



Transportation and Climate Change Resource Center

REAL SOLUTIONS FOR CLIMATE CHANGE

Series Wrap-Up - Who's Saying What About Climate Change and Energy These Days?

JUNE 30, 2011

Presented by:

EMIL FRANKEL, Bipartisan Policy Center and Chair of TRB Special Report 307

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Transportation and Climate Change Resource Center

REAL SOLUTIONS FOR CLIMATE CHANGE

Policy Options for Reducing Transportation Energy Use and Greenhouse Gas Emissions

TRB Special Report 307

JUNE 30, 2011



Presented by:

EMIL FRANKEL

Director of Transportation, Bipartisan Policy Center
Study Committee Chair of TRB Special Report 307



Study Charge and Scope

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Requested by TRB Executive Committee

- Examine Challenges and Opportunities Associated with Reducing Energy and GHGs from US Transportation
- Review Pros and Cons of Major Policy Options to:
 - Reduce Amount of Energy- and Emissions-intensive Transport Activity
 - Increase Vehicle and System Efficiency
 - Reduce GHG-intensity of Transportation Energy Sources
- Emphasis on Policies that Can be Implemented Over Near- to Longer-Terms to Affect Trends in Sector Energy Use and Emissions Over Several Decades

Study Limitations

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- Did not estimate costs associated with different policies, such as safety, national economic and equity impacts, and transportation finance effects
- Did not examine actions taken in other sectors and other regions of the world, which would affect urgency to in transportation
- Thus, we were not in a position to recommend specific policy actions. Goal was to inform decision-making

Study Committee Expertise

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- 16-member special committee with expertise in:
 - Transportation operations and management
 - Vehicle and fuel technologies
 - Economics and policy analysis
- Met 7 times over 2 years. Invited many experts to brief the committee from industry, academia, and government
- Balanced committee led to many lively and thought-provoking discussions—difficult to capture in the report

Why the Policy Interest?

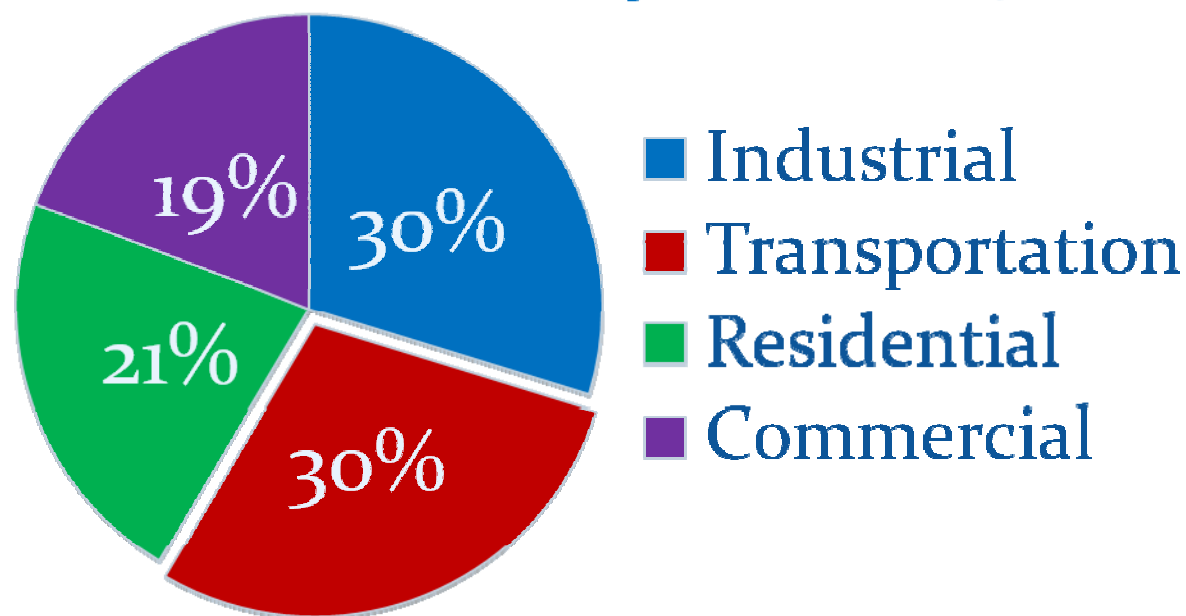
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- Transportation relies almost exclusively on petroleum fuels, accounting for 70% of nation's petroleum use
 - Securing the world's oil supplies is costly
 - Price volatility is disruptive to economy
- Petroleum fuels are carbon-rich, accounting for >25% of energy sector's emissions of CO₂
 - Scientists contend 50 to 80% reduction in GHGs needed by mid-century
- Given the scale of needed reductions, transportation will need to play a major role

