

The Outlook for New Energy Resources

for

ELCON Fall Workshop

AF&PA Conference Center, Washington DC

by

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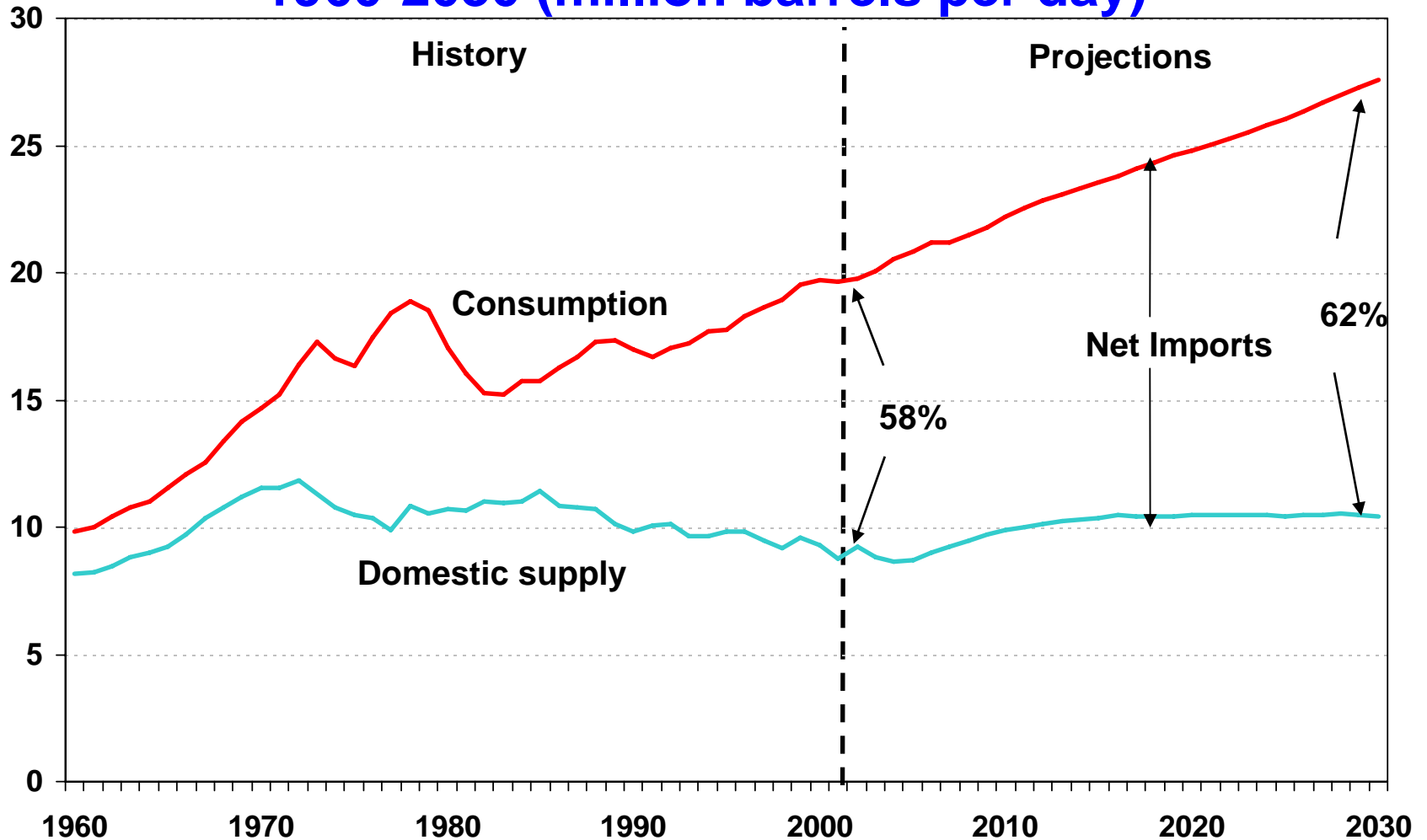
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October 18, 2006

Outline

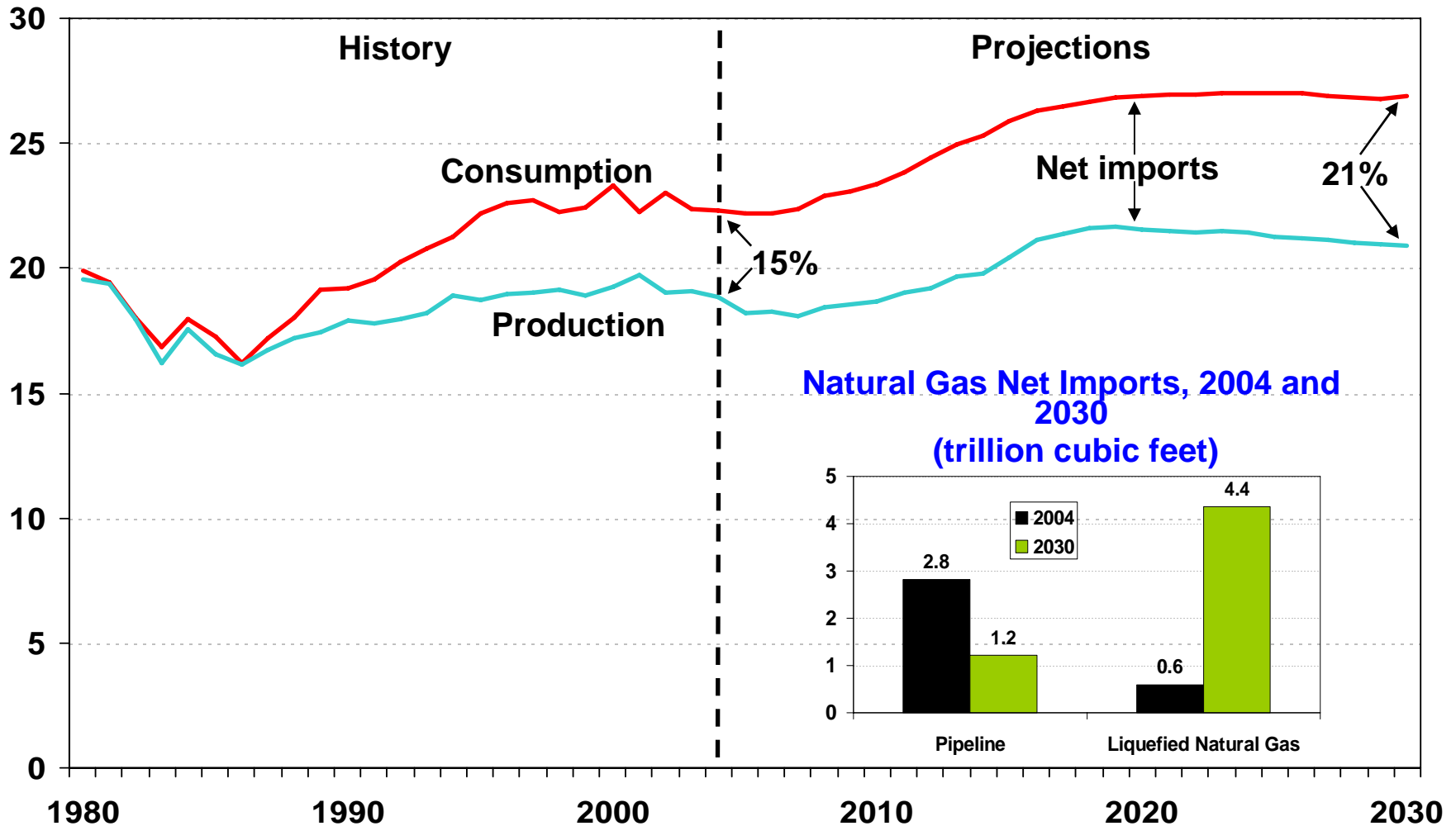
- Data/history review
- U.S. Energy Outlook under current policies
- Potential impacts of policy changes

