

Analyzing Options For GHG Mitigation

Presentation for:
Toward a Lower Carbon Energy Future:
Technology, Economics, and Policy

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Energy Information Administration

Official Energy Statistics from the U.S. Government

Outline

- A (very) little about EIA and its role
- A little about results of recent EIA analyses
- Some additional insights
- Whatever you want to talk about

EIA

- 370 feds, \$90 million
 - Administrator (currently Guy Caruso) is only non-career position
- Data: 80-85 percent of mission
 - statistical agency independence (pretty standard)
- Projections/ Other Analysis: 15-20 percent of mission
 - products for the public and/or Congress are not subject to Administration clearance (pretty unusual)
 - often respond directly to requests from Congress
 - analytical support for EOP offices when requested
- We are always looking for good people!
 - especially statisticians, economists, and OR analysts

Energy Security and GHG Emission Reduction: some synergies (S), some conflicts (C)

- **(S) Improved vehicle efficiency: lowers GHG emissions and oil demand/imports (=more energy security?)**
- **(S/C) Biomass: should it back out coal used in electricity generation or oil used in transport fuels?**
- **(C) Coal to liquids: reduces oil import dependence, but not helpful on GHGs**
- **(S/C) CO2 sequestration requirements: helpful on GHGs, hurts coal, but can reduce oil imports via enhanced production from aging fields.**

Policy to Reduce GHGs Could Significantly Affect the Energy Outlook

- **EIA Reference Case projections are generally based on existing laws and policies.**
- **In recent reports, EIA has examined the energy implications of alternative cap and trade programs for greenhouse gas (GHG) emissions.**
 - **Additional analyses are in progress.**
- **The electricity sector, particularly projected coal use, is most significantly affected.**

