Freeway & Arterial Roadway miles	441 (90 Fwy + 351 Art)	502 (118 Fwy + 384 Art)
Marketing & Incentives	Mode-shift	Workers covered by transportation demand management programs	2.6%	4.9%
		Households in individualized marketing programs	0%	2.15%
	Driving Efficiency	Car sharing vehicles (SOU)	3	20
		ITS Program Index: Ramp Metering	0.0	0.0
		ITS Program Index: Incident Response	0.20	0.70
		ITS Program Index: Signals	0.35	0.40
		ITS Program Index: Access Management	0.0	0.15

Note: All dollars values are reported in 2005 dollars, accounting for inflation.

Chapter 4: Findings

Adopted Plans

The strategic assessment quantifies the effect of implementing plans and policies using mobility, economy, land use, environment, and energy indicators. In other words, if the Rogue Valley metropolitan area builds out its current adopted plans, the region can expect the type of outcomes that are outlined in Table 4 (at the end of this section). The report organizes the outcomes into five categories and includes the relationship of the outcomes to the future Regional Transportation Plan (RTP) goals. The results contrast current conditions, using 2010 as the base year, with expected outcomes from implementation of adopted plans and the continuation of expected trends in the year 2038 (the horizon year of the current RTP).

Mobility

The region continues to grow and attract new residents (47% more by 2038), which will put pressure on the existing transportation system to accommodate the increased demand. Current plans that keep transit investment at 2010 levels, combined with low parking fees, and lower auto operating costs limit the demand for and utilization of alternative modes of transportation. These factors, combined with an assumed growth in income (35%), leads to increased VMT per capita (23.1 to 24.1 miles per day). As a result, the region can expect a more than 40% increase in traffic delay, from 20.1 annual hours per person in 2010 to 28.4 hours in 2038.

Relation to RTP Goals

The findings related to mobility and congestion (delay) present a challenge for the region to meet RTP Goal 8, which identifies freight mobility as a key element to support local and regional economic opportunities.

Livable Communities

Local governments exert a strong influence over the design of communities, including the amount of mixed-use development and the provision of transportation options.

The assessment shows that implementing the region's adopted plans with a focus on growth in activity centers results in significant progress toward creating compact, mixed-use, livable communities serving a diversity of residents. Specifically, the analysis shows an increase in population living in mixed-use areas (from 9% in 2010 to 13% in 2038), with 20% of new dwelling units located in mixed-use areas. Likewise, housing development shifts away from single-family units (75% in 2010 to 67% in 2038). This shift towards single-family attached and multi-family

Relation to RTP Goals

The findings related to community design and land use, specifically those that address population living in mixed-use areas and increased multi-family housing options, support RTP Goal 3, which calls for transportation investments that foster compact, livable unique communities.

Livable communities in turn support increases in active mode share, such as walking and biking, and address RTP Goal 6, which seeks to lessen dependence on single-occupant-vehicles and enhance pedestrian, bicycle systems, and improve upon transit services in the region.

development provides more affordable housing and housing options for less mobile individuals among older adults and aging baby boomers, and serves less auto-dependent millennials.

The increased mixed-use density builds on multi-modal investment in the region's various activity centers and enables shorter trips that are easier to serve by transit, walking, biking, and car share, among other modes. This leads to associated benefits of reduced travel costs and a healthier community with more social interaction, physical activity, and improved air quality.

Better air quality primarily results from the cleaner vehicles of the future (52% reduction in pollutants); less crashes are expected with the safety upgrades of connected vehicles, and more physical activity reduces the burden of disease, through cleaner air increased use of active modes (2% and 34% increase in walking and biking respectively).

Environment

Energy, Criteria Air Pollutants, and Greenhouse Gas Emissions

Current Federal Corporate Average Fuel Economy (CAFE) standards and more stringent state policies means vehicles on the road in 2038 will use significantly less energy (-57% annual gallons consumed by all vehicles), with an anticipated doubling of vehicle fuel efficiency (from a 24 miles per gallon (MPG) average in 2010 to 57 MPG in 2038). Consistent with reduced fuel use are reductions in criteria air pollutants from transportation (-52%) providing significant health benefits for the region.

These energy and emissions reductions also account for the overall drop in social costs (-26%), represented as the unintended costs of transportation such as health, safety, noise, water pollution, and the costs of maintaining secure energy sources globally. Such costs to society are not otherwise paid, directly or indirectly (e.g. cost of congestion or delays caused by traffic incidents) by motor vehicle drivers.

The strategic assessment assumes a significant shift away from household use of light trucks (45% to 34%), which is higher today in Rogue Valley than other areas of the state, and increased use of crossover SUVs. As crossovers are built on a car frame rather than a truck frame, the shift from light trucks improves fuel efficiency (and lower vehicle operating costs).

Relation to RTP Goals

The findings related to air quality and GHG emissions indicate that the RVMPO region's adopted plans do, to an extent, address the regional air quality and GHG performance indicator of livable communities, as expressed in RTP Goal 3. The indicator seeks to measure improved air quality through projects that reduce CO, PM_{10} and GHG. In addition, although per capita VMT is expected to increase, vehicle and fuel efficiency enhancements precipitate gains in the region's air quality.

The strategic assessment shows that by implementing the current local and regional adopted plans and plans to expand local infrastructure for compressed natural gas (CNG)-fueled vehicles, along with federal CAFE fuel efficiency standards and state Clean Fuels programs, the Rogue Valley can expect reduced dependence on foreign oil and a significant reduction in greenhouse gas (GHG) emissions by 2038.

Total GHG emissions from household vehicles are expected to drop by about 64% with combined state and local actions, due mostly to expected improvements in vehicle technology and fuels, and changes to the vehicle fleet between 2010 and 2038. However, considering the effect of local plans and actions alone, the strategic assessment shows an expected 0.6% reduction in GHG emissions.

Rogue Valley's planned investment in CNG infrastructure contributes 0.1% of the region's 0.6% GHG reduction from local plans alone. Light duty commercial vehicles in 2038 are roughly 3% below the emissions in other Oregon areas in 2038.

In short, currently adopted local plans, in combination with state actions called for in the Statewide Transportation Strategy, are unlikely to get the region to the 19% reduction target. However, the sensitivity tests in the following section identify combinations of strategies beyond adopted plans that impact the region's ability to achieve a 19% GHG reduction by 2038.

Relation to State GHG Target

Considering GHG emissions reductions relative to the State target of 19% for the Rogue Valley, which measures reductions above and beyond improvements in fleet, fuels, and technology, the expected per capita reductions are about 16% when local plans are considered in combination with strategies and actions identified in the Statewide Transportation Strategy (i.e. ambitious pricing such as a carbon tax, and comprehensive system operations management techniques). However, it is important to note that the State target is for 2035 and no specific target exists for 2038, the future year analyzed in the strategic assessment based on the currently adopted Regional Transportation Plan.

Keeping Transportation Affordable

The costs to travel are certain to undergo change by 2038. However the best understanding is for household travel costs to remain relatively constant though highly subject to a number of future uncertainties. The key change is that the future shift to more fuel efficient vehicles (24 to 57 MPG) and electric vehicles means lower operating costs (-3%), despite an assumed doubling of fuel prices by 2038. Meanwhile, rising incomes (35%) enable local residents to purchase these new fuel-efficient vehicles (20% increase in ownership costs) at an assumed accelerated vehicle turnover rate (9 years, down from 10.5 years).

Although these new vehicles may be less affordable for purchase by lower income households, they are expected to be increasingly available as on-demand services (e.g. car share) not requiring ownership.

Relation to RTP Goals

Household transportation cost findings address RTP Goal 8: To evaluate, plan, and develop regional transportation investments to foster economic opportunities locally and regionally. Policy 8-1 is to plan, develop, and accommodate travel demand to create a regional transportation system supporting a robust economy. Keeping household transportation costs low allows for more disposable income and keeps more money in the local economy.

Vehicle operating costs are expected to decrease, while ownership costs increase. This indicates the need for affordable transportation options, transit-supportive-development, and alternatives to household vehicle ownership to achieve reductions in overall household travel costs.

Examples of these new transportation options include shared use of vehicles owned by friends and neighbors (e.g. Get-Around programs) as well as more formal car sharing programs (e.g. the car sharing program planned for Ashland).

However, actual fuel price and economic prosperity is unknown and could lead to different outcomes. These conditions are explored in more detail in the Sensitivity Test section. Table 4 below provides a summary of the adopted plans findings and lists the results for each output measure for the 2010 base year and 2038 future year.

Table 4. Summary of RSPM Outputs, Adopted Plans Analysis

Category	Output	2010	2038	% Change
Mobility	*Daily vehicle miles traveled per capita*	*23.1*	*24.1*	*4%*
	Annual walk trips per capita	*107*	*109*	*2%*
	Daily miles traveled by bicycle per capita	*0.16*	*0.21*	*34%*
Economy	*Annual all vehicle delay per capita (hours)*	*20.1*	*28.4*	*41%*
	Daily household parking costs	*$0.03*	*$0.08*	*141%*
	Annual household vehicle operating costs (fuel, taxes, parking)	*$2,484*	*$2,407*	*-3%*
	Annual household vehicle ownership costs (depreciation, vehicle maintenance, tires, finance charges, insurance, registration)	*$6,148*	*$7,368*	*20%*
Land Use	*Residents living in mixed-use areas*	*9.4%*	*12.9%*	*-*
	Housing type (Single-family : Multi-family)	*75:25*	*67:33*	*-*
Environment	*Annual greenhouse gas emissions per capita from light vehicles including reductions from vehicle changes (metric tons)*	*3.0*	*1.1*	*-64%*
	Reduction in greenhouse gas emissions per capita from implementation of adopted plans[1]	*n/a*	*n/a*	*-0.6%*
	Reduction in greenhouse gas emissions per capita from implementation of adopted plans and potential state-led actions	*n/a*	*n/a*	*-16%*
	Commercial Vehicle GHG/mile	*464*	*190*	*-59%*
	Clean Air Act[2] *criteria pollutants (million kilograms per day)*	*37.3*	*18.1*	*-52%*
Energy	*Annual all vehicle fuel consumption per capita (gallons)*	*388*	*168*	*-57%*
	Average all vehicle fuel efficiency (miles per gallon)	*24*	*57*	*141%*
	Annual external social costs per household (unpaid)	*$1,140*	*$852*	*-25%*

Note: Per capita includes both household and group quarter residents. All costs reported per household only. Greenhouse gas emissions cover all light vehicle travel on MPO roads. All dollar values are reported in 2005 dollars, accounting for inflation.

[1] RSPM results indicate that implementing local plans alone will reduce GHG emissions by 0.6% (2005-2038). Incorporating actions, such as aggressive pricing and operations strategies, identified in the Statewide Transportation Strategy (e.g. ambitious policies addressing pay-as-you-drive insurance, full-cost pricing, eco-driving, low-roll-resistant tires, or a carbon tax), which are not currently adopted, will reduce emissions by 16%. Two versions of the 2038 results are presented to illustrate the importance of coordinated and comprehensive actions by both state and local governments to achieve emissions reduction goals. The remaining outputs in Table 2 represent results for implementing adopted plans only.

[2] Clean Air Act criteria pollutants include ozone, particulate matter, carbon monoxide, nitrogen oxides, sulfur dioxide, and lead.

Sensitivity Testing

The analysis of the adopted plans presented above (Table 4) estimates where the region is now, and where it is likely to be in the future, based on financially constrained adopted plans and other future trends. The natural question that follows is, what will it take to further improve outcomes of importance to the community, such as mobility, livable communities, emissions and public health? Sensitivity testing, using the Regional Strategic Planning Model (RSPM), allows the region to evaluate how changes to key factors or policies could affect expected outcomes, as well as the resilience of plans to future uncertainties.

To better understand the possibilities and challenges facing the region, over 20,000 possible scenarios were analyzed. Sensitivity testing analyzes different combinations of policies to identify the combinations that are most effective in achieving different outcomes. Sensitivity tests represent alternative futures and demonstrate how different choices about regional growth and investment, beyond those in the region's adopted plans, affect various outcome measures.

Table 5 outlines the policy bundles and levels of ambition evaluated as part of sensitivity testing. Due to the multiple combinations that could potentially be tested in these alternative scenarios, the policies and levels of ambition were limited to those outlined in the table. If the region decides to move forward with scenario planning, many more possible combinations of policies and levels could be evaluated. See *Appendix A. Sensitivity Tests Inputs and Assumptions* for a detailed description of the inputs and assumptions used for the sensitivity test analysis.

Table 5. Policy Bundles Evaluated as Part of Sensitivity Testing

Category		Adopted Plans		More [*Less*] Ambitious Sensitivity Tests
		2010 Inputs	2038 Inputs	2038 Inputs
Vehicles		• HH vehicle mix: 0% electric vehicles, • 10.5 year vehicle age, 45% Household light trucks	• HH vehicle mix: 6% electric vehicles (Target Rule) • 9 year vehicle age, 34% household light trucks (Target Rule)	• HH vehicle mix: 14% electric vehicles (STS vision) • [*10.5 year vehicle age, 45% Household light trucks*]
Fuels		• CNG fuel for fleets: 115 NG GGE/day (no RNG)	• CNG fuel for fleets: 3400 NG GGE/day (no RNG) • State Low Carbon Fuels Standard (10% GHG drop by 2025)	• CNG fuel for fleets: 3400 NG GGE/day with 100% RNG • [*No low carbon fuel standards through 2038*]
Pricing	Energy Costs & Per Mile Fees	• Electricity cost: $0.08/kWh • State gas tax: $0.424/gallon • No VMT fee, social cost recovery fee, or use of pay as you drive (PAYD) insurance	• Electricity cost: $0.21/kWh • State gas tax: $0.48/gallon • No VMT fee, social cost recovery or use of PAYD insurance	• Electricity cost: $0.30/kWh (STS vision + renewables) • State gas tax: $0.48/gallon • PAYD: 99% use PAYD insurance at $0.05/mile (STS vision) • VMT fee: $0.03/mile (STS vision) • Social costs recovered: 69.4% (e.g. carbon tax) (STS vision)
Community Design	Parking Policies	• Fee parking in Medford, Ashland, and airport • No worker cash-out-buy-back programs • Workers subject to parking fee: 0.6% • Non-work trips subject to parking fee: 0.4% • Avg. daily parking fee: $3.14	• Fee parking in Medford, Ashland, and airport • No worker cash-out-buy-back programs • Workers subject to parking fee: 0.6% • Non-work trips subject to parking fee: 0.4% • Avg. daily parking fee: $7.00	• Add fee parking in select activity centers • Add Cash-out-buy-back program: 7.3% of work trips • Increase workers subject to parking fee: 8.7% • Increase non-work trips subject to parking fee: 3.7% • Avg. daily parking fee: $1.53
	Land Use	• 2010 TAZ land use inputs for travel model (Census)	• 2013 RTP/2038 TAZ land use inputs for travel model • Comprehensive Plan Zoning used for new dwelling unit type	• Activity Centered Growth: Shift 25% of household growth (8,250 units) to activity centers (not Medford or Ashland)
	Transit , Roads & Light Vehicles	• Transit service: 0.6M miles (3.6 miles per capita)	• Maintain 2010 transit service: 0.6M miles (2.3 miles per capita)	• Double 2010 service to 1.2M miles (4.7 miles per capita) • Quadruple 2010 service to 2.4M miles (9.3 miles per capita) (50% of STS vision)
		• 90 Freeway & 351 Arterial lane-miles	• 118 Freeway & 384 Arterial lane-miles (Tier 1 projects)	• Add 19 Arterial lane-miles in 3 projects beyond RTP Tier 1
		• SOV diversion (Single-occupancy-vehicle trips less than 20 miles round trip) to light vehicles (e.g., e-bikes, bikes, segways): 3.9%(OHAS)	• SOV Diversion to light vehicles/bikes: 5%	• Double SOV diversion to light vehicles/bikes: 10% • Ambitious Electric Bike shift, SOV diversion: 55%
Marketing & Incentives	Driving Efficiency	• Percent of optimal ITS deployment levels: – Freeway ramp metering: 0% – Freeway incident response: 20% – Arterial signal optimization: 35% – Arterial access management: 0% • Eco-driving & fuel efficiency promotion: 0%	• ITS adopted plans (% of optimal deployment) – Ramp metering: 0% – Incident response: 70% – Signal optimization: 40% – Access management: 15% • Eco-driving & fuel efficiency promotion: 0%	• Enhanced ITS (% of optimal deployment): – Ramp metering: 95% – Incident response: 95% – Signal optimization: 95% – Access management: 30% • Eco-driving & fuel efficiency promotion: 83.3% (STS vision)
	Demand Management	• Workers in employer-based transportation demand management (TDM) programs: 2.6% • Households in individualized marketing (IM) programs: 0% • Car-sharing: 3 vehicles (dropped SOU program)	• Workers in TDM programs: 4.9% • Households in IM Programs: 2.15% • Car-sharing: 20 vehicles across City of Ashland	• Increased Workers in TDM programs: 7.0% • Triple Households in IM Programs: 7.0% • Ambitious car-sharing program: 54 vehicles, 20 each in Ashland & Medford, plus 2 each in Talent & Central Point

Note: All dollar values are reported in 2005 dollars, accounting for inflation. See *Appendix A. Sensitivity Tests Inputs and Assumptions* for a full description of the levels of ambition for the sensitivity tests, including additional road development beyond the RTP Tier 1 project list, and context variables fuel price, income, and population growth.

Sensitivity Testing Results

A key result of the sensitivity tests is to better understand the relative impact of more ambitious policies beyond those in current adopted plans. Figure 3 below highlights various community goals (columns) and the relative impact of policies (bars) in reaching that goal. In each column, the bars indicate the impact of each policy, relative to the impact of other policies in that particular column. For instance, considering the impact of policies on achieving the greenhouse gas emissions reduction target (first column in Figure 3), pricing policies that cause drivers to pay more of the full costs of driving (e.g. VMT fee or pay-as-you-drive insurance) are roughly as effective as the community design policies combined (green bars), which work to shorten trips. However, when considering the reduced travel costs column, being part of a mixed-use area with transit options, vehicle efficiency programs, and shifting to newer fuel-efficient vehicles are relatively more effective than pricing or parking policies. The impact of these sensitivity test results on key RVMPO goal areas, as well as the impact of more ambitious local and state-led policy combinations on GHG reduction, is discussed in further detail below.

