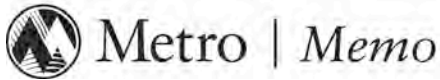# Metro | *Agenda*

Meeting:	Metro Technical Advisory Committee
Date:	Wednesday, December 7, 2011
Time:	10 a.m. – 11:30 a.m.
Place:	Metro Regional Center, **Room 370a/b *Please note room change***

Time	Agenda Item	Action Requested	Presenter(s)	Materials
10 a.m.	**CALL TO ORDER / ANNOUNCEMENTS**	Information	John Williams, Chair	none
10:15 a.m.	**Climate Smart Communities Scenarios** *Objective*: *Roll-out of draft Phase 1 Findings Report*	Discussion	Kim Ellis, Nuin-Tara Key	At meeting
11:30 a.m.	**ADJOURN**			

MTAC meets on the 1st & 3rd Wednesday of the month. **The next meeting is scheduled for January 4, 2012.**

For agenda and schedule information, call Alexandra Roberts Eldridge at 503-797-1839, email:
Alexandra.Eldridge@oregonmetro.gov. To check on closure or cancellations during inclement weather, please call 503-797-1700#.

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Metro | *Memo*

Date:	December 1, 2011
To:	MTAC and interested parties
From:	Kim Ellis, Principal Transportation Planner
Re:	Climate Smart Communities Scenarios – Draft Phase 1 Findings Report

PURPOSE

Staff will present an update of the Climate Smart Communities Scenarios Project and share the draft Phase 1 Findings Report that summarizes the results of the research and analysis conducted since June. While the Report is incomplete, staff is seeking MTAC input on the draft report and suggestions for how the report can be made more useful for engaging other partners and stakeholders in Phase 2.

MTAC will be asked to recommend that MPAC accept the final report at the January 4 meeting.

The draft Phase 1 Findings Report will be sent in a supplemental mailing on Dec. 5.

BACKGROUND

Since 2006, Oregon has initiated a number of actions to respond to mounting scientific evidence that shows the earth's climate is changing, signaling a long-term commitment to significantly reduce greenhouse gas (GHG) emissions.

In 2007 the Oregon Legislature established statewide GHG emissions reduction goals. The goals apply to all emission sectors - energy production, buildings, solid waste and transportation - and direct Oregon to:

- Stop increases in GHG emissions by 2010
- Reduce GHG emissions to 10 percent below 1990 levels by 2020
- Reduce GHG emissions to at least 75 percent below 1990 levels by 2050

In 2009, the Legislature passed House Bill 2001, directing Metro to "develop two or more alternative land use and transportation scenarios" by January 2012 that are designed to reduce GHG emissions from light-duty vehicles. The legislation also mandates (1) adoption of a preferred scenario after public review and consultation with local government; and (2) local government implementation through comprehensive plans and land use regulations that are consistent with the adopted regional scenario. The Climate Smart Communities Scenarios Project responds to these mandates.

Overview of Phase 1 Research and Analysis – Understanding Choices

Phase 1 of the Climate Smart Communities Scenarios Project has focused on understanding the region's choices by testing broad-level, regional scenarios to learn the GHG emissions reduction potential of current plans and policies and what combination of land use and transportation strategies (grouped in six policy areas) are needed to meet the state GHG targets. While some strategies are new to the region, many of the strategies tested are already being implemented to realize the 2040 Growth Concept and the aspirations of communities across the region.

In May, a work group of members from the Transportation Policy Advisory Committee (TPAC) and the Metro Technical Advisory Committee (MTAC) was charged with helping Metro staff develop the Phase 1 scenarios assumptions, consistent with the evaluation framework endorsed by the Metro Council, the Joint Policy Advisory Committee on Transportation (JPACT) and the Metro Policy Advisory Committee (MPAC) in June.

A total of 146 scenarios have been analyzed at a preliminary level. In addition to the scenarios analysis, staff completed the Strategy Toolbox report. The Strategy Toolbox summarizes published local, national and international research on strategies that can help reduce transportation-related GHG emissions and meet other policy objectives. The report documents benefits of different strategies to a community, synergy between strategies and implementation opportunities and challenges to be addressed in Phase 2.

Key findings from the research conducted to date have been summarized in a draft Phase 1 Findings Report. The region's decision-makers will use this information to direct development of a preferred strategy in Phase 2.

NEXT STEPS
A summary of upcoming discussions and milestones is provided for reference:

Dec. 6	Council discussion of draft Phase 1 findings
Dec. 7	MTAC discussion of draft Phase 1 findings
Dec. 8	JPACT discussion of draft Phase 1 findings
Dec. 14	MPAC discussion of draft Phase 1 findings
Dec. 20	*Work Group – if needed*
Jan. 4	MTAC recommendation to MPAC on acceptance of the Phase 1 findings
Jan. 6	TPAC recommendation to JPACT on acceptance of the Phase 1 findings
Jan. 11	MPAC considers acceptance of the Phase 1 findings
Jan. 12	JPACT considers acceptance of the Phase 1 findings

Staff will continue to finalize the Phase 1 Findings Report with the technical committees in December and early January for consideration by JPACT and MPAC in January. MPAC action to accept the findings report would mark the end of Phase 1, and begin the project's transition to Phase 2. Release of the findings provides a vehicle for engaging other stakeholders in the process during Phase 2. The findings will also be submitted to the Oregon Department of Transportation and the Department of Land Conservation and Development in January for inclusion in their joint progress report to the 2012 Legislature.

Upcoming Metro Council, MPAC and JPACT discussions will focus on the Phase 1 findings and policy choices presented by the research. The discussions and input will inform development of the Phase 2 work plan for 2012. Planning is also underway for a JPACT/MPAC/Council work session in Winter 2012 to more formally kick-off Phase 2 of the process.

From January to April 2012, staff will work with Metro's advisory committees to finalize the Phase 2 work plan, building on the Toolbox and the Phase 1 findings and addressing the input provided throughout Fall 2011 and Winter 2012.
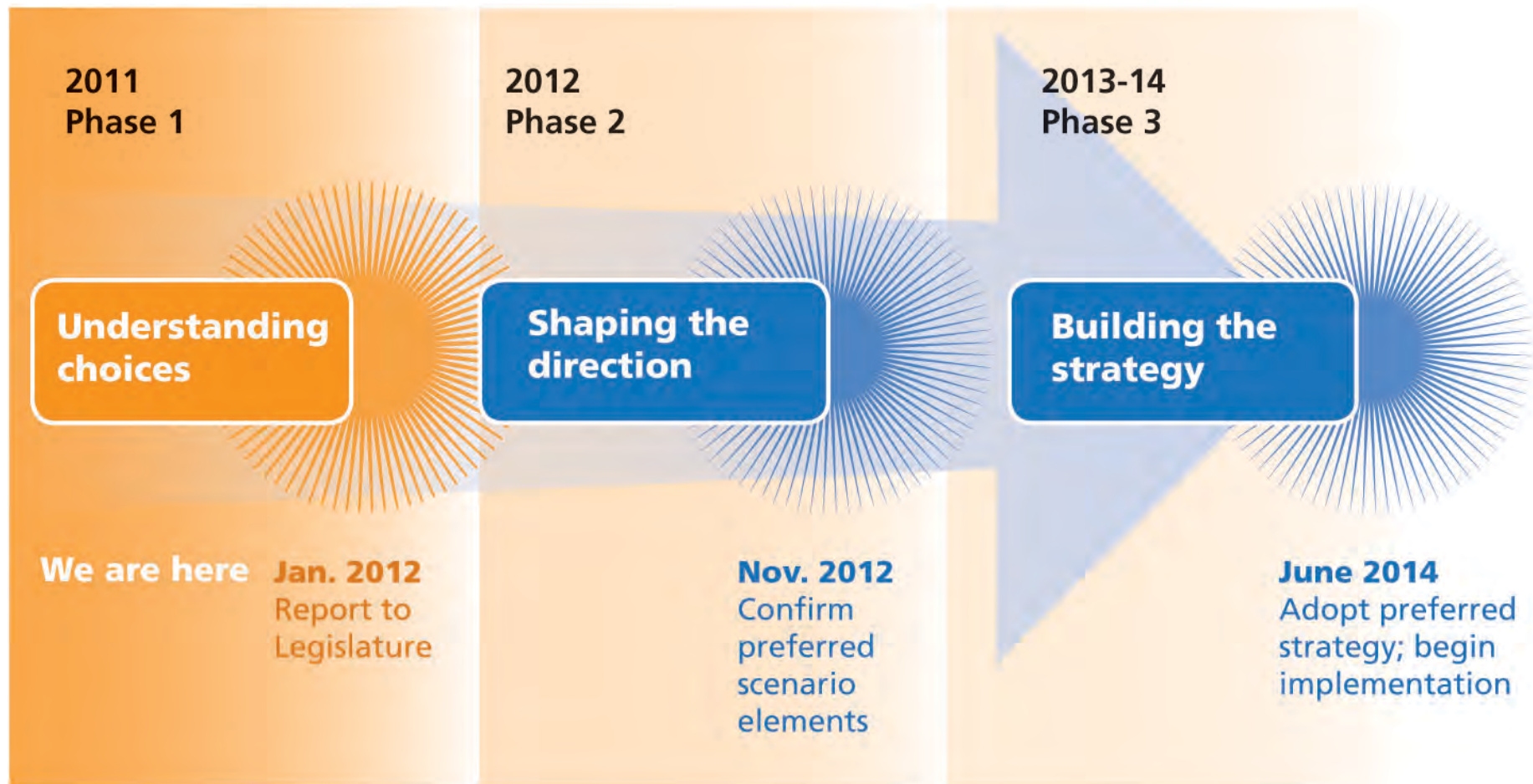
Scenarios timeline
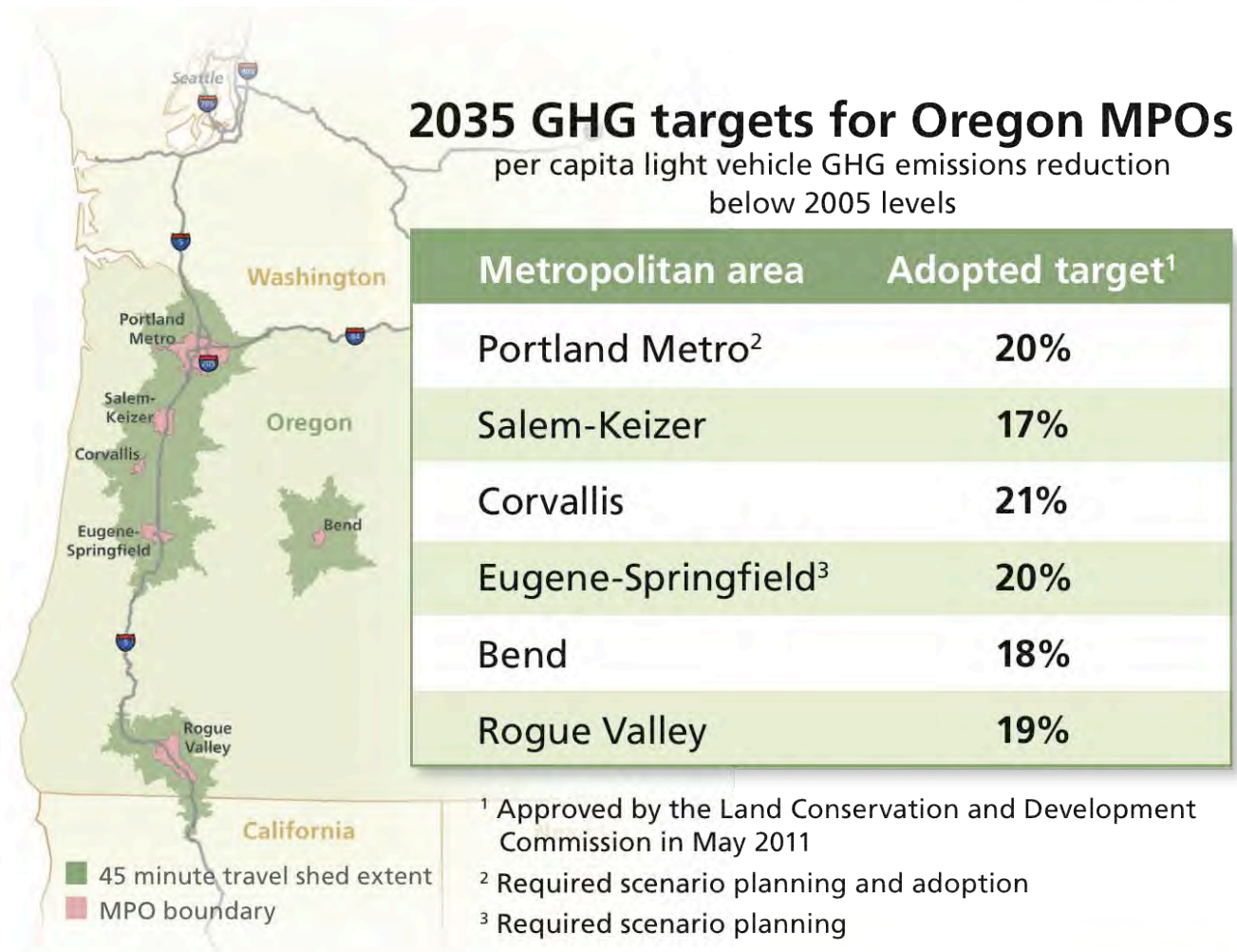
Phase 1 purpose

- How far do current plans and policies get us?

