



***An Analysis of the Lieberman Warner Legislation (S. 2191) and Potential Electricity Price Impact**

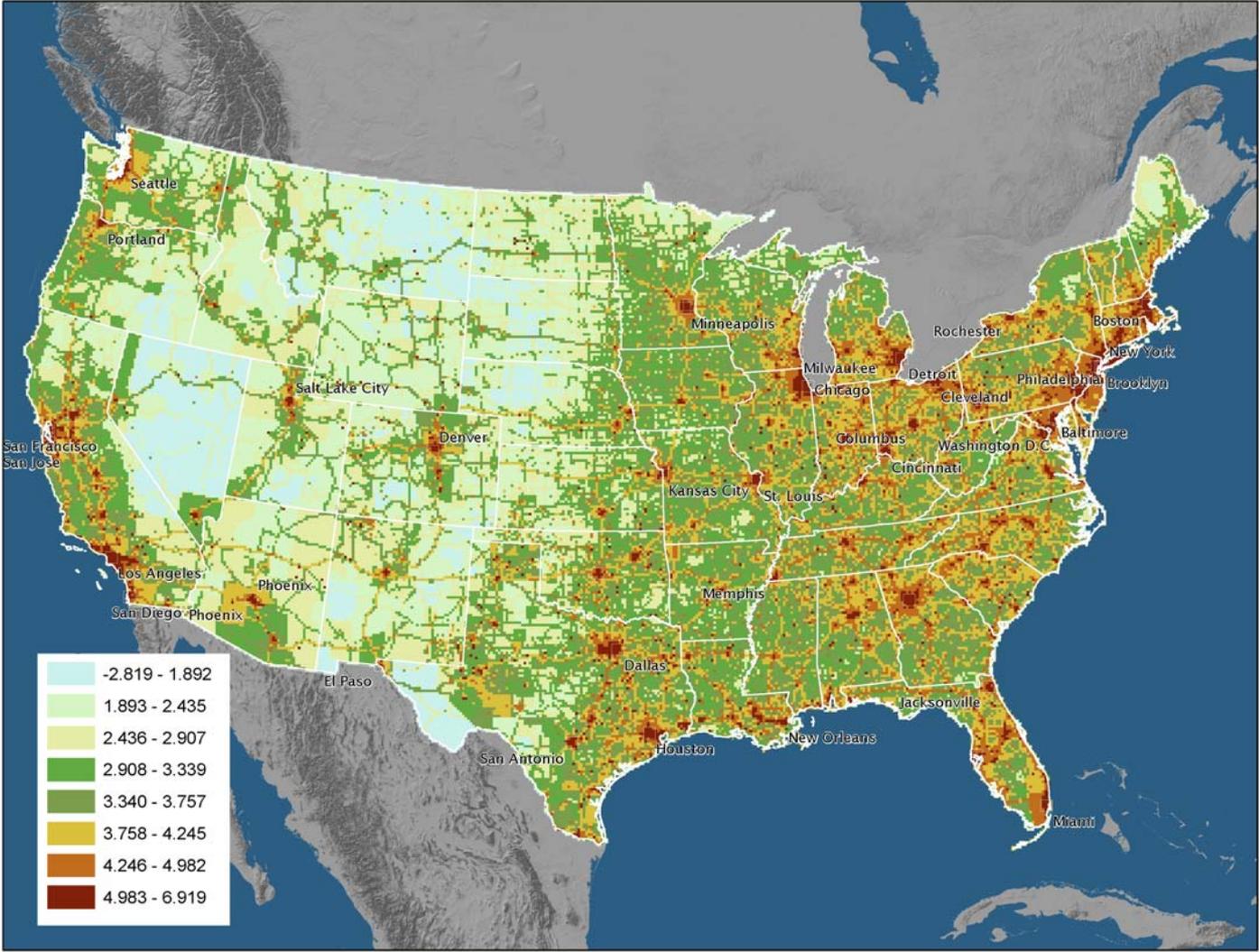
March 26, 2009

**Prepared for the South Dakota Public Utilities
Commission**

<http://climatedebatedaily.com>

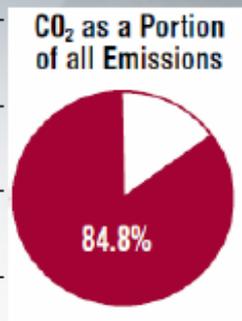
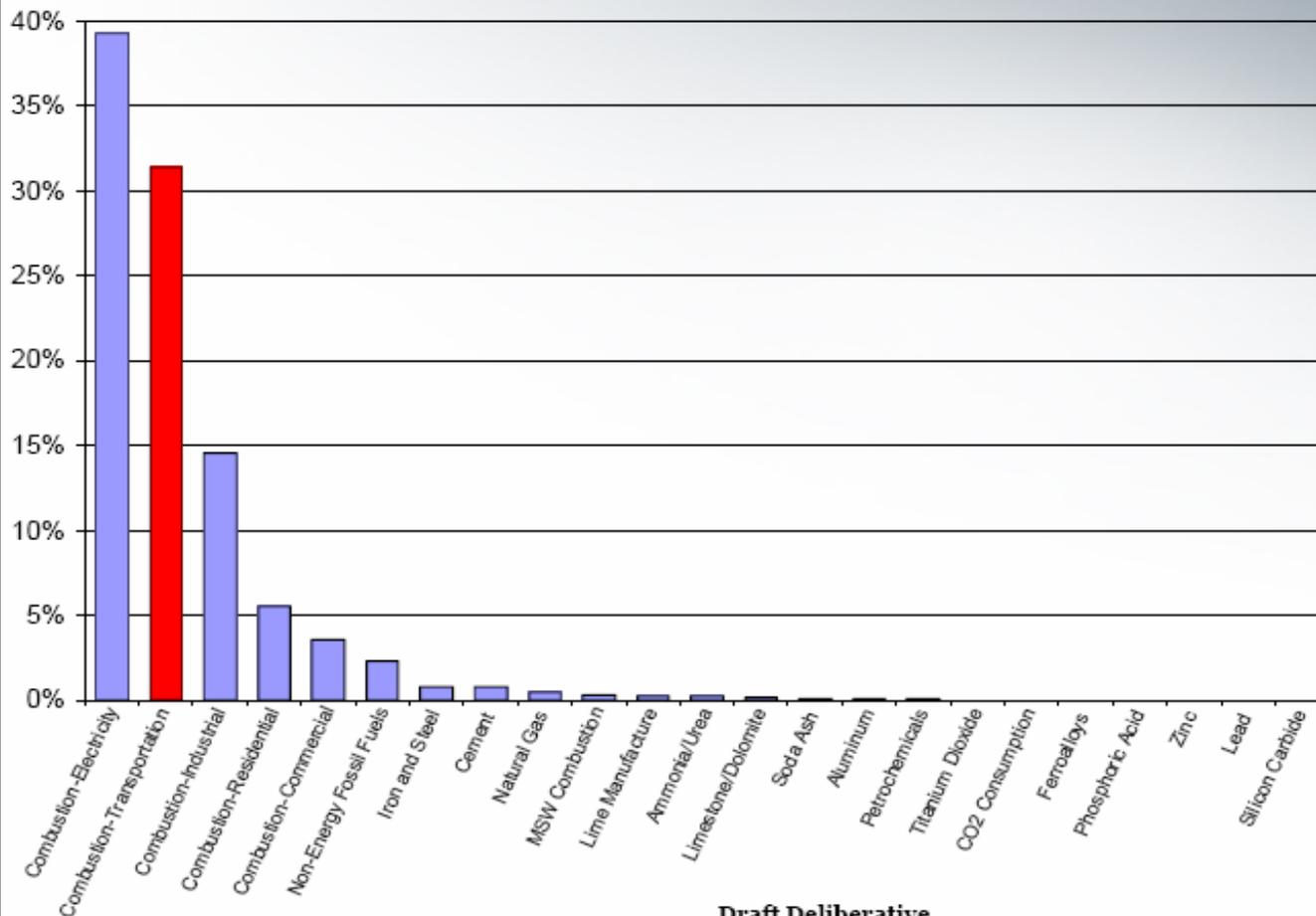
- Essays and research supporting the idea that global warming poses a clear threat to humanity, that it is largely caused by human activity, and that solutions to the problem lie within human reach.
- Essays and research challenging the view that the world warming that began around 1880 is caused by human activity, that it poses a serious threat, or that the vagaries of Earth's climate are within human control.

