Real Solutions: Integrating Climate Change Considerations into the Transportation Planning Process

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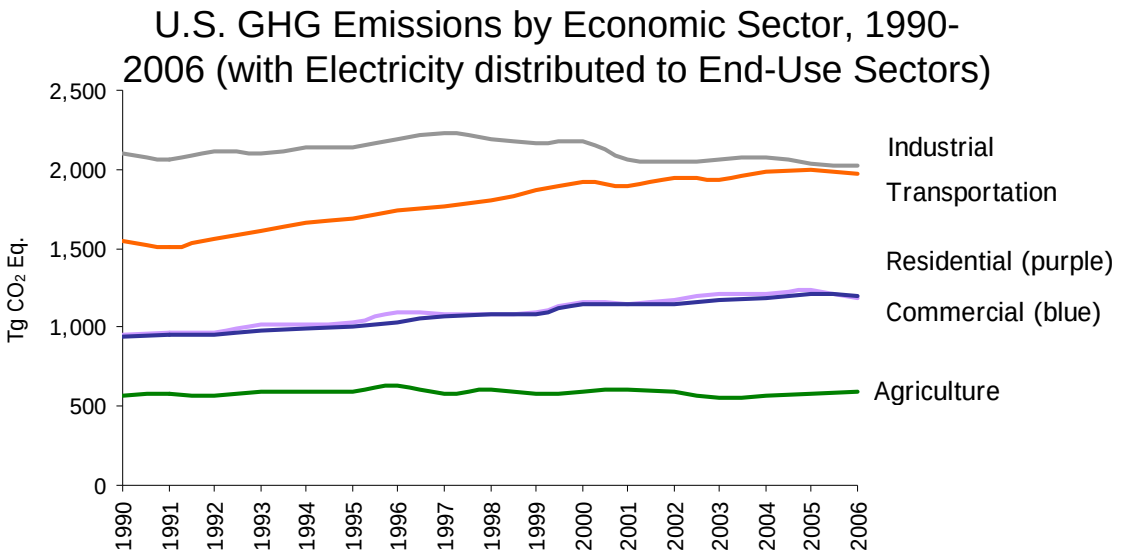
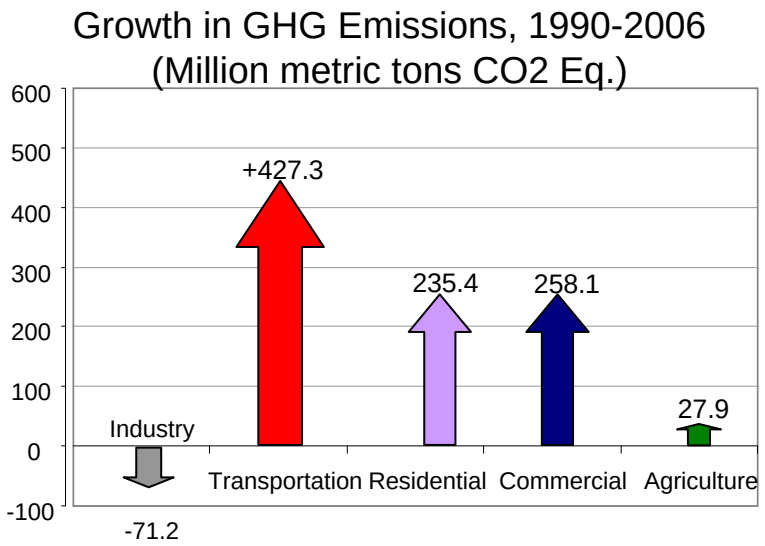
Introduction

- Transportation and climate change are inextricably linked
- Transportation plans are increasingly incorporating climate change considerations
- Transportation plans can
  - acknowledge climate change concerns
  - establish proactive strategies to address climate change
  - measure the impacts of strategies