Additionally, at the end of this section, sensitivity test results are used to assess the impact of future uncertainties (e.g. gas prices) on forecast community outcomes. These sensitivity tests can help the region better understand the most effective strategies to reach goals and understand the resilience of adopted plan outcomes in the face of future uncertainties.

Mobility

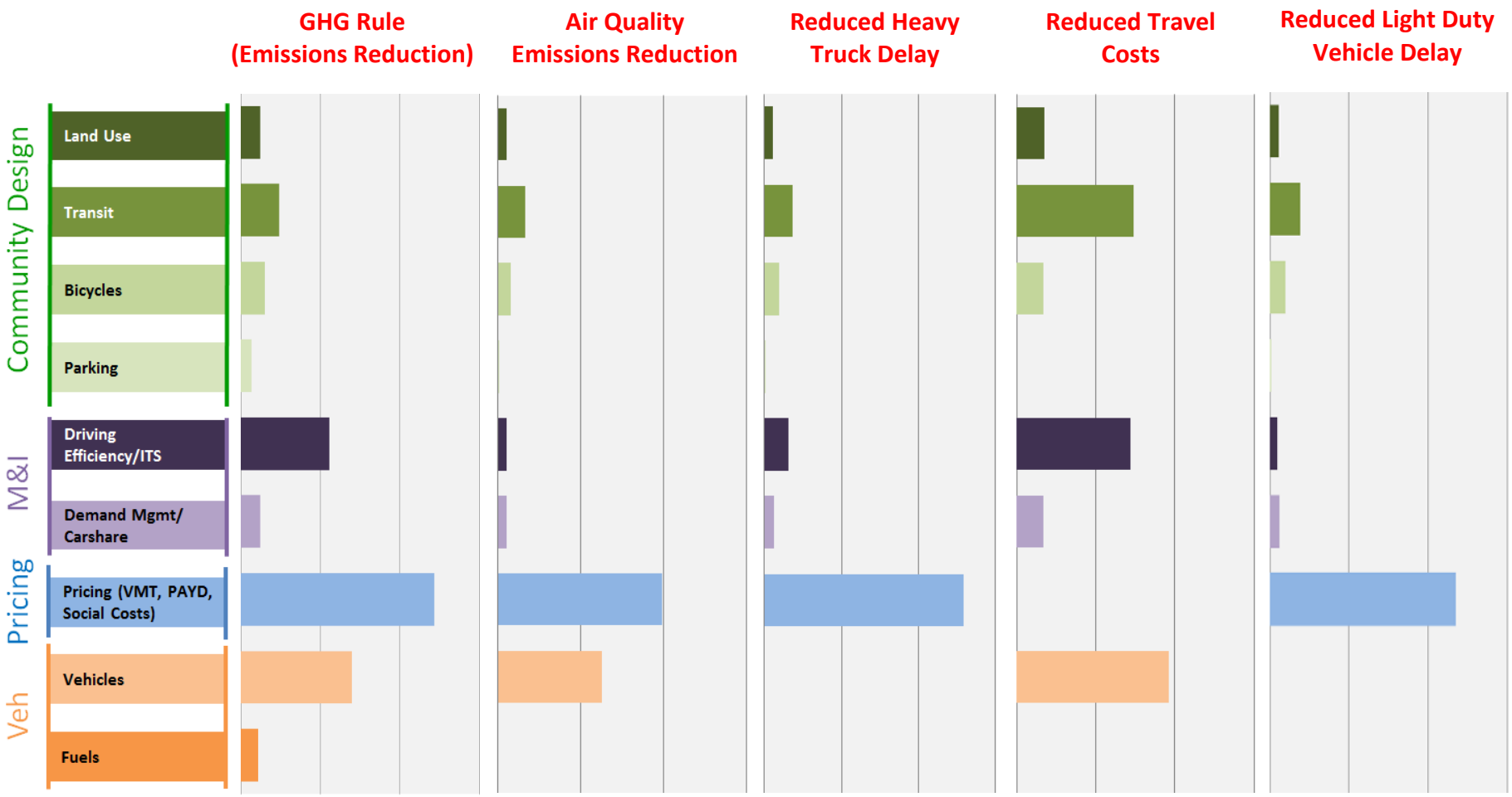
The region's growth in auto delay (20 to 28 annual hours of delay per capita) will require multiple strategies to keep delay in check. A test of investment in roadway capacity produced limited results; adding 19 lane-miles of new roads results in less than one hour of reduced annual auto delay per capita. Similarly, increasing transit four times 2010 levels reduces annual auto delay per capita by just over one hour. In contrast, as shown in Figure 3, pricing strategies have the strongest effect to limit the growth of delay. Vehicle miles traveled (VMT) track closely to delay and aggressive pricing strategies have a similarly strong effect on bringing down VMT from an adopted plans level of 24.1 to the sensitivity test result of 23.0 daily VMT per capita.

Livable Communities

Sensitivity tests indicate that land use changes alone have a limited effect on changing people's driving behavior. Steering more new development toward transit accessible areas and activity centers, the percentage of population living in mixed-use areas increases, but without other supportive policies in place the primary impact is on transportation affordability (in particular if gas prices rise or incomes stay flat), with limited returns on VMT and GHG emissions reduction. Big gains in affordability can be achieved if those living in multi-modal activity centers are able to own one less vehicle, which can be facilitated through availability of newer transportation options such as car sharing and bike sharing, along with traditional transit service, walking and biking to nearby destinations.

Compact, mixed-use land use policies on their own have the largest impact on walk and bike trips per capita, as shorter trip distance helps make active modes of travel more feasible. Sensitivity tests indicate that promotion of biking and other light vehicles (e.g. electric bikes) can produce a sizable shift away from trips made by autos. Light vehicle promotion to encourage

Figure 3. Relative Impacts of Policies by Outcome Measures



Note: Policies (bars) within each outcome (column) have been scaled to 100%, reflecting relative impact for a single outcome. Policy bars should not be compared across outcomes (e.g. land use is not necessarily more effective in reducing in reducing GHG emissions than travel costs).

1. In its current form, the walk model is primarily based on land use changes, without adequate sensitivity to pricing and transportation demand management measures. It also does not include walk to transit trips.
2. Air quality pollutants is based on a simplified model reviewed by the Oregon Department of Environmental Quality and the U.S. Environmental Protection Agency, which is determined using miles driven by fueled vehicles, without direct linkages to fuel gallons.
3. Vehicles and fuels in the sensitivity tests represent more aggressive technology changes beyond the significant change embodied in the Adopted Plans scenario.
4. Some policies conflict with certain outcomes, such as pricing and parking policies which increase household costs, as well as Vehicles/Fuels and ITS/EcoDriving that by lowering costs lead to increased VMT and associated road congestion.

diversion of 10% of single-occupancy-vehicle auto trips to bicycles or electric bikes represents a doubling of annual bike miles per capita (from 76.6 to 153.1). Focused growth in activity centers and increased transit service also lead to modest gains in annual walk trips per capita.

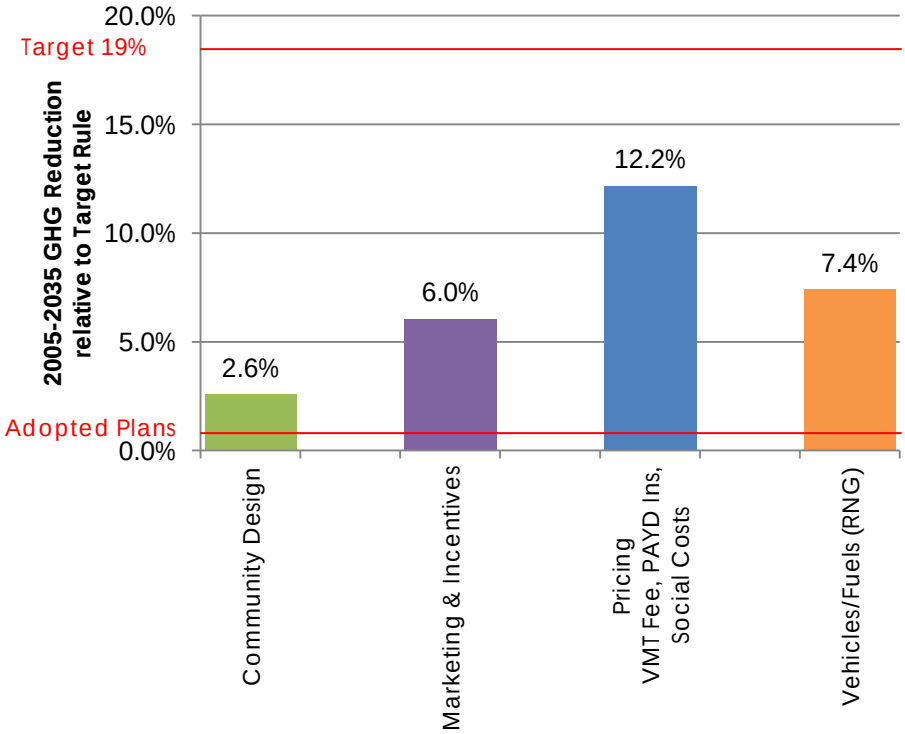
Environment

Two individual policy options have a strong effect on improving air quality: aggressive pricing strategies and an increased turnover of vehicles in the fleet. However, these same policy options pull in opposite directions when measuring VMT and delay. The pricing strategies reduce VMT, while the lower operating costs of newer vehicles tend to increase VMT and delays, although such vehicles are expected to produce fewer emissions.

Figure 4 shows the impact of going beyond adopted plans in four different policy directions: community design (land use/transit, parking policies, shortening trips), marketing and incentives that reduce driving (demand management) or make it more efficient (intelligent transportation systems/eco-driving), pricing (from pay as you drive insurance, VMT fees to cover road operations and maintenance), and more ambitious policies on vehicles/fuels (including shift from CNG to landfill capture of RNG).

None of these directions meets the state GHG reduction target for RVMPO individually. However, over 200 scenarios tested beyond state-led vehicle and fuel related strategies (using reference income and fuel price forecasts) achieve the 19% GHG reduction. The region has multiple paths to consider and that choice can reflect other regional goals, such as air quality concerns, transportation system affordability, freight mobility, and development of livable communities.

Figure 4. Individual Effects of Policy Bundles on GHG Reduction



What will it take to achieve the GHG Target for RVMPO?

The RVMPO's 2038 adopted plan results and the 2035 State GHG target are not fully comparable due to the 3-year difference between the two. However, when comparing RVMPO's 2005-2038 GHG reductions from local actions, beyond state-led vehicles and fuels programs, to the 2035 state GHG reduction target of 19% for RVMPO, over 200 scenarios reach or exceed a 19% GHG reduction by 2038.

The scenarios tested fall along a spectrum of feasibility and level of ambition regarding policies necessary to achieve desired outcomes. Table 6 below presents a set of scenarios, each accompanied by a description of the policies and levels of ambition included (indicated as Level 1, 2, or 3), and the corresponding RSPM results. These scenarios, as illustrated in Figure 5, show the extent to which the region can expect to reduce GHG emissions if it pursues one path over another. Important to note, all of the scenarios described in Table 6 and Figure 5 that exceed 19% GHG reductions include the most ambitious local policies (Level 3) and more ambitious state-led pricing strategies (either Level 2 or Level 3).

Table 6. More Ambitious Scenarios Tested for Effect on GHG Reduction

Scenarios	Land Use	Demand/ Efficiency	SOV Diversion[t]	Transit	Parking	Travel Costs
Local Level 2	Activity Center focused-growth (shift 25% of household growth to activity centers)	<u>Demand Mgmt</u> TDM (7% wkrs) IM (7% HHs) Carshare in multiple activity centers (54 veh) <u>Driving Efficiency</u> Enhanced ITS Eco-driving & Fuel-Efficiency Promotion (83%)	Double Adopted Plans SOV Diversion (divert 10%)	Double Transit Service Per Capita (like Salem today)	<u>Maintain Adopted Plans Levels:</u> Workers: 0.6% Non-work trips: 0.4% Avg. daily fee: $7.00 Cash-out: 0% wk trips	No pricing policies
Local Level 2 + Pricing Level 2						PAYD Ins., increase electric rate
Local Level 2 + Pricing Level 3						PAYD Ins., increase electric rate, VMT fee, social cost recovery*
Local Level 3			Major SOV Diversion (divert 55%)	Quadruple Transit Service Per Capita (like Eugene today)	<u>Parking fee in most activity centers:</u> Workers: 8.7% Non-work trips: 3.7% Avg. daily fee: $1.53[tt] Cash-out: 7% wk trips	No pricing policies
Local Level 3 + Pricing Level 2						PAYD Ins., increase electric rate
Local Level 3 + Pricing Level 3						PAYD Ins., increase electric rate, VMT fee, social cost recovery

*Social cost recovery refers to a fee (e.g. carbon tax) to offset the costs of transportation, such as carbon emissions that contribute to climate change, air pollution that causes health and environmental problems, and other such costs to society that are not otherwise paid by motor vehicle drivers.

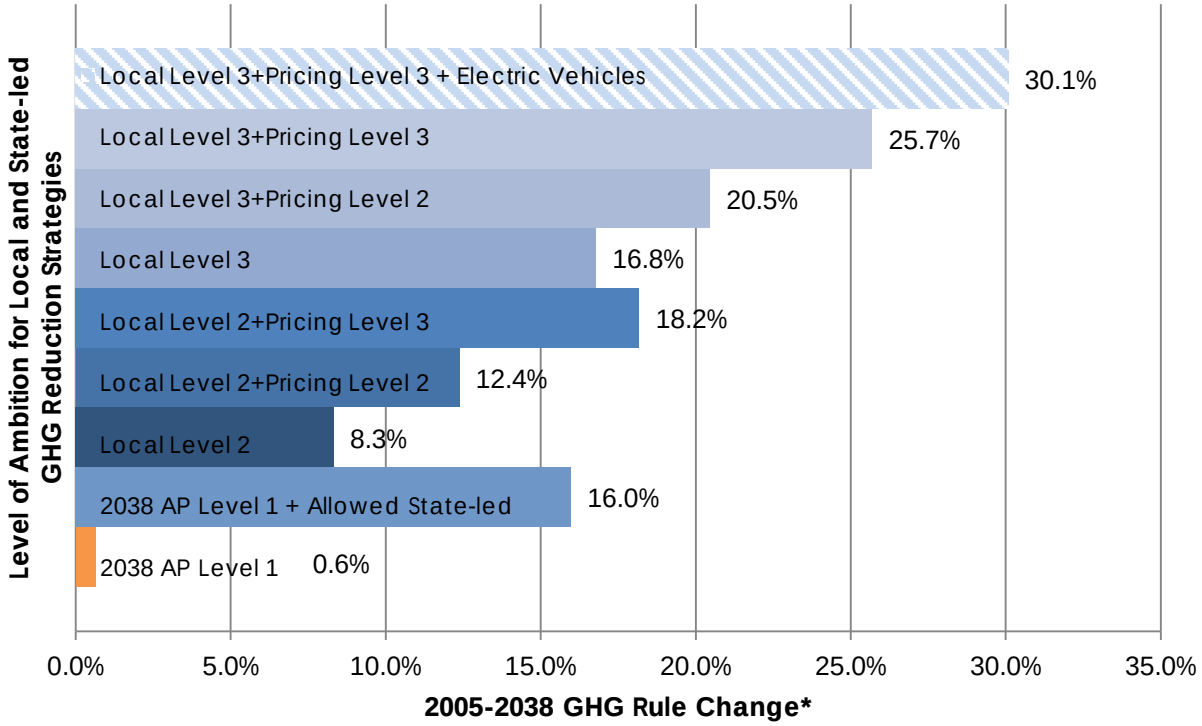
[t]Single Occupancy Vehicle (SOV) diversion to light vehicles, such as bicycles, electric-bikes, Segways, etc.

[tt]The average daily parking fee is lower in the Level 3 scenarios due to an increase in parking fee areas with a $1.00 daily fee in specified activity centers within the MPO region. While more workers and non-work trips would be subject to parking fees, the average fee in the region decreases for those facing a parking cost.

Note: See *Appendix A* for a detailed description of sensitivity test inputs and assumptions.

In addition, one scenario included in Figure 5 shows the impact of a higher level of electric vehicle purchases and use (increasing the EV/PHEV share to 14% of the region's vehicle mix) added to the most ambitious local strategies (Local Level 3) and state-led pricing strategies (Pricing Level 3). While this scenario shows the most substantial GHG reduction, note that vehicle improvements are not generally incorporated into comparisons with the state's GHG reduction target for the region and should be considered separately from the other scenarios.

