The Outlook for Coal and its Sensitivity to GHG Limitation

for
15th Annual
Platts Coal Properties & Investment Conference
Marriott Hotel
West Palm Beach, Florida

by
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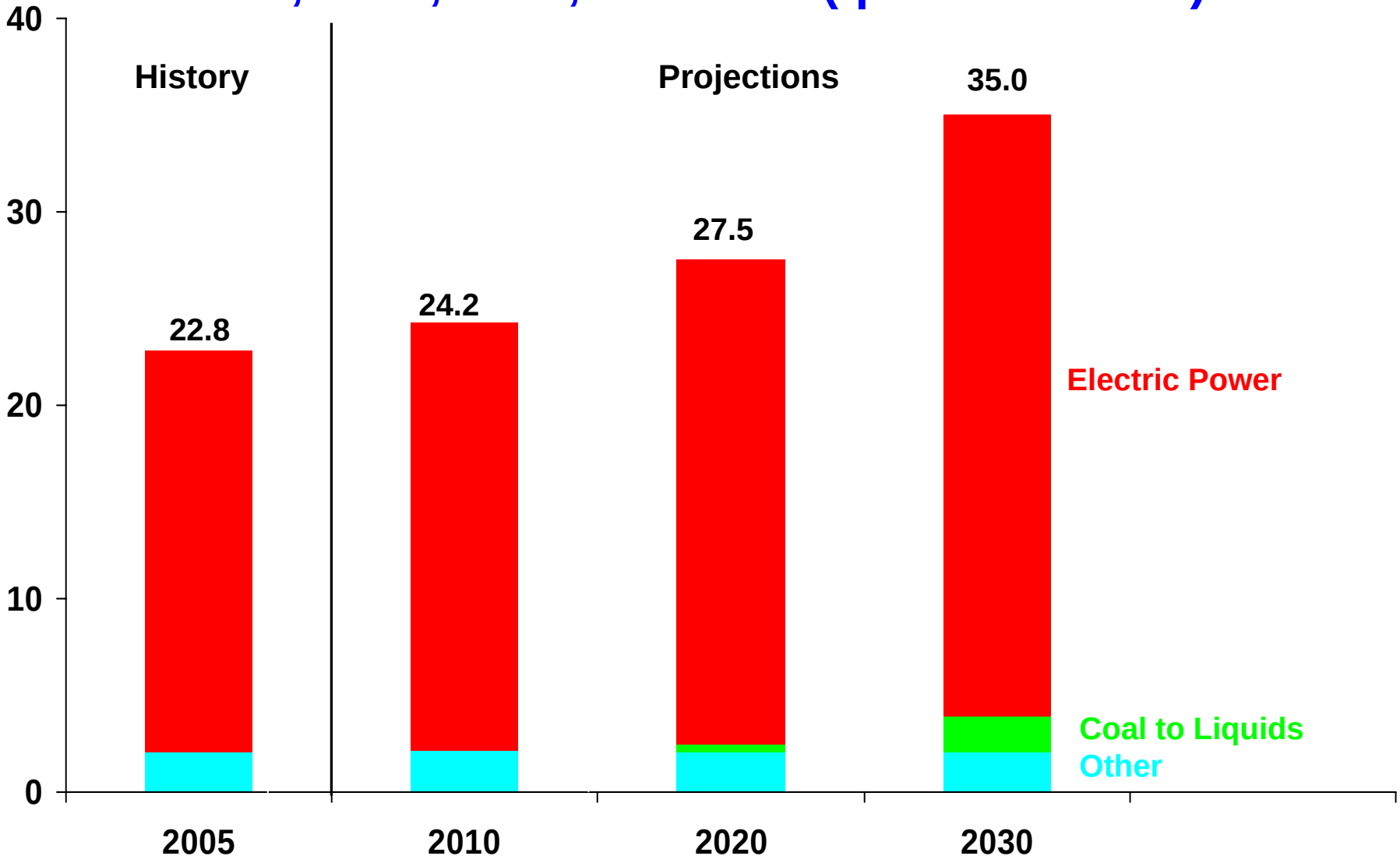
February 27, 2007

