Climate Change and Energy Planning for MPOs

A five-part webinar series to build MPO capacity for energy and climate change planning
5-Part Webinar Series on Climate Change and Energy (CC&E) Planning

1. The Context for CC&E Planning (Nov 29, 2011)
2. CC&E Partners and Collaboration (Jan 10, 2012)
3. CC&E Communications (Mar 2012)
4. Linking CC&E Solutions to Other Goals (May 2012)
5. Effective CC&E Implementation – Traffic Operations/Management (June 2012)

Goal: To build MPO capacity for CC&E planning – and identify common MPO concerns, needs, and opportunities

Sponsored by: FHWA
Performed by: AMPO in partnership with Parsons Brinckerhoff
AICP credits: Pending
Steering Committee

Charlie Howard, **Puget Sound (WA) Regional Council**
Todd Ashby, **Des Moines (IA) Area Metropolitan Planning Organization**
Rich Perrin, **Genesee (NY) Transportation Council**
Cynthia Copeland, **Strafford (NH) Regional Planning Commission**
Jacob Snow, **RTC of Southern Nevada**
Walter Brooks and Jeffrey Roesel, **New Orleans RPC**
Ron Kirby, **Metropolitan Washington (DC) Council of Governments**
Andrea Riner, **Lane (OR) Council of Governments**
Ann Flemer, **San Francisco Bay Area Metropolitan Transportation Commission**

**Sponsor:** Diane Turchetta, FHWA

**Project Planning:** AMPO: DeLania Hardy and Rich Denbow
Parsons Brinckerhoff: Cindy Burbank, Tara Weidner, Gary McVoy, and Tiffany Batac
Climate Change and Energy Planning for MPOs

Webinar #1
Context for Climate Change
Overview

- Climate science – compelling
- Federal policy context – stalemated
- State policy context – divergent
- GHG/energy mitigation – evolving
- Adaptation – increasingly essential
- MPO activity – mixed/evolving
Climate Science - Compelling

- “Warming of the climate system is unequivocal…”
  - Intergovernmental Panel on Climate Change

- “An overwhelming body of scientific evidence paints a clear picture: climate change is happening, it is caused in large part by human activity, and it will have many serious and potentially damaging effects in the decades ahead.”
  - Pew Center on Climate Change
### Projected impacts of climate change

<table>
<thead>
<tr>
<th>Global temperature change (relative to pre-industrial)</th>
<th>0°C</th>
<th>1°C</th>
<th>2°C</th>
<th>3°C</th>
<th>4°C</th>
<th>5°C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Food</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Possible rising yields in some high latitude regions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Falling crop yields in many areas, particularly developing regions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Water</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Small mountain glaciers disappear – water supplies threatened in several areas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Significant decreases in water availability in many areas, including Mediterranean and Southern Africa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Sea level rise threatens major cities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ecosystems</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Extensive Damage to Coral Reefs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Rising number of species face extinction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Extreme Weather Events</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Rising intensity of storms, forest fires, droughts, flooding and heat waves</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Risk of Abrupt and Major Irreversible Changes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Increasing risk of dangerous feedbacks and abrupt, large-scale shifts in the climate system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Climate Science – Compelling

- 26% increase in human GHG since 1990 – world
- GHG levels are at highest in 1000s of years
- 2000-2009 was the warmest decade on record worldwide
- 8 of top 10 years for extreme one-day precipitation events occurred since 1990
- Increased occurrence of abnormally high annual precipitation totals
- Heat stored in oceans has increased substantially
- Sea surface temperatures have been higher during the past three decades than at any other time since large-scale measurement began in the late 1800s
- Intensity of tropical storms in the Atlantic, Caribbean, and Gulf has risen noticeably over the past 20 years
- 6 of the 10 most active hurricane seasons have occurred since the mid-1990s

Source: EPA, Climate Change Indicators in the U.S., May 2010
Climate Science - Compelling

- Arctic sea ice in 2009 was 24 percent below the 1979-2000 historical average.
- Glaciers in U.S. and around the world have generally shrunk since the 1960s and the rate at which glaciers are melting appears to have accelerated over the last decade.
- Glaciers worldwide have lost more than 2,000 cubic miles of water since 1960.
- The growing season in the lower 48 states has increased by about two weeks the since beginning of the 20th century.
- North American bird species have shifted their wintering grounds northward by an average of 35 miles since 1966, with a few species shifting by several hundred miles.