Figure 5. Impact of More Ambitious Scenarios on GHG Reduction

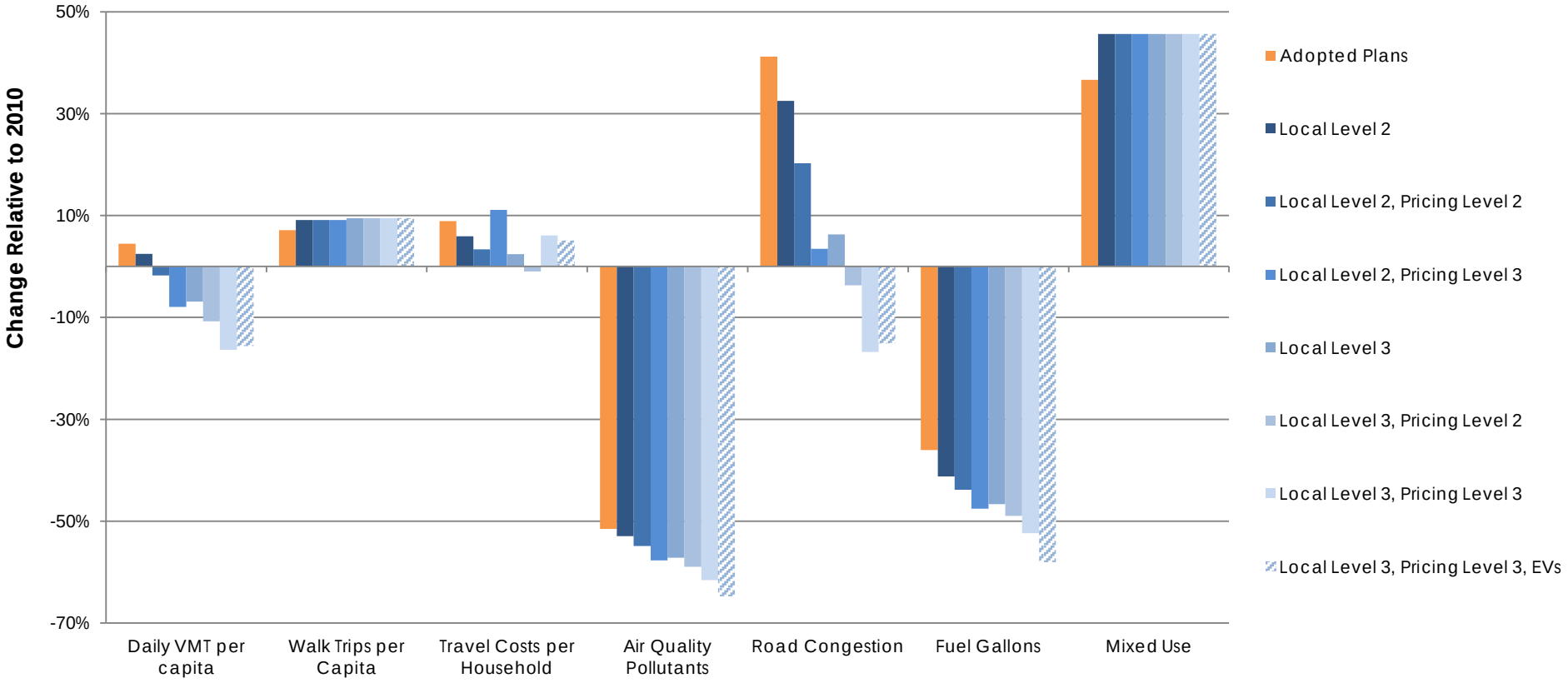


* Noted as guidance, as future year results for 2038 are not fully comparable to the 19% 2035 GHG Target.

More ambitious policies at the local level related to transit, SOV trip diversion to light vehicles, ITS and demand management programs, parking management, and land use all contribute towards GHG reductions, but may be financially and politically challenging to implement in the near-term. Likewise, regional consideration of pricing policies, which have the most significant influence on the region's capacity to reduce GHG emissions, will be needed, whether in terms of local level promotion of pay-as-you-drive insurance, or support for state level pricing initiatives such as a vehicle-miles-traveled fee or carbon tax. An additional regional approach could focus on the promotion of clean and efficient vehicles and fuels, both at the local level by implementing full CNG conversion to RNG and by supporting state-led vehicle technology enhancements and promoting an increased share of electric vehicles in the state's vehicle mix.

Policies and programs that work to reduce GHG emissions also impact other regional outcomes of importance. Figure 6 shows more ambitious local policies combined with ambitious pricing strategies lead to the most substantial reductions in air quality pollutants, delay, daily VMT per capita, and fuel consumption. Household travel costs also decrease from the adopted plans level in each scenario, except for Local Level 2 policies combined with Pricing Level 3 strategies.

Figure 6. Impact of More Ambitious Scenarios on Other Regional Outcomes



Keeping Transportation Affordable

When vehicle miles traveled (VMT) per household is high, keeping vehicle operating costs down has significant impact on transportation costs. These include shifting to the new more fuel efficient vehicles, or even slowing vehicle turnover which keeps people in older less efficient (higher emission) vehicles, but driving less. Mid-level pricing strategies such as VMT fees and increasing parking fees can also improve affordability if they reduce VMT without undue burden on household budgets where affordable transportation options (transit, biking, and walking) are available. However, these same strategies may lead to increased transportation costs for households in auto-dependent areas.

Significant focused investments in transit and bike infrastructure are another way local/regional actions can lead to annual travel cost savings per household. Such policies can be particularly effective if access to these alternative modes support reduced auto ownership. Doubling 2010 transit service levels also results in approximately 300,000 gallons of annual fuel savings, while increasing transit by four times the 2010 regional service level results in approximately 750,000 gallons of annual fuel savings. The fuel savings for households and businesses would be expected to result in a significant economic benefit to the region.

On their own, aggressive pricing strategies such as VMT fees and increasing parking fees have a strong effect on reducing VMT, congestion, and improving air quality. However these strategies increase the cost of transportation for households and hit those with limited incomes particularly hard. Retaining affordable housing in mixed-use areas that provide transportation options can help these households retain accessibility with more affordable travel options. Pricing policies, such as VMT fees, could raise annual household transportation costs by up to 25%, with some offsets for those able to shift to alternate modes or pay less insurance due to fewer miles and mileage-based insurance rates. A shift towards newer vehicles will improve air quality and reduce operating costs for households, but will present challenges for low income households as ownership costs increase. Promotion of national car manufacturing leasing programs can increase the affordability of these new vehicles, while continuing to develop mixed-use, transit accessible housing can help provide other low cost transportation options for low-income households.

Future Uncertainties

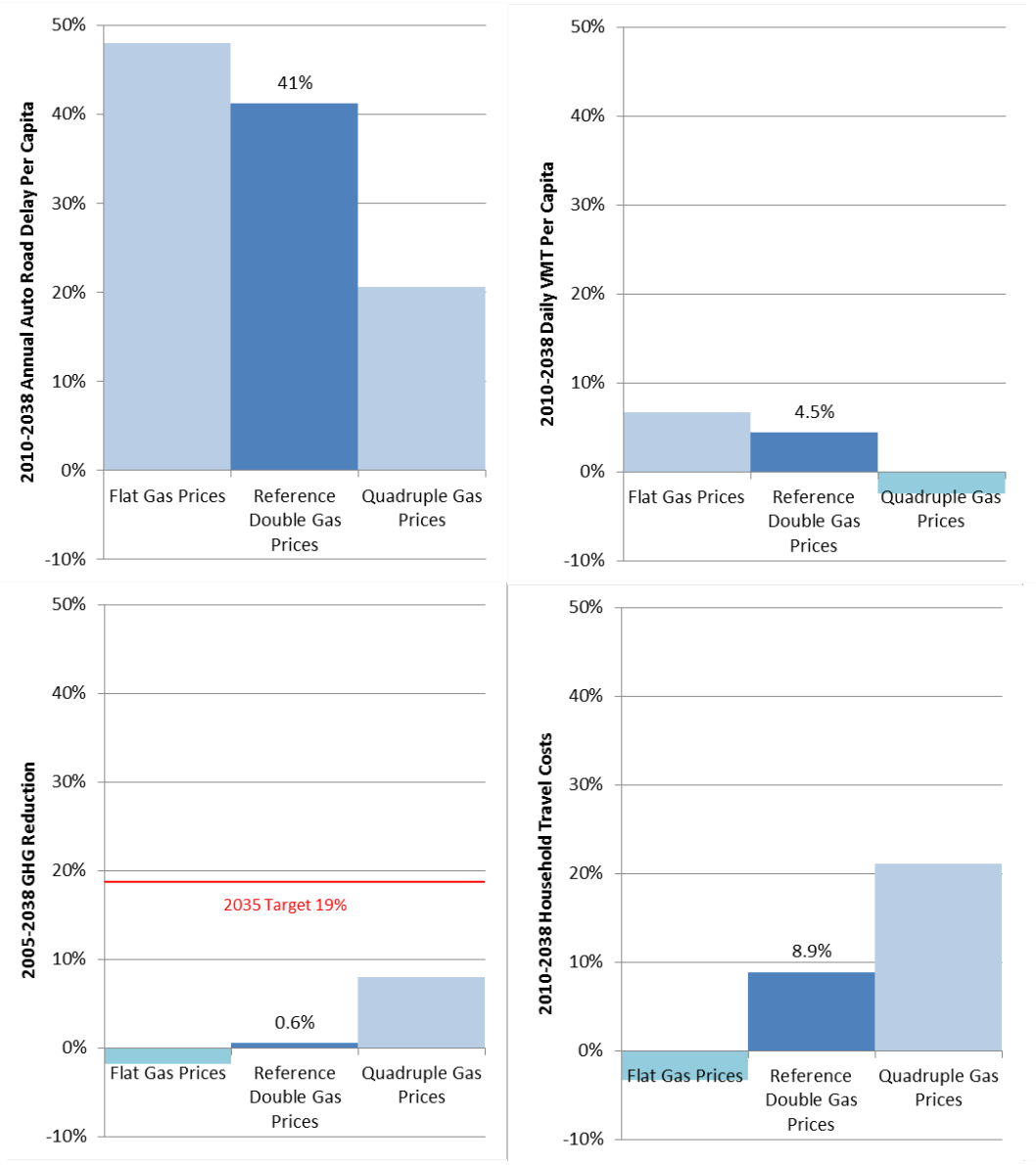
Future uncertainties, some within and some beyond the region's control, will impact the effectiveness of adopted plans. Regional context inputs, such as population growth, household size, and income, in addition to inputs concerning fuel price and funding for local programs (e.g. VMT taxes to cover road maintenance), directly impact the outcomes of adopted plans. Although the future value of these variables is uncertain, the Greenhouse Gas Target Rule (2011) and the Statewide Transportation Strategy (STS) (2012) specify many of the reference input assumptions used in the analysis to date.

Figure 7 illustrates selected RVMPO outcomes under three future 2038 fuel price scenarios: today's fuel price, an estimated doubling of today's price, and fuel price four times that of today. The impact on the regional outcomes of daily VMT per capita, delays, annual household travel costs, and GHG emissions target are shown. The solid blue bar is the adopted plans result shown previously. It uses the fuel price forecast set during the 2010 development of the STS, which had

gas prices nearly doubling by 2038. However, the most recent US Energy Information Administration Annual Energy Outlook shows a flat gas price forecast, largely reflecting increased availability of natural gas in the foreseeable future. The impact of fuel price variability can impact the region's delay and annual household travel costs by roughly 25%, while the adopted plans achievement of the GHG target ranges from a 1.8% increase in emissions in the flat gas price scenario to an 8% decrease in emissions if the price quadruples. In addition, VMT per capita ranges from an anticipated 6.7% increase in the flat gas price scenario to a 2.4% decrease in the quadruple gas price scenario.

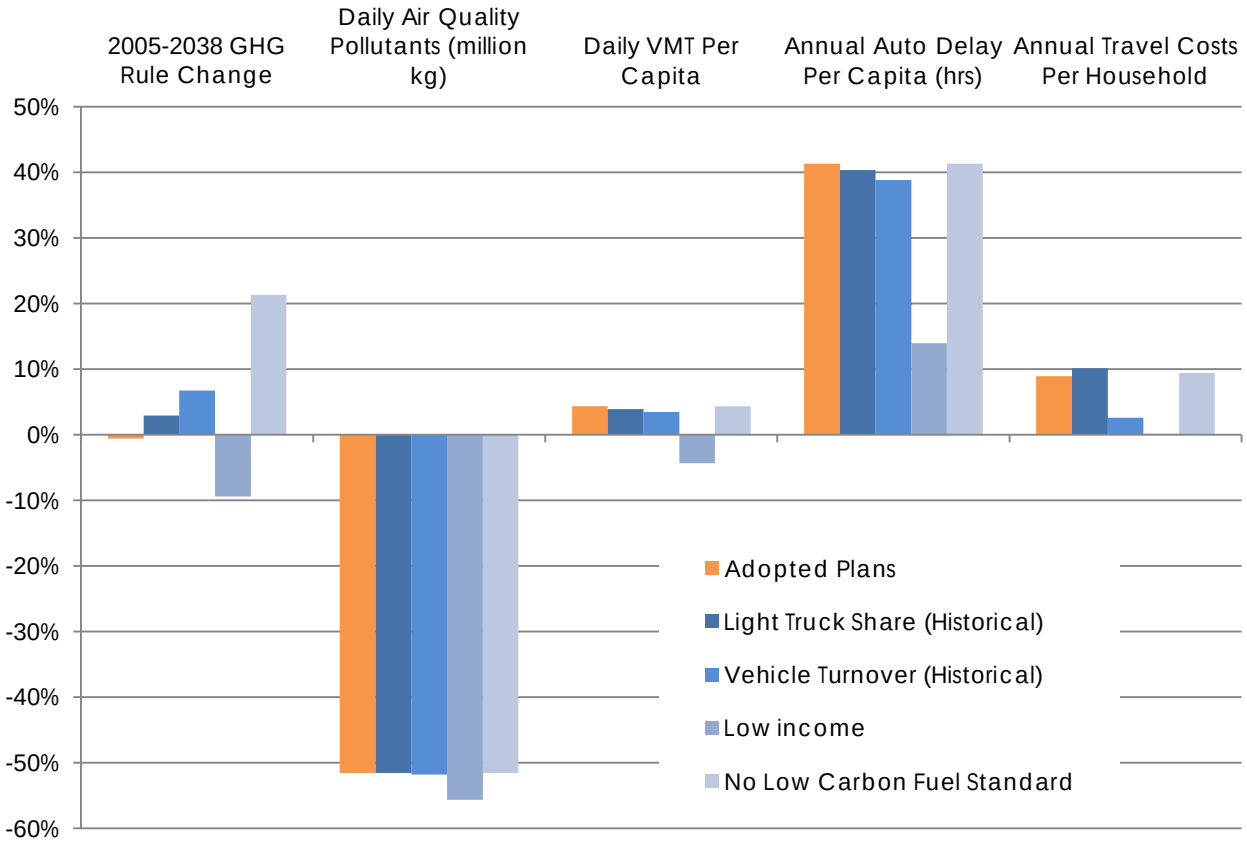
Although future gas prices are uncertain, alternative scenario runs in the model can assess the impact on the effectiveness of the region's plans, and provide options that make the region more resilient to a range of future conditions.

Figure 7. Adopted Plans Resilience to Future Gas Prices (VMT, Delay, Travel Costs, and GHG Emissions)



In addition to fuel price, the region could face additional challenges testing the resilience of adopted plans. The adopted plans scenario assumes 2010-2038 state income will increase by 34.7 percent, consistent with the Statewide Transportation Strategy, which reflects an assumed healthy economy. It also expects vehicle turnover to occur at a faster rate than the historical trend (9 years rather than 10.5 years), households in the region will have a reduced share of light trucks by 2038 (34% rather than 45%), and that low carbon fuel standards will remain in place through the adopted plans horizon year. However, if the economy encounters similar disruptions as the 2008-2012 recession, or if the region maintains the historical rate of vehicle turnover and light truck share, or if low carbon fuel standards are not upheld through 2038, further sensitivity test results (Figure 8) illustrate the impact of such scenarios on key outcomes and the resilience of adopted plans. Regarding impact on GHG reduction, air quality emissions, VMT, delay, and household travel costs, low income growth demonstrates the most variability compared to the adopted plans analysis, whereas the remaining scenarios closely reflect the adopted plans outcomes. One significant outlier is the growth in GHG emissions shown in the event that low carbon fuel standards are removed, which indicates the need additional policies either at the state or local level to mitigate the impact of the fuel standard removal.

Figure 8. Adopted Plans Resilience to Low Income Growth, Vehicle Turnover, Light Truck Share, and Low Carbon Fuel Standards Removal



Low population growth

The adopted plans scenario uses the Jackson County Comprehensive Plan allocation of population forecasts reflected in the RVMPO RTP (2013-2038). An alternate scenario was run that reflects the lower population forecast for the region from Portland State University (PSU) that will likely be used as the official forecast for cities in the region in the next RTP. Relative to adopted plans, lower population growth means less congestion/delay and air quality pollutants with fewer people. However it also reduces mixed-use areas and associated walk and bike trips, with increases to VMT per capita, household travel costs, and GHG emissions. In contrast, the PSU forecast "pattern of growth" channeling increased growth in the activity centers of outlying regions rather than Medford, leads to higher mixed-use, with slight reductions in VMT and household travel costs, and slight improvements in emissions and delays relative to adopted plans. These benefits accrue as more of the population lives within multi-modal mixed-use areas with shorter trip options by non-auto modes. The scenario that combined the slowed population growth and PSU pattern of growth are an approximation of the PSU-based land use forecast expected in the next RTP and had the best reduction in fuel use, air quality pollutants, and delays, while compromising on mixed-use and associated benefits (VMT per capita, active mode use, and GHG emissions). More detail on these scenarios can be found in Appendix A.

Table 7. Findings from Low Household Size and PSU Forecast Scenario

	GHG Target Rule Reduction	Daily Air Quality Pollutants (million kg)	Annual Fuel Gallons (millions)	% Pop in Mixed Use	Daily VMT Per Capita	Annual Bike Miles Per Capita	Annual Walk Trips Per Capita	Annual Auto Delay Per Capita (hrs)	Annual Total Truck Delay (hrs)	Annual Household Travel Costs
Adopted Plans	-0.6%	18.08	41.96	12.9%	24.1	76.6	114.8	28.4	751.8	$ 10,655
Low Pop Growth only	0.7%	16.09	37.25	11.1%	24.5	76.8	111.0	25.1	636.7	$ 10,782
PSU Pattern only	-0.9%	18.04	41.86	13.3%	24.0	76.4	115.7	28.3	749.5	$ 10,631
PSU Growth (low Pop Growth _ PSU pattern)	0.4%	16.05	37.12	11.4%	24.4	76.8	111.7	25.0	634.6	$ 10,756

Key Findings: Options for Rogue Valley Moving Forward

The key findings of the RVMPO strategic assessment are organized by issue area and highlight the key findings of both the initial adopted plans analysis, as well as the sensitivity tests. In addition to these findings, a menu of local policy options is provided to help identify and explore the kinds of actions and programs that can be used to improve mobility, create healthy livable communities, reduce vehicle emissions, and meet other community goals, such as economic vitality, increased biking and walking, and vibrant downtowns and activity centers. The local policy options are included as actions, programs or policies for local jurisdiction consideration.

Mobility

Strategic Assessment Output Measure:
Daily Vehicle Miles per Capita
Travel Delay
Transit Service Trends

A regional transportation system provides for the mobility of people and goods, and influences the patterns of growth and economic activity through the accessibility to land. Providing a balanced transportation system ensures access to all parts of the region with transportation choices that are reliable, accessible, and cost-effective. Goal 1 of the Regional Transportation Plan reflects the importance of providing a balanced, multi-modal transportation system.

Adopted Plans

Population growth means traffic delay increases significantly (41%), even though vehicle miles traveled (VMT) per capita increases only slightly (4%). Transit service miles per capita decrease significantly (-35%). Key factors include the expected growth in income, which coupled with lower expected auto operating costs, increases the demand for automotive travel. Transit investments also play a key role, as transit investment does not keep up with population growth.

