Gambling with Coal

How Future Climate Laws Will Make New Coal Power Plants More Expensive

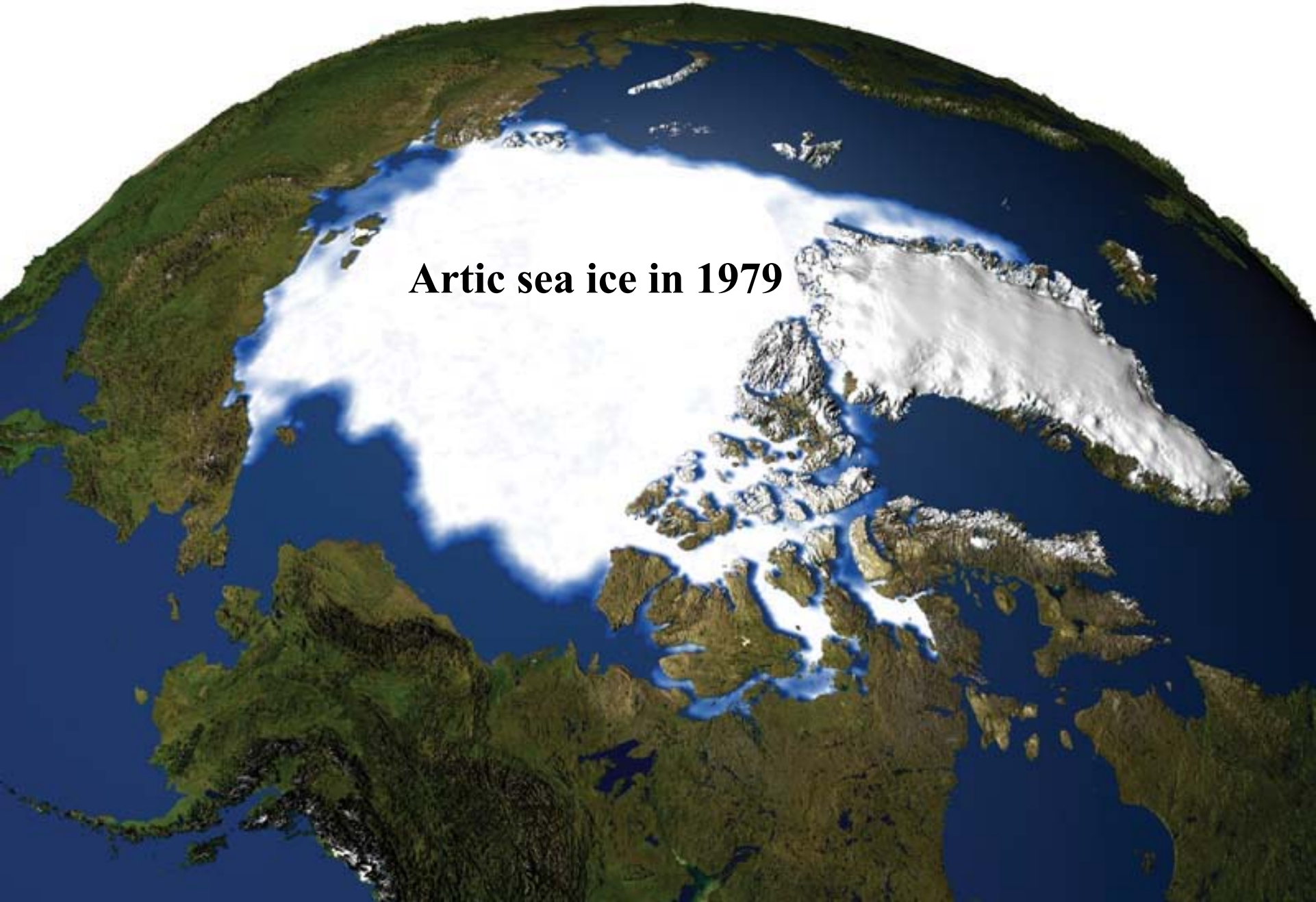
Steve Clemmer
Research Director, Clean Energy Program
Union of Concerned Scientists

Wind Powering America State Summit
Los Angeles, CA
June 7, 2007

Overview of the arguments

- Scientific consensus on global warming
- Emerging climate policy response
- Changing attitudes in the private sector
- Financial impact of carbon reduction laws on coal

