

Climate Smart Communities Scenarios Evaluation Framework

A collaborative approach to building livable, prosperous, equitable and climate smart communities

As recommended by the Metro Policy Advisory Committee (MPAC) and the Joint Policy Advisory Committee on Transportation (JPACT) on June 8 and June 9, 2011



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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 local aspirations while moving the region toward its goals to make the Portland metropolitan region a great place to live, work and play.

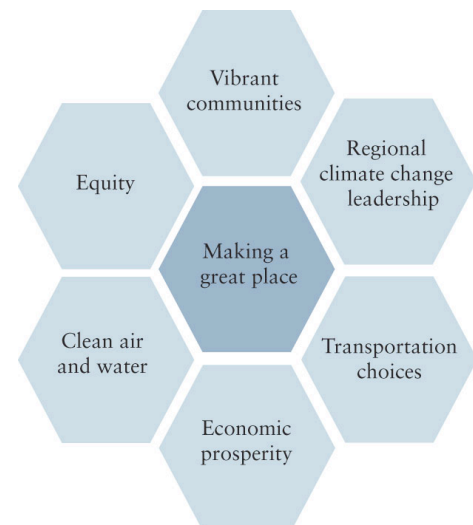
We have set our region on a wise course – but mounting scientific evidence shows Oregon's climate is changing. Oregon has been a national leader and has taken some steps to do its part to address climate change. Regional and local leaders in the Portland region have agreed that it is important to provide leadership and do their part.

Now it's time to act and focus on the investments needed to collaboratively realize those local aspirations and shared regional goals, as well as address state climate goals. The Climate Smart Communities scenarios work is intended to do that.

While reducing greenhouse gas (GHG) emissions is important to the health of the region and the planet, the Climate Smart Communities scenarios work 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 region has choices about how to respond. Through this effort, the region will build on a long tradition of innovation, excellence in planning, and conservation and stewardship of our natural environment. The bold decisions made decades ago have given this region a head start over other cities and regions across the country. It is in this context that we will look to the bold 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 Climate Smart Communities scenarios effort will focus on reducing GHG emissions from cars, small trucks and sport utility vehicles (SUVs) – as required by House Bill 2001. 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.

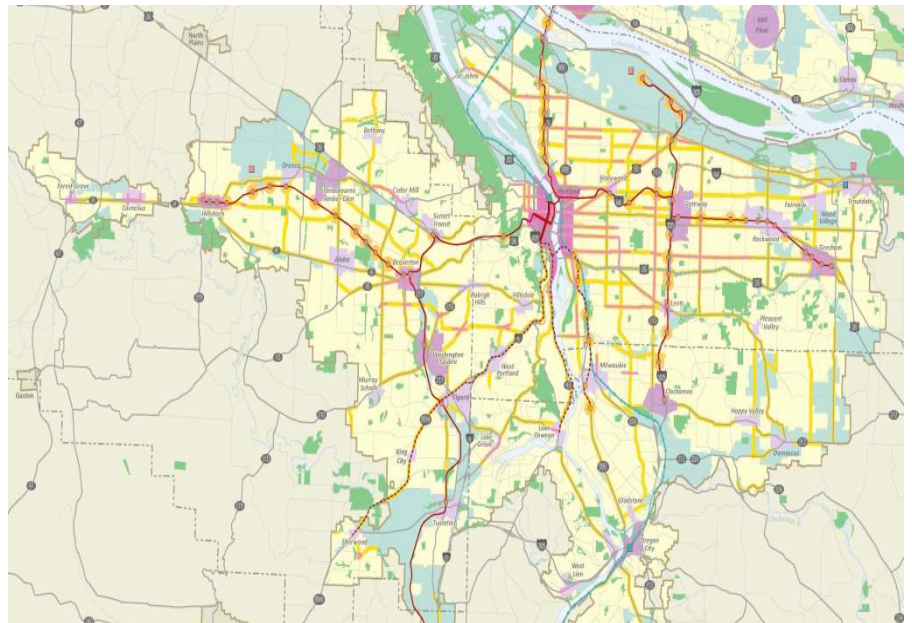


The region's six desired outcomes – adopted by the Metro Council on December 16, 2010.