Sensitivity Tests

Sensitivity tests reveal that no single policy, outside of aggressive pricing schemes or a drastic increase in gas prices, will on its own bring down the delay expected to occur. ITS policies and transit service have only minor impact on delay. Aggressive pricing strategies also have a strong effect on bringing down VMT, from 24.1 to 23.0 daily vehicle miles traveled per capita. However, if gas prices stay flat, VMT per capita could increase even further.

Menu of Local Policy Options

Enhance public transit:

- Seek property tax increase to maintain and expand service
- Implement fare-free transit service funded via a Transit Operations Utility Fee
- Expand partnerships to implement bus corridor improvements and seek resources for youth bus passes and reduced fares for low-income customers

Expand workplace TDM and household transportation options programs

Support statewide pricing efforts such as a VMT fee or pay as you drive insurance

Continue support of increased rail use for freight

Livable Communities

Providing Housing Options for a Changing Population

Strategic Assessment Output Measure:
Population Living in Mixed-Use Areas
Single-Family to Multi-Family Ratio
New dwelling unit type diversity

Household sizes are shrinking and the population is aging. These demographic changes combined with the collapse of the housing market in 2008 affect the demand for multi-family housing and single-family attached housing. Responding to these changes by providing more housing options in mixed-use, walkable areas with convenient access to goods and services could profoundly affect transportation behavior.

Adopted Plans

The adopted plans scenario shows that the region is making progress towards creating compact livable communities with more residents in mixed-use areas and a richer mix of housing options. Key factors include the focus of growth in activity centers and multi-family housing development policies. A challenge for the region is to continue to provide affordable housing near mixed-use and transit-served areas.

Menu of Local Policy Options

Expand programs that encourage residential development in activity centers:

- Multi-unit Property Tax Exemption to stimulate the construction of housing in the core downtown areas
- Adopt a Vertical Housing Development Zone to provide property tax exemptions for mixed-use projects to encourage development within activity centers
- Establish downtown revitalization loans to encourage investments in downtowns
- Residential Development Fee Reduction Program within activity centers
- Reduce parking standards in downtowns and activity centers

Sensitivity Tests

Sensitivity testing reveals that land use changes alone have a limited effect on changing people's driving behavior. Steering more new development toward transit accessible areas and activity centers, the percentage of population living in mixed-use areas increases, but without other supportive policies in place, it will have limited returns on VMT and emissions reduction. Land use policies on their own have the strongest pull on walk trips per capita, by shortening trip lengths and making walking more convenient. The low cost travel options in compact mixed-use communities also provide resilience for lower income growth or high fuel price uncertainties.

Improving Public Health and Reducing Health Care Costs

Strategic Assessment Output Measure:
Air Quality Pollutants
Walk Trips Per Capita
Daily Miles Traveled by Bike Per Capita

Air pollution is a leading threat to public health. People exposed to high levels of air pollution have more heart and lung problems. Therefore, improvements in air quality can aid efforts to improve public health. Increased use

of active transportation (walking and biking), reduced VMT, and cleaner vehicles and fuels can help reduce air pollutants, such as particulates, from transportation. Likewise, a growing body of research demonstrates the connection between biking, walking and other active travel and improved health. A national obesity epidemic poses individual health concerns while causing health care costs to rise. Since 1990, Oregon's adult obesity rate has risen by 121 percent.[ii] Today, about 60 percent of Oregon adults are overweight or obese, which can be mitigated, at least in part, by a more active lifestyle. Obesity leads to other health problems, including diabetes, heart disease, stroke, arthritis and cancer. In 2006, the cost of obesity-related illnesses in Oregon exceeded $1.5 billion.[iii] Auto crashes also have significant health and property impacts.

Adopted Plans

Public health is likely to improve due to improved air quality, safer vehicles, and increased use of active transportation options. Criteria air pollutants emitted from light duty vehicles are expected to drop 52% from 2010 levels, primarily as a result of cleaner vehicles. New vehicles are also slated to significantly improve auto safety, although enabling access for all income groups to new vehicles is a regional challenge. Walk and bike modes show an increase of 2% and 34% respectively due to local efforts to promote walking and biking combined with supportive land use. In addition, these modes provide low cost transportation options.

Sensitivity Tests

Two policy options have a strong effect on air quality: aggressive pricing strategies and turnover of vehicles in the fleet. The compact land use scenarios alone had a strong effect on health through increased use of active modes, such as walk trips, while policies aimed at increasing bicycling pushed the annual bike miles per capita significantly higher than the adopted plans scenario.

Menu of Local Policy Options

Develop facilities that encourage pedestrian travel and bicycling:

- Add bike lanes and pedestrian paths to, from and amongst neighborhoods and activity centers to the local and regional non-motorized transportation network
- Complete system gaps to increase walking and biking connections,
- Integrate mid-block connections (paths, stair-climbs, etc.) into urbanized and developing neighborhoods to promote inter-neighborhood and cross-town pedestrian access
- Enhance overall walking and biking safety through lighting, street design, education, and similar efforts
- Provide bike parking facilities in all new multi-family residential developments of 4 or more units and in all commercial, industrial, recreational, and institutional facilities

[ii] Oregon Health Authority, *Oregon Overweight, Obesity, Physical Activity and Nutrition Facts*, 2012.
[iii] Oregon Health Authority, *Oregon Overweight, Obesity, Physical Activity and Nutrition Facts*, 2012.

Keeping Transportation Affordable

Strategic Assessment Output Measure:
Annual household vehicle ownership cost
Annual household vehicle operating cost

Transportation is second only to housing as the biggest expense for Oregon families. The average household spends about 18 percent of its income, or more than $12,000 a year, on transportation.[iv] In some areas, lower-income households spend even more.[v] The American Automobile Association (AAA) estimates that the cost of driving has increased by 17 cents per mile, from 41 cents to 58 cents, between 1995 and 2015.[vi]

The move toward more fuel-efficient vehicles will decrease the fuel price per mile; however, gas price increases may offset the cost savings. In addition, new high-efficient electric and plug-in vehicles are still cost prohibitive for much of the driving public. Building communities that reduce reliance on auto trips and promote walking, cycling, and transit usage can help families cut their transportation costs, especially if households can own one less vehicle, and provide alternatives when gas prices increase and until new vehicles are more widely affordable.

Adopted Plans

Household transportation ownership costs are likely to increase due to the purchase of newer vehicles, while operating costs for these vehicles decrease. Newer, more fuel-efficient vehicles are cheaper to operate, but will be more expensive for households to purchase. The cost savings of fuel efficiency is offset somewhat by the assumed increases in fuel price. Promotion of national car manufacturing leasing programs can increase the affordability of new vehicles, while continuing to develop mixed-use, transit accessible housing can help provide other low cost transportation options for low-income households. It is important to remember that vehicle costs are highly susceptible to future uncertainties related to fuel price and income growth.

Sensitivity Tests

Pricing strategies such as VMT fees and increased parking fees have a strong effect on reducing VMT, congestion, and improving air quality. However, these strategies increase the cost of transportation for households. Pricing policies, such as VMT fees and cash out parking policies, could raise annual household transportation costs by up to 25%. A shift towards newer vehicles will improve air quality and reduce operating costs for households, but will present challenges for low-income households as ownership costs increase.

Menu of Local Policy Options

Improve access to lower-cost transportation options:

- Invest in public transit enhancements to increase service coverage and frequency
- Promote affordable housing near transit lines
- Partner with employers and community development organizations to provide subsidized ridesharing
- Provide assistance to low-income families to acquire low-emission vehicles

[iv] US Census Bureau, Bureau of Labor Statistics, *Consumer Expenditure Survey*.
[v] Portland Planning and Sustainability Commission, *Housing and Transportation Cost Study*, 2010.
[vi] American Automobile Association, *Your Driving Costs*, 1995 and 2015 Editions.

Environment

Air Quality and Greenhouse Gas Emissions

Strategic Assessment Output Measure:
Greenhouse Gas Emissions
Criteria Air Pollutants

Many of the strategies suggested to reduce greenhouse gas emissions will also improve air quality and help create more livable communities. Over the next several decades, existing Federal and State-led-policies on new vehicle standards and fuel will significantly change vehicle emissions. Building communities and a transportation system that enables people to drive less and use transportation options also helps to reduce emissions.

Adopted Plans

Air quality in the Rogue Valley is expected to improve as a result of adopted plans, both greenhouse gases and criteria air pollutants per capita are expected to decline. By implementing adopted plans alone, greenhouse gas emissions are expected to decrease 0.6% by 2038, but when considered in combination with state and federal improvements to vehicles and fuels, the overall per capita GHG reduction in the region is expected to be 64% from 2005 levels. When combined with potential state-led actions implemented at the local level (e.g. ambitious policies addressing pay-as-you-drive insurance, eco-driving, low-roll-resistant tires, or a carbon tax), RVMPO can expect a 16% GHG reduction by 2038. However, much more work will be needed at the state and local level for the region to reach the 19% GHG reduction target. Of the 0.6% reduction due to local adopted plans, 0.1% can be attributed to local compressed natural gas (CNG) facility plans for partner agency fleet vehicles through 2030. The changes expected to occur in the vehicle fleet will provide the bulk of the expected decrease in emissions as a result of older high emission vehicles being cycled out of the fleet and the benefit of more fuel-efficient vehicles and cleaner fuels.

Sensitivity Tests

Pricing and benefits from improved vehicle fuel economy and lower carbon fuels expected in the future had the strongest single effect on reducing GHG and criteria air pollutants. Conversion of local CNG to captured Renewable Natural Gas (RNG) from the landfill doubled its impact on GHG emissions (0.5% additional reduction compared to adopted plans alone).

Sensitivity tests show that reaching the GHG target is feasible, and the region has choices among over 200 combinations of more ambitious policies (beyond enhancements to vehicles and fuels) that meet the GHG target.

Menu of Policy Options

Shift to cleaner, more efficient vehicles and fuels and aggressive pricing strategies:

- Support state-led pricing policies
- Consider local gas tax increase or regional carbon tax
- Aggressive adoption of EVs/PHEVs

Aggressive programs and pricing:

- Aggressive ITS and driving efficiency programs
- Aggressive investment in public transit, TDM, biking and walking enhancements
- Encourage activity center growth to reduce trip length and increase walking and biking
- Support state-led pricing policies

While no one area of emphasis will enable the region to meet the target, the region can choose from among several variations of ambitious local policies combined with supporting state-led pricing strategies to meet its goals.

Improving Energy Efficiency and Reducing Energy Use

Strategic Assessment Output Measure:
Annual fuel consumption per capita
Annual vehicle miles per gallon

Oregonians drive about 39 billion miles and consume 1.5 billion gallons of gasoline every year. The fuel cost alone accounts for 7 percent of their disposable income.[vii] Additionally, all of Oregon's gasoline is imported, meaning the profits from its sales are not re-invested in the state's economy. Studies have also shown that reducing auto use frees up road capacity, which enables more efficient freight operations. For example, if a delivery truck can make a couple additional stops each day due to reduced congestion, fewer routes can be scheduled to serve the same deliveries. Thus, reducing energy use can help households, businesses, and the state's economy save money.

Adopted Plans

The energy used by households on transportation in the future is expected to decline by 57% of 2010 levels as fuel economy improves (from 24 to 57 average MPG). However, financially constrained adopted plans assume no new transit service by 2038, reducing service per capita as population grows.

Sensitivity Tests

A more ambitious doubling of 2010 transit service levels by 2038 results in approximately 300,000 gallons of annual fuel savings. Increasing transit by four times results in approximately 750,000 gallons of annual fuel savings. State plans also assume a reduction in light trucks for household use, which may be a challenge for the region.

Menu of Local Policy Options

Encourage shift to cleaner, more efficient vehicles and fuels:

- Promote the shift to RNG from landfill sources
- Support state-led pricing policies
- Consider local gas tax increase or regional carbon tax

Promote use of non-SOV transportation options:

- Invest in public transit enhancements
- Encourage activity center growth to reduce trip length and increase walking and biking

[vii] Oregon Energy Task Force, *Recommendations to Governor John Kitzhaber*, 2012.

Chapter 6: Conclusion

The Rogue Valley has a history of regional planning and collaboration, built around a common goal of building healthy communities where residents have a variety of housing and transportation options. This strategic assessment shows that by fully implementing local plans, the region will enjoy several positive outcomes, including modest progress in reducing greenhouse gas emissions. The assessment also shows that there are a number of strategies and actions that can help the region achieve its goals related to mobility, livable communities, air quality, transportation costs, public health, and greenhouse gas emissions.

This report provides the region with new information about the likely outcomes of existing plans, and new tools – Regional Strategic Planning Model (RSPM), Place Types, and a local policy toolkit – that can be used to help decision makers evaluate policy levers for the future. Equipped with this information, the Rogue Valley metropolitan area can continue to advance its planning practices to reach the community goals desired by its residents. This report is intended to help start this conversation.

Next Steps

There are several options for next steps by either RVMPO or member local governments to build on results of the strategic assessment. At a minimum, the information provided in the strategic assessment, including the more detailed information on inputs, assumptions, and sensitivity testing in the appendices, will help to inform future plan updates and investment decisions. The result of the adopted plans analysis and the sensitivity testing show how well the region fairs on a number of regional goal areas. Using this information, planners, local officials, and others can consider policies that may help the region improve on certain measures, whether it be reducing emissions, increasing mixed-use areas, or reducing delay to improve freight mobility, when updating or implementing the following:

- Regional Transportation Plan/Transportation System Plans – evaluate impact of policies to goal areas and policies to best achieve the desired mix of goals; use place types to assist in land use forecasts;
- Transit plan – leverage the strategic assessment to help the business case for continued and/or additional funding for transit service; and
- Renewable CNG – quantify impacts on emissions and support the business case in searching for RNG conversion funding and promoting the effort with new fleet partners.

Opportunity for further analysis

Further analysis, beyond the strategic assessment, ranges from simpler efforts, such as scenario analysis, to more complex scenario planning efforts. The primary consideration for the MPO when deciding to pursue either scenario analysis or scenario planning is whether the desired outcome for further analysis is to support specific decision-making or to establish a preferred scenario – a single agreed upon vision.

Scenario analysis allows for investigation of potential policy scenarios that the MPO could consider incorporating into its future planning processes. The analysis utilizes RSPM to quantify the effects of various combinations of land use and transportation policy choices. Scenario analysis provides the MPO with a method to investigate the tradeoffs associated with implementing a number of different policy scenarios, which are driven by the specific interests

of regional stakeholders. The MPO Staff, Policy Committee, and other stakeholders can then use the results of the analysis to inform policy discussions and guide decisions during the development of future land use and transportation plans, including the federally required Regional Transportation Plan and the state mandated Regional Transportation Systems Plan. ODOT and DLCD can provide financial and technical support in a manner similar to the Strategic Assessment.

Through formal scenario planning, the region could more fully evaluate a range of land use and transportation policies and actions to reduce greenhouse gas emissions and address other issues of importance to the region. As a collaborative process that requires the engagement of various stakeholders, including local jurisdictions, transit agencies, and others, scenario planning would evaluate the impacts of alternative land use and transportation futures for the region to identify a preferred scenario that would be endorsed and adopted by RVMPO member governments. For example, many metropolitan areas around the country have used scenario planning to guide the update of the federally required Regional Transportation Plan.

The state, through ODOT and DLCD, supports and encourages metropolitan areas to engage in scenario planning. Specifically, through contracts negotiated by ODOT, metropolitan areas can request financial and technical assistance. Both ODOT and DLCD offer technical support in the form of data collection and communication and ODOT conducts modeling and analysis. In addition, regions may tailor the scenario planning process to ensure the timing aligns with existing efforts and complements other plan update processes, depending on availability of state financial and technical resources.

APPENDICES

Appendix A. Sensitivity Test Inputs and Assumptions

The RSPM analysis of the adopted plans scenario (Table 4) estimates where the region is now, and where it is likely to be in the future, based on adopted plans. The natural question that follows is, what will it take to further reduce greenhouse gas emissions and to improve other outcomes of importance to the community, such as public health? What will be the most cost-effective way to achieve these goals? "Sensitivity Testing" using the RSPM model allows the region to evaluate how changes to key factors or policies could affect expected outcomes.

To better understand the possibilities and challenges facing the region, sensitivity tests were performed. Sensitivity testing analyzes different combinations of policies to identify which combinations are most effective in achieving different outcomes. Sensitivity tests represent alternative futures and demonstrate how different choices about regional growth and investment, beyond those in the region's adopted plans, affect various outcome measures.

TESTING SENSITIVITY TO POLICIES

- **Base Year - 2010**
- **Level 0 - Less Ambitious**
- **Level 1 - Adopted Plans**
- **Level 2 - More Ambitious**
- **Level 3 - Most Ambitious**

Table 5 outlines the policy bundles evaluated as part of sensitivity testing. Due to the multiple combinations that could potentially be tested in these alternative scenarios, the policies and levels of ambition were limited to those outlined in the table. If the region decides to move forward with scenario planning, many more possible combinations of policies and levels could be evaluated.

The assumptions used in the RSPM analysis are based on the adopted comprehensive plans and zoning implemented by the local jurisdictions in the region, existing and projected parking management strategies, existing and projected transit service levels and goals and policies in RVMPO's adopted Regional Transportation Plan. Some of the inputs required by the RSPM are not specifically addressed in these plans and policies. For those inputs, the RSPM assumptions were developed in partnership with RVMPO, Rogue Valley Transportation District, and local jurisdiction staff to ensure realistic and financially reasonable assumptions.

Over 20,000 model runs were performed as part of sensitivity testing to assess the effect of more ambitious policy actions in the RVMPO region. More specifically, over 200 scenarios (using reference income and fuel price forecasts) meet the greenhouse gas reduction goal of 19 percent beyond existing vehicle and fuel changes.

A more detailed discussion of the assumptions made in the many sensitivity test runs completed is included below. Table A1 identifies the effects of each of these policies implemented in isolation in comparison to adopted plans outcomes. This table presents not only the GHG reduction impact, but also other performance measures important to the region, such as household travel costs, delay, daily vehicle miles traveled per capita, air quality pollutants, fuel consumption, walking and biking activity, and proportion of the population in mixed-use areas.

