Climate Change and the Transportation Planning Process
Transportation: Mitigation and Adaptation

**Transportation Activity**
Driving, shipping, transit, rail, operations, maintenance, etc.

**GHG Emissions**
CO2, CH4, N2O, etc.

**Changes to Climate**
Sea levels (lakes and streams), temperature, precipitation, storms

**GHG Mitigation**
Slow rate of change and reduce impacts

**Climate Change Adaptation**
Plan for and deal with expected impacts

**Impacts on Transportation**
Infrastructure, operations, users, suppliers, services, travel demand
Multiple Transportation Strategies to Reduce GHG

- **Vehicles:** Raise vehicle energy efficiency
- **Fuels:** Reduce carbon content of fuels
- **Amount of Travel:** Reduce VMT
- **Vehicle and System Operations:** Improve system and operational efficiencies
- **Construction, Maintenance, and Agency Operations**
Transportation System Efficiencies

- Traffic flow improvements
  - ITS/Management and Operations
  - Improved Intermodal connections

Travel (by SOV) Activity Reduction

- Reducing VMT
  - Land Use strategies
  - Bike/ped
  - Transit
  - Pricing

...national policy that the MPO designated for each urbanized area is to carry out a continuing, cooperative, and comprehensive multimodal transportation planning process, including the development of a metropolitan transportation plan and a transportation improvement program (TIP), that encourages and promotes the safe and efficient development, management, and operation of surface transportation systems to serve the mobility needs of people and freight (including accessible pedestrian walkways and bicycle transportation facilities) and foster economic growth and development, while minimizing transportation-related fuel consumption and air pollution; 23CFR450.300
Transportation Planning Factors

a) Support economic vitality
b) Increase safety
c) Increase security
d) Increase accessibility and mobility
e) Protect and enhance the environment
f) Enhance connectivity across and between modes
g) Promote efficient system management and operation
h) Preserve the existing transportation system
(e) protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;
Linkage Opportunities in Planning Regulation

- Energy and environmental concerns
- Integrated transportation system, system preservation, safety and security
- Transportation demand and system management strategies
- Consultation

*Integrating Climate Change into the Transportation Planning Process, FHWA, 2008*
MTP and Climate Change?

- Integrated multimodal system
- Transit, multimodal & intermodal, pedestrian walkways & bike facilities
- Operational and management strategies
- Environmental mitigation
- Consultation
Federal Highway Administration

Integrating Climate Change into the Transportation Planning Process

Final Report

July 2008

www.fhwa.dot.gov/hep/climatechange/index.htm
Overview of Current Practice

- Acknowledge connection between transportation and climate change
- Mitigation of GHG emissions
  - (vision – goals – policies – strategies)
- Performance measures
  - Related to GHG emissions
- Quantifying GHG emissions
  - Emerging: tools, methods, data
Climate Change in Planning

Processes

- Coordinate
- Stakeholder Outreach

Step 1: Stakeholder Identification and Initial Outreach
Step 2: Establish Vision, Goals, and Objectives
Step 3: Define Performance Criteria and Data Needs
Step 4: Evaluate Deficiencies
Step 5: Develop Alternative Plan Scenarios
Step 6: Evaluate Alternatives & Select Preferred Alternative

Link funding
Integrate land use

Components
- Vision, Goals, and Trends
- Performance Measures
- Trends and Challenges
- Strategies and Improvement Projects
- Performance Measures

Feedback
Climate Change and the Planning Process

Coordinate
• Existing and new interested parties and stakeholders
• Use the planning process as a forum to educate the public

Integrate Land Use
• Cross linkages with land use plans
• Invest in visioning up front to save time and resources in later planning stages

Link Funding
• Prioritize projects using climate change performance measures
Where Climate Change May Show Up in Plans:

- Vision and Goals
- Trends and Challenges
- Strategies and Improvement Projects
- Performance Measures
## Climate Change in Current Statewide Plans