Source: EPA, Climate Change Indicators in the U.S., May 2010
Climate Science -- Latest Reports

- The global output of CO2 increased in 2010 by a record amount. GHG levels are higher than the worst case scenario outlined by climate experts just four years ago.
  – Department of Energy, Nov 2011

- Energy-related carbon dioxide emissions in 2010 were the highest in history.
  – OECD, Oct 2011

- Emissions climbed to an estimated 30.6 gigatons in 2010 – 5% higher than in the previous record year, 2008.
AUDIENCE POLLING QUESTION
Q 1: Are you currently employed by:

a) MPO in area over 1 M population?
b) MPO in area under 1 M population?
c) State or local government?
d) Federal government?
e) Private sector or other?
AUDIENCE POLLING QUESTION
Q 2: Has your area experienced weather events or changes that are likely linked to climate change?

a) Yes – unusually severe storms and flooding
b) Yes – sea level rise
c) Yes – unusually high temperatures
d) Yes – other impacts
e) No / Not sure
Federal Policy - Stalemated

- Public awareness/concern about climate change was above 50% and growing – until the economy tanked
- Then Federal cap and trade legislation derailed
- No current prospect for Federal legislation on climate change
- Slim possibility for energy legislation and initiatives
- Bright light: CAFE* standards
- Helpful: Federal R&D and technical assistance on climate change
- Will public concern about climate change be re-ignited by increasingly severe weather events? Will this enable Federal legislation and policy? When?

* CAFE = Corporate Average Fuel Economy
Q 3: How would you best summarize public views on climate change and energy in your urbanized area?

a) These rank HIGH among the concerns of the public
b) These rank LOW among the concerns of the public
c) The public resists addressing these concerns
d) The public is concerned about energy, but not climate change
e) Some or all of the above – no dominant view
State Policy Context: Divergent
(States which have prepared climate action plans – not all are still active)

Source: Center for Climate & Energy Solutions
State Policy Context – Divergent

State climate action plans:
- Very “aspirational”
- Managed by state environmental agencies
- Many steering Committees had few or no transportation reps
- Cost considerations nonexistent or unreliable/unrealistic
- Plan implementation is sporadic – if anything
- Some plans never adopted – just a report

State legislation:
- CA, WA, and OR have strong state laws on climate change, with specific and varied provisions focusing on reducing transportation GHG
## State Policy Context – Divergent
(relative emphasis on different transportation GHG reduction strategies in state climate action plans)

<table>
<thead>
<tr>
<th>State</th>
<th>Year</th>
<th>Vehicle Efficiency</th>
<th>Low Carbon Fuels</th>
<th>Smart Growth and Transit</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA</td>
<td>2020</td>
<td>53%</td>
<td>15%</td>
<td>&lt;1%</td>
<td>28%</td>
</tr>
<tr>
<td>CT</td>
<td>2020</td>
<td>51%</td>
<td>38%</td>
<td>8%</td>
<td>2%</td>
</tr>
<tr>
<td>ME</td>
<td>2020</td>
<td>53%</td>
<td>25%</td>
<td>21%</td>
<td>1%</td>
</tr>
<tr>
<td>MN</td>
<td>2025</td>
<td>15%</td>
<td>35%</td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>NY</td>
<td>2020</td>
<td>59%</td>
<td>11%</td>
<td>27%</td>
<td>4%</td>
</tr>
<tr>
<td>SC</td>
<td>2020</td>
<td>14%</td>
<td>15%</td>
<td>29%</td>
<td>1%</td>
</tr>
<tr>
<td>RI</td>
<td>2020</td>
<td>46%</td>
<td>10%</td>
<td>31%</td>
<td>14%</td>
</tr>
<tr>
<td>NC</td>
<td>2020</td>
<td>35%</td>
<td>12%</td>
<td>38%</td>
<td>15%</td>
</tr>
<tr>
<td>MD</td>
<td>2025</td>
<td>24%</td>
<td>12%</td>
<td>45%</td>
<td>20%</td>
</tr>
<tr>
<td>VT</td>
<td>2028</td>
<td>21%</td>
<td>14%</td>
<td>49%</td>
<td>17%</td>
</tr>
</tbody>
</table>

