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Reducing Greenhouse Gas Emissions from Transportation

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Kate Zyla

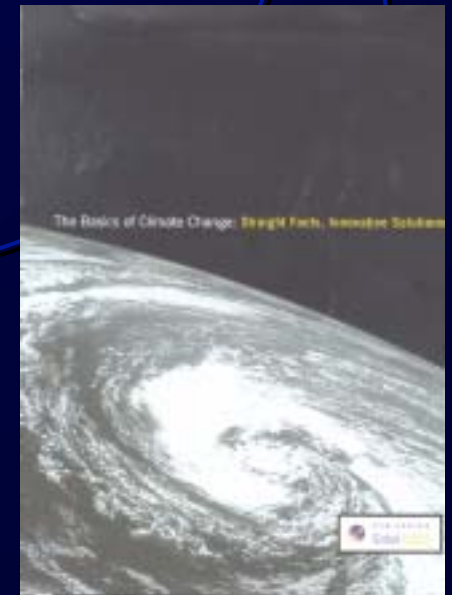
Pew Center on Global Climate Change

www.pewclimate.org

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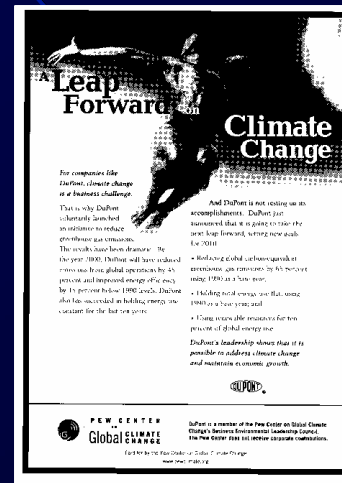
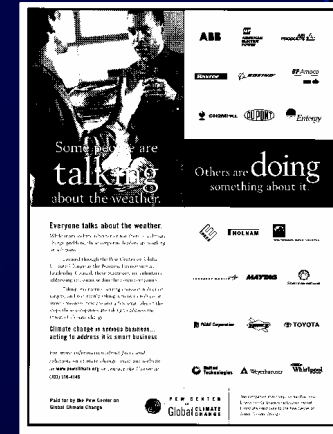
The Pew Center

- Founded in May 1998
- Independent, non-profit, non-partisan
- Divided into five major program areas:
 - Scientific Studies/Analyses
 - Domestic and International Strategies
 - Outreach Activities
 - Business
 - States
 - Solutions
 - Communications



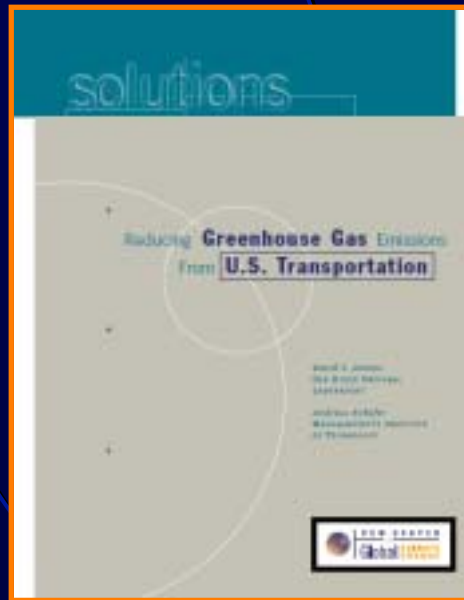
Business Environmental Leadership Council

38 companies demonstrating leadership and taking significant steps to reduce emissions