The debate on the science is over…



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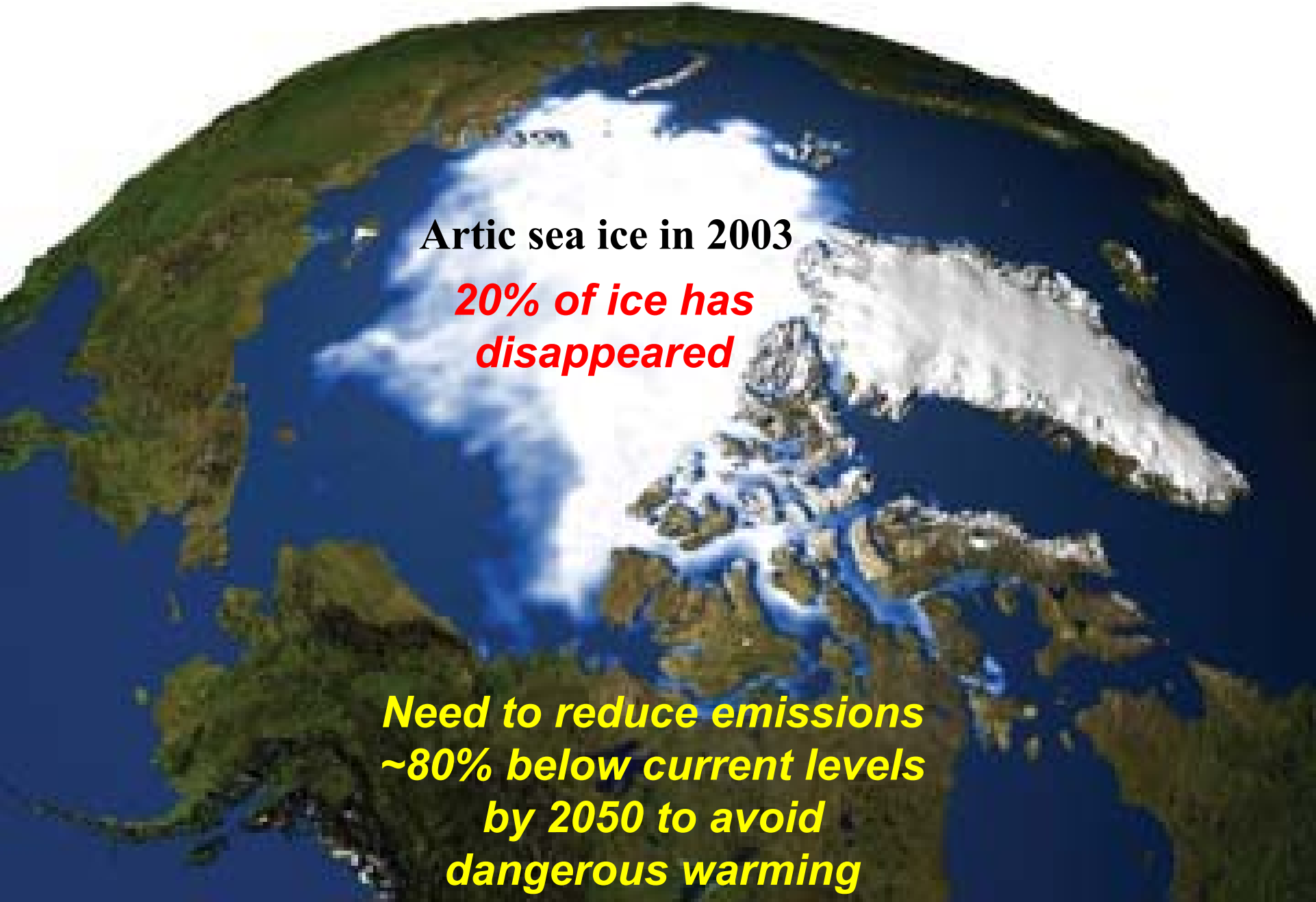
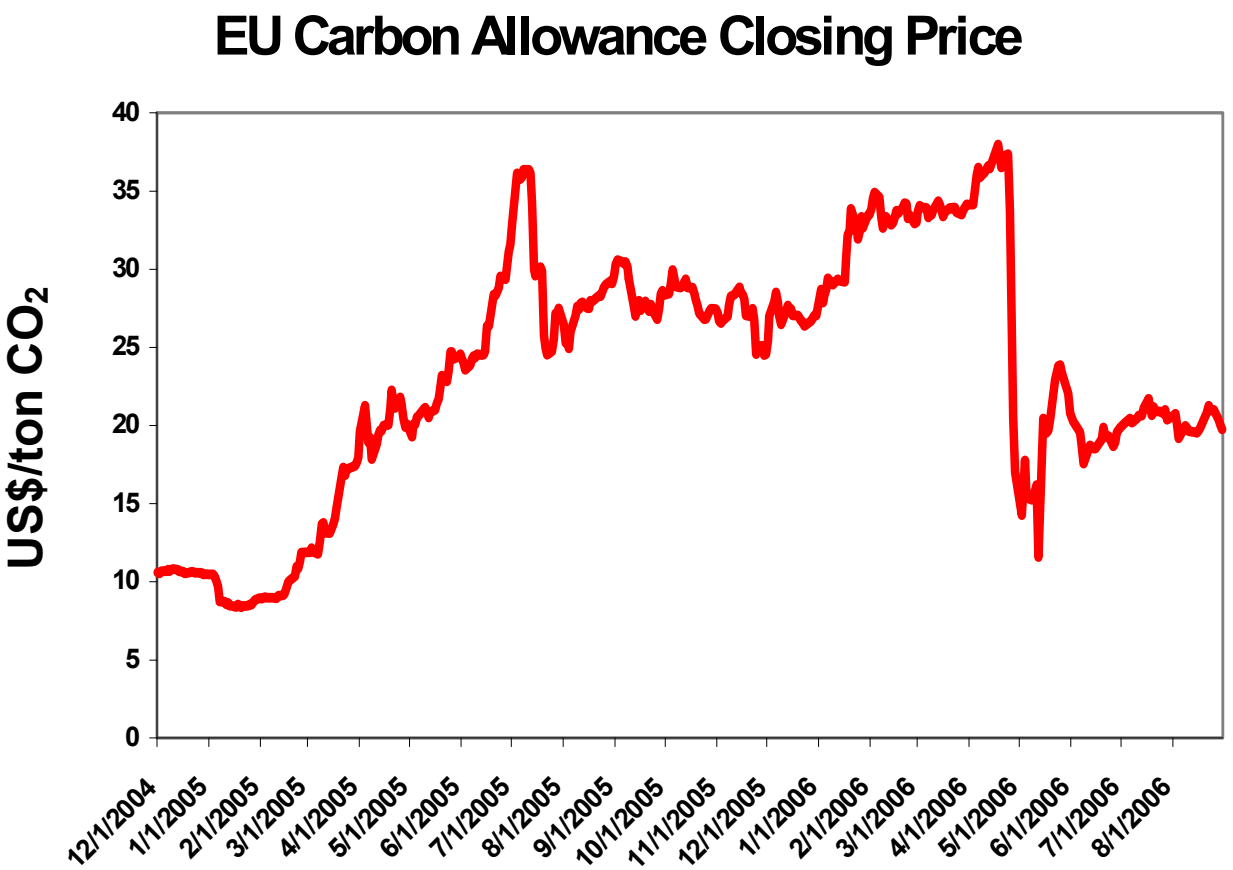
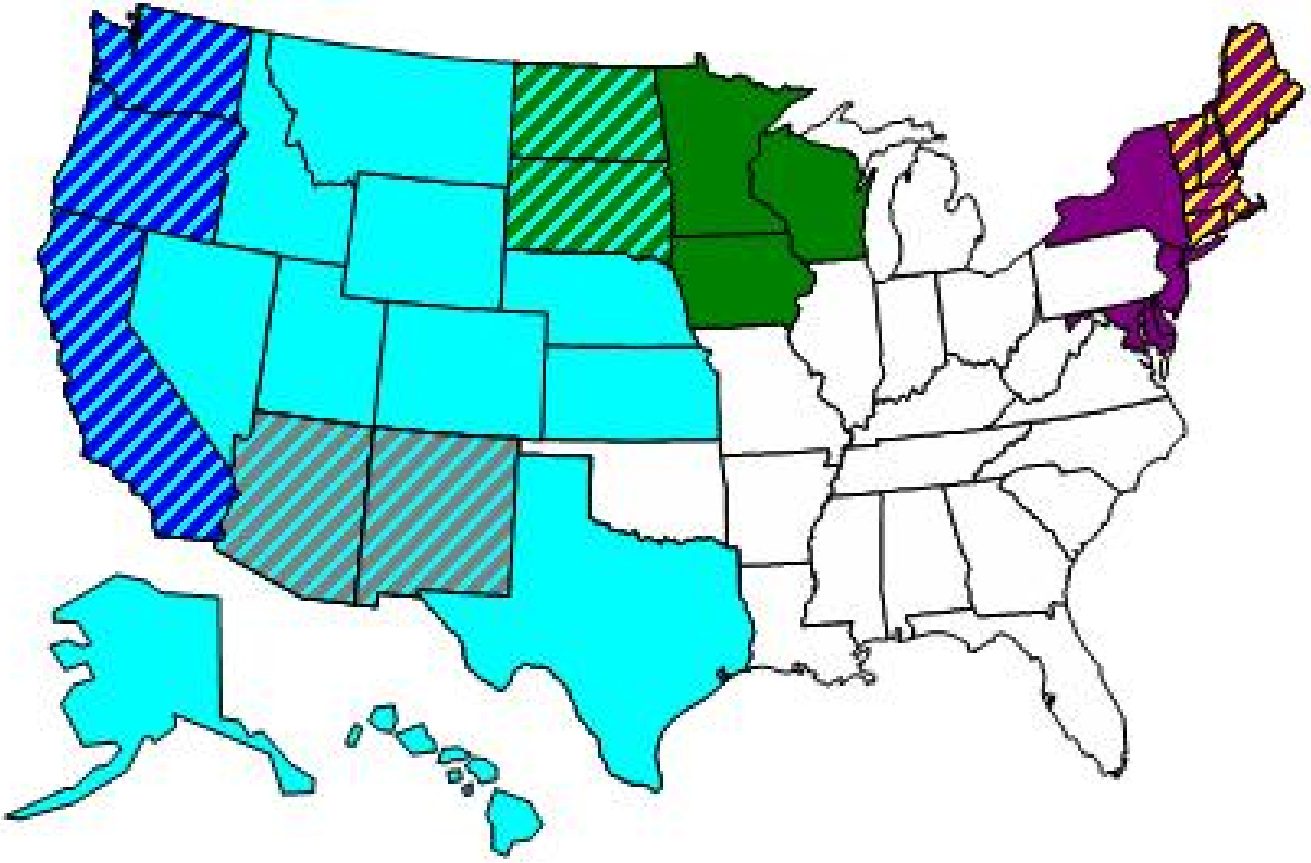


Global climate policy response



- Kyoto and beyond: US isolated and under pressure to act
- EU cap-and-trade system
- G8 agreement