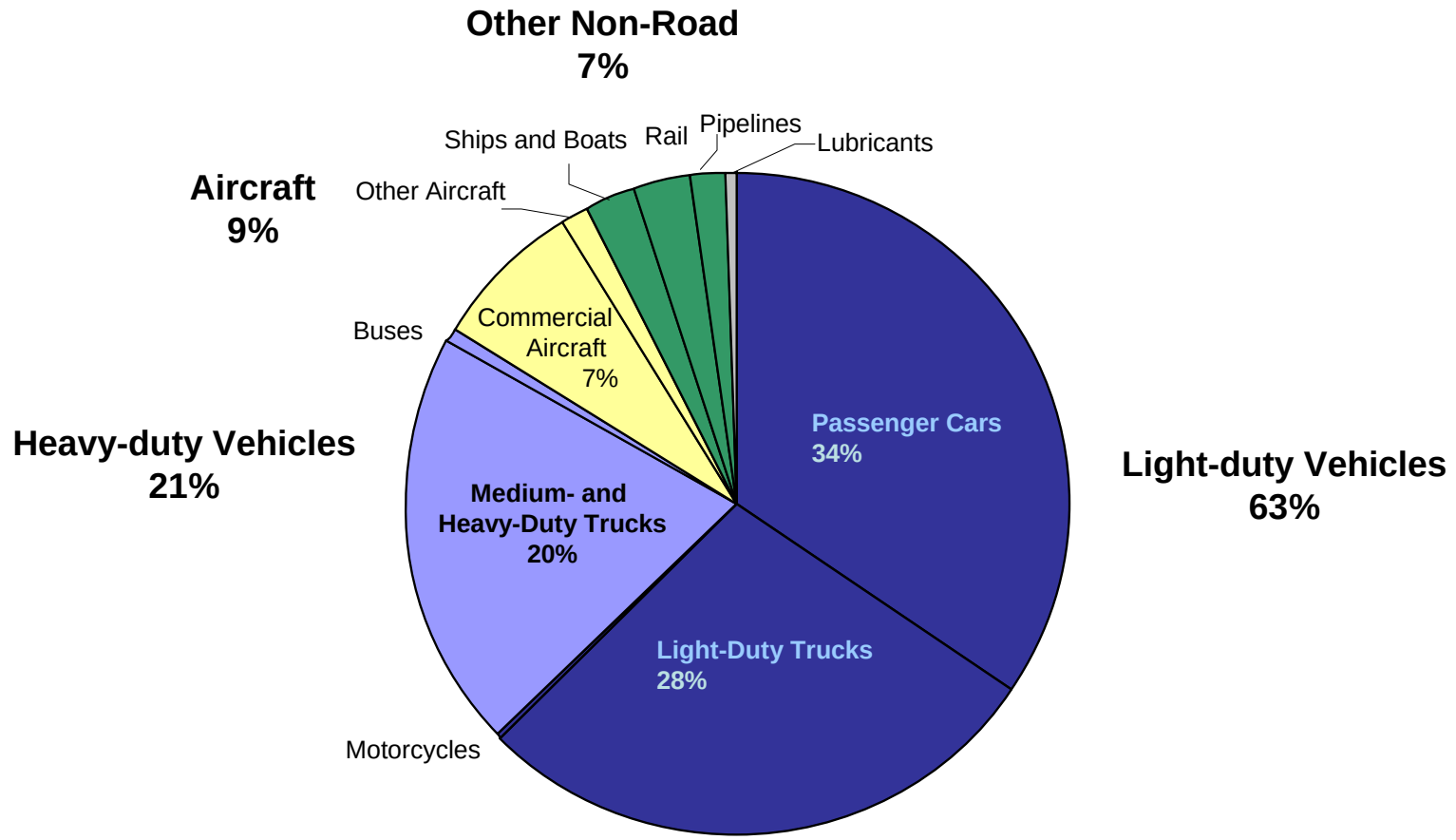
Greenhouse Gases (GHGs) and Transportation

- After industry, transportation is leading source of U.S. GHG emissions
- Transportation sector accounts for 28% of GHGs nationally – much more in some states
- Transportation is among the fastest growing sources of GHG emissions





U.S. Transportation GHG Emissions by Source, 2006



Source: U.S. Environmental Protection Agency, *Inventory of Greenhouse Gas Emissions and Sinks, 1990-2006.*

