Cap and Trade is Not Enough

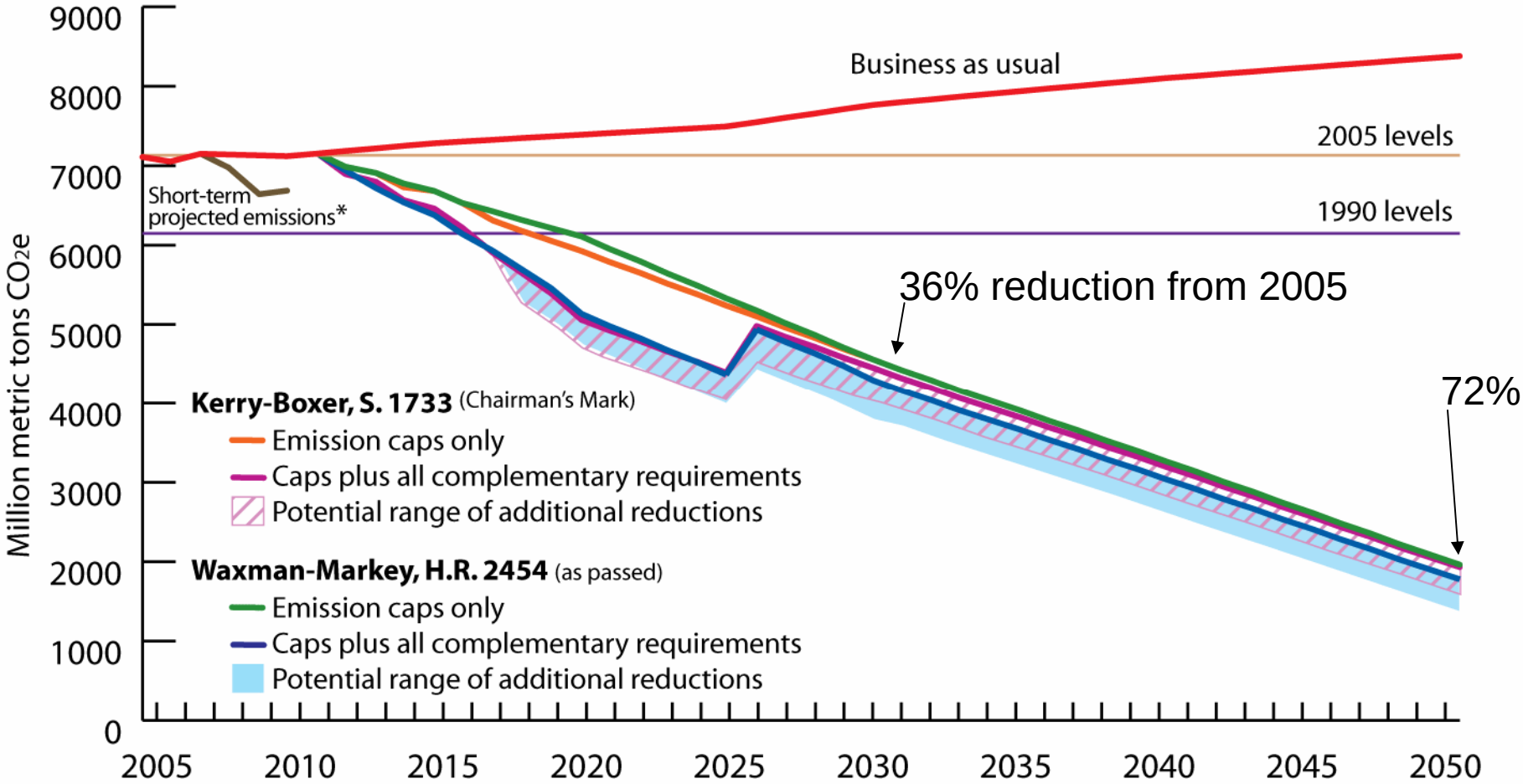
Jay Apt

Carnegie Mellon University
Department of Engineering and Public Policy
and Tepper School of Business

NARUC/NCEP Climate Change Conference:
The Utility of the Future in a Carbon Constrained World
December 3, 2009

Emission Reductions Under Cap-and-Trade Proposals in the 111th Congress, 2005-2050