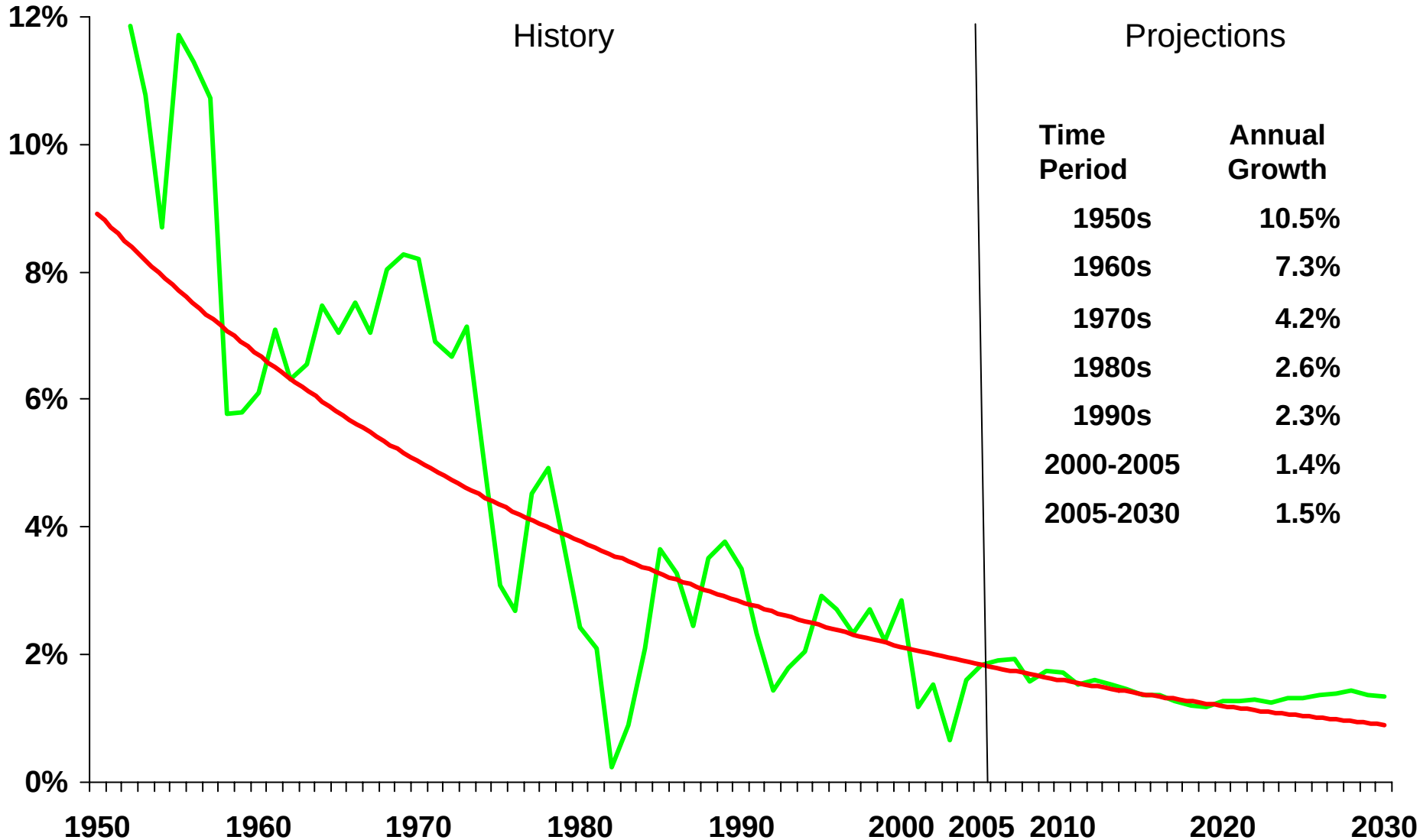
Outline

- Coal outlook to 2030 under current policies
  - Electricity
  - Other Sectors
  - Production
- Energy-related carbon dioxide emissions
- Potential impact of GHG limitation policies

U.S. Coal Consumption by Sector, 2005, 2010, 2020, and 2030 (quadrillion Btu)