Climate Change Potentially Impacts Transportation Infrastructure

Current Sea Level

1.5 Meter Rise

Naval Facilities

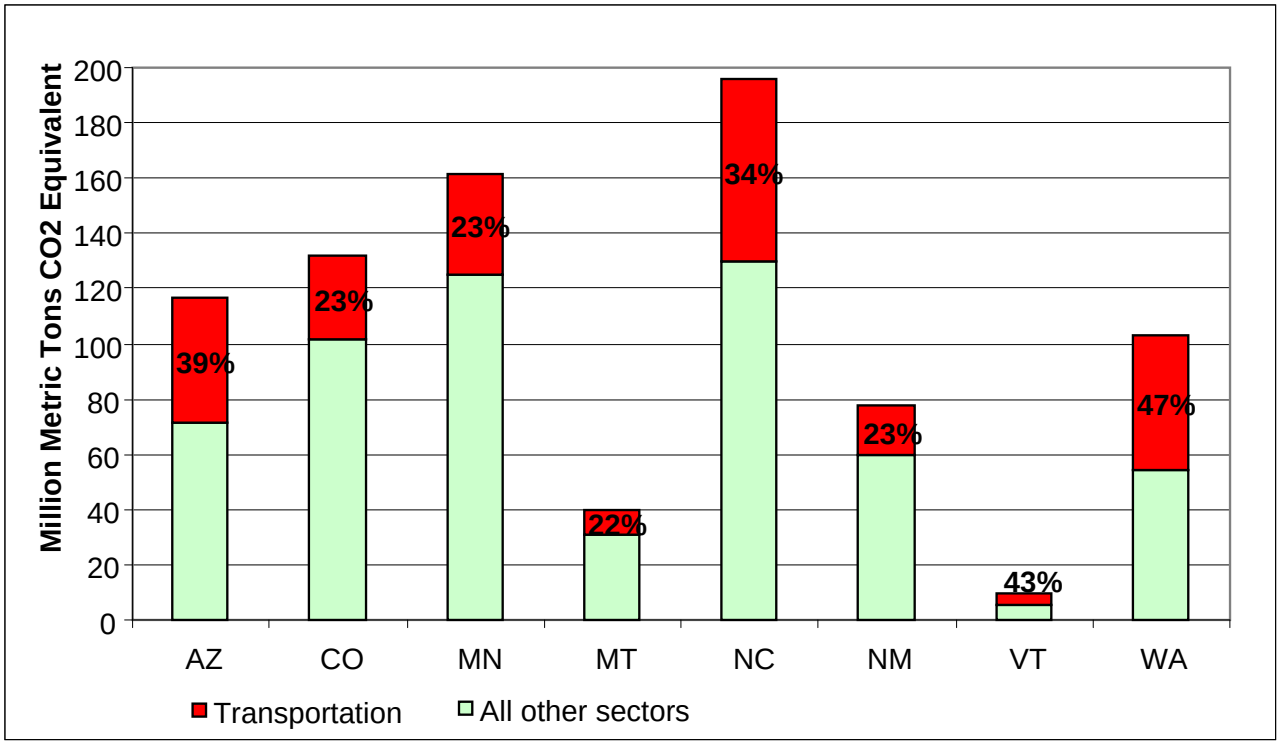
Charts do not include periodic hurricane storm surge, e.g., Isabel 10+ feet.

Source: U.S. DOT, *The Potential Impacts of Global Sea Level Rise on Transportation Infrastructure*, Federal Research Partnership Workshop, October 1-2, 2002, plus ICF follow-on East Coast study