Purdue/Vulcan CO2 Emissions



EPA Endangerment Guidance Briefing; March 6, 2009

Comparison of All U.S. Transportation CO₂ Emissions to Other U.S. CO₂ Sources



IPCC Source Categories

Data year 2006 from EPA Inventory

Energy market and economic impacts of S.2191, the Lieberman-Warner Climate Security Act of 2007

- <http://www.eia.doe.gov/oiaf/servicerpt/s2191/index.html>
- Report #: SR-OIAF/2008-01
Released Date: April 2008
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This report responds to a request from Senators Lieberman and Warner for an analysis of S. 2191, the Lieberman-Warner Climate Security Act of 2007. S. 2191 is a complex bill regulating emissions of greenhouse gases through market-based mechanisms, energy efficiency programs, and economic incentives. This analysis focuses on the impacts of the greenhouse gas cap-and-trade program established under Title I of S. 2191.

Lieberman-Warner: Analyses

Charles River Associates	Economic modeling consultants
Nicolas Institute/Duke University	Academic
Clean Air Task Force	Advocacy
Massachusetts Institute of Technology	Academic
National Association of Manufacturers	Manufacturing trade association
Environmental Protection Agency	Federal government
Energy Information Administration	Federal government

Base case for analyses is Energy Information Administration's *Annual Energy Outlook 2007* reference case.

All figures quoted in 2005 \$.

Lieberman-Warner: Variables

- Primary variables leading to differences between analyses are:
 - Schedule for deployment of new nuclear generation
 - Availability of carbon capture and storage (CCS) for fossil fueled generation
 - Schedule, availability and cost of new renewable generation
 - Availability of offsets
 - Natural gas prices

CRA Analysis

- **Key variables:**
 - 40 GW new nuclear by 2030.
 - 103 GW new CCS by 2030, and 271 GW new CCS by 2040.
 - 176 GW new renewables by 2030.
 - 15% offset limit (domestic only).
- **CO₂ Price impacts:**
 - \$48/ton in 2015
 - \$76/ton in 2030

Nicholas Analysis

- **Key variables:**

- 55% increase in new nuclear over BAU by 2030.
- 56 GW new CCS by 2030, and 286 GW new CCS by 2040.
- 8% increase in new renewables over BAU by 2030.
- “Significant” use of the 30% total available offsets (15% domestic, 15% foreign).

- **CO₂ Price impacts:**

- \$18/ton in 2015
- \$38/ton in 2030

CATF Analysis

- **Key variables:**
 - 117 GW new nuclear by 2030.
 - 125 GW new CCS by 2030.
 - 100+ GW new renewables by 2030.
 - Up to full use of 30% offset limit (15% domestic, 15% foreign).
- **CO₂ Price impacts:**
 - \$18/ton in 2015
 - \$50/ton in 2030

MIT Analysis

- **Key variables:**
 - 3.5 GW new nuclear by 2030.
 - 250 GW new CCS by 2030, and 530 GW new CCS by 2040.
 - 16 GW new renewables by 2030.
 - 15% offset limit (domestic only).
- **CO₂ Price impacts:**
 - \$48/ton in 2015
 - \$86/ton in 2030

NAM Analysis

- **Key variables:**

- 10-25 GW new nuclear by 2030.
- 25-50 GW new CCS by 2030.
- 6-10 GW of renewables per year maximum.
- 15-20% of offsets are high cost, >20% are low cost.

- **CO₂ Price impacts:**

- \$55-\$64/ton in 2020
- \$227-\$271/ton in 2030

EPA Analysis

- **Key variables:**

- 44 GW new nuclear by 2025, 62 GW new nuclear by 2030.
- 175 GW new CCS by 2030, 299 GW new CCS by 2050.
- 61 GW new renewables by 2025.
- Up to full use of 30% offset limit (15% domestic, 15% foreign).

- **CO₂ Price impacts:**

- \$29-\$40/ton in 2015
- \$61-\$83/ton in 2030

EIA Analysis

- **EIA ran multiple scenarios:**
 - **Core:** Key technologies deployed in a manner timely to the cap.
 - **High Cost:** CCS, nuclear, biomass – 50% higher costs.
 - **No International Offsets.**
 - **Limited Alternatives:** CCS not available until 2030, nuclear and biomass limited to base case.
 - **Limited International Offsets & Alternatives:** No international offsets and limited alternatives scenarios combined.