- What is the relative GHG emissions reduction potential of different policies?

Understand choices, not to choose a preferred alternative
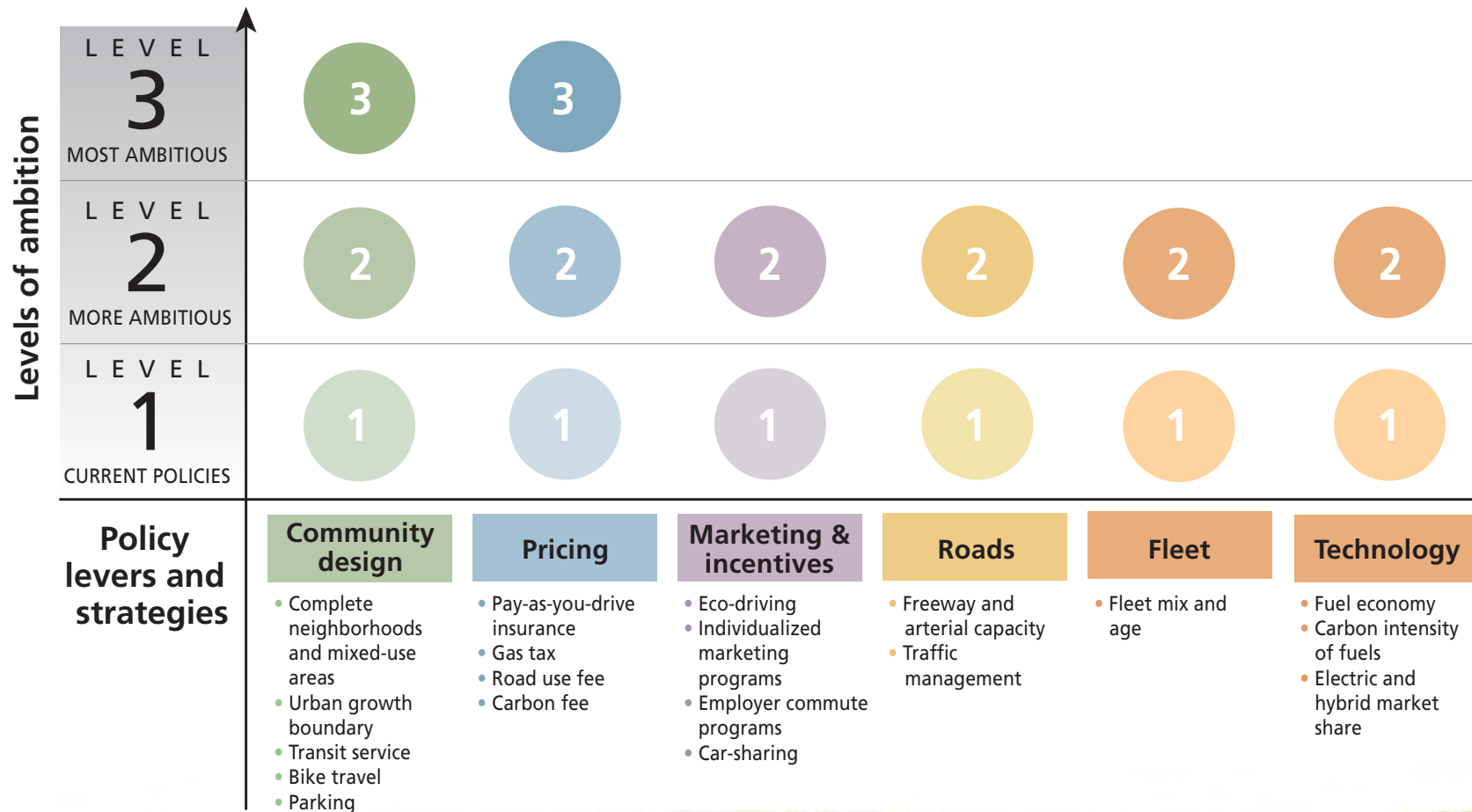
2035 GHG Targets for Oregon MPOs

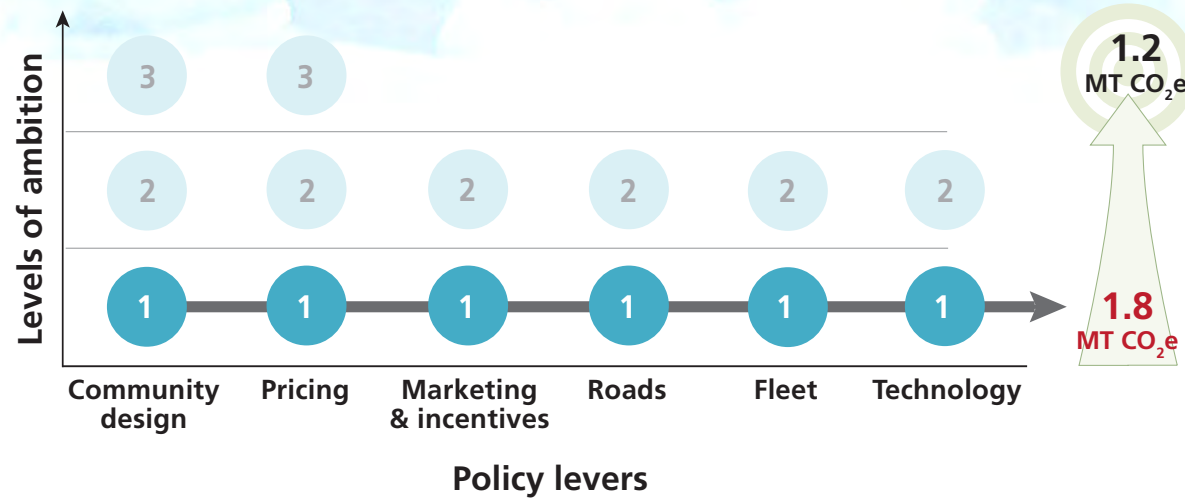*per capita light vehicle GHG emissions reduction below 2005 levels*

2035 GHG targets for Oregon MPOs
per capita light vehicle GHG emissions reduction below 2005 levels

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

[1] Approved by the Land Conservation and Development Commission in May 2011

[2] Required scenario planning and adoption

[3] Required scenario planning

Building blocks for regional scenarios
Testing combinations of plausible strategies

Levels of ambition

| LEVEL 3 MOST AMBITIOUS |
| LEVEL 2 MORE AMBITIOUS |
| LEVEL 1 CURRENT POLICIES |

Policy levers and strategies

Community design	Pricing	Marketing & incentives	Roads	Fleet	Technology
• Complete neighborhoods and mixed-use areas • Urban growth boundary • Transit service • Bike travel • Parking	• Pay-as-you-drive insurance • Gas tax • Road use fee • Carbon fee	• Eco-driving • Individualized marketing programs • Employer commute programs • Car-sharing	• Freeway and arterial capacity • Traffic management	• Fleet mix and age	• Fuel economy • Carbon intensity of fuels • Electric and hybrid market share

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Current plans and policies
Strong foundation but doesn't meet target

Levels of ambition

Policy levers: Community design, Pricing, Marketing & incentives, Roads, Fleet, Technology

1.2 MT CO_2e

1.8 MT CO_2e

Targets are achievable
But will take more effort and action

Levels of ambition

Policy levers: Community design, Pricing, Marketing & incentives, Roads, Fleet, Technology

.72 MT CO_2e
(53% below 2005)

.91 MT CO_2e
(40% below 2005)

1.2 MT CO_2e
(20% below 2005)

Key overall findings

1. Current local and regional plans and policies are ambitious and provide a strong foundation

2. Targets are achievable but will take additional effort and new strategic actions

3. Most strategies are already being implemented in the region

4. The best approach is a mix of policies and strategies

Key policy area findings

1. Community design and/or pricing need to be more ambitious to meet target

2. Fleet, technology and pricing provide similar significant GHG reductions, but not enough to meet target

3. Road management and marketing/ incentives provide similar, but modest GHG reductions

Implications for Phase 2

1. The results simply reflect the assumptions and provide a starting point

2. Each strategy presents its own opportunities and challenges

3. Leadership, partnerships and collaboration are keys to success

4. Flexibility and funding for local planning and implementation is needed

Additional outcomes for Phase 2

Equity
- Access to affordable housing and travel options
- Access to opportunity
- Public health

Environment
- Air quality
- Access to parks and natural areas

Economy
- Access to industry and jobs
- Freight travel time costs
- Economic development opportunities

Costs and savings
- Implementation
- Household and business

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Moving Forward to Phase 2

- Apply Phase 1 findings to identify combinations to study further

- Expand evaluation framework

- Build on local aspirations and planning efforts

- Bring in statewide transportation strategy

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Next steps

Oct. – Nov.

Nov. – Dec.

Jan. 2012

Early 2012
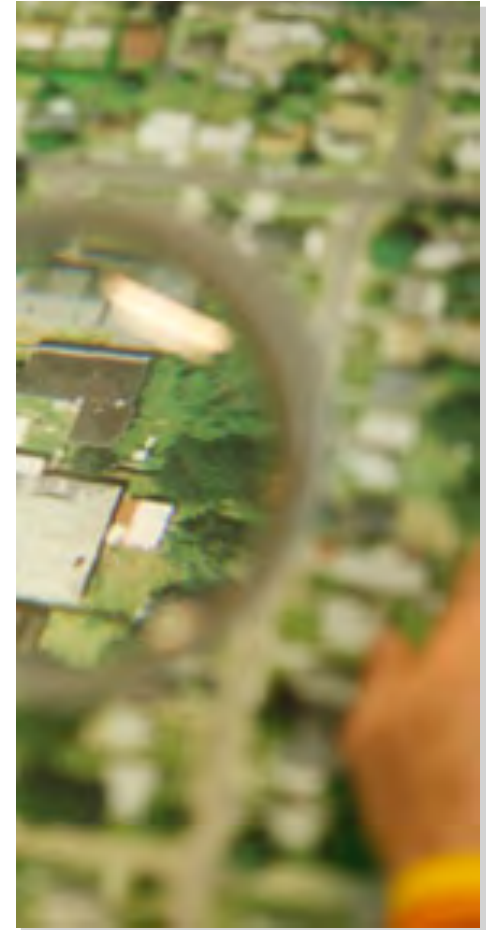
Work Group, TPAC & MTAC review findings and frame choices

Report back to JPACT and MPAC

Request Council, JPACT and MPAC acceptance of Phase 1 Findings Report

ODOT and DLCD submit progress report to Legislature

Begin Phase 2 and share findings with stakeholders

Request Council, JPACT and MPAC direction on Phase 2 work plan

Climate Smart Communities Scenarios

Understanding Our Choices

DRAFT PHASE 1 FINDINGS   I   DECEMBER 2011

Metro | *Making a great place*

Table of contents

The following pages summarize the purpose, scope and key findings from Phase 1 of the Climate Smart Communities Scenarios project. The region's decision-makers will use this information to direct development of a preferred strategy in Phase 2.

This information is for research purposes only and does not necessarily reflect current or future policy decisions of the Metro Council, MPAC or JPACT.

Introduction

Making a Great Place

Over the years, the diverse communities of the Portland metropolitan region have taken a collaborative approach to planning and investment that has helped make our region one of the most livable in the country. We have set our region on a wise course – but times are changing. A faltering economy, troubling jobless rates, rising energy, housing and transportation costs, climate change and other challenges demand continued leadership, innovation and collaboration to ensure this region remains a great place to live, work and play.

Purpose and scope

In 2009, the Oregon Legislature passed House Bill 2001, the Jobs and Transportation Act. JTA directs Metro to "develop two or more alternative land use and transportation scenarios" by January 2012 that are designed to reduce greenhouse gas (GHG) emissions from light-duty vehicles – cars and trucks that weigh less than 10,000 pounds.