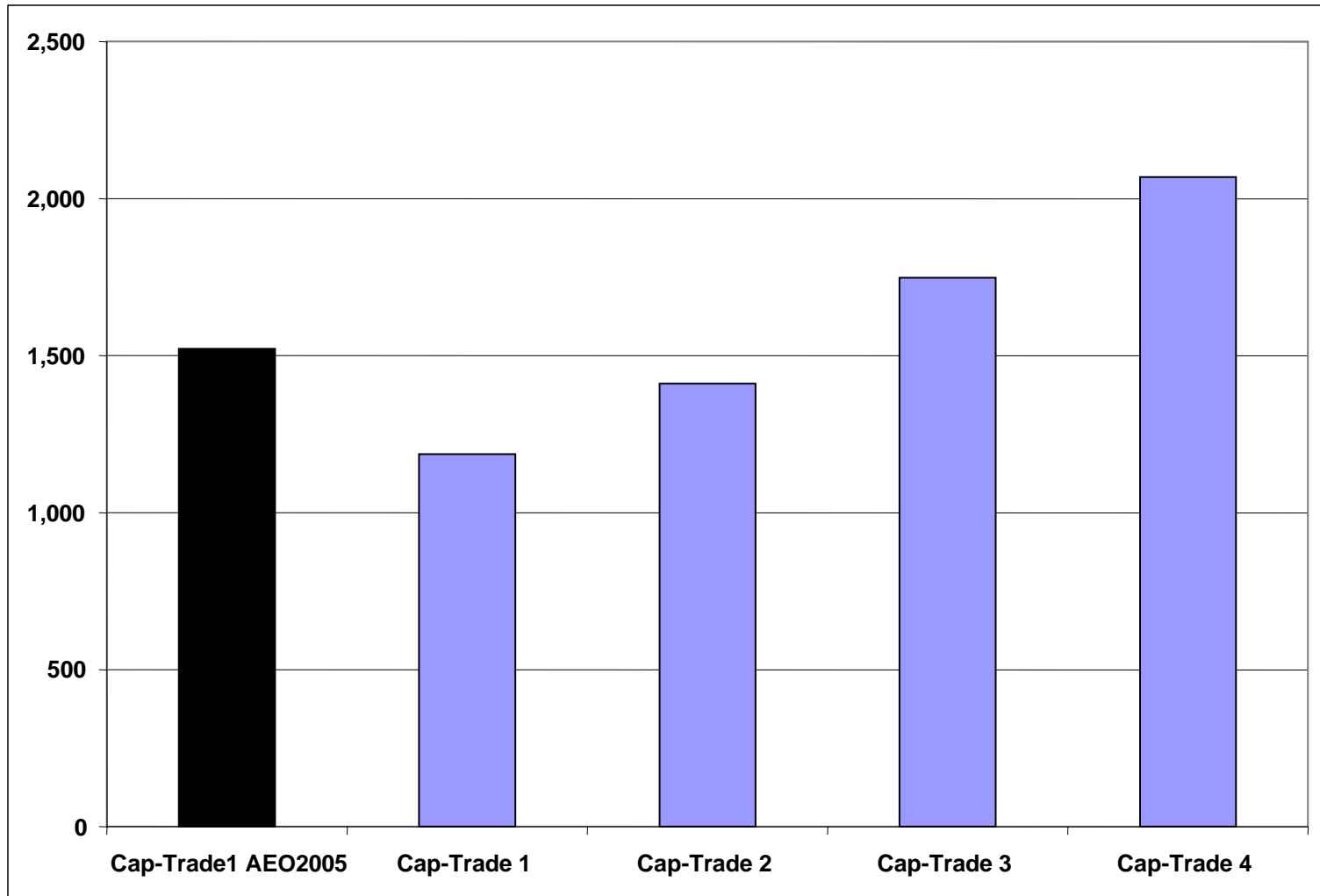
GHG Cap & Trade Analysis Cases

From Study for Senator Salazar, 2006

Case Name	GHG Intensity Reduction Goal (percent per year)		Safety Valve Price (2004 dollars per metric ton CO ₂ equivalent)		Other
	2010-2019	2020-2030	2010	2030	
Cap-Trade 1	2.4	2.8	\$ 6.16	\$ 9.86	Greenhouse gas cap-and-trade system with safety valve.
Cap-Trade 2	2.6	3.0	\$ 8.83	\$14.13	
Cap-Trade 3	2.8	3.5	\$22.09	\$35.34	
Cap-Trade 4	3.0	4.0	\$30.92	\$49.47	
Cap-Trade 3 Low Other	2.8	3.5	\$22.09	\$35.34	Cap-Trade 3 with 50 percent reduction in other GHG abatement supply.
Cap-Trade 3 Low Safety	2.8	3.5	\$ 8.83	\$14.13	Cap-Trade 3 with lower assumed safety valves.
Cap-Trade 3 High Tech	2.8	3.5	\$22.09	\$35.34	Cap-Trade 3 with more optimistic technology assumptions.

