

 **Metro** | *Agenda*

Meeting: Metro Technical Advisory Committee
Date: Wednesday, March 16th, 2011
Time: 10 a.m. – 12:00 p.m.
Place: **Metro Regional Center, Council Chambers**

| Time | Agenda Item | Action Requested | Presenter(s) | Materials |
|--------------------------|---|------------------|---------------------------|-----------|
| 10:00 a.m. | CALL TO ORDER AND INTRODUCTIONS | | Robin McArthur, Chair | |
| 10:10 a.m. (90+ min.) | 1. Climate Smart Communities Scenarios: Evaluation Approach <i>Objective: Discuss statewide scenarios analysis results, share draft literature review of carbon emissions reduction strategies and provide input on variables to test in regional scenarios</i> | Discussion | Kim Ellis / Mike Hogle | |
| Noon | ADJOURN | | | |

MTAC meets on the 1st & 3rd Wednesday of the month. The next meeting is scheduled for April 6th, 2011.

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

 **Metro** | *Memo*

Date: March 10, 2011
To: MTAC and interested parties
From: Kim Ellis, Principal Transportation Planner
Re: Strategies For Reducing Carbon Emissions From Light Vehicles

PURPOSE

The purpose of this agenda item is to share the preliminary results of the statewide scenarios analysis and provide summary information on the actions, programs and incentives that local governments and Metro could implement to reduce carbon emissions from cars, small trucks and SUVs.

This information is intended to provide sufficient background information for MTAC to provide input on the combinations of strategies to be tested in the region's scenarios this summer.

BACKGROUND

The overview of actions, programs and incentives came from a literature review conducted by Cambridge Systematics as part of the Oregon Sustainable Transportation Initiative (OSTI) effort and Metro for the Climate Smart Communities Scenarios effort. The literature review considered existing national, state and regional/local research completed in the past 10 years. A bibliography is provided at the end for reference.

Strategy Organization

The strategies have been organized into seven tables for reference.

- Community design and the built environment
 - Land use (*Table 1*)
 - Active transportation (*Table 2*)
 - Public transit (*Table 3*)
- Pricing (*Table 4*)
- Marketing and travel demand management (*Table 5*)
- System management and operations/Intelligent Transportation systems (*Table 6*)
- Technology and Fleet (*Table 7*)

Staff also prepared a companion "Scenario Development Glossary" of strategies that can be evaluated with the scenario tools to be used in Phase 1 of the Climate Smart Communities Scenarios project. The glossary will be provided as a separate handout to guide MTAC's discussion. A more detailed "Strategy Toolbox" is being developed by Metro staff, and will be available for MTAC review in April.

Community design and the built environment

The strategies outlined Tables 1-3 aim to change community design and the built environment in ways that will reduce the number of vehicle miles traveled in the region and their corresponding emissions, and increase walking, biking and use of transit.

Table 1. Land Use Actions, Programs and Incentives

| Action/Program/Incentive | Description |
|--|--|
| More mixed-use, infill and reinvestment in centers and transit corridors | Change in the mix and location of certain land use types and densities to result in: <ul style="list-style-type: none"> • Increased density and mix of uses in strategic locations • Increased percentage of new development in attached or small-lot detached units, with good bike/ped/transit and mix of uses • Mixing of residential and commercial so jobs and residences are in closer proximity. |
| Transit-oriented development (TOD) | Moderate to higher density development within walking distance to high frequency transit service, generally with a mix of residential, employment and shopping opportunities. |
| Infill development funding and incentives | Strategic public investment in projects such as streetscaping, walking, cycling, and transit infrastructure. Can include tools such as land assembly, system development charges, enterprise zones, urban renewal and tax increment financing to produce investments in centers and corridors. Also includes waiving/reducing fees, tax abatement and developer subsidies for infill development or other desired development. |
| Parking management | Manage the supply of parking provided at a particular site or area. Examples include shared parking credits, timed on-street parking, parking restrictions/minimums/maximums, structured parking and parking permit zones to prevent business customers and transit riders from using residential spaces, programs that allows businesses certain number of free permits/mo then charge for additional ones. |
| Parking restrictions/remove parking minimums/implement parking maximums | Limit parking allowed at a particular site or area (e.g., downtown major commercial center). Portland set a cap of approx. 40,000 parking spaces downtown in 1975. The number increased in the 1980s and 1990s, but is still said to have helped increase transit use. <i>(Source: Victoria Policy Transport Institute)</i> |
| Shared parking credits | System in which parking spaces are shared by multiple users to promote efficient use of parking spaces. Arrangements vary, but in some cases, allows developers to pay in lieu fees instead of private off-street parking. |

| Action/Program/Incentive | Description |
|--------------------------|--|
| Urban growth boundary | This regional boundary is a locational land supply tool to manage urban expansion to protect farms and forests from urban sprawl and to promote the efficient use of land, public facilities and services inside the boundary. |
| School siting/placement | School siting policies aimed at keeping existing schools, or constructing new schools within established communities. Schools with pedestrian and bicycle access can result in greater accessibility for students and parents without the need for a motor vehicle |

Active Transportation

Table 2 summarizes the proposed active transportation actions and strategies. These strategies help reduce carbon emissions by expanding transportation options for people to walk and bike to meet some or all of their daily needs, particularly for short trips. The strategies also help make walking and biking more convenient and promote safety and access to local services and destinations.

Table 2. Active Transportation Actions and Programs

| Action/Program | Description |
|--|--|
| Construct new or connect existing bicycle and pedestrian facilities | Construct both on- and off-street facilities such as bicycle boulevards, bicycle lanes, trails, and bicycle parkways to promote walking, biking, and access to transit. |
| “Complete Streets” policy | Policy that takes into account all users of streets rather than just autos with a goal of completing the streets with adequate facilities for all users. |
| Pedestrian-oriented design/Buffered sidewalks | Protect sidewalks by creating a landscaped buffer between motorized traffic and pedestrians. |
| Bicycle parking at destinations including transit stations | To encourage use – could be all types of parking – short term, long term, secure. |
| Promote bicycle and pedestrian use | Through marketing programs, safety lessons, etc. |
| Traffic calming | Tools employed to reduce vehicle speeds, improve safety, and enhance one’s quality of life. |
| Increase number of crossings, curb cuts and signalized crossings and reduce crossing distances and intersections and mid-block crossings | These actions help people of all mobility levels to cross the street and access destinations. Add signals at pedestrian crossings, especially on busy streets, to increase pedestrian safety and improve traffic flow. Could include innovative signal types, such as hybrid beacons that are dark when not in use to allow traffic flow, but are triggered to flash when pedestrians activate them. |

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| Urban nonmotorized zones | Designated areas for nonmotorized transportation modes only. |
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Public Transit

Table 3 identifies public transit actions and programs. These strategies increase service levels, provide incentives for using transit (and thus reduce the number of single-occupancy vehicle (SOV) trips) and/or enhance operational efficiency of transit vehicles. Together, these investments improve accessibility and can increase ridership levels, facilitating a reduction in the number of cars on the road, congestion levels and VMT. Additional improvements in comfort levels and reductions in fares also help to make transit a more attractive option.

Table 3. Public Transit Actions, Programs and Incentives

| Action/Program/Incentive | Description |
|--|---|
| Discount transit passes/decrease fares | Reduce the cost of using transit. |
| Increase frequency of transit service | Expand service frequency to increase ridership. |
| Limited-stop service | Particularly useful for commuting, common routes into downtowns and major employment centers. |
| Expand public transportation options (LRT/BRT/Express bus/circulators) | Introduce new types of transit and add more service, routes, etc. |
| Park & ride facilities | These can include parking facilities at rail and bus stations, as well as near highway on-ramps to encourage ridesharing. |

Pricing

Actions and programs related to pricing are included in Table 4. These actions and programs focus on raising the cost of vehicle miles traveled (VMT) and fuel consumption, which have been shown to result in people driving less – thereby reducing carbon emissions. These strategies also can help improve system operations by mitigating congestion.