EIA Analysis

- **CO₂ Price impacts:**

- **Core:**

- \$30/ton in 2020 = \$107/MWh (34% increase from BAU).
- \$61/ton in 2030 = \$135/MWh (69% increase from BAU).

- **High Cost:**

- \$38/ton in 2020 = \$114/MWh (43% increase from BAU).
- \$78/ton in 2030 = \$150/MWh (88% increase from BAU).

- **No International Offsets.**

- \$42/ton in 2020 = \$118/MWh (47% increase from BAU).
- \$85/ton in 2030 = \$157/MWh (96% increase from BAU).

- **Limited Alternatives:**

- \$44/ton in 2020 = \$120/MWh (50% increase from BAU).
- \$91/ton in 2030 = \$162/MWh (102% increase from BAU).

- **Limited Offsets & Alternatives:**

- \$76/ton in 2020 = \$148/MWh (86% increase from BAU).
- \$156/ton in 2030 = \$220/MWh (176% increase from BAU).

L-W Analysis Overview

- The prices for CO₂ allowances vary greatly:
 - \$18/ton to \$76/ton in 2015. Mean = \$42/ton.
 - \$38/ton to \$271/ton in 2030. Mean = \$105/ton.

Impact of CO₂ Costs for Customers

Projected Percentage Rate Increases from CO₂ costs*

CO₂ Cost Per Ton	Cost Impact Per kWh	BHP Avg \$0.07481/kWh	CLFP Avg \$0.0863/kWh
\$20.00	\$0.0253	34%	29%
\$30.00	\$0.0380	51%	44%
\$40.00	\$0.0506	68%	58%
\$50.00	\$0.0633	85%	73%

*Based on average rates for Black Hills Power and Cheyenne Light customers as of December 2008. Projected increases are based on an increase in CO₂ costs only, and do not include other potential costs increases such as natural gas or generation costs that may result from CO₂ legislation.

NorthWesternTM Energy

SD Carbon Cost Impact - \$20 per ton with 100% Auction
March 26, 2009

Estimated Carbon Cost \$31,001,944
Divided by 2009 retail sales budget 1,450,000,000

Increased Cost per KWH \$0.021

<u>Monthly Bill Customer Impacts</u>	<u>KWH</u>	<u>Current Bill</u>	<u>New Bill</u>	<u>Increase</u>	<u>% Increase</u>
Residential - Regular Customer	750	\$72.72	\$88.76	\$16.04	22%
Residential - Electric Heat Customer	3,000	\$176.06	\$240.20	\$64.14	36%
Commercial - Small Retail	7,607	\$725.00	\$887.64	\$162.64	22%
Commercial - Grain Elevator	20,744	\$2,367.00	\$2,810.52	\$443.52	19%
Commercial - Fast Food Restaurant	24,487	\$1,882.00	\$2,405.55	\$523.55	28%
Commercial - Car Dealer	39,957	\$2,822.00	\$3,676.31	\$854.31	30%
Commercial - Large Retail	339,625	\$17,097.00	\$24,358.40	\$7,261.40	42%
Commercial - Large Industrial	2,176,800	\$112,948.00	\$159,489.40	\$46,541.40	41%

CO2 COST PER TON	CUSTOMER CLASS	AVERAGE RATE PER KWH - 2008	COST IMPACT PER KWH	PERCENTAGE INCREASE
\$20 / Ton	Residential	0.07598	0.02091	27.5%
	Commercial	0.07613	0.02091	27.5%
	Industrial	0.05573	0.02091	37.5%
	Total South Dakota	0.06492	0.02091	32.2%
\$30 / Ton	Residential	0.07598	0.03136	41.3%
	Commercial	0.07613	0.03136	41.2%
	Industrial	0.05573	0.03136	56.3%
	Total South Dakota	0.06492	0.03136	48.3%
\$40 / Ton	Residential	0.07598	0.04182	55.0%
	Commercial	0.07613	0.04182	54.9%
	Industrial	0.05573	0.04182	75.0%
	Total South Dakota	0.06492	0.04182	64.4%
\$50 / Ton	Residential	0.07598	0.05227	68.8%
	Commercial	0.07613	0.05227	68.7%
	Industrial	0.05573	0.05227	93.8%
	Total South Dakota	0.06492	0.05227	80.5%