Source: NCHRP 20-24, Task 59, 2009
AUDIENCE POLLING QUESTION
Q 4: Does your state have a climate change plan?

a) Yes – it is being actively implemented
b) Yes – it is on the back burner or dismissed
c) Not sure
d) No
GHG/Energy Mitigation – Evolving
(illustrative strategy scenarios from Oregon)

Vehicle efficiency and low-carbon fuel:

Vehicle efficiency and pricing:

Urban planning:

Blue steps above represent Oregon’s GHG reduction targets; Lines represent GHG reductions under different policy scenarios

Source: Brian Gregor, Oregon DOT
GHG/Energy Mitigation - Evolving
(“Moving Cooler” Findings – Individual Strategies)

GHG reductions for individual strategies -- cumulatively effect for 2010-2050, compared to on-road baseline GHG

- 15,186 mmt – carbon pricing equiv to $2.71/gallon
- 3,361 mmt – VMT fees equiv to $2.53/gallon
- 2,428 mmt – speed limit reductions
- 2,233 mmt – PAYD auto insurance (100%)
- 1,815 mmt – eco-driving by 20% of drivers
- 1,445 mmt – at least 90% of new urban development is compact, with high quality transit
- 1,241 mmt – congestion pricing fully implemented in 120 metro areas at 65 cents/mile
- 575 mmt – $1.2 trillion transit expansion
- 352 mmt – combination of 10 freight strategies

Source: “Moving Cooler,” by Urban Land Institute, 2009
GHG/Energy Mitigation – Evolving

High MPG significantly reduces overall GHG, thereby lowering the effectiveness of other GHG strategies. High MPG may “flip” the relative effectiveness of other strategies, such as operational efficiency versus land use/NMT/transit strategies:

If 2050 fleet average is 43 MPG, then:
- 6.3 gigaton GHG reduction from land use/nonmotorized/transit “bundle”
- 6.0 gigaton GHG reduction from system efficiency “bundle”

If 2050 fleet average is 65 MPG, then:
- 3.6 gigaton GHG reduction from land use/nonmotorized/transit “bundle”
- 5.0 gigaton GHG reduction from system efficiency “bundle”

Source: “Moving Cooler,” by Urban Land Institute, 2009
Some strategies are both cost-effective and effective.

AUDIENCE POLLING QUESTION
Q 5: Has your MPO begun planning for GHG mitigation and/or energy conservation?

a) Yes – high level of planning is underway
b) Yes – modest level of planning is underway
c) Will be doing so in 2012
d) May do so in 2012
e) No
Climate Adaptation – Increasingly Essential

- Hurricane Irene and other severe weather over past two years are early indicators of climate change – and dramatic evidence of the threat to transportation

- Adaptation poses major challenges for every transportation function – planning, environmental review, construction, maintenance, operations, and budgeting

- Adaptation planning by state DOTs is rising significantly

- Adaptation planning by MPOs appears to be more limited

- FHWA/FTA are providing significant support for adaptation planning, including adaptation planning by/for MPOs
Adaptation – Increasingly Essential
Adaptation – Increasingly Essential
Adaptation – Increasingly Essential
Adaptation – Increasingly Essential
AUDIENCE POLLING QUESTION
Q 6: Has your MPO begun planning to adapt to climate change impacts?

a) Yes – high level of planning is underway
b) Yes – modest level of planning is underway
c) Will be doing so in 2012
d) May do so in 2012
e) No
MPO Activities – Mixed/Evolving