October 28, 2009

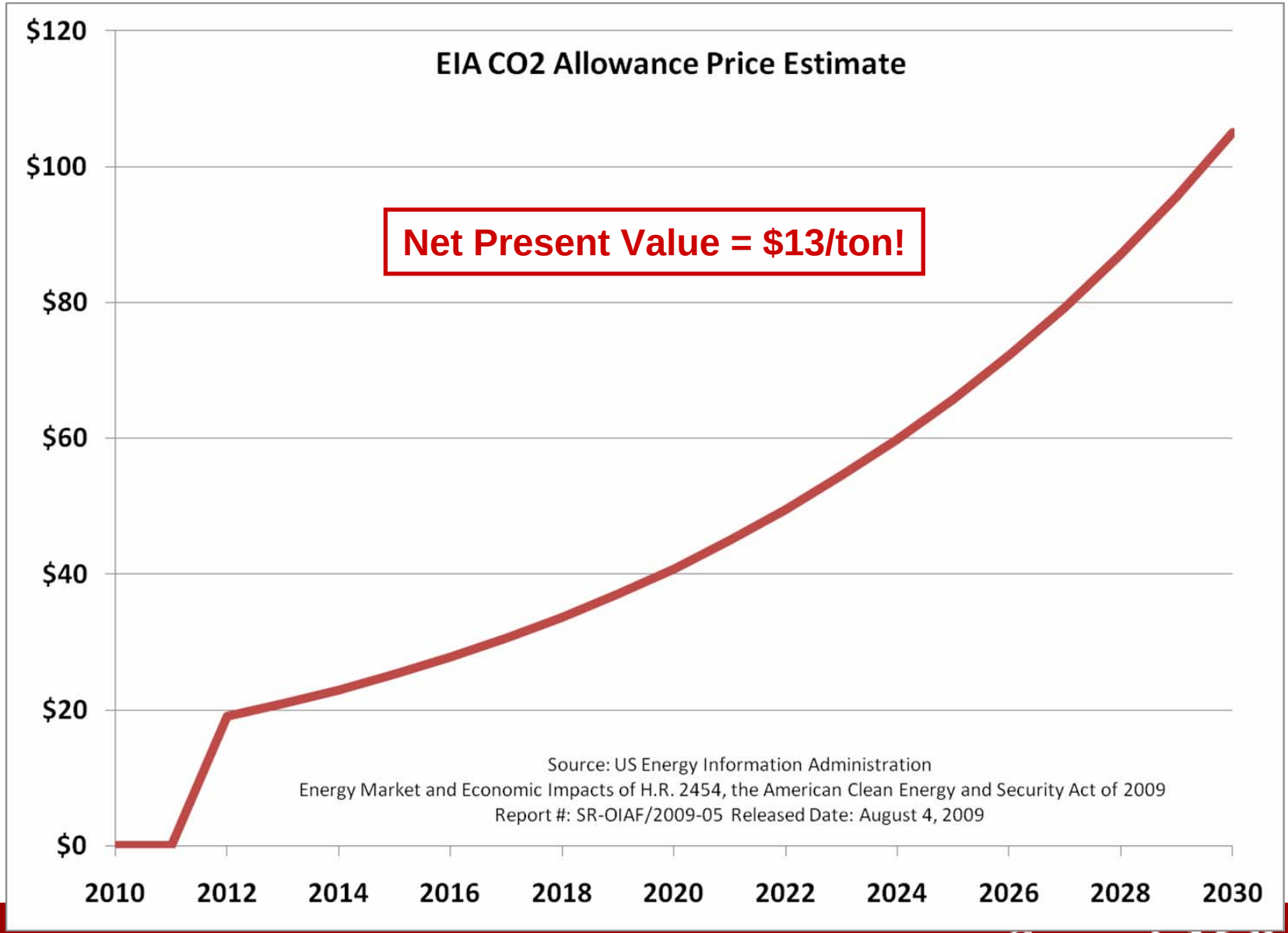


WORLD RESOURCES INSTITUTE

For a full discussion of underlying methodology, assumptions and references, please see http://www.wri.org/usclimatetargets.

