



Climate Change and Transportation

FHWA GA Division

 U.S. Department of Transportation
Federal Highway Administration

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Everyone's Talking About It

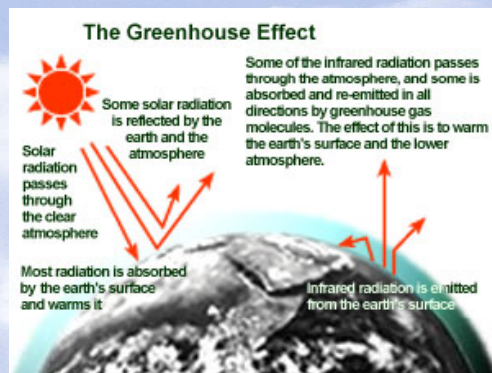


The image displays three magazine covers. On the left is Sports Illustrated, featuring a baseball player and the headline 'SPORTS AND GLOBAL WARMING: As the Planet Changes So Do the Games We Play'. In the center is TIME magazine, with a red border, featuring the headline 'SPECIAL REPORT GLOBAL WARMING' and 'BE WORRIED. BE VERY WORRIED.' On the right is VANITY FAIR, featuring a woman in a green dress and the headline 'SPECIAL GREEN ISSUE: A THREAT GRAVER THAN TERRORISM: Global Warming'.



Climate Science--Introduction

- Climate change is a controversial topic that involves continuing research, debate and some uncertainty
- FHWA relies on the expertise of other federal agencies (particularly NOAA, NASA and USGS), as well as the IPCC, to help guide our decisions regarding which issues to focus on and where to target resources



The greenhouse effect keeps Earth habitable, but recent changes to the atmosphere are causing it to warm.



Influences on global climate

- NATURAL INFLUENCES
 - ❖ variations in the energy output of the Sun
 - ❖ variations in the Earth's orbit and tilt
 - ❖ continental drift
- HUMAN INFLUENCES
 - ❖ rising concentrations of greenhouse gases from deforestation, agriculture, fossil-fuel burning
 - ❖ rising concentrations of particulate matter from agriculture, fossil-fuel burning
 - ❖ alteration of Earth's surface reflectivity by deforestation

Holdren, WHRC, 2006

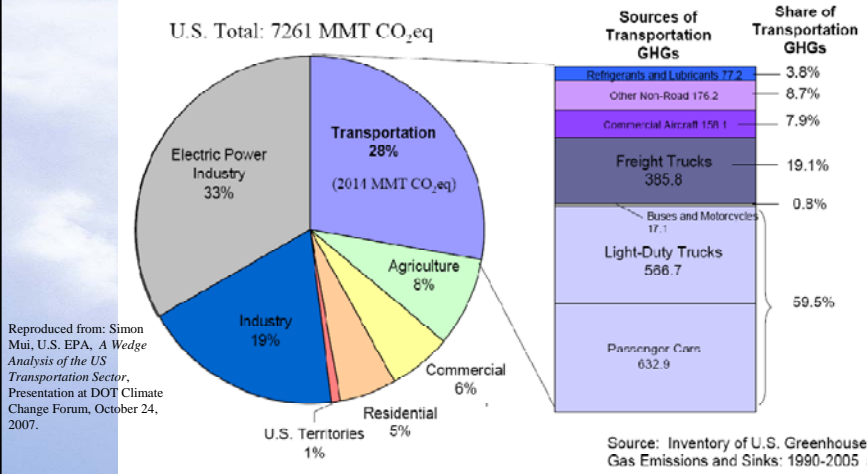


Greenhouse Gases: Carbon Dioxide

- CO₂ is the major transportation GHG (about 95% of the overall impact) and is directly related to energy consumption
- Atmospheric concentrations are growing every year because:
 - CO₂ emissions are growing, and
 - CO₂ has a long atmospheric lifetime (~100 years or more)
- Unlike urban air pollution, which dissipates under the right weather conditions, CO₂ accumulates in the atmosphere because plants and the oceans can't absorb it fast enough

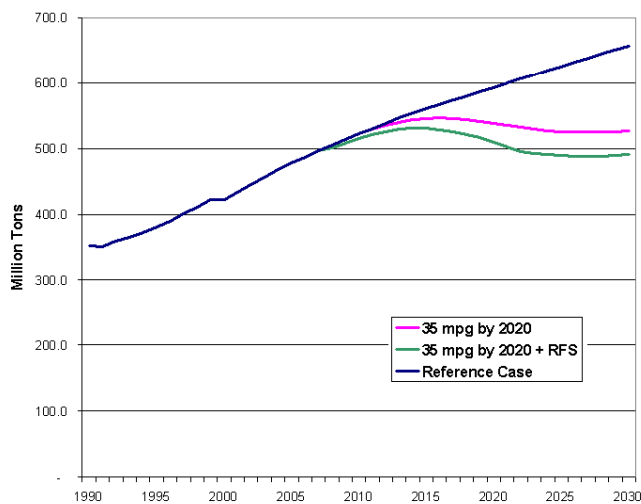
Transportation's Contribution

U.S. Greenhouse Gas Emissions Inventory (2005)