U.S. Petroleum Supply, Consumption, and Net Imports, 1960-2030 (million barrels per day)



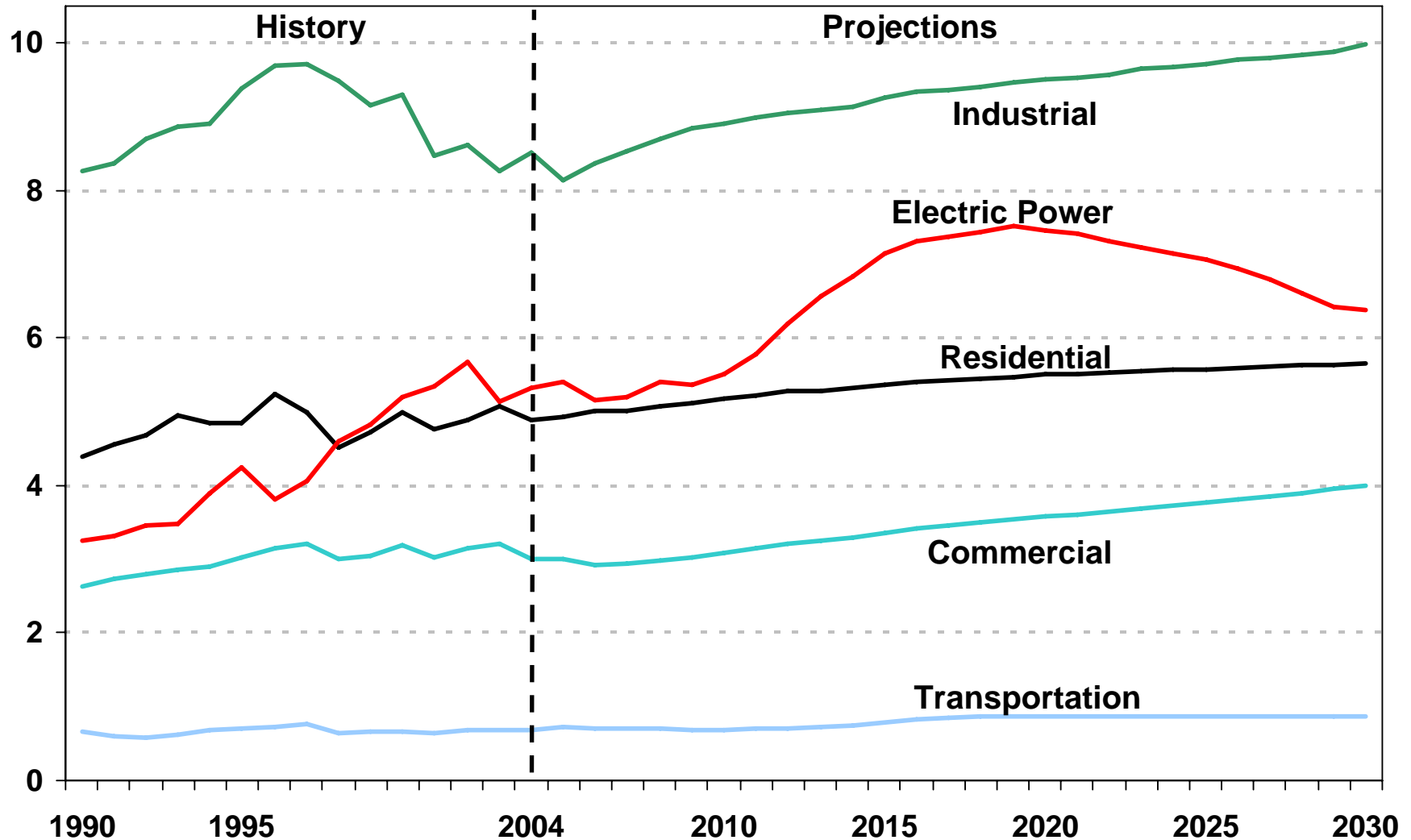
- The import share in total U.S. oil use is projected to grow slowly

Natural Gas Production, Consumption, and Imports, 1980-2030 (trillion cubic feet)