CO2 Emissions from Energy Sectors

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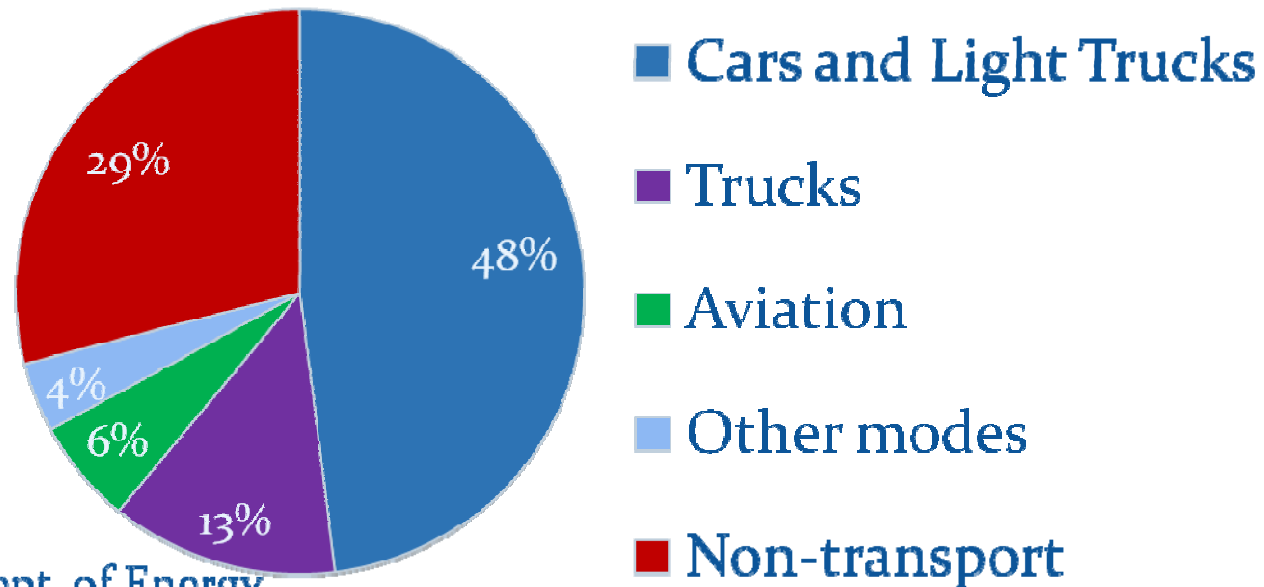
Share of U.S. CO₂ Emissions by Sector, 2009



Transportation Dominates Total U.S. Petroleum Consumption

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Share of U.S. Petroleum Use by Transportation Modes, 2009



Source: U.S. Dept. of Energy

Dimensions of Policy Challenge

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- To reverse trends in transportation energy use will require multi-pronged approach, especially in major modes--cars, trucks, aviation
 - More efficient vehicles
 - Less demand for energy-intensive travel
 - Diversified fuel supply
- Cannot rely solely on mandates for the supply of efficient vehicles and low-GHG fuels
- Must induce demand for efficient vehicles and fuels
- Must encourage and enable less energy-intensive travel
- Must make both early progress and expand it over time