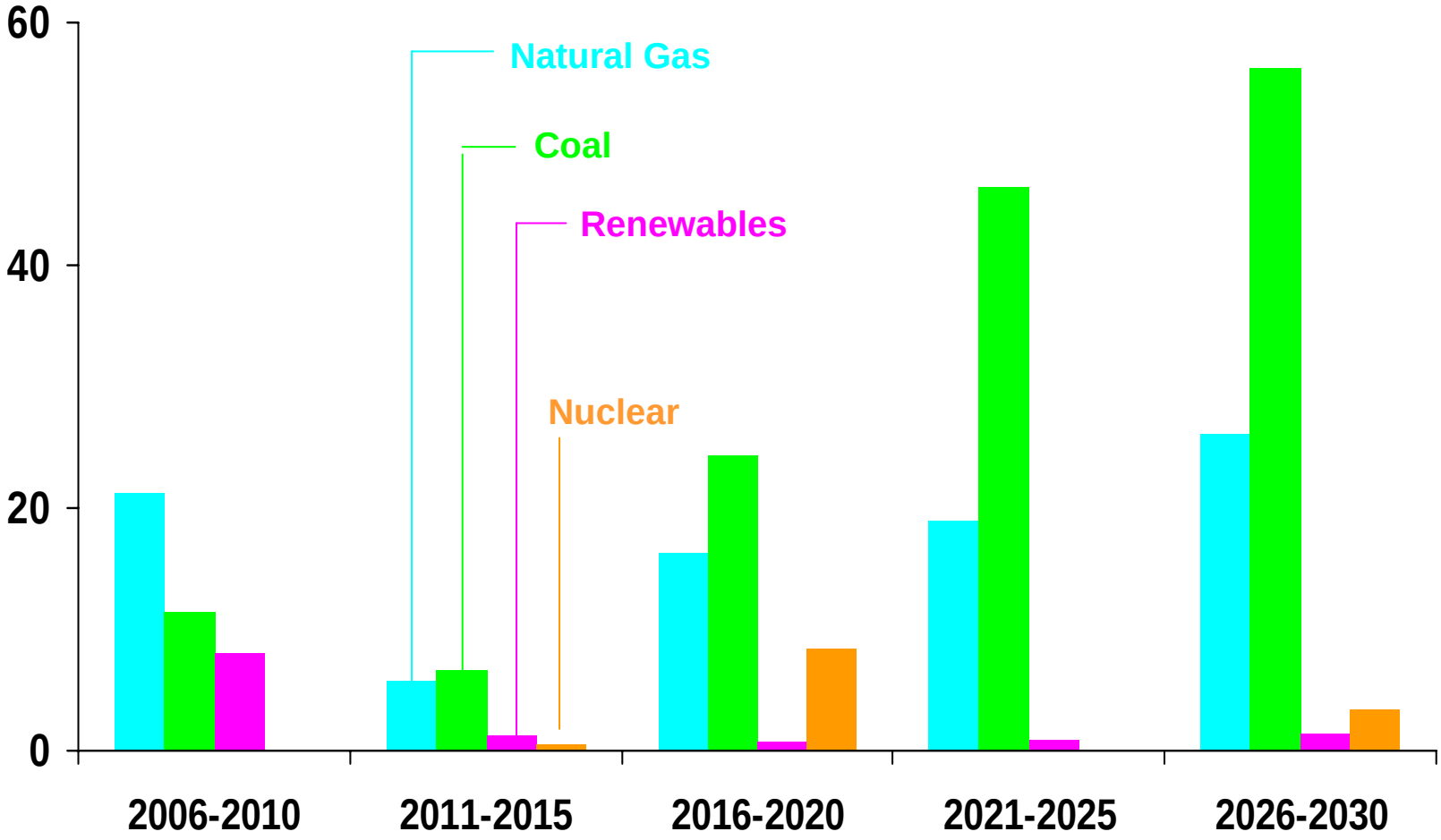


3-Year Rolling Average Electricity Demand Growth (with exponential trend line)



Time Period	Annual Growth
1950s	10.5%
1960s	7.3%
1970s	4.2%
1980s	2.6%
1990s	2.3%
2000-2005	1.4%
2005-2030	1.5%

U.S. Electricity Generation Capacity Additions by Fuel, 2006-2030 (gigawatts)



