



# Impact of Offsets on Compliance Challenge for the Electric Sector

**EPRI GHG Offset Policy Dialogue  
Workshop 1**

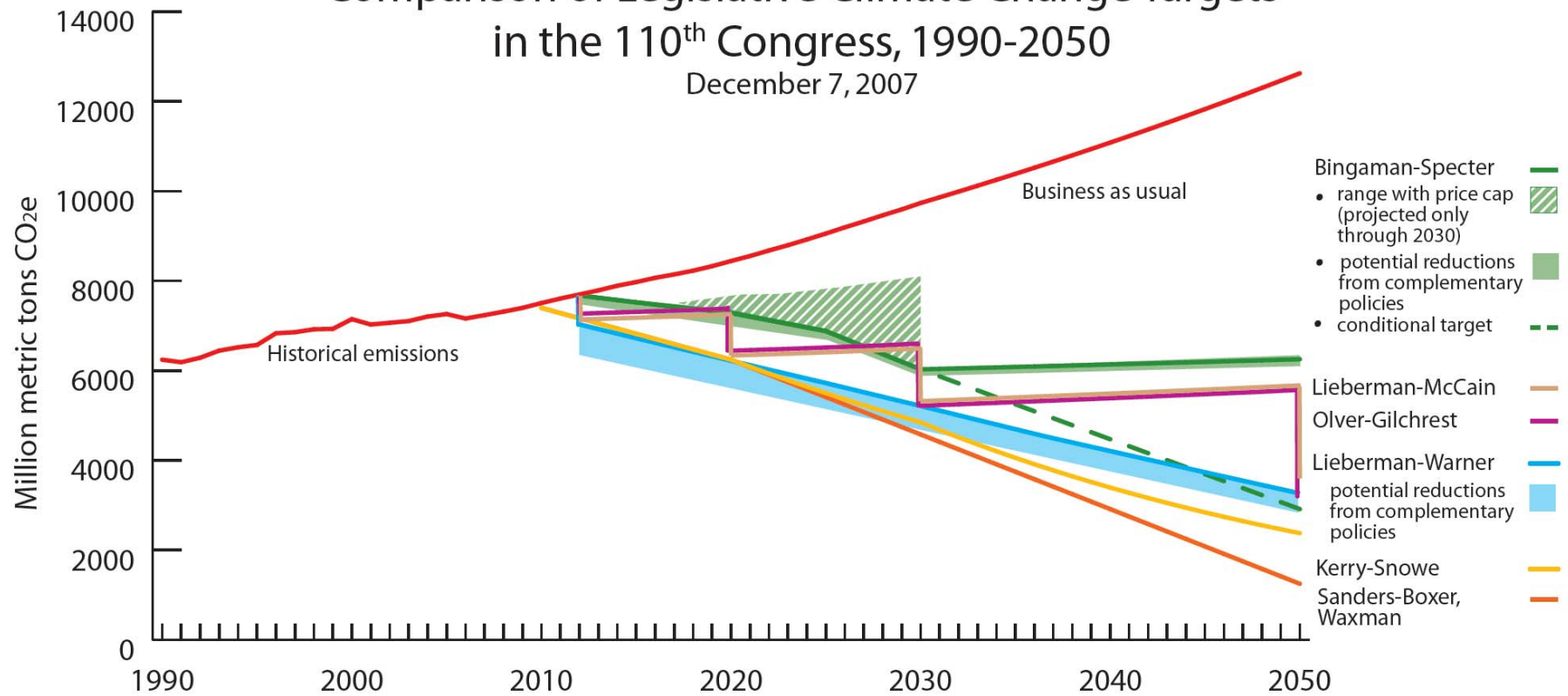
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# U.S. Climate Policy Proposals Focused on Cutting Emissions Below Historic Levels

Comparison of Legislative Climate Change Targets  
in the 110<sup>th</sup> Congress, 1990-2050  
December 7, 2007



 WORLD RESOURCES INSTITUTE

For a full discussion of underlying methodology, assumptions and references, please see <http://www.wri.org/usclimatetargets>. WRI does not endorse any of these bills. This analysis is intended to fairly and accurately compare explicit carbon caps in Congressional climate proposals and uses underlying data that may differ from other analyses. Data post-2030 may be derived from extrapolation of EIA projections.