- Some MPOs are moving aggressively and are compelled to act by state law: CA, OR, WA
- Some MPOs have initiated analysis and/or planning on their own: DC, Atlanta, Boston, Tampa, New Orleans, etc.
- Some MPOs are looking for Federal guidance
- Many MPOs are concerned but face public skepticism/indifference
- Many MPOs are facing more immediate issues re financing and economy
- Partnering/collaboration is key to most or all MPO climate/energy activities -- and is a special asset MPOs bring
MPO Activities – Mixed/Evolving

MPO analyses to date reveal modest potential for planning strategies to reduce transportation GHG/energy:

- **California:** New MPO targets leveraging land use would reduce per capita LDV GHG for households -- but total LDV GHG would rise in 2020 & 2030 compared to 2010.

- **Atlanta:** All planning scenario tests result in an increase of at least 50% in transportation CO2 in 2030 (compared to 1990).

- **Washington DC:** Analyzed 51 strategies for meeting target of 33.5% GHG reduction below 2010 by 2030 – and concluded Federal actions are essential.

- **Hillsborough County FLA (Tampa):** Analyzed 2 scenarios of GHG reduction efforts and found GHG increases either 42% from 2006 (with major transit expansion) or 44% (without major transit expansion).
## MPO Activities – Mixed/Evolving
(Hillsborough County MPO, Tampa, FLA, 2035 LRTP)

<table>
<thead>
<tr>
<th>Year</th>
<th>Scenario</th>
<th>GHG Emissions from Roadways (metric tons CO$_2$e)</th>
<th>GHG Emissions from Transit (metric tons CO$_2$e)</th>
<th>Total GHG Emissions (metric tons CO$_2$e)</th>
<th>% Change vs. 2006</th>
<th>% Change vs. 2035 E+C</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>2006base</td>
<td>16,501</td>
<td>96</td>
<td>16,597</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2035</td>
<td>2013EC</td>
<td>25,790</td>
<td>72</td>
<td>25,862</td>
<td>56%</td>
<td></td>
</tr>
<tr>
<td>2035</td>
<td>CAA 17</td>
<td>23,743</td>
<td>81</td>
<td>23,824</td>
<td>44%</td>
<td>-8%</td>
</tr>
<tr>
<td>2035</td>
<td>CAA 18</td>
<td>23,326</td>
<td>220</td>
<td>23,546</td>
<td>42%</td>
<td>-9%</td>
</tr>
</tbody>
</table>

**KEY POINT:** Year 2035 roadway GHG emissions increase 42-56 % compared to 2006 due to higher levels of VMT and increased congestion – even with significant land use policies and major transit expansion.
TPB can begin designing some actions that the region could consider for the near-term:

1. Expand pay-as-you-drive insurance to the whole region
2. Accelerate the TPB Bike/Ped Plan completion
3. Begin an eco-driving public education campaign (potentially through Commuter Connections)
4. Promote state/local incentives to accelerate use of fuel efficient/alternative fuel vehicles for both public fleets and private use
5. Strengthen long-term focus on mixed use activity centers and transit-oriented development

MPO Activities – Linkage to Other Goals

- Rarely can MPO strategies be justified solely for GHG reduction
- Increasingly MPOs consider GHG/energy as another “thumb on the scale” when developing plans and selecting strategies to meet multiple goals
- Co-benefits: GHG reduction may be a modest co-benefit of strategies MPOs are considering to meet other goals: environmental, operational efficiency, congestion reduction, “clean energy” economy, etc.
Closing Thoughts

- **Climate math**: There are no “silver bullets” – both large and small GHG strategies will be needed to avoid severe climate impacts.

- **Biggest GHG reductions**: Federal policies on vehicles, fuels, & carbon price are crucial – but not alone likely to meet GHG targets.

- **MPO role**: MPO ability to reduce transportation GHG is likely in the range of 1-5% effect on future baseline – not enough to achieve absolute reductions below current levels – but still a key contribution to climate change targets.

- **Co-benefits**: GHG reductions are a co-benefit of many strategies already being implemented by MPOs -- land use/transit/TDM strategies, pricing strategies, and congestion management/traffic flow/speed management strategies.