The Climate Smart Communities Scenarios Project (Scenarios Project) responds to HB 2001 and subsequent GHG emissions reduction targets adopted by the Land Conservation and Development Commission in May 2011. During Phase 1, more than 140 regional scenarios were tested to learn the GHG emissions reduction potential of current plans and policies. The analysis was also intended to highlight which combinations of land use and transportation strategies (grouped in six policy areas) are needed to meet the state GHG targets.

Metro staff conducted the research with the assistance of a technical work group of members from the Transportation Policy Alternatives Committee (TPAC) and the Metro Technical Advisory Committee (MTAC), consistent with policy direction from the Joint Policy Advisory Committee JPACT and MPAC.

Policy areas tested in Phase 1

Why this work matters

Achieving the region's six desired outcomes and meeting State climate goals

More than a decade ago, the region set a course for growth with the adoption of the 2040 Growth Concept. Over the years, Metro and its partners have collaborated to help communities realize their aspirations while moving the region toward its goals to make the Portland metropolitan area a great place to live, work and play.

We have set our region on a wise course – but we have challenges to confront. Mounting scientific evidence shows Oregon's climate is changing. Oregon has been a national leader in addressing climate change. Now it's time for regional and local leaders to focus and act on the investments and actions needed to collaboratively realize those local aspirations and shared regional goals, as well as address state climate goals. The Scenarios Project is intended to do just that.

While reducing greenhouse gas (GHG) emissions is important to the health of the region and the planet, the Scenarios Project will demonstrate that the region can progress toward the GHG reduction goals set by the state within the context of achieving outcomes of equal importance to residents: a healthy economy; clean air and water; and access to good jobs, affordable housing, transportation options, nature, trails and recreational opportunities.

The Scenarios Project is not only addressing climate change for the sake of state mandates. Through this effort, the region will build on a long tradition of innovation, excellence in urban planning, and conservation and stewardship of our natural environment. The bold decisions made decades ago have given

Climate smart strategies can bring many benefits to the region– including significant savings in fuel costs, less time spent in traffic as well as other benefits to the environment, public health and the economy.

this region a head start over other cities and regions across the country. In this context we will consider policies, investments and actions needed to tackle the climate challenge and show that solutions are at hand that will turn the challenge of climate change into opportunities to enhance our region's resilience, prosperity and quality of life, now and for generations to come.

For now, the Scenarios Project will focus on developing a regional strategy reducing GHG emissions from cars, small trucks and sport utility vehicles (SUVs) – as required by the Jobs and Transportation Act. Preparation for and adaptation to a changing climate will be addressed in future phases and through other efforts already underway in the region and state.

2040 Growth Concept Map

November, 2011

The Metro 2040 Growth Concept defines the form of regional growth and development for the Portland metropolitan region. The Growth Concept was adopted in December 1995 through the Region 2040 planning and public involvement process. This concept is intended to provide long-term growth management of the region.

The map highlights elements of parallel planning efforts including: the 2035 Regional Transportation Plan that outlines investments in multiple modes of transportation, and a commitment to local policies and investments that will help the region better accommodate growth within its centers, corridors and employment areas.

For more information on these initiatives, visit http://www.oregonmetro.gov/2040

Legend

- Central city
- Regional center
- Town center
- Station communities
- Main streets
- Corridors
- Employment land
- Parks and natural areas
- Neighborhood
- Rural reserve
- Urban reserve
- Urban growth boundaries

- Existing high capacity transit
- Planned high capacity transit
- Proposed high capacity transit tier 1
- Mainline freight
- High speed rail
- County boundaries
- Neighbor cities
- Airports
- Intercity rail terminal
- Areas added to the UGB, effective 01/18/12

Metro
Making a great place

The information on this map was derived from digital databases on Metro's GIS. Care was taken in the creation of this map. Metro cannot accept any responsibility for errors, omissions, or positional accuracy. There are no warranties, expressed or implied, including the warranty of merchantability or fitness for a particular purpose, accompanying this product. However, notification of any errors are appreciated.

A collaborative approach

Building on community aspirations and the 2040 growth concept to achieve state climate goals

Adopted in 1995, the 2040 Growth Concept is the region's blueprint for the future, guiding growth and development based on a shared vision to create livable, prosperous and equitable communities. The Growth Concept envisioned encouraging development in centers, corridors and employment areas to support environmental, social and economic objectives.

How we get there

The Scenarios Project is a multi-year collaborative effort designed to help communities realize their aspirations and maximize achievement of the region's six desired outcomes and state climate goals.

Phase 1 (Jan – Dec 2011)
Understanding choices by testing policy options

In 2011, the region used scenario planning and other research to understand the region's choices for meeting the state GHG emission reduction target. The analysis included development of a Strategy Toolbox report synthesizing published research on different strategies in terms of their GHG reduction potential,

benefits to communities, synergies, and implementation opportunities and challenges to be addressed in Phase 2.

In addition, Metro in collaboration with state and local partners, developed and analyzed 144 aleternative scenarios. The scenarios will be used to identify potential policy options for policymakers to discuss during winter of 2012. The regional policy discussion will shape potential packages of strategies recommended for further evaluation.

Phase 2 (Jan – Dec 2012)
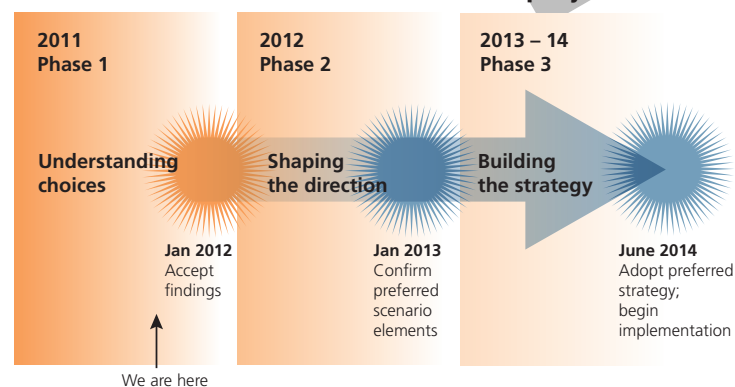**Shaping the direction by turning policy options into regional strategy**

In 2012, the region will design and evaluate more customized alternataive scenarios, applying the findings from Phase 1 and incorporating strategies identified in local and regional planning efforts that are underway. This phase will also evaluate the benefits, impacts and costs and savings associated with different strategies across environmental, economic and equity goals, and use case studies to illustrate potential community effects. This phase will result in a draft preferred scenario that will be subject to further analysis and review in Phase 3.

Phase 3 (Jan 2013 – June 2014)
**Building the strategy and implementation**

In 2013 and 2014, the region will collaboratively build and select a preferred scenario after public review and consultation with local governments. This phase will define policies, investments and actions needed to implement the preferred strategy. This work will also include development of a finance strategy. Effective implementation of the preferred strategy will likely require the participation and cooperation of all levels of government agencies, the private sector and community organizations.

Climate smart communities scenarios project timeline

2011 Phase 1	2012 Phase 2	2013 – 14 Phase 3
Understanding choices	Shaping the direction	Building the strategy
Jan 2012 Accept findings	Jan 2013 Confirm preferred scenario elements	June 2014 Adopt preferred strategy; begin implementation

We are here

Oregon joins other states, MPOs and communities to lead the way

States with adopted climate action plans

In progress
Completed
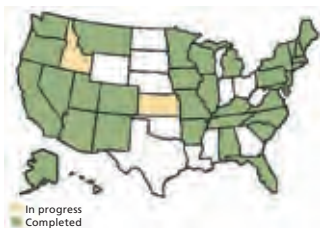
Source: Center for Climate & Energy Solutions

States with adopted GHG emissions reduction targets

Source: Center for Climate & Energy Solutions

For years, states and regions have been taking action to address climate change in the absence of federal legislation. A wide range of policies have been adopted at the state and regional levels to reduce greenhouse gas emissions, develop clean energy resources and promote more energy-efficient vehicles, buildings, and appliances. Although climate change will ultimately require a national and international response, the actions taken by states and regions will continue to play an important role by developing and testing innovative solutions, demonstrating successful programs, and laying the groundwork for broader action.

Many states have completed or are in the process of revising or developing comprehensive Climate Action Plans. Many states view policies that address climate change as an economic opportunity, not as a burden on commerce. These states are trying to position themselves as leaders in new markets related to climate action: producing and selling alternative fuels, ramping up renewable energy exports and attracting high-tech business.

Economic issues are just one motivator for state policies that address climate change. Policies to improve air quality, reduce traffic congestion, and develop domestic, clean energy supplies can all have climate benefits. Also states are discovering that climate policies often bring about benefits in these other areas as well.

Washington, Oregon and California have significant state laws on climate change, with specific and varied provisions focusing on reducing transportation GHG emissions.

2007

Similar to many other states, the Oregon Legislature established statewide GHG emissions reduction goals in 2007. The goals apply to all emission sectors – energy production, buildings, solid waste and transportation – and direct Oregon to:

- Stop increases in GHG emissions by 2010
- Reduce GHG emissions to 10 percent below 1990 levels by 2020
- Reduce GHG emissions to at least 75 percent below 1990 levels by 2050

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 was charfed with helping the state, local governments, businesses and residents prepare for the effects of climate change.

West Coast MPOs

Seattle
Portland
Sacramento
San Francisco
Los Angeles
San Diego
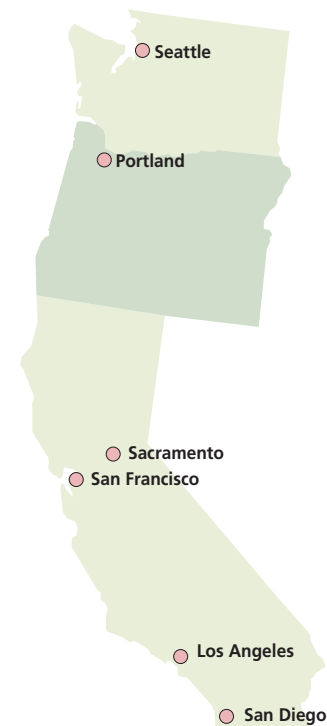
The largest West Coast MPOs have been engaged in scenario planning and climate action planning to meet state GHG emissions reduction targets.

2009

The Oregon Legislature passed House Bill 2001, directing Metro to "develop two or more alternative land use and transportation scenarios" by January 2012 that are designed to reduce GHG emissions from light-duty vehicles. The legislation also mandates:

1) adoption of a preferred scenario after public review and consultation with local government; and

2) local government implementation through comprehensive plans and land use regulations that are consistent with the adopted regional scenario.

2010

In 2010, the OGWC developed an Interim Roadmap to 2020 that includes recommendations in all sectors of the state's economy – energy, transportation and land use, materials management, forestry, agriculture, and industrial use – to meet state climate goals.

The first Oregon-specific assessment of climate change impacts was released by the Oregon Climate Change Research Institute (OCCRI) in December of 2010. The OCCRI Oregon Climate Assessment Report is the work of over 100 researchers across the Oregon University System with input from the OGWC. The report documents likely impacts to Oregon's weather patterns, water supplies, agricultural production, forest health, fish and wildlife species and ecosystems, public health, transportation infrastructure and coastal communities.

In addition, State agencies collaborated with the OGWC, the OCCRI and each other to produce the first comprehensive Oregon policy framework for climate change adaptation planning

in December of 2010. The Oregon Climate Change Adaptation Framework identifies near term, low cost and high benefit actions Oregon can take. These actions will help Oregonians minimize the impacts of climate change to their communities and livelihoods, and to the environmental values we hold dear in this state.

Taken together with the Interim Roadmap to 2020 report, these comprise a carefully considered and systematic response to address climate change in Oregon.