Importance of State and Local Efforts

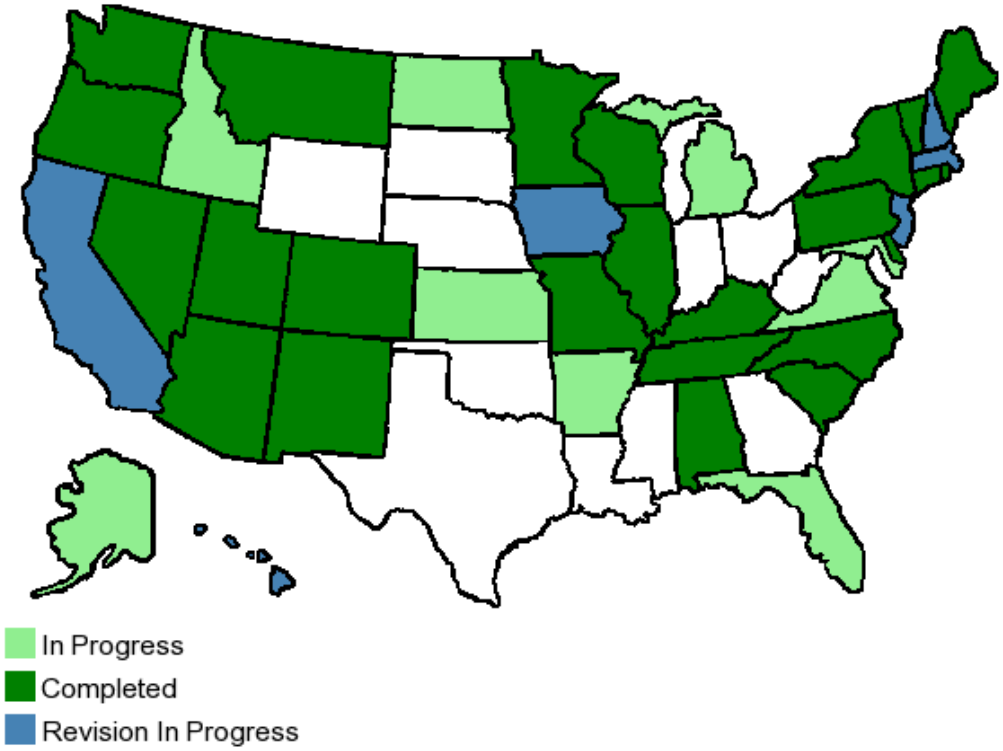
- Can have large impacts – 34 of 75 largest GHG sources in the world are U.S. states
- States are testing grounds for emerging policy

Estimated Transportation Share of Total GHG Emissions by State, 2010



State Climate Actions Plans

- Plans propose specific policies and programs for consideration by the state legislature or implementation by state agency
- Stakeholder groups convened to develop policies aimed at meeting state emission goals



Source: Pew Center on Global Climate Change, online.

39 states have developed or are developing a climate plan

Key State Policy Affecting Transportation Planning

- Washington State
  - **SB 6001** – requirement to reduce GHG emissions to 1990 levels by 2020, with additional targets thereafter
  - **HB 2815** – requirement to reduce light duty vehicle per capita VMT 18% by 2020, 30% by 2035, and 50% by 2050.
- California
  - **AB 32** – mandates that California reduce GHG emissions to 1990 levels by 2020. It further directs the California Air Resources Board (CARB) to monitor and regulate GHG emissions in coordination with relevant state agencies.
  - **SB 375** (awaiting Governor's signature) – requires CARB to allocate reductions to large urban areas. If enacted, this legislation would directly affect the long-range planning functions of MPOs in the state.
  - Legal action under CEQA

Key State Policy Affecting Transportation Planning, cont.

- Oregon
  - **HB 3543** – requirement to reduce GHG emissions to 10% below 1990 levels by 2020, with additional targets thereafter
  - **Oregon Strategy for GHG Reductions (2004)** – recommended that GHG emission impacts be incorporated into transportation planning decisions.
- New York
  - **New York State Energy Plan (2002)** – recommends that MPOs, in conjunction with the State, assess the energy use and greenhouse gas emissions expected to result from implementation of transportation plans and programs.

Research

- Funded by FHWA
- Review of federal transportation planning legislation
- Review of DOT and MPO Long Range Transportation Plans (LRTPs)
- Interviews with DOTs and MPOs

Relationship of Federal Planning Statutes and Regulations

Linkage Opportunities

1. **Requirements to address energy and environmental concerns**
   (23 CFR 450 Subparts 200, 206, 214, and 306)

2. **Requirements to ensure an integrated transportation system, preserve the projected and existing system, and ensure the safety and security of the system for users is preserved**
   (23 CFR 450 Subparts 206, 214, and 306; 49 CFR 613 Subparts 100 and 200)

