FHWA Climate Change Activities

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Adaptation
Goal: systematic consideration of climate change vulnerability and risk in transportation decision making

- Systems level (Metropolitan, Statewide planning) & individual projects, as appropriate

• Motivations
  - Internal: protect integrity of transportation investments, safety
  - External: CEQ guidance on addressing climate change in NEPA and Adaptation Planning

• Interdisciplinary cooperation is key to effort
  - Represents cooperative effort of multiple offices in FHWA, U.S. DOT, AASHTO, AMPO, and partnerships with science agencies such as USGS and NOAA
Gulf Coast Study: Phase 2 Underway

- **Phase 1** – Overview of impacts on central Gulf Coast transportation infrastructure
  - Completed 2008

- **Phase 2** – Examines issues at metropolitan scale (Mobile, AL)
  - Task 1: Identify critical assets in Mobile
  - Task 2: Assess climate changes and sensitivities
  - Task 3: Determine vulnerability of critical assets
  - Task 4: Develop risk management tools
• **Goal**: Identify vulnerable assets and adaptation strategies
  - Assets most exposed to climate change threats; and
  - Resulting in most serious consequences from those threats

• Conceptual model complete

• Pilot testing by State DOTs and MPOs (2010-2011)

• Update the conceptual model
Climate Change Vulnerability and Risk Assessment Pilot Locations

- Oahu (Hawaii)
- San Francisco (California)
- Central New Jersey (New Jersey)
- Hampton Roads (Virginia)

• Report synthesizes information on climate change projections for transportation decision makers
  ▪ Snapshot: Summarizes recent science

• Projected changes by region
  ▪ Annual, Seasonal Temperature (change in °F)
  ▪ Seasonal Precipitation (% change)
  ▪ Where information exists:
    • Sea level rise, Storm activity

• Also includes information at local, state scales

• Received assistance from climate experts at NOAA, USGS, DOE, etc.

http://www.fhwa.dot.gov/hep/climate/climate_effects/
How Can This Information Be Applied?

• Inform planning efforts with a consistent set of projections

• Inform consideration of vulnerability of key assets

• Not detailed/certain enough for definitive decisions on specific projects
Lessons Learned From FHWA Adaptation Activities (So Far)

• Interdisciplinary cooperation is key
  ▪ Need to include science information, engineering specifications, planning processes, etc.
  ▪ Multi-disciplinary stakeholder communication is not easy
  ▪ Understand existing decision-making processes and frameworks

• Embrace the uncertainty
  ▪ Must be comfortable with range of climate projections
  ▪ Not all climate trends are clear

• Community priorities are an integral part of a climate vulnerability assessment

• Impacts and concerns will vary by region – no one-size-fits-all answers
Next Steps: FHWA Adaptation Strategy

• Council on Environmental Quality (CEQ) guidance directs all federal agencies to develop adaptation plans, based on 2009 Executive Order. Requirements:
  ▪ High-level analysis of agency vulnerability to climate change
  ▪ 3-5 priority adaptation actions for implementation in FY2012
  ▪ Submit adaptation plan to CEQ for implementation in 2013

• FHWA is already working on an overall strategy that will meet CEQ’s guidance

• U.S. DOT’s complete plan will be released June 2012

• CEQ draft NEPA guidance also includes adaptation component
Mitigation
Mitigation Strategies

• The strategies to reduce transportation GHG emissions are organized into four major groups:

  ✓ Introduce low-carbon fuels
  ✓ Increase fuel efficiency
  ✓ Improve transportation system efficiency
  ✓ Reduce travel activity
FHWA Mitigation Research/Activities

- Mitigation Guidebook and Web-Based Tool
  - Mitigation Guidebook will review and analyze a variety of transportation strategies to reduce GHG emissions (Completion date: summer 2011)
  - Web-Based Tool is being developed to model a large number of GHG reduction policy scenarios and alternatives (Completion date: summer 2011)

- GHG Reductions from Operations Strategies
  - This research will further investigate the GHG reduction potential of highway operation and management strategies (Preliminary results: fall 2011, Completion date: 2012)
• State DOT Climate Change Workshops – In coordination with AASHTO, seven workshops have been scheduled to take place between April and July (NC, AZ, CT, VT, MA, DC, and IL)

• Peer Exchanges - 3 mitigation and 3 adaptation peer exchanges will take place in 2011 and 2012

• Electric Vehicle Research – In coordination with the Pew Climate Change Center and AASHTO – goal of the project is to layout a short, medium and long-term action plan to integrate plug-in electric vehicles with the U.S. electricity grid nationwide
Thank you.

www.fhwa.dot.gov/hep/climate
Gulf Task 1: Identifying Critical Assets

- **Purpose:** Determine subset of transportation network for vulnerability assessment and adaptive measures
  - What is “critical” will vary by region
  - Important to consider community priorities as well as traditional measures

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Gulf Task 2: Projecting Climate Data

- **USGS providing statistically downscaled projections for temperature and precipitation**
  - Provides a way to translate global climate models into local data
  - Up to 7 climate models used
  - 3 emission scenarios examined

- **Sea level rise analysis**
  - Range of recent global SLR scenarios used
  - Accounts for local subsidence

- **Storm Surge Modeling**
  - Range of storm intensities
  - Output includes surge distribution and dynamics

- **Wave Modeling**
  - Outputs include key aspects of wave energy

- **Exposure of transportation systems will be assessed using a GIS analysis**
Example of Conceptual Model Pilot: New Jersey DOT

• Study Areas:
  ▪ New Jersey Coastal
  ▪ Central New Jersey

• Partners:
  ▪ New Jersey DOT
  ▪ North Jersey Transportation Planning Authority,
  ▪ South Jersey Transportation Planning Organization,
  ▪ Delaware Valley Regional Planning Commission,
  ▪ New Jersey Department of Environmental Protection