Table 4. Pricing Actions, Programs and Incentives

| Action/Program/Incentive | Description |
|---|---|
| Parking pricing | <p>Fees charged for all parking in a certain area; could include:</p> <ul style="list-style-type: none"> • Central business districts (CBD), employment areas, and retail areas • Higher fees on previously free parking lots • All downtown workers pay for parking • Requirements for residential parking permits and for visitors • Dynamic pricing is another form of parking pricing; it involves changing pricing based on the time of day; pricing could be higher during peak traffic periods to create a disincentive to drive. <p>A flat fee-per-space on parking spaces provided by businesses would discourage automobile-dependent development, encouraging more efficient land use, and – to the extent the fees are passed on to parkers – encourage non-auto transportation choices. The revenue generated by such a fee (on parking spaces, not their use) could be used for transit and other transportation investments not eligible for highway dollars.</p> |
| Traffic Impact Fee | <p>A charge on new development to cover the full cost of the additional transportation capacity, including transit, required to serve the development. Only those developments that result in an increase in vehicle trips would be charged.</p> |
| Emissions-based vehicle registration fees | <p>Fees based on emissions.</p> |
| Vehicle Miles Traveled (VMT) fee | <p>Fee charged based on how many miles a car is driven; odometer readings determine the exact fee charged; a city or county could modify the structure of the fee to include a carbon fee; VMT fees can be layered to be higher or lower based on the fuel economy of one's car.</p> |
| Congestion pricing/road user fees | <p>Tolls are charged to drivers using congested roadways; toll based on specific level of service goal; refers to parking, tolling, or other road user fees where prices increase during congested times in congested locations.</p> |

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|--|---|
| Cordon pricing/area pricing | Requires all motorists who pass through a certain area, generally an area around a CBD or other major employment or retail area, to pay a fee. |
| Traditional toll roads | Payment charged for passage on roads, bridges or ferries that carry cars. |
| Nontraditional toll roads <ul style="list-style-type: none"> • Managed lanes • High-occupancy toll (HOT) lanes | <ul style="list-style-type: none"> • Managed Lanes – A lane or lanes designed to increase freeway efficiency through a combination of operational and design actions. • HOT Lanes – High Occupancy Vehicle (HOV) lanes that allow a limited number of low-occupancy vehicles to use the lane if a fee is paid |

Marketing and Travel Demand Management

Table 5 identifies marketing and transportation demand management actions and programs including ridesharing. These actions and strategies reduce carbon emissions by reducing trips, shifting trips to other modes and thus reducing vehicle-miles traveled (VMT).

Table 5. Marketing and Travel Demand Management Actions, Programs and Incentives

| Action/Program/Incentive | Description |
|---|---|
| Trip reduction ordinances/ Transportation Management Associations (TMAs) | Organizations that provide transportation services in a particular area that are controlled by association members. |
| Financial support for public, private, or nonprofit car-sharing organizations | Increased financial support show commitment to this program. |
| Car-sharing <ul style="list-style-type: none"> • Standard • Personal Vehicle Car-Sharing (PVCS) | <ul style="list-style-type: none"> • Standard – Program in which automobile rental services are used to substitute private vehicle use and ownership. Programs are designed to be accessible to residences, affordable, follow easy check-in/out processes, and reliable. • PVCS – Enables private car owners to make their vehicle available on a temporary basis to a carsharing company for rental. In return, the vehicle owner gets a substantial portion of the rental revenue from the carsharing company. When not rented, the vehicle owner can continue to use their car as before. Also called “peer to peer carsharing” (abbreviated P2P carsharing). |

| Action/Program/Incentive | Description |
|--|--|
| <p>Employer-based programs:</p> <ul style="list-style-type: none"> • Alternative work schedules • Telecommuting • Teleconferencing/videoconferencing • Ride-sharing • Vanpool programs • Park & ride • Mandatory SOV reduction programs for large employers • Parking cash-out • Guaranteed ride home | <ul style="list-style-type: none"> • Commuter incentive programs take advantage of a variety of options used to reduce SOV trips for workplace travel. Employers can adopt programs that best suit the needs of their employee base, including: • Alternative work schedules – Schedules other than 9:00 a.m.-5:00 p.m.) • Telecommuting – Employees work from home rather than a central office • Teleconferencing/videoconferencing – Use of live video connections in place of physical meetings • Ride-sharing – Practice of commuting with other people (generally those that live nearby), often aided by a service or program that matches people going to the same employment area • Vanpool programs – Similar to ride-sharing but on a larger scale, allowing many people to ride in one vehicle • Park & ride – Parking facilities at transit stations, bus stops, and highway on-ramps, generally charging lower fees than in CBDs; these help facilitate transit use and ride-sharing • Mandatory SOV-reduction programs for large employers – Employers of a certain size would be required to reduce the number of SOV that commute to their offices • Parking cash-out – Program in which an employer offers a choice between a paid-for parking space or a cash allowance, equivalent to the market value of the parking place, giving employees an opportunity to save money if they avoid driving. • Guaranteed ride home – Provides subsidized ride home from work to commuters who use alternative modes. For example, a commuter would receive a ride if his/her carpool driver must stay late at work or a bus rider must return home in an emergency. This addresses challenges to the use of alternative modes. |
| <p>Tire Fuel Efficiency Programs</p> | <p>Public education program to encourage the purchase of fuel efficient replacement tires.</p> |
| <p>Pay-as-you-drive insurance (PAYD)</p> | <p>A system where participants are assessed based on the number of vehicle miles traveled in combination with traditional risk based rates. PAYD goes beyond what current insurance companies are offering in premiums to low distance drivers. Shifting to this type of mileage-based auto-insurance system allows motorists to reduce their costs while encouraging them to drive less.</p> |

System Management and Operations/Intelligent Transportation Systems (ITS)

Table 6 identifies actions and programs related to operations and ITS. These strategies improve system operations using technology to provide information about roadway conditions or other data and other management strategies.

Table 6. System Management and Operations/ITS Actions and Programs

| Action/Program | Description |
|--|---|
| Incident management | Restore “normal service operation” after roadway incidents (accidents or other actions that interrupt standard operation of roadways) as soon as possible after an incident. |
| Ramp-metering | Control entry of traffic onto freeways to improve traffic flow and decrease accidents. Cars are stopped and allowed to enter via ramp at intervals determined by current congestion levels. |
| Electronic message signs | Signs located along roadways providing drivers with traveler information, such as accidents, detours, etc. |
| Transportation Management Center (TMC) | A facility into which real-time traffic data from roadways flows that provides coordinated transportation management on transportation facilities (e.g., state highways, other parts of system). Data is processed and decisions are made (such as rerouting, etc.) in order to maintain best possible system operations. In an emergency, TMC is command center that directs relief efforts. |
| Freeway Management System | Provides highway conditions data, including freeway traffic camera, and information on related programs and services. |
| Traffic Signal Coordination/Arterial System Management | When a group of two or more traffic signals work together so that cars moving through the group will make the least number of stops. |
| Active Traffic Management (ATM) | Use of automatic systems and human intervention to manage traffic flow, aka “managed lanes” or “smart lanes.” |
| Integrated Corridor Management | Using all possible capacity in a transportation system to get out most of entire network. For example, using formerly underused parallel routes to help mitigate heavy traffic on freeways or using the nonpeak direction during peak hours. |
| Road weather management | Includes three types of strategies applied during inclement weather: advisory (fog warnings, etc.); control strategies (speed limit reductions using Variable Speed Limit (VSL) signs, etc.); and treatment strategies (sand, salt, ice). |
| Arterial management | Program designed to improve traffic signal systems operation, improve flow of traffic, and reduce arterial congestion. |
| Access management | Coordination between land use and design of roadways to improve transportation. |