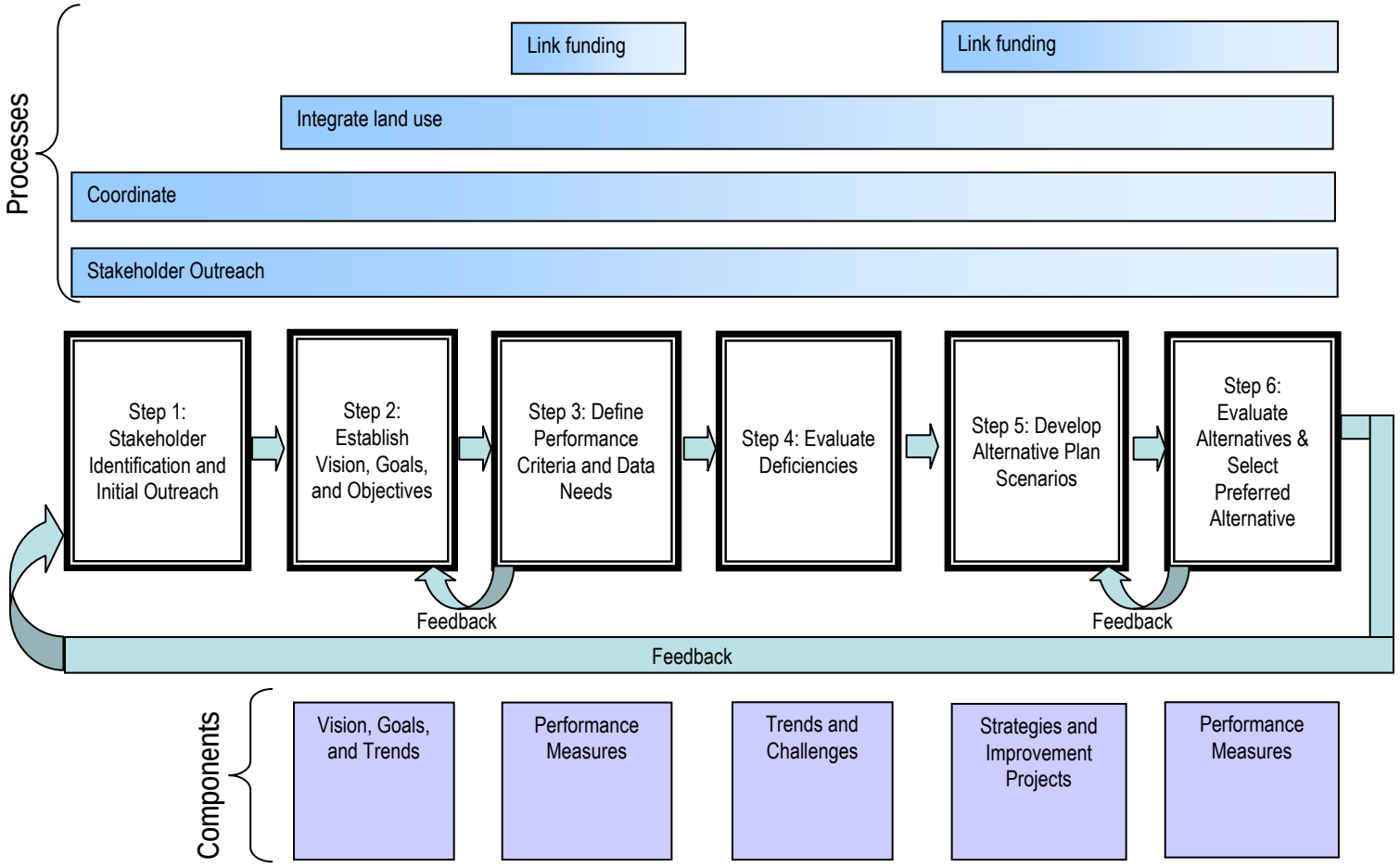
3. **Transportation demand management and transportation system management strategies**
   (23 CFR 450 Subparts 200 and 320)

4. **Consultation requirements**
   (23 CFR Subpart 208 and 214)

