Cap & Trade vs. the Energy Industries

Thank you for joining us today.
The webinar will begin promptly at 12pm.

Please note, your phone lines will be automatically muted upon entering the webinar.

Today's Presenter: Michael B. Stuart

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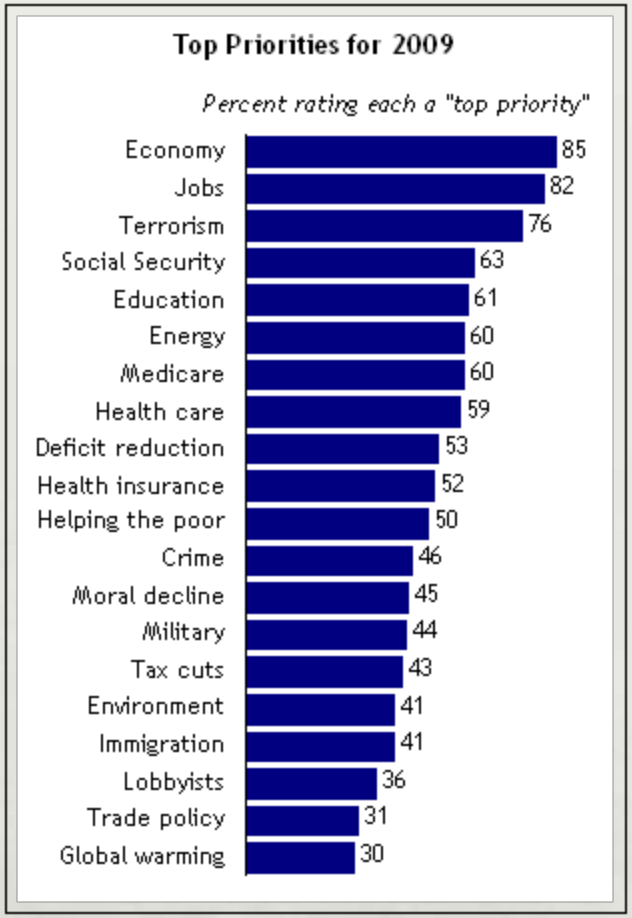
Cap & Trade vs. the Energy Industries

Climate Change: Not a Top Priority

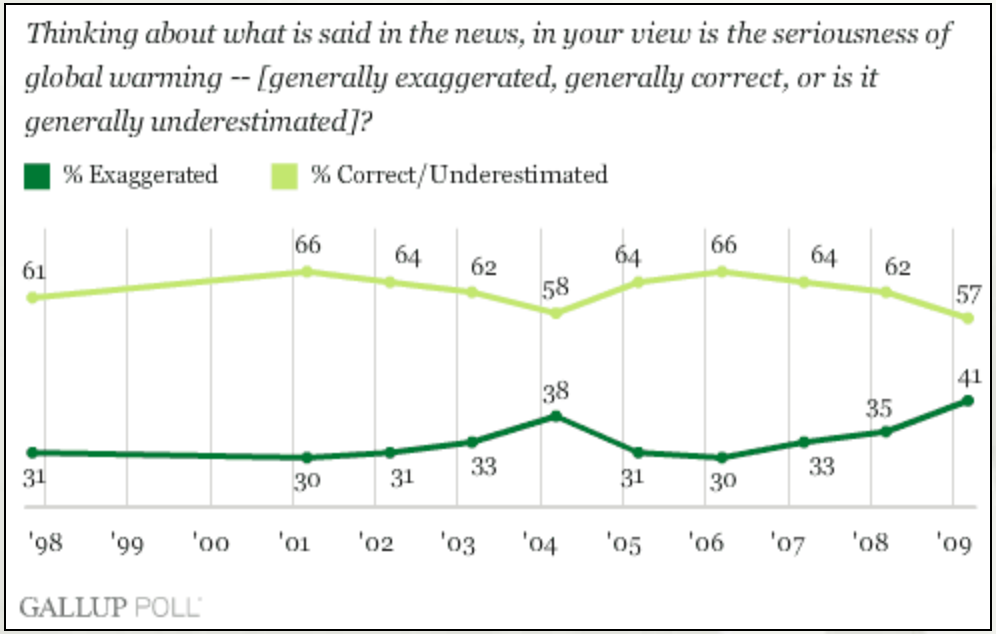
January '09 Pew Research Center poll

- Climate change ranked dead last in 20 issues of concern to Americans
- Energy ranked number 6



March '09 Gallup poll

- Majority of Americans believe seriousness of global warming either correctly portrayed in news or underestimated
- However, 41% now say it's exaggerated
- Highest level of public skepticism in more than a decade of Gallup polling on the subject



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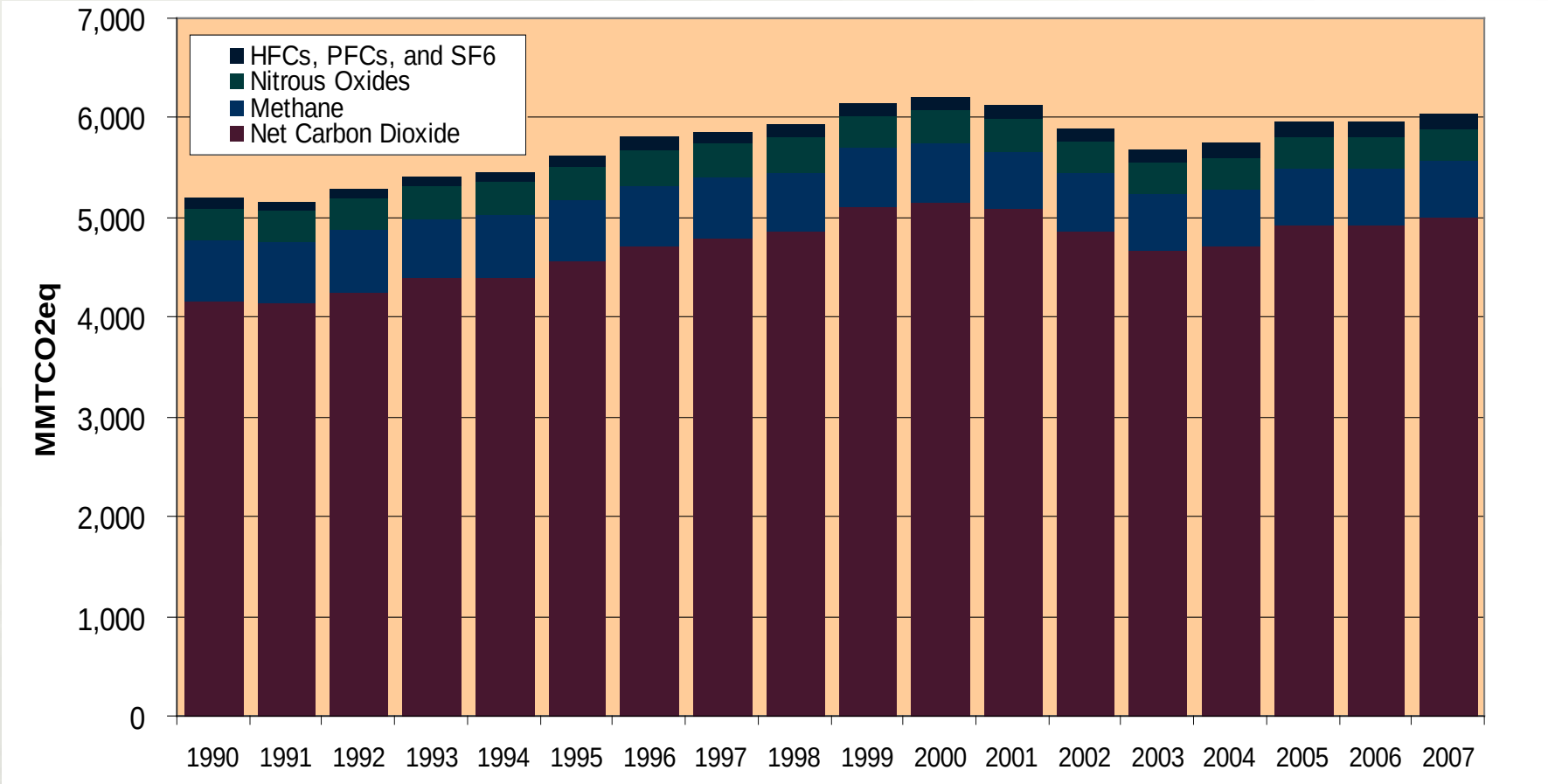
U.S. vs. World GHG Emissions