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Light-Duty Vehicle Carbon Emissions



business as usual

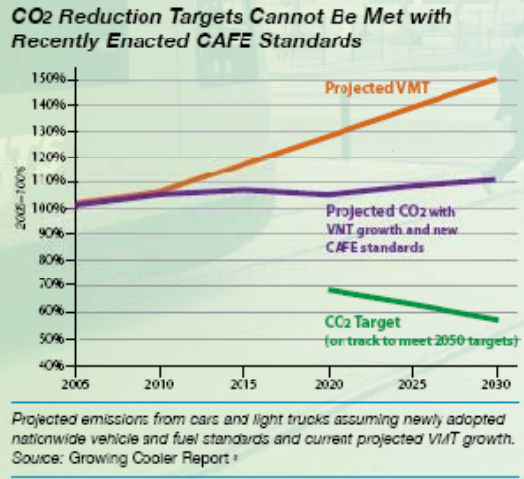
new CAFE standard

new CAFE standard plus
renewable fuel standard
(RFS)

Reproduced from: Therese Langer, American Council for an Energy Efficient Economy, *Reducing Vehicle Miles Traveled as a Climate Change Strategy*, Presentation to DOT Climate Change Forum, January 9, 2008.

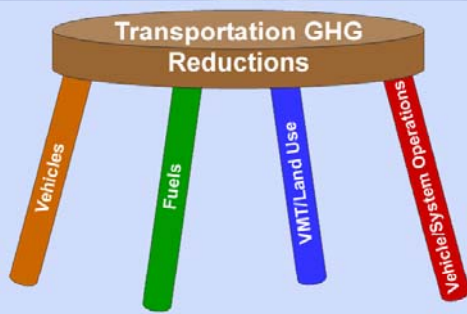
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VMT increases cancel out improvements in efficiency and carbon content



Reproduced from American Public Transportation Association, *Public Transportation Reduces Greenhouse Gases and Conserves Energy*, February 2008.

What can be done to reduce Greenhouse Gases? Multiple Transportation Strategies



- Raise vehicle energy efficiency
- Reduce carbon content of fuels
- Reduce VMT
 - ❖ Land use
- Improve vehicle and system operations

No one “silver bullet” will produce major reductions in GHG emissions—all of these strategies will likely be needed to achieve 50-85% reductions



The Potential for Costly Impacts



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Adapted from Virginia Burkett, USGS



Climate Impacts vary by region, and could include:

- Higher sea levels due to sea level rise, and in some areas sinking of the land
- Increased hurricane storm surge as hurricanes become more intense
- Changes in temperature: increases in average and daily high temperatures, number of hot days
- Changes in precipitation: some rain storms could be more intense



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Transportation Planning and Climate Change

- Climate change becoming an important issue in the transportation planning process
- State DOTs and MPOs beginning to address climate change – qualitative and quantitative
- Both mitigation and impacts/adaptation strategies being addressed
- How do we integrate climate change considerations into the planning process?

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Transportation Planning and Climate Change

- Planning factors – opportunity to include climate change
- Impacts should be addressed in long range transportation plans and project designs
- Integration into SAFETEA-LU 6001 requirements
- TRB report recommendations – inventory of critical infrastructure

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What are we in FHWA doing?

- Outreach
 - ❖ CCAP, EPA, Other Federal Agencies
- Education
 - ❖ Informational Q&As, Webinar, Clearinghouse
- Technical Assistance
 - ❖ Modeling, Adaptation
- Research
 - ❖ Gulf Coast Study, VMT, Mitigation strategies
- Reauthorization

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FHWA Future Activities and Challenges

- Preparing reauthorization proposals
 - ❖ Stakeholder input
- Identifying actions to make a real contribution to reducing GHG emissions
 - ❖ Actions need to reduce emissions effectively
- Tools to measure are not yet adequate
 - ❖ Working with EPA and others on data/modeling issues
- Growth in VMT makes reductions difficult
 - ❖ Reducing VMT may require fundamental changes

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In Closing

- Transportation is the largest single source of CO₂ in the US
- CO₂ is the major transportation GHG (about 95% of the overall impact) and is directly related to energy consumption
- The scientific community recommends a 50-85% reduction in GHGs by 2050
- There are many common-sense options, including some that can be facilitated by FHWA/FTA, for reducing transportation GHG emissions