

National Energy Policy Discussion

22.811 Fall 2010

Agenda

- Policy overview
- Carbon emission policies
- Energy security
- Economics
- Politics

Policy Overview- Current and Historical

- EISA
- RPS
- Cap & Trade
- CAFÉ
- Low Carbon Fuel Standard
- Stimulus Package
- DOE
 - ARPA-E
 - Loan Guarantee
- EPA
- CAA



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Carbon Emissions Policy

The riven Senate, with the decision today not to close out a modest package of energy initiatives focused on oil drilling, is basically saying the following: Don't look for the vital 21st-century energy quest, let alone a reality-based approach to global warming, to begin within the borders of the United States.

- Andrew Revkin, New York Times (August 3, 2010)

Carbon Emissions Policy

- *Do we need federal legislation to have national policy in the US?*



State Efforts

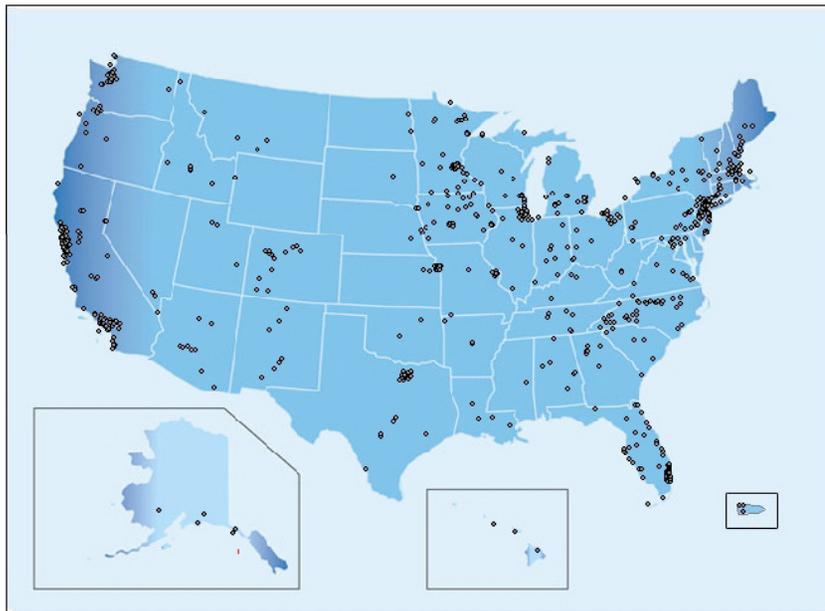
Example State Targets

- California: 1990 levels by 2020, 80 percent below 1990 by 2050
- Minnesota: 15% below 2005 levels by 2015, 30% below 2005 levels by 2025, 80% below 2005 levels by 2050
- Florida: 1990 levels by 2025, 80% below 1990 levels by 2050
- Illinois: 1990 levels by 2020, 60% below 1990 levels by 2050
- Massachusetts: 1990 levels by 2010, 10% below 1990 by 2020, 75-85% below 1990 long-term



Local Efforts

Signatories of the US Mayor's Climate Protection Agreement: 1044 as of 12/1/2010



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Example Policy Measures

- Green Building Standards
- Energy Efficiency Retrofit
- Public Transportation
- Land Use Planning
- Community Choice Aggregation
- Financing
- Community Engagement and Education

Ecosystem

Please see [ICLEI - Local Governments for Sustainability](#), [Center for Climate Strategies](#), and [U.S. Green Building Council](#).

Who Needs DC!?



Who Needs DC!?

QUESTION

Would a decentralized (regional, state, local) climate and energy policy for the United States achieve what we need?

What strengths come with decentralization?

What shortcomings may there be?

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Energy Security

*- “Without fuel, they were nothing.
They built a house of straw.”*



What is Energy Security?

- *“The reliable supply of energy at an affordable price.”*
(IEA, 2001)
- *“Energy security refers to a resilient energy system.”*
(NCIL, 2001)
- *“Energy security has two key dimensions, reliability and resilience. Reliability means users are able to access the energy services they require, when they require them. Resilience is the ability of the system to cope with shocks and change.”*
(New Zealand Ministry of Economic Development, 2006)



Current Situation in the United States

- Electricity Generation
 - Coal: exports >> imports
 - Natural gas: ~8% imported
 - Uranium ore: Most from foreign sources (Australia, Canada) but U.S. has significant assured resources.
- Petroleum
 - ~62% imported
- In U.S., energy security is for most discussion purposes equivalent to oil security.