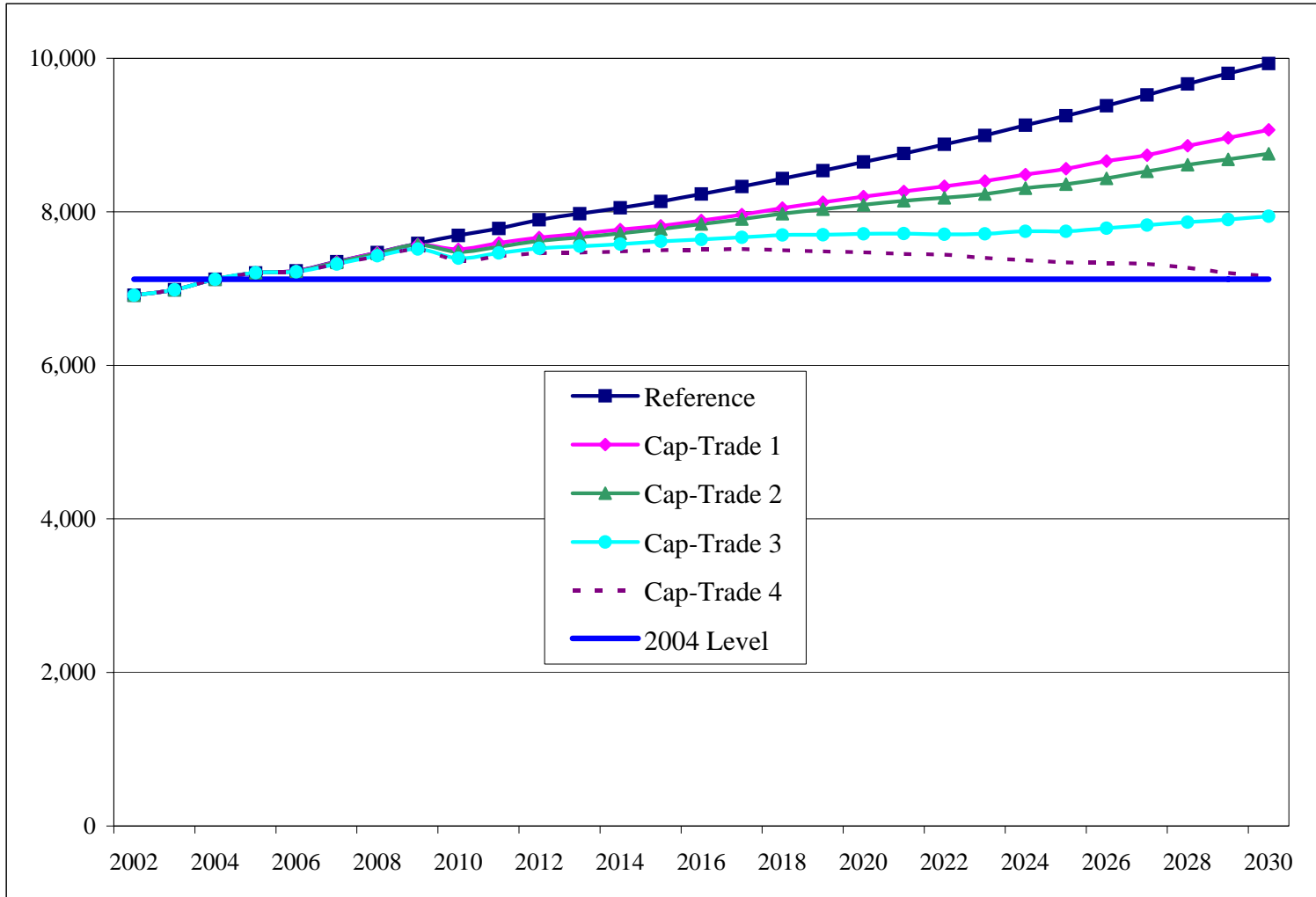
- A \$25/ton CO₂ permit price raises gasoline prices by about 23 cents/gallon.

Targeted Reduction in GHG Emissions in 2025 (Million Metric Tons Carbon Dioxide Equivalent)