Table A1. RVMPO Sensitivity Test Results for Policy Actions in Isolation (2038 RVMPO Output Measures)

			Environment					Land Use	Mobility			Economy		
Policy Bundle	Sensitivity Test	Description	2005-2038 GHG Rule Change	2005-2038 GHG Per Capita Reduction	Annual GHG Per Capita (metric tons)	Daily Air Quality Pollutants (million kg)	Annual Fuel Gallons (millions)	% Pop in Mixed Use	Daily VMT Per Capita	Annual Bike Miles Per Capita	Annual Walk Trips Per Capita	Annual Auto Delay Per Capita (hrs)	Annual Total Truck Delay (hrs)	Annual Travel Costs Per Household
	Adopted Plans		-0.6%	-65.42%	1.071	18.08	41.96	12.9%	24.1	76.6	114.8	28.4	751.8	$ 10,655
State-Level Actions	Vehicles	Vehicle Fleet (STS, 14% EV/PHEVs)*	-7.0%	-67.62%	1.003	16.94	37.47	12.9%	24.2	76.8	114.8	28.7	756.5	$ 10,451
		Slow Veh Turnover (historical rate)	**6.7%**	**-62.9%**	**1.15**	17.98	**45.24**	12.9%	23.9	75.9	114.8	27.9	**742.8**	**$ 10,037**
		Light Truck share (hold to historical)	**2.9%**	**-64.2%**	1.11	18.07	43.55	12.9%	24.0	76.3	114.8	28.2	748.6	$ 10,776
	Fuels	Without low carbon fuel standard thru 2038	21.3%	-57.8%	1.31	18.08	41.96	12.9%	24.1	76.6	114.8	28.4	751.8	$ 10,703
		Without local CNG	-0.5%	-65.4%	1.07	18.08	41.96	12.9%	24.1	76.6	114.8	28.4	751.8	$ 10,655
		CNG to RNG	-1.1%	-65.6%	1.07	18.08	41.96	12.9%	24.1	76.6	114.8	28.4	751.8	$ 10,655
		Cleaner Electric Utility	**-2.3%**	**-66.0%**	**1.05**	**18.08**	**41.96**	12.9%	24.1	76.6	114.8	28.4	**751.8**	**$ 10,652**
	Pricing	PAYD Ins, Renewable Elec Rates	**-5.5%**	**-67.1%**	**1.02**	**17.26**	**39.91**	12.9%	**23.0**	73.5	114.8	25.6	705.3	$ 10,381
		VMT Fee, Social Cost/Carbon Tax	**-5.6%**	**-67.2%**	**1.02**	**17.23**	**39.84**	12.9%	**23.0**	73.5	114.8	**25.5**	**704.2**	**$ 11,661**
Community Design	Land Use	Activity Center Growth Pattern	-1.2%	-65.6%	1.07	17.98	41.70	**13.8%**	24.0	76.5	**116.7**	28.1	746.7	$ 10,617
	Roadway Investment	Add 19 lane-miles new roads	-0.7%	-65.4%	1.07	18.08	41.93	12.9%	24.1	76.6	114.8	27.6	**728.0**	$ 10,653
	Transit Investment	Transit - 2x 2010 service (1.2M, 4.6/capita)	-1.3%	-65.7%	1.06	17.96	41.66	12.9%	24.0	76.4	**115.0**	28.1	746.0	$ 10,602
		Transit - 4x 2010 service (2.4M, 9.2/capita)	-2.4%	-66.0%	1.05	17.75	41.21	12.9%	23.7	76.1	**115.5**	**27.3**	**735.2**	**$ 10,498**
	Light Vehicle Promo	Bike diverts 10% (doubled)	-1.5%	-65.7%	1.06	17.92	41.59	12.9%	23.9	**153.1**	114.8	**27.9**	743.1	$ 10,619
		Major SOV diversion (Elec-Bike diverts 55%)	**-9.4%**	**-68.5%**	**0.98**	**16.51**	**38.26**	12.9%	**22.0**	**842.0**	114.8	**23.1**	**662.5**	**$ 10,293**
	Parking Policies	Activity Center $1 Fee (9%wk,4%nonwk)	-0.7%	-65.4%	1.07	18.08	41.94	12.9%	24.1	76.5	114.8	28.4	751.5	$ 10,688
		Cash-Out-Buy Back (7%workers)	-1.6%	-65.8%	1.06	17.86	41.54	12.9%	23.8	75.7	114.8	27.7	**739.8**	**$ 11,024**
Marketing & Incentives	Driving Efficiency	ITS (STS levels)	-0.7%	-65.4%	1.07	18.08	41.94	12.9%	24.1	76.6	114.8	27.9	**736.2**	$ 10,654
		EcoDrive, Low Roll Tires Programs	-2.2%	-66.0%	1.05	18.10	41.29	12.9%	24.1	76.6	114.8	28.5	753.1	$ 10,608
	Demand Management	Carsharing (20->54 veh, Medford+)	-0.8%	-65.5%	1.07	18.05	41.88	12.9%	24.1	76.4	114.8	28.4	750.3	$ 10,640
		TDM/IM (7%, 3x home and 1.5x work)	-1.1%	-65.6%	1.07	18.01	41.77	12.9%	24.0	76.5	114.9	28.2	748.1	$ 10,631
Context Setting	Income Growth	Low Inc growth (cut in half)	**-9.4%**	**-68.5%**	**0.98**	**16.54**	**38.21**	13.0%	**22.1**	**71.3**	**111.9**	**22.9**	**486.6**	**$ 9,798**
		High Income Growth (1.5x)	**2.8%**	**-64.2%**	**1.11**	**18.67**	43.38	13.0%	**24.9**	**78.6**	**116.3**	**30.7**	**884.4**	**$ 10,992**
	Population Changes	Low household size	-0.3%	-65.3%	1.08	18.13	42.07	**13.3%**	24.2	**84.0**	**118.2**	**28.7**	**755.3**	**$ 9,849**
		Low Pop Growth (approx PSU)	**0.7%**	**-64.9%**	1.09	**16.09**	**37.25**	11.1%	24.5	**76.8**	**111.0**	**25.1**	**636.7**	**$ 10,782**
		Low Pop Growth + PSU LU pattern	**0.4%**	**-65.1%**	1.08	**16.05**	**37.12**	11.4%	24.4	**76.8**	**111.7**	**25.0**	**634.6**	**$ 10,756**
	Fuel Price	Flat Fuel Cost ($2.50/gallon)	**1.8%**	**-64.6%**	1.10	18.47	42.99	12.9%	24.6	**77.9**	114.8	**29.8**	**772.7**	**$ 9,461**
		Fuel Cost doubles ($10/gallon)	**-8.0%**	**-68.0%**	**0.99**	**16.86**	**38.82**	12.9%	**22.5**	**72.2**	114.8	**24.3**	**683.8**	**$ 11,852**

2010-2038 GHG Per Capita Reduction	2010-2038 reduction in GHG per capita from light vehicles on MPO area roads including reductions from fleet changes
Annual GHG Per Capita (metric tons)	2038 Annual per capita metric tons of CO2e emitted by light duty vehicles on MPO area roads
Daily Air Quality Pollutants (million kg)	2038 Daily million kilograms of HC, CO, NOx emitted by MPO residents
Annual Fuel Gallons (millions)	2038 Annual gasoline equivalent gallons of fuel consumed by MPO light duty vehicles
% Pop in Mixed Use	2038 Proportion of MPO population living in urban mixed-use neighborhoods
Daily VMT Per Capita	2038 Average daily per capita VMT of MPO households
Annual Bike Miles Per Capita	2038 Average annual per capita bike miles of MPO households
Annual Walk Trips Per Capita	2038 Average annual per capita walk trips of MPO households
Annual Auto Delay Per Capita (hrs)	2038 Annual hours per capita of light duty vehicle delay on MPO area roads
Annual Total Truck Delay (hrs)	2038 Annual hours of truck delay on MPO area roads
Annual Travel Costs Per Household	2038 Average annual MPO household vehicle operating cost (including parking), ownership costs, and social costs (in 2005$)

Note: All monetary units are in 2005 dollars.

State-led Actions

Vehicles and Fuels

The attributes of the vehicles on the region's roadways, including fuel type and fuel efficiency, have a significant impact on the amount of criteria air pollutants and greenhouse gas emitted per mile of vehicle travel and is expected to change significantly in the next 20 years. Assumptions about the future vehicle fleet, fuels, and technology result in significant improvements in air quality, fuel consumption, and operating cost. The Level 2 vehicle inputs match the STS assumptions, but are more aggressive than the values used in the GHG target rule analysis (adopted plans). In addition, the light truck reduction assumed in the STS for the Rogue Valley is ambitious, given the higher than state average light truck share of household vehicles in the region. Fleet turnover and electric vehicle sales inputs for the future year are also ambitious considering the challenge for low-income households to afford new fuel-efficient or electric vehicles. A Level 0 vehicle scenario assumes vehicle turnover and light truck share are maintained at historic rates, slowing the move to newer more fuel efficient vehicles. A Level 2 scenario capitalizes on the region's current and planned investment in CNG pumping stations, by assuming the full replacement of the CNG gallons assumed in the adopted plans scenario with Renewable Natural Gas (RNG) from the region's Dry Creek landfill; actions that are not yet funded. Another scenario assumes electric utility carbon intensity in the region is cleaned up to the level found today in the City of Ashland's publicly owned electric utility.

Vehicles

	2010	Level 0	Adopted Plans	Level 2
Light Truck Share of Household Vehicles	45%	45%	34%	-
Vehicle Turnover	10.5 yrs	10.5 yrs	9 yrs	-
Electric Vehicle Mix of Vehicle Sales	~0%	-	6% EV	14% EV

Fuels

	2010	Adopted Plans	Level 2
CNG Fuels in Commercial Fleets	115 gal/day	3,400 gal/day	3,400 gal/day
(Gallons per day, CNG/RNG mix)	100% CNG/ 0% RNG	100% CNG/ 0% RNG	100% RNG
Electric Utility Carbon Intensity	1.6 gCO2e, (Ashland 0.128)	0.9 gCO2e, (Ashland 0.128)	0.128 gCO2e

Pricing

Mileage fees, including a VMT fee, carbon pricing, gas taxes, and pay-as-you-drive insurance (PAYD) are potential state-led pricing actions, which move towards full-cost pricing and are some of the most effective policies related to travel behavior. Fuel prices, electric utility prices (as we electrify our vehicles), and other direct costs of driving affect how much individuals drive and choices regarding vehicle and fuel type.

Some prices are beyond local, regional, or even the state's control. To test resilience to different possible futures, sensitivity tests were run assuming different fuel prices in 2038. The adopted plans fuel price is based on the 2010 EIA Annual Energy Outlook forecast used in the STS. More recent EIA forecasts have been lower, given the boom in natural gas in the U.S. A Level 0 scenario assumes gas prices stay at 2010 levels, while a Level 2 scenario doubles the reference price. Additionally, electricity costs in the STS were anticipated to rise as more renewables are added to clean the state's electricity grid and meet the state's GHG goals.

Fuel and Electric Costs

	2010	Level 0	Adopted Plans	Level 2
Fuel Price ($/Gal)	$2.43	$2.43	$5.53	$10
Electricity Cost ($/kwh)	$0.08	-	$0.21	$0.3

Note: All monetary units are in 2005 dollars.

Other pricing policies include actions that can be implemented at the state, regional, or local level. These include a number of pricing actions in the STS vision to meet state GHG goals. Level 2 sensitivity tests are consistent with the future assumptions in the STS, which added a VMT fee to cover road building, operations, and maintenance costs, replacing the current gas tax with a 3-cents-per-mile user fee by the year 2020 for drivers in very congested conditions in Oregon. PAYD insurance is based on the number of miles driven rather than a flat annual rate. The state is considering shifting from the current gas tax to a road user fee that charges by miles driven.

Social costs refer to the unintended consequences of transportation, such as carbon emissions that contribute to climate change, air pollution that causes health and environmental problems, and other such costs to society that are not otherwise paid, directly or indirectly (e.g. cost of congestion or delays caused by traffic incidents), by motor vehicle drivers. The Statewide Transportation Strategy (STS) uses $50 per metric ton of carbon as an estimated cost of CO2 emissions by 2035. The STS expresses the need to restructure funding sources for ground passenger and commercial services, such that a small portion of social costs is paid in the short-term, a greater share in the mid-term and full share in the long-term. A carbon tax is one way to implement the collection of social costs resulting from roadway users.

Because these pricing actions are not currently adopted (insurance companies have just started offering PAYD insurance), they are only included in sensitivity tests and not assumed in the adopted plans scenario. However, the three Level 2 pricing policies noted below are allowed in calculating the region's progress towards reaching the 19% GHG target, but will require support at the MPO level and are not included in the Adopted Plans (Level 1) GHG emissions results.

Pricing Policies

	2010	Adopted Plans	Level 2
VMT Fee ($/mile)	0	0	$ 0.03
Social Cost Recovery Fee ($50/CO2 ton)	0	0	69.4%
Pay as you Drive Insurance (% HHs, $/mi)	0	0	99% at $ 0.05

Note: All monetary units are in 2005 dollars.

Local Actions

For the RVMPO strategic assessment sensitivity testing using the Regional Strategic Planning Model (RSPM), more ambitious community design policy bundles were analyzed beyond that of adopted plans. This section documents the assumptions in these scenarios in regards to land use, parking, bicycles, and transit. These assumptions will be particularly helpful to provide a context of reasonable local actions the region could take in light of other communities within and outside of Oregon, in follow-on scenario planning efforts.

Community Design

Unlike pricing, vehicles, and technology considerations, local governments exert a strong influence over the design of communities, including the amount of mixed-use development and the provision of transportation options. Due to the synergistic effects of these inputs, land use, housing type, parking pricing, light vehicle/bicycling promotion, and transit service are bundled into the community design category. By increasing densities, encouraging transit ridership and alternative modes and dis-incentivizing auto trips by increasing parking fees, these inputs, in combination, are especially effective towards reducing emissions.

	2010	Adopted Plans	Level 2
Allocation of Household Growth	Census	2013-2038 RTP	Activity Centered Growth 25% of HH growth in Activity Centers

Level 2 - Compact Development within Activity Centers

Under this scenario, 25% (8,250) of the regional household growth is redirected to TAZs that are within the Activity Centers identified in RVMPO's Alternative Measures analysis. Growth is only removed and added to TAZs that are within the Urban Reserve Areas (URAs) and UGBs of the cities, while household growth in the unincorporated county remains consistent with the adopted plans.

Household growth is removed based upon the relative proportion of projected growth in the adopted plans, in other words more growth is removed from higher growth TAZs and less growth is removed from low growth TAZs. Household growth removed was assumed to be single

family detached homes or mobile homes, with the resulting density not to exceed 70% of the density (0.02 DUs/acre), the lowest found in the 2038 adopted plans.

Redirected household growth is added to TAZs that are within Activity Centers based upon the proportion of acreage of Activity Center within each TAZ. Keeping with the compact design, the dwelling units added are assumed to be 2+ multi-family apartment units. Zoning capacity limitations are considered by capping development in some districts based on not exceeding development assigned to these districts in the RPS analysis, which takes into account land capacities, zoning, and accessibilities. This capped growth in some districts, including Ashland and downtown Medford.

Roadway Investment

Roadway investments reflect the freeway and arterial lane miles planned to be added to the existing road network. Adopted Plans (Level 1) scenario assumed the financially constrained Tier 1 projects in the 2013 RTP, 28 freeway miles and 33 arterial miles were added to the baseline street network. An alternate scenario was tested which also added the Jacksonville Arterial Connector Refinement Plan (5-lanes, 10 lane miles), the Stage Road Long Term Potential Corridor (3-lanes, 4 lane miles), and the full Hwy 62 Bypass (multi-lane, 5 lane miles).

	2010	Level 0	Adopted Plans
Freeway Lane Miles	90 mi	118 mi	118 mi
Arterial Lane Miles	351 mi	403 mi	384 mi

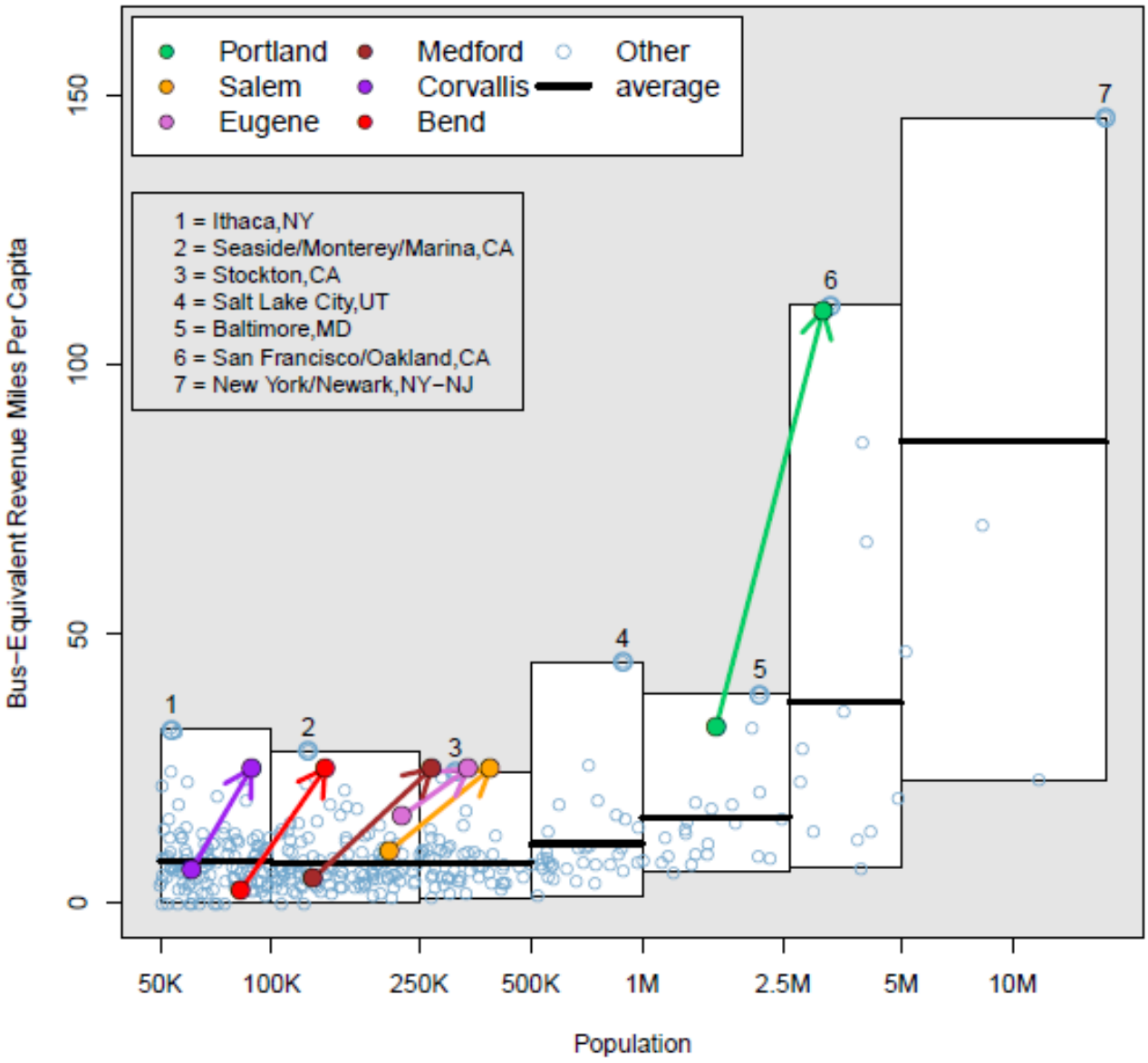
Transit Investment

RVTD fixed route transit service miles per capita were 3.59 service miles per capita in 2010 and with a growing population and no expansion of the transit system in the adopted plans, the service miles per capita drops to 2.33 miles per capita in 2038. Transit investment was tested by doubling the service miles per capita to 4.7 as well as quadrupling to 9.3 miles per capita in 2038 under more aggressive transit investment scenarios. The 2038 transit service levels in the Level 2 and Level 3 scenarios would resemble current service levels in Salem and Eugene, respectively.