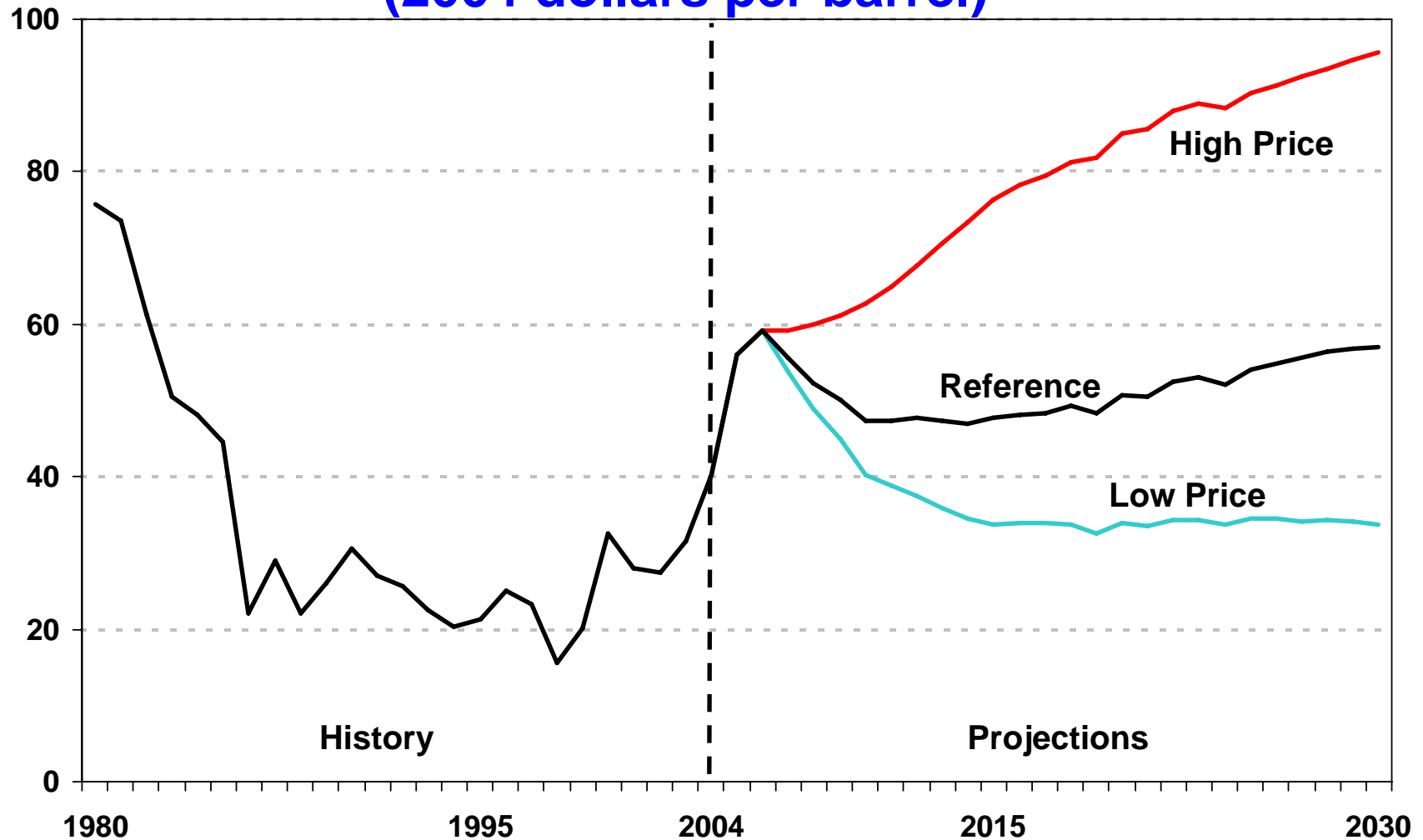
- Natural gas consumption flattens after 2020; import sources also change

U.S. Natural Gas Consumption by Sector, 1990-2030 (trillion cubic feet)



- Projected use of gas to generate electricity falls after 2020

World Oil Prices in Three Cases, 1980-2030 (2004 dollars per barrel)