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%

■ 45-minute travelshed extent
■ MPO boundary

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

The challenge for our region

MT CO$_2$e stands for metric ton of carbon dioxide equivalent. Measured and stored at standard atmospheric pressures, one metric ton of CO$_2$ occupies a cube approximately the size of a 3-story building (27 x 27 x 27 feet).
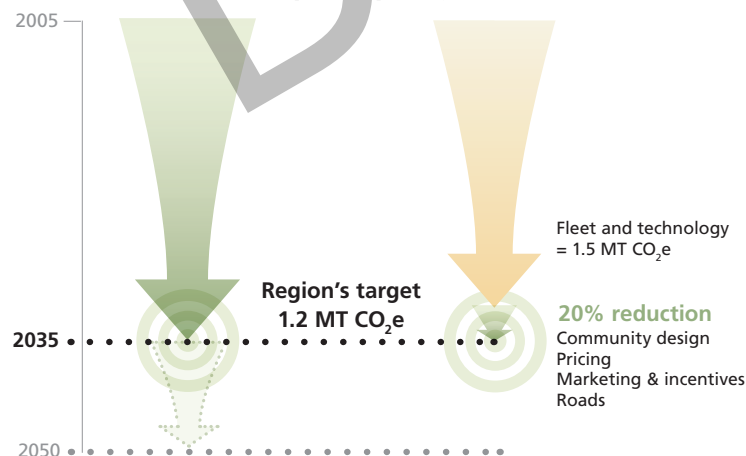
27'

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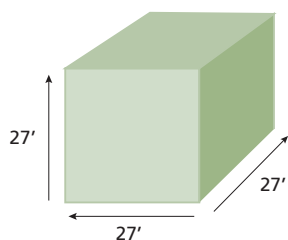
2011

The Oregon Department of Transportation (ODOT) and the Department of Land Conservation and Development (DLCD) are leading the state response relative to the transportation sector through the Oregon Sustainable Transportation Initiative (OSTI). As part of this effort, the Land Conservation and Development Commission (LCDC) adopted per capita roadway GHG emissions reduction targets for light-duty vehicles for all six metropolitan areas within Oregon on May 19, 2011.

The LCDC target-setting process assumed changes to fleet and technology would reduce 2005 emissions levels from 4.05 to 1.51 MT CO$_2$e per capita by 2035 through improvements to fuel economy, fleet mix and vehicle technology.

The target for the Portland region calls for an additional 20 percent GHG emissions reduction below 2005 levels by 2035. This is an additional reduction to what can reasonably be anticipated from technology and fleet improvements.

Region's 2035 GHG emissions reduction target in per capita terms

2005

Region's target
1.2 MT CO$_2$e

Fleet and technology
= 1.5 MT CO$_2$e

20% reduction
Community design
Pricing
Marketing & incentives
Roads

2035

2050

To meet the LCDC target the region must reduce roadway GHG emissions to 1.2 MT CO$_2$e per capita from 4.05 MT Co$_2$e in 2005. While the regional target is based on 2005 emissions values, it has been calibrated to 1990 emissions levels and, if achieved, ensures the region is on track to meet the overall state 2050 GHG reduction goal. LCDC will review the state targets in 2015.

The Scenarios Project is one element of a larger set of climate-related initiatives at Metro collectively known as Climate Smart Communities:

Regional Greenhouse Gas Emissions Inventory. In 2010, Metro completed a regional GHG emissions inventory for the year 2006. The inventory establishes a snapshot of the region's carbon footprint to focus planning and monitoring efforts to achieve long-term GHG reductions.

Greenhouse Gas Emissions Assessment Toolkit. Metro developed a regional GHG Emissions Assessment Toolkit that establishes a framework for regional climate impact assessments and provides consistent guidance on analysis methods, reporting, and evaluation of Metro projects, programs, and policies.

Climate Leadership Initiative. Metro participated in the Climate Leadership Initiative, completed in January 2010, which engaged local experts and stakeholders on how to prepare the lower Willamette Valley River Basin for climate change impacts.

Climate Prosperity Strategy. Metro worked with local governments, businesses, educational institutions, and the Portland Oregon Sustainability Institute to develop the 2011 Portland Metro Climate Prosperity Strategy—a 'greenprint' for integrating climate change policy and economic development into a single strategy.

Principles to guide our approach

Phase 1 of the Scenarios Project focused on understanding the region's choices for reducing GHG emissions. Testing broad-level, regional scenarios revealed the potential of current plans and policies as well as what combinations of land use and transportation strategies (grouped in six policy areas) are needed to meet the state GHG targets.

In May, 2011, a work group of members from TPAC and MTAC was charged with helping Metro staff develop the Phase 1 scenarios assumptions, consistent with the guiding principles and evaluation framework endorsed by the Metro Council, JPACT and MPAC in June, 2011.

Climate Smart Communities Scenarios Project guiding principles

1. Focus on outcomes and benefits
The strategies that are needed to reduce GHG emissions can help save individuals, local governments and the private sector money, grow local businesses, create jobs and build healthy, livable communities. These multiple benefits should be emphasized and central to the evaluation and communication of the results.

2. Build on existing efforts and aspirations
Start with local plans and 2010 regional actions that include strategies to realize the region's six desired outcomes (page 6).

3. Show cause and effect
Provide sufficient clarity to discern cause and effect relationships between strategies tested.

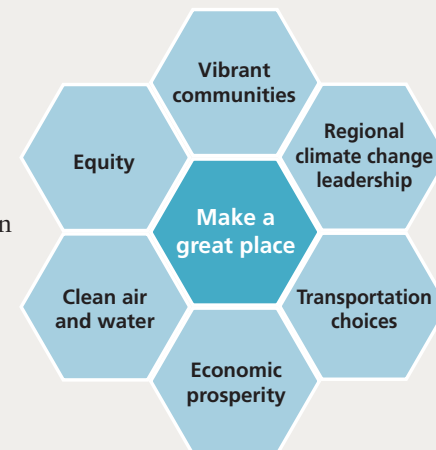### 4. Be bold, yet plausible and well-grounded
Explore a range of futures that may be difficult to achieve but are possible in terms of market feasibility, public acceptance and local aspirations.

5. Be fact-based and make information relevant, understandable and tangible
Develop and organize information so decision-makers and stakeholders can understand the choices, consequences (intended and unintended) and tradeoffs. Use case studies, visualization and illustration tools to communicate results and make the choices real.

6. Meet state climate goals
Demonstrate what is required to meet the state GHG emission reduction target for cars, small trucks and SUVs, recognizing reductions from other emissions sources must also be addressed in a comprehensive manner.

The Metro Policy Advisory Committee (MPAC) and the Joint Policy Advisory Committee on Transportation (JPACT) endorsed the six principles on June 8 and June 9, 2011.

Vibrant communities · Regional climate change leadership · Equity · Make a great place · Clean air and water · Transportation choices · Economic prosperity

The region's six desired outcomes – endorsed by city and county elected officials and approved by the Metro Council in December 2010.

Phase 1: methods and tools

The technical work group defined the scenario assumptions to be tested while Metro and ODOT staff developed tools to support the analysis in summer 2011. The model development work concluded in September 2011, and the initial model runs were completed in October.

Metro staff used a regionally tailored version of ODOT's Greenhouse Gas State Transportation Emissions Planning (GreenSTEP) model to conduct the analysis. Using GreenSTEP—the same model used to set the region's GHG emissions reduction target—ensures compatibility with state's planning efforts and provides a common GHG emissions reporting tool across the State.

The foundation of this work is the development of a Base Case – the existing conditions for 2010 – and a Reference Case – a forecast of how the region will perform in 2035 based on projected population and demographic trends.

The Reference Case assumes the realization of existing plans and policies, and represents the Level 1 assumptions for each policy area. The remaining 143 scenarios test plausible combinations of land use and transportation strategies that could affect GHG emissions from light-duty vehicles.

Strategies were organized into six policy areas:
- Community design
- Pricing
- Marketing and incentives
- Roads
- Fleet
- Technology

Each of these policy levels include individual strategies that have been shown to affect GHG emissions (see page 13). While some strategies are new, many of the strategies tested are already being implemented to realize the 2040 Growth Concept and the aspirations of communities across the region. A summary of the strategies tested is provided on pages 20 – 29.
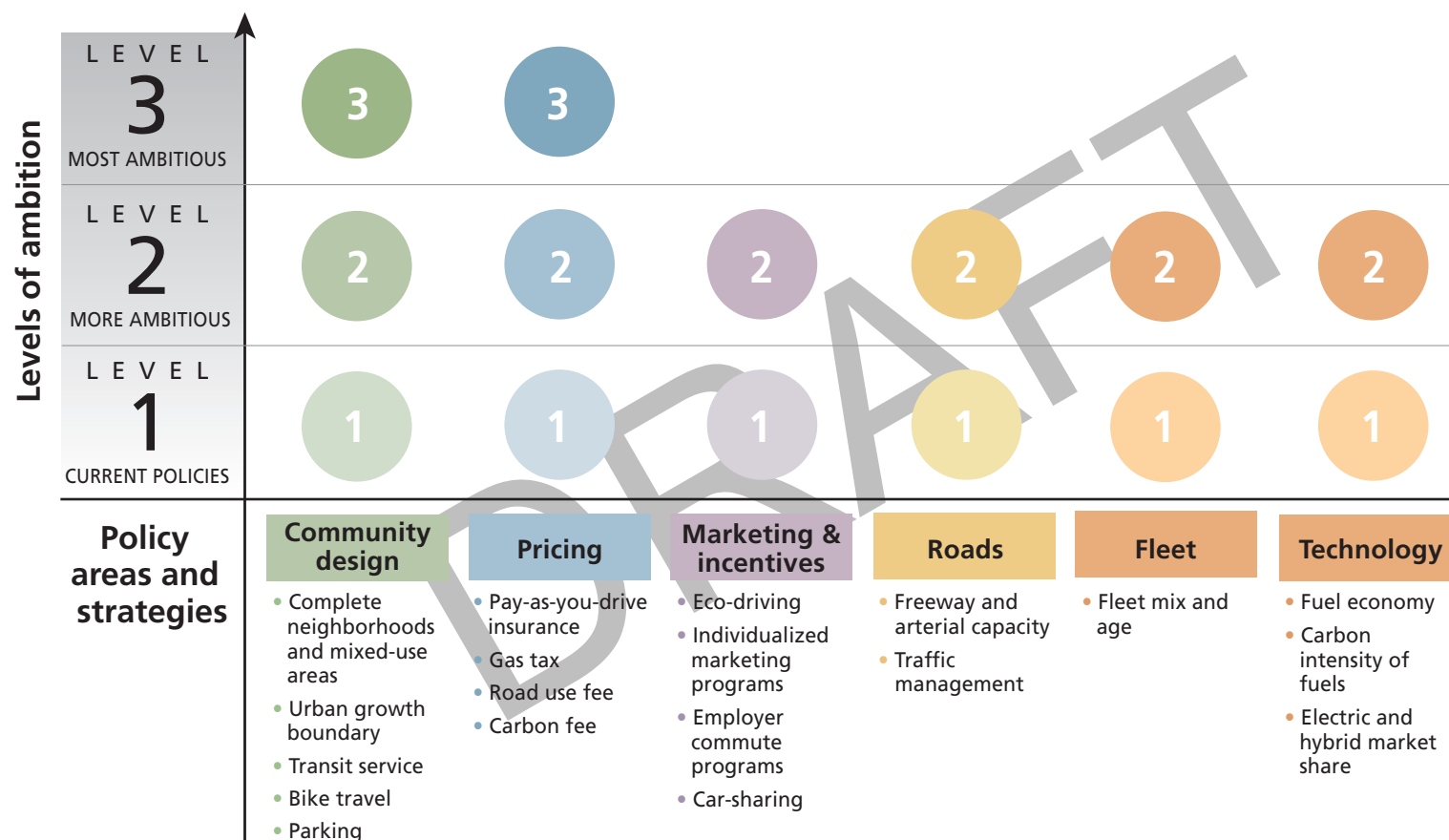
Including the Reference Case, a total of 144 scenarios have been analyzed at a preliminary level. In addition to the scenarios analysis, staff completed the Strategy Toolbox report. The Strategy Toolbox report summarizes published local, national and international research on strategies that can help reduce transportation-related GHG emissions and meet other policy objectives. The report documents benefits of different strategies to a community, synergy between strategies, and implementation opportunities and challenges to be addressed in Phase 2.

Key findings from Phase 1 will be used to refine scenario inputs to develop customized scenarios for further analyses in Phase 2.

www.oregonmetro.gov/climatescenarios

Climate Smart Communities: Scenarios Project

Strategy Toolbox
for the Portland metropolitan region

Review of the latest greenhouse gas emissions reduction bring to the region

October 2011

Metro

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Climate Smart Communities: Scenarios Project

Phase 1
Metropolitan GreenSTEP
Scenarios Technical
Documentation

This information is for research purposes only and does not necessarily reflect current or future policy decisions of the Metro Council, MPAC or JPACT.