U.S. GHG emissions account for about 15% of global emissions (based on IPCC global estimate of 49 $GtCO_2$ eq. in 2004)



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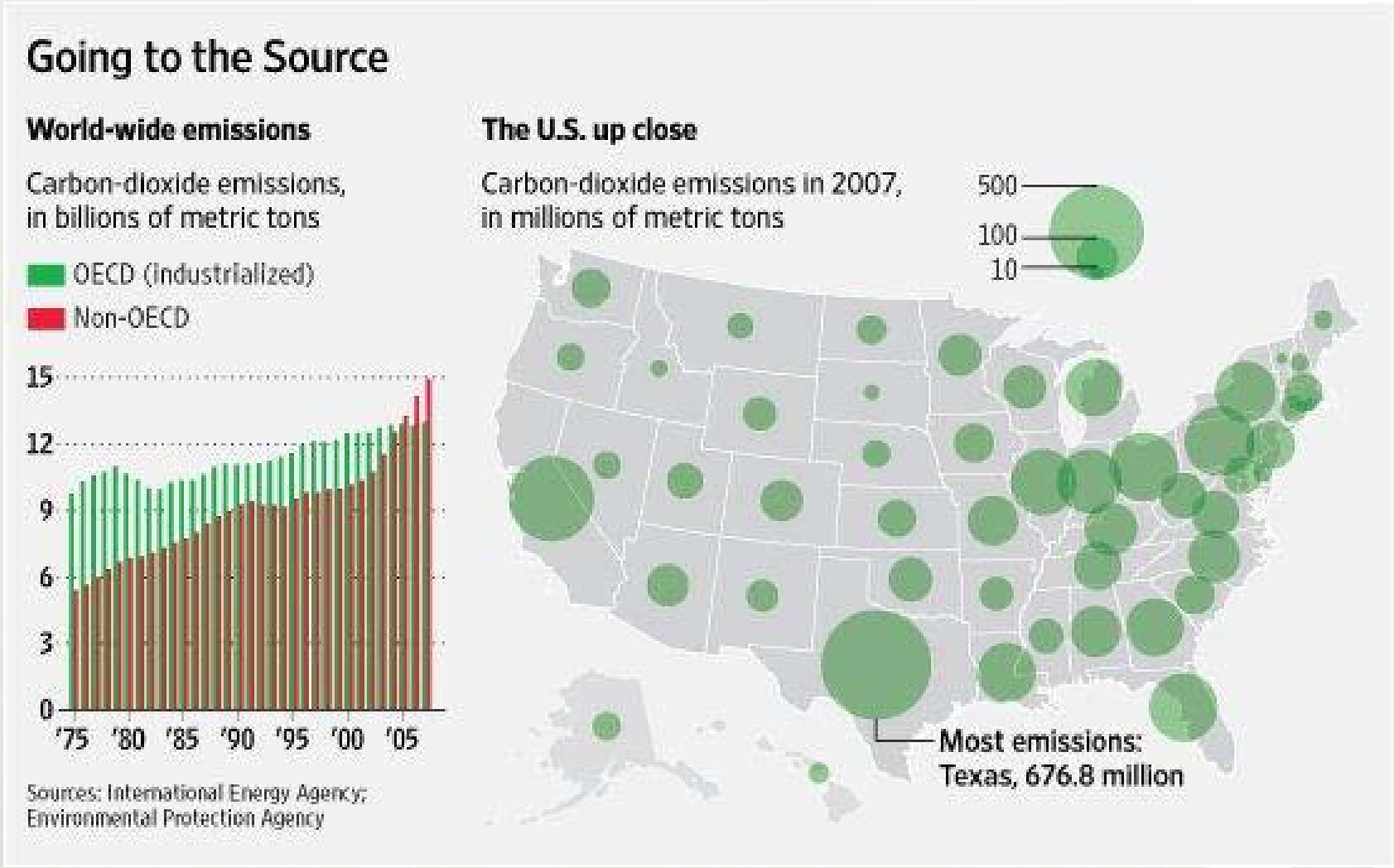
Top CO_2 Emitters



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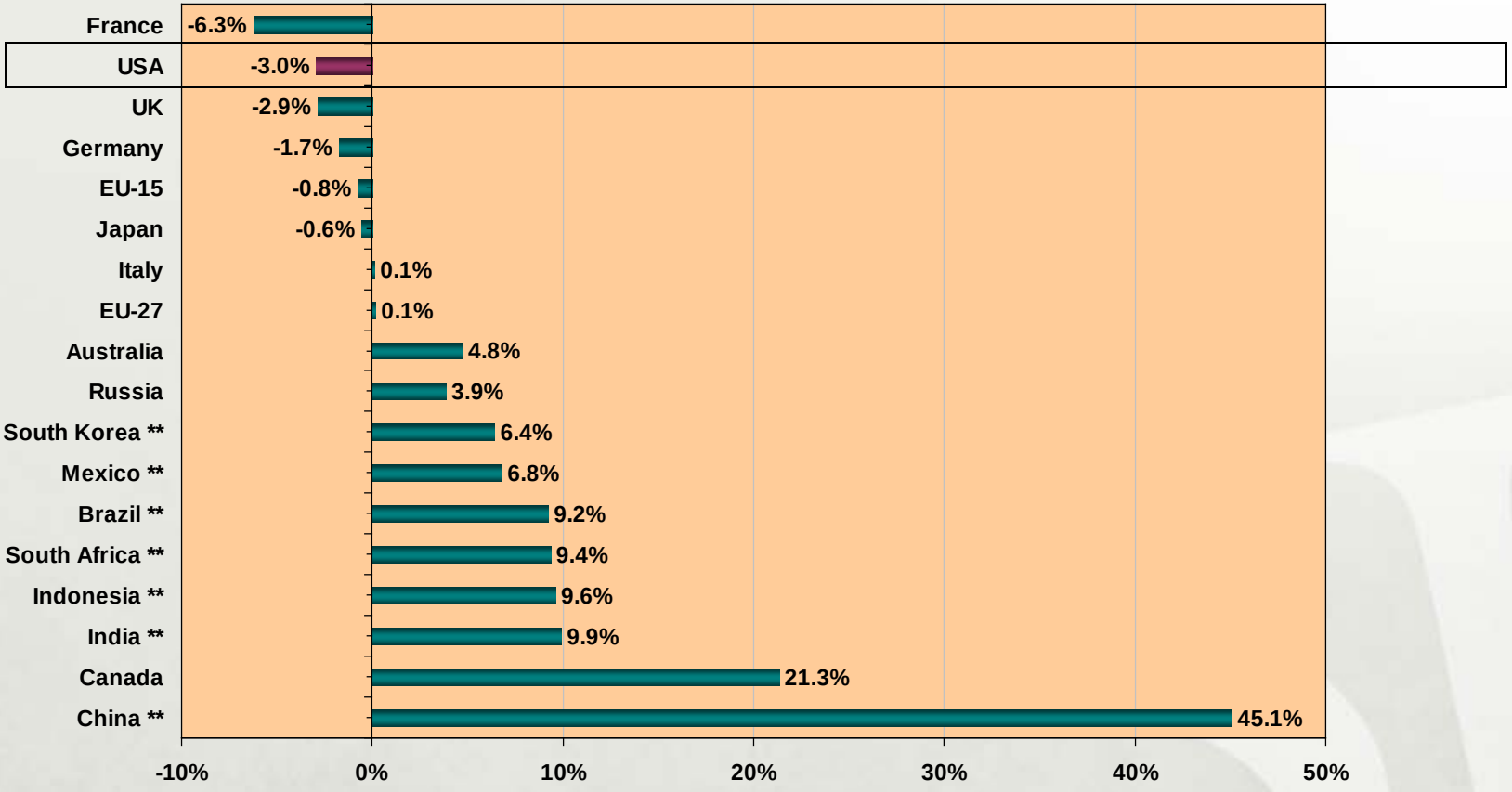
Changes in *Net* GHG Emissions 2000-2006

Seventeen Major Economies



Sources: UNFCCC, 2008 National Inventory Reports and Common Reporting Formats (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/4303.php); IEA Online Energy Services <http://data.iea.org/ieastore/statslisting.asp>.