# Electric Sector is Major Source of Emissions

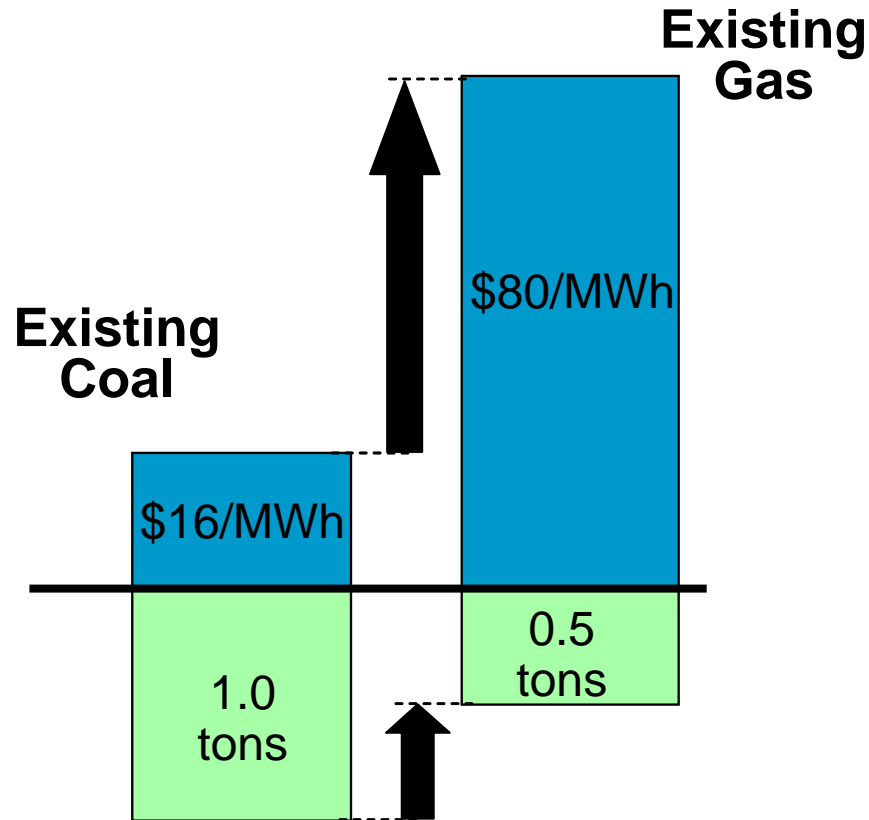
Electric sector's share of national total (2006)

- 33% of total GHGs
- 39% of total CO<sub>2</sub>

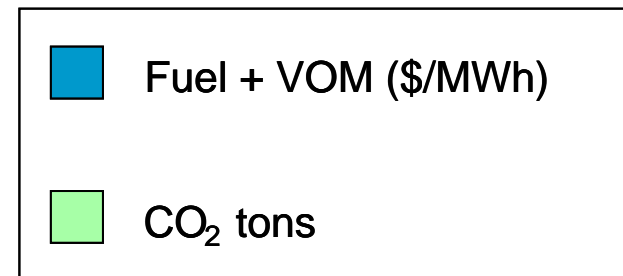
Shares within the electric sector CO<sub>2</sub>