Regional global warming initiatives



West Coast Governors' Initiative

Powering the Plains

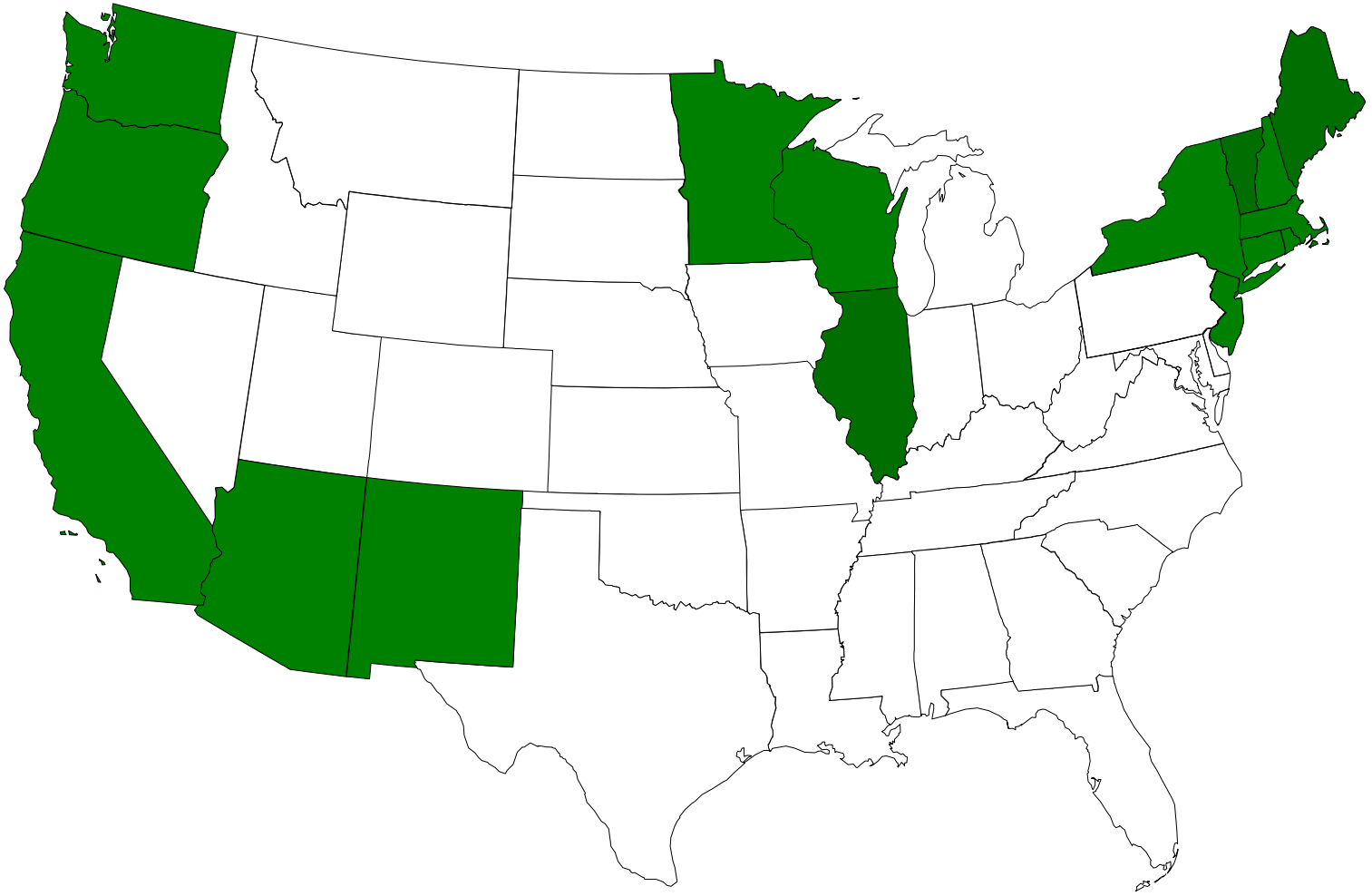
NEG-ECP

Southwest Climate Change Initiative

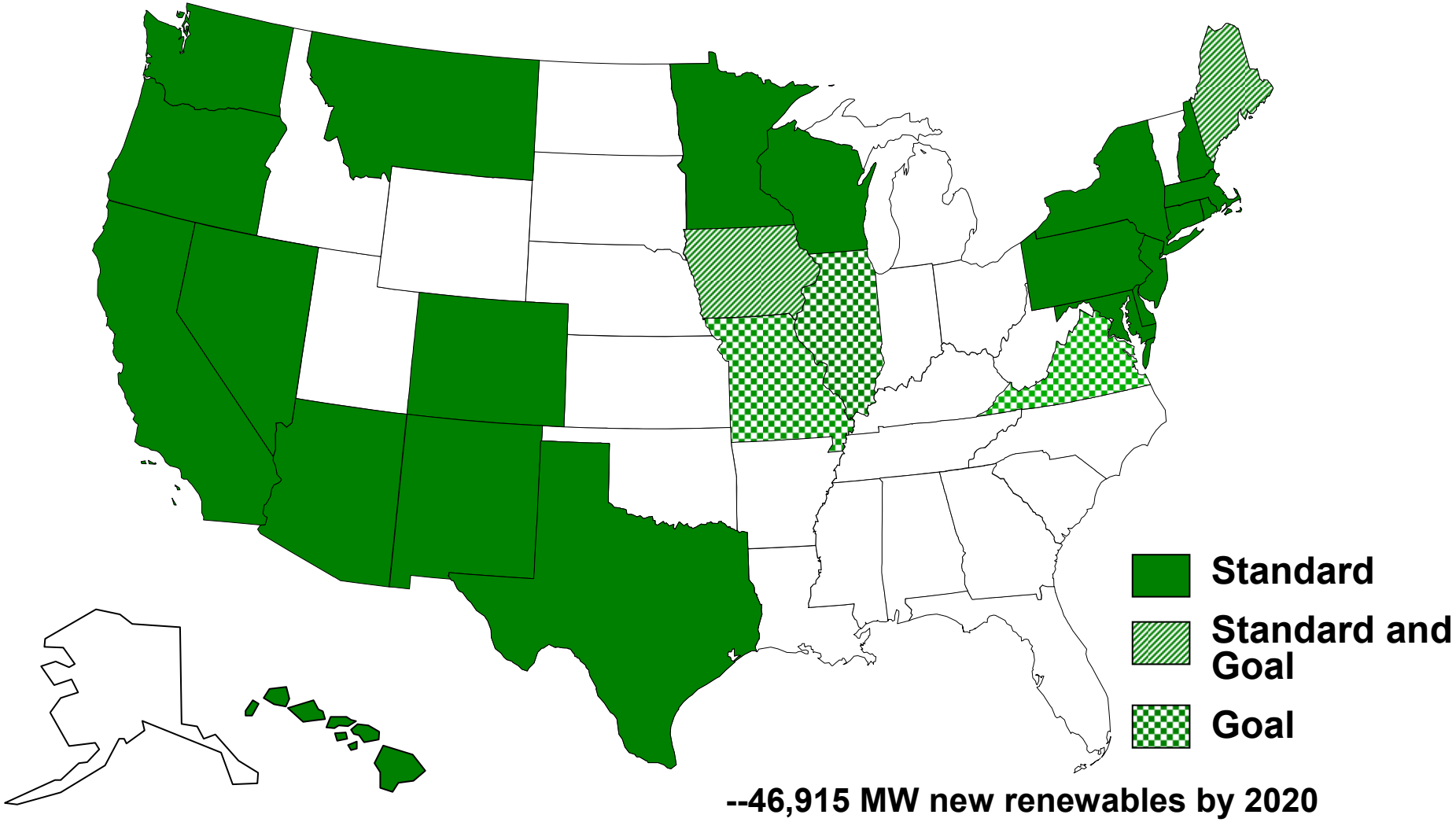
WGA

RGGI

State global warming reduction targets



Renewable Electricity Standards



--46,915 MW new renewables by 2020
--CO_2 reductions: 109.8 Million Metric Tons = 17.9 million less cars

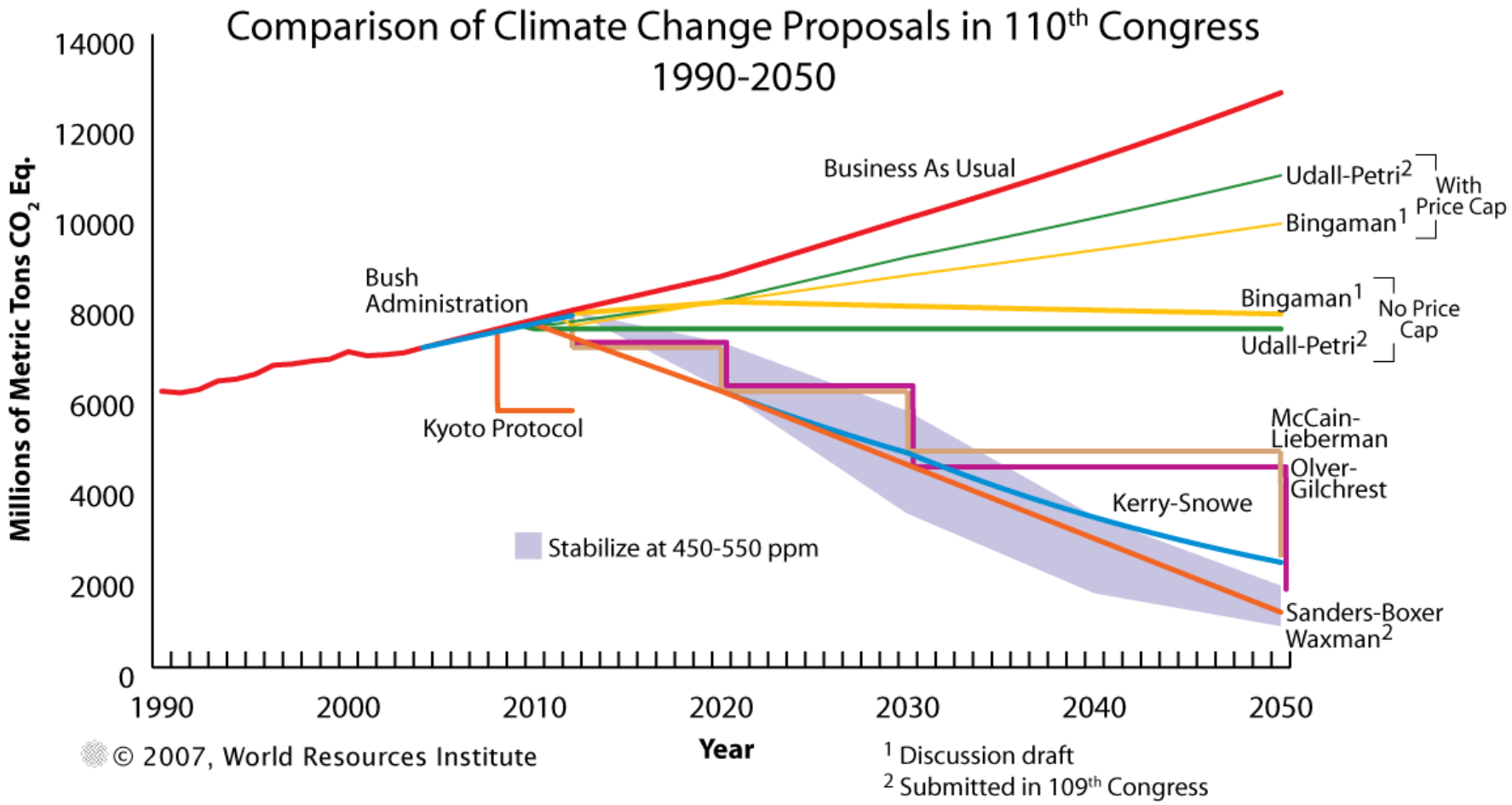
Climate proposals in 109th Congress

- **Sense of the Senate Resolution:**

  "It is the sense of the Senate that Congress should enact a comprehensive and effective national program of *mandatory, market-based limits* and incentives on emissions of greenhouse gases..."