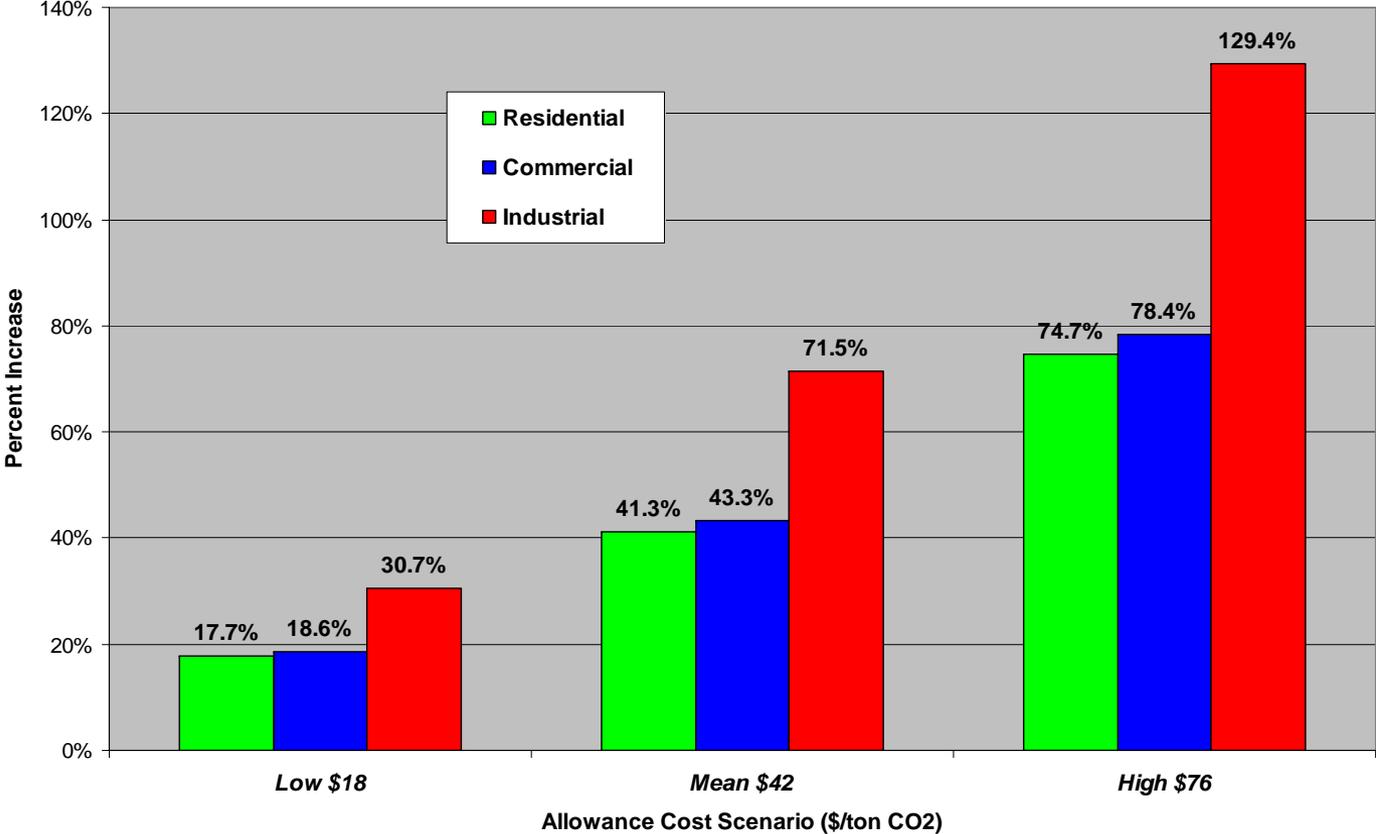
Total Annual Impact on Otter Tail Power Company's South Dakota customers: 22,267,020

Assuming no growth in sales and a level CO2 charge, OTP's SD customers would pay out over \$890 million dollars from 2010 - 2040.