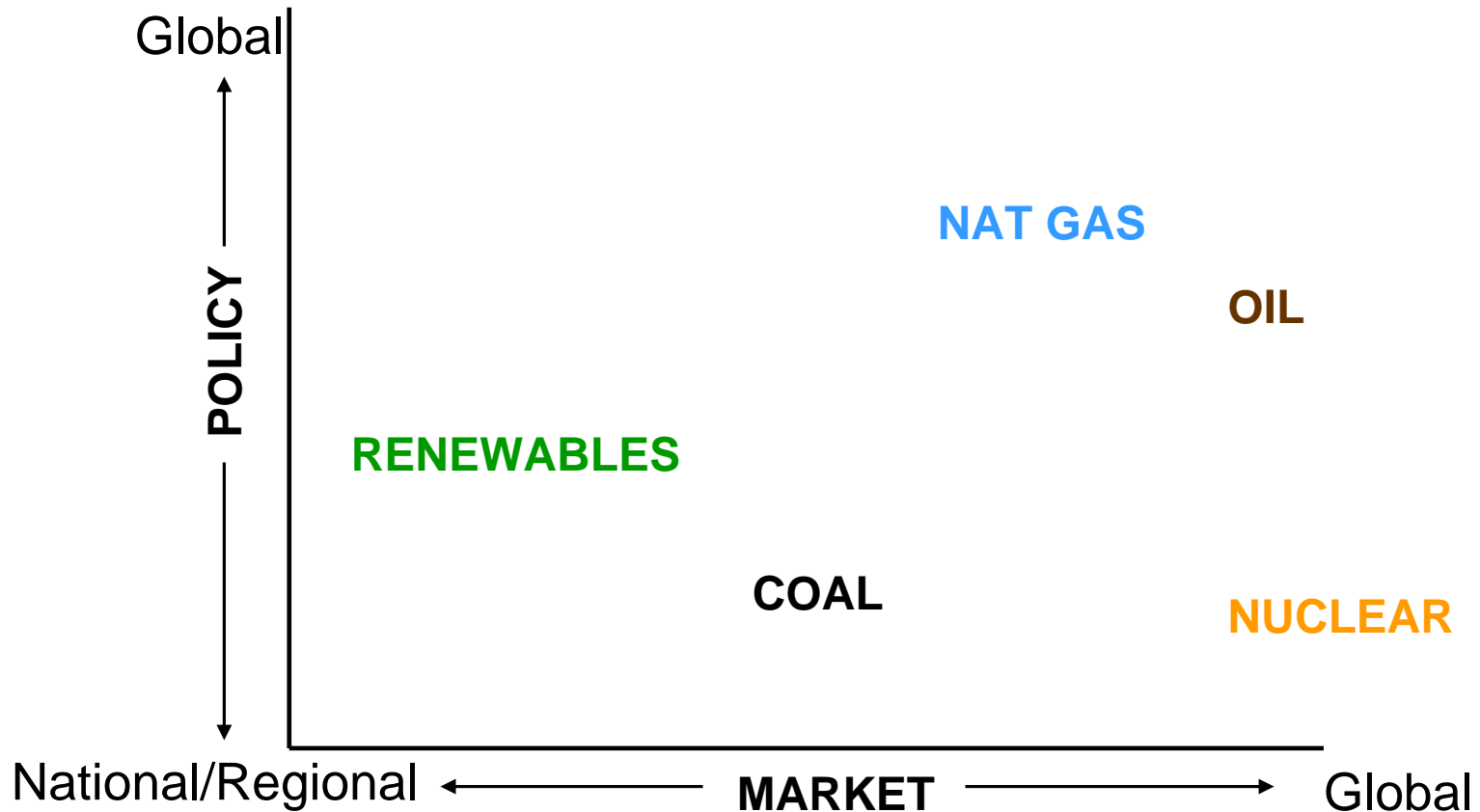


- The future path of oil prices is highly uncertain

Oil and U.S. Natural Gas Prices

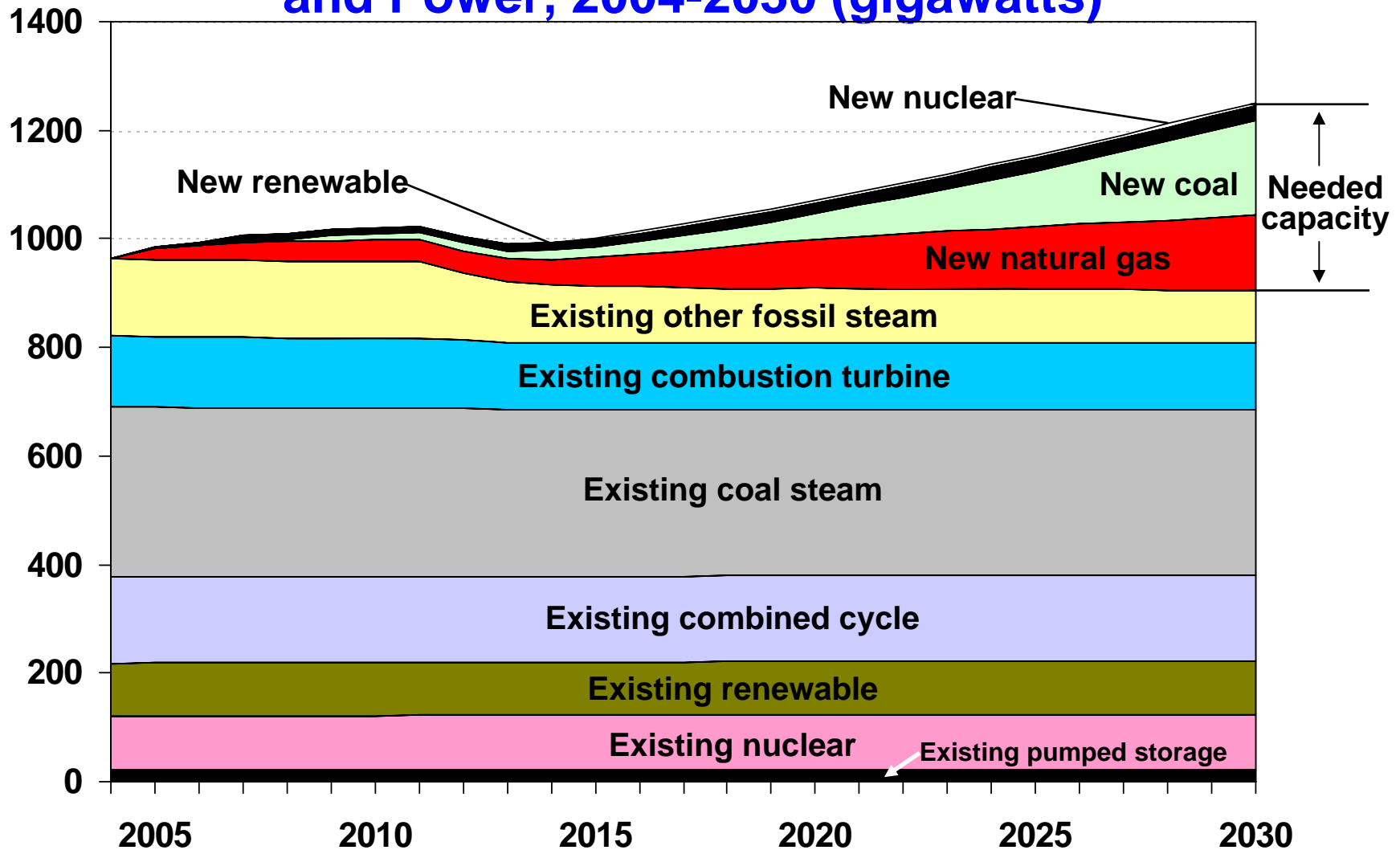
- **Oil prices are projected to remain higher than natural gas prices on an energy content basis through 2030.**
- **Although there are significant flows of LNG, U.S. natural gas prices are determined in the North American market.**
- **Three key interrelated questions:**
 - **Elasticity of global supply of stranded natural gas**
 - **Potential competition between LNG and GTL markets**
 - **Value of foreign stranded natural gas at the wellhead**

National/Regional and Global Influences Vary by Fuel



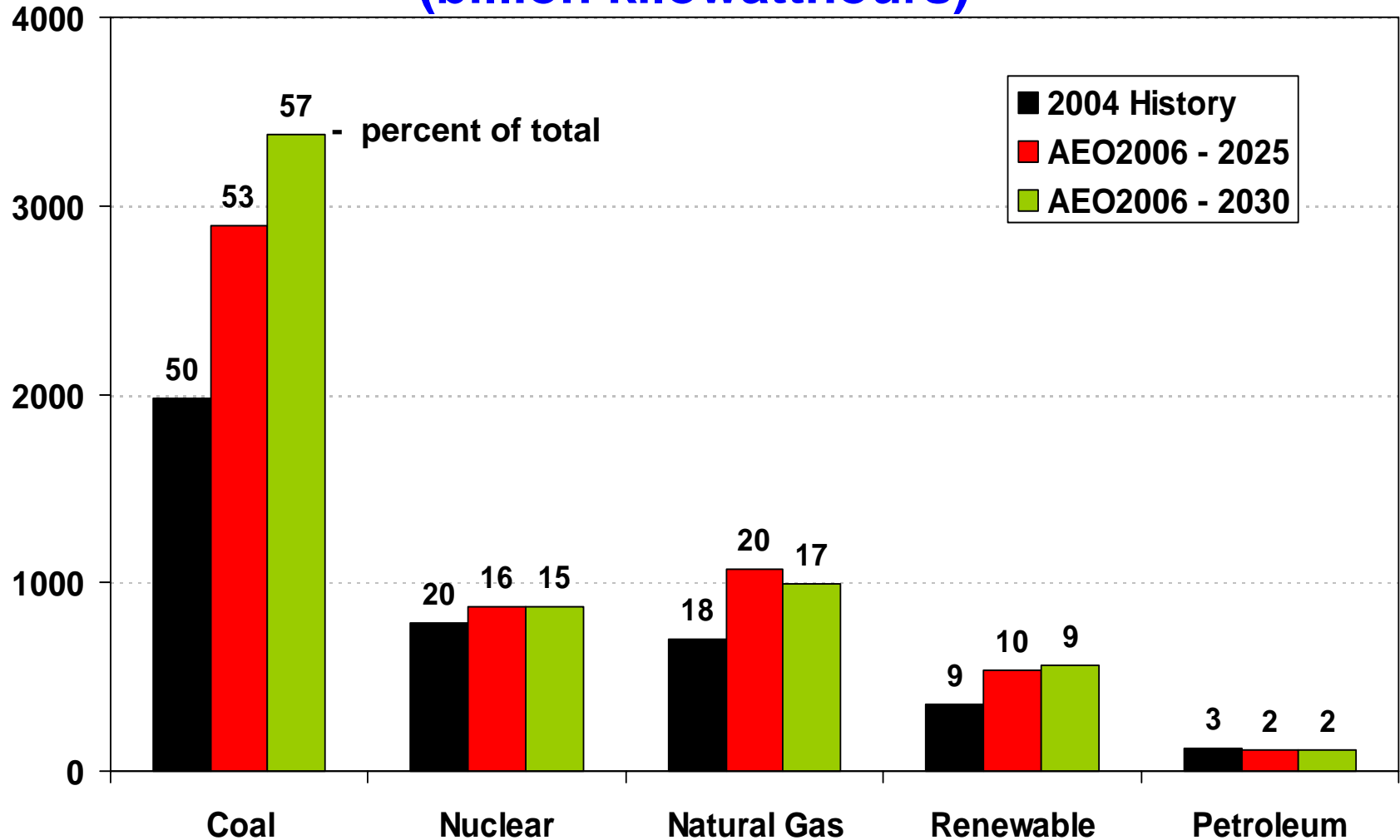
- Oil and nuclear are the most global fuels from a market perspective