Policy Options Considered: Their Advantages

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- **Fuel Taxes**
 - Induces consumer and supplier interest in efficiency
 - Motivates reductions in energy-intensive travel activity
 - Induces interest in alternative energy sources
- **Vehicle Efficiency Standards**
 - Compels development and supply of more efficient vehicles
- **Low-Carbon Fuel Standards**
 - Motivates innovation in the development and supply of low-carbon fuels
- **Land Use/Transportation Coordination**
 - Induces and enables reductions in energy-intensive travel activity
 - Valued by consumers when fuel prices are rising
- **Public Investments in Infrastructure and More Efficient System Operations**
 - Reduces congestion to increase system energy efficiency
 - Valued by consumers when fuel prices are rising

Their Challenges

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- **Fuel Taxes**
 - How to gain political acceptance over time?
- **Vehicle Efficiency and Low-Carbon Fuel Standards**
 - How to motivate consumer demand for efficient products?
- **Land Use/Transportation Coordination**
 - How to generate interest across thousands of localities?
 - How to hasten impacts on urban form?
- **Public Investments in Infrastructure/Operations**
 - How to prevent more energy-intensive travel activity?

Summary of Policy Advantages and Challenges

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Policy Options	Advantages	Challenges
Fuel tax	<ul style="list-style-type: none">• Exerts broad influence on<ul style="list-style-type: none">- Amount of transport- Vehicle & system efficiency- GHG content of fuels	<ul style="list-style-type: none">• How to gain acceptance?• How to sustain support for raising taxes overtime?
Efficiency standards	<ul style="list-style-type: none">• Track record of implementation• Potential to have early influence on vehicle efficiency	<ul style="list-style-type: none">• Will consumers buy the vehicles?• Can standards be developed for trucks, aircraft, and ships?
Land use/travel demand management	Complementary to other goals such as “livability” and congestion reduction	<ul style="list-style-type: none">• How to convince thousands of jurisdictions?• Will land uses change fast enough?

Combine Policies to Exploit their Strengths and Compensate for their Weaknesses?

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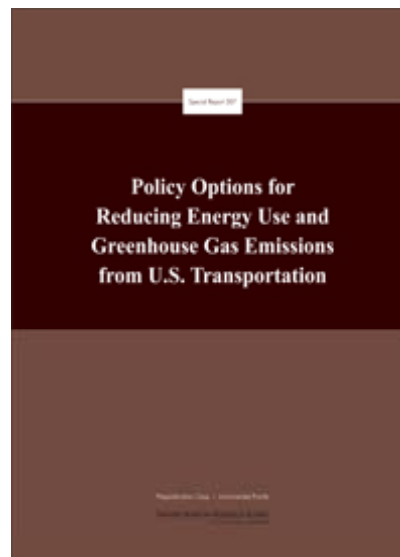
- **Vehicle and Fuel Efficiency Standards**
 - Track record of implementation—needed for early progress
 - Adding feebates will help spur consumer demand for technology
- **Fuel taxes**
 - Higher fuel prices will motivate consumers to buy efficient vehicles and counter the “rebound effect”
 - Fuel tax revenues may substitute for other taxes—reducing their burden
- **Land Use/Transportation Coordination**
 - If energy prices rise (from markets or taxes), consumers will find these options increasingly beneficial
- **Investments in Infrastructure for More Efficient Operations**
 - Efficient system is a linchpin to building public support for fuel taxes

Summary Message

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- Reversing trends in transportation energy use and emissions will take time and commitment—but early progress is essential
- Reducing petroleum use, reducing GHG emissions, and improving system efficiency are highly compatible public interests
- A strategic approach to policymaking must consider how best to achieve both timely and expanding reductions in energy use and emissions
- The policy choices ahead are by no means “either/or” decisions

TRB Special Report 307



<http://onlinepubs.trb.org/onlinepubs/sr/sr307.pdf>



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Communicating about Climate Adaptation & Preparation