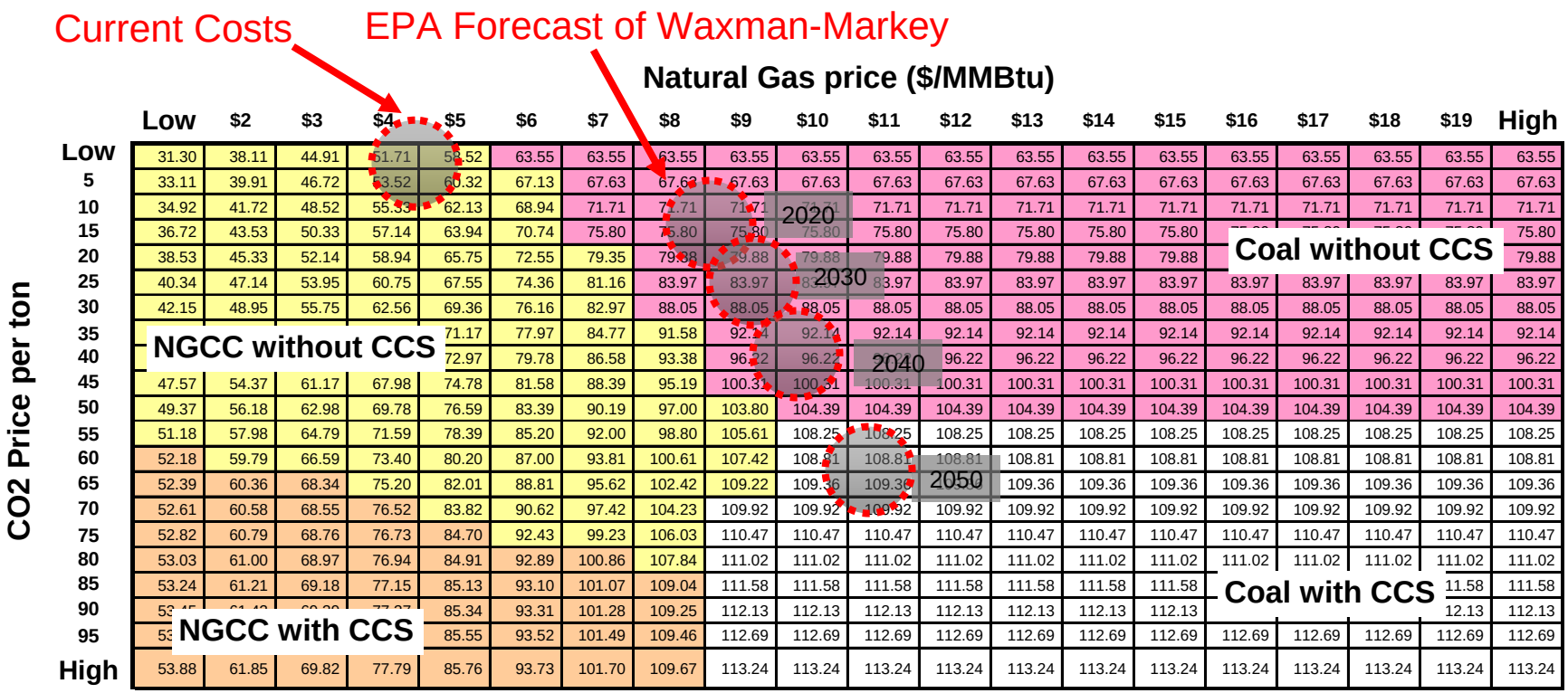
* "Business as usual" emission projections are from EPA's reference case for its analysis of the Waxman Markey Discussion Draft. "Short-term projected emissions" represent EIA's most recent estimates of emissions for 2008-2010.

Suppose Congress Enacts Waxman-Markey?