Climate Change in LRTPs: Components

- Trends and Challenges
  - Recognize the interrelation of transportation and climate change
  - E.g., “Connecticut’s greenhouse gas (GHG) emissions from non-renewable fuel consumption are contributing to global climate change.”
- Vision and Goals
  - Establish intent to address climate change
  - E.g., Managing Global Warming (MTC)
- Policies and Strategies:
  - Propose mechanisms to address climate change
  - E.g., Increasing use of public transportation, freight rail, bicycling, and walking
- Performance Measures
  - Establish metrics to monitor progress
  - E.g., GHG emissions

Climate Change in LRTPs



Integrating Climate Change in Statewide Transportation Plans

DOT	Status of LRTP	Climate Change Mitigation in:				Energy Conservation or Alternative Fuels in:			
		Trends and Challenges	Vision and Goals	Policies and Strategies	Performance Measures	Trends and Challenges	Vision and Goals	Policies and Strategies	Performance Measures
Maine	adopted 2007	■	■	■		■	■	■	■
New Mexico	adopted 2005						■	■	
Arizona	adopted 2004						■		
Colorado	adopted 2008	■							
Connecticut	adopted 2004	■	■	■		■	■	■	
Massachusetts	adopted 2006			■				■	■
Maryland	draft goals 2008								
Oregon	adopted 2006	■	■	■		■	■	■	
Washington	adopted 2006	■					■		
California	adopted 2006	■	■	■		■	■	■	■
Florida	adopted 2005		■				■		
New York	adopted 2006			■					

Source: ICF International, *Integrating Climate Change Considerations into the Transportation Planning Process.* Prepared for Federal Highway Administration, July 2008.

Available at: http://www.fhwa.dot.gov/hep/climatechange/climatechange.pdf

■ **Includes adaptation**

Integrating Climate Change in Metropolitan Transportation Plans

MPO Region	Status of LRTP	Climate Change Mitigation in: Trends and Challenges	Vision and Goals	Policies and Strategies	Performance Measures	Energy Conservation or Alternative Fuels In: Trends and Challenges	Vision and Goals	Policies and Strategies	Performance Measures
Eugene, OR	final draft Sep 2007			■			■	■	■
Missoula, MT	adopted May 2004		■				■		
Santa Fe, NM	draft due 2009								
Albany, NY	draft August 2007			■					
Grand Rapids, MI	adopted April 2007	■				■	■		
Portland, OR	final draft Jan 2008	■	■	■	■		■	■	
Salt Lake City	adopted May 2007						■		
Baltimore	adopted Nov 2007	■		■			■	■	
Chicago	updated June 2007		■				■		
Denver	adopted Dec 2007					■	■	■	■
Houston-Galveston	updated Oct 2007	■					■		
Philadelphia	adopted 2005								
Sacramento	draft Nov 2007	■		■		■		■	
San Diego	adopted Nov 2007	■	■	■		■		■	■
San Francisco	draft goals 2008		■		■				
Seattle	adopted Spring 2008**	■	■	■	■			■	
Southern California	draft Dec 2007	■			■	■	■		
Washington, DC	adopted Oct 2006								

** Refers to Vision 2040, a regional growth, transportation, and economic strategy.

Source: ICF International, *Integrating Climate Change Considerations into the Transportation Planning Process.* Prepared for Federal Highway Administration, July 2008.

Available at: http://www.fhwa.dot.gov/hep/climatechange/climatechange.pdf

■ **Includes adaptation**

Example: Maine DOT

- *Connecting Maine*, adopted December 2007
- Section: Greenhouse Gases and Global Warming
  - Overview of Maine GHG emissions inventory
  - Need for long-term strategies including:
    - Low-GHG fuels
    - Tailpipe emissions standards
    - Slowing VMT growth
    - Increasing the availability of low-GHG travel modes
    - Shift freight movement from highways to rail and marine modes
- Estimate of emissions impact of the plan:
  - Reduce GHG emissions by 26,000-32,000 metric tons by 2020
  - Reduce GHG emissions by 40,000-48,000 metric tons by 2030