JUNE 30, 2011



Presented by:

CARA PIKE

Director

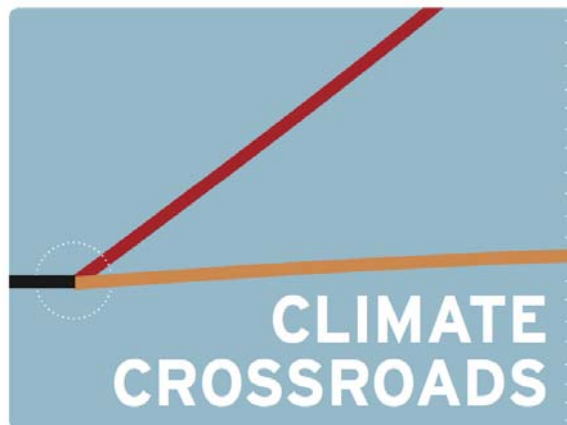
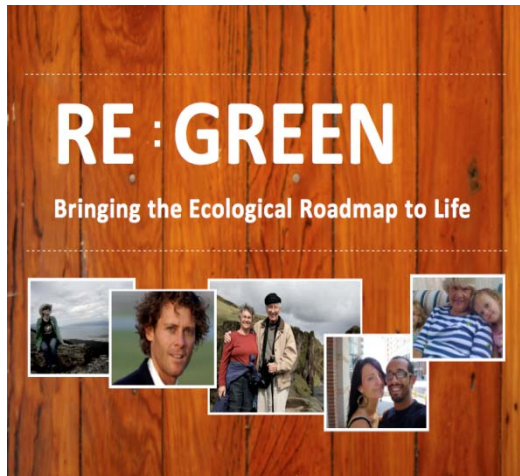
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The Resource Innovation Group

the Social Capital Project

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Climate Communications and Behavior Change

A Guide for Practitioners



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American Climate Attitudes

An Analysis of Public Opinion Trends and Recommendations
for Advancing Public Engagement on Global Warming



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May 2011



1. Basic Acknowledgment

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- Concern about global warming increased from 1997 to 2008, but in 2010, it declined to 2001 levels.
- A majority of Americans still believe that global warming is happening.



2. Issue Understanding

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- Most people do not understand the basic mechanisms of climate change.
- The number of Americans who believe in anthropogenic warming has declined.



3. Concern

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- While a majority of Americans consider climate change to be a serious issue, they are also less worried.
- Fewer Americans think that global warming will affect them personally.



4. Issue Priority

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- From 1997 to 2010 global warming has ranked at the bottom of America's priorities.
- Most Americans favor dealing with more seemingly immediate issues over taking action on global warming.



5. Categorizing the Issue

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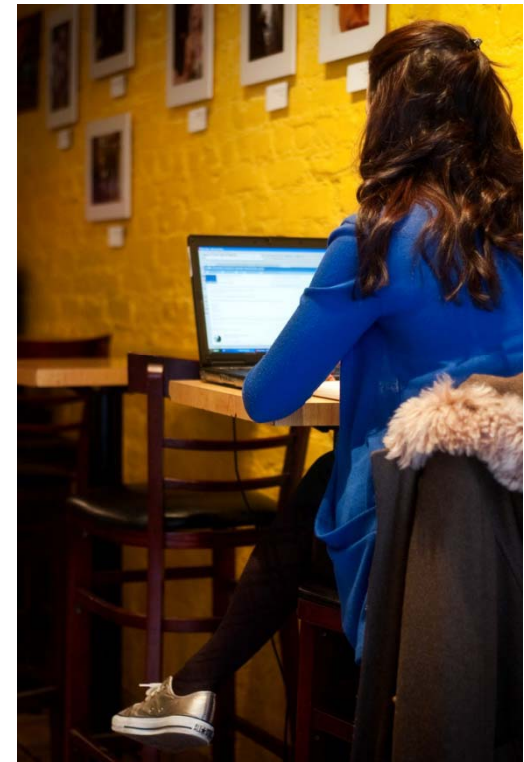
- Efforts have been made to tie global warming to issues that the public cares more about, i.e. the economy, energy, and national security.
- It's also important to build the public's basic understanding of the causes of global warming.