<table>
<thead>
<tr>
<th>DOT</th>
<th>Status of LRTP</th>
<th>Trends &amp; Challenges</th>
<th>Vision &amp; Goals</th>
<th>Policies &amp; Strategies</th>
<th>Performance Measures</th>
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</thead>
<tbody>
<tr>
<td>Maine</td>
<td>adopted 2007</td>
<td></td>
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<td>Arizona</td>
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<td>Connecticut</td>
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<td>Massachusetts</td>
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<tr>
<td>Maryland</td>
<td>draft goals 2008</td>
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<tr>
<td>Oregon</td>
<td>adopted 2006</td>
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<tr>
<td>Washington</td>
<td>adopted 2006</td>
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<tr>
<td>California</td>
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<td>Florida</td>
<td>adopted 2005</td>
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<tr>
<td>New York</td>
<td>adopted 2006</td>
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</tr>
</tbody>
</table>

- **Climate change mitigation**
- **Climate change mitigation & adaptation**

## Climate Change in Current RTPs

<table>
<thead>
<tr>
<th>MPO Region</th>
<th>Status of LRTP</th>
<th>Trends &amp; Challenges</th>
<th>Vision &amp; Goals</th>
<th>Policies &amp; Strategies</th>
<th>Performance Measures</th>
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<td>Albany, NY</td>
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<tr>
<td>Baltimore</td>
<td>adopted Nov 2007</td>
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<tr>
<td>Chicago</td>
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<td>Eugene, OR</td>
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<td>Sacramento</td>
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<td>San Diego</td>
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<td>San Francisco</td>
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<tr>
<td>Santa Fe, NM</td>
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<tr>
<td>Seattle</td>
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<tr>
<td>Southern California</td>
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<tr>
<td>Washington, DC</td>
<td>adopted Oct 2006</td>
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</tr>
</tbody>
</table>

** Climate Change Mitigation

- Refer to Vision 2040, a regional growth, transportation, and economic strategy.

Environmental Stewardship Section of Plan

Specific strategies that will reduce GHG emissions include:

- Truck stop electrification
- Incident management
- Alternative fuel vehicle purchases
- Park-and-ride lot improvements
- Rideshare coordination
- Telework promotion
Integration of Climate Change Considerations in Statewide and Regional Transportation Planning

USDOT Center for Climate Change

Case Studies and Proceedings
- TRB Panel
- AMPO Conference

Climate Change in Transportation Planning
- Vision and long range planning
- Forecasts, data and performance measures
- Public involvement
- Collaboration with partners
- Project selection

NY State
PSRC
MWCOG
BRMPO
NEG/ECP
## Integration of Climate Change Considerations

### Table 1: State and Regional Transportation Planning and Climate Change: Summary of Major Aspects of Transportation Planning Processes

<table>
<thead>
<tr>
<th>Innovative Planning Application</th>
<th>MPOs (Metropolitan Area)</th>
<th>State DOT</th>
<th>Multi-State or Province</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boston MPO</td>
<td>DC MPO</td>
<td>Seattle MPO</td>
</tr>
<tr>
<td>Policy development</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>GHG reduction targets</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Supportive regulations</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Link to State/city/county GHG plan</td>
<td>X</td>
<td>X</td>
<td>A</td>
</tr>
<tr>
<td>Own GHG plan</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vision plans - scenarios</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Links to land use</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Link to decisions and investments (criteria)</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Role of co-benefits</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Technical and use of models</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Adaptation to impacts</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education and outreach</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Partnerships</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

X = In place or pending  
A = Anticipated
Incorporating Climate Change Considerations into Transportation Planning

FIGURE 2  Conceptual transportation planning framework (23).