- 15% from natural gas (\$12.5/MMBtu)
- **83% from coal (\$2.5/MMBtu)**

# Redispatching Existing Gas Over Existing Coal



- Extra cost/MWh: \$64
- 0.5 tons CO<sub>2</sub> reduced
- **Cost/ton: \$128**



# Potential Near-Term Electric Sector Impacts of a Stringent CO<sub>2</sub> Emission Reduction Policy

- No large-scale, low-cost GHG abatement options available in the near-term.
- The cost to reduce large amounts of GHG emissions in the near-term will be high
  - Can be accomplished with real-time fuel-switching via changes in power plant dispatch from coal to gas
  - Recent EPRI modeling suggests ~\$100/tCO<sub>2</sub>
  - Will cause large increases in retail electricity prices
- CO<sub>2</sub> prices also could be volatile in the near-term as any new U.S. cap and trade scheme evolves.

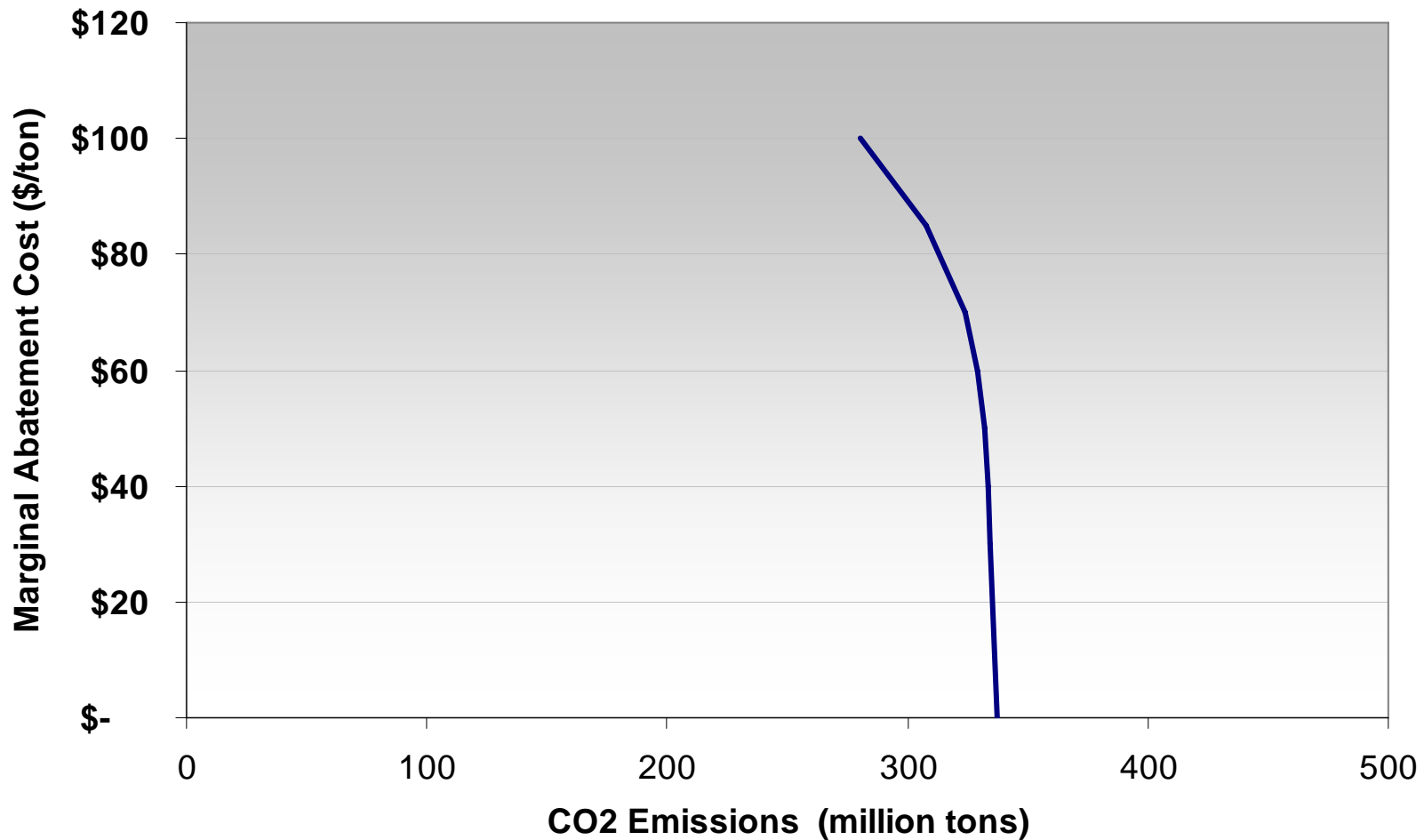


# Modeling System Integrates All Major Options for Reducing Electric Sector CO<sub>2</sub> Emissions

- Combines three CO<sub>2</sub> reduction activities for generation in integrated cost-minimizing mix
  - Redispatch existing generation
  - Add new generation to cover growth and retirements
  - Add new generation to cut existing source emissions
- Reflects lead times to build new capacity
- Includes role of customer load response to higher power prices (and the interaction over time w. needs for new generation)
- Result is “Emission Abatement Curve” showing what reductions occur at what CO<sub>2</sub> price

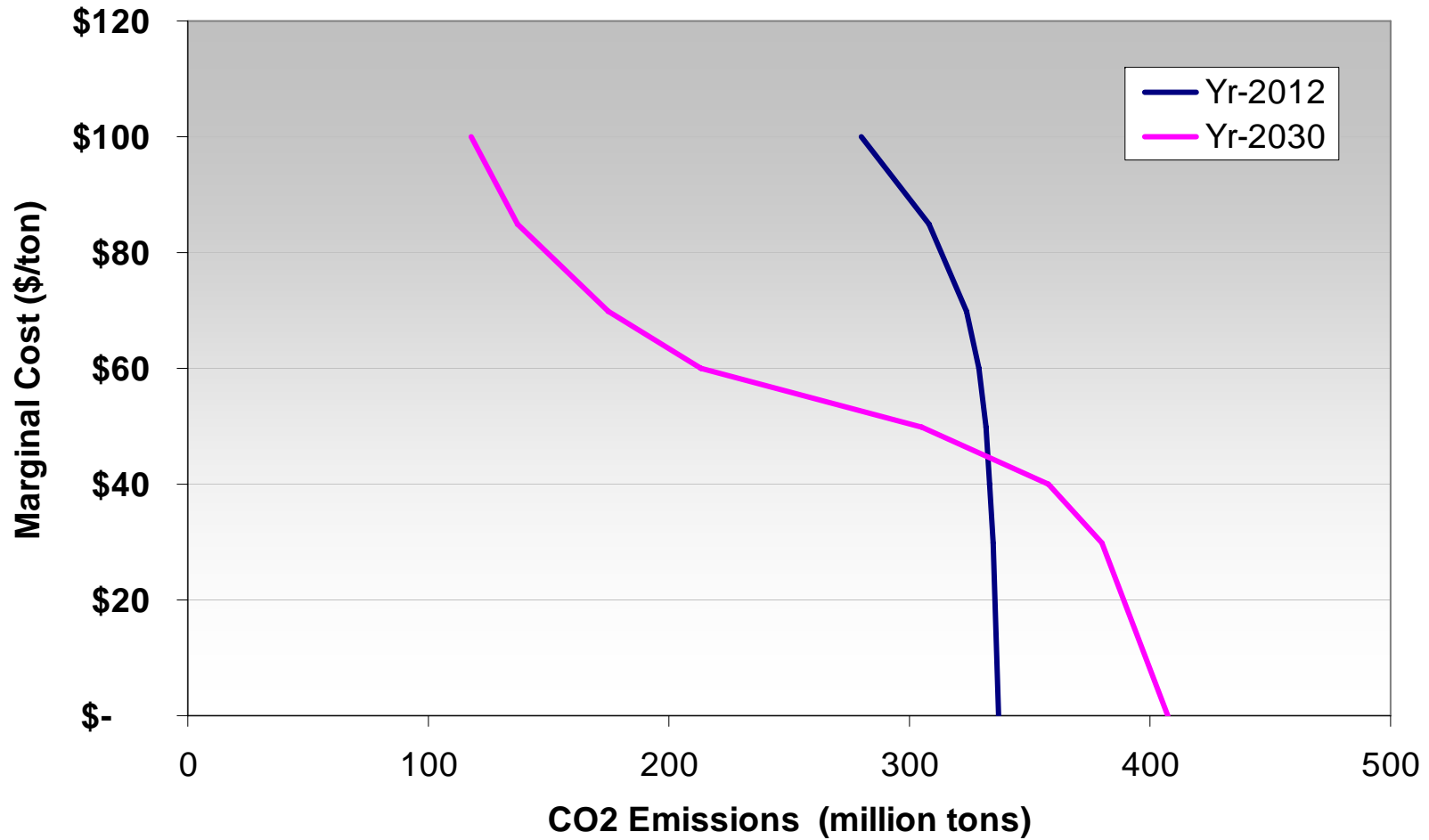
# Electric Sector Demand for Emissions Will be Insensitive to Allowance Prices in Near-term