Why Should We Care?

- “Nine out of ten of the U.S. recessions since World War II were preceded by a spike up in oil prices.” (Palgrave, 2005)
- 1956- Suez Crisis
 - 10.5% drop in world oil production; corresponding 2.5% drop in U.S. real GDP (Hamilton, 2003)

1973 Oil Crisis

Photos of cars lined up for [gas in Brooklyn](#) removed due to copyright restrictions.



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1979 Oil Crisis



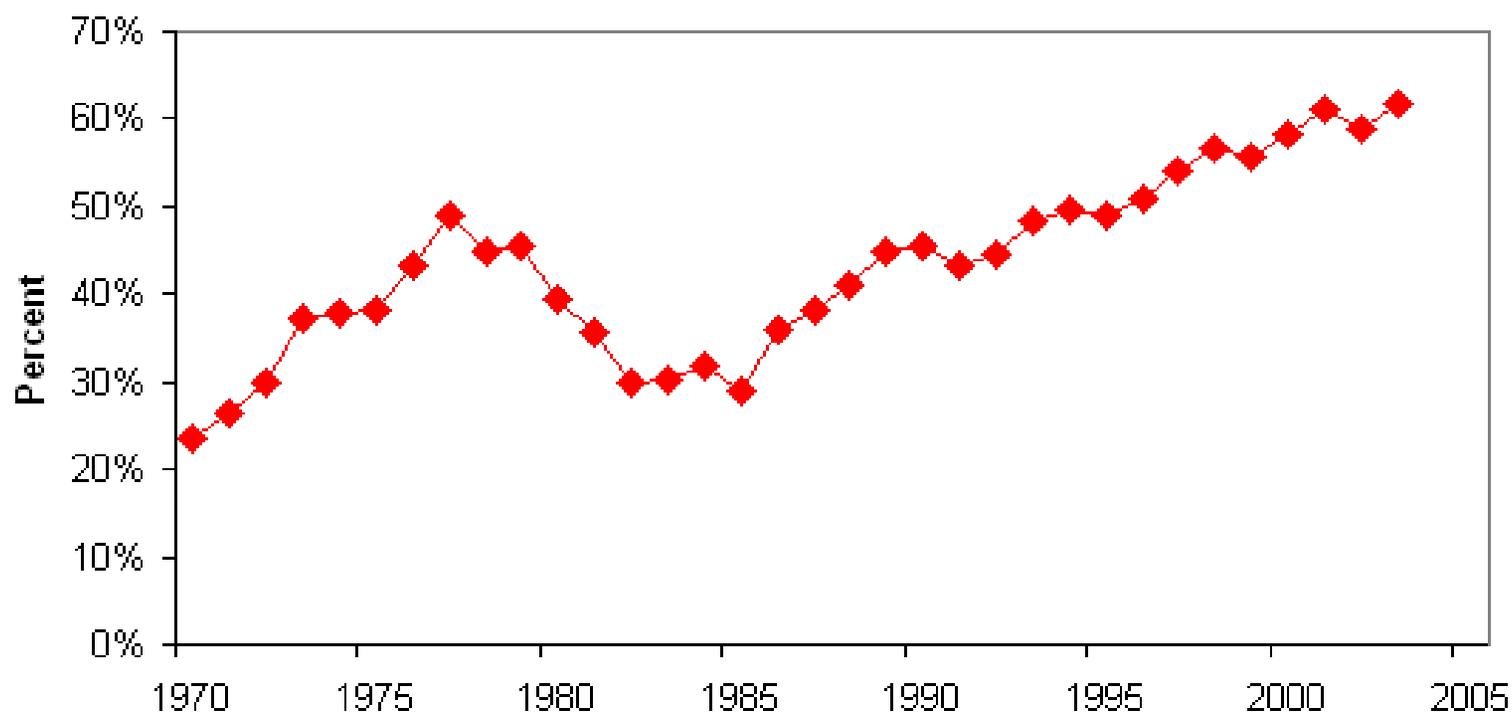
Photo by Warren K. Leffler, via Library of Congress, Prints & Photographs Division, U.S. News and World Report Magazine Collection: LC-U9-37734-16A.



Photo by Warren K. Leffler, via Library of Congress, Prints & Photographs Division, U.S. News and World Report Magazine Collection: LC-U9-29102-18.