TRR 2219, TRB
Incorporating Climate Change Considerations into Transportation Planning

**Vision**
GHG emissions, mitigation, adaptation
Climate change facts

**Goals, Objectives, and Performance Measures**
Current goals that support GHG reduction
GHG mitigation (with policy approval)
Likely effects of climate change on existing goals
GHG reduction targets
Performance measures
Incorporating Climate Change Considerations into Transportation Planning

Analysis
- Incorporate GHG analysis into process
- Long term urban form/land use effects on GHG
- Collect data related to assessing vulnerability
- Cost effectiveness of mitigation strategies

Identify Strategies
- Identify potential adaptation strategies
- Scenario Planning – climate change scenario
- GHG Reduction Strategies in existing process (CMP)

Evaluation
- GHG emissions mitigation and adaptation as criteria
Incorporating climate change considerations into the planning process would provide the opportunity for transportation planners and decision makers to best develop the most cost effective strategies in the context of all the other goals that are guiding the planning process.
State and Regional Transportation Plans
What is climate change?
How does transportation contribute to climate change?
Why should transportation plans address climate change?
How does the plan address climate change?

“Transportation 2040 proposes a strategy for reducing transportation’s contribution to climate change and its impact on important regional concerns such as air pollution and the health of Puget Sound.”


“This plan does not include a quantitative assessment of Greenhouse Gases. However, as more consistent methods to measure GHG emissions are developed, and as legislative and regulatory mandates emerge (i.e., SAFETEA-LU reauthorization), MUMPO will address them accordingly. In the meantime, MUMPO will work on providing more education about transportation and its effects on climate change.”

## Educating the Public on Climate Change Issues: DOT and MPO Best Practices

<table>
<thead>
<tr>
<th>DOT</th>
<th>State</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caltrans</td>
<td>California</td>
<td>- Internal Teleconferences&lt;br&gt;- Internal Climate Change Listserv</td>
</tr>
<tr>
<td>Iowa DOT</td>
<td>Iowa</td>
<td>- Transportation and Climate Change Presentation</td>
</tr>
<tr>
<td>Kentucky Transportation Cabinet</td>
<td>Kentucky</td>
<td>- Climate Change /Livability/Air Quality Conference</td>
</tr>
<tr>
<td>NYSDOT</td>
<td>New York</td>
<td>- IntraDOT Climate Change /Energy Website&lt;br&gt;- Public Climate Change Website&lt;br&gt;- Earth Day Fair Outreach</td>
</tr>
<tr>
<td>Oregon DOT</td>
<td>Oregon</td>
<td>- ODOT Climate Change Technical Advisory Committee&lt;br&gt;- Efforts on Climate Change Factsheet&lt;br&gt;- Briefing Paper: ODOT’s Efforts on Climate Change</td>
</tr>
</tbody>
</table>

*FHWA, 2010*
### Educating the Public on Climate Change Issues: DOT and MPO Best Practices

<table>
<thead>
<tr>
<th>MPO</th>
<th>Region</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delaware Valley Regional Planning Commission</td>
<td>Philadelphia Region</td>
<td>• Climate Change Initiatives Program</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Energy and GHG Reduction Toolkit</td>
</tr>
<tr>
<td>Metropolitan Transportation Commission</td>
<td>San Francisco Bay Area</td>
<td>• Climate Initiatives Public Outreach Program</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• K-12 Schools Climate Change Workshop</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Public Meeting: GHG Reduction Target</td>
</tr>
<tr>
<td>Puget Sound Regional Council</td>
<td>Seattle Area</td>
<td>• Climate Change Adaptation White Paper</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Climate Change Website</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Project-Level Transportation GHG Evaluation Protocol</td>
</tr>
<tr>
<td>Mobile Metropolitan Planning Organization</td>
<td>Mobile Area</td>
<td>• MPO Climate Change Work Group</td>
</tr>
<tr>
<td>Capitol Region Council of Governments</td>
<td>Hartford, CT Area</td>
<td>• Municipal Summit on Climate Change</td>
</tr>
<tr>
<td>Mid-America Regional Council</td>
<td>Bi-state Kansas City Region</td>
<td>• Climate Change Courses</td>
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<tr>
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<td></td>
<td>• New Climate Change &amp; Energy Use Policy Goal – Interactive Webpage for Public Rating</td>
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<tr>
<td>North Jersey Transportation Planning Authority</td>
<td>Northern New Jersey Region</td>
<td>• Climate Change Working Group</td>
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<td></td>
<td></td>
<td>• Climate Change Roundtable</td>
</tr>
</tbody>
</table>

*FHWA, 2010*
Transportation Outlook 2040
Mid America Regional Council

Regional Vision:
Greater Kansas City is a sustainable region that increases the vitality of our society, economy, and environment for current residents and future generations.