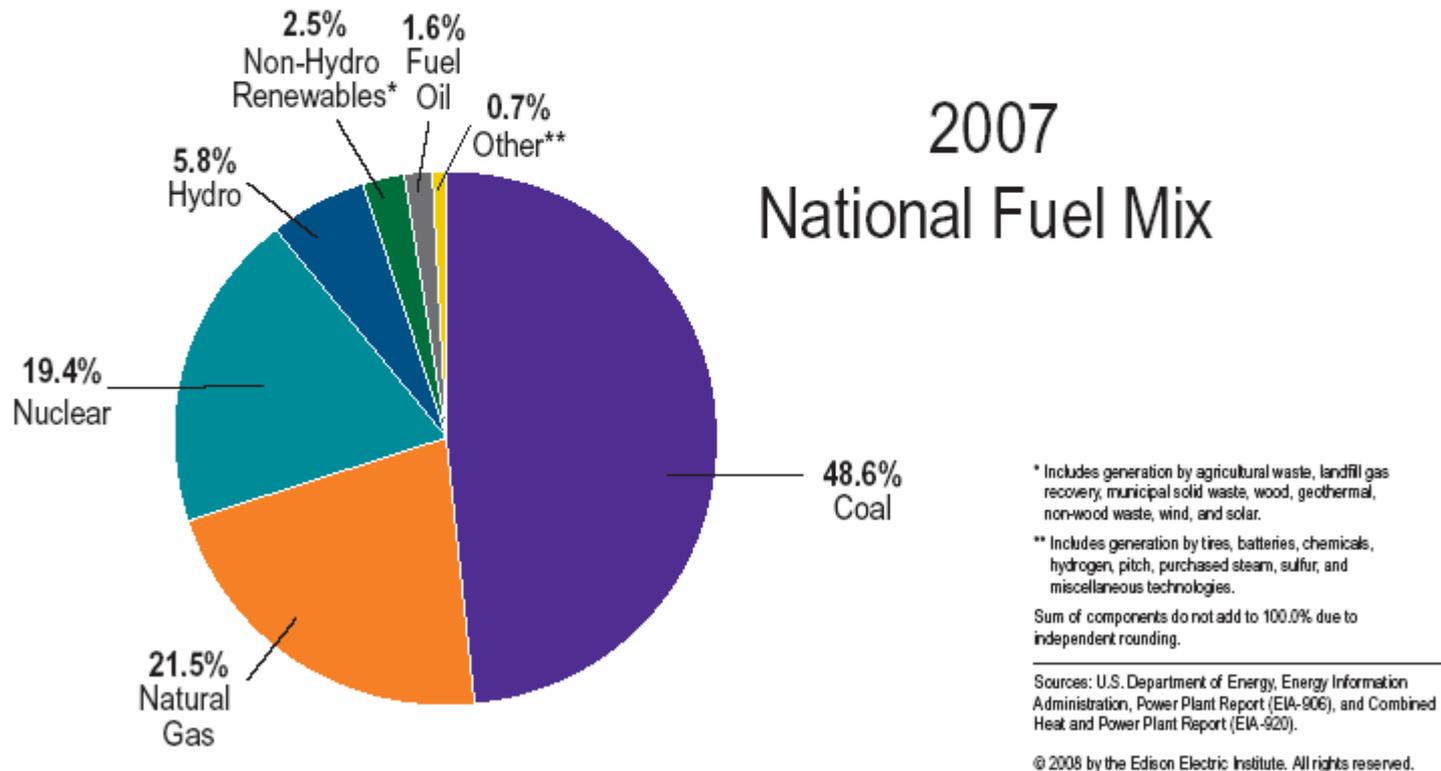
MidAmerican Energy

Potential Bill Increase