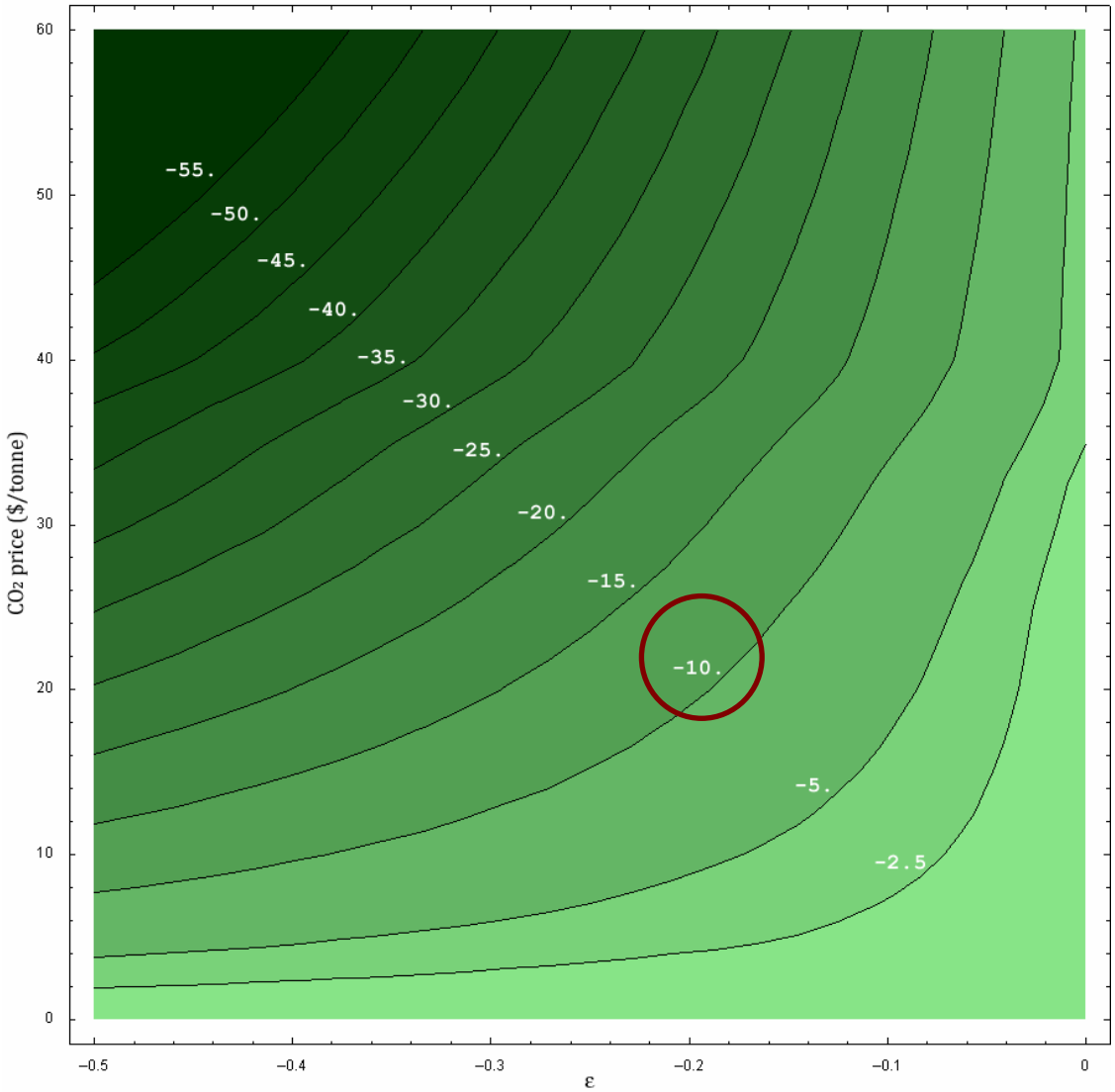


CMU's Paul Fischbeck has looked at firm-level decisions

Strategy regions for four decision options



A Carbon Price Will Cause Some Demand Reduction



By the way, a $20/tonne CO_2 price increases gasoline price by about 20¢ per gallon.