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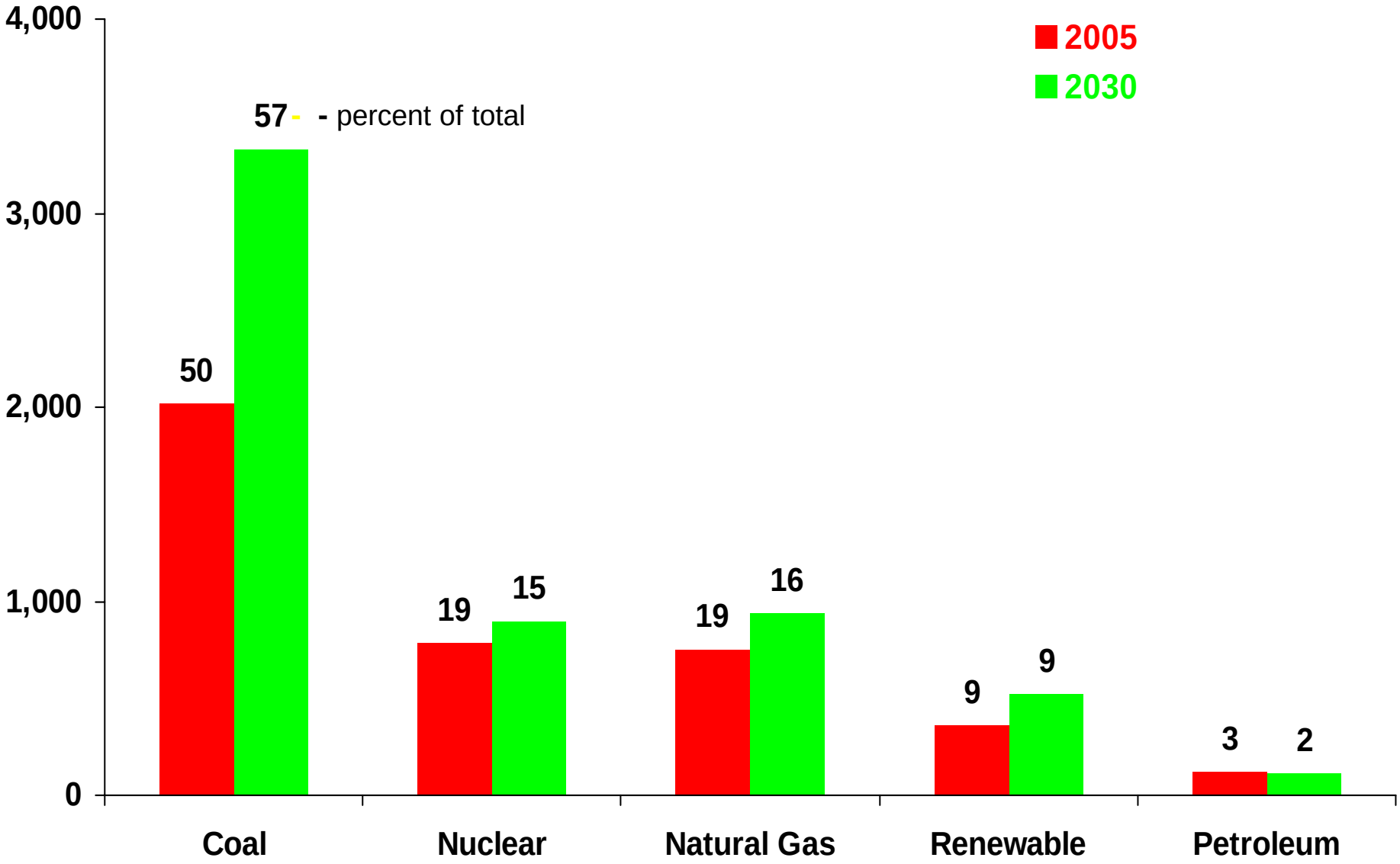
U.S. Electricity Generation by Fuel, 2005 and 2030 (billion kilowatthours)