Quantifying GHG Effects of Transportation Plans

- New York State MPOs
  - In response to New York State Energy Plan, New York State requires MPOs to quantify GHG emissions from transportation plans and transportation improvement programs (TIPs).
  - Guidance for:
    - Roadway projects – direct vehicle energy
    - Roadway projects – construction and maintenance
    - Rail projects
- Several other MPOs are estimating GHG emissions effects of their transportation plans
  - Completed: Sacramento, San Diego, Southern California (SCAG)
  - Forthcoming: Chicago region, Portland OR, Missoula, San Francisco Bay Area, Philadelphia region, Puget Sound
- Additional states considering quantification requirements
  - California, Oregon, Washington

Example: Sacramento Area Council of Governments (SACOG)

- Environmental Impact Report for *Metropolitan Transportation Plan for 2035*

	2005	2035 No Project	2035 Draft MTP	Difference
On-Road Non-Transit VMT/Yr (000)	17,685,380	28,887,188	27,220,285	-1,666,903
Gasoline (billion BTUs)	114,140	186,612	175,843	-10,769
Diesel (billion BTUs)	9,359	13,766	12,971	-794
Total Gas + Diesel (billion BTUs)	123,499	200,378	188,815	-11,563
Transit Electricity Revenue Miles/Yr	1,777,915	3,189,005	5,216,945	2,027,940
Transit Diesel Revenue Miles/Yr	20,016,600	42,705,365	58,586,880	15,881,515
Transit Electricity (billion BTUs)	169	303	496	193
Transit Diesel (billion BTUs)	722	1,540	2,112	573
Transit Total (elect + diesel, billion BTUs)	891	1,843	2,608	765
Totals (billion BTUs)	124,389	202,220	191,423	-10,798
CO2 Emissions (ton)/Yr		16,064,000	17,689,600	-1,625,600

Example: Metropolitan Transportation Commission (MTC), San Francisco Bay Area

- Developing *Transportation 2035 Plan*
- Including specific measurable objectives (targets) for each of its key principles – one relates to climate change

Economy	**Target 1** – Reduce per-capita delay by 20 percent below today's levels
Environment	**Target 2** – Reduce daily per-capita vehicle miles traveled (VMT) by 10 percent
	Target 3 – Reduce CO_2 emissions by 40 percent below 1990 levels by 2035
	Target 4 – Reduce emissions of finer particulates (PM2.5) by 10 percent and coarser particulates (PM10) by 45 percent
Equity	**Target 5** – Decrease by 10 percent from today the combined share of household income consumed by transportation and housing costs by low and low-middle income households.

Source: MTC Memorandum to Planning Committee, January 2008.

Example: Metropolitan Transportation Commission (MTC), cont.

- Analyzing scenarios to assess which options meet the target
- Pricing and land use measures are essential to meet the goal
- Next step: analyzing individual projects

Plan Alternatives: 2035 CO2 Emissions (Thousands Tons per Day)

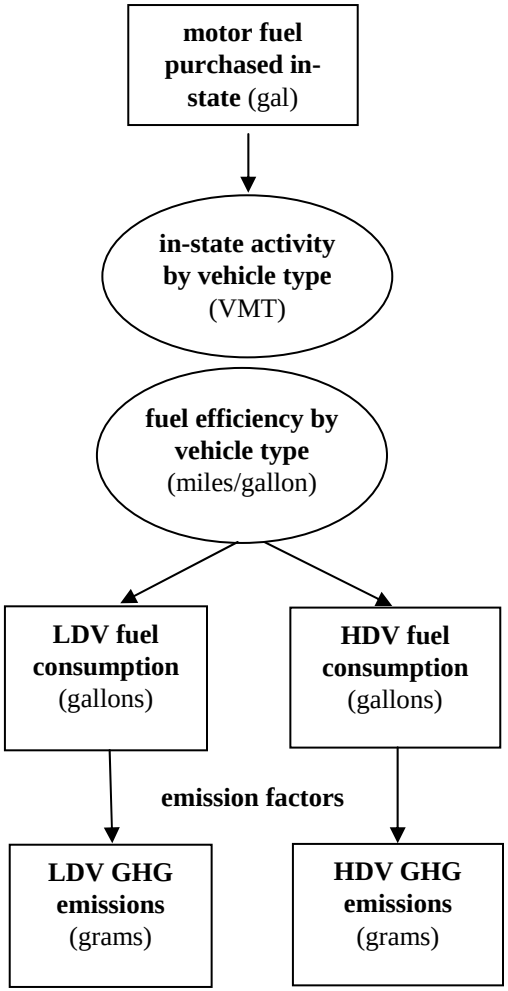
	Infrastructure Packages			
	No New Investments	Freeway Performance	HOT & Local/ Express Bus	Regional Rail & Ferry
Baseline Emissions (No Policy Changes)	101.4	92.4	97.0	99.1
Reductions from Policy Packages				
Pricing Sensitivity	-8%	-6%	-8%	-8%
Land Use Sensitivity	-8%	-6%	-7%	-7%
Combined Pricing & Land Use	-14%	-11%	-13%	-14%
Combined Pricing, Land Use, and Telecommuting	n/a	-14%	-17%	n/a
Combined Pricing, Land Use, Telecommuting and Fuel Efficiency	n/a	n/a	-46%	n/a

