Use of the GreenSTEP Model for Scenario Planning in Oregon

Approaches to Scenario Planning
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Outline

• Scenario Planning in Oregon
• Overview of the GreenSTEP model
• Example: Statewide Transportation Strategy for Reducing GHG Emissions
• Lessons Learned
Oregon Planning Context & Background

- **1973: Comprehensive Planning Requirements**
  - Urban growth boundaries, resource lands protection, requirements to accommodate housing

- **1991: Transportation Planning Rule**
  - Require coordinated planning of land use & transportation

- **1992: Oregon Transportation Plan**
  - State multimodal transportation plan

- **1992-1995: Region 2040**
  - Scenario planning to develop 50-yr growth plan for the Portland metropolitan area

- **1999-2001: Willamette Valley Alternative Transportation Futures**
  - Large scale land use and transportation scenario planning for Oregon’s Willamette Valley
Current Scenario Planning Efforts

• Focus on greenhouse gas (GHG) mitigation
  – State GHG reduction goals from 1990 levels: 10% by 1990, 50% by 2050

• Statewide
  – Requirement to develop a statewide transportation strategy for reducing GHG emissions

• Portland metropolitan area
  – Requirement to develop and implement a scenario plan for reducing GHG emissions

• Eugene/Springfield metropolitan area
  – Requirement to develop a scenario plan for reducing GHG emissions

• Other urban areas
  – No current requirements. Figuring out how to move ahead.
GHG Mitigation Planning is a Strategic Planning Exercise

- Effects are large scale
  - Unlike criteria air pollutants, effects are not just local or regional

- Big challenge
  - If total GHG to be reduced by 75% while population doubles, per capita GHG has to be reduced by about 88%

- Many interacting factors
  - Demographics, economics, land use, transportation services, travel behavior, vehicle technology, fuels ...

- Many actors
  - Gov’t (federal, state, regional, local), Private (many various)

- Large amount of uncertainty
  - Prices, technological advances, federal actions (or inactions)
Models Important to Strategic Planning Processes

• Enable evaluation of complex systems
  – Mental models are insufficient
  – It’s important to model interactions between factors

• Enable evaluation of many scenarios
  – Large solution space to explore (but requires model to be fast enough: set up and run time)

• Facilitate discussions and consensus building among stakeholders
  – Differing mental models lead to conflict
  – Computer models bring together mental models and apply greater analytical rigor
  – Stakeholders see their mental models as important, but not the only important consideration
The GreenSTEP Model

- GreenSTEP = Greenhouse gas Strategic Transportation Energy Planning model
  - Requested by Oregon Global Warming Commission
  - Development started in 2008

- Models at the household level

- Two GreenSTEP versions
  - Statewide: supports strategic planning at the state level
  - Metropolitan: supports metropolitan area scenario planning

- Offshoots
Factors are Considered at the Household Level
Forecasts Are Made at the Household Level
**Statewide Transportation Strategy (STS)**

**Phase I: Statewide Transportation Strategy**
- **Clarify:**
  - The Problem
  - What it takes to reduce GHG
- **Establish:**
  - Future Vision (2050) of reduced GHG
  - Broad Recommendations for achieving the vision

**Phase II: Implementation**
- **In near-term, identify:**
  - Legislative concepts
  - Ways to work with federal partners and other partnership opportunities
  - Necessary policy changes
  - Necessary incentive programs
- **In mid-term, develop Implementation Plan:**
  - More detailed economic assessment of individual STS actions
  - Specific implementation actions, timelines and responsibilities
  - Performance measures
- **Long-term (ongoing):**
  - Execute implementation plan
  - Develop and/or amend long-range transportation policies

**Phase III: Monitor and Adjust**
- Regularly assess progress using performance measures
- Make any necessary changes to timelines
- Adjust strategy as needed
**STS Scope**

- **Travel market segments**
  - Ground passenger and commercial service
  - Freight
  - Air passenger

- **Geography**
  - Considers household travel of Oregonians
  - Only Oregonians
  - Regardless of where the travel occurs
  - Considers commodity movements from wherever they originate to final destinations in Oregon
Selection of STS Evaluation Measures

Average DVMT Per Capita

- Estimated 2010: 23
- Reference Case: 25
- STS Vision: 18

Average Annual Walk Trips Per Household

- Estimated 2010: 114
- Reference Case: 133
- STS Vision: 142

Percentage of Metropolitan Households Living in Urban Mixed Use Neighborhoods

- Estimated 2010: 20%
- Reference Case: 31%
- STS Vision: 31%
Selection of STS Evaluation Measures

**Annual Statewide Light Vehicle GHG**
(million metric tons)

- Estimated 1990: 13.1
- Reference Case: 8.4
- STS Vision: 2.7

**Annual Light Vehicle Fuel Consumption**
(million gasoline equivalent gallons)

- Estimated 1990: 1505
- Reference Case: 1045
- STS Vision: 314

**Metropolitan Criteria Air Pollutants**
(kilograms per day)

- Estimated 2010: 535
- Reference Case: 278
- STS Vision: 77
Selection of STS Evaluation Measures

Average Annual Household Costs for Owning & Operating Vehicles

Average Percentage of Income Spent on Owning & Operating Vehicles
Lessons Learned

• Scenario planning is a strategic planning exercise
• Planning for GHG reduction is a learning process
• An iterative approach is necessary
• Oregon’s land use framework is well established & carrying out existing plans will achieve most of the land use related benefits
• Many of the key issues are related to financing
• Need to monitor and continue to consider implications of vehicle and information technologies