2012 CO2 Emissions Abatement Curve for WECC Region



# Greater Long-term Opportunities to Cut Emissions from Price Response and New Generation

## CO2 Emissions Abatement Curves for WECC Region



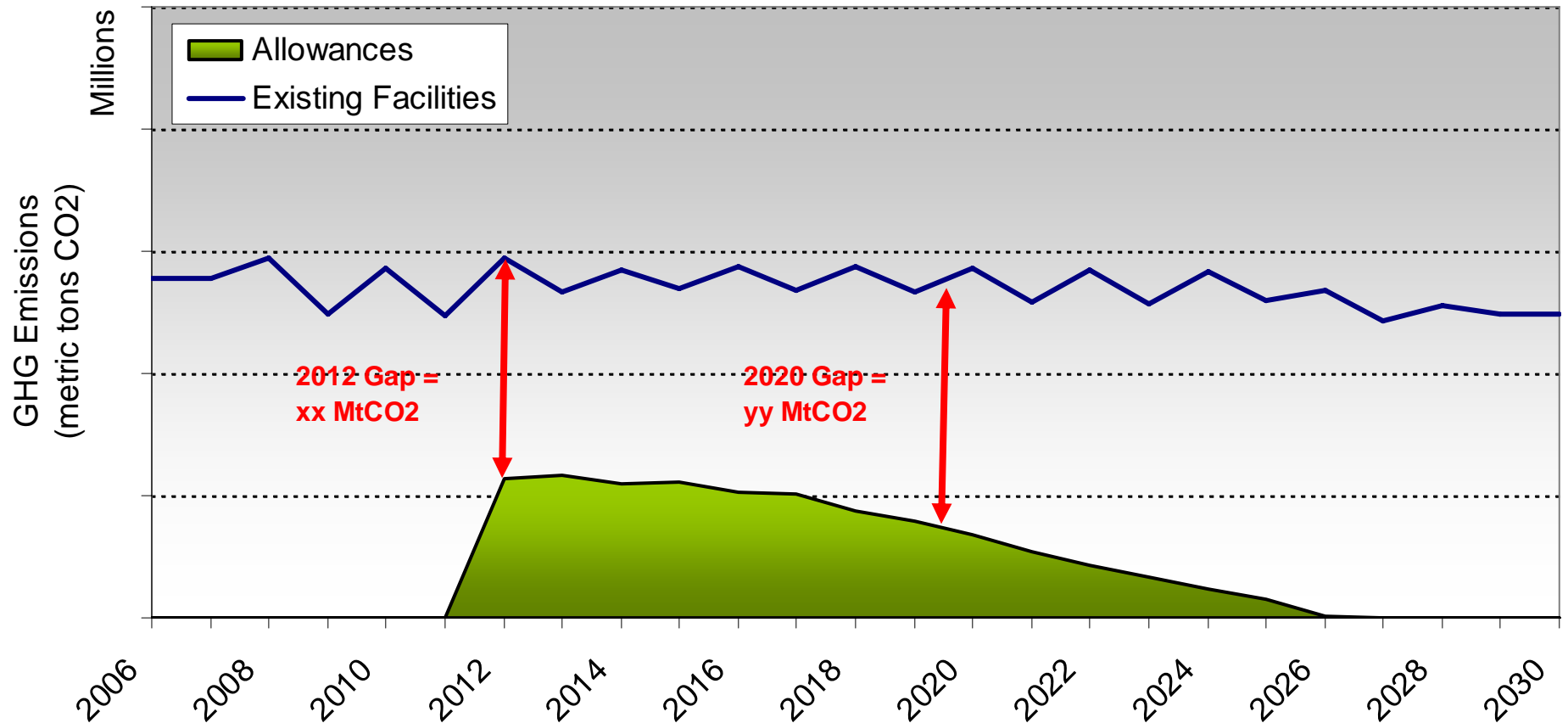


# Implications for Offset Programs

- Steepness of abatement curve means small increase in supply of offsets can have tremendous impact on lowering compliance costs