Transportation Vision:
A safe, balanced, regional multimodal transportation system that is coordinated with land-use planning, supports equitable access to opportunities, and protects the environment.
Transportation Outlook 2040
Mid America Regional Council

Transportation System Goals:

Accessibility - Maximize mobility and access to opportunity for all area residents

Climate Change & Energy Use** - Decrease the use of fossil fuels through reduced travel demand, technology advancements and a transition to renewable energy sources

Economic Vitality - Support an innovative, competitive 21st-century economy

Environment - Protect and restore our region's natural resources (land, water and air) through proactive environmental stewardship

Place Making** - Coordinate transportation and land-use planning as means to create quality places in existing and developing areas, and strengthen the quality of the region

Public Health** - Facilitate healthy, active living

Safety & Security - Improve safety and security for all transportation users

System Condition - Ensure transportation system is maintained in good condition

System Performance** - Manage the system to achieve reliable and efficient performance

**New plan goals for Transportation Outlook 2040
CLIMATE CHANGE AND ENERGY USE –
Decrease the use of fossil fuels through reduced travel demand, technology advancements, and a transition to renewable energy sources.

Objectives:
Reduce regional transportation-related greenhouse gas emissions.
Reduce regional transportation-related energy use derived from fossil fuels.

Strategies: See chapter 10.0 Environmental Integration for additional detail.
MARC Climate Change Strategies

- Develop Regional Climate Protection Plan
- Include Climate Change and Energy Considerations in Transportation Planning and Programming
- Improve Management of Existing System
- Increase Efficiency
- Reduce Vehicle Miles Traveled (VMT)
- Land-Use Integration
- Implement Metrogreen Trails and Greenways System
- Implement the Clean Air Action Plan
DEVELOP REGIONAL CLIMATE PROTECTION PLAN

Specific transportation-related strategies:

a. Incorporate energy conservation, use of renewable energy, and reductions in GHG into the transportation project solicitation and funding processes.

b. Adjust methodologies and models for quantification of transportation-related greenhouse gas emissions.

c. Work with local governments to include transportation-related greenhouse gas reductions strategies in their policies and ordinances, such as:
   • Encourage eco-driving.
   • Encourage carpooling (e.g., RideShare).
   • Allow employees to telecommute.
   • Ramp up speed limit enforcement.
   • Install LED traffic lights.
   • Use low greenhouse-gas emissions pavement and paving practices.
   • Adopt policies to facilitate the development of compact, mixed-use, walkable communities.
Specific implementation strategies:

a. Conduct planning and strengthen incentives for alternative fuel infrastructure needed to support alternative-fuel vehicle technology implementation.

b. Educate stakeholders on vehicle fuel efficiency and alternative-fuel vehicles.