	2010	Adopted Plans	Level 2	Level 3
Transit Service Miles per Capita	3.59	2.33	4.7	9.3

Figure A-1 indicates the potential growth in transit service for the Medford area, as compared to additional peer US cities as assumed in the Statewide Transportation Strategy. It shows a range of revenue miles per capita from a level on par with Monterey, CA to a level that reflects service in Stockton, CA. The most ambitious sensitivity test, quadrupling RVTD's 2010 per capita service miles, approximates being on track to meet the 2050 STS transit service level targets.

Figure A-1. U.S. Metropolitan Area Transit Service Levels in 2009 by Population Size (Present and STS Assumed Future Service Levels for Oregon's Metropolitan Areas)



SOV Trips Diverted to Bicycles

In the model, bicycle promotion is represented as the level of diversion of single occupancy vehicle (SOV) trips to light vehicles, including bicycles, electric bicycles, segways, and other light vehicles that may occur in the future. The Oregon Household Activity Survey provided a baseline 3.9% mode diversion to bicycles for trips less than 20 miles. A 5% mode split was tested under the adopted plans scenario and a 10% mode split was tested under a more ambitious Level 2 sensitivity test. Level 3 represents a huge increase in SOV diversion, assuming a revolution in electric bikes and other light vehicles that enables a 55% shift of trips less than 20 miles roundtrip.

	2010	Adopted Plans	Level 2	Level 3
Trips Diverted to Bicycles	3.9%	5%	10%	55%

For context, Table A2 provides data from Portland Metro's background research for the Climate Smart Communities scenario planning effort. It includes bicycle mode share rates and targets in other U.S. and international cities for reference, despite a variety of metrics not fully compatible with the RSPM inputs.

Table A2. U.S. and International Bike Mode Share and Targets

City or region	Current bike mode share	Adopted or defined bike mode share target
Portland, OR	6% (2009 ACS) 7% (2010 Auditor report work trips)	30% of work trips (Draft Portland Plan)
Corvallis, OR	9.4% (2000 Census)	*None*
Davis, CA	14% (2000 census)	25% of all trips by 2012 (adopted in 2009 bike plan)
Boulder, CO	12.3% (2009 ACS) 7% (2000 census) 15.9% (2009 travel diary survey - includes all trips, not just commute)	Increasing bicycle mode share (all trips) at least 4% between 1994 (11.3%) and 2020 (1996 bicycle system plan). (Goal has been met according to travel diary survey results.) Other related targets are: 75% non-SOV mode share by 2020 (2008 Transportation plan) zero growth in VMT from 1994 levels.
Eugene, OR	10.8% (2009 ACS)	Approximately 22% (Draft bike/ped plan has defined a target of doubling bike mode share by 2020)
Seattle, WA region	0.90% (2009 ACS) Seattle-Tacoma-Bellevue MSA	*None*
San Francisco, CA region	1.5% (2009 ACS) SF-Oakland-Fremont MSA	None, but they have a goal to increase active transportation activity per day from 8 to 15 minutes by 2040
Nashville, TN region	0.10% (2009 ACS) Nashville-Davidson-Murfreesboro-Franklin MSA	None
Sacramento, CA region	1.6% (2009 ACS) Sacramento-Arden-Arcade-Roseville, MSA	Double the percentage of all trips made by bicycling and walking in the Sacramento Region from 6.6%in 2000 to 13.2% of all trips by 2020. (Modeled data)
Copenhagen, Denmark	37%	50% by 2015

Parking Policies

Parking fees and cash-out parking programs are community-led actions averaged across the MPO area. Parking fees were tested against existing parking fees in Medford and Ashland, $5.50 and $1 per day respectively. The Level 2 and Level 3 sensitivity tests considered parking fee area expansion to selected activity centers and mixed-use areas across the region as identified in conversations with RVTD. These areas were tested with a $1.00 daily parking fee. The most ambitious scenario (Level 3) adds 7.3% of work trips covered by parking cash-out-buy-back programs, assuming ten large employers and the downtown Medford association members participate. Cash-out-buy-back programs are generally offered by employers that own employee parking lots or Transportation Management Associations (TMAs). They shift the burden of

costly parking from the employer to the employee. The employee is paid for the parking space and can opt to use it to pay for continued use of the parking space or pocket the money and use multi-modal transportation options. Such programs impact travel behavior, reduce the demand for parking and are most effective when coupled with multi-modal transportation incentives.

	2010	Adopted Plans	Level 2	Level 3
Share of Workers Subject to Parking Fees	0.6%	0.6%	8.7%	8.7%
Share of Non-workers Subject to Parking Fee	0.4%	0.4%	3.7%	3.7%
Share of Workers in Cash-out Parking	0%	0%	0%	7.3%
Average Daily Parking Fee	$3.14	$7.00	$1.53*	$1.53*

Note: All monetary units are in 2005 dollars.

* The average daily parking fee is lower in the Level 2 and Level 3 sensitivity tests due to an expanded number of parking fee areas with a daily fee of $1.00 in specified activity centers within the MPO region. In this scenario, more workers and non-work trips would be subject to parking fees, but the average fee decreases across the region for those facing a parking cost.

Intelligent Transportation Systems

Intelligent Transportation Systems (ITS) are operational strategies that smooth out traffic flow using ramp metering, incident response, traffic signal timing, and access management tools. Smoother, more consistent traffic flow results in reduced congestion and emissions as stop/start and idling time goes down. These policies maximize investment in the existing transportation system. ITS implementation is measured by the ITS Program Index, in which a 0.5 represents an average implementation for US cities of similar population. Level 2 reflects more ambitious assumptions used in the STS.

ITS Program Index	2010	Adopted Plans	Level 2
Freeway Ramp Metering	0	0	0.95
Freeway Incident Response	0.2	0.7	0.95
Arterial Signal Optimization	0.35	0.4	0.95
Arterial Access Management	3.9%	0.15	0.3

Marketing and Incentives

Public education and marketing programs include teaching motorists to drive as fuel efficiently as possible and maintain vehicles appropriately, as well as affecting vehicle demand by building awareness of travel choices. These measures are part of transportation demand management programs that can be implemented by businesses, employers, institutions such as universities and hospitals, or local or regional governments. These strategies can be tailored to a particular

audience and can raise public awareness of the benefits of driving less or more efficiently, saving user costs beyond just emissions reduction.

Driving Efficiency

Driving efficiency tests assume marketing tools to promote EcoDriving and fuel saving measures. EcoDriving is a method of driving that improves fuel economy and reduces vehicle emissions by such actions as proper vehicle maintenance, decreasing highway speeds, maintaining steady speeds, and avoiding idling. The STS provides the EcoDriving and Tire program participation levels projected for the Level 2 assumptions. These programs are not included in the adopted plans scenario.

	2010	Adopted Plans	Level 2[ii]
EcoDriving Participation	0%	0%	83.3%
Low rolling resistance tires	0%	0%	82.2%

Demand Management

Transportation Demand Management (TDM) was tested as the percentage of households covered by Individualized Marketing (IM) Programs and the percentage of workers covered by workplace TDM programs. An ambitious scenario was tested which increases the adopted plans participation in IM and TDM to 7% of households and workers, respectively. Sensitivity test levels are based on conversations with Rogue Valley Transit District.

	2010	Adopted Plans	Level 2
Households in IM	0%	2.15%	7%
Workers Covered by TDM	2.6%	4.9%	7%

Car Sharing

Car sharing, a membership-based system of short-term automobile rental, is also tested as a demand management strategy. The adopted plans scenario calls for restoring a broader version of the 2010 Southern Oregon University car share program by 2038, with 20 vehicles across the city of Ashland. A more ambitious Level 2 scenario adds 30 vehicles in Medford at a similar car to population ratio as Ashland, plus adds 2 vehicles in Central Point, and 2 vehicles in Talent. Car sharing services provide benefits of a private vehicle, but without the costs associated with ownership, such as traditional auto loans, maintenance, and insurance costs. Access to car share vehicles, whether peer-to-peer or company-owned, can encourage households to reduce the number of vehicles owned. This reduced auto ownership can lower household transportation

[ii] Denotes inputs the greenhouse gas target rules adopted by the LCDC (Oregon Administrative Rules 660-044) allow. The figure represents implementation of policies or actions identified in the Statewide Transportation Strategy. The target rules allow metropolitan areas to count actions identified in the Statewide Transportation Strategy (e.g. EcoDriving and low-rolling-resistance tires) when evaluating whether or not the metropolitan area is likely to meet the adopted target.

costs significantly. Car sharing also provides additional transportation options and mobility benefits for households that do not own a car.

	2010	Adopted Plans	Level 2
Car Sharing Vehicles	3	20	54

Resilience to External Factors

External socio-demographic factors such as population growth, household size, and income growth directly impact mobility, livability, and air quality. As a household-based model, assumptions of how these variables change over time act as the foundation of the model. Although the future is uncertain, the MPO greenhouse gas target rule and the Statewide Transportation Strategy specify our best estimate for these inputs in 2010. Testing differing levels of these variables demonstrates the resiliency of adopted plans to an uncertain future. Forecast fuel price, another uncertain external factor, is discussed with state-led pricing options.

Population

Demographics have a large impact on housing and travel demand. The sensitivity tests evaluated alternative population growth and alternative household size assumptions.

The adopted plans scenario uses the Jackson County Comprehensive Plan population forecasts reflected in the RVMPO 2013 RTP. An alternate scenario reflects a lower population forecast that approximates the growth from Portland State University (PSU) that will be the official forecast for cities in the region in the next RTP. This lower forecast (1.0% vs. 1.6% compound annual growth) was used to scale back equally across all locations the growth assumed in the adopted plans and Level 2 Activity Center allocation of growth. A special scenario was run with lower population growth combined with the PSU allocation of growth, as discussed below.

In the adopted plans scenario, the future household size is held constant at 2010 levels. Although most studies show reductions in household size, a realistic value is unclear. Instead, sensitivity tests include a lower household size. The low average household size for the Level 0 test comes from a comparison of Oregon counties that are similar to the Rogue Valley in terms of population demographics related to age groups. One of the lowest average household sizes among Oregon counties is 2.2 (Lincoln County) with an increased one-person household share of 31%, which is also included in the Level 0 sensitivity test.

	2010	Level 0	Adopted Plans
2038 MPO Population in Households (compound annual growth rate)	168,000	216,000 (1.0%)	247,000 (1.6%)
Average Household Size	2.41	2.2	2.41
1-Person Households	29%	31%	29%

Income

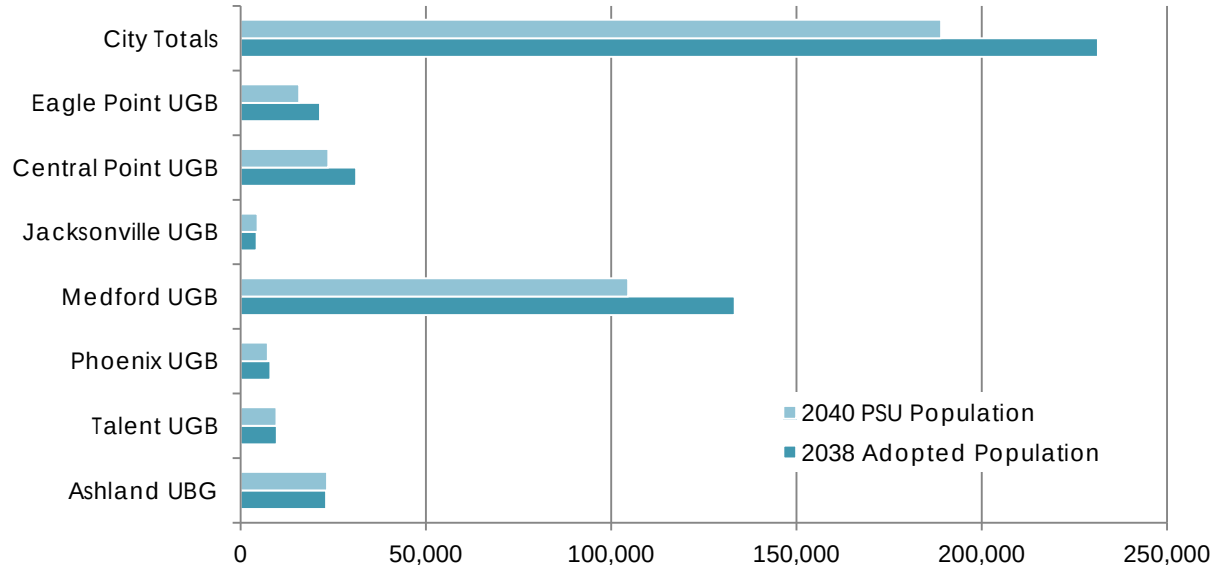
Travel typically increases with higher incomes, reflecting more consumption and more recreation/vacation activities. Income growth is tested as average annual per capita income growth, beyond the growth that is expected to occur with inflation. Three levels of income growth were tested, a 0% growth, 0.7% compound annual growth (CAGR) consistent with the STS, and a high income growth scenario that assumes a 1.5% CAGR.

	2010	Level 0	Adopted Plans	Level 2
Average Annual Income Growth	N/A	0%	0.7%	1.5%

PSU Population Growth and Pattern of Growth

The adopted plans scenario uses the Jackson County Comprehensive Plan allocation of population forecasts reflected in the RVMPO 2013 RTP. An alternate scenario reflects the new lower population forecast from PSU that will be the official forecast for cities in the region in the next RTP. The PSU forecast is only for the cities and does not include the unincorporated areas within the RVMPO boundary, making comparisons to the 2013 RTP challenging. However, the 2040 PSU forecast looks to be much lower than that in the current RTP. Shown in Figure A-2 below, the majority of the change in population is within Medford (reduced by 21%), Central Point (reduced by 24%), and Eagle Point (reduced by 26%), while the rest of the cities remain roughly the same.[iii] Caution should be used in comparing these results with the results from the adopted plans and other sensitivity test findings due to the different populations. However this scenario is useful in providing a first look at the effects of the change in both total population and the regional allocation of population by jurisdiction from the PSU forecast.

Figure A-2. Population Forecast Comparison – Adopted Jackson County and PSU



[iii] Because the PSU forecast data includes only cities, and population rather than household numbers (used in the travel models), caution should be exercised in interpreting the results.

PSU forecasts population only, to make the translation to the household units for use in RSPM, the household to population ratio from the 2040 Jackson County Comprehensive Plan forecast was utilized. The lower PSU forecast household change was applied proportionally to the adopted plans households in each TAZ in each city. No change to the adopted plans household growth was assumed outside of city boundaries.

See Table 7 in the *Sensitivity Test Findings* section to compare RSPM results from the PSU growth sensitivity tests with the results of the adopted plans analysis.

Appendix B. Explanation of Key RSPM Adopted Plans Inputs and Assumptions

Inputs and assumptions for the RSPM are drawn from a number of sources, including Census data, RVMPO's travel demand model, and state programs and rules, including the greenhouse gas target rule, the Statewide Transportation Strategy, future vehicle and fuel assumptions from a collaborative analysis of Oregon with the Oregon Departments of Energy and Environmental Quality, and federal standards. In addition, some of the assumptions used in the RSPM analysis are based on the adopted plans in the region, including:

- Regional Transportation Plan, 2013-2038
- Jackson County Population Forecast, adopted 2007
- Comprehensive Plans and zoning

Absent specific, adopted policies for some inputs, RVMPO worked in partnership with the Rogue Valley Transportation District, Jackson County, Southern Oregon University, and local jurisdictions to develop realistic and financially reasonable assumptions. This appendix provides details on the summary of inputs, provided in Table 3 of this report, for the adopted plans analysis.

Table B1: Key Inputs, Regional Context

Measure	2010	2038
MPO population in households	168,000	247,000
Average household size	2.41	2.41
Percent single-person households	29%	29%
Average annual per capita income	$21,900	$29,500

Note: All monetary units are in 2005 dollars.

Regional context inputs, such as population, household size, and income have an impact on greenhouse gas emissions. As a household-based model, these inputs act as the foundation of the RSPM. The RSPM creates households using census-based household size, income, and age mix. Households are located within the region based on a variety of other factors, such as census-based pattern of household size and income, matched to available dwelling unit type mix. Although the future value of these variables is uncertain, the MPO greenhouse gas target rule, the Statewide Transportation Strategy, or holding to 2010 census values provide reasonable context for adopted plans inputs.