** No UNFCCC data available for time period; 2001 through 2005 IEA data used.

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Legislative Activity

- **Lieberman-Warner-Boxer Climate Bill (2008 Senate)**
  - Economy-wide cap & trade
  - Reduce covered emissions to 1990 level by 2020, 65% below by 2050
  - **Defeated soundly**

- **Obama Administration (FY2010 Budget)**
  - Cap & trade legislation
  - Achieve 14% below 2005 by 2020 (at 1990 level by 2020)
  - **83% reduction by 2050 (80% below 1990 level)**

- **Waxman-Markey (2009 House)**
  - Economy-wide cap & trade
  - Reduce covered emissions to 17% below 2005 level by 2020, 42% below by 2030 & 83% below by 2050
  - Passed out of Committee on a mostly party-line, 33-25 vote
    - 4 Democrats & 1 Republican crossing over
  - **Passed the House by a vote of 219-212**
    - **Rahall, Mollohan, Capito voted No**

What is Waxman-Markey?

Legislation Would:

- Create a multibillion-dollar cap & trade system for large emitters
  - Includes coal-fired power plants, refineries, large manufacturers, oil & gas companies
- Require utility companies to provide at least 20% of electricity from renewable power, with up to 5% from efficiency improvements
- Change the building codes for energy efficiency
- Set literally hundreds of new lighting & appliance standards
  - “Art work lighting,” “commercial hot food holding cabinets,” etc.
- Agriculture is exempt and nuclear not addressed

How does Cap & Trade work?

Emissions trading (or **emission trading**) - administrative approach used to control pollution by providing economic incentives for achieving reductions in emissions of pollutants

CO_2 would be capped - companies or other groups would be issued emission permits and required to hold an equivalent number of *allowances* (or *credits*) which represent the right to emit a specific amount of CO_2

Total amount of allowances and credits cannot exceed the cap limiting total emissions to that level

- To increase emission allowance companies must buy credits from those who pollute less
- Transfer of allowances is referred to as a trade
- In effect, buyer is paying a charge for polluting, while seller is rewarded for reducing emissions by more than needed

Cap & Trade vs. Carbon Tax

Cap & Trade - the government sets an overall emissions cap and issues tradable allowances that grant businesses the right to emit

Those who can reduce their emissions cheaply able to sell extra allowances to others who would otherwise have to pay more to comply

Carbon Tax - emitters required to pay a tax for every ton of pollution they emit

According to Exxon's CEO, "As a businessman it is hard to speak favorably about any new tax but a carbon tax strikes me as a more direct, a more transparent and a more effective approach."

Credits vs. Offsets

Two distinct types of Carbon Credits:

Carbon Offset Credits (COC's) - clean forms of energy production, wind, solar, hydro and biofuels

Carbon Reduction Credits (CRC's) - collection and storage of Carbon from our atmosphere through reforestation, forestation, ocean and soil collection and storage efforts

Waxman-Markey utilizes both

Free Credits

We do not really know enough

Free allowances given to distribution utilities will be worth a lot

But the law is pretty clear that the benefits of receiving the free allowance go to the utility's customers**, *not their shareholders***

Bulk of free allowances given to utilities can be given only to a gas or electric distributor — not to a standalone retailer or generator.

The law says "the allowances distributed to an electric or gas local distribution company … shall be used exclusively for the benefit of retail ratepayers of such…company."

Emission Reduction Goals

- Mid-Term Goal - Cut U.S. emissions to 17% below 2005 level
  - To meet goal must cut/avoid ≈1 gigaton GHG emissions by 2020
- Long-Term Goal - Cut emissions 83% below 2005 level
  - To meet goal must cut/avoid ≈6-7 gigatons GHG emissions by 2050
- If U.S. achieved an 83% reduction in emissions in 2050
  - GHG emissions/capita would decline from 24 tons CO_2 in 2005 to 2.8 tons in 2050

Is such a transition of energy systems over a 40 year timeframe possible without severe economic harm?

And just how big is a gigaton of CO_2?

How Big is One Gigaton?

Today's Technology	Actions that Provide 1 Gigaton per Year of Mitigation
Coal-Fired Power Plants	Build 320 "zero-emission" 500-MW coal-fired power plants in lieu of coal-fired plants without CO_2 capture and storage (73% CF)—the equivalent of nearly half U.S. coal-fired nameplate generating capacity
Nuclear	Build 130 new nuclear power plants, each 1.0-GW in size (in lieu of new coal-fired power plants without CO_2 capture and storage) (90% CF)
Electricity from Landfill Gas Projects	Install 7,700 "typical" landfill gas electricity projects (typical size being 3-MW projects at non-regulated landfills) that collect landfill methane emissions and use them as fuel for electric generation
Efficiency	Deploy 290 million new cars at 40 miles per gallon (mpg) instead of new cars at 20 mpg (12,000 miles per year)
Wind Energy	Install 127,500 wind turbines (2.0-MW each, operating at 0.45 capacity factor) in lieu of coal-fired power plants without CO_2 capture and storage
Solar Photovoltaics	Install 1.7 million acres of solar photovoltaics to supplant coal-fired power plants without CO_2 capture and storage (10% cell DC eff'cy; 1700 kWh/m2 solar radiance; 90% DC-AC conv. eff'cy).
Biomass Fuels from Plantations	Convert to biomass crop production a barren area about 5.4 times the total land area of Iowa (about 200 million acres)
CO_2 Storage in New Forest.	Convert to new forest a barren area about 2.5 times the total land area of the State of Washington (over 100 million acres) (Assumes Douglas Fir on Pacific Coast)

[1]Gigaton = 1 billion metric tons.

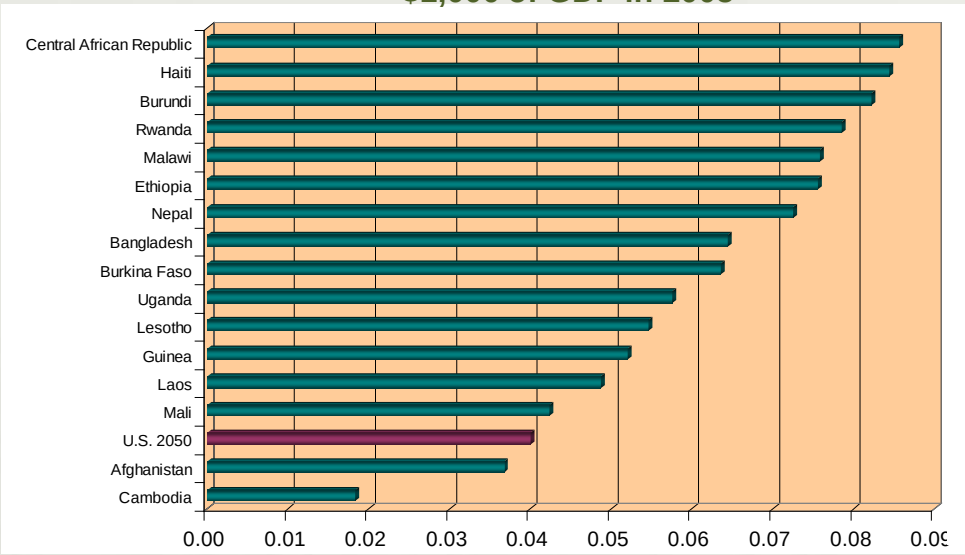
[2] Based on current technology and U.S. data.

Source: Climate Change Technology Program. 2006. *Strategic Plan.* (Numbers updated and converted from carbon equivalents to carbon dioxide.)

Some Perspective: 2050 Levels of CO_2

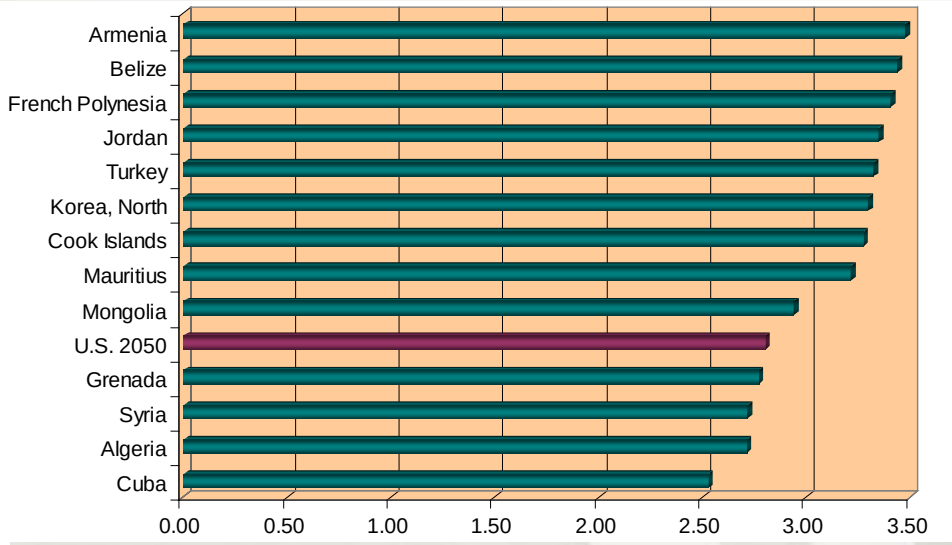
- 0.04 metric tons CO_2 / $1,000 GDP in 2050 comparable to CO_2 emissions intensities of Bangladesh, Ethiopia, Guinea, Laos, Uganda in 2005
- 2.8 metric tons / capita in 2050 comparable to the CO_2 emissions per capita of Armenia, Gabon, Jordan, North Korea, Turkey in 2005