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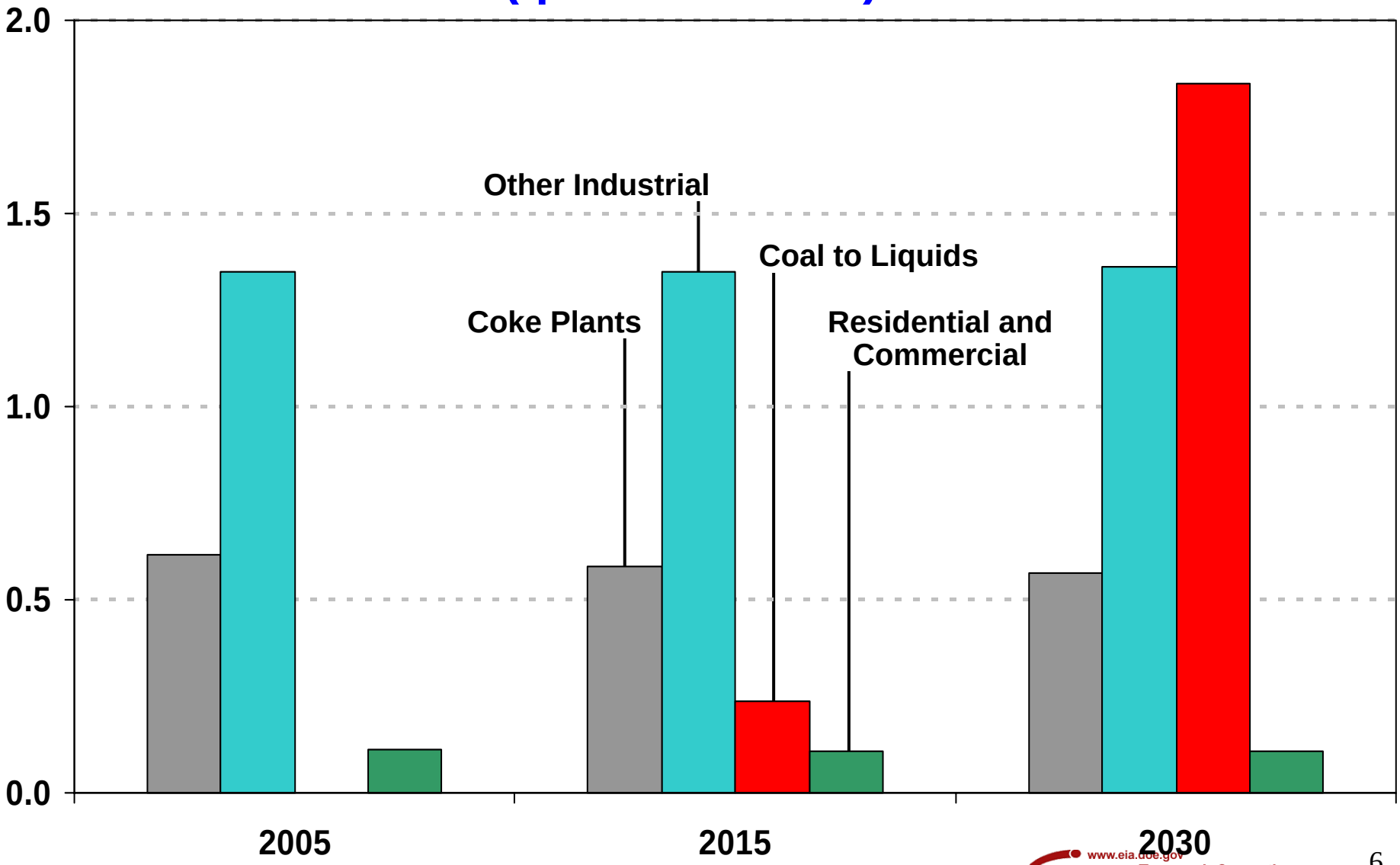
Coal Consumption in the Industrial and Buildings Sectors and at Coal-to-Liquids Plants, 2005, 