Electricity Generating Capacity including Combined Heat and Power, 2004-2030 (gigawatts)



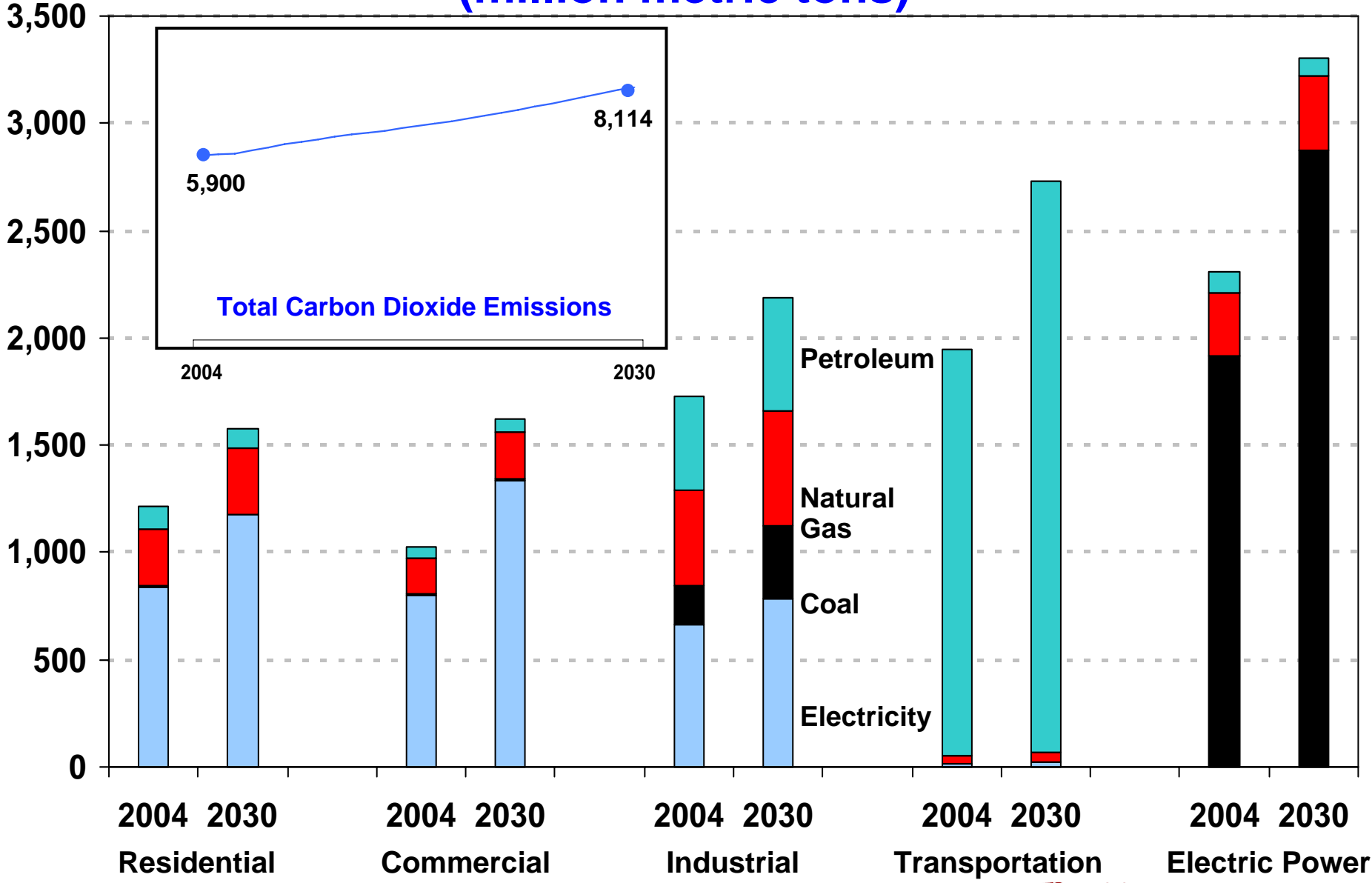
- Nearly all existing capacity is projected to still be used in 2030

Electricity Generation by Fuel, 2004, 2025, and 2030 (billion kilowatthours)



- The share and absolute level of coal-fired generation increases over time

Carbon Dioxide Emissions by Sector and Fuel, 2004 and 2030 (million metric tons)



Synergies and Conflicts Among Policies and Impacts of Potential Policies to limit US GHG Emissions

Interrelationships Between Oil Demand, Energy Security and Greenhouse Gas (GHG) Reduction

- Would U.S. energy security improve or worsen in a world where unstable exporters provided a larger share of a smaller world demand?
- What is the relative weight placed on reducing oil imports compared to reducing greenhouse gas emissions?
- What are we willing to do if things get really “bad?” – *ex ante* and *ex post* opportunity sets may differ.
 - Fact: 9-11 and Pearl Harbor
 - Fiction: Independence Day and Dr. Strangelove

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 Changes Could Significantly Affect the Outlook for Electricity Markets