WHERE WE'VE BEEN AND WHERE WE'RE HEADED In 2007, the Oregon Legislature established statewide goals for GHG emissions – calling for stopping increases in emissions by 2010; a 10 percent reduction below 1990 levels by 2020 and at least a 75 percent reduction below 1990 levels by 2050. The targets apply to all emission sectors, including energy production, buildings, solid waste and transportation.

In 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 mandated adoption of a preferred scenario after public review and consultation with local governments. Finally, HB 2001 calls for local government implementation through comprehensive plans and land use regulations that are consistent with the adopted regional scenario.

In 2010, Metro, its technical and policy committees and local elected officials continued to support the 2040 vision for the region by adopting an outcomes-based blueprint for the future – the Community Investment Strategy - through updates to the Regional Transportation Plan, Regional Freight Plan, High Capacity Transit Plan, Transportation System Management and Operations Plan, Capacity Ordinance, Urban Growth Report, urban growth boundary process and designating urban and rural reserves. These actions provide the policy foundation for better integrating land use decisions with transportation investments to achieve the region’s 2040 vision and six desired outcomes, as well as the 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, equitable and climate smart communities.

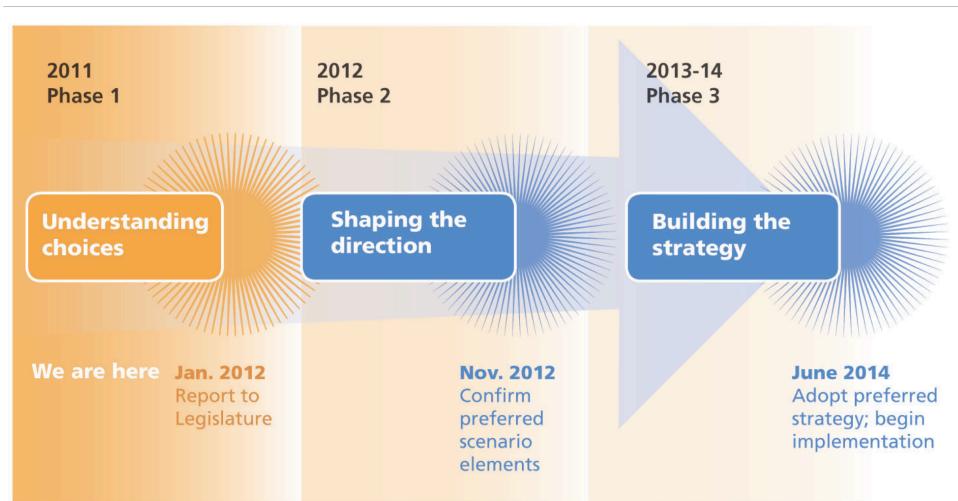
In May 2011, the Land Conservation and Development Commission (LCDC) adopted per capita GHG emissions reduction targets for the Portland region. The State calls for the region to reduce per capita GHG emissions from cars, small trucks and SUVs by 20 percent below 2005 levels by 2035 in order to be on track to meet the state’s 2050 goal. The targets assume the region will achieve a certain amount of emissions reduction through improvements to fuel economy, fleet mix and vehicle technology. This means the region needs to build, and eventually adopt, a land use and transportation strategy that will reduce GHG emissions an additional 20 percent below what we can anticipate from fuel, fleet and technology improvements.

A variety of different strategies are available to reduce GHG emissions, many of which are already being implemented in the region to realize the 2040 Growth Concept and local plans. Concerns have been raised that the fuel, fleet and technology changes assumed in the targets may be too aggressive and difficult to reach and that the region should not rely on state or federal actions to meet the targets. Instead, the region should prepare itself to reduce emissions by more than 20 percent in case the technology and fleet improvements do not come to fruition as quickly as anticipated.

DESIRED OUTCOME The goal of the Climate Smart Communities scenarios effort is to collaborate across different levels of government and public and private sectors to target investments to generate maximum local and regional benefits, and identify and implement programs and policies that help build prosperous, vibrant, equitable and climate smart communities.