- Steeper near-term slope means early availability of offsets particularly critical to cost containment
- Uncertainty in offset supply magnifies CO<sub>2</sub> price volatility
  - Resolution of regulatory uncertainty lowers volatility (and vice versa)

# Emission Reductions from a Utility Perspective

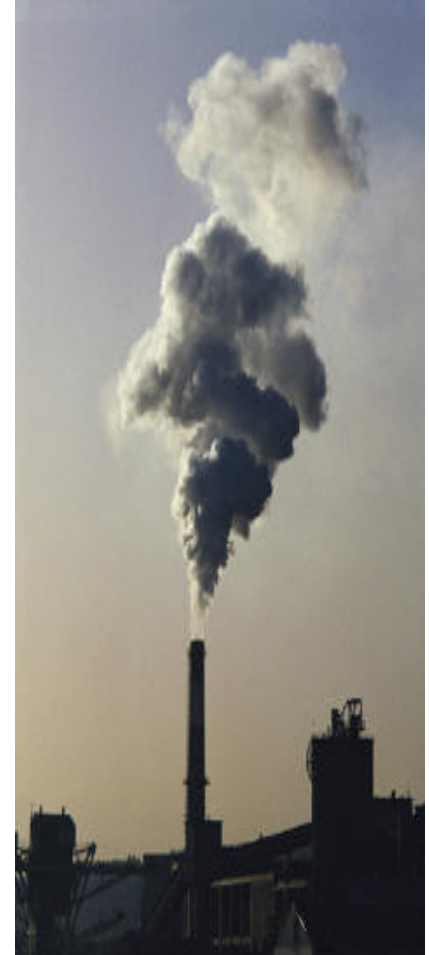
Projected "Compliance Gap"  
PowerCo Existing Facilities