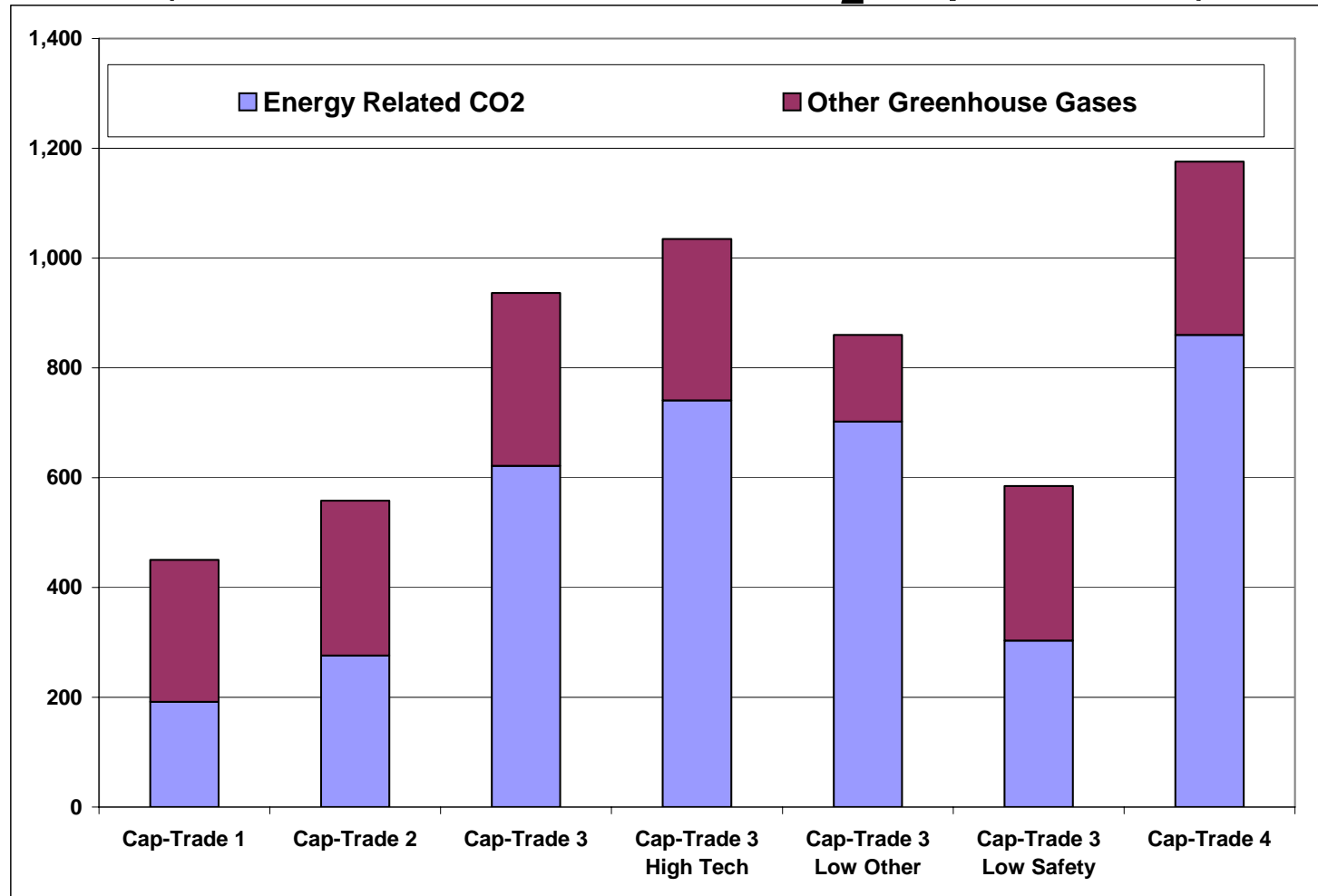
- Higher projected energy prices have reduced projected U.S. CO₂ emissions

Total GHG Emissions in Alternative Cases (million metric tons CO₂ equivalent)