HOW WE GET THERE This is a multi-year collaborative effort designed to help communities realize their local aspirations and maximize achievement of the region's six desired outcomes and state climate goals.

CLIMATE SMART COMMUNITIES SCENARIO PLANNING TIMELINE



PHASE 1 TESTING POLICY OPTIONS TO UNDERSTAND CHOICES (JAN. - DEC. 2011) In 2011, the region will use scenario planning and other research to determine the combinations of land use and transportation strategies that are most promising for meeting the region's GHG emission reduction target for cars, small trucks and SUVs in the Portland metropolitan region. The analysis will include development of a "Strategy Toolbox" that synthesizes existing research on different strategies in terms of their GHG reduction potential, potential co-benefits and synergies, and implementation feasibility. In addition, potential impacts and benefits will be evaluated against the region's six desired outcomes, local aspirations and feasibility of implementation using a combination of qualitative and quantitative indicators.

The analysis will be used to identify potential policy options and provide information useful for policymakers and stakeholders to discuss the trade-offs and choices presented by the most effective GHG reduction strategies during Fall 2011. The regional policy discussion will shape the findings and potential packages of strategies recommended for further evaluation in 2012.

PHASE 2 SHAPING THE DIRECTION BY TURNING POLICY OPTIONS INTO A REGIONAL STRATEGY (JAN. - DEC. 2012) In 2012, the region will apply the most promising strategies to communities around the region in a more customized way, examining the potential to pursue different strategies that support distinct community goals in recognition that implementation may be different in each one. This phase will also identify the benefits, impacts and costs (and cost savings) associated with different scenarios across environmental, economic and equity goals, and use case studies to illustrate effects in communities around the region.

PHASE 3 BUILDING THE STRATEGY AND IMPLEMENTATION (JAN. 2013 - JUNE 2014) In 2013 and 2014, the region will collaboratively build and adopt a preferred scenario that recognizes community values and local differences while moving toward regional and state goals. This will entail selecting a preferred set of land use and transportation strategies to be implemented through

state, local and regional plans, policies and investments. Effective implementation of the preferred strategy will likely require the participation and cooperation of an array of Federal, State, regional and local government agencies, the private sector and community organizations. This work will include development of a finance strategy because many of the strategies will be implemented locally and regionally.

KEY PRODUCTS A number of products will be developed throughout the project that will support current and future planning and implementation efforts in communities throughout the region, including:

- **Resources, research and technical support** to help regional partners produce climate communications materials that inform communities, connect actions to outcomes and inspire residents to act at the neighborhood level.
- **Case studies from the Portland area** to illustrate on-the-ground examples of how local actions can achieve community aspirations and other desired outcomes. Many of the strategies being considered are already being implemented in the region to realize the 2040 Growth Concept and local plans.
- User-friendly **visualization tools** that bring local case studies and other technical information to life for decision-makers and the public by illustrating existing conditions and future choices.
- Enhanced and new **state-of-the-art analytic tools** for local and regional land use and transportation system planning efforts, available in FY 11-12. The tools will help policy- and decision-makers evaluate **market feasibility** of development alternatives, housing and transportation **affordability, fiscal, economic, equity, environmental** and **public health** impacts, and **energy consumption** of buildings and transportation. New **pedestrian and bike models** will better account for walking and biking, and access to transit in the region.
- **Alternative growth scenarios** that build on community aspirations and support the 2040 Growth Concept.
- **Locally-developed preferred scenario recommendations** for land use and transportation **investment priorities, programs** and **actions** for use in downtowns, main streets and employment areas across the region. This will include a **financing strategy** to fund investments in transportation systems and projects that support the development of great communities.
- Updated **Regional Transportation Plan, air quality conformity determination, Regional Framework Plan, Urban Growth Report, functional plans** and other growth management policies that support local elected officials and decision-makers in achieving local aspirations and meeting regional goals.

MOVING FORWARD Selecting strategies will involve policy decisions that could have political, economic, environmental, equity, community and lifestyle implications. By identifying the policy choices and tradeoffs that decision-makers will need to consider throughout the process, this summer's research can serve as a basis for continuing a regional dialogue on how to confront the threat of global climate change through state, regional and local actions while advancing the region's efforts to build livable, prosperous and equitable communities.