Figure 3. Net Import Share of Petroleum Consumption



Source: Annual Energy Review 2003, EIA



Providing Energy Security in the U.S.

- (1) Rely on market forces
- (2) Foreign relations
 - Diplomacy
 - Military force
- (3) Oil reserve
- (4) Improve vehicle efficiency

Energy Independence through Substitution

- (5) Increase domestic oil production (oil shale, etc.)
- (6) Electric vehicles
- (7) Biofuels
- (8) Hydrogen economy
- (9) Coal-to-liquids
- (10) CNG vehicles

Social Perspectives

Please see [Mad Max](#), 1979 and [Mad Max 2: The Road Warrior](#), 1981.

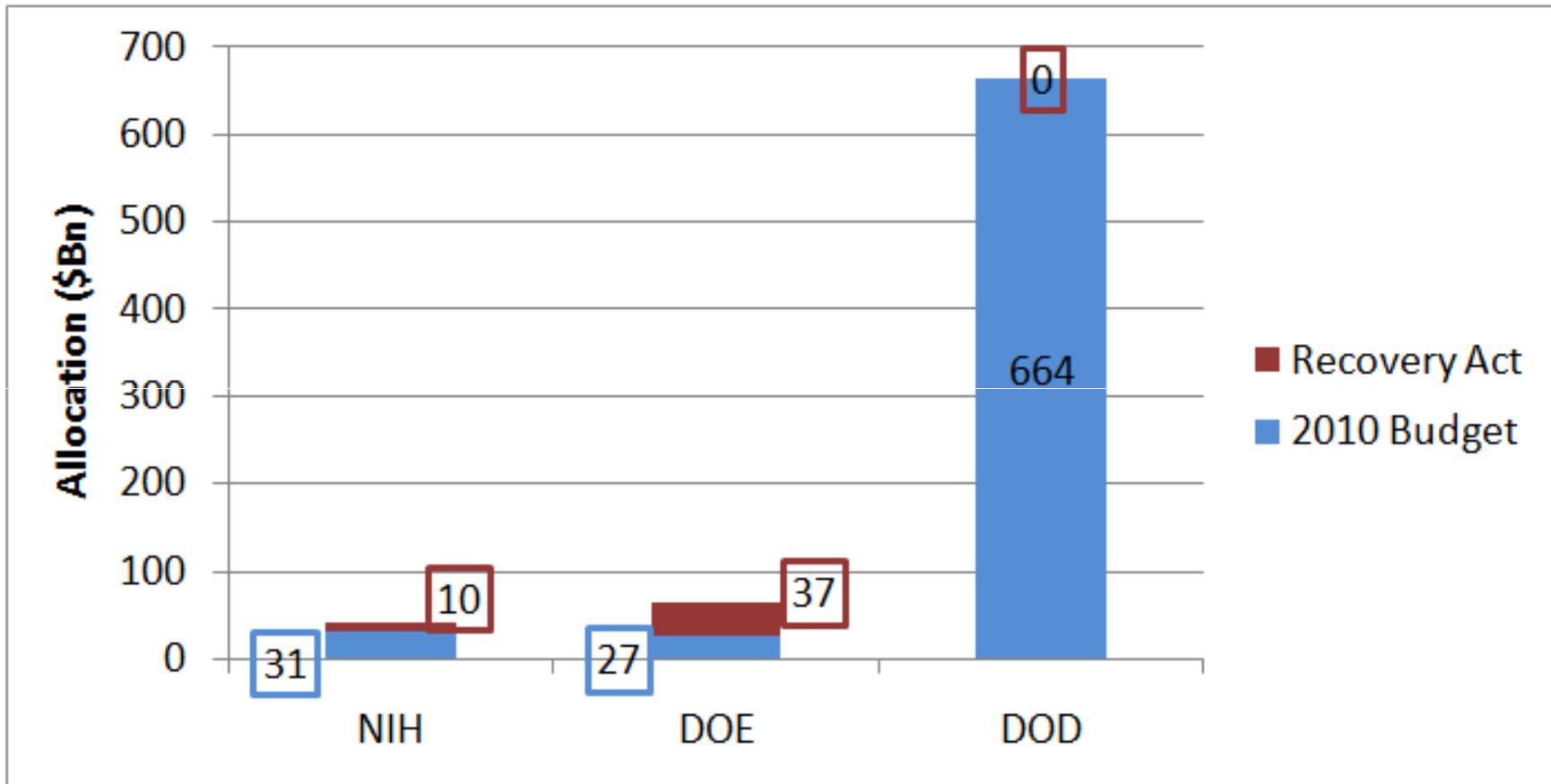
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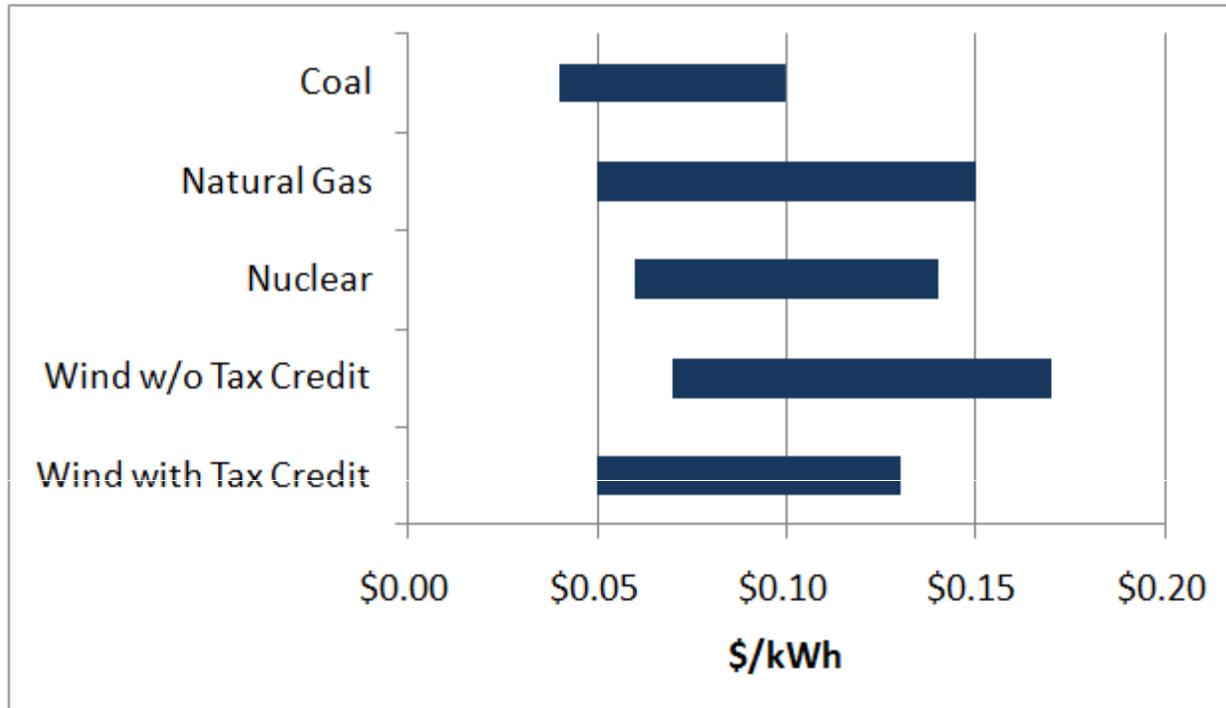
Total Energy RD&D Investments