Countries With CO_2 Emissions Intensities Less than 0.1 Metric Tons per $1,000 of GDP in 2005



Metric Tons CO_2 per Constant $1,000 of GDP (Using PPP)

Countries With per Capita CO_2 Emissions Between 2.5 and 3.5 Metric Tons in 2005



Metric Tons per Capita

Sources: EIA, World Carbon Intensity—World Carbon Dioxide Emissions from the Consumption and Flaring of Fossil Fuels Using Purchasing Power Parities, 1980-2006 <http://www.eia.doe.gov/pub/international/iealf/tableh1pco2.xls>; EIA, World Per Capita Carbon Dioxide Emissions from the Consumption and Flaring of Fossil Fuels, 1980-2006 <http://www.eia.doe.gov/pub/international/iealf/tableh1cco2.xls>. NOTE: Data for countries other than U.S. includes CO_2 from fossil fuel combustion only. The inclusion of other GHGs would raise these figures only modestly, if at all.

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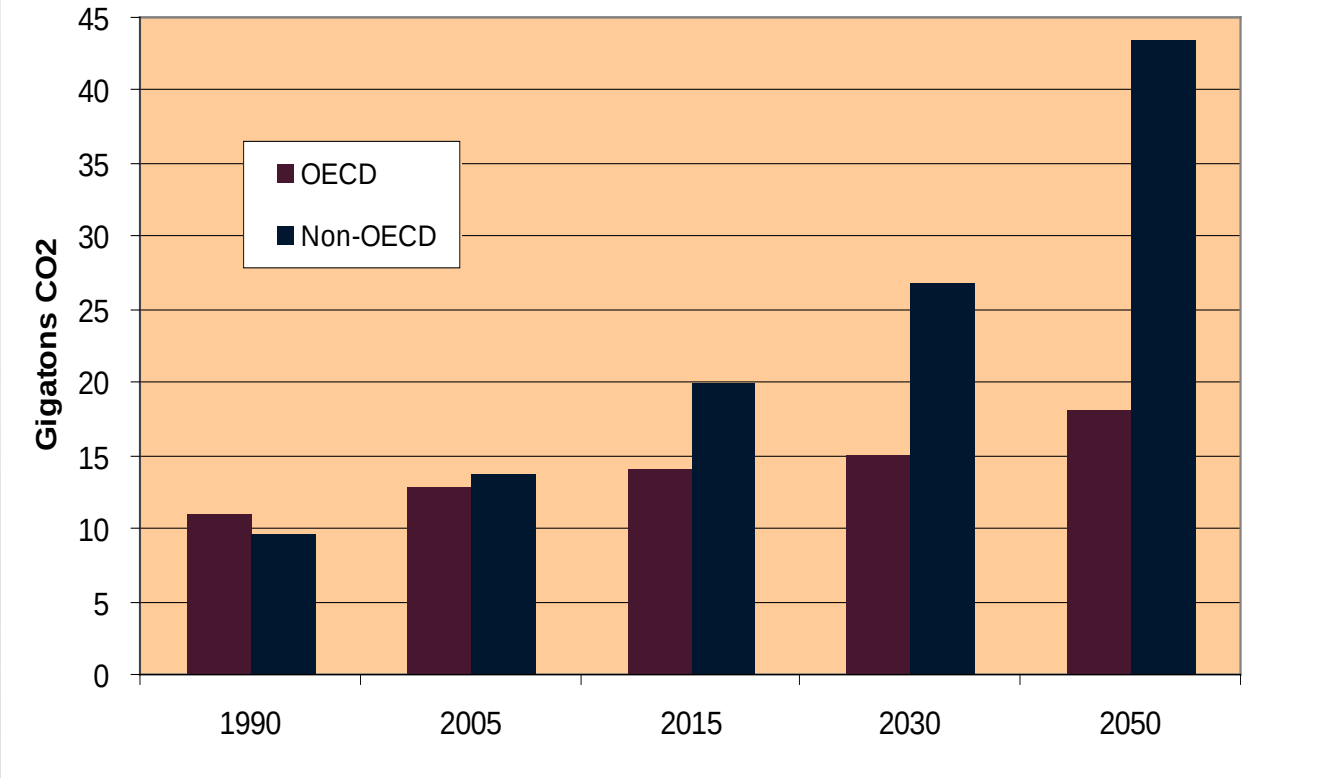
Energy-Related CO_2 Emissions 1990 - 2050

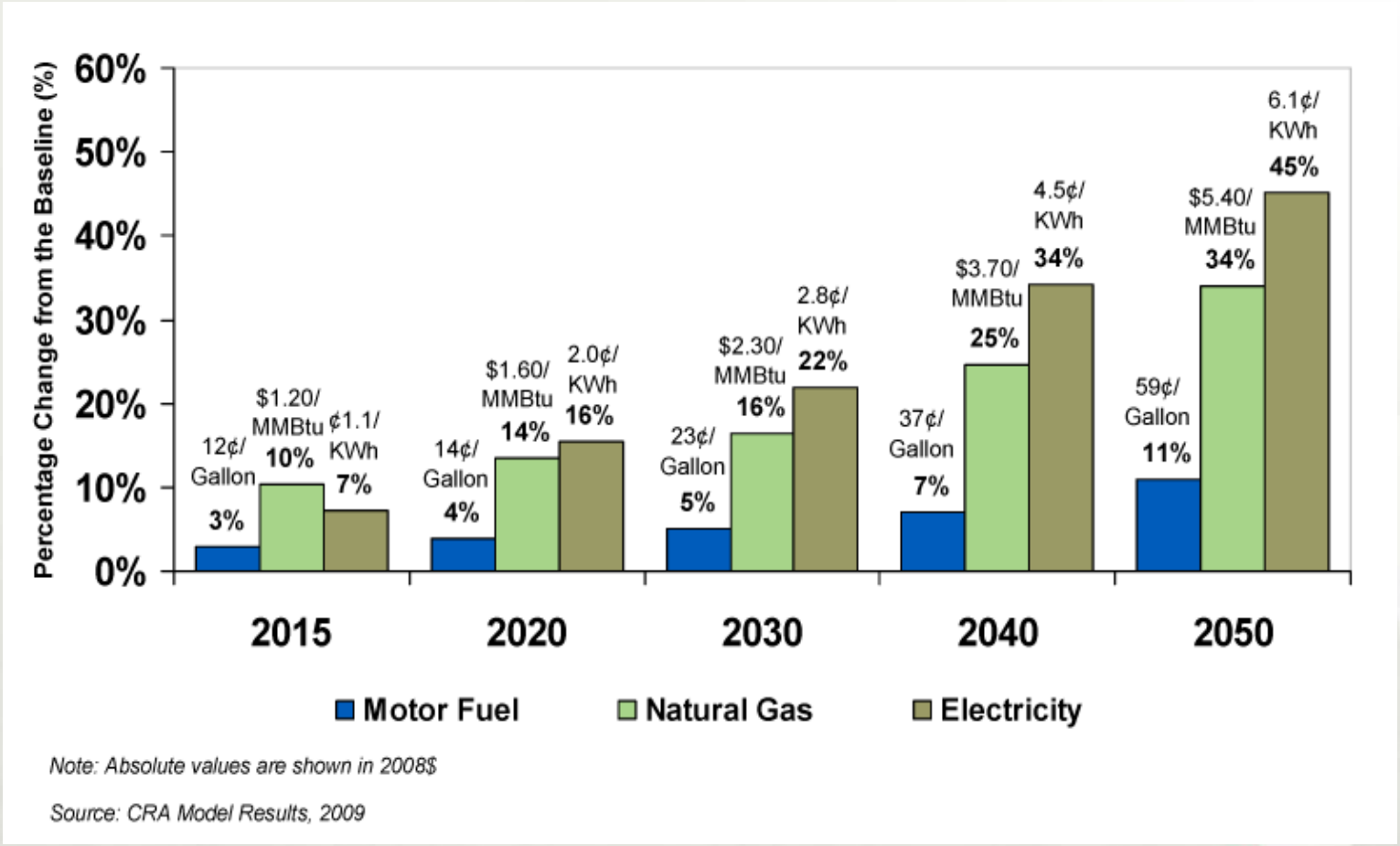
Most future emissions will come from developing countries