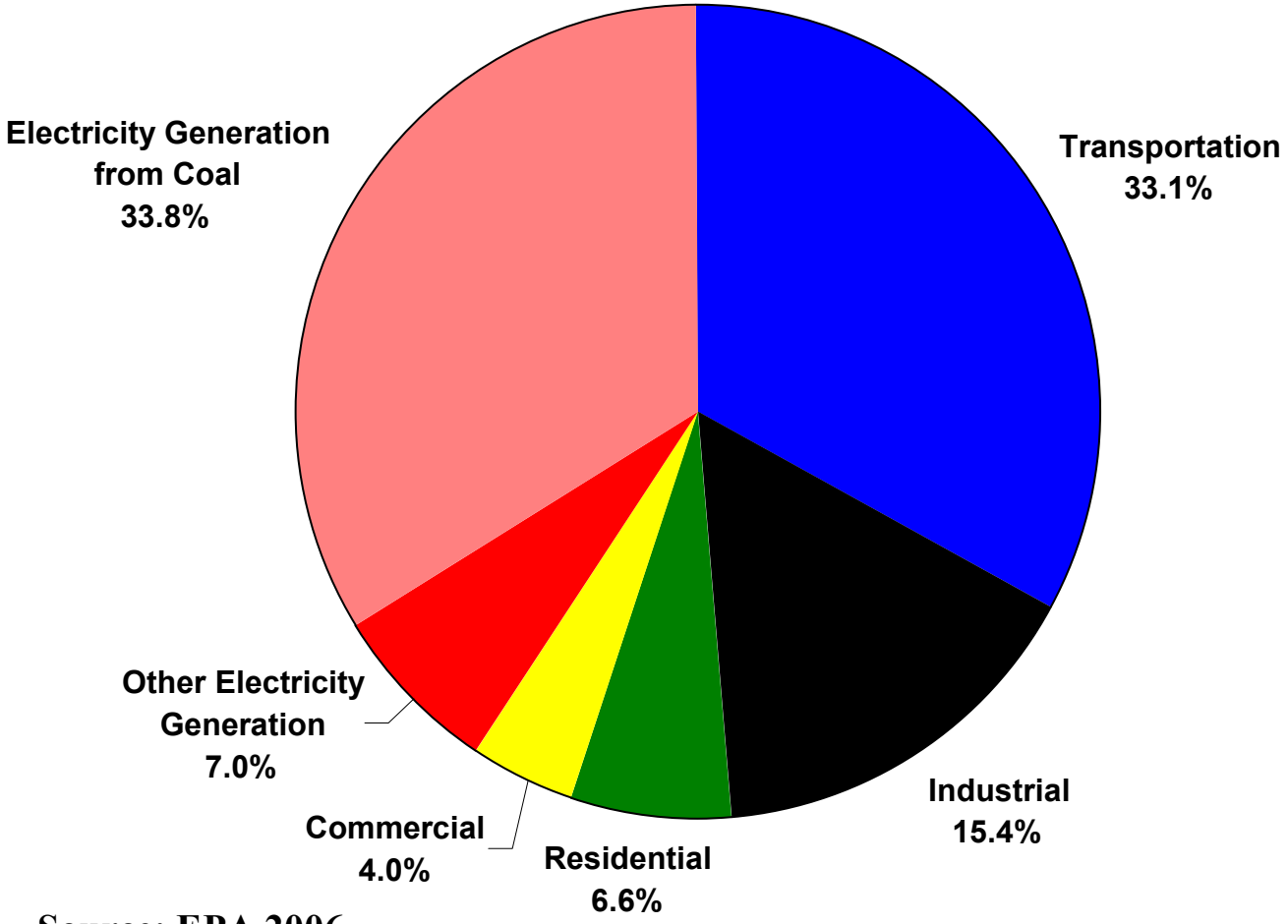
  - **adopted June 22, 2005, supported by 54 Senators**
- **Seven cap-and-trade proposals**
- **Hearings held by Senate Energy Committee on cap-and-trade design**

Climate proposals in 110th Congress



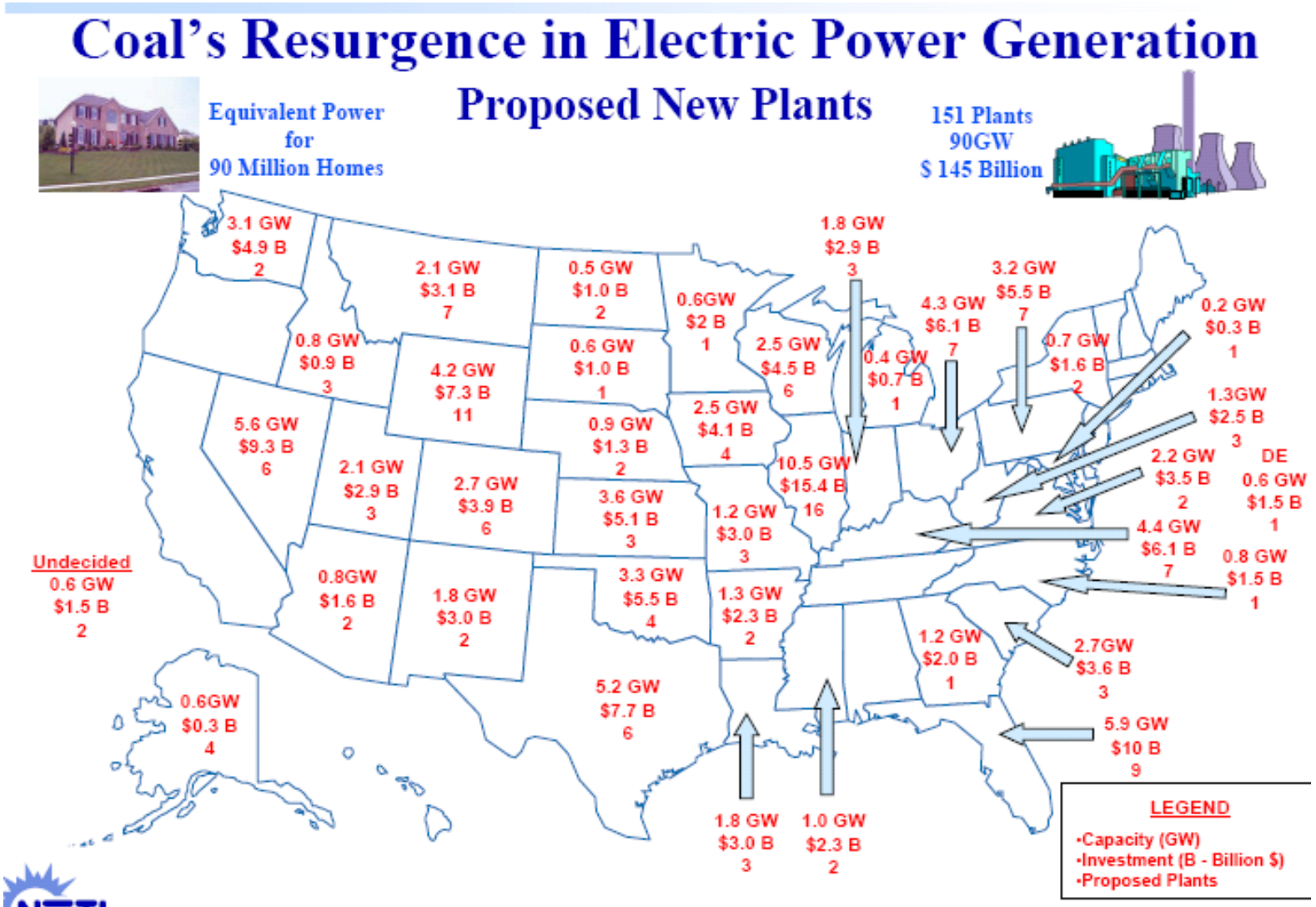
Coal plants targeted by all bills

Sources of U.S. Energy Related CO_2 Emissions, 2004



Source: EPA 2006

High natural gas prices driving new coal rush and higher carbon emissions



Growing support in private sector

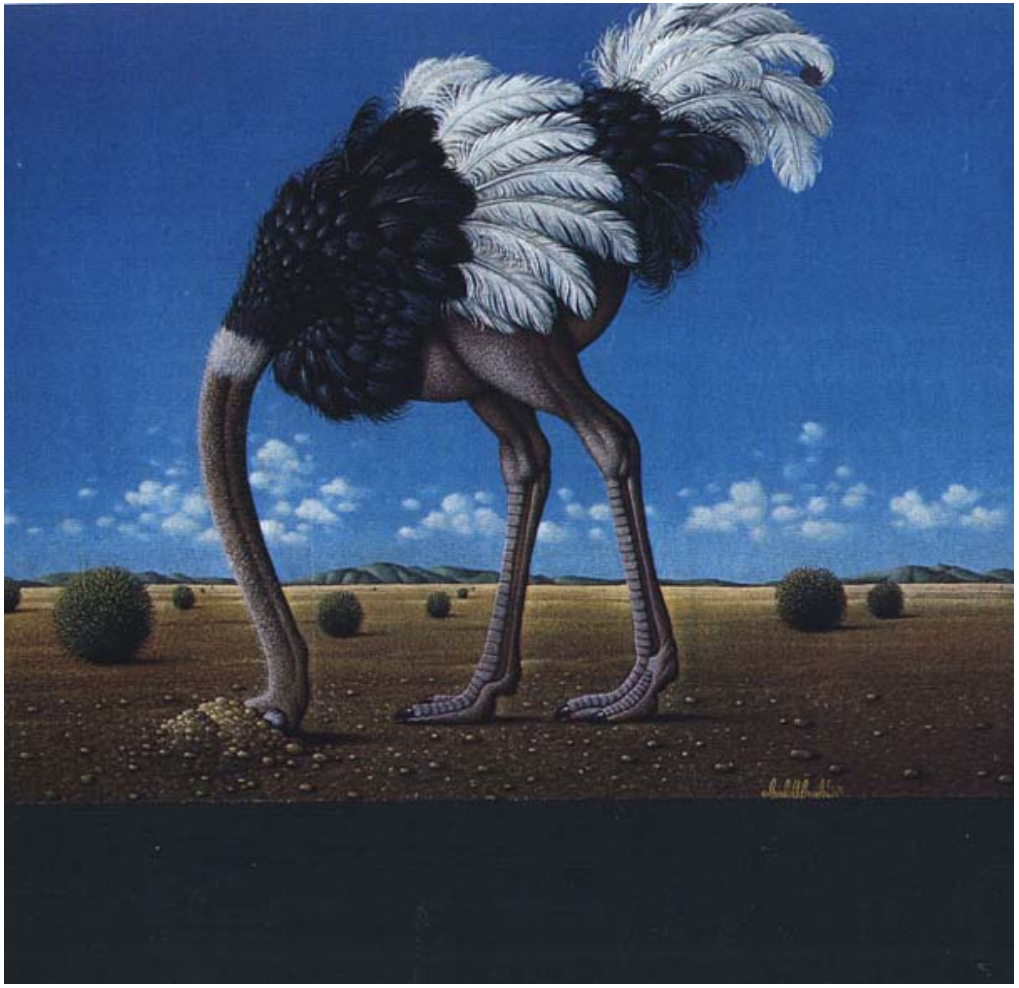
- Five of nation's top 10 power companies support federal CO_2 cap-and-trade legislation
- Half of power executives surveyed in 2004 expected CO_2 laws within 5 years
- Wal-Mart, GE, Ford, Google & many other major corporations support CO_2 limits
- US Climate Action Partnership report calls for Congress to act "as quickly as possible"
  - emission cuts of 10-30% within 15 years; 60-80% by 2050