The next section provides additional guidance to Metro, state and local agency staff by defining the evaluation approach and analytic framework to be used in Phase 1 of the Climate Smart Communities Scenarios effort. Included are principles to guide the work, and specific direction on the strategies and outcomes to be evaluated. The approach and framework will be updated for Phase 2 to reflect lessons learned and recommendations from Phase 1.

Phase 1 Scenario Evaluation Framework (June – December 2011)

GUIDING PRINCIPLES:

- **Focus on outcomes and co-benefits:** The strategies that are needed to reduce GHG emissions can help save individuals, local governments and the private sector money, grow local businesses and create jobs and build healthy, livable communities. The multiple benefits should be emphasized and central to the evaluation and communication of the results.
- **Build on existing efforts and aspirations:** Start with local plans and 2010 regional actions¹ that include strategies to realize the region's six desired outcomes.
- **Show cause and effect:** Provide sufficient clarity to discern cause and effect relationships between strategies tested and realization of regional outcomes.
- **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.
- **Be fact-based and make 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.
- **Meet state climate goals:** Demonstrate what is required to meet state the 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 region's six desired outcomes – adopted by the Metro Council on December 16, 2010.

WHAT WE HOPE TO ACCOMPLISH:

- Determine what combinations of land use and transportation strategies are required to meet the state GHG emission reduction targets for light vehicles.
- Show potential impacts and benefits through a comprehensive array of measures that link back to the six desired outcomes and community values. This information will be used to demonstrate how well the strategies support local plans and the region's desired outcomes, and communicate the relationship of these strategies to GHG emission reductions in other sectors beyond light duty vehicles.
- Identify the potential challenges, opportunities and tradeoffs associated with different strategies and the fiscal, social equity, economic and environmental implications for the region and state.
- Identify the key characteristics and combinations of strategies that are most promising for meeting the region's GHG emission reduction target and that should be carried forward to Phase 2 for further evaluation. This should include identifying the strategies that are needed if technology advancements do not come to fruition.
- Report findings and make recommendations to the 2012 Legislature and Phase 2 (Jan. - Dec. 2012).

¹ In 2010, the Metro Council adopted the Community Investment Strategy and Regional Transportation Plan, and designated urban and rural reserves. These actions provide the policy foundation for better integrating land use decisions with transportation investments to achieve the region's six desired outcomes and state climate goals.

DEFINING THE SCENARIOS:

- **Build on lessons learned from statewide scenarios.** In Phase 1, scenarios will be created to test different levels of implementation for each strategy to meet state GHG targets. The region will use the attributes of the best performing statewide scenarios as a starting point for this work. The region may want to consider different assumptions, however, such as more or less aggressive assumptions for deployment of electric vehicle and hybrid vehicles.
- **Develop complementary packages of strategies to test policy options.** In Phase 2, 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.** Phase 1 (June – Dec. 2011) 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.
- **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.

Table 1 summarizes the strategies that can be tested during Phase 1. The strategies are assumed to be implemented with consideration of environmental justice and equity concerns; there may be some strategies that by their very nature could pose challenges. The evaluation will be supplemented with national and local research findings, past regional model runs and scenarios work, and localized case studies from current planning efforts.

The top performing combinations of strategies will be evaluated in more detail, using the indicators listed in Table 2. Additional sensitivity analysis may be conducted after the initial scenarios are evaluated as time and resources allow.

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 and experiment with different actions and policies to see their affect on GHG emissions reduction and other quality of life indicators without actually implementing the policies. This effort will use a 2-step scenario evaluation process.

In **Phase 1 (June – Dec. 2011)**, **policy option scenarios** will be tested using different combinations of strategies and levels of implementation to determine the most promising strategies for meeting the state climate goals, considering cost, economic, equity and environmental implications. Level 1 will represent a Reference Case that reflects current adopted plans and policies. Up to 3 levels will be tested for some strategies.