+ Pew Report Series

- + • Policy
- + • Economics
- + • Environment
- + • Solutions



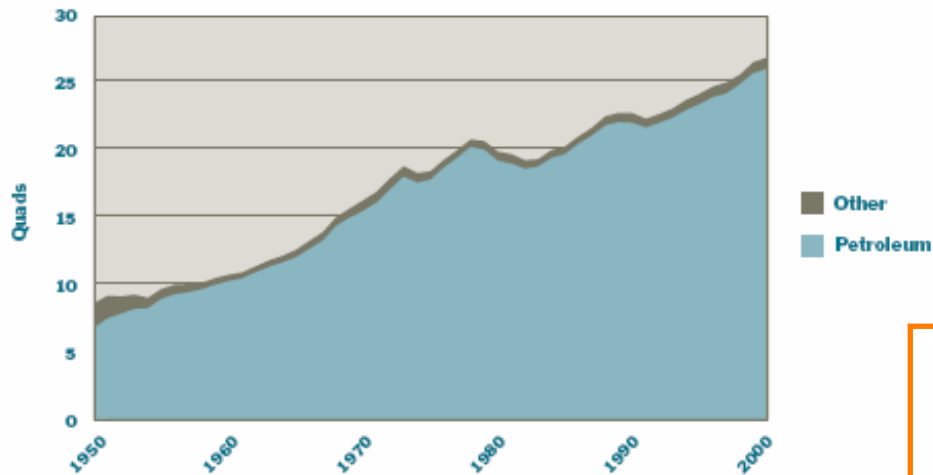
Reducing Greenhouse Gas Emissions from U.S. Transportation

David L. Greene, Oak Ridge National Laboratory

Andreas Schafer, Massachusetts Institute of Technology

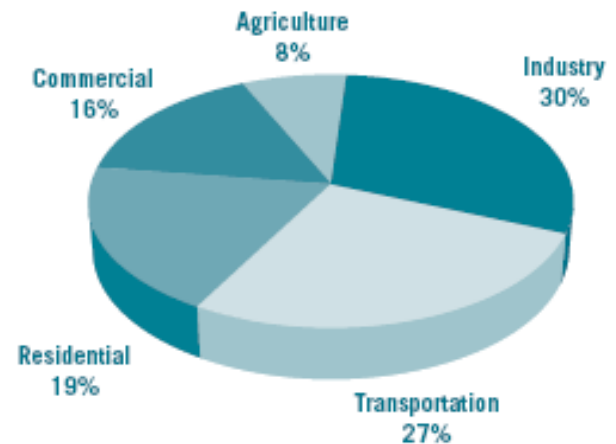
U.S. Transportation and GHGs

U.S. Transportation Energy Use 1950-2000



Source: U.S. DOE/EIA Annual Energy Review 2000, Table 2.1a.

Transportation Share of U.S. Greenhouse Gas Emissions, 2000

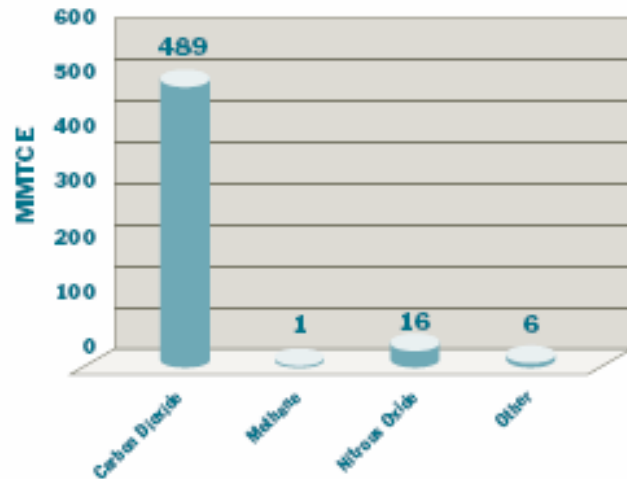


Source: U.S. EPA, 2002, ES-5.

U.S. Transportation and GHGs

Transportation GHG Emissions

by Gas, 2000

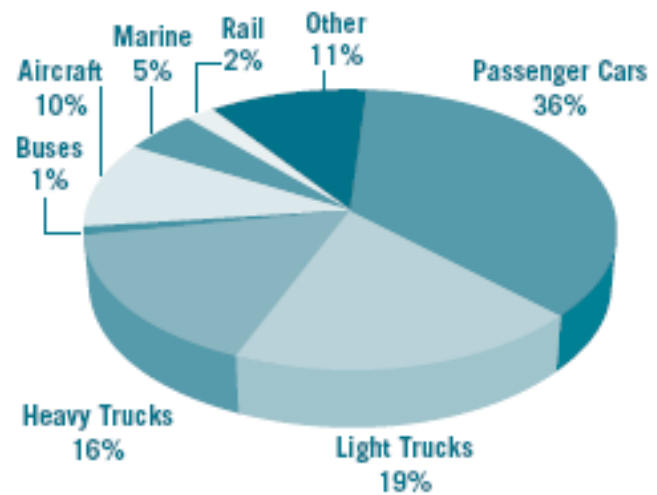


MMTCE = million metric tons of carbon-equivalent

Source: U.S. EPA, 2002.