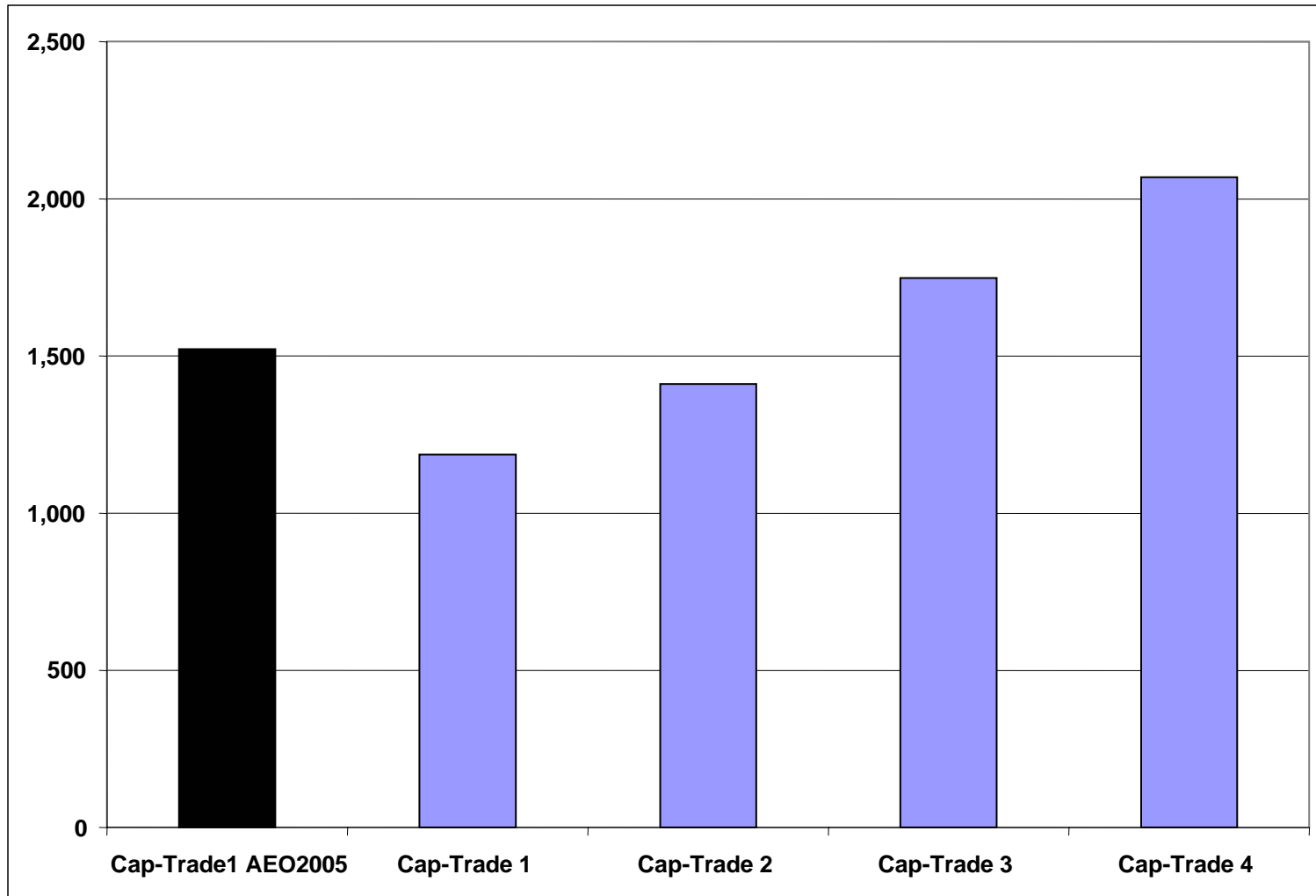
- **As previously noted, EIA Reference Case projections are generally based on existing laws and policies.**
- **In recent reports, EIA has examined the energy implications of alternative cap and trade programs for greenhouse gas (GHG) emissions.**
- **The electricity sector, particularly projected coal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

GHG Cap & Trade Analysis Cases

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.

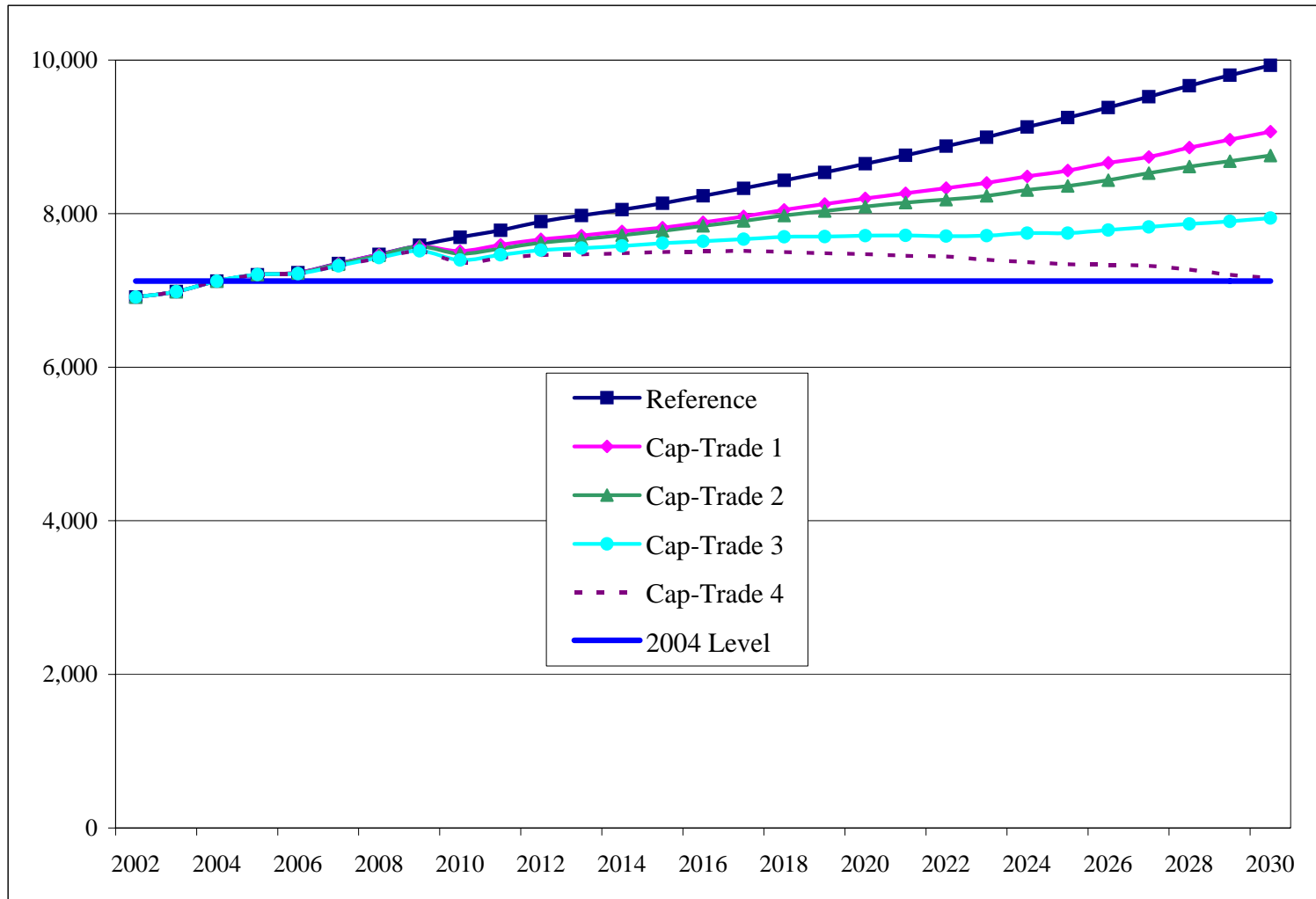
- A \$25/ton CO₂ permit price raises gasoline prices by about 23 cents/gallon.