In **Phase 2 (Jan. - Dec. 2012)**, **alternative scenarios** will test the most promising combinations of strategies in a more customized manner across the region. This will reflect lessons learned from Phase 1 and include examining the potential to pursue different strategies that support distinct community goals in recognition that implementation may be different in each community. The alternative scenario evaluation will be used to determine the best course of action to achieve the region’s desired outcomes and state climate goals.

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

Table 1. Policies, programs and investment strategies to be tested in Phase 1 and Phase 2

Key Strategies to be Tested (indicated in bold)		Phase 1 & 2 GreenSTEP	Phase 2 Envision Tomorrow
COMMUNITY DESIGN	Urban growth boundary (rate of expansion relative to rate of population growth)	X	
	Balance of jobs and housing		X
	Households located in mixed-use areas and neighborhoods with public amenities ² (percent)	X	X
	Pedestrian travel (in GreenSTEP, this is accounted for in the mixed-use areas strategy)	X	X
	Bicycle travel (percent of bike roundtrips less than 6 miles)	X	
	Households with access to transit (percent)		X
	Road capacity (lane miles of arterial and freeway capacity)	X	
	Bus and rail transit service levels (rate of revenue miles of growth relative to rate of population growth)	X	
PRICING	Workers that pay for parking (percent and cost in 2005\$)	X	
	Non-work trips that pay for parking (percent and cost in 2005\$)	X	
	Pay-as-you drive insurance (cost per mile driven)	X	
	Emissions pricing ³ (cost per pound of carbon emitted)	X	
	Gas tax ⁴ (cost per gallon)	X	
	Vehicle travel pricing ⁵ (cost per mile driven)	X	

² Forecasted population and employment held constant across all scenarios. This policy lever links several strategies to account for the effect of density (people and jobs), design, diversity of uses, destinations and distance to transit on vehicle miles traveled. Examples of amenities include pedestrian-friendly street designs, well-connected network of streets, sidewalks and biking facilities, and good transit.

³ Carbon fee or other instruments could be used.

⁴ Increased gas tax, or other instruments could be used.

⁵ Vehicle miles traveled fee or other instruments could be used.

Key Strategies to be Tested (indicated in bold)		Phase 1 & 2 GreenSTEP	Phase 2 Envision Tomorrow
MANAGEMENT	System management strategies such as traffic signal timing, incident management (percent of delay addressed)	X	
MARKETING & INCENTIVES	Households participating in individualized marking programs (percent)	X	X
	Workers participating in employer-based commute options programs ⁶ (percent)	X	
	Individuals participating in carsharing (target participation rate per carshare vehicle)	X	
	Households participating in ecodriving ⁷ (percent)	X	
FLEET	Auto/truck vehicle proportions (light truck percent)	X	
	Fleet turnover rate/ages (vehicle age)	X	
TECHNOLOGY	Fuel economy (average of auto and light trucks)	X	
	Carbon intensity of fuels	X	
	Electric vehicles and plug-in hybrids market shares (percent)	X	

Phase 1 and Phase 2 scenario evaluation tools

Greenhouse Gas State Transportation Emissions Planning (GreenSTEP) is a non-spatial model used to estimate transportation sector emissions with sensitivity to mixed-use, vehicle fleet mix, transportation cost, fuels and other factors which are used to calculate household vehicle miles traveled (VMT) and corresponding GHG emissions. Inputs within the statewide model will be tailored where more current local/regional information is available to create a metropolitan GreenSTEP model for Phase 1 (June - Dec. 2011). GreenSTEP will also be used in Phase 2 (Jan. – Dec. 2012)

Envision Tomorrow is a spatial GIS-based scenario planning tool that estimates the effect of changes to land use using a combination of land use, environmental and transportation data. The inputs will be tailored where more current local/regional information is available for more refined scenario analysis in Phase 2 (Jan. – Dec. 2012).

⁶ Examples include transit fare reduction, carpool matching and other carpool programs, and compressed work week.

⁷ Educating motorists on how to drive in order to reduce fuel consumption and cut emissions. Examples avoiding rapid starts and stops, matching driving speeds to synchronized traffic signals, and avoiding idling.