by Year 2015

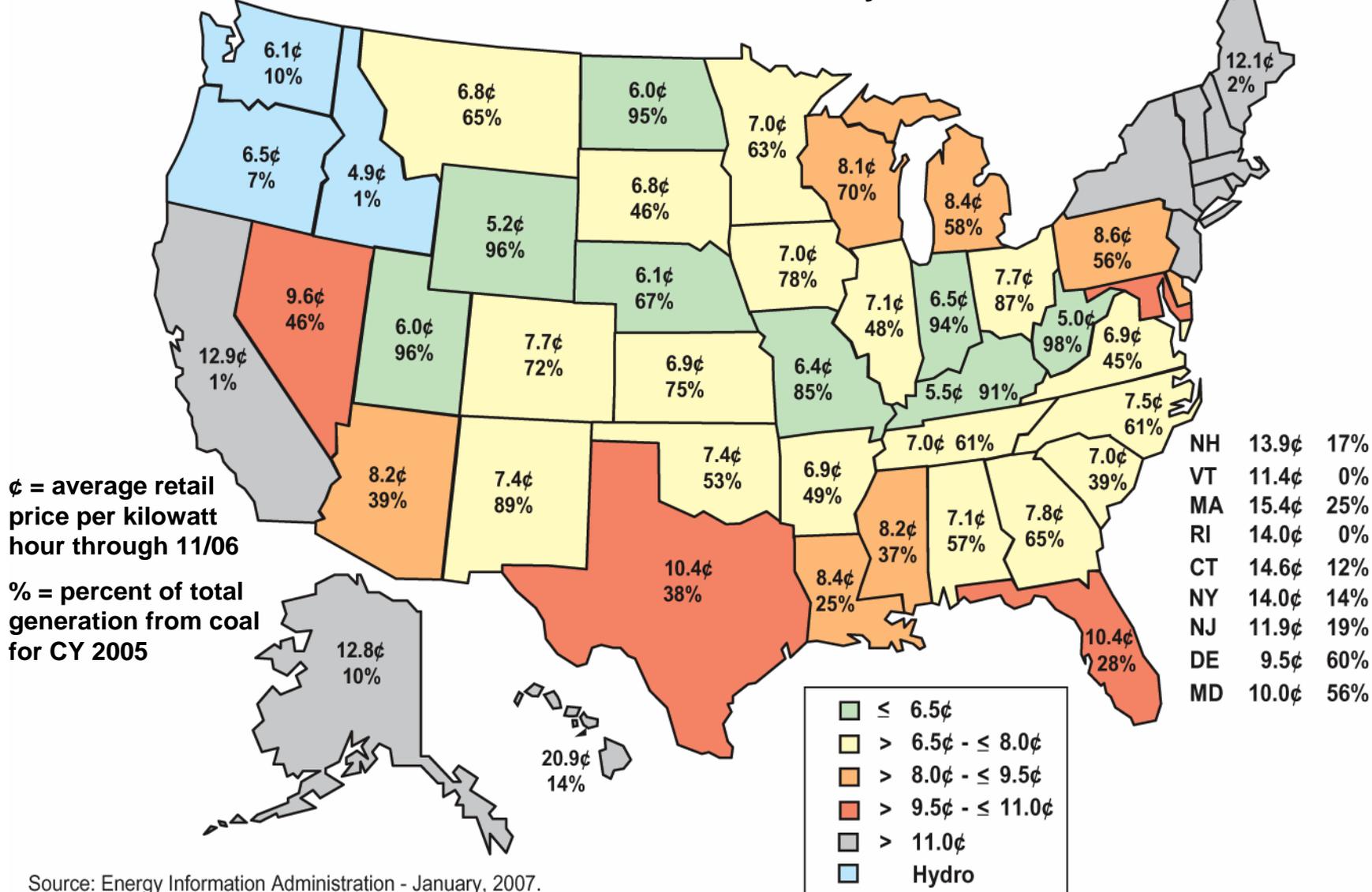
(From Base Year 2008)