Key factors and assumptions:

- Long-range population forecasts from the Jackson County Comprehensive Plan (forecasts adopted in 2007), show that population is expected to grow by 47 percent between 2010 and 2038. The share of population over 65 years increases from 17 percent to 27 percent in Jackson County. The region's census average household size

and share of single-person households was held fixed between 2010 and 2038. The slightly slower adopted employment forecast means current ratio of population to jobs declines slightly (1:2.4 in 2010 to 1:2.2 in 2038). This data is consistent with the region's 2013 RTP urban travel demand model scenario assumptions.

- 2010-2038 state income is assumed to increase by 34.7 percent, consistent with the Statewide Transportation Strategy, a reflection of an assumed healthy economy. The RSPM calculates RVMPO's average annual per capita income as $29,500 in 2038, consistent with the Bureau of Economic Analysis (2005$).

Table B2: Key Inputs, Vehicles & Fuels

Measure	2010	2038
Light truck share of household vehicles	45% (MPO DMV)	34% (MPO Rule)
Vehicle turnover (years)	10.5	9
Plug-in hybrid/all electric vehicles sales*	0%	6% (5% stock)
Fuel economy for autos (miles per gallon)	24	57
Bus fuels, share of CNG/bio-diesel in transit fuel usage	80% / 0%	80% / 0%
CNG fuel for commercial fleets (gasoline-gallons-equivalent per day)	115 (0.2% LDV/0.9% HDV)	3,400 (17.0% LDV/4.4% HDV)

*Vehicle "sales" reflects what is sold on the market (new vehicles for that year), vehicle "stock" is the mix of vehicles (many model years) owned by residents.

The vehicles on the region's roadways, including vehicle fuel efficiency and fuel type used, has a significant impact on the amount of greenhouse gases emitted per mile of vehicle travel and is expected to change significantly in the next 20 years. Assumptions about vehicle type and fuel economy were developed by three state agencies (ODOT, ODEQ and ODOE) for auto and commercial vehicles, and used by LCDC when setting the region's 2035 per capita emissions reduction target. The assumptions were developed based on the best available information and current estimates about improvements in technologies and fuels. Slightly more ambitious assumptions were required in the Statewide Transportation Strategy to meet state GHG targets by 2050, and were incorporated into the sensitivity analysis noted in Appendix A.

Key factors and assumptions:

- The STS assumed the share of light trucks in the vehicle fleet needed to decline in the future to meet state GHG targets. That means with more people choosing to purchase smaller more fuel-efficient cars, rather than full-sized trucks, vans, and SUVs. Crossover vehicles with SUV body on an auto chassis aid this trend.
- The vehicle turnover rate (i.e. the average age of vehicles owned) will need to decline slightly, from historical average of 10.5 years to 9 years in 2038 (8 years by 2050) to

meet state goals. Vehicle turnover affects how quickly new emission standards reduce total fleet emissions, but can increase auto ownership costs for households.

- Fuel economy is expected to more than double largely as a result of new federal CAFE fuel economy standards for cars and light trucks through 2025. Additionally, Oregon has joined with California and other states with more ambitious vehicle policies, including the Zero Emission Vehicle (ZEV) standards that will increase the purchase of plug-in hybrid and electric vehicles.

  Oregon is a leader in adopting and implementing low-carbon fuel standards that reduce the use of gasoline through higher mixes of biofuels and other low-carbon fuels. It is assumed that these standards, reinstated in the Clean Fuels bill in the 2014-2015 legislative session, will continue to be in place.

  Rogue Valley is a leader in developing local facilities to increase use of Compressed Natural Gas (CNG) in RVTD buses and other government commercial fleets. In 2015 Rogue Valley Clean Cities was awarded a grant to substantially increase these efforts through the new Antelope Road facility. Conversion to Renewable Natural Gas (RNG) off the Dry Creek landfill is part of the long-range plans. However, since the RNG component is not funded, the CNG to RNG conversion is not included in the adopted plans analysis, but is discussed as a sensitivity test in Appendix A.

Table B3: Key Inputs, Pricing

Measure	2010	2038
Fuel price (dollars per gallon)	$2.43	$5.53
Federal/State Gas taxes (dollar per gallon)	$0.424	$0.48
Electricity costs (dollar per kilowatt-hour)	$0.08	$0.21

Note: All monetary units are in 2005 dollars.

Fuel prices and other direct costs of driving affect how much individuals drive and choices regarding vehicle type and use of alternative modes. Future fuel prices are highly uncertain, but contribute the largest share of the operating cost of driving. In addition to the price of fuel and gas taxes, VMT fees also contribute to pricing. By 2038, analysis found that new sources of funding, such as a vehicle miles traveled based fee, may be in place, or the gas tax may be increased.

Key factors and assumptions:

- In 2010, the average price Oregonians paid for a gallon of gas was $2.43. The 2038 price from the STS is estimated at $5.53 per gallon (in 2005 dollars after controlling for inflation). The 2038 price is based on the US Energy Information Agency's 2010 forecasts. It should be noted that more recent US EIA fuel price forecasts are lower.
- The state gas tax is expected to increase from $0.424 per gallon in 2010 to $0.480 per gallon in 2038, slightly exceeding inflation. RVMPO has no local gas tax.
- The price of electricity becomes more important with a greater shift from gasoline to electric-fueled vehicles. The cost per mile of an electric vehicle is pennies on the

dollar relative to gasoline vehicles, even hybrids. Further study will ensure the ability of the energy sector to absorb this increased demand. However, indications show the expected electric vehicle charging push should even out electricity demands (e.g. overnight or use of hard-to-store renewable energy during the day). The STS assumes the cost of electricity rises from 8 cents to 20 cents per kilowatt hour, reflecting an increase in renewable power to meet statewide GHG goals for the utility sector.

Table B4: Key Inputs, Community Design

Measure	2010	2038
Share of workers subject to parking fee	0.59%	0.64%
Share of non-work trips subject to parking fee	0.38%	0.38%
Average per day parking fee (where charged)	$3.14	$7.00
Single-family to multi-family ratio (SF:MF)	75:25	67:33
Single-family attached and multi-family (2-4 units) – 34% of new units	9,500	21,900 (total) 12,300 (new)
Population in urban mixed-use areas	9.4%	12.9%
Transit service miles per capita	3.59	2.33
Single occupant vehicle trips diverted to light vehicles (e.g. bicycles)	3.9%	5.0%
Freeway and Arterial Roadway miles	441 (90 Fwy + 351 Art)	502 (118 Fwy + 384 Art)

Unlike pricing, vehicles, and technology considerations, metropolitan areas exert a strong influence over the design of communities, including the amount of mixed-use development, parking management, and the provision of transportation options. Due to the synergistic effects of these inputs, housing type, density, parking pricing, vehicle trips diverted to light vehicles such as bicycles or electric-bicycles, and transit service are bundled into the community design category. By increasing densities, encouraging transit ridership and diverting single-occupant vehicle trips to light vehicles through enhancements to the transportation options network and parking management strategies (e.g. increased parking fees), these inputs in combination shorten trip lengths, enable alternative modes, and are effective in reducing household travel costs, VMT per capita, and greenhouse gas emissions.

The assumptions used in the analysis are based on the adopted comprehensive plans and zoning implemented by the local jurisdictions in the region, existing and projected parking management strategies, existing and projected transit service levels and goals and policies in RVMPO's adopted 2013 Regional Transportation Plan. Some of the inputs required are not

specifically addressed in these plans and policies. For those inputs, the RSPM assumptions were developed in partnership with RVMPO, Rogue Valley Transportation District (RVTD), Jackson County staff (bike inputs), and local jurisdiction staff to ensure realistic and financially reasonable assumptions.

Key factors and assumptions:

- The 2010 Census, local comprehensive plans and zoning provided the basis for the inputs related to housing type, consistent with the region's latest travel demand model and the RVMPO 2013 RTP. This future assumes a higher share of single-family attached and smaller multi-family units (2-4 units), anticipating 34% of such units to be built between 2010 and 2038.The adopted plans analysis shows that one in five new households in 2038 is expected to be developed in mixed-use areas, including the core districts of most jurisdictions. However, limited future growth is planned for downtown Medford and Ashland, missing the opportunity to capitalize on the multi-modal investments of these centers. The adopted plans show MPO densities increasing within the urban growth boundaries for local communities, with the share of households in mixed-use rising significantly to just less than 13 percent, approximating Corvallis area MPO today.
- In the absence of specific policies related to mode shift and lack of household survey data, the percentage of auto trips diverted to bicycles and other light vehicles (less than 20 miles roundtrip) was assumed to be 3.9 percent in 2010 (Oregon Household Activity Survey) and 5.0 percent in 2038, (per Jackson County representatives).
- RVMPO's 2013 Regional Transportation Plan provided the information necessary for inputs related to parking, while verification of existing and forecast parking fees and facilities was provided by Jackson County Airport, City of Ashland, and City of Medford representatives.
- Based on conversations with RVTD and considering the 2013 RTP expectation that funding for transit will remain flat at 2010 levels, annual transit fixed route service miles are expected to be held at 2010 levels (607,900 miles) for the future year, which results in a reduction of per capita transit service miles as population grows (3.59 in 2010 to 2.33 in 2038).

Within the RSPM, land use is characterized by Place Types, which are defined by a combination of Area Type and Development Type. A big picture Area Type (or Regional Role) describes the inter-dependencies of each neighborhood compared to the rest of the region, e.g. how connected is the neighborhood to jobs in the region. The Area Type is measured by the accessibility to Destinations (jobs accessible from TAZ), Density (jobs and households per acre), with some credit given for walkable street Design (multi-modal network links). In contrast the more localized Development Type (or Neighborhood Character) is used to describe the physical characteristics of each neighborhood in isolation, e.g. how multi-modal, compact, mixed-use is the neighborhood. Development Type is determined by the Density (jobs and households per acre), walkable street Design (multi-modal network links), land-use Diversity (ratio of jobs to households), and presence of transit (service level) within each neighborhood district.

Table B5: Key Inputs, Marketing & Incentives

Measure	2010	2038
Workers covered by transportation demand management programs	2.6%	4.9%
Households covered by individualized marketing programs	0%	2.15%
Car sharing vehicles	3	20
Intelligent Transportation Systems (ITS) Program Index (relative to US peer cities):		
– Ramp Metering	0.0	0.0
– Incident Response	0.20	0.70
– Signals	0.35	0.40
– Access Management	0.0	0.15

Public education and marketing programs include teaching motorists to drive as efficiently as possible and maintain vehicles appropriately, as well as building awareness of travel choices. These measures are part of transportation demand management programs that can be implemented by businesses, employers, institutions such as universities and hospitals, or local or regional governments. These strategies can be tailored to a particular audience and can raise public awareness of the benefits of driving less beyond just emissions reduction. Several programs have been successfully implemented in the region (see description in Regional Context section in the report), all of which helped to inform the inputs and assumptions related to marketing and incentives, for work-based (TDM) and home-based individualized marketing (IM) programs.

As explained in Appendix A, Intelligent Transportation Systems (ITS) include programs that serve to improve safety and roadway operations. One effect is speed smoothing that leads to increased vehicle fuel efficiency and associated greenhouse gas emissions reduction. The ITS inputs listed above are based on an assessment of the extent that freeway (ramp metering, incident response strategies) and arterial (signalization, and access management strategies) measures have been or are expected to be implemented in the Rogue Valley, which is then compared to ideal implementation in US peer cities to generate an index for each ITS strategy. The index ranges from 0.0 to 1.0, with 0.5 representing an average level of implementation compared to US peer cities of similar population size.

Key factors and assumptions:

- For workplace transportation demand management programs, data collected from RVTD and specific employers show that 2.6 percent of RVMPO area workers

participated in 2010, which is assumed to rise to 4.9 percent in 2038. This increase is modest and reflects potential program outcomes from continued status quo funding levels. The benefits of increased investments in transportation demand management can be explored in scenario planning.

- For home-based individualized marketing programs, 2.15 percent of MPO households are anticipated to participate in a program by 2038. The first such program was implemented in 2015 in coordination with Southern Oregon University. In the adopted plans scenario, four additional programs (Ashland, Talent, West Medford, and Phoenix neighborhoods based on conversations with RVTD) would be implemented with a reasonable expectation of additional funding.
- Based on car sharing data and discussions with RVTD, 3 vehicles were available in an Ashland program (now defunct) in 2010, but a new expanded program is expected to grow to 20 vehicles across the City of Ashland by 2038.

Appendix C. Oregon's Strategy for Reducing Greenhouse Gas Emissions

Metropolitan scenario planning and this strategic assessment are part of a comprehensive effort that the state is undertaking to significantly reduce greenhouse gas emissions. The state efforts listed below provide a framework and support efforts at the regional and local level to reduce.

State Greenhouse Gas Emission Reduction Goals

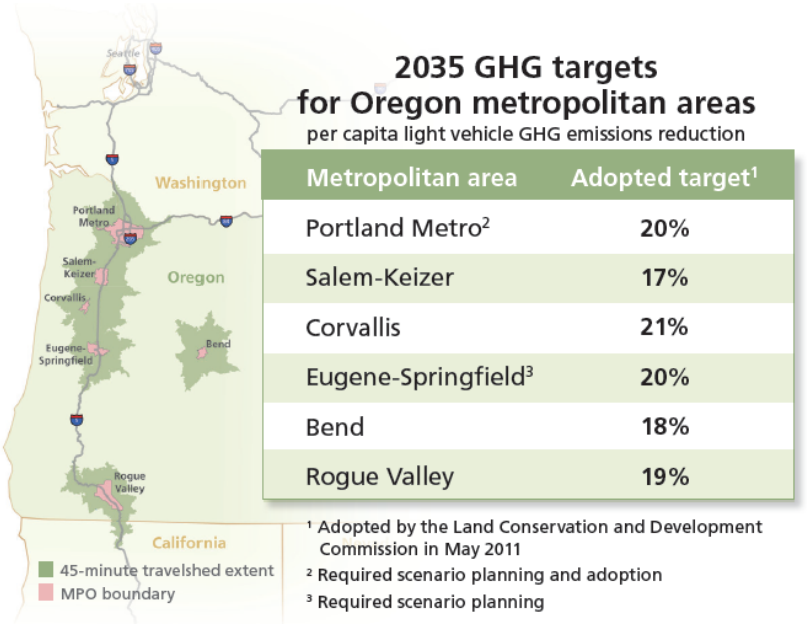
In 2007, the Oregon Legislature adopted House Bill 3507 establishing a statewide goal to reduce greenhouse gas emissions reduction goals. The goals apply to all emission sectors, including energy production, buildings, solid waste and transportation, and call for:

- Stopping increases in emissions by 2010
- Reducing emissions to 10 percent below 1990 levels by 2020
- Reducing emissions to 75 percent below 1990 levels by 2050

Metropolitan Greenhouse Gas Emissions Targets

The Oregon Legislature passed House Bill 2001 (Jobs and Transportation Act) in 2009 and in 2010, passed Senate Bill 1059, requiring the development of planning methods to reduce Greenhouse Gas (GHG) emissions from light motor vehicles within areas served by Metropolitan Planning Organizations (MPOs).

In 2011, the Land Conservation and Development Commission (LCDC) adopted GHG emission reduction targets for six metropolitan areas. The targets are intended to guide scenario planning by metropolitan areas and identify the per capita percentage reduction in emissions that each area would need to achieve to enable the state to meet its overall emission reduction goals. Scenario planning to meet the targets is voluntary, except for the Portland metropolitan area – which is required to adopt a preferred land use and transportation scenario meeting its adopted target by the end of 2014.



2035 GHG targets for Oregon metropolitan areas

per capita light vehicle GHG emissions reduction

Metropolitan area	Adopted target[1]
Portland Metro[2]	20%
Salem-Keizer	17%
Corvallis	21%
Eugene-Springfield[3]	20%
Bend	18%
Rogue Valley	19%

[1] Adopted by the Land Conservation and Development Commission in May 2011
[2] Required scenario planning and adoption
[3] Required scenario planning

Roadmap to 2020

The 2007 Oregon Legislature also established the Oregon Global Warming Commission (OGWC) – a 25-member commission charged with helping coordinate statewide efforts to reduce greenhouse gas emissions and guide the state toward its climate goals. The commission

is also charged with helping the state, local governments, businesses and residents prepare for the effects of climate change.

The OGWC's *Roadmap to 2020* outlines a series of recommendations for state, regional and local actions to achieve the state's goal of reducing emissions to 10 percent below 1990 levels. In addition, the OGWC has prepared a series of reports to the Oregon Legislature that outline progress in implementing its recommendations.

Governor's 10-Year Energy Action Plan

In 2012, Governor Kitzhaber put forth a 10-year energy action plan to help Oregonians reduce energy use in a way that makes Oregon more competitive and resilient economically and environmentally. The comprehensive plan outlines strategies to meet energy efficiency, renewable energy, greenhouse gas reduction, and transportation objectives, with strategies that help to create investment opportunities to keep more capital circulating in Oregon.

ODOT Climate Change Adaptation Planning

In 2012, ODOT completed an Adaptation Strategy Report, a preliminary assessment of risks to our transportation infrastructure and system operations in the face of increased climate variability and change. This is necessary because, even if emissions are reduced or stopped today, a certain level of climate impacts will be experienced into the future. Climate impacts are projected to include:

- higher average temperatures,
- higher sea levels,
- extreme precipitation events, and
- an increase in the frequency and magnitude of coastal flooding.

These changes can all have a direct effect on transportation infrastructure. The 2012 report identifies current areas of adaptive capacity and potential actions to be taken by ODOT, and underlines the need for a statewide vulnerability assessment.

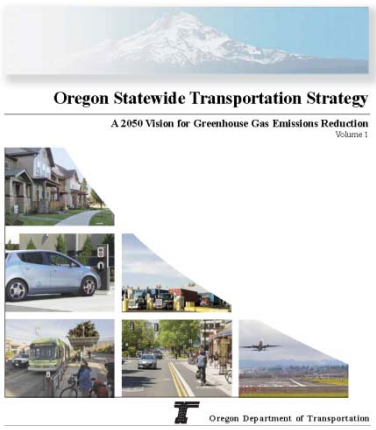
Foll0wing up on the state assessment ODOT conducted a Climate Change Vulnerability Assessment and Adaptation Options Study on the north coast of Oregon. This pilot project assessed the vulnerability of the region's highway infrastructure to extreme weather events and higher sea levels. Through input from mapping exercises and workshops with local maintenance crews, vulnerable infrastructure and hazards were inventoried and prioritized, including detailed analysis of specific site options and analysis of their costs and benefits. Lessons learned from the pilot are being used to inform ODOT's future adaptation efforts and plans for a statewide vulnerability assessment.