2015, and 2030 (quadrillion Btu)



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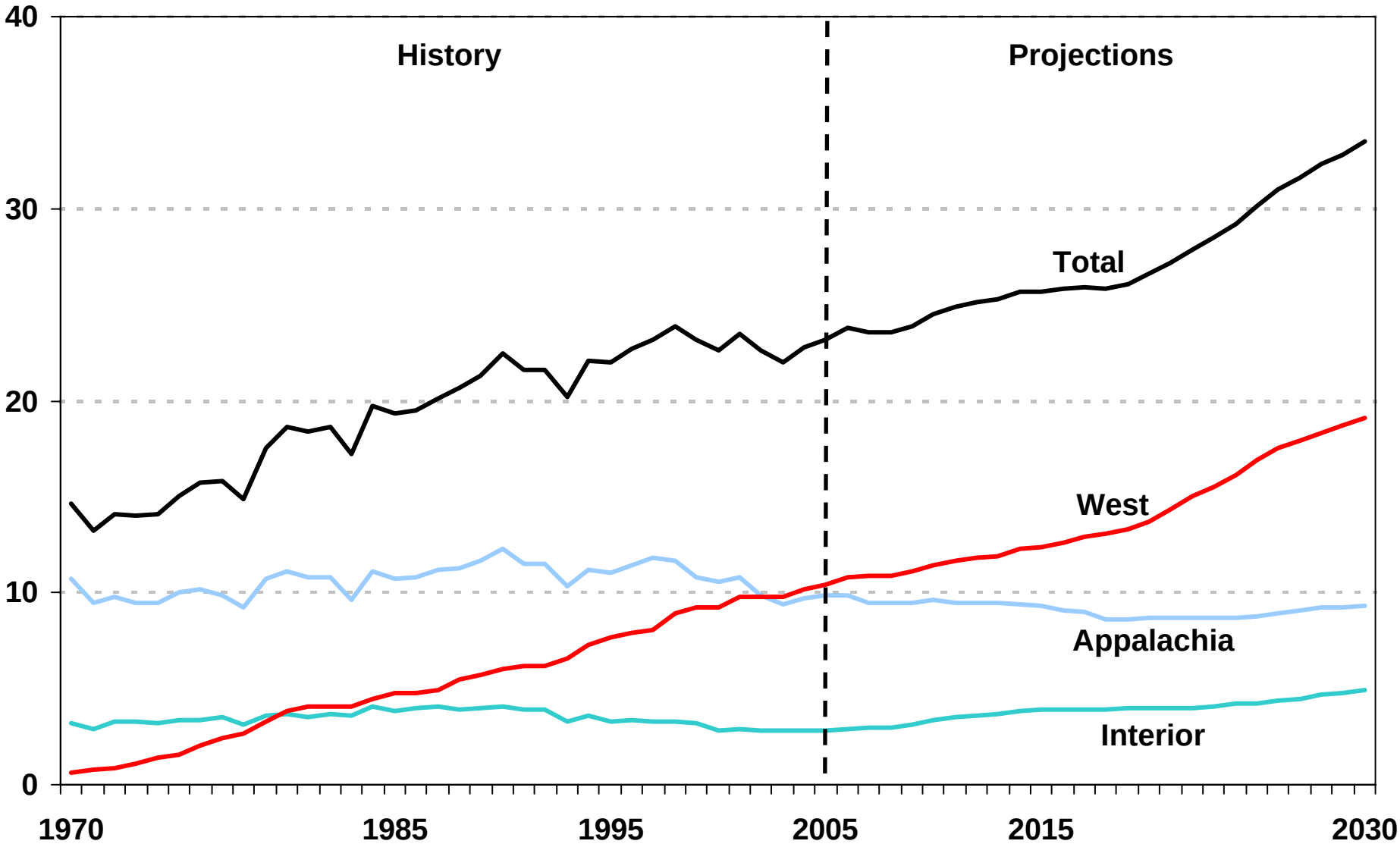
Coal Production by Region, 1970-2030 (quadrillion Btu)