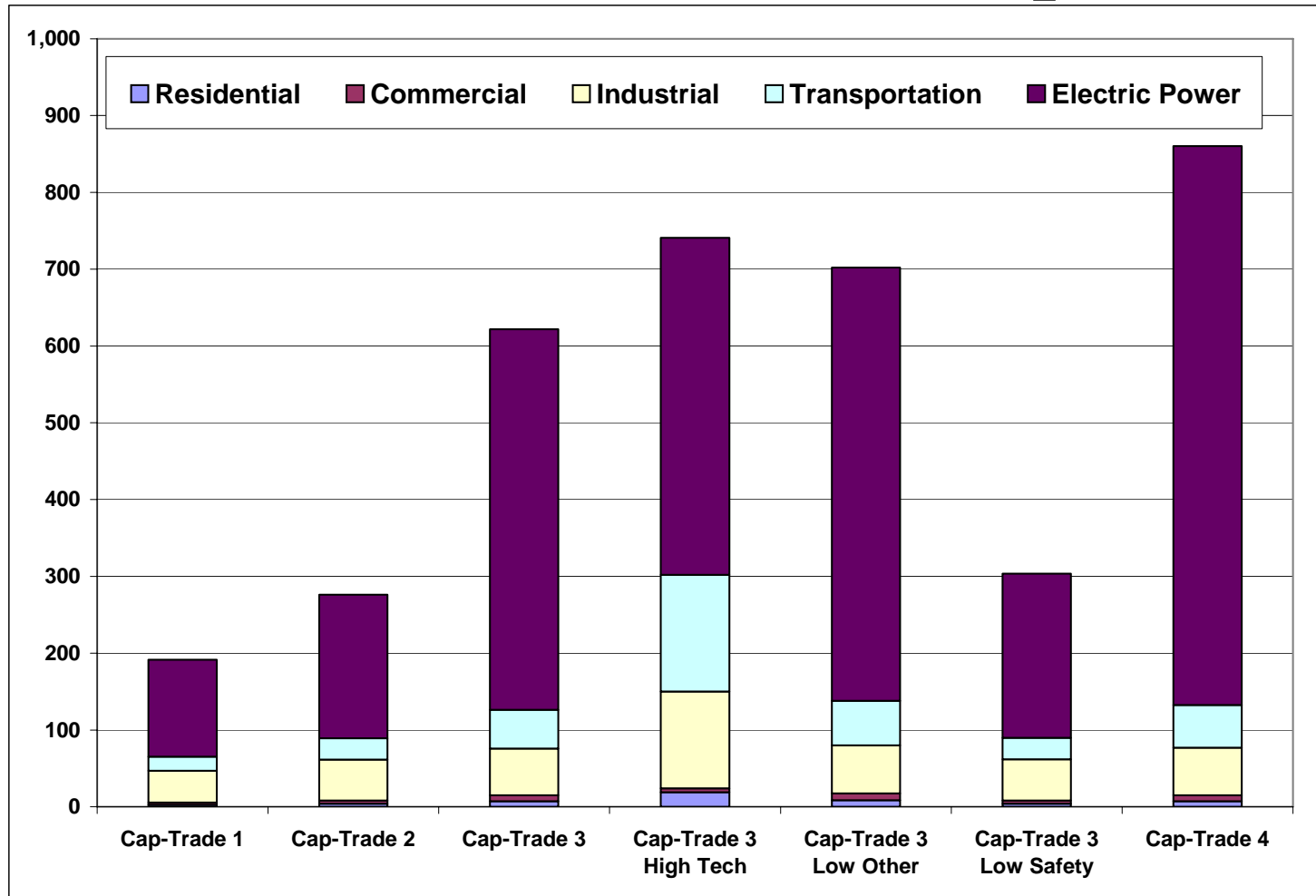
- The toughest program examined in the study for Senator Salazar returns emissions to the 2004 level by 2030

GHG Emissions Reduction in 2020 in Alternative Cases (million metric tons CO₂ equivalent)