Oregon Sustainable Transportation Initiative

In 2010, ODOT and DLCD created the Oregon Sustainable Transportation Initiative (OSTI) to coordinate state agency efforts to achieve emission reductions for the transportation sector. A major element of OSTI work is assistance to metropolitan areas and local governments to conduct scenario planning and related efforts to reduce emissions. Since the inception of OSTI in 2010, the Oregon Department of Transportation and the Department of Land Conservation and Development have worked to plan for ways to reduce transportation-related GHG emissions

and provide rules, guidelines, and tools to support metropolitan areas and other parts of the state in similar planning efforts, including the Regional Strategic Planning Model, the Statewide Transportation Strategy, Scenario Planning Guidelines and a Greenhouse Gas Emissions Reductions Toolbox of effective actions and programs that can be implemented at the local level. OSTI also provides funding and technical support for metropolitan scenario planning.

Statewide Transportation Strategy



In 2010, the Oregon Legislature directed ODOT to prepare a statewide strategy for achieving emission reductions in the transportation sector. In 2012, the Oregon Transportation Commission accepted the Statewide Transportation Strategy (STS).

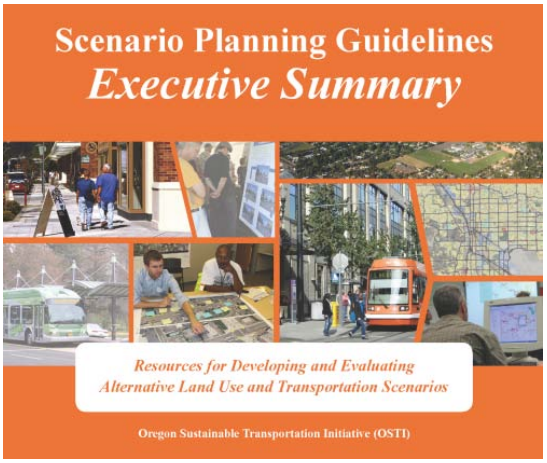
The STS identifies the most effective GHG emissions reduction strategies in transportation systems, vehicle and fuel technologies, and urban land use patterns. These strategies will serve as the best tools available to help meet the state's GHG reduction goals while supporting other societal goals such as livable communities, economic vitality and public health. The STS is neither directive nor regulatory, but rather points to promising approaches that should be further considered by policymakers at the state, regional, and local levels. As summarized below, the STS includes the following three phases:

- **Phase I** was the development of the STS document and public outreach. This phase concluded with the OTC's acceptance of the STS in March 2013.
- **Phase II** includes the development and execution of a series of implementation plans that define what STS strategies ODOT will pursue, how, and when. For activities outside the jurisdictional authority of ODOT, other agencies and organizations will need to determine their own course forward. Read additional information on STS implementation.
- **Phase III** is the monitoring and adjustment phase, which includes the tracking of progress over time and the periodic assessment and modification of the STS. Phase III is anticipated to be an on-going process.

The STS identifies the following 18 strategies effective in reducing greenhouse gas emissions:

Strategy 1 – More Efficient, Lower-Emission Vehicles and Engines
Strategy 2 – Cleaner Fuels
Strategy 3 – Operations and Technology
Strategy 4 – Airport Terminal Access
Strategy 5 – Parking Management
Strategy 6 – Road System Growth
Strategy 7 – Transportation Demand Management
Strategy 8 – Intercity Passenger Growth and Improvements
Strategy 9 – Intercity Transit Growth and Improvements
Strategy 10 – Bicycle and Pedestrian Network Growth
Strategy 11 – Car sharing
Strategy 12 – More Efficient Freight Modes
Strategy 13 – Compact, Mixed-Use Development
Strategy 14 – Urban Growth Boundaries
Strategy 15 – More Efficient Industrial Land Uses
Strategy 16 – Funding Sources
Strategy 17 – Pay-As-You-Drive Insurance
Strategy 18 – Encourage a Continued Diversification of Oregon's Economy

Scenario Planning Guidelines



The reasons to embark on scenario planning are plentiful; however the primary benefit is to uncover better information about future conditions to help communities make decisions. This is done using powerful new tools to estimate likely effects of growth and development patterns over the next 20-25 years. Information from these tools can help local governments evaluate how well existing plans will do in meeting a community's needs and the likely results from implementing these plans. Scenario planning will help identify issues or needs and explore options for refining plans to ensure the community and citizens are better off in the future.

The world is changing rapidly in a number of respects, such as climate, technology, economy. These are forces that will greatly affect communities in the future and to which little attention has been paid in most areas. We have a substantial challenge ahead of us and community action will play an important part. Scenario planning gives communities a way to assess where the path they're following leads, how it intersects with emerging trends, and changes they may consider to cope with and perhaps benefit from those changes.

The Scenario Planning Guidelines present recommendations about how metropolitan areas can use new tools to conduct scenario planning. Metropolitan areas are encouraged to use the handbook as guidance to design a scenario planning process that best addresses local conditions and builds on other concurrent or recent planning efforts.

The Scenario Planning Guidelines were developed as a resource to help Oregon metropolitan organizations and local governments conduct metropolitan land use and transportation scenario planning. Scenario Planning may seem unfamiliar and daunting. The Guidelines are intended to present the scenario planning process in a way that feels approachable, exciting and useful. The guidelines are set forth in six steps, recognizing that scenario planning is voluntary.

Step-by-Step Framework for Conducting Scenario Planning

Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
Create a Framework for Your Scenario Planning Process	Select Evaluation Criteria	Set Up for Scenario Planning: Evaluation Tools, Data and Building Blocks	Develop and Evaluate Base Year Conditions and a Reference Case	Develop and Evaluate Alternative Scenarios	Select the Preferred Scenario

Greenhouse Gas Emissions Reductions Toolbox

The Greenhouse Gas Emissions Reduction Toolkit is designed to help local jurisdictions identify and explore the kinds of actions they can undertake to reduce vehicle emissions, as well as meet other community goals, such as spur economic development, increase biking and walking, support downtowns, create healthy livable communities, and more.

Categories include:

- Emphasize Cost Effectiveness
- Emphasize Early Results
- Support Downtowns and Mixed-Use Areas
- Spur Economic Development
- Create Complete Streets
- Increase Walking & Biking
- Manage Parking
- Create Healthy & Livable Community
- Increase Transit Use
- Strategies for Small Cities

Strategy Report

Each Strategy Report describes an action, program or policy which can be implemented by a jurisdiction. The report gives an overview of what it is, how it can benefit a community, how costly it is implement (and how long it takes to see results), and gives examples of where it has been used. The reports are an entry point to a topic, and intended as a tool for planners to explore and communicate about the strategies described.

Case Studies

The Case Studies in the Toolkit explore the strategies more deeply and show on the ground examples within Oregon where they have been used. They illustrate the benefit of multiple strategies used together, and show how collaboration is used to achieve results.

Appendix D. Glossary

Alternative fuels: Fuels that serve as a cleaner alternative to gasoline, including but not limited to: biodiesel, liquefied or compressed natural gas, electricity, hydrogen, ethanol, and methanol.

Bicycle sharing program: A membership based system of short-term bicycle rental. Zagster bike share began operations in RVMPO in 2015.

Biofuel: Any alternative fuel whose energy is derived from carbon fixation, which results in lower carbon emissions per unit of fuel consumed. Examples include biodiesel (a fuel derived from animal fats and vegetable oils) and ethanol.

Carbon user fee: A fee that could be assessed on the impact of carbon emissions, including users of the transportation network, such as currently implemented in Vancouver, BC Canada. Unlike the gas tax (which is assessed per gallon of gas consumed) a carbon user fee would be assessed per unit of carbon emissions produced by energy used in the operation of the vehicle.

Car sharing: A membership-based system of short-term automobile rental. Car sharing can be station-based (e.g., Zipcar), point-to-point (e.g., Car2Go), or peer-to-peer (e.g. RelayRides or Getaround, which allow car owners to make their private vehicle available for short-term rentals).

CNG: Compressed-natural-gas from traditional sources, such as natural gas drilling operations, used to fuel vehicles.

Eco-driving: A driving technique that reduces fuel consumption, reduces emissions, and improves automobile efficiency by accelerating and decelerating smoothly, avoiding excess idling, driving at or under the posted speed limit, removing excess vehicle cargo weight, and keeping tires properly inflated.

Employer-based commute programs: Work-based travel demand management programs that can include transportation coordinators, employer-subsidized transit pass programs, ride-matching, carpool and vanpool programs, telecommuting, compressed or flexible work weeks and bicycle parking and showers for bicycle commuters.

Greenhouse gas (GHG): Emissions that trap heat in the atmosphere, contributing to global climate change. Some greenhouse gases occur naturally and others are emitted to the atmosphere through natural processes and human activities. Atmospheric gases such as carbon dioxide, methane, and nitrous oxide contribute to global climate change by absorbing infrared radiation produced by solar warming of the Earth's surface.

House Bill 2001 (Oregon Jobs and Transportation Act): Passed by the Legislature in 2009, this legislation provided specific directions to the two largest Oregon metropolitan areas to undertake scenario planning and develop a preferred land use and transportation scenario that accommodates planned population and employment growth while achieving the 2035 GHG emissions reduction targets approved by LCDC in May 2011. Other Oregon MPOs are encouraged to engage in scenario assessments of their adopted plans, and performance-based planning to achieve desired regional outcomes, including reaching their GHG emission targets.

Incident management: An ITS strategy entailing planned and coordinated processes followed by state and local agencies to detect, respond to, and remove traffic incidents quickly and safely in order to keep traffic flowing efficiently.

Individualized marketing (IM): Travel demand management programs focused on individual households, IM programs involve individualized outreach to households that identify household travel needs and ways to meet those needs with less vehicle travel.

Intelligent transportation systems (ITS): Intelligent Transportation Systems (ITS) smooth out traffic flow by using ramp metering, incident response, traffic signal timing, and access management tools. Smoother, more consistent traffic flow results in reduced congestion and emissions as stop/start and idling time goes down. The ITS inputs evaluated in RSPM include freeway (ramp metering, incident response strategies) and arterial (signalization, and access management strategies) measures.

ITS program index: ITS implementation is measured by the ITS Program Index, a 0 to 1 scale in which 0.5 represents an average implementation of ITS strategies for peer US cities of similar population.

Light vehicles: Bicycles, electric bicycles, segways, small personal mobility devices, and similar light-weight slower moving vehicles.

Light duty vehicles: Refers to vehicles under 10,000 lbs gross vehicle weight (GVW). Generally includes cars, sport utility vehicles, and pick-up trucks used by households or commercial service fleets.

Metropolitan Planning Organization (MPO): An association of local governments, per US Code Title 23, in charge of transportation planning and programming for the area. Oregon has nine MPOs, representing Portland Metro, Salem-Keizer, Rogue Valley, Bend, Central Lane, the Rogue Valley, Albany Area, Middle Rogue (Grants Pass area), and Milton-Freewater (led by sister city Walla Walla, WA).

Mixed-use neighborhoods: Refers to portions of urban areas where commercial (e.g., retail, office, entertainment) and non-commercial uses (such as residential space), are located near one another with sufficient density. Different uses may be mixed vertically (e.g., housing above retail) or horizontally (e.g., housing within walking distance of retail). Compact mixed-use neighborhoods reduce demand for motorized transportation by locating common destinations near residences where pedestrian and bicycle access is conveniently served by shorter trips.

Parking cash-out program: Program intended to reduce vehicle trips and increase the use of multi-modal transportation options by offering employees monetary incentives for relinquishing their parking space. Also referred to as an employer buy-back program, parking cash-out programs are generally offered by employers that own employee parking lots or Transportation Management Associations (TMAs). They shift the burden of costly parking from the employer to the employee. The employee is paid for the parking space and can opt to use it to pay for continued use of the parking space or pocket the money and use multi-modal transportation options instead.

Pay-as-you-drive insurance (PAYD): A method of insuring vehicles in which premiums are based in large part on the vehicle miles traveled within a given period of time. PAYD is also sometimes referred to as distance-based, usage-based, or mileage-based insurance. It impacts travel behavior as users face more of the full costs of transportation with each mile driven.

Place Types: Within RSPM, land use is characterized by Place Types, which are defined by a combination of a big-picture Area Type (or Regional Role) and a localized Development Type (or Neighborhood Character).

Rideshare program: Formalized programs such as carpools and vanpools, which coordinate multiple travelers riding together in the same vehicle, typically for work purposes.

Regional Plan: Greater Bear Creek Valley Regional Plan resulting from the Regional Problem Solving planning process NOW x 2.

Regional Problem Solving (RPS): Often referred to as "Regional Plan," the Regional Problem Solving planning process established a system to guide long-term planning for a doubling of the population in the Greater Bear Creek Valley. The plan designates approximately 8,529 acres of urban reserves for the cities of Central Point, Eagle Point, Medford, Phoenix, and Talent to accommodate urban growth to the year 2060.

Renewable Natural Gas (RNG): Compressed-natural-gas (CNG) sourced from the capture of emissions, such as captured methane gas emitted from the decaying material in landfills, which represents a lower emission alternative to traditionally sourced compressed natural gas (CNG). The carbon intensity of CNG is roughly 80% of diesel, while RNG is roughly 20%.

Scenario planning: A planning method that analyzes the impacts of trends, actions and policies to estimate their likely impact on future conditions. Scenario planning is often performed at the state or regional level to evaluate various future alternatives against a set of established community priorities, and can lead to the establishment of a preferred scenario for a region to pursue.

Senate Bill 1059: Oregon state legislation aimed at reducing greenhouse gas emissions from transportation. This bill also included the development of the ODOT Statewide Transportation Strategy on greenhouse gas emission reduction goals. (2010 Oregon Legislature)

Single-occupant vehicle (SOV): A vehicle containing only one occupant, the driver.

Social costs: Social costs refer to the unintended consequences of transportation, such as carbon emissions that contribute to climate change, air pollution that causes health and environmental problems, and energy security costs associated with importing fossil fuels from foreign nations.

Statewide Transportation Strategy (STS): The STS defines a vision for Oregon to reduce its GHG emissions from transportation systems, vehicle and fuel technologies and urban form by 2050. It covers ground transportation by light-duty vehicles, long-haul freight transportation by various modes, and air travel generated by the needs of Oregon residents and businesses.

Transportation Demand Management (TDM): The application of techniques that aim to influence decisions on when, how, where, and how much people travel, done in a purposeful manner by government or other organizations. TDM techniques, typically implemented at the work place, include education, policies, regulations, and other combinations of incentives and disincentives, and are intended to reduce single occupant vehicle trips on the transportation network.

Travel demand modeling/forecasts: Travel demand modeling refers to the analytical estimation of future travel volumes and patterns performed with detailed computer models that use socioeconomic data and other key indicators to predict the number of trips that will be made in a region, where people will go, and the mode and route of travel they will take to get there.

Urban growth boundary (UGB): Under Oregon law, each city or metropolitan area in the state has a UGB that separates urban land from rural land. UGBs control urban expansion/sprawl into rural lands and promote efficient use of land, public facilities and services inside the boundary.

Urban reserve area (URA): Land outside urban growth boundaries that has been reserved for eventual inclusion in an urban growth boundary and protected from development that would impede urbanization. The URAs in the Regional Plan provide land supply for urban development within the RVMPO region to 2060 to accommodate a doubling of the regional 2007 base urban population.

Vehicle miles traveled (VMT): Refers to the total distance traveled by motor vehicles in a specified area for a given period of time.

Vehicle mix (Auto-Light Truck): The percentage of light duty vehicles (weighing less than 10,000 lbs.) classified as automobiles compared to the percentage classified as light trucks.

Vehicle mix (power train): The shares of vehicles by the power train, including traditional internal combustion engines (ICE), hybrid-electric vehicles (HEV), plug-in hybrid-electric vehicles (PHEV), and electric vehicles (EV). The battery ranges of the PHEV and EV vehicles make them best suited to mixed-use areas where trips are shorter. The power train mix of vehicles impacts the fuel efficiency (miles per gallon) and emissions. The vehicle mix or fuel efficiency can be reported by year of new vehicle sales, or as the stock of vehicles owned in any year. Fuel efficiency is regulated by federal CAFÉ standards, as well as more ambitious standards Oregon has committed to with California and several other states.

Vehicle turnover: The rate of vehicle replacement or the turnover of older vehicles to newer vehicles; the historical turnover rate in Oregon is 10.5 years. The STS assumed a transition to a shorter 8-year turnover rate by 2050 to help meet state GHG targets.

Appendix E. Resources and Links

Central Lane Scenario Planning:
http://www.clscenarioplanning.org/

Cool Planning Handbook:
http://www.oregon.gov/LCD/TGM/docs/cool_planning_handbook.pdf?ga=t

Governor's 10-Year Energy Action Plan:
http://www.oregon.gov/energy/pages/ten_year/ten_year_energy_plan.aspx

Greenhouse Gas Emissions Reduction Toolkit:
http://www.oregon.gov/ODOT/TD/TP/Pages/ghgtoolkit.aspx

Metro's Climate Smart Communities:
http://www.oregonmetro.gov/public-projects/climate-smart-communities-scenarios

Metropolitan Greenhouse Gas Reduction Targets:
http://www.oregon.gov/LCD/docs/rulemaking/trac/660_044.pdf

ODOT Climate Change Adaptation Planning:

http://www.oregon.gov/ODOT/TD/CLIMATECHANGE/pages/cc_adaptation.aspx

Oregon Global Warming Commission:
http://www.keeporegoncool.org/

Oregon Sustainable Transportation Initiative:
http://www.oregon.gov/ODOT/TD/OSTI/Pages/index.aspx

Regional Problem Solving (RPS) in the Greater Bear Creek Valley
http://www.rvcog.org/mn.asp?pg=rps_2010

Regional Transportation Plan
http://www.rvmpo.org/index.php/ct-menu-item-13/regional-transportation-plan-rtp

Scenario Planning Guidelines:
http://www.oregon.gov/ODOT/TD/OSTI/pages/scenarios.aspx

Statewide Transportation Strategy:
http://www.oregon.gov/ODOT/TD/OSTI/pages/sts.aspx

Regional Strategic Planning Model (RSPM):
http://www.oregon.gov/ODOT/TD/OSTI/Pages/scenario_planning.aspx#reg