Over 80% expected increase in GHG emissions from 2005-2050 to come from developing countries, primarily China, India & SE Asia



Potential Impacts on Households

Potential impacts on energy prices to households, inclusive of carbon costs



Note: Absolute values are shown in 2008$

Source: CRA Model Results, 2009

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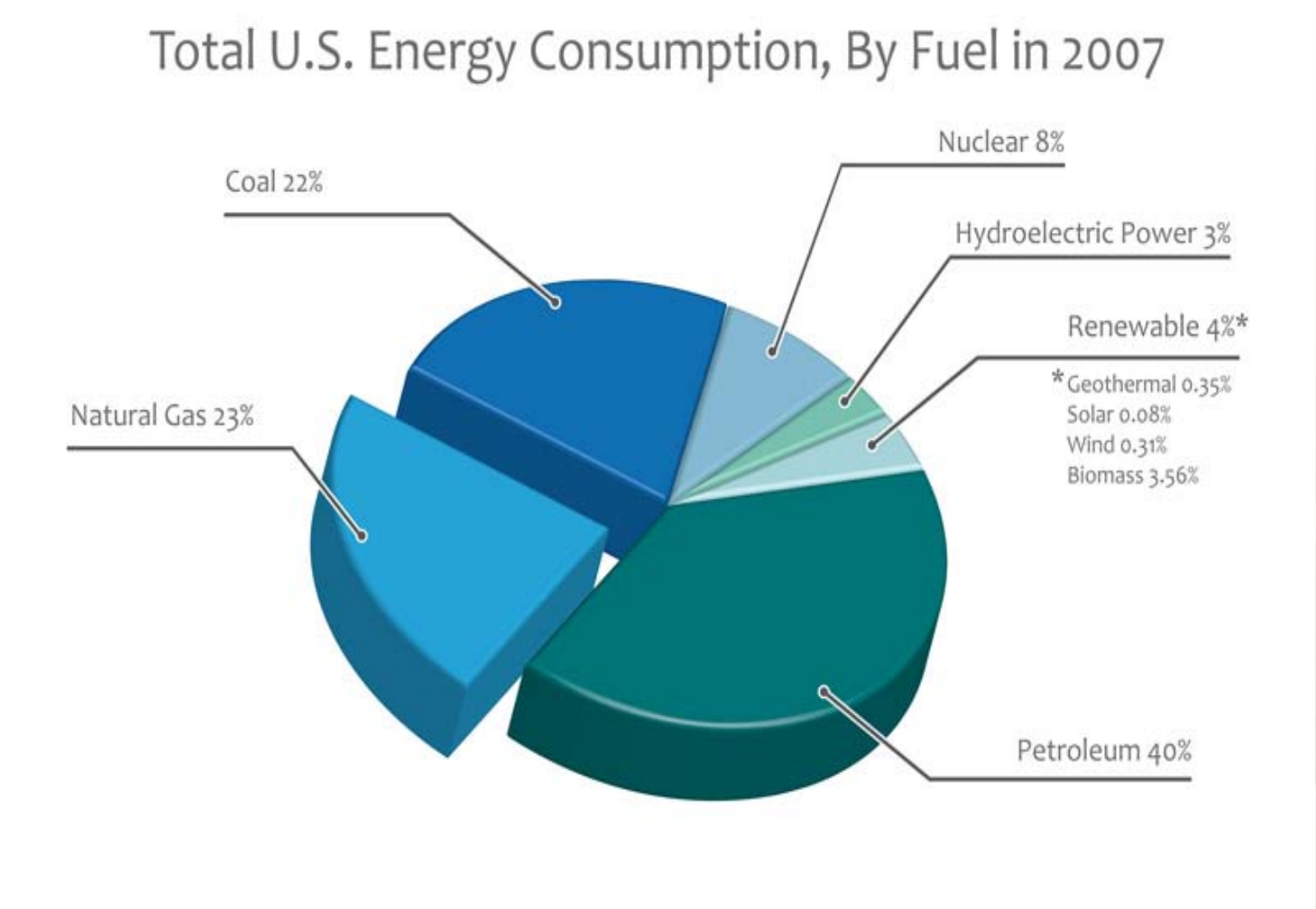
Fuel Consumption - 2007

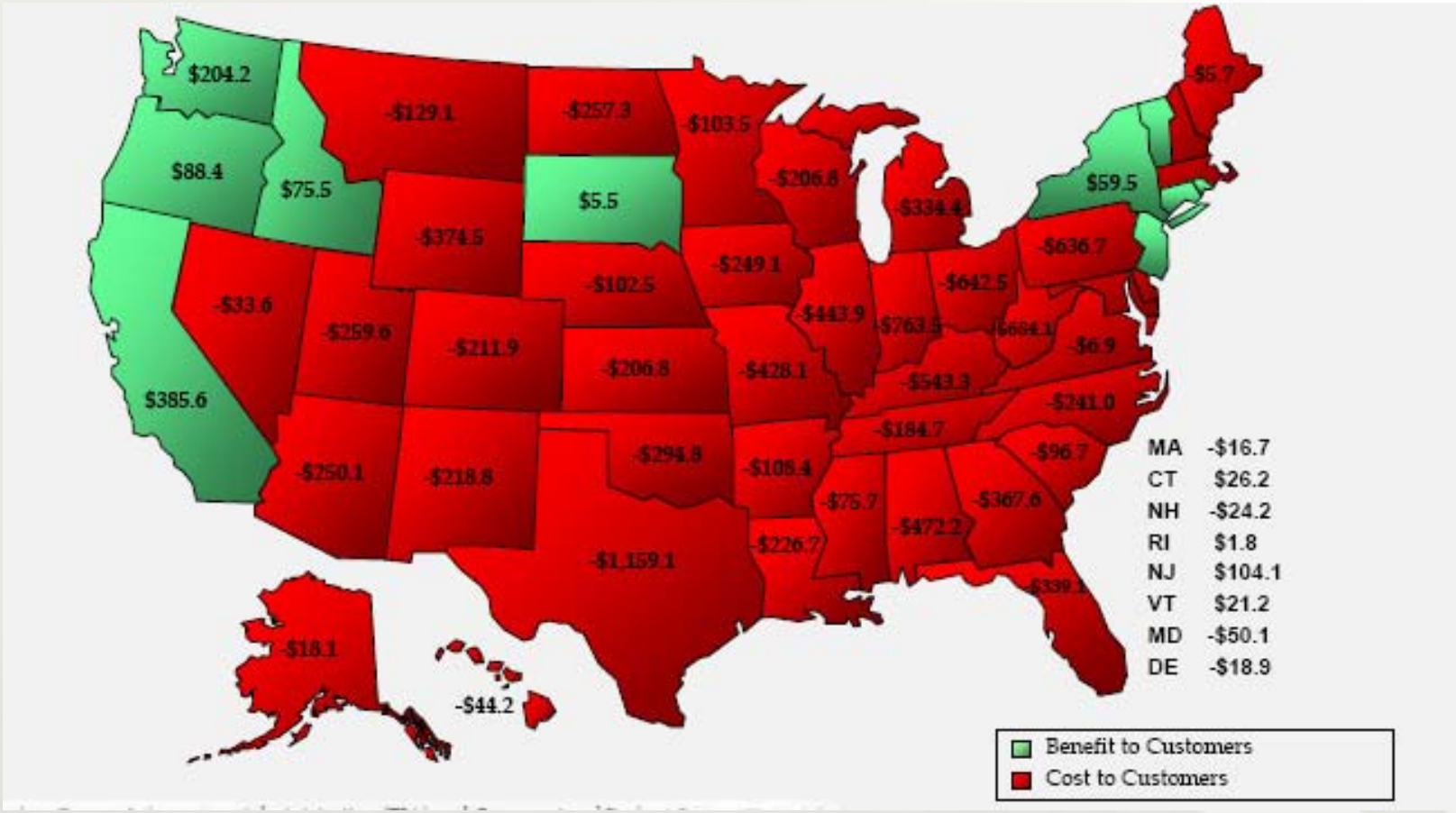


Impact of Cap & Trade

American Council for Capital Formation, National Association of Manufacturers, and others say if cap & trade becomes law

- U.S. economic growth will slow
- Industrial production will begin to decline
- Employment is negatively impacted
- Energy prices will rise, and
- Household income will drop

According to the CBO: $ in Millions



Based on the allowance allocation formula in H.R. 2454 for electricity consumers, the red states will not have enough allowances to cover their emissions from electricity generation. The shortfall in allowances to the red states will lead to higher electricity costs for consumers, the total of which will roughly correlate with the dollar losses noted on the map. For example, Texas electricity consumers will see electricity costs go up by roughly $1 billion. To make up the shortfall, red states will have to seek high-cost, non-CO2 emitting electricity sources, reduce electricity production and consumption, or purchase allowances from the green states, or purchase domestic and international offsets, likely a combination of the three.