October 2011 - DRAFT

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Phase 1: Building blocks for regional scenarios
Testing combinations of plausible strategies

Levels of ambition

LEVEL 3 MOST AMBITIOUS	
LEVEL 2 MORE AMBITIOUS	
LEVEL 1 CURRENT POLICIES	

Policy areas and strategies

Community design	Pricing	Marketing & incentives	Roads	Fleet	Technology
• Complete neighborhoods and mixed-use areas	• Pay-as-you-drive insurance	• Eco-driving	• Freeway and arterial capacity	• Fleet mix and age	• Fuel economy
• Urban growth boundary	• Gas tax	• Individualized marketing programs	• Traffic management		• Carbon intensity of fuels
• Transit service	• Road use fee	• Employer commute programs			• Electric and hybrid market share
• Bike travel	• Carbon fee	• Car-sharing			
• Parking					

Phase 1: findings

Phase 1 of the Scenarios Project has focused on understanding the region's choices by conducting a review of published research and by testing 144 regional scenarios. Phase 1 was designed to accomplish two things: 1) to understand the GHG emissions reduction potential of current plans and policies and 2) to understand the combinations of plausible land use and transportation strategies that reduce GHG emissions from light duty vehicles by an additional 20 percent per capita below 2005 levels by 2035. The region's decision-makers will use this information to direct development of a preferred strategy in Phase 2.

Current plans and policies
Strong foundation but doesn't meet target

Targets are achievable
But will take more effort and action
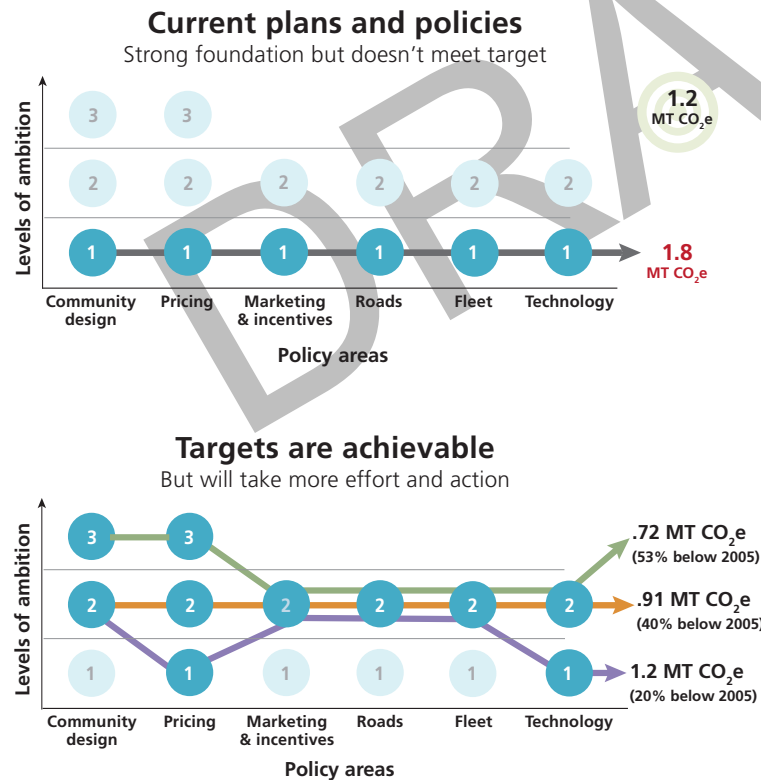
What we learned from the Phase 1 Scenarios
The work completed to date yielded the following findings:

Overall Findings

Finding #1: Current local and regional plans and policies are ambitious and provide a strong foundation toward meeting the region's GHG target. If realized, they will result in substantial per capita GHG emissions reductions from 2005 levels. However, significant investment, commitment and leadership are needed to realize existing local and regional aspirations.

Finding #2: The reduction target is achievable but will take additional effort and new strategic actions. Ninety-three of 144 scenarios tested meet the 20 percent per capita GHG emissions reduction target. Various combinations of policies achieved GHG emissions reductions ranging from 20 percent to 53 percent below 2005 levels.

Finding #3: Most of the strategies under consideration are already being implemented in the region to achieve the **2040 Growth Concept vision and other important economic, social and environmental goals.** Driving less conserves energy, reduces fuel consumption and saves money that consumers and businesses can spend on other things to help stimulate the region's economy. Supporting infrastructure investments such as bike lanes, sidewalks, new transit service, and electric vehicle charging stations will help expand travel options for everyone.

Finding #4: A range of policy choices exists to reduce GHG emissions; the best approach is a mix of strategies. Light-duty vehicle emissions are a function of vehicle efficiency, technology, fuel content and vehicle travel. While improving vehicle and fuel efficiency achieves significant reductions in GHG emissions, per capita vehicle travel must be reduced to meet the target.

Comparison of Phase 1 policy areas
estimated reductions in roadway GHG emissions
from current plans and policies

Policy area	Level	Estimated percent reduction*
Community design	2	18%
Community design	3	36%
Pricing	2	13%
Pricing	3	14%
Marketing and incentives	2	4%
Roads	2	2%
Fleet	2	11%
Technology	2	14%

*MT CO_2e percent change from 2035 Reference Case (current plans and policies)

The table above demonstrates the effect of applying each policy area at each level of implementation beyond the Reference Case (Level 1). The estimated percent reduction represents the average reduction in roadway GHG emissions for each policy area, while considering all possible combinations of policy areas. It should be noted that these reduction estimates do NOT assess the relative effect of changes to individual strategies, but rather the reductions attributable to each policy area. In addition, the reduction estimates are NOT additive.

Policy area findings

Finding #5: Community design and pricing play a key role in how much and how far people drive each day and contribute significant GHG emissions reductions. The analysis revealed that community design and/or pricing strategies must be more ambitious than current policies to meet the target.

Finding #6: Fleet, technology and pricing strategies contribute similar GHG emissions reductions but not enough individually to meet the region's target. Pricing, when compared with the most ambitious fleet and technology strategies, meets the target.

Finding #7: Road management and marketing strategies improve system and vehicle efficiency and reduce vehicle travel to provide similar, but modest GHG emissions reductions. Combining these strategies with community design provides additional emissions reduction that can be used to fill gaps.

Phase 1 at a glance: results from selected scenarios

How far do current policies get us?

Findings: Current plans and policies are on the right track and provide substantial per capita GHG reductions but do not meet the target.

Community design and/or pricing must be more ambitious than current policies to meet the target

LEGEND

Region's target = 1.2 MT CO_2e

Policy areas:

C Community design

P Pricing

M Marketing & incentives

R Roads

F Fleet

T Technology

Results:

1.8 MT CO_2e does not meet target

1.2 MT CO_2e meets target

0% Percent reduction in GHG emission from 2005

Scenario 1 – 2035 Reference Case
Current policies

Result: **1.8 MT CO_2e**
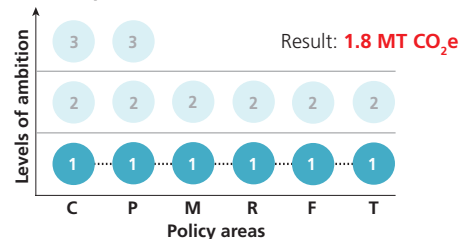
Scenario 2
Boost fleet and technology

Result:**1.3 MT CO_2e**
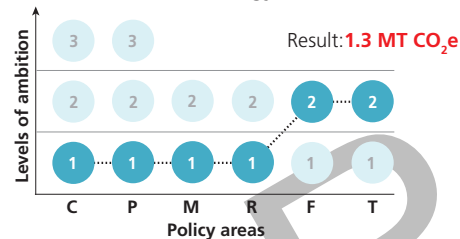
Scenario 3
Boost system efficiency

Result: **1.7 MT CO_2e**
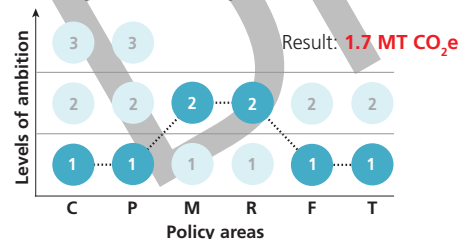
Scenario 4
Boost fleet, technology and system efficiency

Result: **1.3 MT CO_2e**
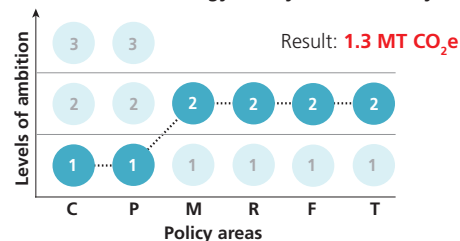
What is the range of possible reductions?

Findings: Ninety-three out of 144 scenarios meet or exceed the target.

The reductions ranged from 20 to 53 percent below 2005 levels on a per capita basis.

Scenario 5
Boost all policies but pricing and technology

Result: **1.2 MT CO_2e**
– 20%
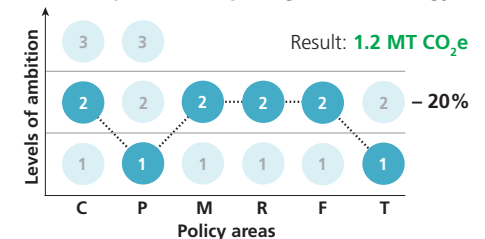
Scenario 6
Boost all policies but pricing

Result: **1.0 MT CO_2e**
– 32%
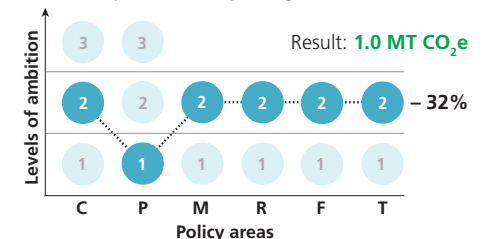
Scenario 7
Boost all policies to level 2

Result: **.9 MT CO_2e**
– 40%
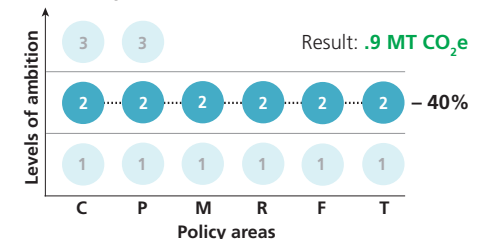
Scenario 8
Boost all policies to their most ambitious level

Result: **.72 MT CO_2e**
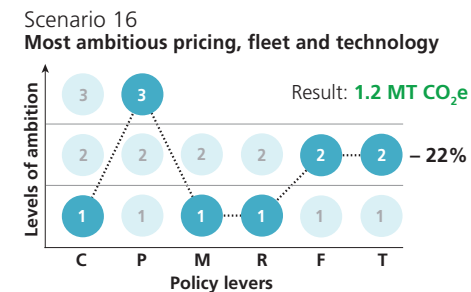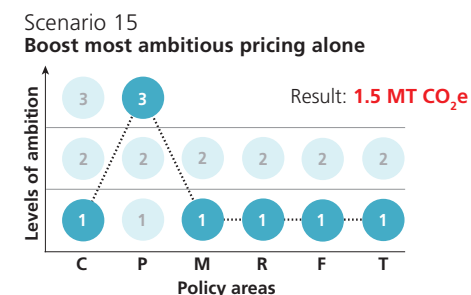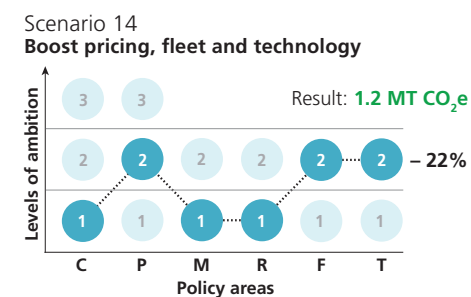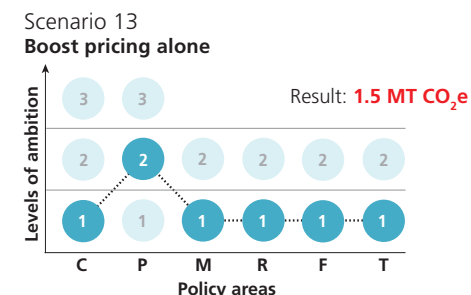– 53%
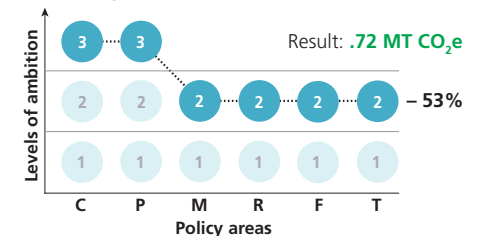
What is the effect of the built environment?

Findings: Similar reductions are possible through the most ambitious community design and fleet/technology scenarios.

Combining more ambitoius community design with the most ambitious system efficiency policies is not enough to meet target.