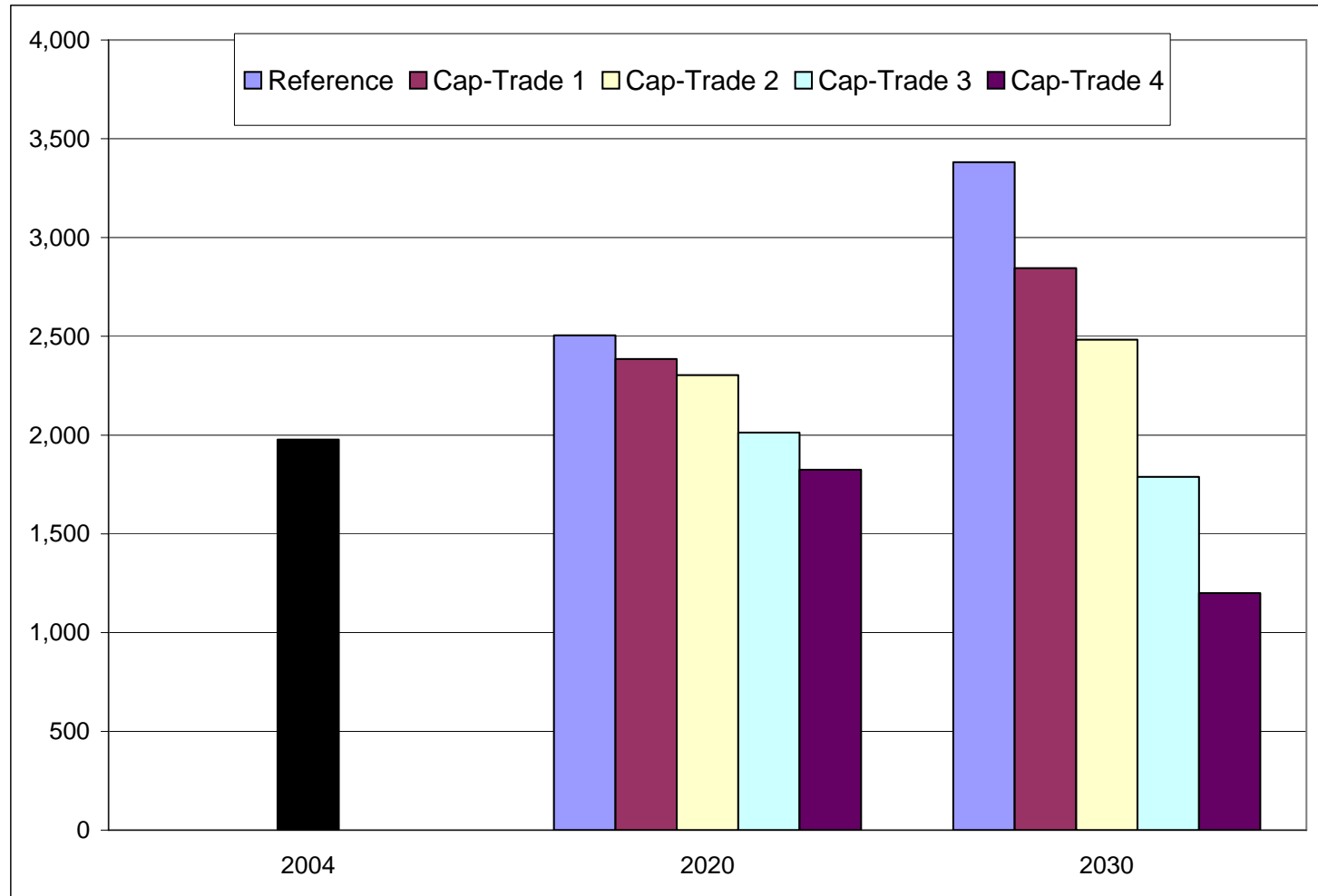
- EPA sees significant opportunity for low-cost reduction of non-energy GHGs

Energy-Related CO₂ Emissions Reductions in 2020 (million metric tons CO₂)



- The electricity sector is the main source of energy-related GHG reductions

Coal Generation in Alternative Cases (billion kilowatthours)