Transportation GHG Emissions

by Mode, 2000



Source: U.S. EPA, 2002, Table 1-14.

+ Reducing GHG Emissions from Transportation

+ Options:

- + • Use alternative fuels
- + • Increase efficiency
 - + – Vehicle energy efficiency
 - + – System efficiency
- + • Reduce transportation activity
- +
- +

Alternative Fuel Options

- **Liquefied petroleum gas**
 - Pro: Can reduce GHGs by almost 20%
 - Con: Limited supply, vehicles slightly more expensive
- **Low carbon-to-hydrogen fuels (CNG, ethanol, methanol)**
 - Pro: Up to 30% (CNG) or 100% (alcohols) CO₂ reductions, existing gasoline infrastructure, flex-fuel vehicles already on the road
 - Con: Increased NH₄ emissions, higher vehicle cost, fuel cost, lack of CNG infrastructure, limited land area for biofuels

Alternative Fuel Options (continued)

- **Hydrogen and electricity**

- Pro: Variety of feedstocks (including zero-carbon), zero emissions (without exhaust control), high efficiency for electric vehicles
- Con: Commercial H₂ vehicles ~10 years away, no fueling network, range of electricity fuel sources, onboard storage difficulties

- **Replacement fuels (Alt. fuels blended w/ gasoline)**

- Pro: Compatible with conventional vehicles and infrastructure
- Con: Less impact than other options

Vehicle Energy Efficiency

- Passenger car fuel economy could be increased by 12-17% (25-42% for light trucks) using technologies that would not change the size, weight, or performance of vehicles.
- While many of these technologies would increase vehicles' price, they could more than pay back their cost over the life of a vehicle.
- A typical car buyer considers only the first three years of fuel savings when choosing a vehicle.

Vehicle Energy Efficiency Options

- **Improve energy efficiency of drive train**
(engine and transmission)
 - Advanced technology engines: e.g. compression-ignition diesel, hybrids
 - Regenerative braking
- **Reduce energy needed to move vehicle:**
weight, aerodynamic drag, rolling resistance
 - Materials choices
 - Low-resistance tires
 - Electrification of mechanical accessories

System Efficiency

- Behavioral changes can happen quickly but require determined and sustained effort
- Governments play a major role through investments in infrastructure and operations (highways, transit, airports, etc.)
- Nearly all of the money is spent by state and local governments