GHG Inventories

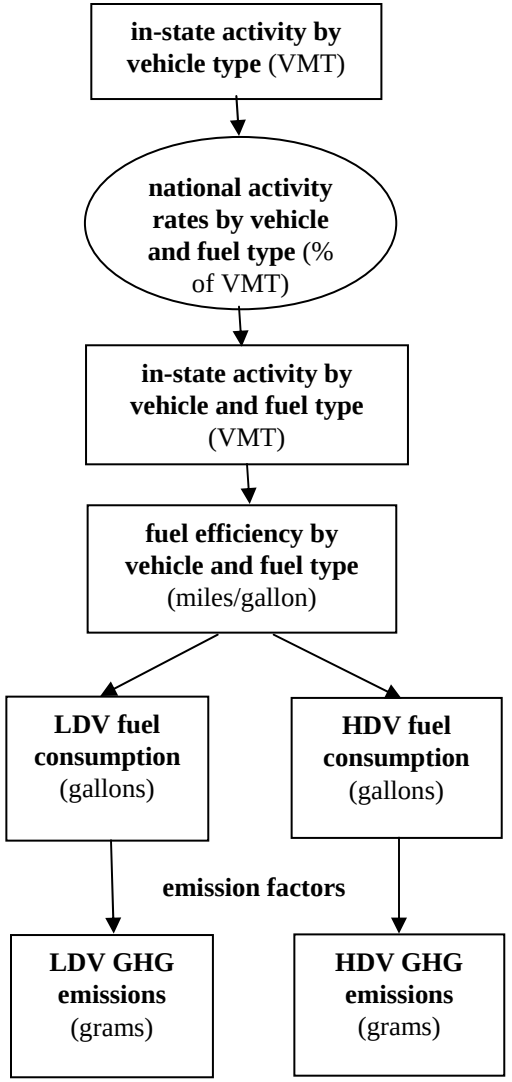
- Most states now have GHG inventories
- A few regions are developing their own GHG inventories
  - E.g., Philadelphia region (DVRPC), Washington D.C.
- Challenges
  - Top-down approach based on aggregate fuel sales data vs. bottoms-up approach based on VMT
  - Disaggregation by mode, vehicle type, and geography is difficult
- EPA's MOVES model should improve local inventories
  - Incorporates local driving conditions
  - Pilot project with Puget Sound Regional Council

GHG Inventories, cont.

Top-down fuel-based approach



Bottoms-up VMT-based approach



Adaptation to Climate Change

- Impact of climate change on transportation systems
- Less well understood than GHG emissions
- Climate models cannot yet predict local impacts with any certainty
- Most agencies focusing on awareness and research
  - Examples: MTC, ODOT, ConnDOT, PSRC

Summary

- Many DOTs and MPOs are beginning to incorporate climate change issues into their transportation planning processes
- Current practice for incorporation varies widely by agency
- A number of agencies are waiting on decisions or recommendations from state agencies or committees
- Quantification of GHG emissions bringing new challenges
- GHG reduction strategies
  - Lots of on-going analysis
  - Concern that effective strategies outside DOT and MPO control
- Adaptation – more uncertainty, less urgency

Thank you!

For more information:

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