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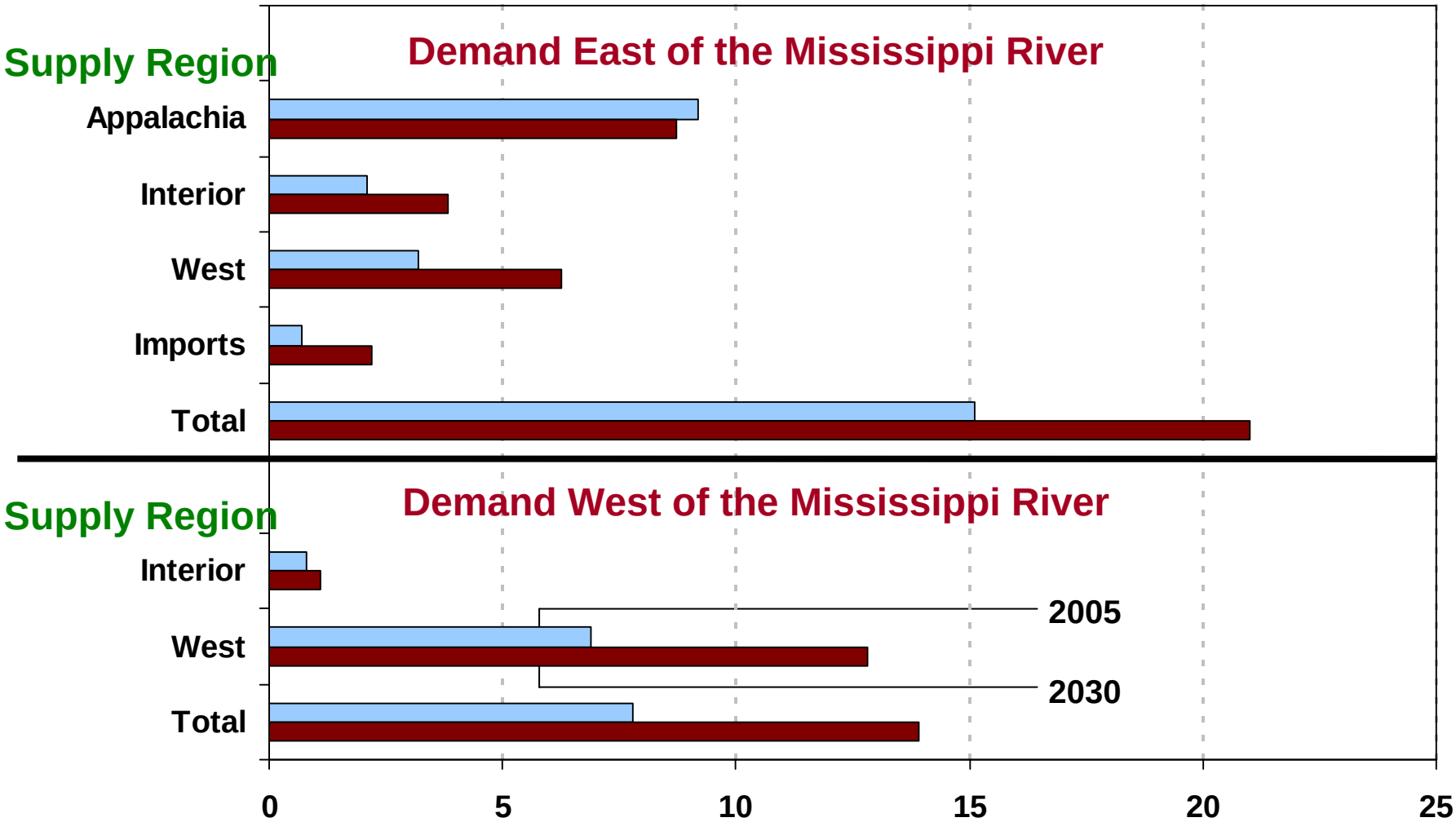
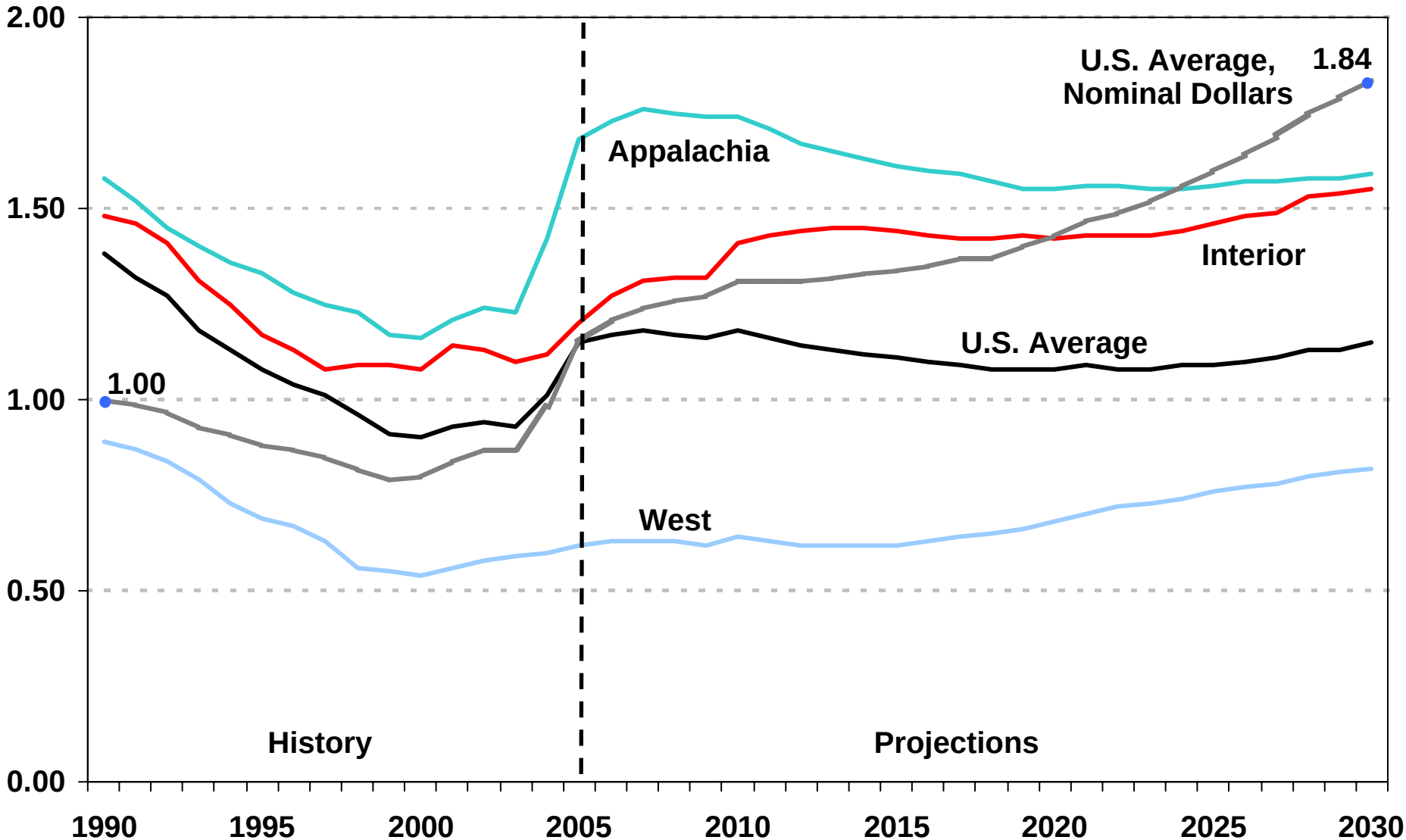
Distribution of Coal to Domestic Markets by Supply and Demand Regions, including Imports, 2005 and 2030 (quadrillion Btu)