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| “Eco-driving” training programs | Programs that train drivers to use techniques that reduce gas consumption, such as avoiding rapid acceleration and braking, driving at lower speeds, proper gear changes, and other strategies; also includes proper vehicle maintenance, including tire pressure, etc. |
| Traffic signal timing coordination | When a group of two or more traffic signals work together so that cars moving through the group will make the least number of stops. |
| Transit priority treatments (includes signal prioritization) | Tools used to reduce transit vehicle delay. Could include bus lanes, queue-jumper lanes, bus-priority traffic signals, intersection reconfiguration, and grade separation so transit is not delayed by cross-streets and traffic congestion. |
| Traveler information system | Dissemination of traveler information through radio, traffic hotline (511) and other technologies such as the internet and smart phone applications. |
| Vehicle Infrastructure Integration (VII) | Research and applications dedicated to linking road vehicles to their physical surroundings to improve road safety. |
| Reduce speed limit | Lower speeds on city and county roads, possibly to 20 mph to increase bicycle/pedestrian safety. |
| Yield signs | Increase use of yield signs, as opposed to stop signs, which reduces car idling and helps bicycles move along faster. It would take driver education, but it’s common in Europe. In the U.S., research has shown that completely unmarked intersections and roundabouts are safe. |

Technology and Fleet Actions and Programs

Table 7 identifies fleet actions and programs. These provide incentives or disincentives to change travel behavior in a way that will reduce VMT and/or improve system operations.

Table 7. Technology and Fleet Actions/Programs

| Action/Program | Description |
|---------------------------------|---|
| Electric vehicle infrastructure | Build electric vehicle charging stations/infrastructure. |
| Vehicle Age Programs | Policies to influence the age of vehicles on the road (may be incentive or regulatory-based). |
| Vehicle Type Programs | Policies to influence vehicle type such as CAFE standards, etc. |

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Metro | Memo

Date: March 10, 2011
To: MTAC and interested parties
From: Kim Ellis, Principal Transportation Planner
Re: Updated Phase 1 Scenario Approach and Framework

BACKGROUND

The Phase 1 Climate Smart Communities Scenarios analysis will occur during Summer 2011 and focus on learning what combinations of land use and transportation strategies are required to meet the state targets for reducing carbon emissions from light vehicles.

Staff presented the *Discussion Draft Phase 1 Scenario Approach and Framework* (dated February 23, 2011) to the Transportation Policy Alternatives Committee (TPAC) and the Metro Technical Advisory Committee (MTAC) on February 28 and March 2, respectively. The Joint Policy Advisory Committee on Transportation (JPACT) and Metro Policy Advisory Committee (MPAC) provided further input on March 3 and March 9, respectively.

The committees supported the overall approach, recognizing more information and discussion is needed to define the combinations of land use and transportation strategies to be tested this summer, and measures to be used to evaluate the scenarios. Several committee members also expressed concern that House Bill 2001 only mandates consideration of carbon emissions from light vehicles. MTAC also recommended building in more opportunities for collaboration with TPAC throughout the scenario planning process.

The attached document reflects the comments and refinements identified to date, and provides direction to staff moving forward.

NEXT STEPS

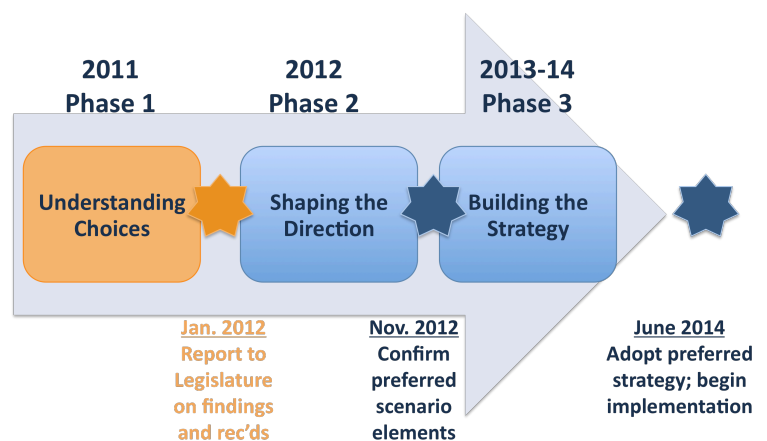
Staff will define a process to foster more collaboration between TPAC and MTAC. In addition, staff will work with MTAC and TPAC in the coming months to identify strategies to be tested in the region's scenarios this summer. This work will also include defining a set of measures that can be used to evaluate the Phase 1 scenarios.

MTAC and TPAC recommendations will be brought forward for consideration by MPAC, JPACT and the Metro Council in June.

Findings and recommendations from the analysis will be reported to MPAC, JPACT and the Metro Council in Fall 2011 before being finalized for submittal to the Legislature in January 2012. The recommendations will also guide future phases of the project.

/attachment: Draft Phase 1 Scenario Evaluation Framework (March 10, 2011)

CLIMATE SMART COMMUNITIES SCENARIO PLANNING



CLIMATE SMART COMMUNITIES SCENARIOS PROJECT

DRAFT Phase 1 Scenario Evaluation Framework

This framework is proposed to guide the development and evaluation of the Phase 1 scenarios in 2011 and reflects input received to date from Metro's policy and technical advisory committees and the Metro Council.

PHASE 1. UNDERSTANDING CHOICES

(JAN. – DEC. 2011)

GUIDING PRINCIPLES:

- **Build on existing efforts and aspirations:** Start with local plans and 2010 regional actions¹ to demonstrate how strategies affect realization of the region's six desired outcomes.
- **Focus on outcomes and co-benefits:** The strategies that are needed to reduce carbon emissions can help save individuals, local governments and the private sector money, grow local businesses and create jobs and build livable communities. The multiple benefits should be emphasized and central to the evaluation and communication of the results.
- **Show cause and effect:** Provide sufficient clarity to discern cause and effect relationships between policy levers.
- **Be Bold, Yet Plausible:** Explore a range of futures that may be difficult to achieve but are possible.
- **Relevant, understandable and tangible:** Organize to be easily communicated so decision-makers and stakeholders can understand the choices, consequences (intended and unintended) and tradeoffs.
- **Meet state climate goals:** Demonstrate what is required to meet state carbon emissions reduction targets for cars, small trucks and SUVs, recognizing reductions from other emissions sources must also be addressed in a comprehensive manner.



The region's six desired outcomes – adopted by the Metro Council on December 16, 2010.

WHAT WE HOPE TO ACCOMPLISH:

- Learn what combinations of land use and transportation strategies are required to meet the state carbon emissions reduction targets for light vehicles.
- Show potential impacts and benefits through a comprehensive array of measures that link back to the six desired outcomes.
- Learn how well the strategies support local plans and the region's desired outcomes.
- Identify the potential challenges, opportunities and tradeoffs associated with different strategies and implications for the region and state.
- Report findings and make recommendations to the 2012 Legislature and future project phases.