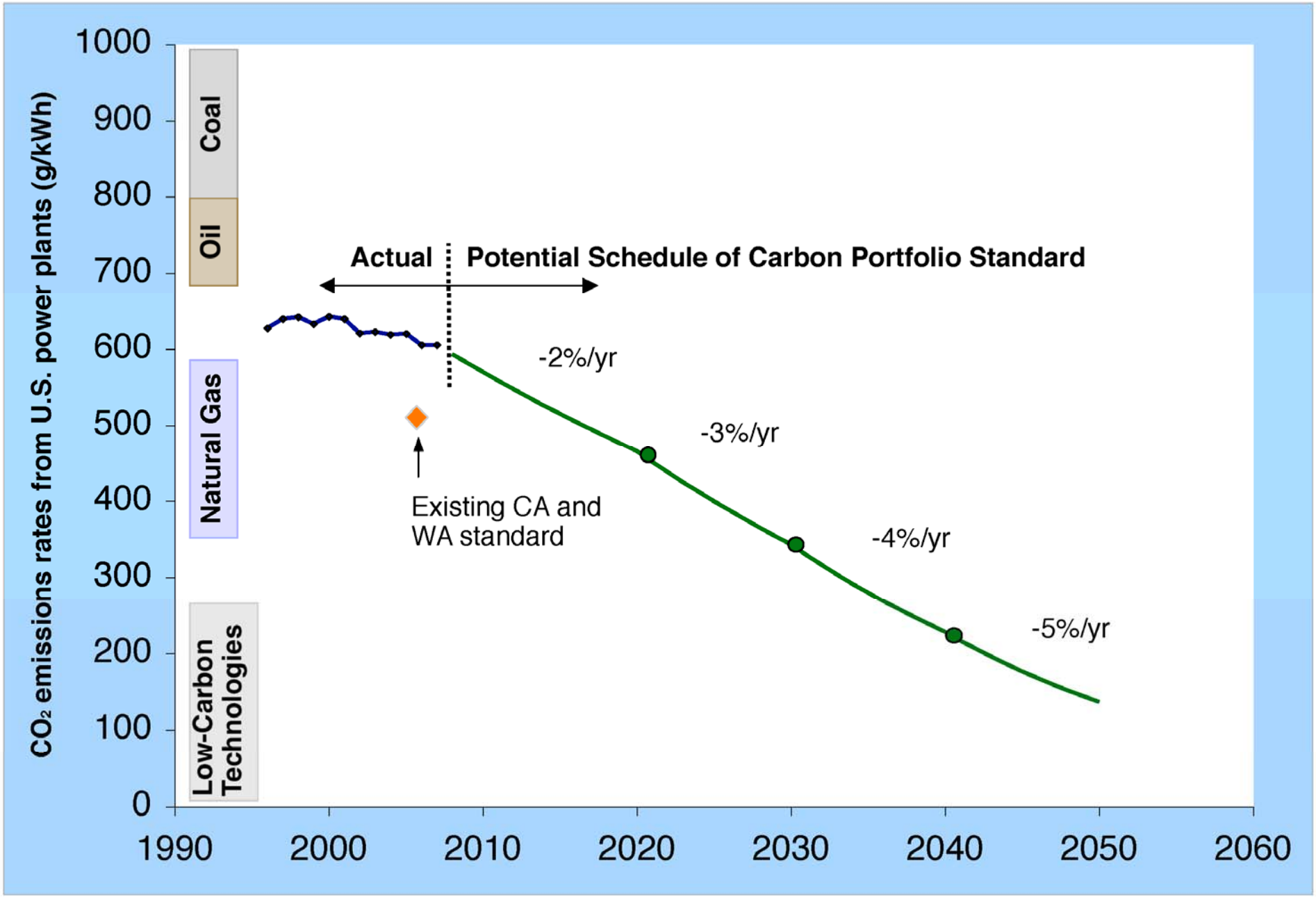
Source: Newcomer, A., S.A. Blumsack, J. Apt, L.B. Lave, and M.G. Morgan, *Short run effects of a price on carbon dioxide emissions from U.S. electric generators.* Environmental Science & Technology, 2008. **42**(9): 3139-3144.

Strategies to Control CO_2

- An emissions tax
  - Favored by economists as the most efficient, but not politically feasible, and may not provide enough certainty to encourage multi-billion dollar investments
- Cap-and-Trade
  - Economists' second-favorite choice (after a carbon tax).
  - Requires an initial allocation of permits up to the cap
    - Auction revenues may be irresistible, but strong political pressures to allocate them to existing emitters (large wealth transfer in EU)
    - Price will be too low to change investment
- RPS
  - Excludes many less costly generators
  - Tries to pick technology or social winners

Strategies to Control CO_2

- A carbon emissions portfolio standard
  - Each electric supplier must meet an overall constraint, in pounds of CO_2 per MWh, which declines over time in a predictable way
  - Avoids the problem of allocating permits
  - Allows suppliers to seek the most inexpensive generation
  - Can allow trading for regional differences
  - Encourages efficiency, both in generation and use
  - Similar to CAFE standards


CO_2 emissions rates from U.S. power plants (g/kWh)
1000
900
800
700
600
500
400
300
200
100
0
Coal
Oil
Natural Gas
Low-Carbon Technologies
Actual
Potential Schedule of Carbon Portfolio Standard
-2%/yr
-3%/yr
-4%/yr
-5%/yr
Existing CA and WA standard
1990
2000
2010
2020
2030
2040
2050
2060

If we let the least cost ones win, what might they be?

- Efficiency. Clearly the least expensive, but not considered by most state RPS legislation
- Geothermal. Hydrothermal sources are limited, but water-injection geothermal may be practical in the SW.
- Biomass co-firing, near where it is produced.
- Nuclear, if Westinghouse, GE, & Areva can keep costs down and performance up.
- Wind. 10 to 20% is probably practical in some regions. Requires going from the existing 18,000 wind turbines to 200,000 – 400,000 turbines & lots of transmission.
- Coal gasification and post-combustion capture.
- Natural gas, with post-combustion capture.
- Solar thermal, in a few of the best sites.

Thank You!

For more information,
see our briefing paper, *Cap and Trade Is Not Enough*
http://wpweb2.tepper.cmu.edu/ceic/papers/cap_and_trade.htm

Jay Apt

apt@cmu.edu