Scenario 9
Boost community design and system efficiency

Result: **1.4 MT CO$_2$e**

Levels of ambition

Policy areas: C P M R F T

Scenario 10
Boost community design and marketing

Result: **1.4 MT CO$_2$e**

Levels of ambition

Policy areas: C P M R F T

Scenario 11
Boost community design even more

Result: **1.1 MT CO$_2$e** − 29%

Levels of ambition

Policy areas: C P M R F T

Scenario 12
Boost fleet and technology

Result: **1.1 MT CO$_2$e** − 31%

Levels of ambition

Policy areas: C P M R F T

What is the effect of pricing?

Findings: Pricing when combined with the most ambitious fleet and technology strategies meets the target.

Scenario 13
Boost pricing alone

Result: **1.5 MT CO$_2$e**

Levels of ambition

Policy areas: C P M R F T

Scenario 14
Boost pricing, fleet and technology

Result: **1.2 MT CO$_2$e** − 22%

Levels of ambition

Policy areas: C P M R F T

Scenario 15
Boost most ambitious pricing alone

Result: **1.5 MT CO$_2$e**

Levels of ambition

Policy areas: C P M R F T

Scenario 16
Most ambitious pricing, fleet and technology

Result: **1.2 MT CO$_2$e** − 22%

Levels of ambition

Policy levers: C P M R F T

Our starting point is the Reference Case – current plans and policies

Key population and household assumptions:
- Population is forecasted to grow from 1.3 to 1.8 million residents living within the Metro urban growth boundary.

Key land supply assumptions:
- The Metro urban growth boundary (UGB) is expanded by 7,680 acres by 2035, one-quarter of the urban reserves designated in 2010 and 2011.

Key pricing assumptions
- The Federal gas tax is 18 cents per gallon – the same as today.
- State gas tax is 30 cents per gallon – the same as today.
- The average daily cost of parking is $5 per day – the same as in 2005.
- Locations with paid parking are limited to downtown Portland, the Oregon Health Science University (OHSU) campus and the Lloyd District, representing approximately 13 percent of the region's workers and 8 percent of other trips made each day – the same as in 2005.
- Zero households participate in pay-as-your-drive insurance.

Key marketing and incentives assumptions
- 9 percent of households participate in individualized marketing – the same as today.
- 20 percent of workforce participates in employer-based commute programs – the same as today.
- Participation in carsharing programs remains the same as today: one member for every 100 people in higher-density areas like the Pearl District in Portland and one member for every 200 people in medium-density areas like inner eastside Portland neighborhoods.

Key road assumptions
- The 2035 Regional Transportation Plan financially constrained system of highway and investments are implemented.
- Future delay on the highway and arterial network is reduced by 10 percent through traffic management, such as clearing accidents and breakdowns more quickly, traffic signal timing and other strategies.

Key fleet and technology assumptions
- The region's fleet mix stays nearly the same as today – 56 percent of the fleet is passenger cars and the remaining 44 percent is small trucks and sport utility vehicles.
- The Low Carbon Fuel Standard (as proposed by the Oregon Department of Environmental Quality) is adopted; carbon intensity of fuels will decline by 10 percent below today's average.
- Federal Corporate Average Fuel Economy (CAFÉ) standards calling for a fleet average of 50 miles per gallon for model years 2017-2025 are achieved. This fleet average represents a fuel economy of 59.7 mpg for passenger cars and 41 mpg for light- trucks.
- Electric vehicles and plug-in hybrid electric vehicles represent 4 percent of the total passenger vehicle fleet and 1 percent of the light-truck fleet.

Key transportation system assumptions:

- The 2035 Financially-Constrained Regional Transportation Plan (RTP). The plan includes $13.6 billion of investments, reflecting the amount of revenue reasonably expected to be available in the Metro region from 2007 to 2035.
- The 2035 RTP financial plan assumes existing federal, state and local funding plus new revenues that are not part of the modeled pricing assumptions. Significant increases in transportation revenue are likely to be needed if anticipated improvements in vehicle fuel economy are realized.

Targeted highway investments:

- I-5 / Columbia River Crossing (CRC) Project is completed.
- Interchanges in the OR 217, US 26, I-205 corridors and at the junction of I-5/I-84 are improved.
- The Sunrise Project connection from I-205 to 172nd Avenue is built.
- US 26 West is widened to six through lanes to Shute Road.

Regional transit investments:

- Milwaukie light rail and Columbia River Crossing light rail are constructed.
- Lake Oswego streetcar, Portland streetcar loop, and Burnside/Couch streetcar to Hollywood Transit Center are constructed.
- Frequent bus service is expanded in some transit corridors.

Other multi-modal investments:

- On-street bicycle and pedestrian projects, such as bicycle lanes, cycle tracks, bicycle boulevards, sidewalks and crossing improvements are constructed.
- Off-street regional trail projects are constructed, such as the Lake Oswego to Portland trail, Fanno Creek (Red Electric) trail, Beaverton Creek Trail, Westside trail, Columbia Slough trail, Scouter's Mountain trail, E. Buttes Loop trail, and the Gresham-Fairview trail.
- New street connections that build out the regional street grid are constructed.
- Freight related street extensions and expansions focused on serving industrial areas
- Major streets are widened or retrofitted with sidewalks, bicycle facilities and other multi-modal designs.
- System and demand management projects and programs to improve the efficiency of our existing transportation infrastructure are completed.

2035 RTP Funding Sources

- 25% State $3.4 B
- 44% Local $6 B
- 31% Federal $4.2 B
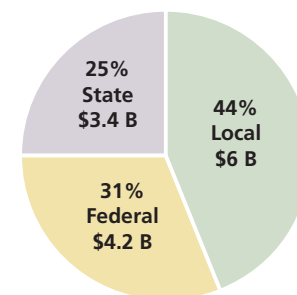
2035 RTP by investment type and share of total cost

Investment type	Cost	Percent of total RTP cost
Sidewalks, bike facilities and trails	$948 M	7%
Freight	$623 M	5%
Traffic management, signal timing and other ITS projects	$ 19 M	<1%
Regional programs • Regional Travel Options • Regional Transportation System Management and Operations • Regional Transit-oriented Development	$196 M	1%
Roads and bridges	$4.3 B	32%
Highways	$4.0 B	29%
Public transit	$3.5 B	25%
Total (costs have been rounded)	**$13.6 B**	**100%**

Community Design – what we tested

Households living in mixed-use areas

GreenSTEP estimates the probability that a household lives in a mixed-use area or complete neighborhood based on Census tract population density. In Phase 1, GreenSTEP internally calculated the following values:

2010 Base year: 24%
2035 Level 1:   33%
2035 Level 2:   33%
2035 Level 3:   34%

In future project phases these values can be adjusted to reflect land use policies aimed at changing the amount and type of mixed-use development.

Urban growth boundary

This input tests the effect of urban growth boundary expansion relative to population growth.

2010 Base Year captures the existing land area with the UGB.
2035 Level 1 assumes one-quarter of the adopted urban reserves areas come into the UGB by 2035.
2035 Level 2 assumes the same level of expansion as Level 1.
2035 Level 3 tests the effect of a no-expansion policy.

Bicycle mode share

This input reflects the share of all trips less than 6 miles round trip in length are made by bicycle.

2010 Base Year reflects the estimated regional bike mode share, as reflected in the 2035 RTP.
2035 Level 1 assumes no change from 2010 in the share of regional bike mode split, an estimate consistent with the 2035 RTP.
2035 Level 2 assumes the same share of bicycle travel as Level 3 of the first round of STS scenarios.
2035 Level 3 assumes regional bike mode share grows to 30 Percent of all trips less than 6 miles roundtrip. Level 3 reflects a significantly more aggressive bike mode share than the STS Scenarios in an effort to evaluate whether bike mode share, at a regional scale, might have a larger impact on reducing GHG emissions than it would at a state level.

Transit service level

This input reflects per capita transit service growth.

2010 Base Year reflects current TriMet service levels for light-rail, streetcar and bus service growth. This ratio represents the equivalent of 29 revenue miles per capita.
2035 Level 1 maintains the current per capita service rate assumed in the adopted 2035 RTP.
2035 Level 2 assumes per capita transit service levels grows significantly – the equivalent of 69 revenue miles per capita, roughly comparable to the service levels of Chicago and Washington DC or 2.5 times the 2035 RTP service levels.
2035 Level 3 assumes even more substantial growth in per capita transit service levels, the equivalent of 115 revenue miles per capita, roughly comparable to New York City service levels or 4 times the 2035 RTP services levels.

Workers/non-work trips paying for parking

GreenSTEP considers parking pricing as a trip-based cost. There are two types of parking costs addressed in GreenSTEP:

Strategy	2010	2035		
	Base Year *Reflects existing conditions*	Level 1 **Reference case** *Reflects current plans and policies*	Level 2 *Reflects more ambitious policy changes*	Level 3 *Reflects even more ambitious policy changes*
Households living in mixed-use areas and complete neighborhoods[1] (percent)	GreenSTEP calculates			
Urban growth boundary expansion (acres)	2010 UGB	7,680 acres	7,680 acres	No expansion
Bicycle mode share[1] (percent)	2%	2%	12.5%	30%
Transit service level	2010 service level	2035 RTP service level	2.5 times RTP service level	4 times RTP service level
Workers/non-work trips paying for parking (percent)	13% / 8%	13% / 8%	30% / 30%	30% / 30%
Average daily parking fee ($2005)	$5.00	$5.00	$5.00	$7.25

1. for trips 3 miles or less.

Community Design – the results

(1) parking costs at places of employment and (2) non-work parking costs.

2010 Base Year reflects the current estimate of areas with work and non-work parking fees from the 2035 RTP – this includes downtown Portland, OHSU and the Lloyd District.

2035 Level 1 assumes no change from 2010 parking areas.

2035 Level 2 assumes new areas charge parking fees, based on the 2035 RTP assumptions. This is the only community design input where Level 2 reflects adopted policy, not Level 1.

2035 Level 3 assumes no change from Level 2.

Average daily parking fee

This input provides the opportunity to evaluate the effects of adjusting work and non-work parking factors. The Phase 1 scenarios tested the following parking fees (2005 $):

2010 Base Year: $5.00
2035 Level 1: $5.00
2035 Level 2: $5.00
2035 Level 3: $7.25

Community design	Strategy lead			
	Federal	**State**	**Regional**	**Local**
Complete neighborhoods and mixed-use areas				●
Urban growth boundary			●	
Transit service			●	
Bicycle travel				●
Parking				●

From the Strategy Toolbox Report

Community benefits
• Increased physical activity from walking and biking, leading to reduced risk of obesity, diabetes, heart disease and premature death

• Enhanced public safety; reduced risk of traffic injuries and fatalities

• Improved air quality and fewer air toxics emissions, leading to reduced risk of asthma, lung disease and premature death

Environmental benefits
• Lower levels of pollution

• Less energy use

• Natural areas, farm and forest protection

Economic benefits
• Job opportunities

• Improved access to jobs, goods and services

• Consumer savings

• Municipal savings

• Leverage private investment, increased local tax revenues

• Increased property values

• Reduced fuel consumption, leading to less dependence on foreign oil

• Improved energy security

Pricing – what we tested

Pay-as-you-drive-insurance

2010 Base Year reflects current program options with no pay-as-you-drive insurance options available to consumers.

2035 Level 1 assumes no change in program options from 2010.

2035 Level 2 reflects a 100 percent transition to pay-as-you-drive insurance. This assumption reflects the State's most ambitious assumption for the first round of STS scenarios.

Gas tax

2010 Base Year reflects the 2010 State and Federal gas tax levels.

2035 Level 1 reflects the State gas tax increase resulting from HB 2001.

2035 Level 2 assumes no change in the Federal gas tax and reflects a shift of the State gas tax to a road use fee (see road use fee Level 2).

Road use fee

2010 Base Year reflects the current policy status of no light-duty vehicle mileage-based road use fee.

2035 Level 1 assumes no change from 2010 (no implementation of a light-duty vehicle road use fee).

2035 Level 2 assumes a transition of the 2011 State gas tax to

Pricing	Strategy lead			
	Federal	State	Regional	Local
Pay-as-you-drive insurance	●	●		
Gas tax	●	●		●
Road use fee		●	●	
Carbon fee	●			

an equivalent cost per mile road use fee. The total road use fee includes the equivalent of an annual increase of $.01 per year gas tax increase, which reflects the 2035 RTP financial assumptions for maintenance and operation of the transportation system.