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



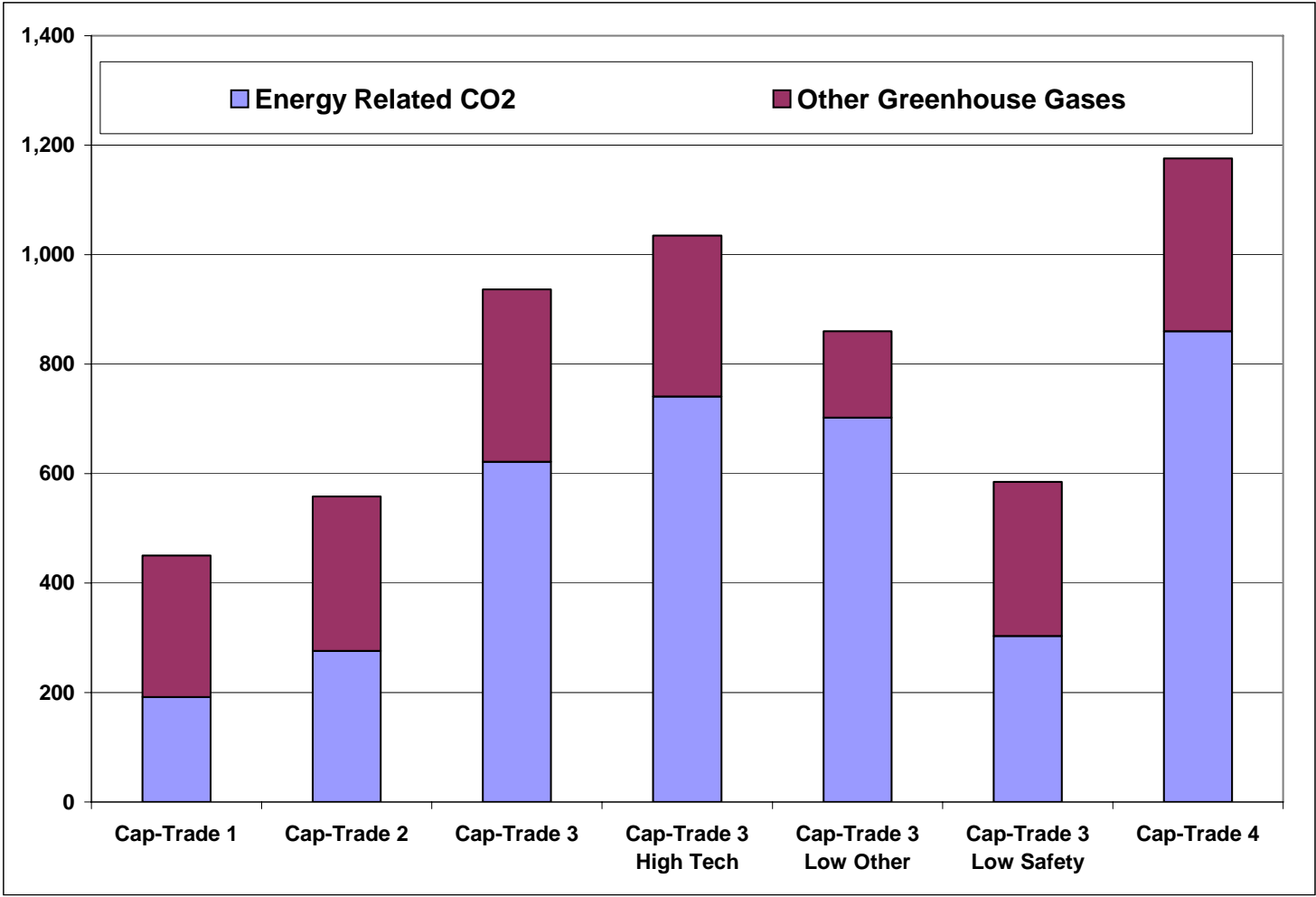
- Higher projected energy prices have reduced projected U.S.CO₂ emissions