c. Secure grant resources for the promotion and support of fuel efficiency and alternative fuel vehicles.
<table>
<thead>
<tr>
<th>GOAL</th>
<th>FACTOR</th>
<th>MEASURE</th>
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<tbody>
<tr>
<td>Accessibility</td>
<td>Level of Transit Service</td>
<td>- Revenue service hours</td>
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<tr>
<td></td>
<td></td>
<td>- Ridership</td>
</tr>
<tr>
<td></td>
<td>Environmental Justice</td>
<td>- Percent of transportation investments in Environmental Justice tracts</td>
</tr>
<tr>
<td>Economic Vitality</td>
<td>Transportation Costs</td>
<td>- Combined transportation and housing costs as a percent of median income</td>
</tr>
<tr>
<td>Climate Change/Energy Use</td>
<td>Vehicle Miles Traveled / Carbon Dioxide</td>
<td>- System-wide daily VMT/CO² emissions</td>
</tr>
<tr>
<td></td>
<td>Vehicle Occupancy</td>
<td>- Vehicle occupancy rate</td>
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<tr>
<td>Environment</td>
<td>MetroGreen Network</td>
<td>- Percent/miles of MetroGreen network completed</td>
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<tr>
<td>Place Making</td>
<td>Multimodal Options</td>
<td>- Modal balance (mode share)</td>
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<tr>
<td>Public Health</td>
<td>Ozone</td>
<td>- Ozone levels</td>
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<tr>
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<td>Physical Health</td>
<td>- Obesity rate</td>
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<tr>
<td>Safety and Security</td>
<td>Crash Fatality and Disabling Injuries</td>
<td>- Annual crash fatalities and disabling injuries</td>
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<td>System Condition</td>
<td>Bridge &amp; Pavement Condition</td>
<td>- Pavement condition</td>
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<tr>
<td></td>
<td></td>
<td>- Bridge condition</td>
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<tr>
<td>System Performance</td>
<td>Level of Service</td>
<td>- Observed speed versus posted speed on the Congestion Management System network</td>
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<tr>
<td></td>
<td>Congestion</td>
<td>- Percent of Congestion Management System network congested</td>
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<td>Travel Time</td>
<td>- Average commute time</td>
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<td></td>
<td>On-Time Performance</td>
<td>- On-time performance of transit system</td>
</tr>
</tbody>
</table>
Climate Change Performance Measures, MARC

Goal: Climate Change/Energy Use  
Measure: Vehicle Miles Traveled per Capita

2009 Baseline: 29 daily vehicle miles traveled per capita
Desired Trend: Flat

Goal: Climate Change/Energy Use  
Measure: Vehicle Occupancy Rate

2002 Baseline: 1.22 occupants per vehicle
Desired Trend: Up

Goal: Climate Change/Energy Use  
Measure: Carbon Dioxide (CO₂) Emissions

2005 Baseline: 9.95 million tons CO₂
Desired Trend: Down

Carbon Dioxide Emissions and Future Goals
# MARC: Performance Measures & Progress Report

## Performance Report Summary | June 2011

The Mid-America Regional Council (MARC) long-range transportation plan, Transportation Outlook 2040, outlines a vision for the Kansas City region that is socially, environmentally, and economically sustainable. The plan includes performance measures that will promote and track progress toward the vision over time. This summary report lists indicators that can help MARC and its planning partners understand the region as it exists today and evaluate how well the transportation system is achieving our stated goals. Resulting trends will inform decisions about alternative strategies or investment priorities that could improve performance over time.

According to recent data, many of the indicators are moving in the desired direction, including better-maintained bridges, fewer crash fatalities and faster clearing of roadway incidents. Others, such as transit ridership and land-use redevelopment, suggest that we have more work to do.

A performance progress report will be compiled annually. The complete June 2011 report contains greater explanation and analysis of these trends, and cites data sources. Read it online at [www.marcl.org/2040](http://www.marcl.org/2040).

## Accessibility

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<tr>
<th>Factor</th>
<th>Measure</th>
<th>Desired Trend</th>
<th>Actual Trend</th>
</tr>
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<tbody>
<tr>
<td>Level of transit service</td>
<td>Population living within 1/2 mile of fixed-route transit service</td>
<td>3.2% (2000-2010)</td>
<td>↓</td>
</tr>
<tr>
<td>Revenue service hours</td>
<td>Annual hours of operating service</td>
<td>7.1% (2000-2008)</td>
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</table>

## Environmental Justice

<table>
<thead>
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<th>Factor</th>
<th>Measure</th>
<th>Desired Trend</th>
<th>Actual Trend</th>
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<tbody>
<tr>
<td>Transportation investment in environmental justice tracts</td>
<td>Percent of federal funds invested in environmental justice tracts</td>
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<td>Awaiting data release in October 2011</td>
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## Public Health

<table>
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<th>Measure</th>
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<th>Actual Trend</th>
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<tbody>
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<td>Ozone pollution</td>
<td>Ground-level ozone</td>
<td>Three-year average ground-level ozone readings (parts per billion)</td>
<td>↓ -5.2% (2008-2010)</td>
</tr>
<tr>
<td></td>
<td>Ozone pollution violations</td>
<td>Number of annual ozone pollution violations</td>
<td>No change (2009-2010)</td>
</tr>
<tr>
<td>Physical health</td>
<td>Obesity rate</td>
<td>Percent of population that is obese</td>
<td>N/A</td>
</tr>
</tbody>
</table>