¹ In 2010, Metro's Making the Greatest Place initiative resulted in Metro Council adoption of six desired outcomes, the Community Investment Strategy, urban and rural reserves and an updated Regional Transportation Plan. All of these actions provide the policy foundation for better integrating land use decisions with transportation investments to create prosperous and sustainable communities and meet state climate goals.

WHAT IS A SCENARIO?

A scenario is a possible future, representing a hypothetical sequence of possible events or set of circumstances. Scenarios are often used to help see the potential impacts of different land-use and transportation decisions on future generations and their quality of life. Scenarios can be created around a set of themes or stories to test what might happen if the strategies assumed in the scenario are implemented. Scenarios can foster an understanding of the opportunities and challenges that the future might hold to inform development of a preferred strategy or course of action. Scenarios can also help manage uncertainty because scenarios are a range of possible futures.

The scenarios to be tested in this phase are for discussion and research purposes only, and do not represent a Metro Council, JPACT or MPAC endorsed policy proposal. The scenarios will be developed and analyzed with input from Metro's technical advisory committees during the summer 2011. Results will be presented to decision makers and stakeholders in the Fall 2011.

DEFINING THE SCENARIOS:

- **Build on lessons learned from statewide scenarios.** Scenarios will be created by applying different levels of implementation or investment to meet state carbon emissions reduction targets for cars, small trucks and SUVs. The region should use the attributes of the best performing statewide scenarios as a starting point for defining the region's scenarios. The region may want to consider different assumptions, however, such as more aggressive assumptions for deployment of electric vehicle and hybrid vehicles.
- **Develop complementary packages of strategies.** Scenario inputs will be based on different combinations of strategies and levels of implementation or investment, reflecting MPAC, JPACT and Metro Council direction. For example, combining mixed-use development, expanded public transit and parking management could make one scenario and combining industrial centers, travel demand management and vehicle travel fees could create another one.
- **Explore a range of possible futures.** The first phase is not about 'picking a winner' from the set of scenarios evaluated, but to explore a range of possible futures and then discuss and agree on the associated opportunities, challenges and implications for the region and state.

EVALUATING THE SCENARIOS:

- **Good communication tools and methods are critical.** Use case studies, visualization and illustration tools to communicate results and make the choices real for policymakers and the public.
- **A comprehensive evaluation is needed to understand the political, community, social equity, and economic implications of different strategies.** Analysis needs to consider benefits, costs and tradeoffs for individuals, businesses and local governments. There are many choices – the first phase should clearly pose the consequences (intended and unintended) of different choices.
- **Public health and equity need to be meaningfully built into the evaluation.** This should include assessing the impacts to transit dependent communities and places in the region that do not have well-connected street systems, sidewalks, and bicycle facilities.
- **New public transit approaches should be evaluated.** The scenarios should move beyond current approaches for public transit service to consider role of bus rapid transit, more frequent bus service to more places and paratransit.
- **Test realistic pricing strategies.** The scenarios need to be realistic about pricing as a strategy given the lack of public acceptance and current economic climate.
- **Evaluate parking management as a potential resource to realize community investments.** Assess how parking management and other resources developed by the strategies could be used to help fund expanded transit or streetscape investments in downtowns and main streets.

Scenario Development Glossary

The table below is designed to help inform Climate Smart Communities Scenarios project staff about what strategies should be tested for possible carbon emissions reductions from cars, small trucks and SUVs. Though not a complete list, it represents strategies that can be measured by the tools being used in Phase 1 of the project.

The strategy column is a list of programs, actions and incentives that have been shown to have an effect on reducing carbon emissions from cars, small trucks and SUVs. The second column offers a brief description or example of the strategy. The third column shows the carbon emissions reduction potential of each strategy. In most cases, the reduction is expressed as a range and is based on research and analysis results from several sources. It has been difficult to assign ranges for each of the strategies because some literature describes broad categories of strategies while other sources talk about emissions reduction for specific strategies. The potential reduction estimates are subject to further refinement. The carbon reduction potential of an action/program depends largely on the specific context in which it is implemented and that the amount of reduction that can be achieved will vary greatly depending on the context.

April 1 Climate Leadership summit participants will provide input about the challenges and opportunities associated with these strategies from a political, community, social equity, and economic perspective.

| Strategy | | Description / Examples | Carbon-reduction effectiveness ¹ |
|----------------------------|---|--|--|
| Urban/ Community Design | Complete sidewalks, bike facilities and trails | <ul style="list-style-type: none"> Includes pedestrian improvements made near business districts, schools, and transit stations Comprehensive bicycle infrastructure implemented in moderate to high-density urban neighborhoods | <ul style="list-style-type: none"> 0.10 – 0.31% 0.09 – 0.28% |
| | Expand bus service | <ul style="list-style-type: none"> Expand intercity service by 3% annually Increase frequency at least 40% off-peak to max of also adding 10% to peak | <ul style="list-style-type: none"> 0.06% 0.2 – 0.6% |
| | Expand high capacity transit | [Pending more information] | |
| | More mixed-use, infill and reinvestment in centers and transit corridors | <ul style="list-style-type: none"> Increase new urban growth in compact, mixed use development by 25% - 75% Increase infill development funding & incentives | <ul style="list-style-type: none"> 0.4 – 3.5% 0.2 – 2.1% |
| | Incentives to spur the market | Tools such as land assembly, system development charges, enterprise zones, urban renewal and tax increment financing to produce investments in centers and corridors. | [Pending more information] |
| | Parking management | <ul style="list-style-type: none"> Charge in CBDs, employment and retail areas | <ul style="list-style-type: none"> 0.8 – 1.8% |

¹ The reduction numbers were drawn mostly from the tables in the memo, dated March 1, 2011, from Cambridge Systematics, Inc. to ODOT. The numbers in the memo are based, in turn, on several research data sources and are subject to further refinement. All numbers are carbon emissions reduction percentages, except where noted.

| | Strategy | Description / Examples | Carbon-reduction effectiveness ¹ |
|------------------|--|---|--|
| | | <ul style="list-style-type: none"> Higher fees on previously free parking lots All downtown workers pay for parking <p>Other examples are timed on-street parking, parking restrictions, structured parking; residential parking zones (RPZ) to prevent business customers and transit riders from using residential spaces; programs that allows businesses certain number of free permits/mo then charge for additional ones.</p> | <ul style="list-style-type: none"> 7-12%, or 18.6% 0.2% |
| | Manage urban growth boundary | This tool is a locational land supply tool. | Reductions depend upon amount and location of new urban land, densities and amount of mixed use within the new area, and growth dynamic in larger region. |
| Marketing | Individualized marketing (IM) | IM is a voluntary travel behavior change program that provides personalized information, motivation and support to targeted households that are interested in replacing automobile trips with other travel modes such as bicycling, walking, public transportation, and carpooling. Mostly targeted to residents, some programs have targeted employees at work places. | Reductions in VMT have been in range of 2-18%. Three city programs in Oregon have yielded average 9% reduction. |
| | Employer-based programs | <ul style="list-style-type: none"> Alternative work schedules Telecommuting Teleconferencing/videoconferencing Ride-sharing Vanpool programs Park & ride Mandatory SOV reduction programs for large employers Parking cash-out | <ul style="list-style-type: none"> 0.1 – 2.4% for compressed work week, depending on participation rate up to 0.2% for carpool/vanpool |
| | Public education programs (e.g. Drive Less Save More) | [Pending more information] | [Pending more information] |
| | Car sharing | <ul style="list-style-type: none"> Standard program – rental services are used to substitute private vehicle use and ownership. Programs are designed to be accessible to residents, affordable, follow easy check-in/out processes, and reliable PVCS –private car owners make their vehicle available on a | 0.05 – 2.0% |