Pressure from investors

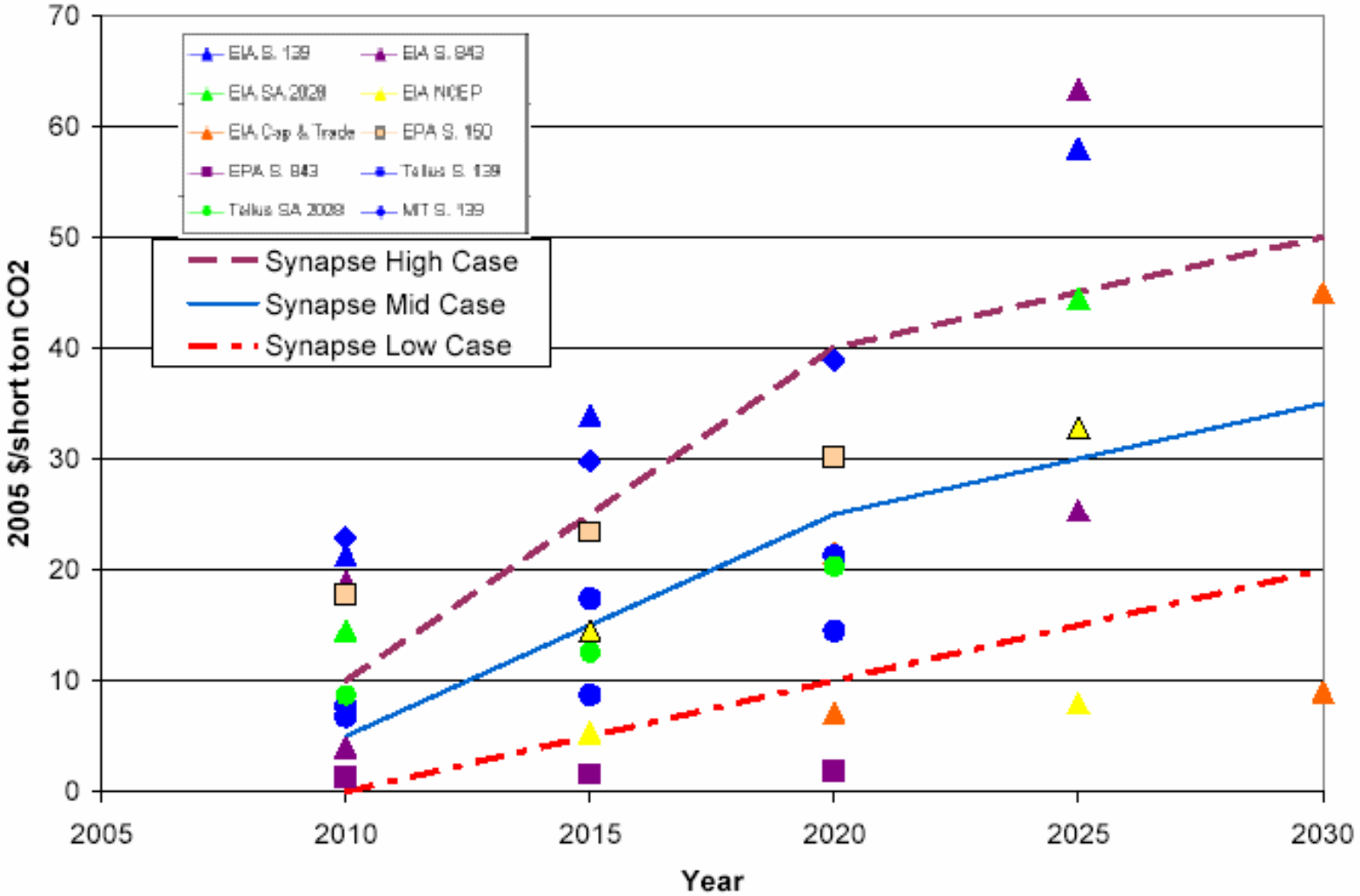
- Investor Network on Climate Risk
  - $3 trillion in assets
  - 5 times bigger than in 2003
- Carbon Disclosure Project (international)
  - $31 trillion in assets
- Major banks and investment firms analyzing CO_2 risk, trying to reduce exposure
- Banks under pressure to avoid financing new coal plants

Why is CO_2 risk being ignored?

- IOUs believe they can pass costs on to ratepayers?
- History and ratemaking principles suggest otherwise
- Last major base-load construction boom in US resulted in:
  - abandoned nuclear plants
  - excess coal capacity
- Betting that new plants built under the wire will get allocated free allowances

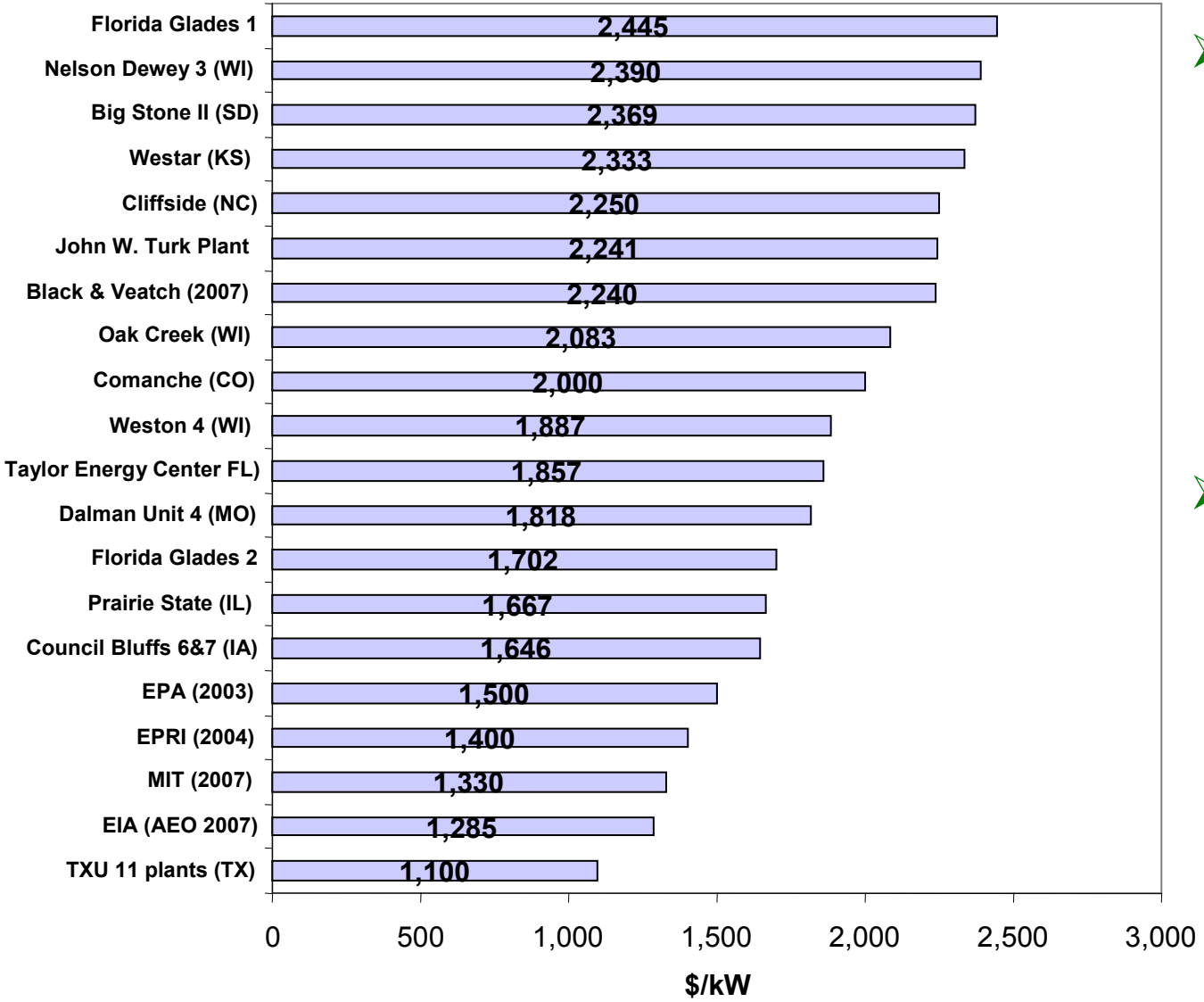


What is the cost of future CO_2 limits in the US?