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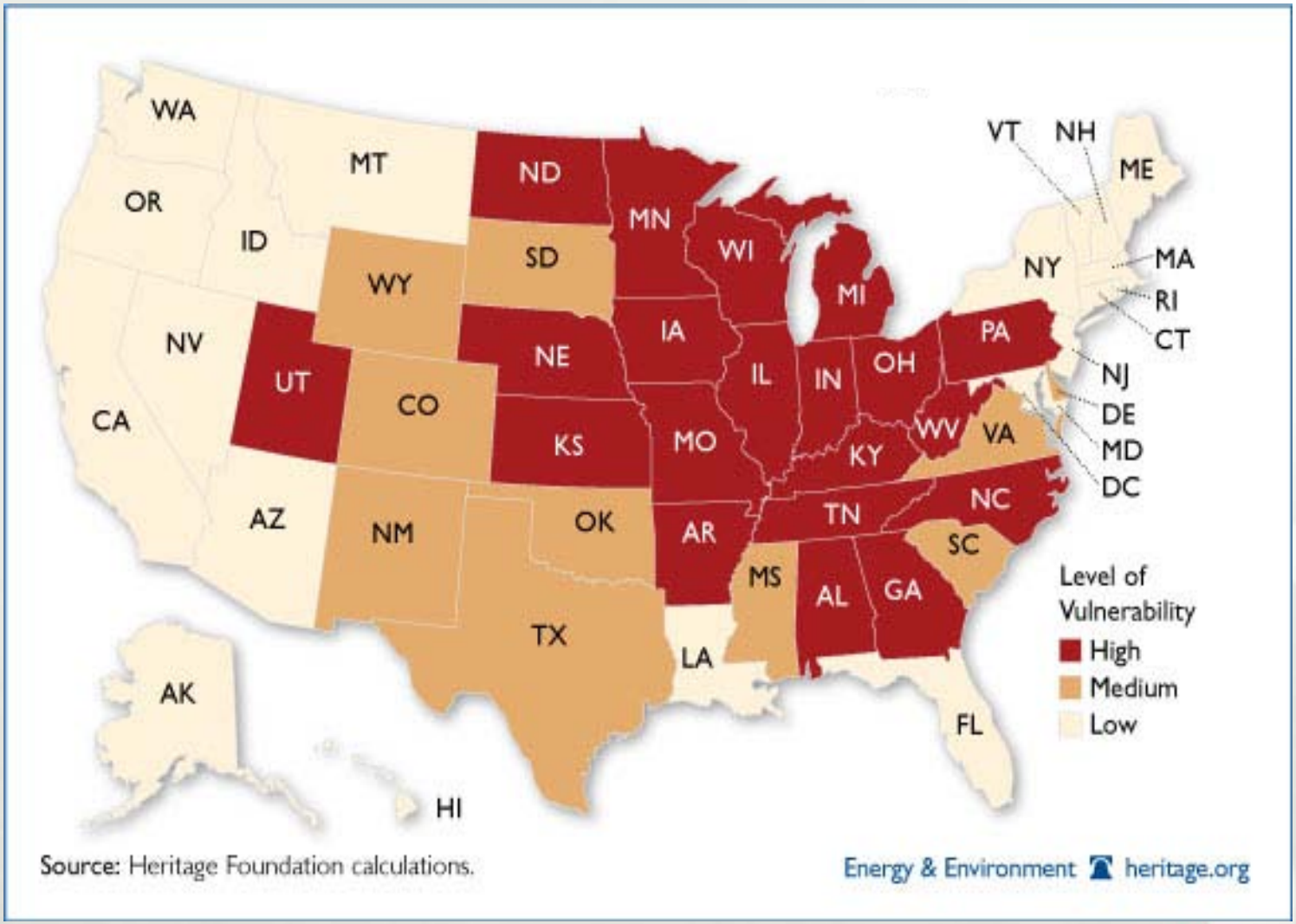
Vulnerability of States to Energy Tax



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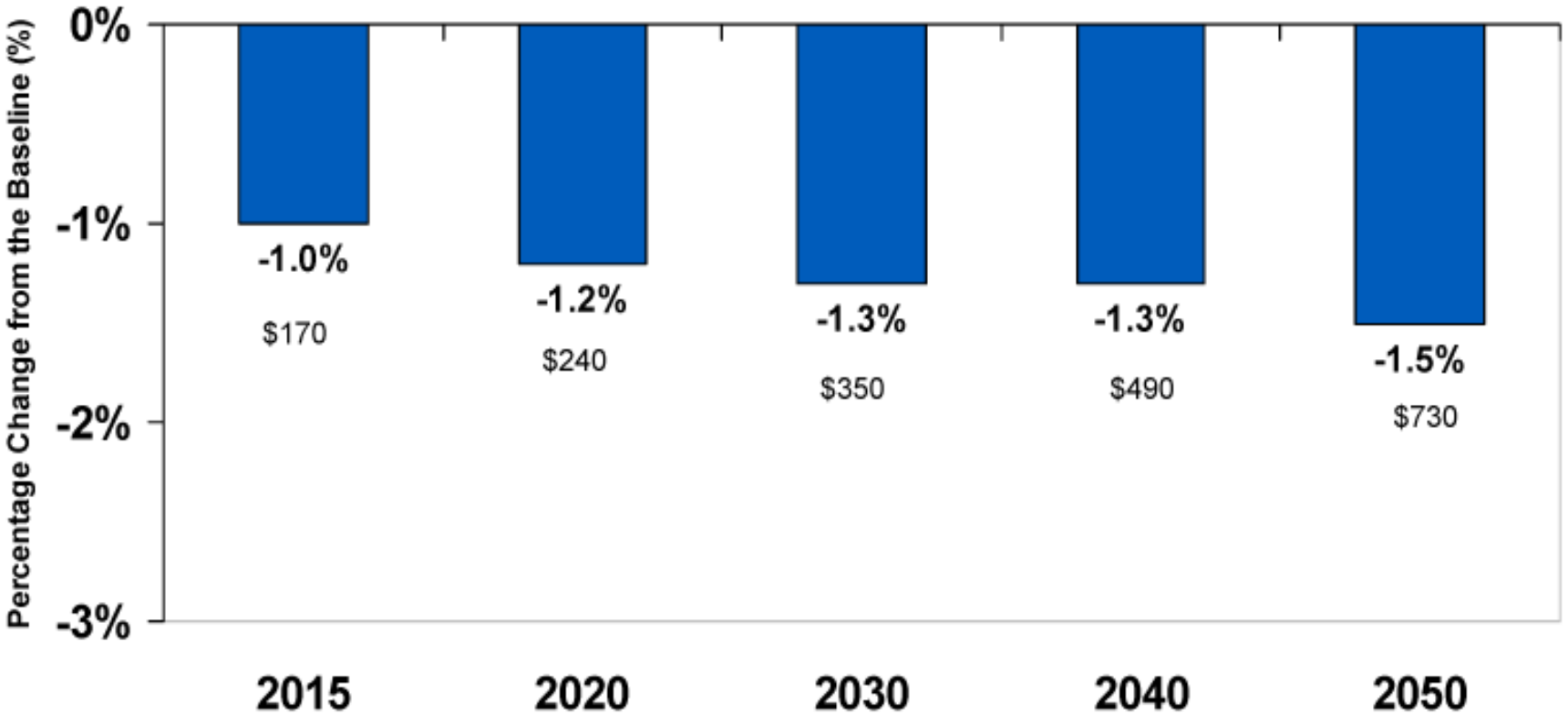
GDP Impacts Relative to No Climate Policy



Note: Absolute values are shown in Billions of 2008$

Source: CRA Model Results, 2009

But Could Cap & Trade be a Friend to NG?