| | Strategy | Description / Examples | Carbon-reduction effectiveness ¹ |
|----------------|--|--|--|
| | | temporary basis to a carsharing company for rental. In return, the vehicle owner gets a substantial portion of the rental revenue from the carsharing company. | |
| | Pay as you drive insurance | <ul style="list-style-type: none"> Insurance premium cost partly based on how many miles driven in a vehicle per year: <ul style="list-style-type: none"> ➤ Require states to permit PAYD insurance ➤ Require companies to offer | <ul style="list-style-type: none"> ➤ 7-12% or 18.6% (8) ➤ 1.1 – 3.5% |
| Pricing | Vehicle miles traveled fee | <ul style="list-style-type: none"> General - Fee charged based on how many miles a car is driven; odometer readings determine the exact fee charged; a city or county could modify the structure of the fee to include a carbon fee; VMT fees can be layered to be higher or lower based on the fuel economy of one's car Specific exm: VMT fee of 2 to 5 cents per mile | <ul style="list-style-type: none"> 0.8 – 1.8% or 18.6% (depending on data source) 0.8 – 2.3% |
| | Carbon/fuel fee | <ul style="list-style-type: none"> Increase fuel taxes Allowance price of \$30-50 per ton in 2030, or similar carbon tax | <ul style="list-style-type: none"> 0.8 – 1.8%, 7 - 12% or 18.6%, depending on data source 2.8 – 4.6% |
| | Congestion pricing/road user fee | Tolls are charged to drivers using congested roadways; toll based on specific level of service goal. These include following: traditional toll roads where users charged for passage on roads, bridges or ferries that carry cars; High Occupancy Toll (HOT) lanes that allow a limited number of low-occupancy vehicles to use the lane if a fee is paid; cordon pricing - charge on metro area CBDs within defined area <ul style="list-style-type: none"> [Ex: LOS _____ [pending more information]] | Reductions between 0.5 – 1.6% have been shown depending _____ |
| | Parking fee in downtowns, centers and station areas | Fees charged for all parking in a certain area that could include CBD, employment areas and retail centers; higher fees on previously free parking lots; requirements for residential parking permits and for visitors; dynamic pricing - changing pricing based on the time of day, e.g. higher during peak traffic periods | <ul style="list-style-type: none"> 0.8 – 1.8%, depending on price level 7 – 12% or 18.6% |
| | Emissions-based fee | Fee based on vehicle emissions | <ul style="list-style-type: none"> 0.8 – 1.8%, depending on price level 7 – 12% or 18.6% |
| | Traffic impact fee | A charge on new development to cover the full cost of the | <ul style="list-style-type: none"> 0.8 – 1.8%, depending |

| Strategy | | Description / Examples | Carbon-reduction effectiveness ¹ |
|--------------------------|--|---|--|
| | | additional transportation capacity, including transit, required to serve the development. Only those developments that result in an increase in vehicle trips would be charged. | on price level <ul style="list-style-type: none"> 7 – 12% or 18.6% |
| System Management | Incident management | Restore “normal service operation” after roadway incidents (accidents or other actions that interrupt standard operation of roadways) as soon as possible after an incident. | 0.02 - 0.03% [0.24 - 0.34%] |
| | Increase operational efficiency of vehicles | Many of these programs and actions, known as ITS, fall under this category including: <ul style="list-style-type: none"> • Ramp metering • Message signs • Traffic command center • Active traffic mgmt, e.g. ‘smart lanes’ • Freeway mgmt system • Speed limit reduction • Access management • Eco driving | <ul style="list-style-type: none"> • Most of these actions result in reductions from between 0.1 – 0.6%, often in combination with each other. • Reducing speed limit to 55 mph results in 1.2 – 2.0% reduction. • Ecodriving can range from 0.8 – 3.7% |
| | Traffic signal timing coordination | When a group of two or more traffic signals work together so that cars moving through the group will make the least number of stops. | 0.1%; 0.6% with other ITS actions |
| | Transit priority treatments | Reduce transit vehicle delay including bus lanes, queue-jumper lanes, bus-priority traffic signals, and grade separation so transit is not delayed by cross-streets and traffic congestion. | Can result in up to 1.1% reduction |
| | Traveler information system | Program to provide traveler advisories for road and weather conditions | [Pending more information] |
| Technology | Build electric vehicle charging stations/infrastructure | [Pending more information] | [Pending more information] |
| | Buy-out program/tax credits to replace older vehicles | Policies to encourage or regulate the age of vehicles on the road (may be incentive or regulatory-based). | 0.8 – 1.8% |
| | Diesel retrofits (off and on-road fleet vehicles) | [Pending more information] | [Pending more information] |

DISCUSSION DRAFT Phase 1 Scenario Development Framework

This table is for discussion and research purposes only, and does not represent a Metro Council, JPACT or MPAC endorsed policy proposal.

- The table provides a framework for identifying regional-level scenario variables for each GreenSTEP category.
- Each category includes a set of variables that represent land use and transportation strategies that the GreenSTEP model is able to test. Each level represents an increased amount of implementation or investment.
- Agreement is needed on how many levels should be evaluated for each category, and on what combination of strategies should be assumed within each level.
- Scenarios would be created, reflecting different implementation/investment levels for each variable.
- Each scenario is intended to reduce carbon emissions from cars, small trucks and SUVs.
- Level 1 represents the Reference Case.

| Green STEP Category | Implementation/Investment Levels | | | Potential GreenSTEP Variables (indicated in bold) |
|------------------------|--|---------|---------|--|
| | Level 1 | Level 2 | Level 3 | |
| URBAN | | | | Households in mixed-use areas and neighborhoods ¹ (percent) |
| | | | | Urban growth boundary expansion |
| | | | | Bicycle travel (mode share) |
| | | | | Workers paying parking fees (percent) |
| | | | | Household daily parking fees |
| | | | | Bus and rail transit expansion (percent) |
| PRICING ² | | | | Fuel use and emissions fees ³ |
| | | | | Vehicle travel fees ⁴ |
| MARKETING & INCENTIVES | | | | Households participating in individualized marking programs (percent) |
| | | | | Workers participating in employer-based demand management programs (e.g., transit fare reduction, carpool matching and other carpool programs, compressed work week) (percent) |
| | | | | Pay-as-you drive insurance |
| | | | | Households participating in carsharing (percent) |
| | | | | Households participating in ecodriving (percent) |
| ROADS | | | | Incident management (percent of delay addressed) |
| | | | | Freeway and arterial lane-mile capacity (e.g., traffic signal timing and other system management strategies, physical expansion, and bottleneck removal) |
| FLEET | TBD in Metropolitan Greenhouse Gas Reduction Target Rule | | | Level 2 and Level 3 inputs to be defined in <i>Metropolitan Greenhouse Gas Reduction Target Rule</i> (includes, auto/truck vehicle proportions and fleet turnover rate/ages) |
| TECH | TBD in Metropolitan Greenhouse Gas Reduction Target Rule | | | Level 2 and Level 3 inputs to be defined in <i>Metropolitan Greenhouse Gas Reduction Target Rule</i> (includes fuel economy , carbon intensity of fuels , and electric vehicles and plug-in hybrids market shares) |

¹ Existing zoning and forecasted population and employment held constant across all scenarios.

² Reflected as the cost per mile to drive. Fuel price held constant across all scenarios, reflecting market trends.

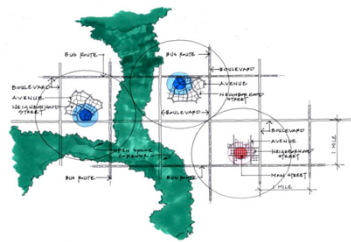
³ Carbon fee, gas tax, or other instruments could be used.