## Safety & Security

<table>
<thead>
<tr>
<th>Factor</th>
<th>Measure</th>
<th>Desired Trend</th>
<th>Actual Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crash fatalities and disabling injuries</td>
<td>Roadway crash fatalities</td>
<td>Number of annual crash fatalities (not total number in half by 2040)</td>
<td>↓ -15.4% (2008-2010)</td>
</tr>
<tr>
<td></td>
<td>Roadway disabling injuries</td>
<td>Number of disabling injuries</td>
<td>↓ -8.0% (2008-2010)</td>
</tr>
</tbody>
</table>

## System Condition

<table>
<thead>
<tr>
<th>Factor</th>
<th>Measure</th>
<th>Desired Trend</th>
<th>Actual Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pavement and bridge condition</td>
<td>Roadway pavement condition</td>
<td>Percent of roads in poor or medocre condition</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Bridge condition</td>
<td>Percent of structurally deficient bridges</td>
<td>↓ -0.5% (2008-2010)</td>
</tr>
<tr>
<td></td>
<td>Bridge condition</td>
<td>Percent of functionally obsolete bridges</td>
<td>↓ -1.3% (2008-2010)</td>
</tr>
</tbody>
</table>

## System Performance

<table>
<thead>
<tr>
<th>Factor</th>
<th>Measure</th>
<th>Desired Trend</th>
<th>Actual Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of service</td>
<td>Travel speeds</td>
<td>Observed travel speeds compared to posted speeds on specific routes</td>
<td>N/A</td>
</tr>
<tr>
<td>Congestion</td>
<td>Network congestion</td>
<td>Percent of lane miles congested</td>
<td>↓ -13.7% (2009-2010)</td>
</tr>
<tr>
<td></td>
<td>Incident clearance time</td>
<td>Average incident clearance time (min)</td>
<td>N/A</td>
</tr>
<tr>
<td>Regional travel time</td>
<td>Travel time on selected routes (min)</td>
<td>N/A</td>
<td>Awaiting 2011 Travel Time Study update</td>
</tr>
<tr>
<td></td>
<td>Average travel speed (mph)</td>
<td>N/A</td>
<td>Awaiting 2011 Travel Time Study update</td>
</tr>
<tr>
<td>Travel time</td>
<td>Average commute time</td>
<td>Travel Time Index</td>
<td>↓ -0.9% (2008-2010)</td>
</tr>
<tr>
<td></td>
<td>Travel delay</td>
<td>Annual hours of delay</td>
<td>↓ -4.26% (2008-2010)</td>
</tr>
</tbody>
</table>

---

1 Unlinked passenger trip — number of passengers who board public transportation vehicles. Passengers are counted each time they board vehicles no matter how many vehicles they use to travel from their origin to their destination.

2 Environmental justice tract — defined in two ways: 1) Census tracts with a greater percentage of minority population than the Kansas City metropolitan planning boundary average (17.4%) and/or 2) Census tracts where more than 30 percent of the households are in poverty.

3 Travel Time Index — ratio of peak-period travel time to free-flow travel time. It expresses the average extra travel time it takes to travel during the peak flow relative to free flow.

4 Roadway Congestion Index — a measure of vehicle travel density on major roadways in the Kansas City metropolitan region.
<table>
<thead>
<tr>
<th>FACTOR</th>
<th>MEASURE</th>
<th>DESIRED TREND</th>
<th>ACTUAL TREND</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle miles traveled</td>
<td>System-wide vehicle miles traveled</td>
<td>↓ Total vehicle miles traveled</td>
<td>↓ -4.37% (2007–2008)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>↓ Total vehicle miles traveled per person</td>
<td>↓ -4.65% (2007–2008)</td>
</tr>
<tr>
<td>Vehicle occupancy</td>
<td>Vehicle occupancy rate</td>
<td>↑ Number of vehicle occupants</td>
<td>↓ -0.62% (2008–2009)</td>
</tr>
<tr>
<td>Carbon dioxide</td>
<td>System-wide carbon dioxide emissions</td>
<td>↓ Tons of carbon dioxide emitted</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Sustainable Communities Partnership