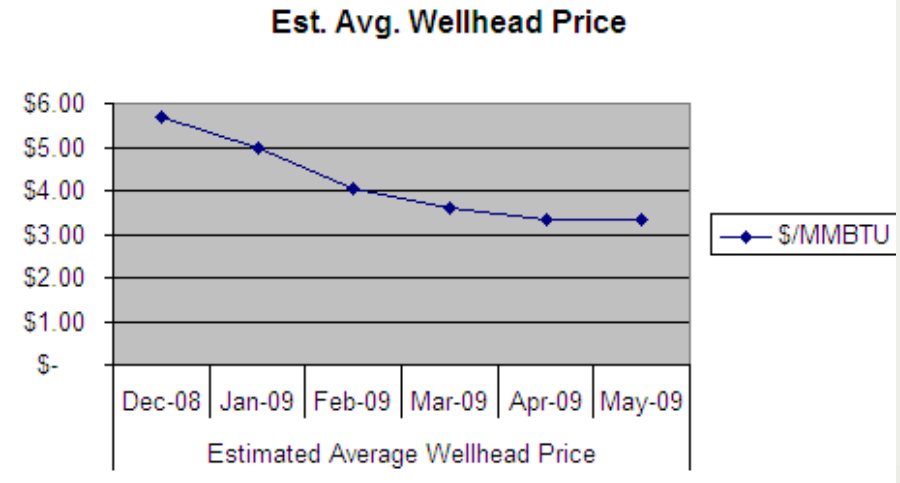
Current climate for NG

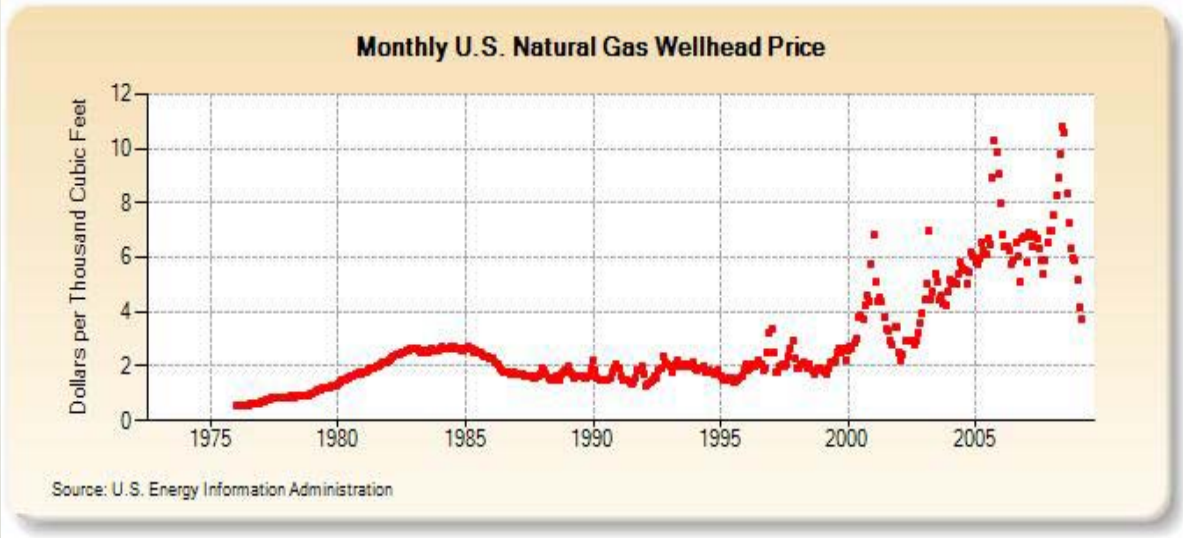
- NG prices have dropped substantially
- Price not high enough to support certain drilling
- Foreign liquified gas entering US market
- 39% increase in US gas resources

After Cap & Trade

- Coal is targeted CO_2 emitter
- Best natural gas power plants produce less than half as much carbon dioxide / kWh of electricity as coal fired power plants
- Coal fired power plants could become gas-fired power plants

Current Wellhead Gas Trends… DOWN





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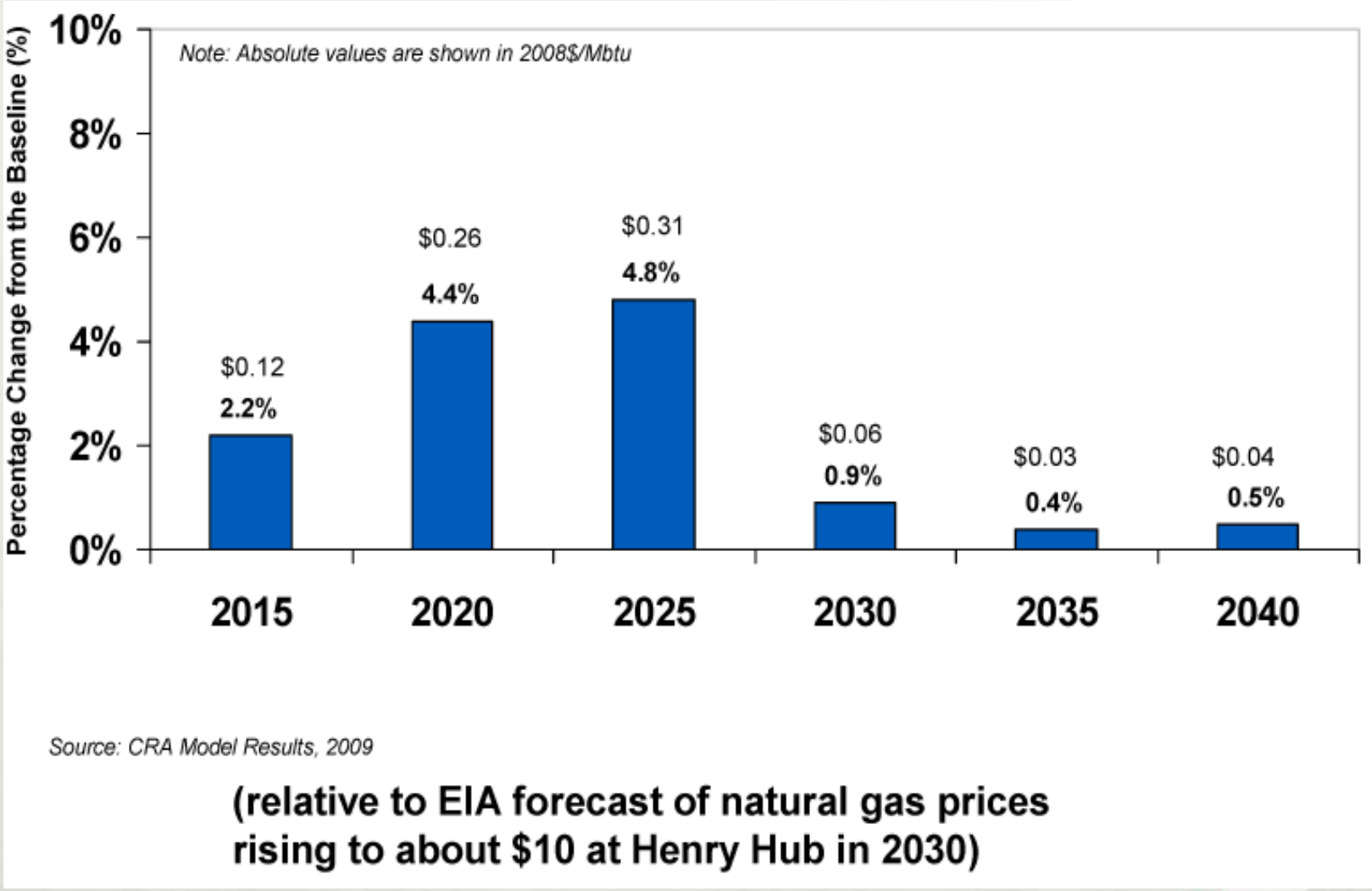
Impact on Natural Gas Wellhead Prices



Source: CRA Model Results, 2009

(relative to EIA forecast of natural gas prices rising to about $10 at Henry Hub in 2030)