⁴ Vehicle miles traveled fee or other instruments could be used.

Climate Smart Communities Scenarios

Strategies for Reducing Carbon Emissions from Light Vehicles

MTAC
March 16, 2011



 Metro | *Making a great place*

Presentation Overview

1. Share results of statewide scenario planning & GHG target-setting
2. Describe possible similarities to upcoming Metro-wide scenario planning

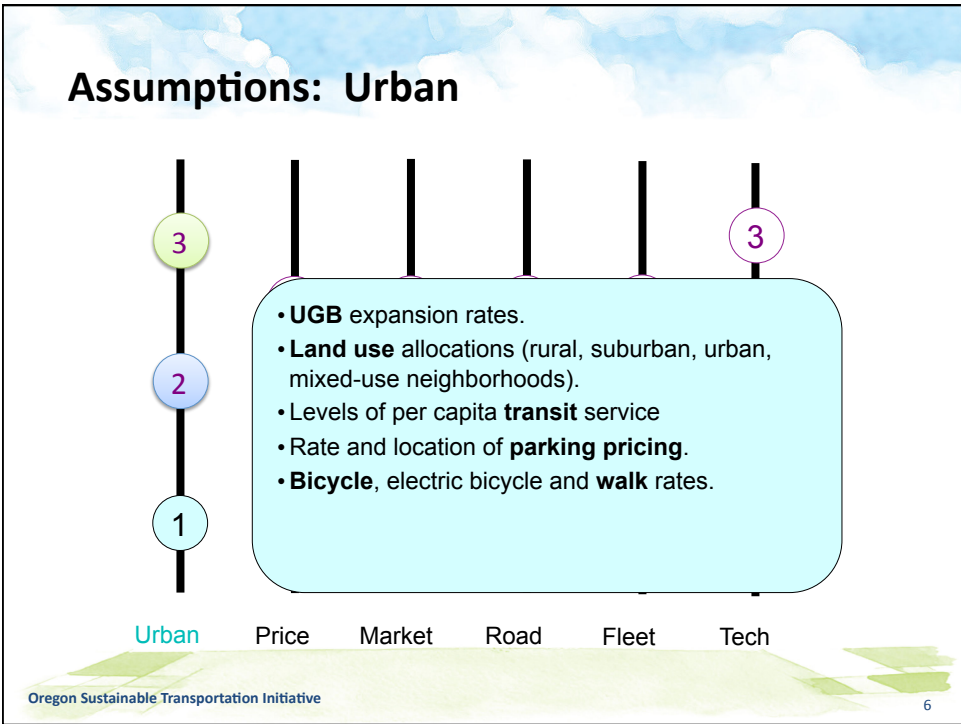
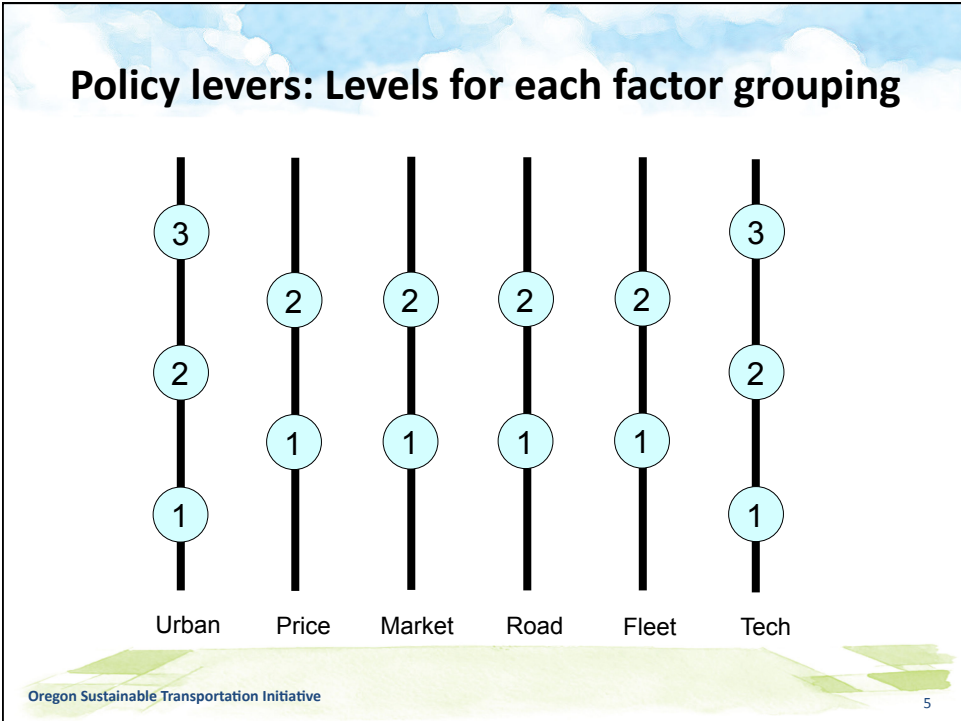
State GHG scenario planning purpose

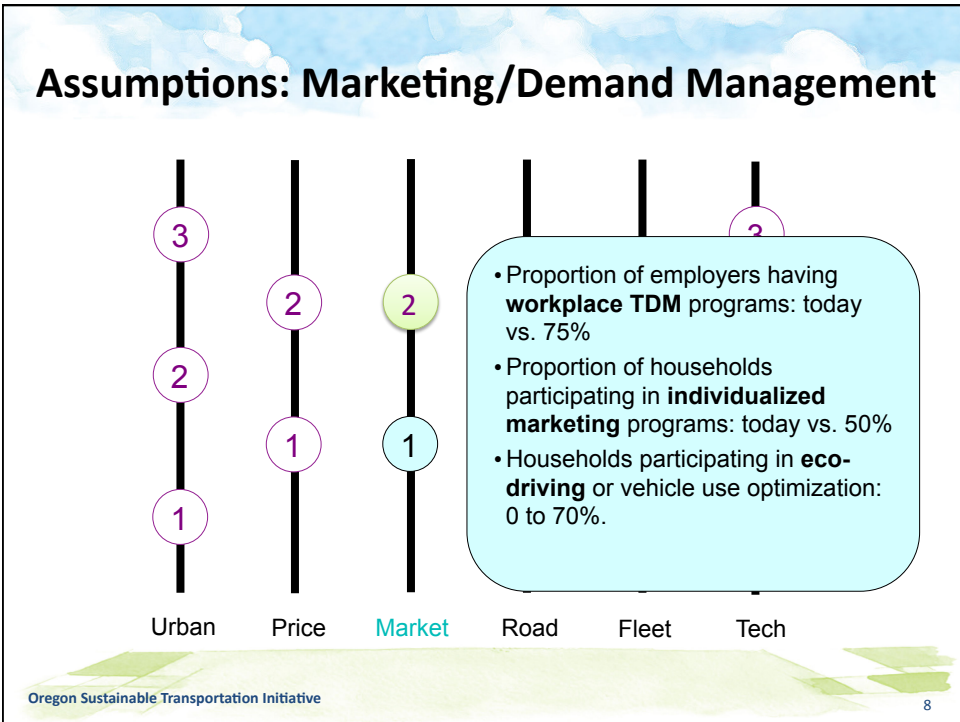
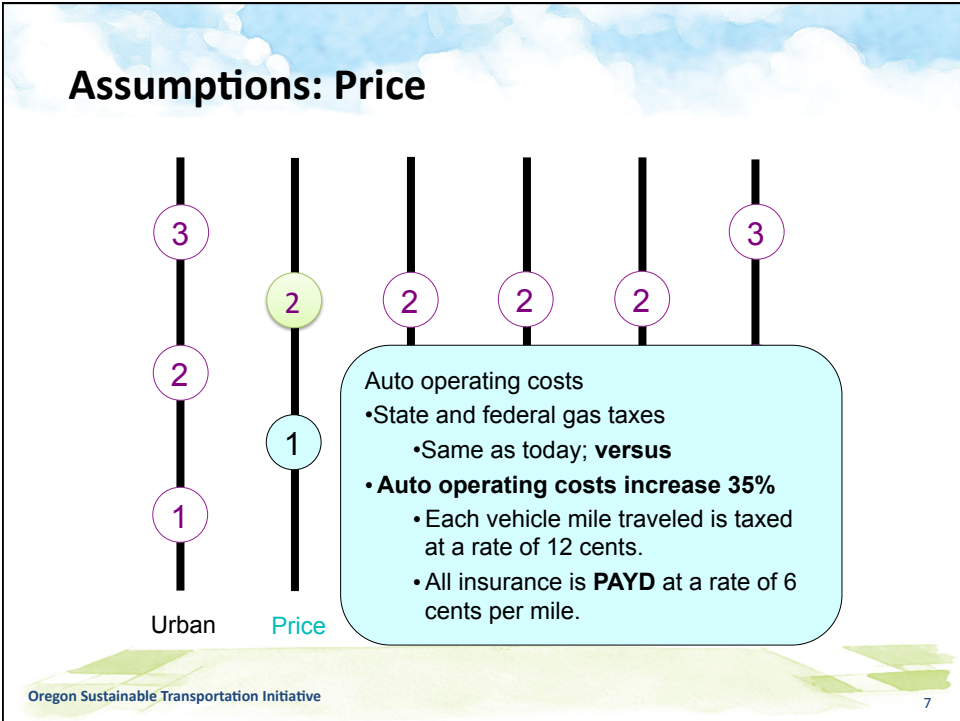
- Guide development of metropolitan area GHG targets
- Identify *plausible/feasible* policy options to reduce light-duty vehicle GHG emissions
- Test options
- Provide 2035 targets to Oregon metropolitan planning orgs. (MPOs)