- Improve access to affordable housing, provide more transportation options and lower transportation costs while protecting the environment.
- Encourages livability principles to be incorporated into federal programs and funding.
- Achieve our economic, social, and environmental goals most effectively when we work on them together.
Partnership Livability Principles

- Transportation Choices
- Equitable, Affordable Housing
- Economic Competitiveness
- Support Existing Communities
- Align Federal Policies
- Value Communities
Livable Communities

More efficient use of resources

Increase accessibility

Improve connections and options

Reduce energy use

Environmental benefits

Health and Social benefits

Livable Communities are where people have access to many different forms of transportation and affordable housing.....” U.S. DOT Secretary, Ray LaHood
Opportunities to Address Climate Change

Planning for:
- Grid street patterns, short blocks, streetscapes
- Transit and transit supportive land use
- Planning for bike and pedestrian travel
- Land use (as it supports transportation and vice versa)
- System efficiencies
- Travel Demand Management
Making the Land Use Connection

- Scenario Planning
- Integrating transportation and land use plans
- Context Sensitive Solutions
- Align regional goals, policies and programs
- LRP supports regional or corridor plan or vision
- Partnership efforts with local agencies
- Technical assistance for integrated plans
- Transportation project selection criteria consistent with Comprehensive Plan goals
- Financial incentives for local actions to support vision
Scenario Planning

Puget Sound Regional Council

- Continue as planned
- Focus growth in bigger cities
- Focus growth in smaller cities and towns
Gainesville, Florida

Rip Van Winkle Technique

Source: Marlie Sanderson
North Central Florida Regional Planning Council
Town/Village Centers Concept

North Central Florida Regional Planning Council
Gainesville Round 2: Peak Oil

- Minimize VMT
- Minimize Congested Lane Miles
- Increase Transit Ridership
- Increase Bicycle/Pedestrian Trips
Tool Kit for Integrating Land Use and Transportation Decision-Making

Introduction

Welcome! The objective of this tool kit is to provide a user-friendly, web-based set of procedures for integrating land use and transportation planning, decision making, and implementation. This tool kit is designed:

- To assist metropolitan and regional planning organizations, State transportation agencies, and other organizations involved in the transportation planning process in incorporating land use considerations into their planning and project development activities;
- As a resource for local government land use and transportation planners, policy makers, and other people who wish to better understand and implement linkages between transportation and land use planning and development.

The tool kit is made up of three parts:

- **The Tools** which includes brief descriptions of 30 tools, along with links to additional information;
- **Case Studies** provide a detailed look at how land use and transportation decisions are made in practice; and
- **Other References and Links** that provide additional information on land use and transportation decision-making:
  - Publications
  - Web Sites

FHWA Scenario Planning Guidebook

September 2010

Prepared for:
Office of Planning
Federal Highway Administration
U.S. Department of Transportation

Prepared by:
Transportation Policy, Planning and Organizational Excellence Division
John A. Volpe National Transportation Systems Center
Research and Innovative Technology Administration
U.S. Department of Transportation
ICMA’s membership has called sustainability which they define as balancing economic development, environmental protection, and social equity goals while maintaining financial viability, “the issue of our age.”
Applying smart growth principles to climate concerns on the local and regional levels:

- Create more sustainable and resilient communities
- Green the local economy
- Engage the community in the climate change planning process
- Approach climate change planning on a regional level
- Address transportation through transit-oriented development and complete streets
- Promote density through infill development and brownfield redevelopment
- Adopt green building policies
- Preserve and create green space
- Plan for climate adaptation.
# Transportation Planning for Sustainability

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   - Section III: Definitions and Acronyms

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   - Fiscally-constrained Planning
   - Performance Measurement and Performance-based Planning
   - Climate Change Adaptation and Mitigation
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Prepared for US DOT Federal Highway Administration