OUTCOMES TO BE EVALUATED:

A variety of policy options will be tested using a metropolitan GreenSTEP model. The evaluation will be supplemented with national research, past regional model runs and scenarios work, localized case studies from current planning efforts and the Envision Tomorrow scenario planning tool. The results of the analysis will be summarized and brought forward for discussion by the region's decision-makers and community and business leaders in Fall 2011. The regional policy discussion will shape the findings and recommendations forwarded to the next phase of the process and the 2012 Legislature.

While the primary objective of the Phase 1 analysis (June - Dec. 2011) is to estimate the GHG emissions reduction potential of different combinations of strategies and their ability to achieve state targets for cars, small trucks and SUVs, the evaluation will also consider:

- **Outcomes and co-benefits** – Evaluate the costs, benefits and impacts across environmental, economic, and equity goals from a business, individual/household, local government and regional perspective to clearly illustrate the policy choices and tradeoffs as well as the political, community, social equity, and economic implications of different strategies. There are many choices – the first phase should clearly pose the consequences (intended and unintended) of different choices, including the consequences of no action and current plans and policies. Evaluation methods and criteria will be clearly explained and available.
- **Effectiveness and cost** – A full cost-benefit analysis cannot be conducted. GHG emissions reduction potential will be evaluated, along with the costs and cost effectiveness of different strategies. The analysis will use a “triple bottom line” approach to show the cost implications and tradeoffs across economic, environmental and equity goals. The evaluation will identify potential public and private costs (and savings) associated with different strategies and the potential costs of inaction. The information provided must be well-grounded and fact-based to inform a variety of backgrounds and interests.
- **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 for 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.
- **Public health and equity** – The evaluation will meaningfully consider public health and equity. This should include assessing the impacts to transportation disadvantaged communities in the region that do not have well-connected street systems, transit, sidewalks, and bicycle facilities, or households of modest means that may not have access to lower carbon vehicle options (e.g., electric vehicles, more fuel-efficient vehicles).
- **Community investment revenues generated** – The evaluation should assess how parking management and other resources developed by the strategies could be used to help fund expanded transit or streetscape enhancements in downtowns and main streets.



MEASURING THE COSTS, BENEFITS AND IMPACTS TO FRAME A REGIONAL DIALOGUE:

Table 2 identifies a draft scorecard of indicators that reflect the outcomes that the GreenSTEP model is able to measure. During Phase 1, the indicators will measure the GHG emissions reduction potential of different combinations of strategies in addition to their potential community, environmental, economic, and equity costs, benefits and impacts from a business, individual/household, and regional perspective. This information will be used to communicate which combination of strategies (e.g., scenarios) will achieve the state GHG targets and how different approaches could affect the cost of moving freight, air quality, household expenditures, public health, infrastructure costs, travel behavior, and other outcomes. The results of the analysis will be brought forward for discussion by the region’s decision-makers and community and business leaders in Fall 2011.

Table 2. Draft Community Scorecard (beta-indicators)

Business	Individuals and Households	Region
Delay by vehicle type (light vehicle, bus, freight truck)	Amount of daily driving (VMT) & travel time per capita for all income groups	Carbon emissions
Freight truck travel costs	Housing and transportation cost per household by income group	Air quality emissions
Freight truck travel time	People living in areas with a range of affordable housing choices and access to jobs and services by income group	Transportation and building energy consumption
Private costs	Physical activity /Walking, biking and transit per capita	Community investment revenues generated
	Fuel consumption per capita and by income group	Public infrastructure costs (capital and operations)
	Water consumption per capita	Land consumption
	Transit service levels per capita	

The evaluation process may reveal that not all of the community scorecard indicators are relevant, or it may reveal additional indicators that are better for measuring how well the scenarios support achievement of the state climate goals and the region’s desired outcomes. As a result, the indicators will continue to be refined in Phase 2 (Jan. - Dec. 2012) as the evaluation effort transitions to using Envision Tomorrow in combination with the metropolitan GreenSTEP model. These tools will expand the region’s spatial analysis capabilities allowing for a more robust analysis of economic development, public/private costs, accessibility, public health and environmental justice indicators.