Source: Synapse Energy Economics, *Climate Change and Power: Carbon Dioxide Emissions Costs and Electricity Resource Planning*, May 2006.

Costs for new pulverized coal plants are on the rise

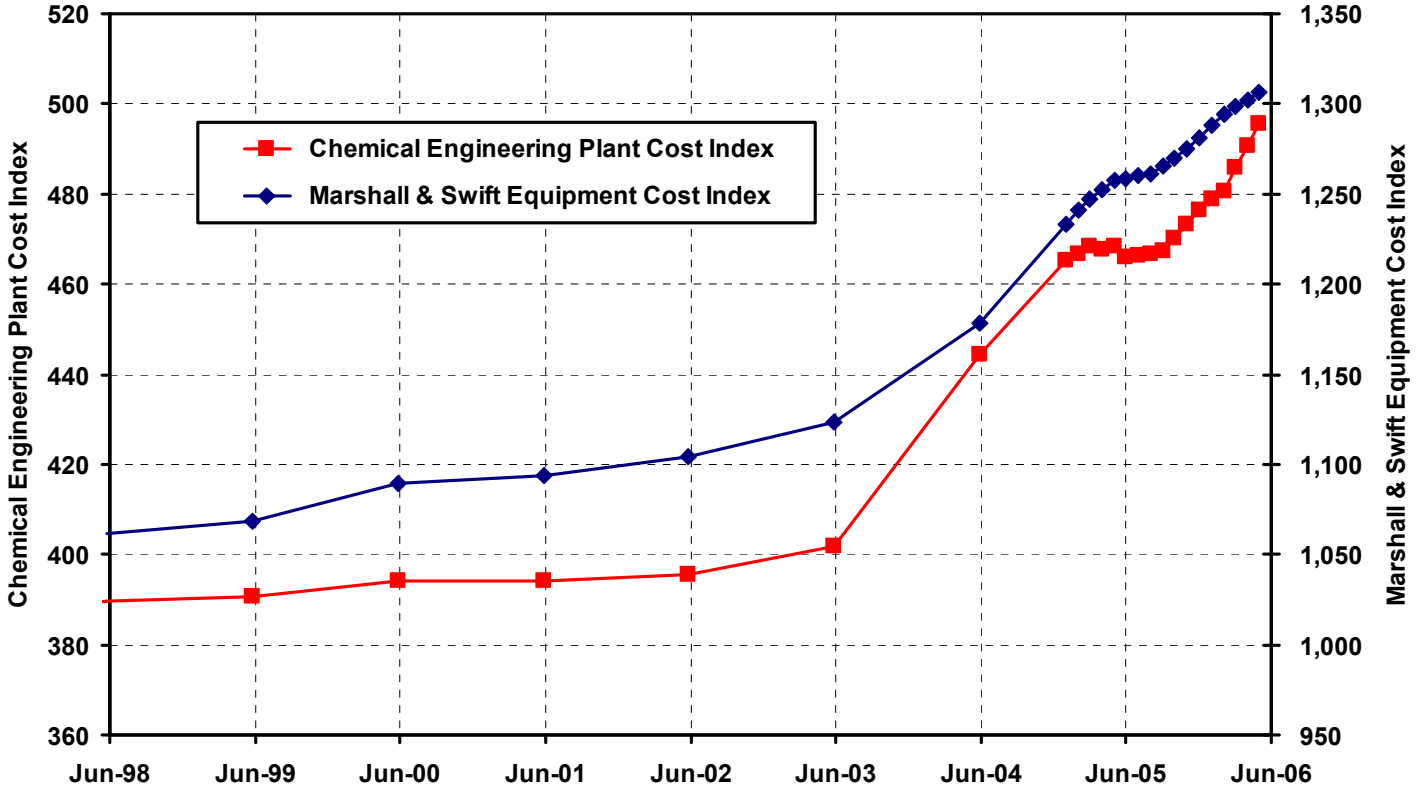


- US and global coal rush creating supply constraints for equipment and skilled labor
- At least 4 plants have announced 30-80% capital cost increases in the past year

Construction costs on the rise…

Construction Cost Indices

Source: Chemical Engineering Magazine, August 2006



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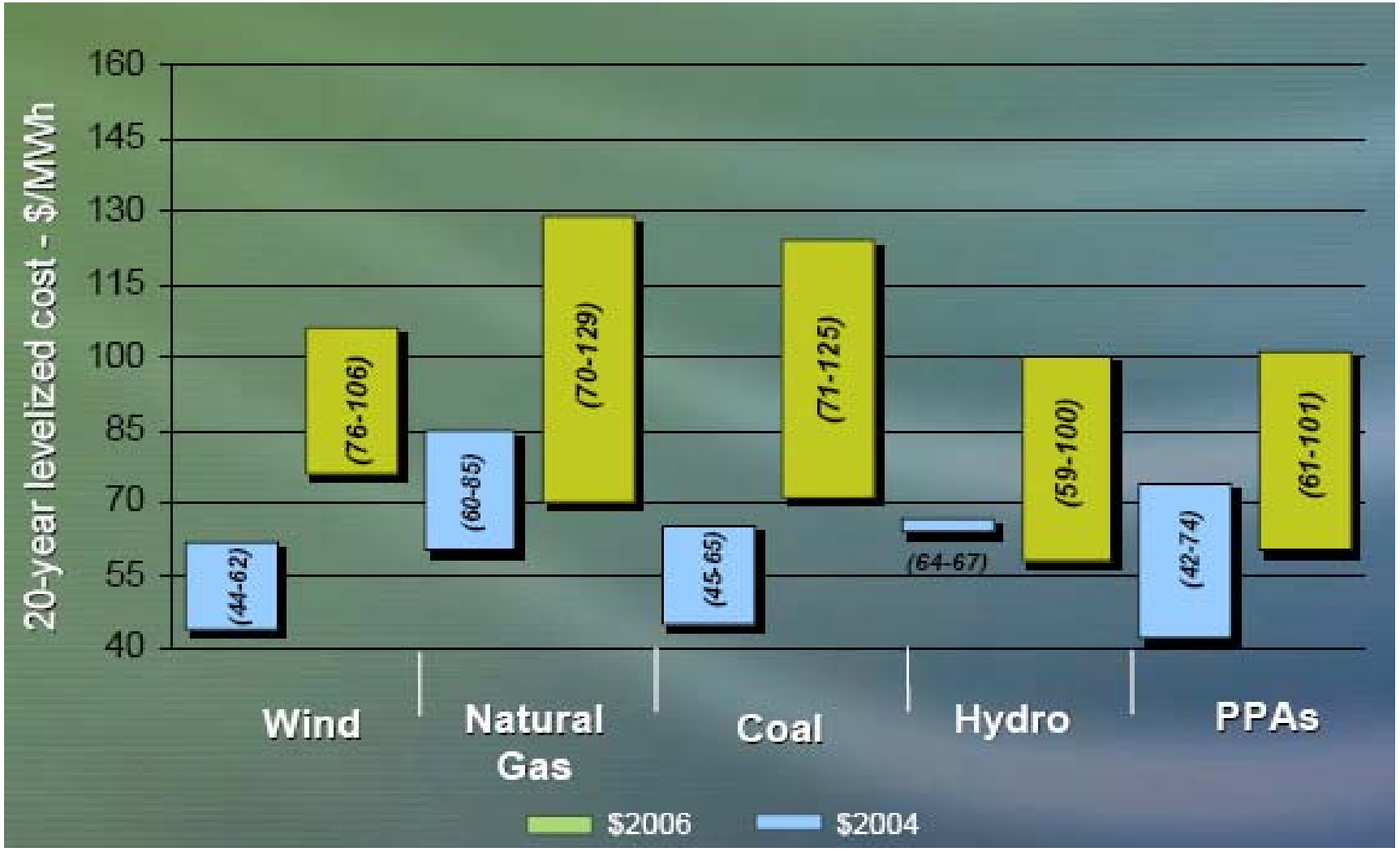
EPRI ELECTRIC POWER RESEARCH INSTITUTE