System Efficiency Options

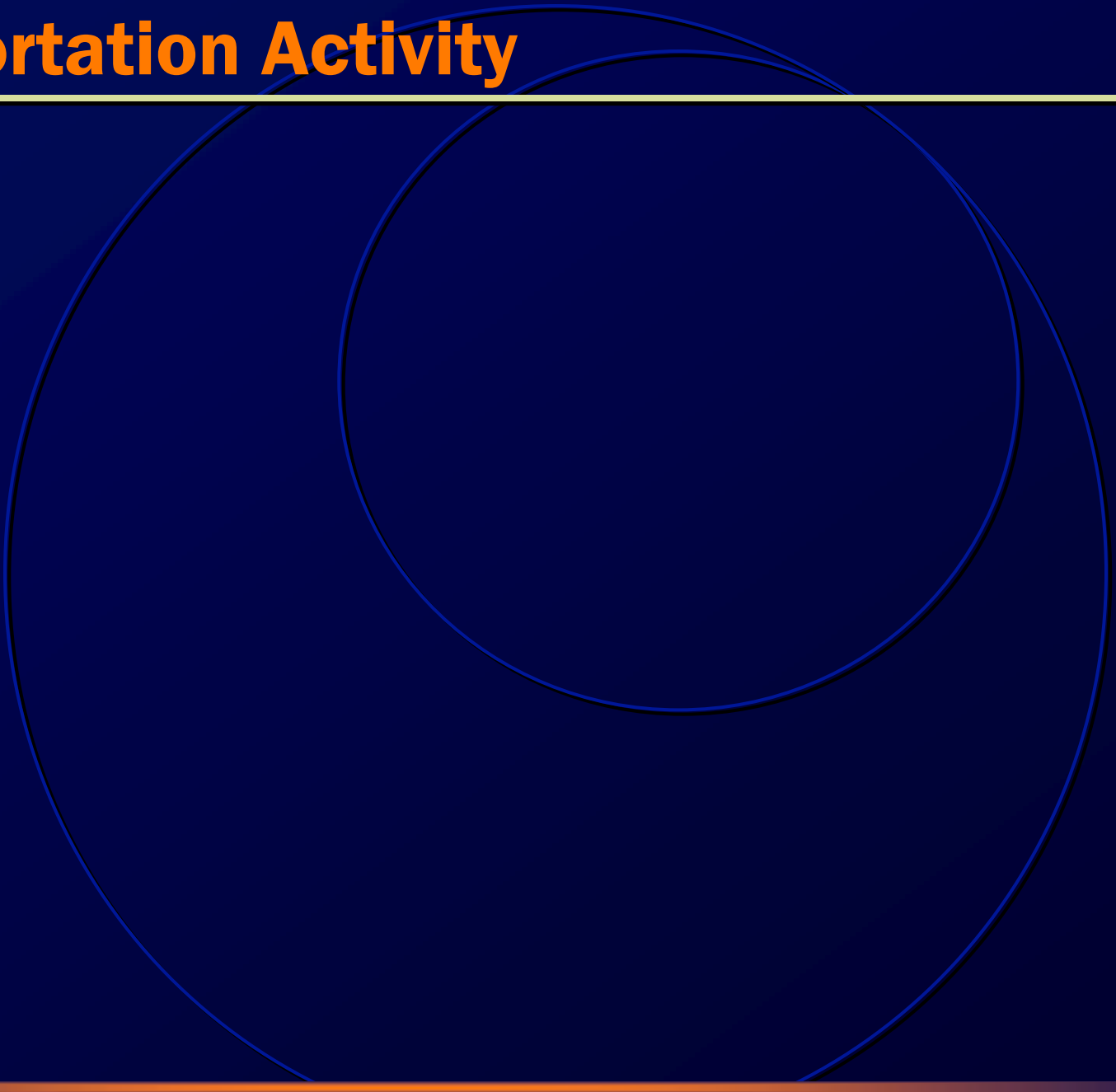
- **More direct routes**
 - GPS, information technology
- **Increasing vehicle occupancy rates**
 - Ride-sharing, HOV lanes, parking restrictions
- **Shifting traffic to lower-emission modes**
 - Improve intermodal freight transfers
 - Increase transit occupancy rates
- **Improving the in-use efficiency of vehicles: maintenance and driving behavior**
 - Proper vehicle maintenance, minimized braking (minimized tailgating), lowered/enforced speed limits

Transportation Activity

- Possible to reduce travel without compromising accessibility

Transportation Activity

- +
- +
- +
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Bush Administration Initiatives - Technology

- **Hydrogen Fuel and FreedomCAR**
- **Clean coal**
 - **The Carbon Sequestration Leadership Forum**
 - **FutureGen**

+ **Activity in Congress**

- + • **Climate Strategy (Byrd-Stevens)**
- + • **GHG tracking and reporting (Brownback-Corzine)**
- + • **Sequestration (Brownback)**
- + • **Multi-pollutant controls for power plants (Jeffords, Carper)**
- + • **Auto fuel economy standards (Kerry-McCain)**
- + • **Cap-and-trade (Lieberman-McCain; Gilchrest-Olver)**
- + • **Energy bill**
- + • **Transportation bill**