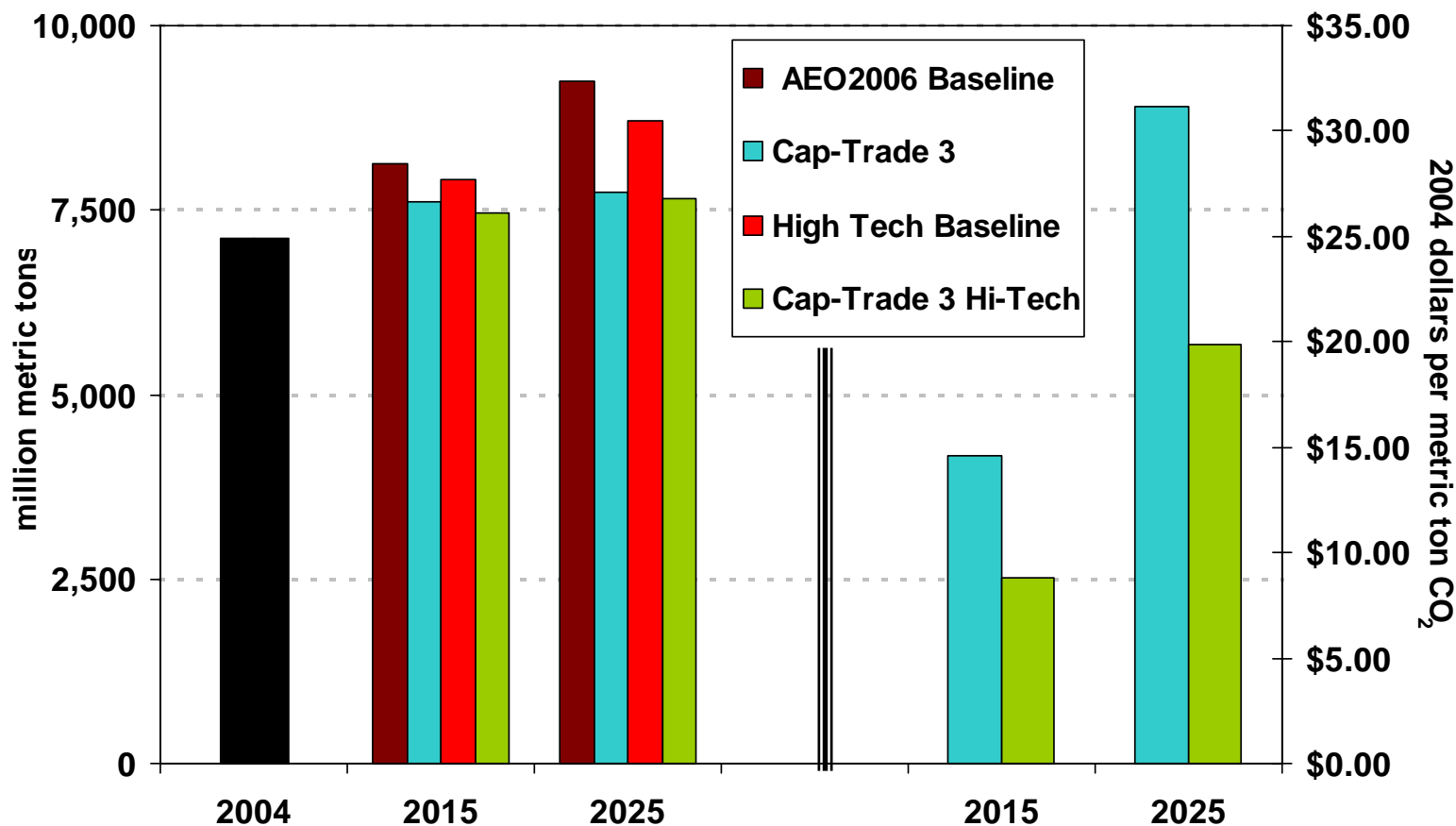


- As the emissions cap is lowered, coal-fired generation is reduced

The State of Energy Technology Matters

- With lower cost and earlier availability of advanced energy technology, it is both easier and cheaper to reach any given GHG emissions target. Advanced technology lowers baseline GHG emissions and also makes it cheaper to further reduce emissions.
- EIA is not able to relate the state of future technology to specific government initiatives.

Covered GHG Emissions and Emission Allowance Price



Contextual Factors

- Precautionary principle(s)
 - VERSION 1: The absence of scientific certainty is not a valid argument for inaction.
 - VERSION 2: Given a significant environmental concern, it may be environmentally irresponsible to insist on policy design features (stringency and/or structure) that reduce the political feasibility of implementation.
- Efforts to hide costs or pick winners (or prevent particular technologies from coming to market) can affect the realized costs of mitigation
 - Experience with the Public Utility Regulatory Policies Act
 - Prospects for new nuclear power are a critical issue
- *Ex ante* consideration of incentives for *ex post* behavior
 - Analyses generally reflect “efficient” responses without regard to public (or private) concerns other than GHG mitigation.
 - Different policy approaches that are analytically similar can have very different implications for post-implementation behavior.

Additional Observations

- **All long-run energy projections are highly uncertain. Differences between scenarios and general trends are more important than specific model results.**
- **Distributional effects as well as overall impacts matter. The rules for handing out or auctioning emissions allowances are very important in this regard.**
- **Coal will bear the brunt of efficient GHG emissions reduction in the energy sector. Carbon capture and sequestration may be too expensive for coal to maintain its share of total energy supply.**
- **Losers from action to limit GHG emissions can probably self-identify much more readily than winners.**



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