6. Trust in Messengers

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- While scientists are a trusted source of information on climate, the public is less sure about scientific consensus.
- “Climategate” and misinformation campaigns have created confusion about the concept of scientific uncertainty.



7. Policy Solutions

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- Investments in clean energy and limits on greenhouse gas emissions are popular policies across the political spectrum.
- Americans are more likely to take action as consumers than to engage politically.



Adaptation / Preparation

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- **Global Warming Polling Summary**
2007–2010, 60 polls
- **Media analysis**
2007–2010, US Print Media Trends
- **Literature review**
40 articles, Academic & trade journals

Overview

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- What is missing from the global warming conversation?
- What is known about communicating climate adaptation & preparation?
- Questions for further research.
- Opportunities for engagement.

What's missing from the global warming conversation?

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Urgency & Relevancy

- People don't know how or when global warming will impact their lives.
- Adaptation has been largely ignored.



Nancy J. Gassman

media analysis 1

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VULNERABILITY IN THE U.S. AND ABROAD

US Adaptation Articles:

- *National security*
- *Infrastructure*
- *Wildlife*

International:

- *Climate refugees*
- *Poor populations*
- *Food Security*



media analysis 2

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NORTH-SOUTH DIVIDE

- Developing countries need to focus on adaptation due to vulnerability and low emission levels.
- “Climate justice” and the responsibility of developed nations.



media analysis 3

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MITIGATION VS. ADAPTATION

- Adaptation & Mitigation – competing or complementary?
- Will adaptation divert public attention from mitigation?



Communicating Climate Adaptation & Preparation

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➡ Little research has been done and the focus is narrow.

- Adaptation and mitigation are not commonly understood.
- Adaptation sounds natural, gradual and passive.

Preparation has Potential

literature review 1

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Preliminary evidence that “preparation” or preparing for climate impacts/extreme weather events might have traction.

Climate Preparation

Preparation sounds proactive, hopeful and does not specifically reference “climate change”.



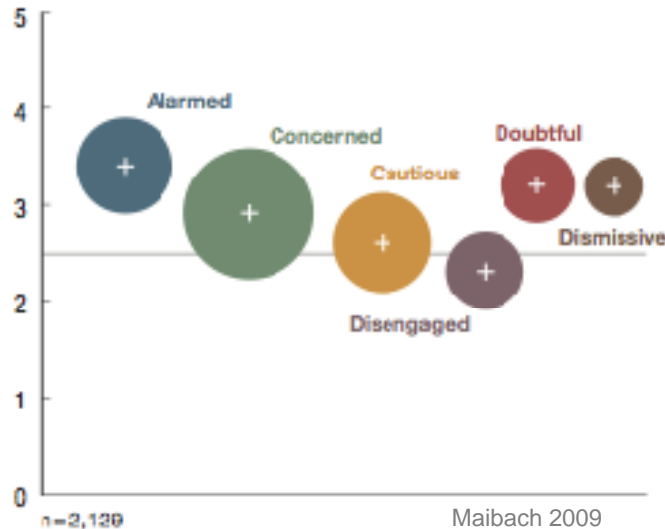
Preparation Doesn't Rely on Global Warming

literature review 2

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Number of energy efficiency improvements made to home

Number of improvements made from the following list of five: insulating the attic; caulking and weather-stripping the home; installation of an energy-efficient water heater; installation of an energy-efficient furnace; installation of an energy-efficient air conditioner.



People may not accept global warming, but will still take steps to prepare.