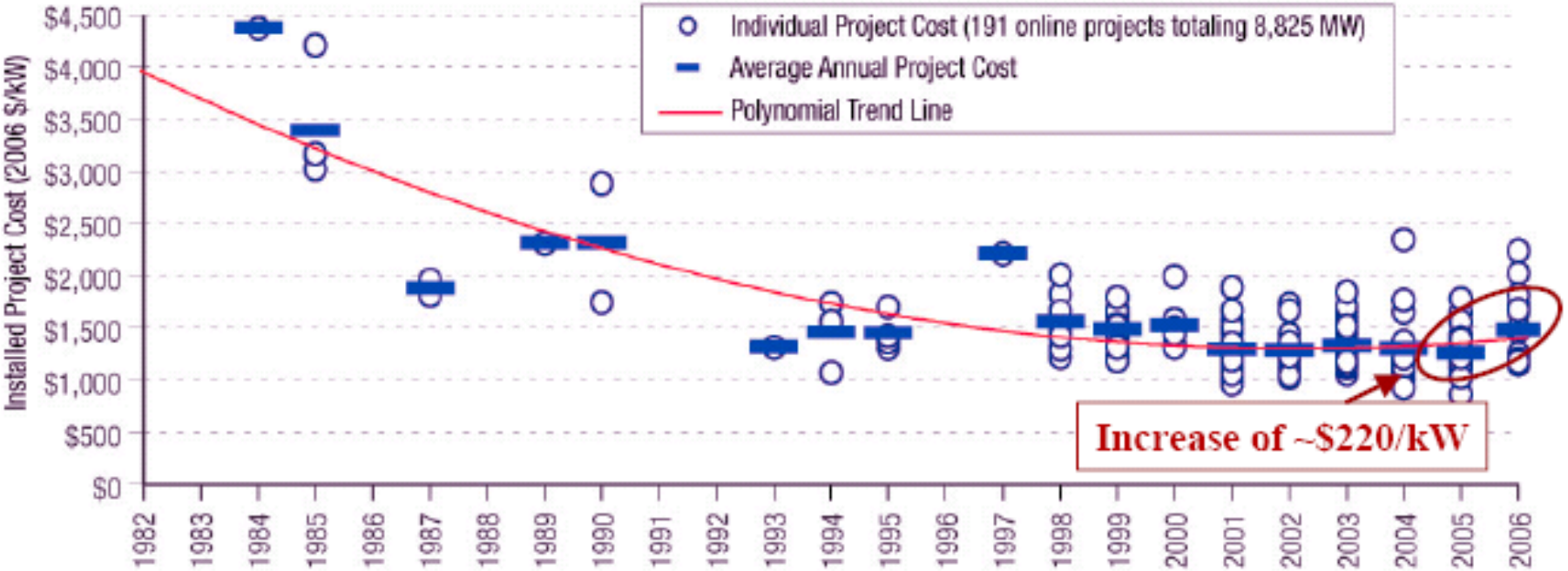
Costs have increased for all technologies

Prices from Puget Sound Energy RFPs



Source: Puget Sound Energy IRPAG, powerpoint presentation, June 22, 2006.

Installed Project Costs Are On the Rise, After a Long Period of Decline

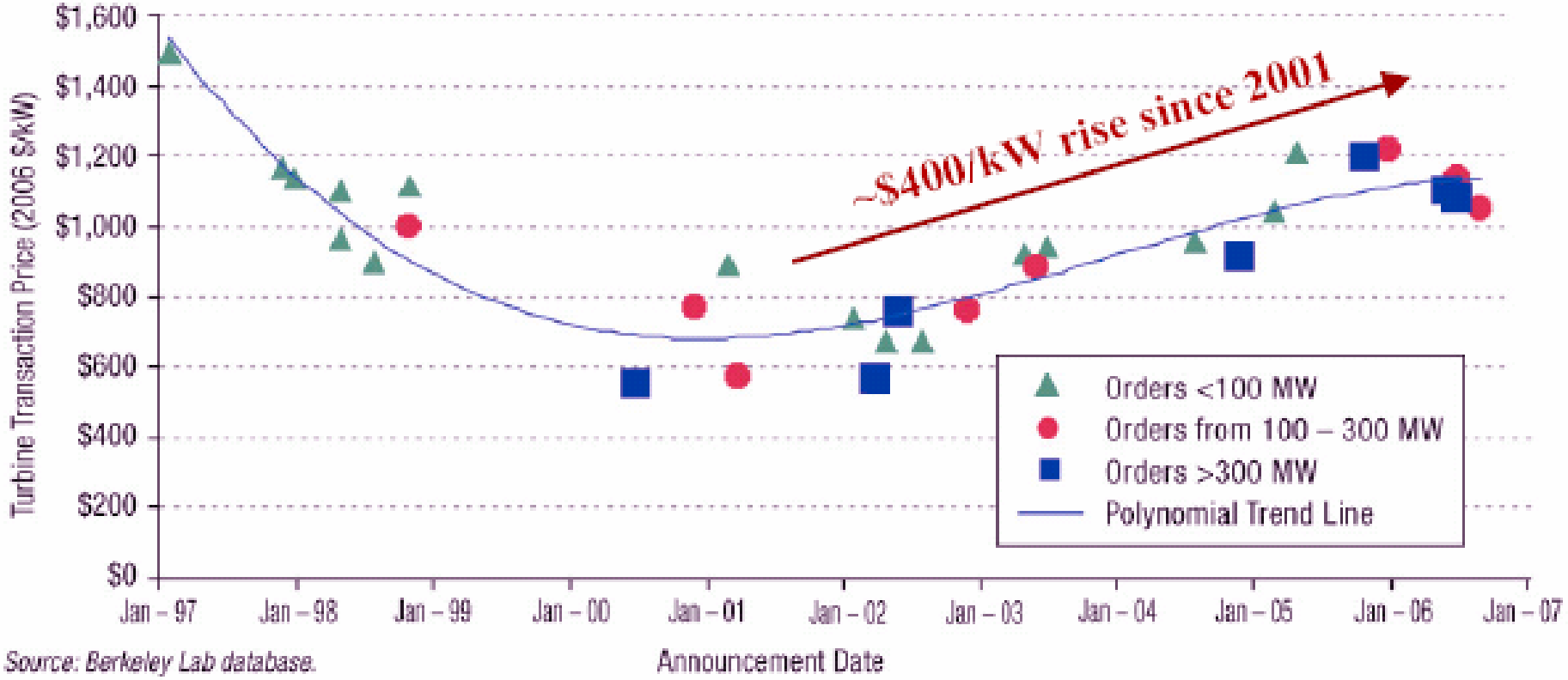


Source: Berkeley Lab database (some data points suppressed to protect confidentiality).

Projects proposed (but not yet built) in 2006 (not shown in graphic) are $200/kW higher still (avg. ~$1,680/kW)

Note: Sample of projects includes 191 online wind projects, totaling 8,825 MW (~76% of all wind capacity installed in the U.S. at the end of 2006)

Project Cost Increases Are a Function of Wind Turbine Prices

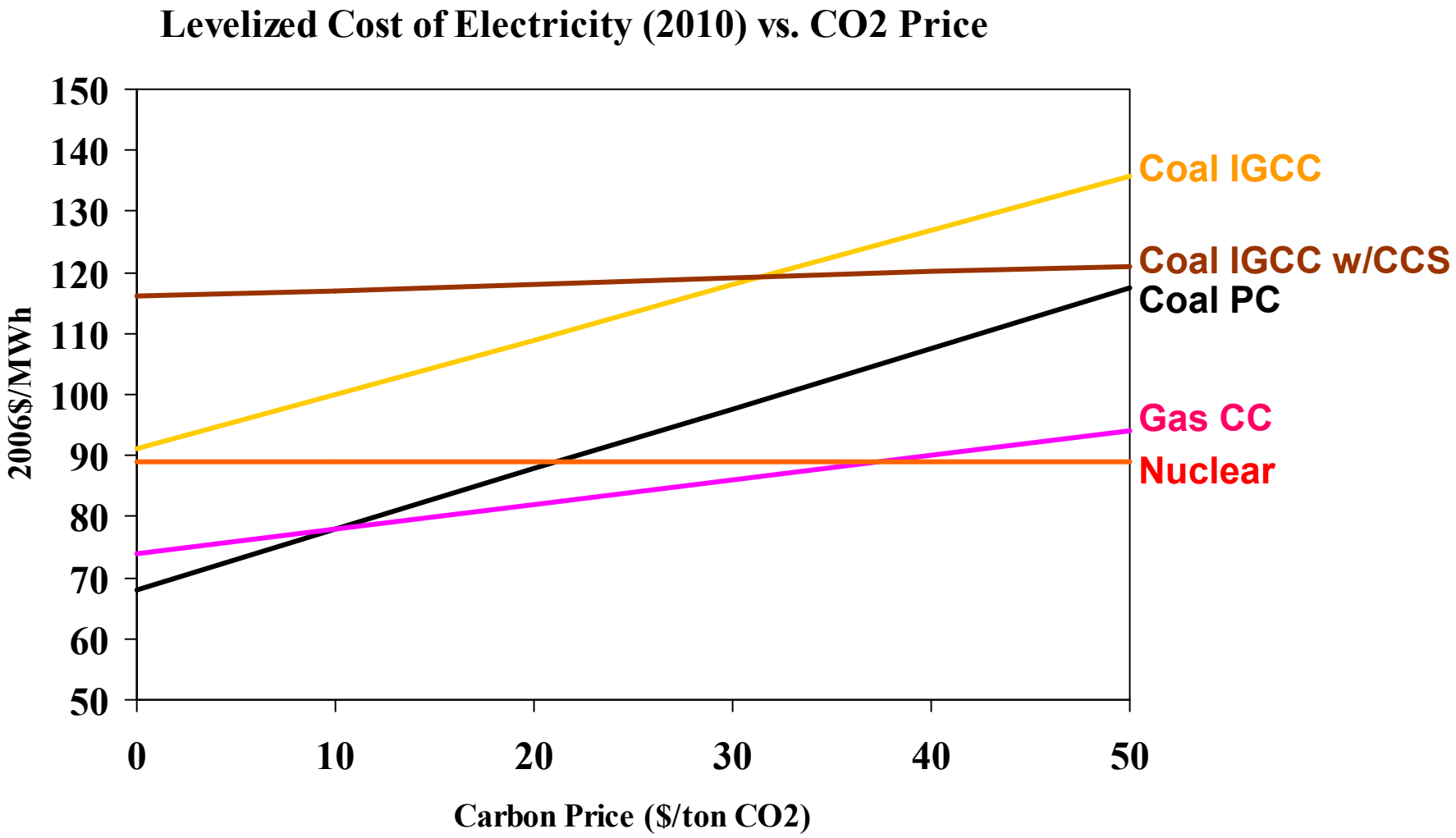


Source: Berkeley Lab database.