Electric Companies Use a Diverse Mix of Fuels to Generate Electricity

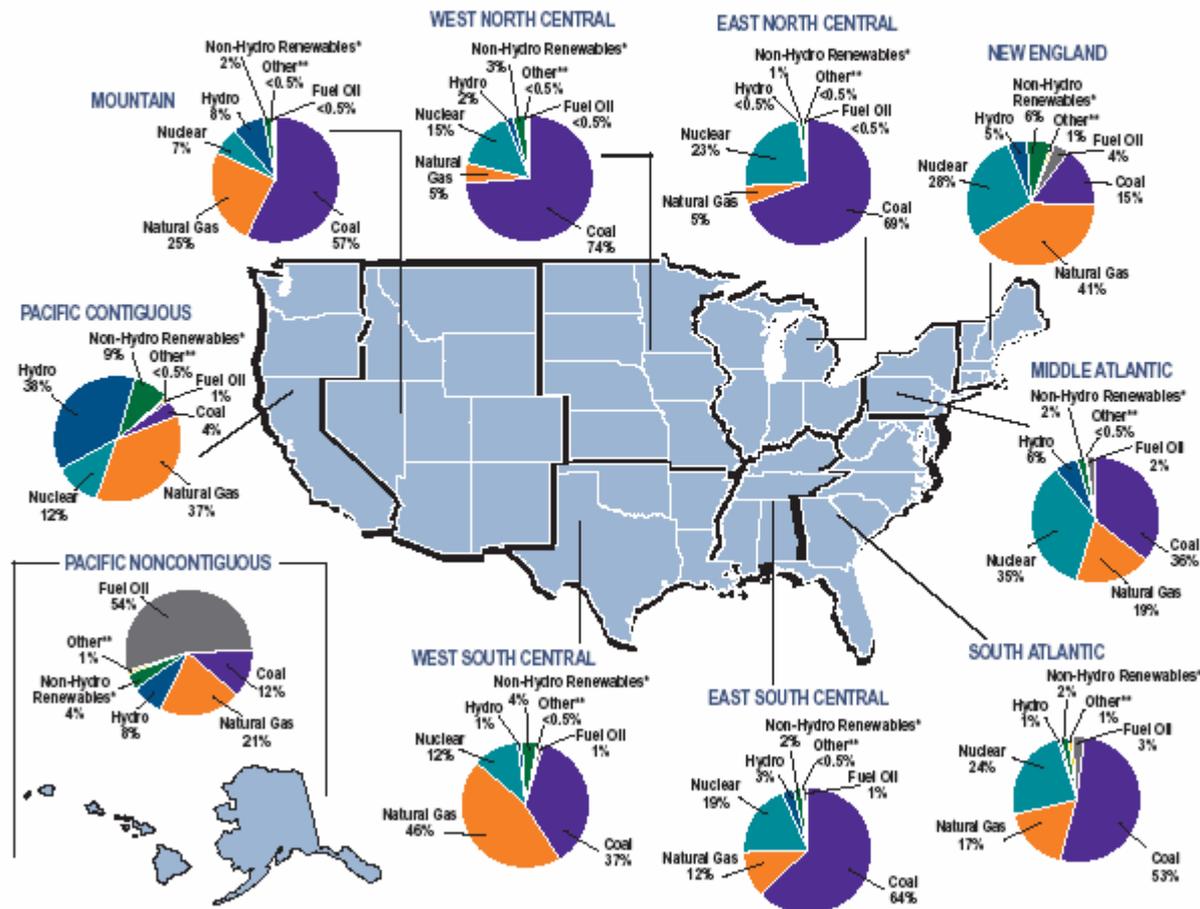


Retail Cost Per kWh & Percent of Electricity Generation from Coal



Source: Energy Information Administration - January, 2007.

Different Regions of the Country Use Different Fuel Mixes to Generate Electricity.



Across the United States, a diverse mix of fuel is used to generate electricity. Several factors influence an electric company's decision to use particular fuels. These include the price and the availability of supply. This map, arranged by census region, illustrates the diversity of fuel use and shows how the electricity generation mixes in various regions of the country differ. The map further demonstrates that major changes in the generation mix could have economic and reliability impacts, especially on a regional basis.

* Includes generation by agricultural waste, landfill gas recovery, municipal solid waste, wood, geothermal, non-wood waste, wind, and solar.

** Includes generation by fires, batteries, chemicals, hydrogen, pich, purchased steam, sulfur, and miscellaneous technologies.

Sum of components may not add to 100% due to independent rounding.

Sources: U.S. Department of Energy Energy Information Administration, Power Plant Report (EIA-906), and Combined Heat and Power Plant Report (EIA-900), 2007 Final.

February 2009

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To consider:

- Review the individual company recommendations contained within their reports.
- Abide by NARUC recommendations.
- Do not underestimate the costs.
- Impose the tax with transparency.
- Protect the consumer.