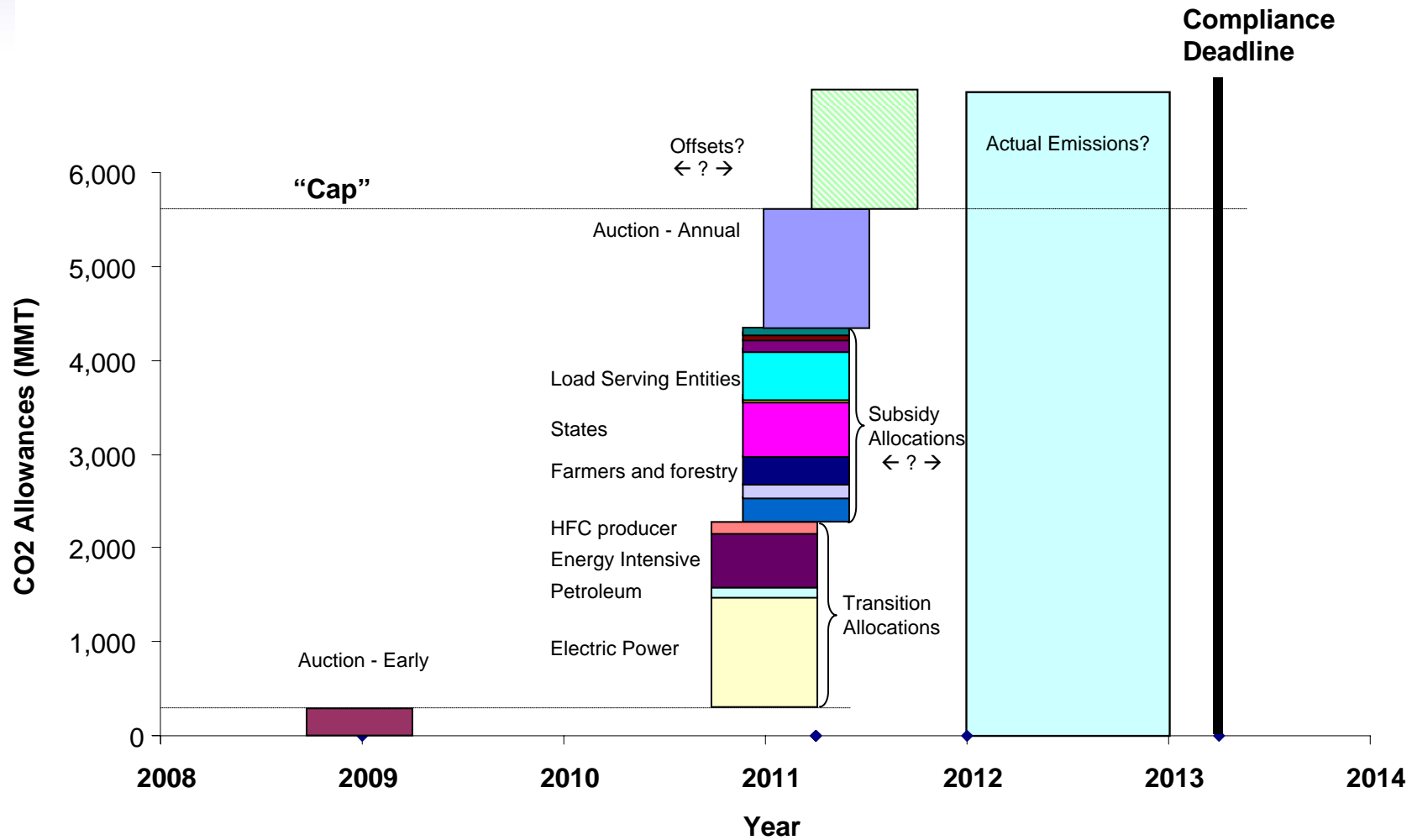
# Cap and Trade Compliance Options

**IF** GHG allowance allocations are less than expected GHG emissions, **THEN** electric companies can achieve compliance by choosing the least-cost option of:

- Internal GHG abatement
- Buy power on the market
- Buy GHG allowances in the market
- **Buy or develop GHG offsets**



# Timing of Allowance Distribution and Compliance for Illustrative Policy Starting in 2012



# Conclusions

- Abatement curves likely to be very steep, especially during early years of program implementation
- For electric sector abatement in short term could cost over \$100/ton
- Offset supply could dramatically lower allowance prices needed to meet the cap
- Uncertainty in availability of offsets will have big impact on allowance price volatility
- Some of greatest value could be in early years of program implementation when abatement options are limited