Actions Americans want to take to improve the energy efficiency of their homes over the coming year:

- Insulating the attic (9-17%)
- Caulking & weather-stripping (12-28%)
- Getting a more efficient furnace (12-29%)
- Getting a more efficient air conditioner (14-27%)
- Getting a more efficient water heater (14-30%)
- Changing most of their lighting CFLs (28-51%)

Caution in Conveying Impacts

literature review 3

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“Mad Max”



Impacts projected
into the future



“Realistic Hope”



Direct, local
impacts



Caution in Conveying Impacts

literature review 3

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The Terrarium Challenge

Framed as an environmental issue, global warming becomes about plants and animals when other issues may seem like a higher priority.



The Role of Uncertainty

literature review 4

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Successful risk communication depends on recognizing uncertainty.

“Some people may disagree with the science of global warming, but we can all agree that taking steps to ensure our communities are prepared to deal with drought (or fire, flooding, storms, etc.) makes sense.”



Framing Opportunities

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- Safe, prosperous communities
- Prevention pays
- Readiness
- Better future
- Health and well-being

Framing Challenges

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- Urgency is lost when impacts are projected into the future.
Need to emphasize near-time consequences with supporting facts when possible.
- Avoid triggering protectionist or anti-immigration views.
Emphasize collective action.
- Adaptation is a long-term issue where success is not obvious.
Set milestones and avoid the idea that we can put an end to global warming.

Research Questions

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- What is the best way to talk about impacts and how to address them?
- Should adaptation/preparation be discussed separate from mitigation?
- How do you tie together local impacts and solutions with regional, national and international trends?
- What adaptation policies and behavior changes would the public be willing to support?
- Who are the best preparation messengers?

Contact

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Coming Soon:



Climate Access is a bridge between research and action. This summer, join the network for climate communication and behavior change thinkers and doers and get the tools you need to build effective public engagement campaigns.

Climate Communications and Behavior Change

A Guide for Practitioners



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Exploring Alternative Energy Sources MoDOT's Experience

JUNE 30, 2011



Presented by:

Rebecca Geyer
Organizational Performance Specialist
Missouri Department of Transportation



Research Study Findings

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- Independent Research Study by Missouri University of Science and Technology, HDR Engineering and Paragon Business Solutions
- Literature Review and Best Practices Summary
 - Many sources were used to determine the best practices highlighted in the report.

Table 1 Data Sources

Source	Reference/Website
Database of State Incentives for Renewable Energy (DSIRE)	http://www.dsireusa.org/
National Association of State Energy Offices (NASEO)	http://www.naseo.org/
DOE - Energy Efficiency & Renewable Energy (EERE)	http://www.eere.energy.gov/

- The citation links to the maps displayed on pages 7, 8, 9 and 10 were very useful. These showed the resource availability in Missouri by power source: Example for Figure 9. Missouri Wind Map is: http://nreldev.nrel.gov/gis/images/eere_wind/eere_wind_missouri.jpg

Research Study Findings (cont'd)

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Survey of Federal and State agencies, universities and consultants results

- Agencies who've installed or are planning to install alternative energy projects were the majority at 72 percent.