- **More than meets the eye**: Operational strategies (ecodriving, traffic smoothing, speed management, etc.) can reduce GHG more than is generally recognized.

- **Adaptation**: Is increasingly important – MPO role needs to be intensified, in collaboration with state DOTs, state environmental agencies, etc.
MPO Panel Discussion

- Cynthia Copeland, Strafford (NH) RPC
- Todd Ashby, Des Moines (IA) Area MPO
- Mike Hoglund, Portland (OR) Metro
MPO Panel Question #1

Could you each give us a snapshot of your MPO – population, area characteristics, and major challenges or issues you are facing?
Strafford MPO

- Location: Rochester, NH
- Population: ~147,000
  - ~700 - Smallest community
  - ~30,000 – Largest 2 communities
- Area: 534 sq. mi.
  - Inland-coastal region
  - Historic Mill communities
    - Dover - permanently settled 1623
- 3 Counties
  - 1 entire, 2 partial
- UNH
  - Land, Sea & Space - Grant University (Tier 1)
    - Largest employer (~4,500)
    - Climate Change Research Center
      http://ccrc.unh.edu/index.html
Strafford MPO Resources

- NH Climate Action Plan

- Vermont Geomorphic Assessment

- Oyster River Culvert Analysis Project

- Fluvial Erosion Hazards
Des Moines Area MPO

- Location: Des Moines, IA
- Population: ~ 500,000
  - ~ 3,800 smallest
  - ~ 200,000 largest
- Area: 542 sq. mi.
  - Cross Roads of America
    - Interstate 35
    - Interstate 80
  - 4 Counties
  - Agricultural Center
  - Insurance / Banking
  - Iowa State University
    - Oldest Land Grant College in the United States
- The Tomorrow Plan: [www.thetomorrwplan.com](http://www.thetomorrwplan.com)
Portland OR MPO -- Metro

- Location – Portland, OR
- Population –
  - MPO: 1.5 million
  - PMSA: 2.2 million
- MPO Area – 463 sq. mi.
- Key Attributes –
  - Elected Regional Govt.
  - Growth Management; climate responsibilities
  - 3 Counties/25 cities
  - Other regional functions (zoo, solid waste, parks)

http://www.oregonmetro.gov/index.cfm/go/by.web/id=32823
MPO Panel Question #2

How does climate change fit into the issues your area is facing? What are the views of your public and local officials on climate change?
MPO Panel Question #3

Is your MPO doing any planning on GHG mitigation? If so, please describe.
Has your MPO started thinking about or planning for climate adaptation? What kinds of climate impacts are you concerned about in your area?
1. Could you each give us a snapshot of your MPO – population, area characteristics, and major challenges or issues you are facing?
2. How does climate change fit into the issues your area is facing? What are the views of your public and local officials on climate change?
3. Is your MPO doing any planning on GHG mitigation? If so, please describe.
4. Has your MPO started thinking about or planning for climate adaptation? What kinds of climate impacts are you concerned about in your area?
5. Recognizing there are tremendous differences among MPOs, do you have any recommendations on climate change for other MPOs?
MPO Panel Question #5

Recognizing there are tremendous differences among MPOs, do you have any recommendations on climate change for other MPOs?
Are there any climate change resources or tools that you’ve found particularly helpful, that you would recommend to other MPOs? Or resources or tools that you think need to be developed?
MPO Panel Question #7

Looking **10 or 20 years ahead**, do you see more or less emphasis on climate change planning for MPOs?
Audience Discussion

Please use the webinar question tool to submit questions – and also to provide your own insights, information and suggestions.
Upcoming Webinar:

Climate Change Partners and Collaboration

Tuesday, January 10
2:00-3:30 PM Eastern
AICP credits pending

Register at: https://www3.gotomeeting.com/register/963050838
Thank you!

Webinar slides available at: www.ampo.org

Contacts for further info:
AMPO: Rich Denbow  rdenbow@ampo.org
FHWA: Diane Turchetta  diane.turchetta@dot.gov
PB: Tara Weidner  weidner@pbworld.com
Cindy Burbank  burbank@pbworld.com