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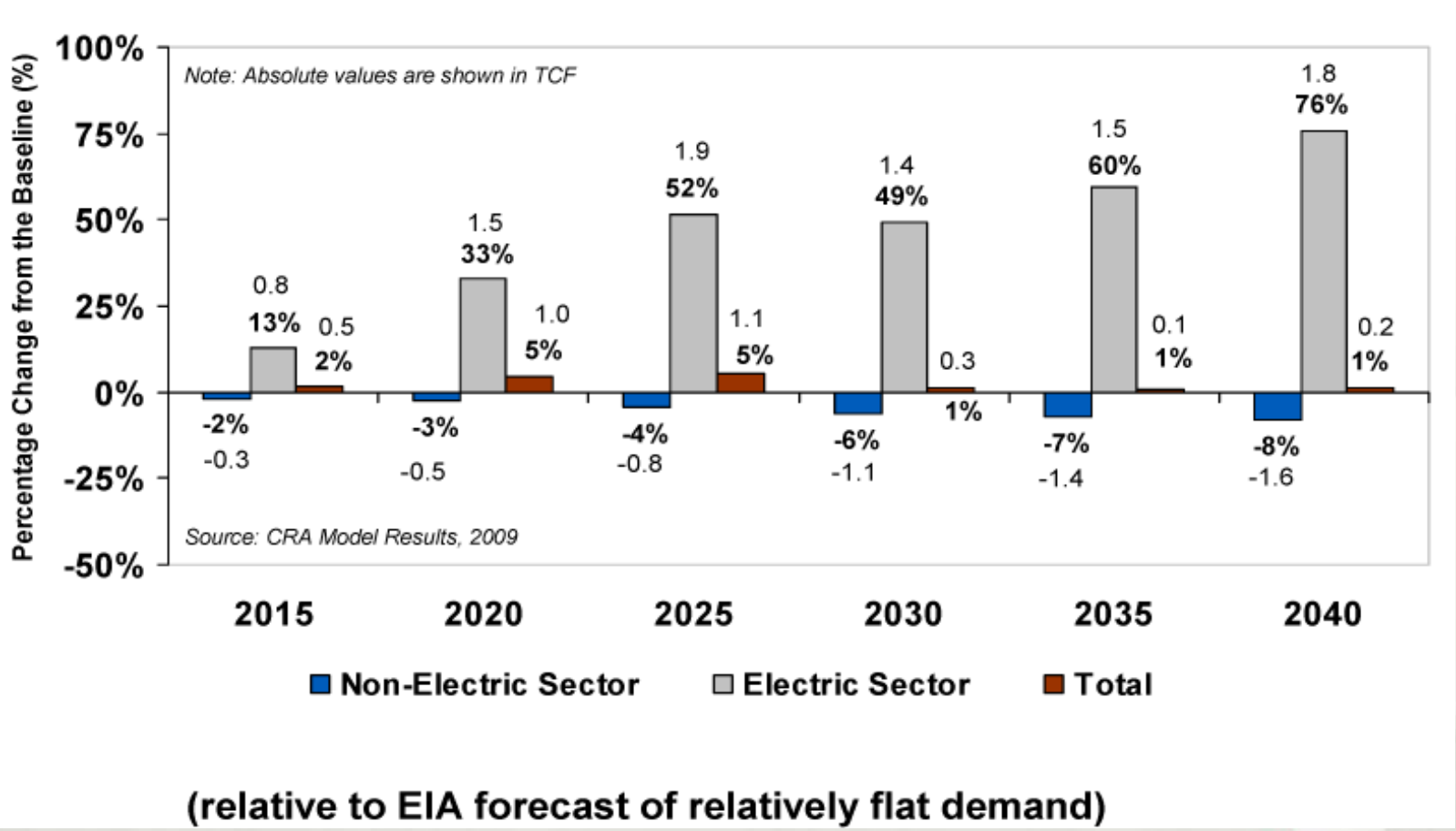
Increased Natural Gas Demand

Increased natural gas demand in electric sector
Mostly offset by non-electric sector through 2040



(relative to EIA forecast of relatively flat demand)

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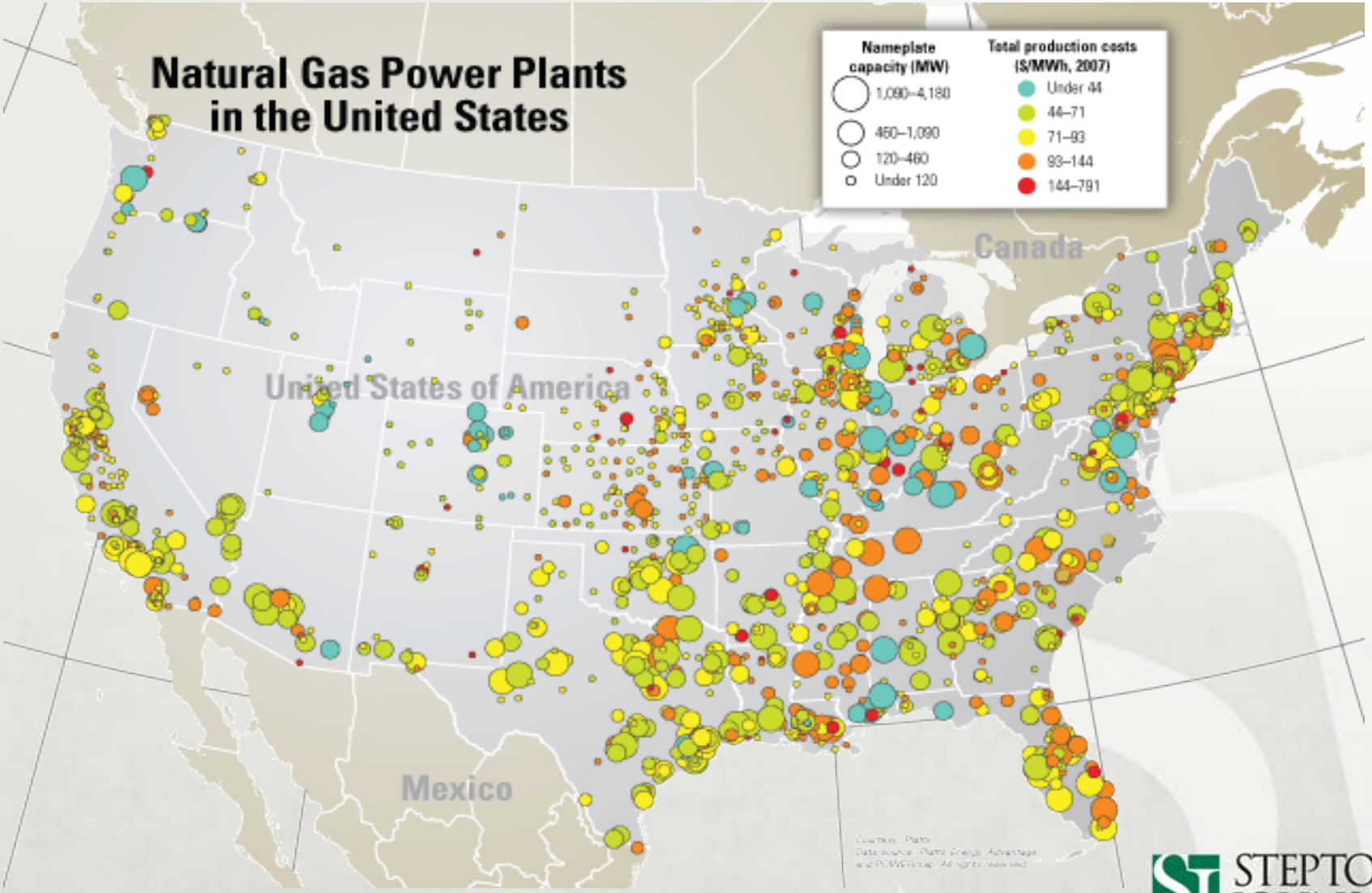

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Oil and Gas Production

Natural gas can make a substantial contribution to GHG mitigation

- Additional 10 TCF annually by 2020 could allow closure of 200 GW of coal plants
  - Would reduce GHG emissions by 840 million metric tons per year or 12% of total GHG emissions in 2007

- How would natural gas compete with coal if shale gas is abundant and low in cost?

Climate policies could increase natural gas prospects if

- **Carbon prices are kept low by offsets**
- **Other "energy" mandates do not rule it out**

Implications of Climate Policy

Threats to Oil and Gas Production

- Natural gas hindered by renewable, low carbon fuel standards that force uneconomic renewable, electric vehicle technologies into market
- Petroleum demand threatened if international offsets less readily available
- Oil & natural gas production vulnerable to proposed tax changes, notably ending expensing of intangible drilling costs and limits on access
- Natural gas, albeit cleaner than coal, is a fossil fuel and emits CO_2

Could cap & trade be only the beginning?

What Does This Mean for Natural Gas?

Short Term

- NG prices, demand likely increase due to inability of renewables to keep pace and "better" CO_2 than coal
- There is a price in terms of company economics, overall economic factors

Long Term

- Uncertain at best
- Industrial production could decline, possibly reducing demand for NG
- Natural gas could be targeted in favor of non-fossil fuel alternatives

The meeting host will now open phone and chat lines for questions.

To pose a question to the presenter, please click “Raise Your Hand” and the host will open your phone line.

You may also ask questions by typing your question into the chat box on the lower right-hand portion of the screen.

Thank you for participating!

Mark Your Calendar
December 15
The U.S. EPA's Proposed Regulation of CO_2

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