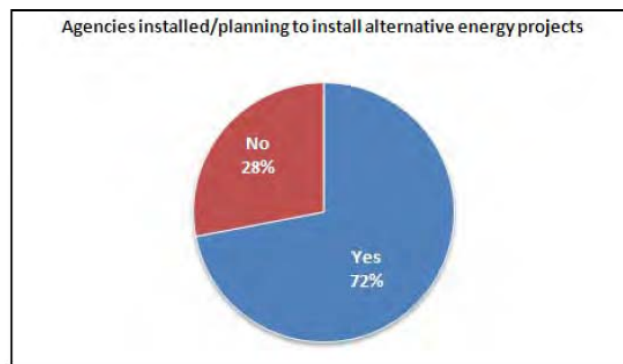


Figure 1. Alternative energy sources in transportation

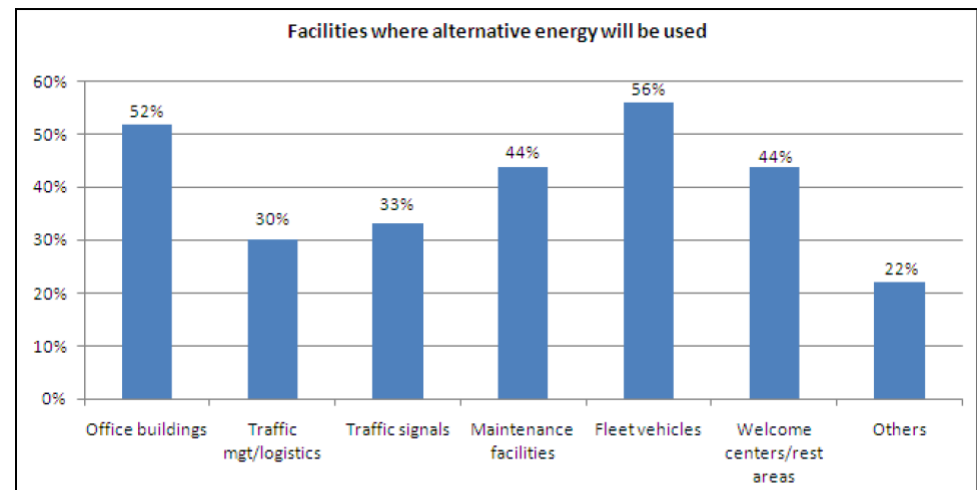


Figure 2. Facilities where alternative energy will be deployed

- The breakdown of facilities where alternative energy was or will be deployed is displayed on the right.

Research Study Findings (cont'd)

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Survey of Federal and State agencies, universities and consultants results

- Survey showed the most common alternative energy sources used were solar (64%), alternative vehicle fuels (46%) and wind (39%).
- A majority of respondents did not know the maximum rated output of the sources they used in their projects.
(See example for wind turbines question results.)