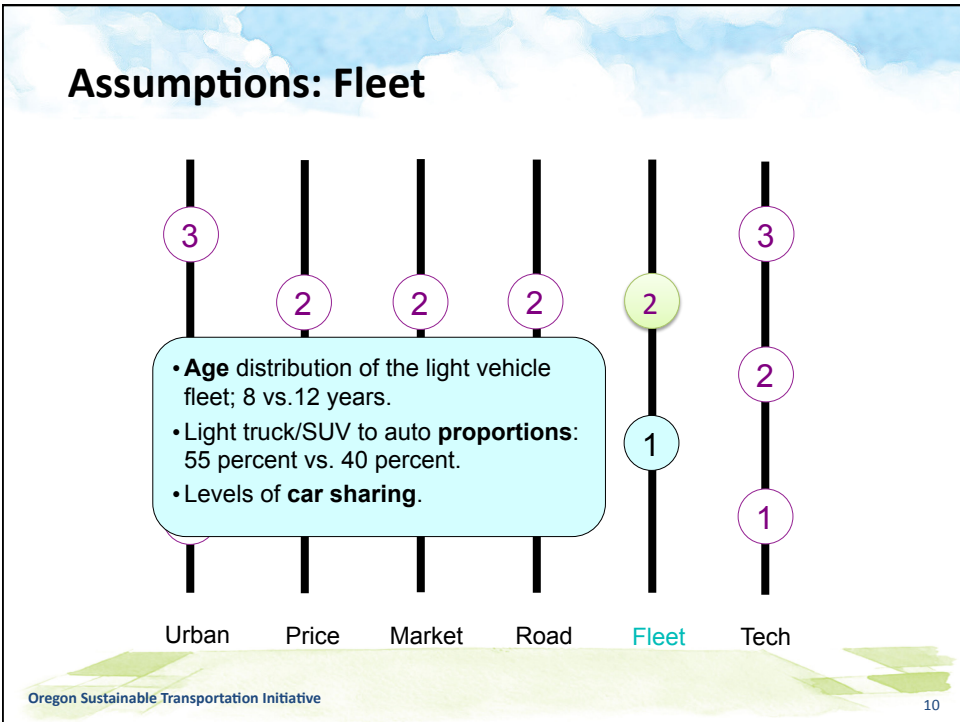
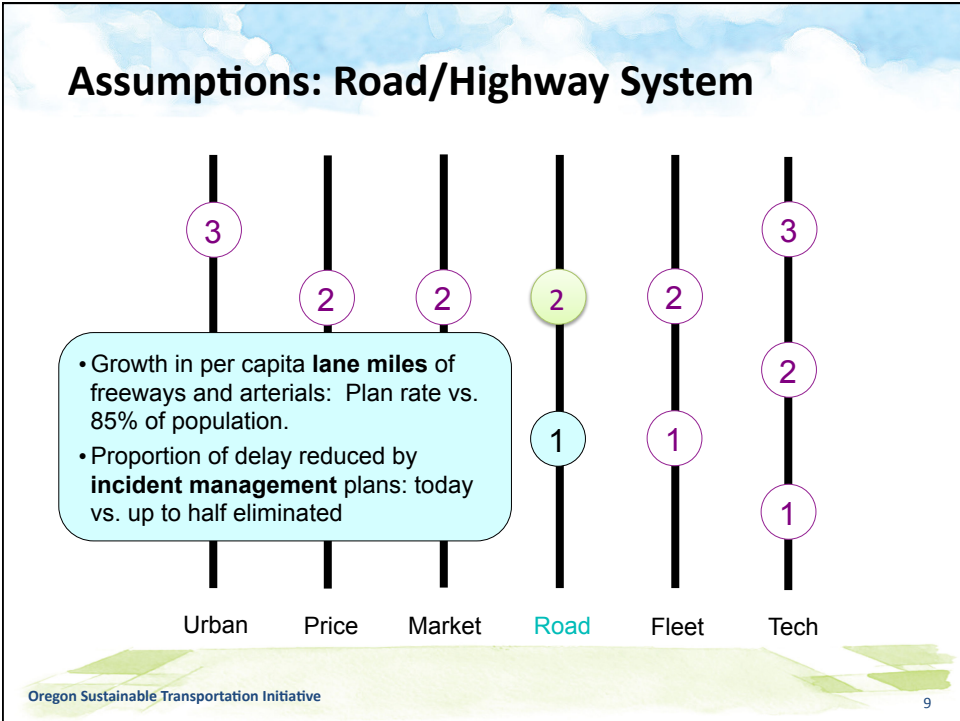
State GHG scenario planning model