Since turbines are often ordered 12 or more months in advance, further project cost increases are expected

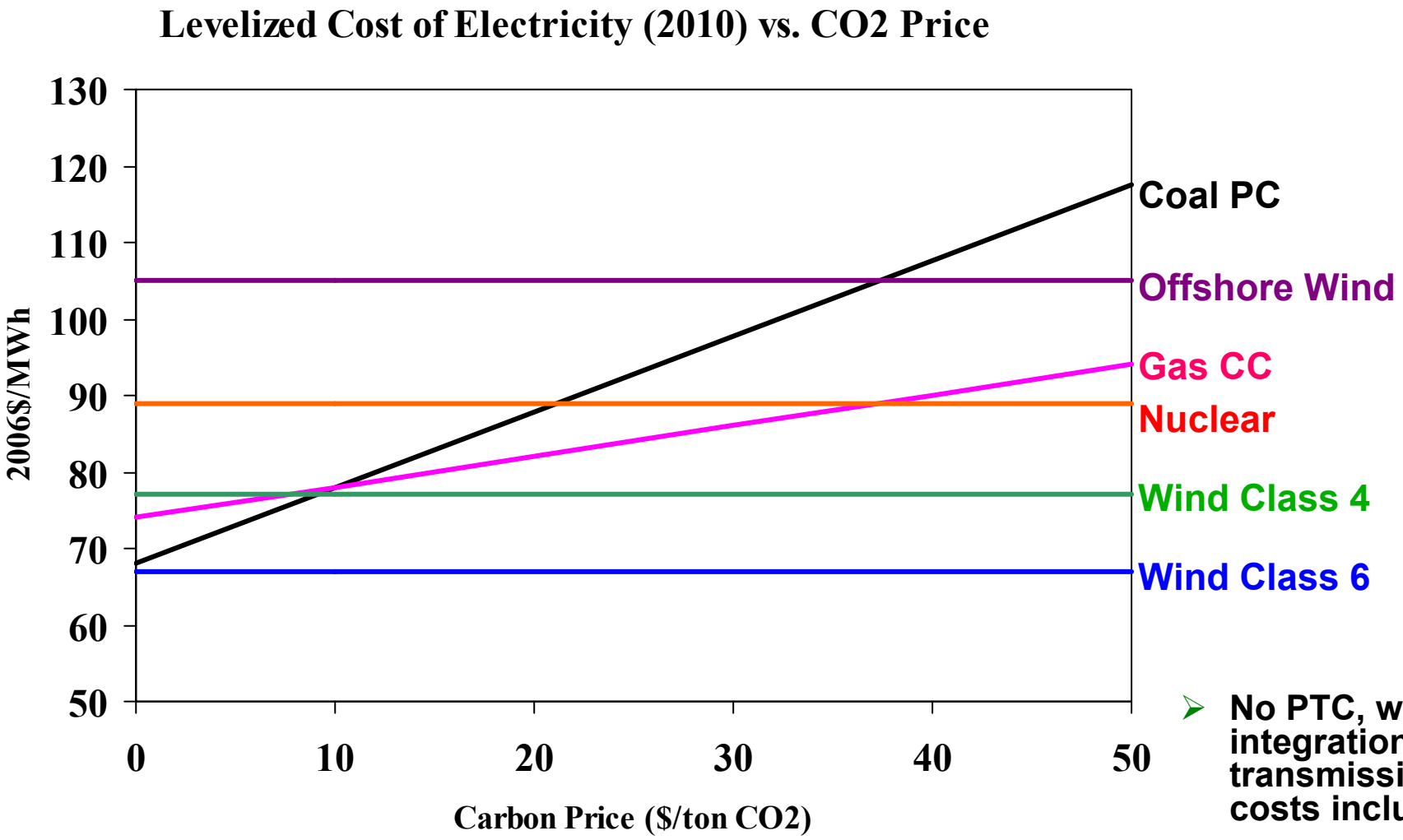
Note: Figure depicts reported transaction price data for 32 U.S. wind turbine orders totaling 8,986 MW and placed from 1997-2006

CO_2 costs make pulverized coal plants uneconomic



Source: Preliminary information developed by Black & Veatch for AWEA, except Coal IGCC w/CCS, which adds IPCC estimates for the cost of CCS to Black & Veatch's Coal IGCC costs.

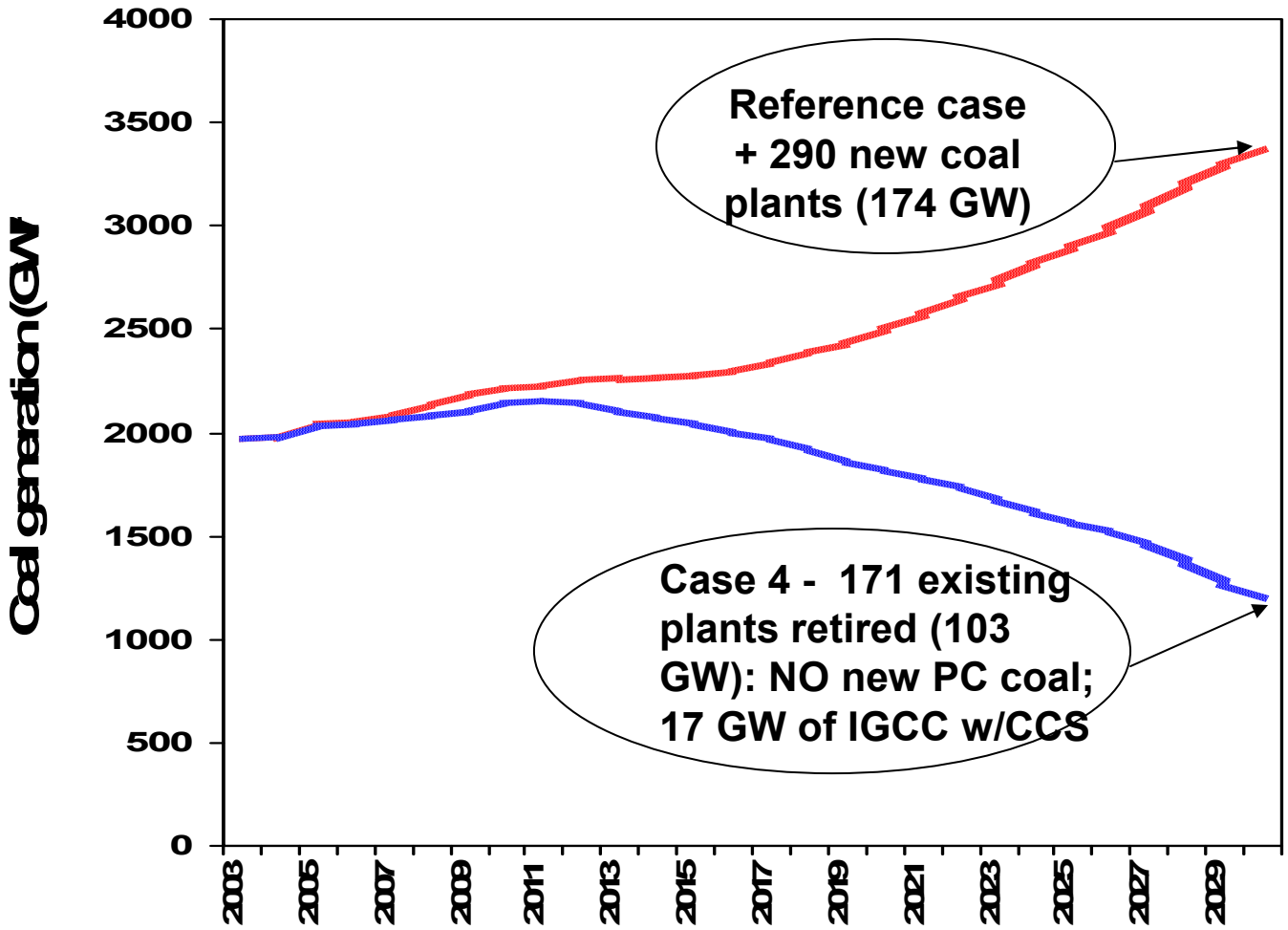
CO_2 prices make wind cheaper than new coal



- No PTC, wind integration or transmission costs included

Source: Preliminary information developed by Black & Veatch

EIA: Reducing carbon in electricity means replacing or decarbonising coal



- National Commission Case 4 (2x rate of reductions; $49/ton ceiling)
- Only scenario with overall carbon reductions
  - 44% by 2030
- Coal makes the difference

Source: EIA, Energy Market Impacts of Alternative Greenhouse Gas Intensity Reduction Goals, March 2006. http://www.eia.doe.gov/oiaf/servicerpt/agg/pdf/sroiaf(2006)01.pdf

Conclusions

- Future limits on global warming emissions are coming soon
  - major financial risk to utilities and ratepayers
  - will raise the cost of electricity from fossil fuels
- Mandatory market based limits on CO_2 with complementary policies for efficiency and renewables has lowest costs and greatest benefits
- Utilities should factor CO_2 into resource planning and procurement and aggressively pursue cleaner alternatives
- Regulators should require utilities to takes these steps and shareholders not ratepayers to bear the risk
- Shareholders and investors should invest in companies that are proactively managing these risks & require reporting and accountability
- Ratepayers and consumer groups should oppose efforts by utilities to recover CO_2 costs in rates and support investments in cleaner alternatives