Power Plants: 3 vs. 4

- S.366: The Clean Power Act of 2003
 - Sponsor: Sen. James M. Jeffords (I-VT) (19 cosponsors)
 - 4P bill – CO₂ emissions would be reduced to 1990 levels by 2009
- Bush 3P “Clear Skies” initiative
 - Announced on 2/14/02
 - S.485: The Clear Skies Act of 2003 – sponsored by Sen. James Inhofe (R-OK); H.R.999 sponsored by Rep. Joe Barton (R-TX)
- S.843: The Clean Air Planning Act of 2003
 - Sponsor: Sen. Thomas Carper (D-DE) (3 cosponsors)
 - 4P bill – CO₂ emissions would be reduced to 2006 levels by 2009 and to 2001 levels by 2013

Climate Change in Congress

Lieberman-McCain Climate Stewardship Act

(As debated in the U.S. Senate on Oct. 30, 2003)

Gilchrest-Olver Climate Stewardship Act

(As introduced in the U.S. House on March 30, 2004)

- Caps GHGs economy-wide, with credit trading
- 2000 emission levels by 2010
- Credit for early action, sequestration, & international credits up to limit
- Six GHGs, not just CO₂
- Credit allocation decided by Dept. of Commerce

+ State Solutions

- Oregon – Requires CO₂ offsets for new power plants
- + • Massachusetts – Adopted rule imposing a cap on carbon emissions from six older plants
- + • New Hampshire – First state to legislatively impose a carbon cap on fossil fuel burning plants (as part of a multi-pollutant approach)
- + • Wisconsin and New Jersey – mandatory reporting of GHGs for large emitters
- + • California – GHG emissions reductions from vehicles required for 2009 model year and beyond
- + • 13 states have some form of mandatory requirement for renewable energy production

Regional Solutions

- **New England Governors/Eastern Canadian Premiers' Climate Action Plan**
- **New York and 9 mid-Atlantic and northeastern states have agreed to discuss a regional cap-and-trade system for CO₂ emissions from power plants**
- **West Coast initiative – 3 Governors' offices will work together toward policy recommendations**

25 BELC Companies Have Set Targets

- **Cinergy**

- reduce greenhouse gas emissions to an average of five percent below their 2000 level during the period 2010 through 2012.

- **DuPont**

- ✓ Reduce GHG emissions by 65% from 1990 levels by 2010. New target is to hold emissions flat.
- Hold total energy use flat at 1990 levels. (Had reduced by 6% from 1990 by 2002.)
- Source 10% of global energy use from renewables by 2010.

25 BELC Companies Have Set Targets

- BP
 - ✓ Reduce GHG emissions 10% from 1990 levels by 2010.
 - ☐ Maintain net emissions at or below 2001 levels over the next decade.
- AEP
 - ☐ Cap CO₂ emissions at average 1998-2001 levels and reduce or offset them by a cumulative 10% over the period 2003-2006.
- Deutsche Telekom
 - ✓ Reduce energy use by 15% from 1995 levels by 2000.
 - ☐ Reduce energy use by 3% from 2001 levels by 2004.

How does this add up?

- Voluntary efforts significant for firms, not enough nationally or internationally
- Energy Scenarios
 - All scenarios show increased emissions absent national policy by 2035

+ **What business needs from policy-makers**

- + • **Reasonable targets and timetables**
- + • **Regulatory certainty**
- + • **Protection for early action**
- + • **Internationally compatible trading systems**

U.S. Climate Policy Recommendations

- Mandatory reporting/baseline protection
- Technology incentives
- Mandatory reduction programs with flexible mechanisms
- Transition assistance
- Climate-friendly energy policy
- Long-term view (10-50 approach)

+ **Looking Ahead**

- **World moves ahead with Kyoto?**
- **U.S. Situation:**
 - Legislation debated
 - States continue to act
 - Businesses continue to act
- **Need for single global system:**
 - With U.S.
 - With key developing countries
- **Challenges:**
 - Getting countries to move ahead, gain experience, and reduce emissions
 - Designing a global system

+ **For More Information**

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+ **www.pewclimate.org**
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