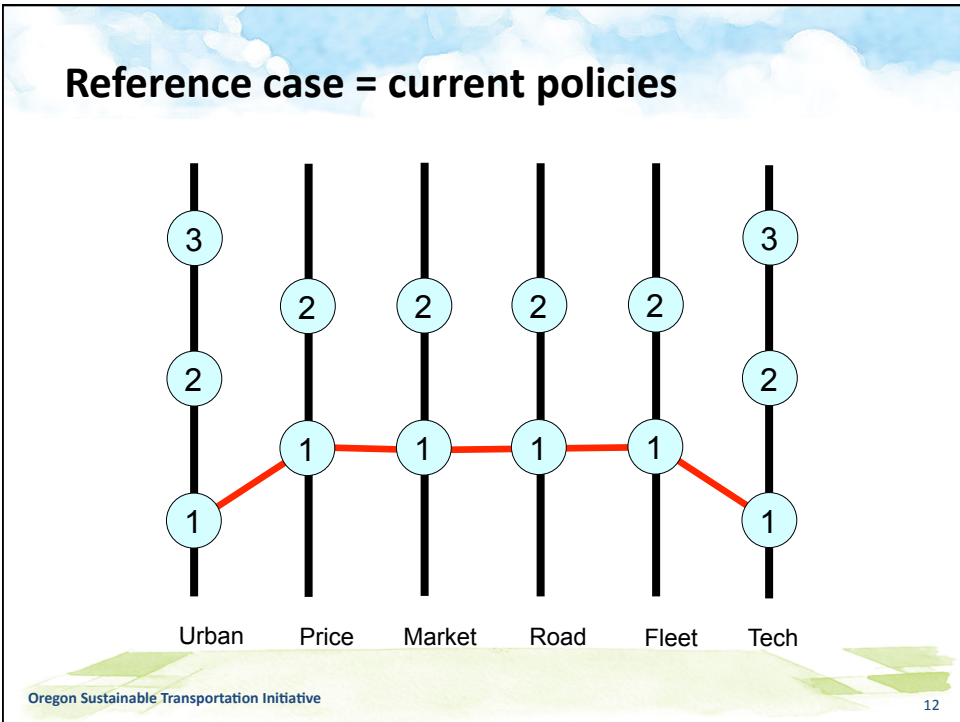
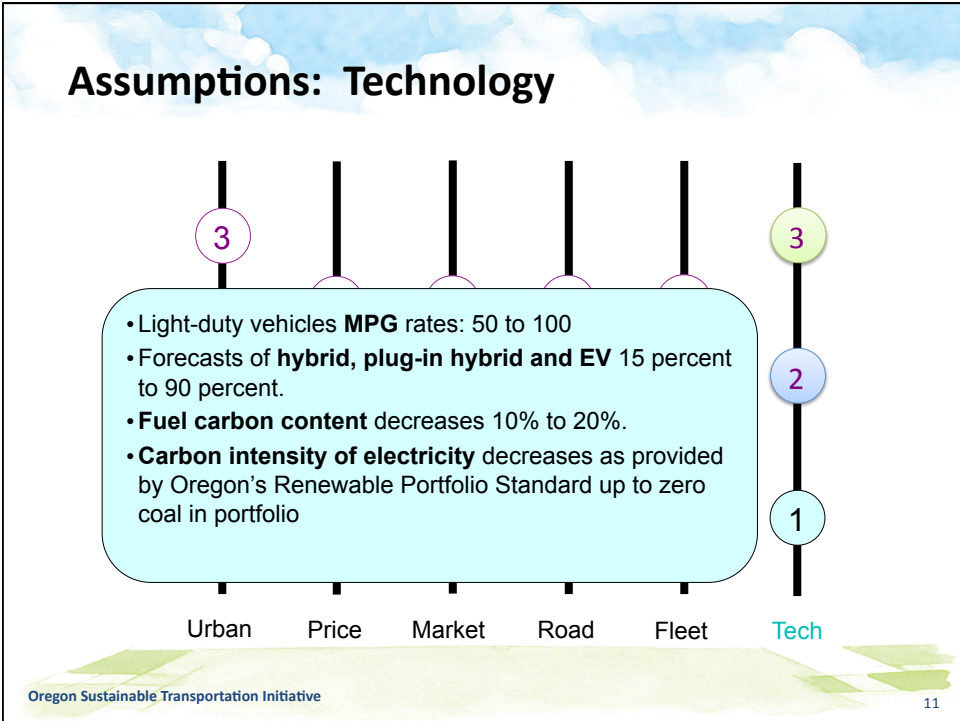
Greenhouse gas State Transportation Emissions Planning model (GreenSTEP)

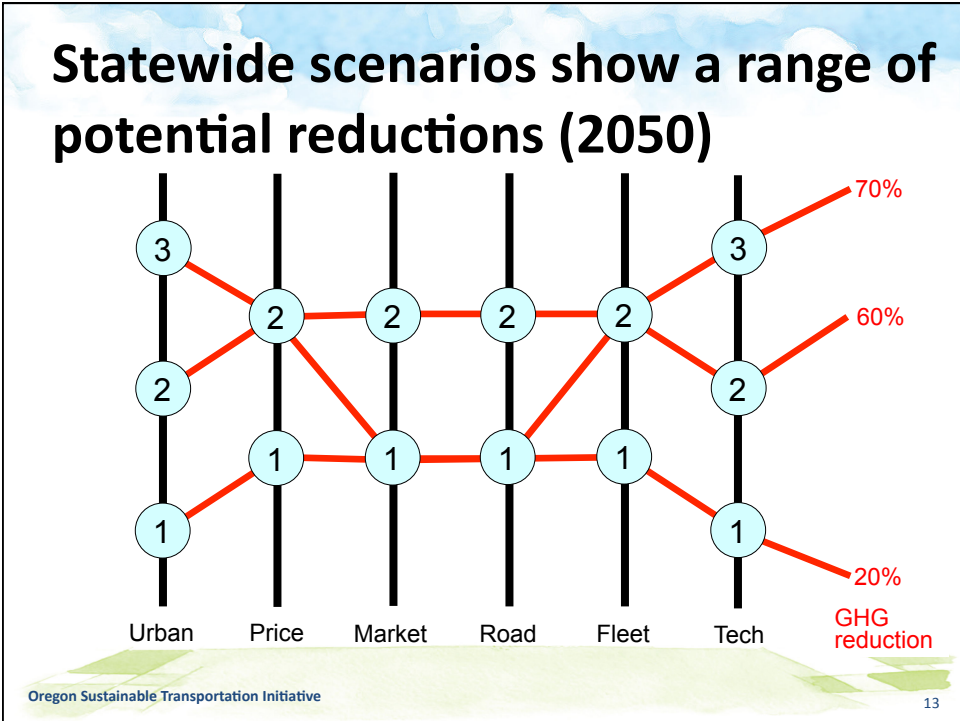
Statewide GHG planning model with sensitivity to larger number of transportation vehicle, price, fuels and other inputs











Preliminary statewide results...

Most effective = vehicle technology

- 70-100 miles/gallon required for 65-75% ghg reductions by 2050

Second most effective = urban

Least effective = additional lane miles

Oregon Sustainable Transportation Initiative 14

...preliminary statewide results

Results are estimated percentages (ordinal)

- No network or spatial modeling

Background conditions (controlled) vs. policy levers (uncontrolled)

- Ex. Gasoline price (background) and auto operating (policy lever)

State Evaluation Criteria... What else matters?

- Travel and System Performance
- Energy Consumption
- Economic Impact
- Land Use and Natural Resources
- Public Health
- Infrastructure/Implementation Costs
- Risk Assessment

Lessons for Metro Scenario Planning

- Potential targets achievable with aggressive, plausible policy and investment decisions
- Some actions more effective than others
- Levels of “aggressiveness” approach provides a useful understanding of key choices
- Results are ordinal estimates; additional refinement modeling and analysis will be necessary
- GHG emission analysis is an evolving field; estimates will change as precision increases
- Communication of results is key challenge

What's Next at State Level?

•Target Rulemaking Advisory Committee

- Metropolitan Area Targets by June 1
 - GHG reduction target for each of Oregon's six MPOs
 - Assumptions for fuels, technology, fleets
 - “VMT” target for each MPO
 - Per Capita based
- LCDC Comment Period April-May

•Statewide Strategy – Phase 2

- Heavy Duty vehicles, Inter-City travel , Toolkit