- VC: ~\$8 bn yearly – mostly “clean tech”
- Federal Gov’t:
 - Recovery Act: \$37 bn total. \$33 bn “clean tech”
 - DOE: \$27 bn total. \$13 bn “clean tech”
- Corporate R&D: probably in between VC and Fed spending

Comparable Federal Gov't Budgets



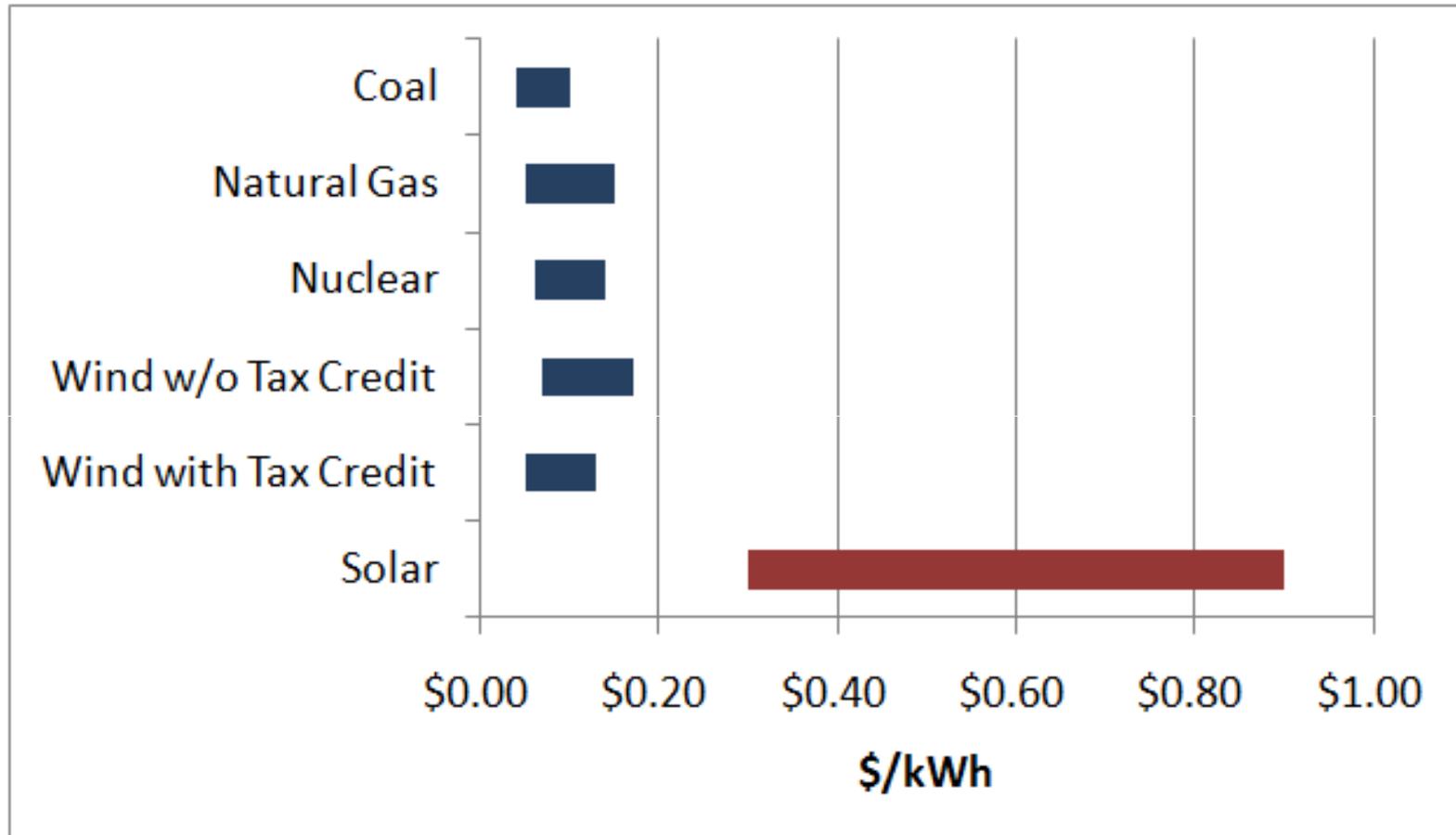
Levelized Cost of Electricity



Note 1: LCOE is an inappropriate measure of the cost of wind. LCOE erroneously values all kWh identically. Peak electricity prices > off peak electricity prices. Wind production profile is stronger in off-peak. Thus, LCOE “under-costs” wind.

Note 2: Wind integration costs are typically 10% of LCOE

Levelized Cost of Electricity



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Short Term Thinking Dominates

Cartoons about [climate change prediction](#) and [summit](#) removed due to copyright restrictions.

Republicans Deny Warming

Comic by Tom Toles removed due to copyright restrictions.

- Pew Research Center 2010:
 - 53% of Republicans say there is absolutely no evidence of global warming.
 - 70% "Tea Party" supporters said no evidence
- Pew Research Center 2007:
 - 62% of Republicans said there WAS evidence

- Why the shift? Is this an accurate portrayal of Republicans?
- <http://www.youtube.com/watch?v=7h08RDYA5E>



Democrats Fear Political Backlash

Cartoon about [President Obama and climate change](#) removed due to copyright restrictions.

- Pew Research Center 2010:
 - 79% of Democrats believe climate change is occurring, relatively unchanged from previous years
 - Even with 59 members in the Senate, Bill could not be passed without threat of filibuster

What Do We Do Now?



"HOW ON EARTH DO WE TURN IT OFF?"

Courtesy of R. J. Matson. Used with permission.

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Introduction to Sustainable Energy

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