Carbon emissions fee

2010 Base Year reflects the current policy status of no carbon emissions fees in place.

2035 Level 1 assumes no change from 2010 (no implementation of a carbon emissions fee).

2035 Level 2 assumes implementation of a carbon emissions fee that represents an estimated value of the external costs of transportation GHG emissions.

Strategy	2010	2035		
	Base Year *Reflects existing conditions*	**Level 1** **Reference case** *Reflects current plans and policies*	**Level 2** *Reflects more ambitious policy changes*	**Level 3** *Reflects even more ambitious policy changes*
Pay-as-you-drive insurance (percent of households participating and cost)	0%	0%	100% at $0.06/mile	No change from Level 2
Gas tax (cost per gallon $2005)	$0.42	$0.48	$0.18	
Road use fee (cost per mile $2005)	$0	$0	$0.03	
Carbon emissions fee (cost per ton)	$0	$0	$0	$50

Pricing – the results

From the Strategy Toolbox

Community benefits
• Reduced number of uninsured motorists

• Improved air quality and fewer air toxics emissions, leading to reduced risk of asthma, lung disease and premature death

Environmental benefits
• Lower levels of pollution

Economic benefits
• More available land for development or preservation

• New revenues

• Consumer savings

• Reduced fuel consumption, leading to less dependence on foreign oil

Marketing and incentives – what we tested

Households participating in eco-driving

Eco-driving involves educating motorists on how to drive in order to reduce fuel consumption and cut emissions. Examples of eco-driving practices include avoiding rapid starts and stops, matching driving speeds to synchronized traffic signals, and avoiding idling.

2010 Base Year reflects the current status of no existing eco-driving marketing programs. There is also no supporting data to indicate the proportion of households that follow eco-driving practices.

2035 Level 1 assumes no change from 2010 (no eco-driving marketing programs).

2035 Level 2 reflects an adoption of and participation in eco-driving marketing programs. The participation rate for this marketing program reflects the State's Level 2 input assumption for the first round of STS scenarios.

Household participating in individualized marketing programs

Individualized marketing (IM) programs are travel demand management programs focused on individual households.

2010 Base Year is an estimate of current participation rates.

2035 Level 1 assumes no change from 2010 (continuation of existing participation levels).

2035 Level 2 assumes a significant increase in participation rates, which reflects the percent of households within peak transit coverage areas reflected in the 2035 Financially Constrained RTP.

Workers participating in employer-based commuter programs

Employee commute options (ECO) programs are work-based travel demand management programs, which can include, employer-subsidized transit passes, bicycle parking, education and promotion, carpool and vanpool programs, etc.

2010 Base Year is an estimate of current participation rates.

2035 Level 1 assumes no change from 2010 (continuation of existing participation levels).

2035 Level 2 assumes a doubling of participation rates, which could reasonably be accomplished with increased programmatic resources/funding and would not require a legislative change to the State ECO Rule.

Car-sharing in high density areas

Because car-sharing is a relatively new phenomenon, Green-STEP models the approximate effects of car-sharing on vehicle travel and vehicle ownership.

2010 Base Year is an estimate of current participation rates.

2035 Level 1 assumes no change from 2010 (continuation of existing participation rates).

2035 Level 2 assumes a doubling of participation rates.

Car-sharing in medium density areas

Because car-sharing is a relatively new phenomenon, Green-STEP models the approximate effects of car-sharing on vehicle travel and vehicle ownership.

2010 Base Year is an estimate of current participation rates.

2035 Level 1 assumes no change from 2010 (continuation of existing participation rates).

2035 Level 2 assumes a doubling of participation rates.

Strategy	2010	2035		
	Base Year *Reflects existing conditions*	**Level 1** **Reference case** *Reflects current plans and policies*	**Level 2** *Reflects more ambitious policy changes*	**Level 3** *Reflects even more ambitious policy changes*
Households participating in eco-driving	0%	0%	40%	No change from Level 2
Households participating in individualized marketing programs (percent)	9%	9%	65%	
Workers participating in employer-based commuter programs (percent)	20%	20%	40%	
Car-sharing in high density areas (target participation rate)	Participation rate of 1 member/100 people	Participation rate of 1 member/100 people	Double participation to 2 members/100 people	
Car-sharing in medium density areas	Participation rate of 1 member/200 people	Participation rate of 1 member/200 people	Double participation to 2 members/200 people	

Marketing and incentives – the results

Marketing and incentives	Strategy lead			
	Federal	State	Regional	Local
Eco-driving	●	●	●	
Individualized marketing			●	
Employer commute programs				●
Car-sharing				●

From the Strategy Toolbox Report

Community benefits

• Increased physical activity from walking and biking, leading to reduced risk of obesity, diabetes, heart disease and premature death

• Enhanced public safety; reduced risk of traffic injuries and fatalities

• Improved air quality and fewer air toxics emissions, leading to reduced risk of asthma, lung disease and premature death

Environmental benefits

• Lower levels of pollution

• Less energy use

Economic benefits

• Job opportunities

• Improved access to jobs, goods and services

• Consumer savings

• Reduced fuel consumption, leading to less dependence on foreign oil

• Increased cost effectiveness of transit investments through improved ridership

Roads – what we tested

Freeway and arterial expansion

The road capacity input in GreenSTEP only models the affect of roadway expansion relative to population growth and does not distinguish between the impact of street connectivity and road-way expansion projects.

2010 Base Year reflects current freeway and arterial system.

2035 Level 1 assumes implementation of the 2035 financially constrained RTP road system.

2035 Level 2 assumes no roadway expansion beyond today and relies only on system management.

Delay reduced by traffic management

GreenSTEP provides a mechanism to evaluate the effects of system management programs on GHG emissions.   System management includes traffic signal timing and incident management.

2010 Base Year reflects the input assumption used in the State's first round of STS Scenarios (no existing regional data or modeling assumptions are available for this input).

2035 Level 1 assumes no change from 2010 (no change in delay reduction).

2035 Level 2 assumes an increase in delay reduction based on the input assumption used in the State's first round of STS Scenarios (no existing regional data or modeling assumptions are available for this input).

Roads	Strategy lead			
	Federal	**State**	**Regional**	**Local**
Freeway and arterial capacity		●		●
Traffic management		●	●	●

Strategy	2010	2035		
	Base Year *Reflects existing conditions*	**Level 1** **Reference case** *Reflects current plans and policies*	**Level 2** *Reflects more ambitious policy changes*	**Level 3** *Reflects even more ambitious policy changes*
Freeway and arterial expansion	2010 system	2035 financially constrained system	No expansion	No change from Level 2
Delay reduced by traffic management strategies (percent)	10%	10%	35%	

Roads – the results

DRAFT

From the Strategy Toolbox Report

Community benefits
• Increased physical activity from walking and biking, leading to reduced risk of obesity, diabetes, heart disease and premature death

• Enhanced public safety; reduced risk of traffic injuries and fatalities

• Improved air quality and fewer air toxics emissions, leading to reduced risk of asthma, lung disease and premature death
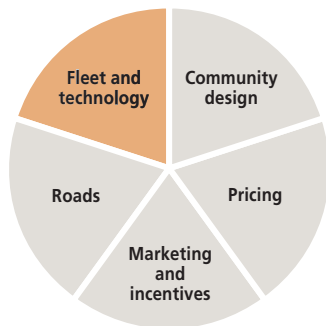
Environmental benefits
• Lower levels of pollution

• Less energy use

Economic benefits
• Job opportunities

• Improved access to jobs, goods and services

• Consumer and business savings

• Reduced fuel consumption, leading to less dependence on foreign oil

Fleet and technology – what we tested

Fleet mix

The vehicle type model in GreenSTEP calculates the likelihood that a vehicle is a light truck, which in western states tend to be higher than the national average.

2010 base year is an estimate of existing conditions.

2035 Level 1 assumes a relatively constant ratio between light trucks and autos compared to the 2010 base year.

2035 Level 2 assumes a significant shift in fleet mix with a growth in auto ownership relative to light truck ownership.

Fleet turnover rate

Fleet turnover reflects the rate at which new vehicles will replace existing vehicles. Since newer vehicles are typically more fuel efficient than older vehicles, newer fleets will yield greater GHG reductions.

2010 base year is an estimate of existing conditions.

2035 Level 1 maintains the current fleet turnover rate of 10 years.

2035 Level 2 increases the rate vehicle replacement to 8 years.

Fuel economy

The fuel economy values reflect anticipated improvements in light vehicle fuel efficiency for 2035 model year vehicles.
2010 base year is an estimate of existing conditions.

2035 Level 1 assumes a significant increase in fuel efficiency; on average it reflects a doubling of fuel efficiency by model year 2035.

2035 Level 2 assumes a slight increase from the Level 1 assumptions.

Carbon intensity of fuels

2010 base year is an estimate of existing conditions (see page 18 for a detailed description).

2035 Level 1 assumes that the carbon intensity of vehicle fuels will be 10 percent below the current average by 2035, consistent with the adopted low carbon fuel standard.

2035 Level 2 assumes that vehicle fuel carbon intensity will be 20 percent below the current average by 2035, consistent with the proposed low carbon fuel standard.

Plug-in hybrid and electric vehicles

2010 base year is an estimate of existing conditions (see page 18 for a detailed description).

2035 Level 1 is the only technology input that varies from the State's assumed enhancements used in the first round of STS scenarios. Rather than keep the EV & PHEV inputs constant across all levels Level 2 reflects the midpoint between the base year and Level 2.

2035 Level 2 is a general estimate of percent of light-duty vehicles that are plug-in hybrids or electric vehicles.

	2010	2035		
Strategy	**Base Year** *Reflects existing conditions*	**Level 1** **Reference case** *Reflects current plans and policies*	**Level 2** *Reflects more ambitious policy changes*	**Level 3** *Reflects even more ambitious policy changes*
Fleet Fleet mix (proportion of autos to light trucks and SUVs)	auto: 57% light truck/SUV: 43%	auto: 56% light truck/SUV: 44%	auto: 71% light truck/SUV: 29%	No change from Level 2
Fleet turnover rate (age)	10 years	10 years	8 years	
Technology Fuel economy (miles per gallon)	auto: 29.2 mpg light truck/SUV: 20.9 mpg	auto: 59.7 mpg light truck/SUV: 41 mpg	auto: 68.5 mpg light truck/SUV: 47.7 mpg	
Carbon intensity of fuels	90 g CO_2e/megajoule	81 g CO_2e/megajoule	72 g CO_2e/megajoule	
Light-duty vehicles that are electric or plug-in electric	auto: 0% light truck/SUV: 0%	auto: 4% light truck/SUV: 1%	auto: 8% light truck/SUV: 2%	

All fleet and technology assumptions reflect the values defined in the State Agency Technical report (3/1/11) and assumed in the Metropolitan GHG Reduction Target Rule adopted by LCDC in May 2011 (http://www.oregon.gov/ LCD/docs/rulemaking/trac/ 660_044.pdf).

Fleet and technology – the results

Fleet and technology	Strategy lead			
	Federal	State	Regional	Local
Fleet mix		●		

From the Strategy Toolbox Report

Community benefits
• Improved air quality and fewer air toxics emissions, leading to reduced risk of asthma, lung disease and premature death

Environmental benefits
• Lower levels of pollution

• Less energy use

Economic benefits
• Job opportunities

• Consumer savings

• Municipal savings

• Leverage private investment, increased local tax revenues

• Reduced fuel consumption, leading to less dependence on foreign oil

• Improved energy security

Bringing it all together: Phase 2 implications

The results simply reflect the underlying model assumptions and provide a starting point for Phase 2. The assumptions used in Phase 1 were based on the need to set "stakes in the ground" to serve as a starting point to test scenarios and show whether the region could achieve sufficient GHG emissions reductions to meet the region's target. *During Phase 2, assumptions can be refined to better reflect policy choices for the region to consider.*

Each strategy presents its own opportunities and challenges. The cost, level of effort and type of actions needed will vary by policy and strategy. The process of defining a preferred approach must be inclusive and engage stakeholders from diverse backgrounds to allow for a variety perspectives to be shared and considered. *Effects on the economy, equity, the environment, costs, savings, public acceptance, and actions needed to implement a particular strategy must be considered* as the region defines a preferred strategy in Phase 2. The region's approach must also advance realization of the region's six desired outcomes, strengthen our economy and support the individual needs and aspirations of each community in the region.