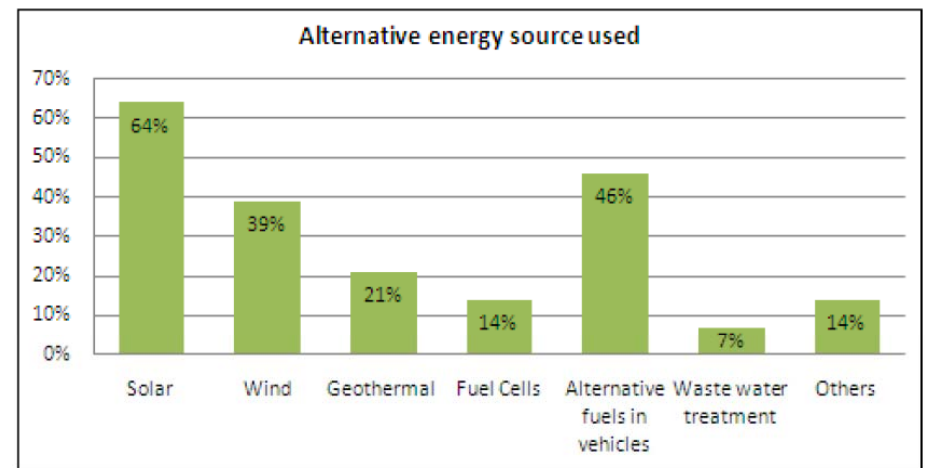


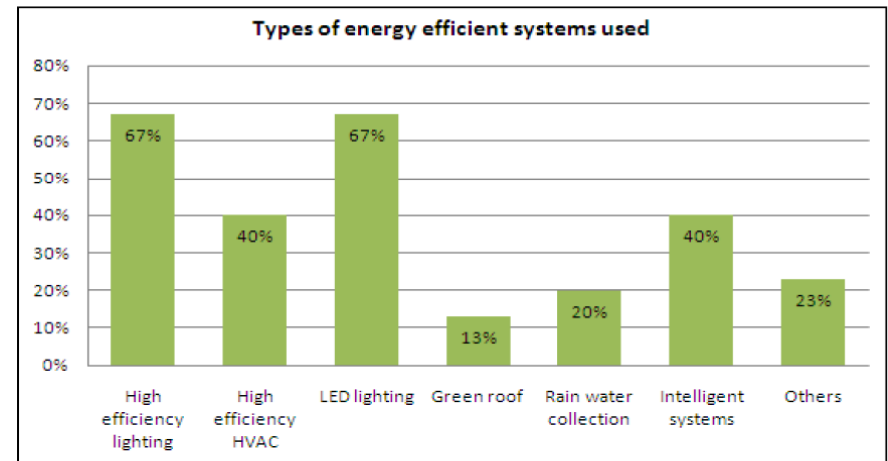
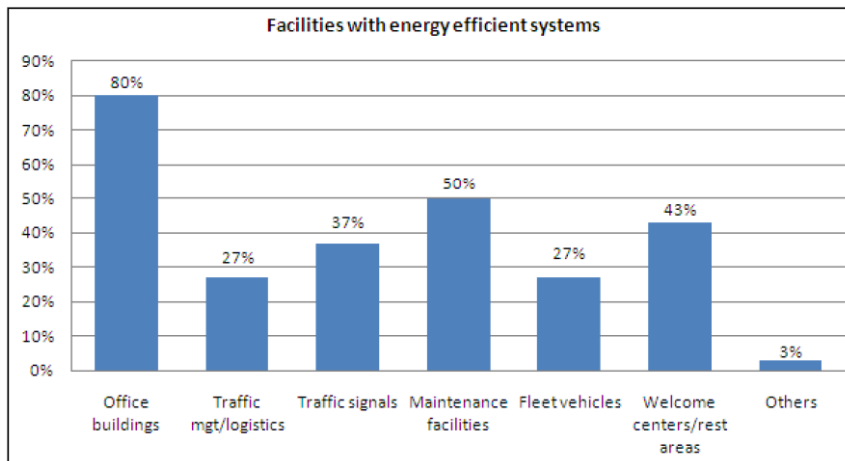
Figure 3. Alternative energy used at different DOT facilities



Research Study Findings (cont'd)

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Survey of Federal and State agencies, universities and consultants results



Research Study Findings (cont'd)

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The study validated current MoDOT practices

- Each recommended energy source was already in use or considered for use at MoDOT.
- Final report may be found here:
<http://library.modot.mo.gov/RDT/reports/TRyy1006/or11010.pdf>

Roadway Lighting (Overhead)

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LED luminaires research in progress

- Current data is showing no power usage reduction on the first four lights installed nearly a year ago
- Evaluating different models to determine cost effectiveness of converting to LED lighting
- Research will provide data from municipal experiences with this product.

Traffic Signals

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- LED conversion
 - Began converting all signals in 1999 or 2000
 - All signals that MoDOT operates are converted to LED
- Solar Power
 - One signal and one roadway luminaire in the state operating on solar power
 - Currently evaluating the signal and lighting installations

Statewide Facilities for MoDOT

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- All facilities have made improvements
 - High efficiency lighting
- New facilities are built using efficient systems
 - Low flow toilets in new Welcome Centers
 - Ground source heat pumps
 - Rockport Welcome Center will be LEED Silver certified
 - August 2011 Notice to Proceed
- Solar Panels at two locations
 - Currently assessing payback on these two locations

Other Energy Sources Considered

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- Wind
 - Not enough wind power to support the need
- Solar Panels
 - Electricity prices are low in Missouri for now
 - Cost of equipment and installation provide no more savings than break-even.
- Capturing Storm Water
 - 35-50 year payback, at best case scenario

Questions?

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http://environment.transportation.org/center/products_programs/climate_change_webinars.aspx

**These materials will also be available on AASHTO's climate change website,
where you can also find more information on climate change:**
<http://climatechange.transportation.org/webinars/>

Thank you!