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



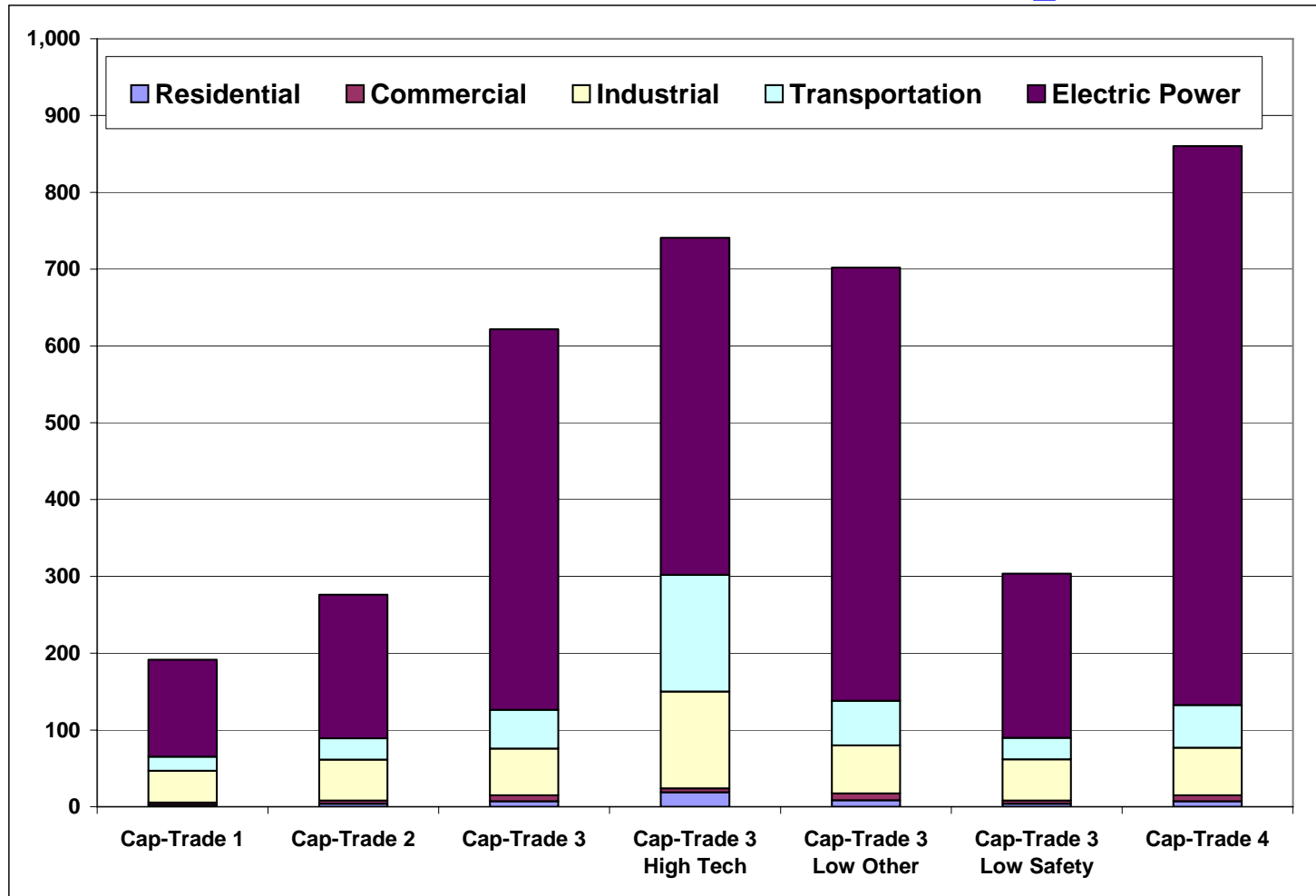
- The toughest program examined returns emissions to the 2004 level by 2030

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



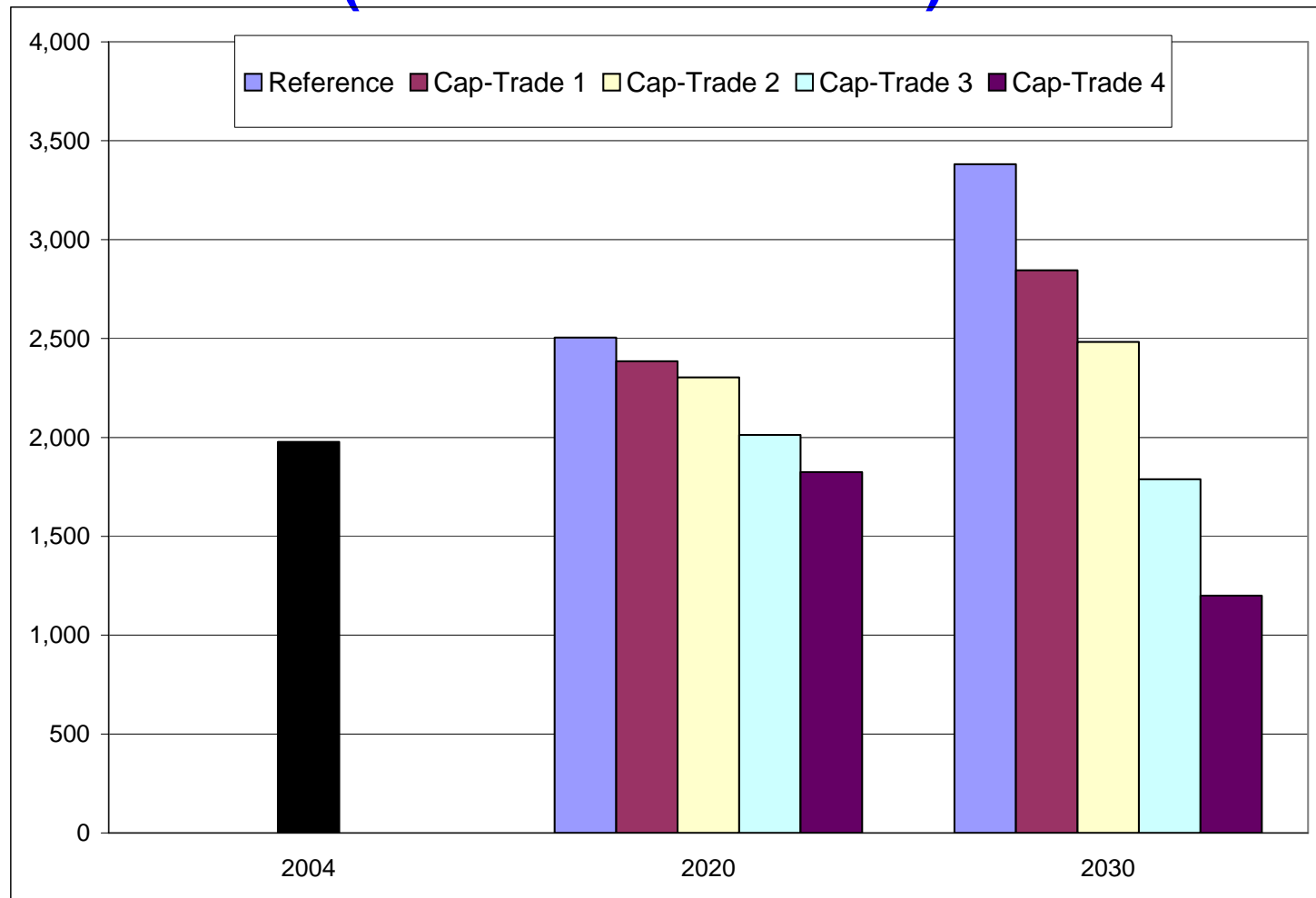
• EPA sees significant opportunity for low-cost reduction of non-energy GHGs

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



Energy Information Administration

Official Energy Statistics from the U.S. Government

www.eia.doe.gov