Existing governance structures require that scenario planning be a collaborative effort between the State, Metro, cities and counties. While Metro is responsible for conducting and coordinating land use and regional transportation planning, scenario planning involves evaluation of policies and strategies that are the responsibility of different levels of government. *A collaborative planning and decision-making model allows agreement to be reached at each level.*

Metro, cities and counties will need flexibility and support from the State to be successful. Existing staff are fully subscribed with current planning responsibilities. These responsibilities vary in complexity and scope across jurisdictions. It will be *important to integrate GHG scenario planning with existing Metro, county and city planning processes.* Staff and financial resources may need to be augmented to do planning and implementation for GHG emission reduction.

Leadership, partnerships and coordination are keys to success. Strategies under consideration have a mix of "sponsors" and funding sources. *Metro and local governments cannot achieve the targets alone; it will take leadership, working together and coordinated action at the local, regional, state and federal levels.*

Selecting strategies will involve policy decisions that could have political, economic, environmental, equity, community and lifestyle implications. By framing the policy choices that decision-makers will consider throughout the process, *Phase 1 research serves as a basis for continuing a regional dialogue on how to reach our GHG reduction target* while advancing local and regional efforts to build livable, prosperous and equitable communities.

Where we are headed in Phase 2

The primary objectives of the Phase 1 analysis (2011) are to estimate the GHG emissions reduction potential of current policies and that of alternative combinations of strategies. Phase 2 will build on this work and consider:

Effectiveness, cost and benefits. Evaluate the costs, benefits and impacts across environmental, economic, and equity goals from all perspectives – business, individual, household, local government and regional. This evaluation will clearly illustrate the political, community, social equity, and economic implications of different strategies. The evaluation will identify potential public and private costs and savings associated with different strategies as well as the potential costs of inaction. There are many choices. The next phase should clearly articulate the consequences (intended and unintended) of different choices, including no action and of current plans and policies.

Implementation opportunities and challenges. The feasibility of implementing different strategies, potential financing strategies and the timeframe required will be assessed to inform next steps and recommendations in Phase 2 (Jan. – Dec. 2012). Recommended solutions should not put the state, region or local governments at an economic disadvantage, but rather should boost economic competitiveness and provide greater economic opportunity for everyone.

Equity. The evaluation will meaningfully consider equity. This should include assessing the impacts to transportation disadvantaged communities without well-connected street systems, tran-

sit, sidewalks, and bicycle facilities, or households of modest means that may lack access to lower carbon vehicle options or affordable housing options.

Community investment revenues generated. The evaluation will assess how revenues generated from parking management and other strategies could be funding sources for community investments, such as expanded transit service, building sidewalks, fixing bottlenecks and providing electric vehicle infrastructure.

> **DRAFT policy questions to be addressed in Phase 2 – 2012**
>
> Together, we must answer pivotal policy questions in the next phase of the project:
> - Which actions are local and regional leaders currently taking and what new actions are they willing to take?
> - Which strategies appear most difficult to implement and how might we address those challenges?
> - What are the benefits and impacts of these strategies to individuals, businesses, the region's economy and other desired outcomes communities and the region are trying to achieve?
> - How might revenues generated through pricing help reinvestment in other strategies, such as transit expansion or system management?
> - What is the right mix of land use and transportation investments and strategies?

Phase 1: scenario inputs

This table summarizes the inputs for the 2010 Base Year and 144 alternative scenarios that reflect different levels of implementation for each category of policies. The inputs were developed by Metro staff in consultation with a technical work group of MTAC and TPAC members. Documentation of the inputs and rationale behind each input can be found in the *Phase 1 Metropolitan GreenSTEP Scenarios Technical Assumptions report (draft September 2011). This information is for research purposes only and does not necessarily reflect current or future policy decisions of the Metro Council, MPAC or JPACT.*

Metropolitan GreenSTEP Model
2010 base year and alternative scenarios inputs

Strategy	2010 Base Year *Reflects existing conditions*	2035 Level 1 Reference case *Reflects current plans and policies*	2035 Level 2 *Reflects more ambitious policy changes*	2035 Level 3 *Reflects even more ambitious policy changes*
Community design				
Households living in mixed-use areas and complete neighborhoods[1] (percent)	GreenSTEP calculates			
Urban growth boundary expansion (acres)	2010 UGB	7,680 acres	7,680 acres	No expansion
Bicycle mode share[1] (percent)	2%	2%	12.5%	30%
Transit service level	2010 service level	2035 RTP service level	2.5 times RTP service level	4 times RTP service level
Workers/non-work trips paying for parking (percent)	13% / 8%	13% / 8%	30% / 30%	30% / 30%
Average daily parking fee ($2005)	$5.00	$5.00	$5.00	$7.25
Pricing				
Pay-as-you-drive insurance (percent of households participating and cost)	0%	0%	100% at $0.06/mile	No change from Level 2
Gas tax (cost per gallon $2005)	$0.42	$0.48	$0.18	
Road use fee (cost per mile $2005)	$0	$0	$0.03	
Carbon emissions fee (cost per ton)	$0	$0	$0	$50

1. for trips 3 miles or less.

Strategy		2010	2035		
		Base Year *Reflects existing conditions*	**Level 1** **Reference case** *Reflects current plans and policies*	**Level 2** *Reflects more ambitious policy changes*	**Level 3** *Reflects even more ambitious policy changes*
Marketing and incentives	Households participating in eco-driving	0%	0%	40%	No change from Level 2
	Households participating in individualized marketing programs (percent)	9%	9%	65%	
	Workers participating in employer-based commuter programs (percent)	20%	20%	40%	
	Car-sharing in high density areas (target participation rate)	Participation rate of 1 member/100 people	Participation rate of 1 member/100 people	Double participation to 2 members/100 people	
	Car-sharing in medium density areas (target participation rate)	Participation rate of 1 member/200 people	Participation rate of 1 member/200 people	Double participation to 2 members/200 people	
Roads	Freeway and arterial expansion	2010 system	2035 financially constrained system	No expansion	
	Delay reduced by traffic management strategies (percent)	10%	10%	35%	
Fleet	Fleet mix (proportion of autos to light trucks and SUVs)	auto: 57% light truck/SUV: 43%	auto: 56% light truck/SUV: 44%	auto: 71% light truck/SUV: 29%	No change from Level 2
	Fleet turnover rate (age)	10 years	10 years	8 years	
Technology	Fuel economy (miles per gallon)	auto: 29.2 mpg light truck/SUV: 20.9 mpg	auto: 59.7 mpg light truck/SUV: 41 mpg	auto: 68.5 mpg light truck/SUV: 47.7 mpg	
	Carbon intensity of fuels	90 g CO_2e/megajoule	81 g CO_2e/megajoule	72 g CO_2e/megajoule	
	Light-duty vehicles that are electric or plug-in electric vehicles (percent)	auto: 0% light truck/SUV: 0%	auto: 4% light truck/SUV: 1%	auto: 8% light truck/SUV: 2%	

Glossary

Car-sharing. A model similar to a car rental where people rent cars for short periods of time, often by the hour. They are attractive to customers who make only occasional use of a vehicle, as well as others who would like occasional access to a vehicle of a different type than they use day-to-day. The organization renting the cars may be a commercial business or the users may be organized as a company, public agency, cooperative, or peer-to-peer. Users are members and have been pre-approved to drive (background driving checks have been performed and a payment mechanism has been established). Vehicle locations are distributed throughout the service area, and often located for access by public transport. Insurance and fuel costs are included in the rates. Today there are more than one thousand cities in the world where people can carshare. The Portland region has Zipcar –http://www.zipcar.com/

Eco-driving. A combination of public education and driving practices that result in more efficient vehicle operation, and reduced fuel consumption and emissions. Examples of eco-driving practices include avoiding rapid starts and stops, matching driving speeds to synchronized traffic signals, and avoiding idling. Practicing eco-driving also involves keeping vehicles maintained in a way that reduces fuel consumption such as keeping tires properly inflated and reducing aerodynamic drag

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.

Fleet mix. The percentage of vehicles classified as automobiles compared to the percentage classified as light trucks (weighing less than 10,000 lbs.); light trucks make up 43 percent of the light-duty fleet today.

Fleet turnover. The rate of vehicle replacement or the turnover of older vehicles to newer vehicles; the current turnover rate in Oregon is 10 years.

Greenhouse gas emissions. According to the Environmental Protection Agency, gases that trap heat in the atmosphere are called greenhouse gases, or GHG emissions. Greenhouse gases that are created and emitted through human activities include carbon dioxide (emitted through the burning of fossil fuels), methane, nitrous oxide and fluorinated gases. For more information see www.epa.gov/climatechange/emissions/index.html.

GreenSTEP. GreenSTEP is a new model developed to estimate GHG emissions at the individual household level. It estimates greenhouse gas emissions associated with vehicle ownership, vehicle travel, and fuel consumption, and is designed to operate in a way that allows it to show the potential impacts of different policies and other factors (e.g. gas prices) that have synergistic effects on vehicle travel and emissions.

House Bill 2001 (Oregon Jobs and Transportation Act). Passed by the Legislature in 2009, this legislation provided specific directions to the Portland metropolitan area to undertake scenario planning and develop two or more land use and transportation scenarios by 2012 that accommodate planned population and employment growth while achieving the GHG emissions reduction targets approved by LCDC in May 2011. Then Metro, after public review and consultation with local governments, is to select a preferred scenario. Following selection of a preferred scenario, the local governments within the Metro jurisdiction are to amend their comprehensive plans and land use regulations to be consistent with the preferred scenario. The legislation also directs the Central Lane MPO (which includes Eugene and Springfield) to undertake scenario planning on or after January 2013 and to develop modeling capability by July 2013.

Individualized marketing. 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.

Light vehicles. Vehicles weighing 10,000 pounds or less, and include cars, light trucks, sport utility vehicles, motorcycles and small delivery trucks.

Low-carbon Fuel Standard. In 2009, the Oregon legislature authorized the Environmental Quality Commission to develop low carbon fuel standards (LCFS) for Oregon. Each type of transportation fuel (gasoline, diesel, natural gas, etc.) contains carbon in various amounts. This is

also known as the "carbon content" of a fuel. When the fuel is burned, that carbon turns into carbon dioxide (CO2), which is a greenhouse gases. The goal is to reduce the average carbon intensity of Oregon's transportation fuels by 10 percent by 2022. Carbon intensity refers to the emissions per unit of fuel; it is not a cap on total emissions or a limit on the amount of fuel that can be burned. The lower the carbon content of a fuel, the fewer greenhouse gas emissions it produces. Not every gallon of fuel needs to be 10 percent lower carbon emissions; rather the entire mix of fuel available needs to have 10 percent lower carbon emissions

Pay-as-you-drive insurance (PAYD). This pricing strategy converts a portion of liability and collision insurance from dollars-per-year to cents-per-mile to charge insurance premiums based on the total amount of miles driven per vehicle on an annual basis and other important rating factors, such as the driver's safety record. If a vehicle is driven more, the crash risk consequently increases. PAYD insurance charges policyholders according to their crash risk.

Oregon Sustainable Transportation Initiative (OSTI). An integrated statewide effort to reduce GHG emissions from the transportation sector. Guided by stakeholder input and outreach, the initiative has built collaborative partnerships among local governments and the state's six Metropolitan Planning Organizations (MPOs) to help meet Oregon's goals to reduce GHG emissions and increase our region's energy security and prosperity through integrated land use and transportation planning. The effort includes five main areas: Statewide Transportation Strategy development, GHG emission reduction targets for metropolitan areas, land use and transportation scenario planning guidelines, tools that support MPOs and local governments and public outreach.

Policy areas. Categories of land use and transportation strategies used in GreenSTEP to show how the application of different policies may impact GHG emissions. A policy area can be adjusted at different levels of implementation in the model, for example, changes in fuel economy standards.

Scenario is a term that is used to describe a possible future, representing a hypothetical set of strategies or sequence of events.

Scenario planning is a way to test different actions and policies to see their affect on GHG emissions reduction and other quality of life indicators.

Statewide Transportation Strategy. The strategy will define a vision for Oregon to reduce its GHG emissions from transportation systems, vehicle and fuel technologies and urban form by 2050. Upon completion, the strategy will be adopted by the Oregon Transportation Commission.

Traffic incident management. A coordinated process to detect, respond to, and remove traffic incidents from the roadway as safely and quickly as possible, reducing non-recurring roadway congestion.

Traffic management. Strategies that improve transportation system operations and efficiency, including ramp metering, active traffic management, traffic signal coordination and real-time traveler information regarding traffic conditions, incidents, delays, travel times, alternate routes, weather conditions, construction, or special events.

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

A regional approach simply makes sense when it comes to making decisions about how the region grows. Metro works with communities to support a resilient economy, keep nature close by and respond to a changing climate. Together we're making a great place, now and for generations to come.

www.oregonmetro.gov/climatescenarios

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