Average Minemouth Price of Coal by Region, 1990-2030 (2005 dollars per million Btu)



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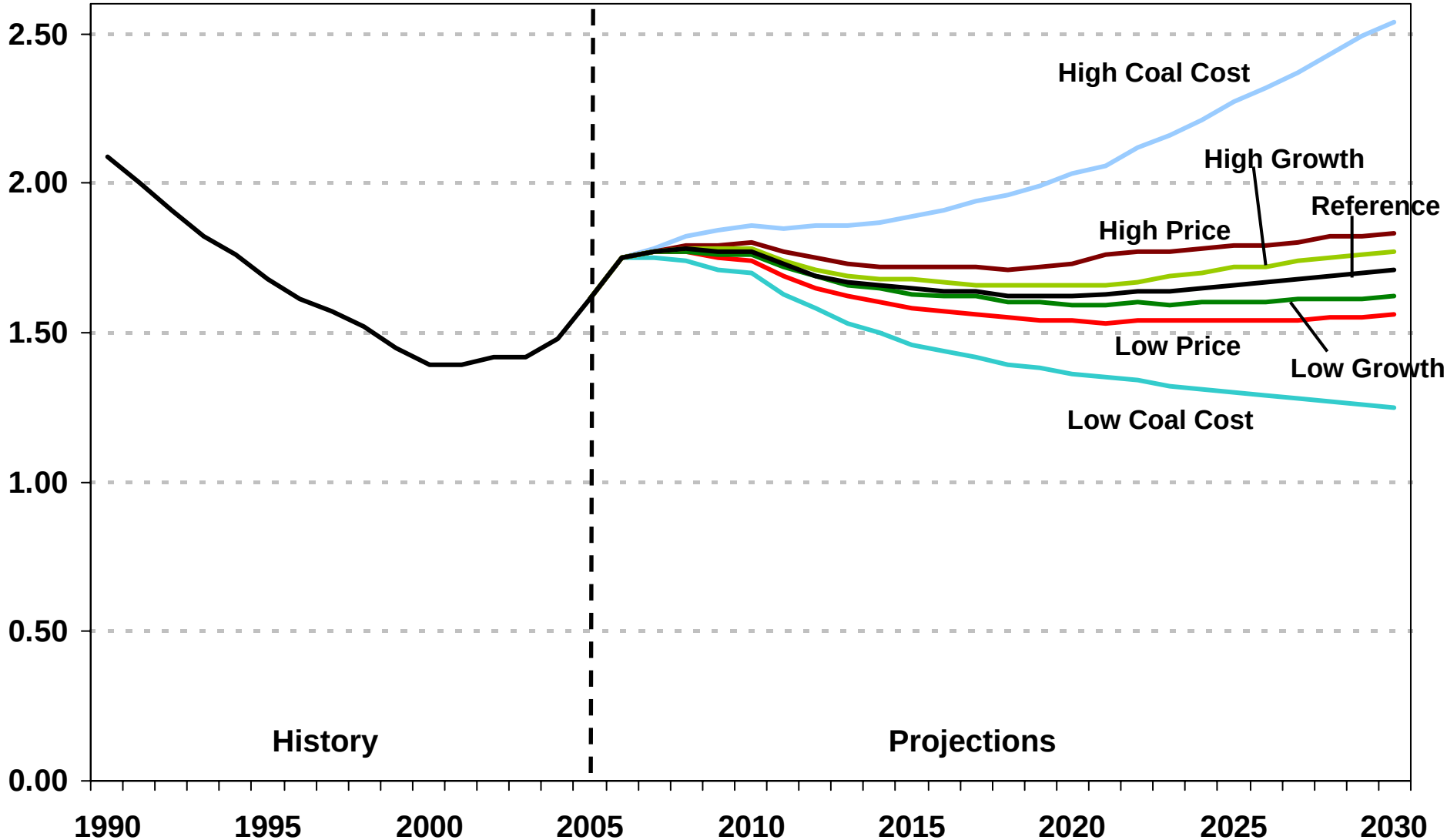
Average Delivered Coal Prices, 1990-2030
(2005 dollars per million Btu)



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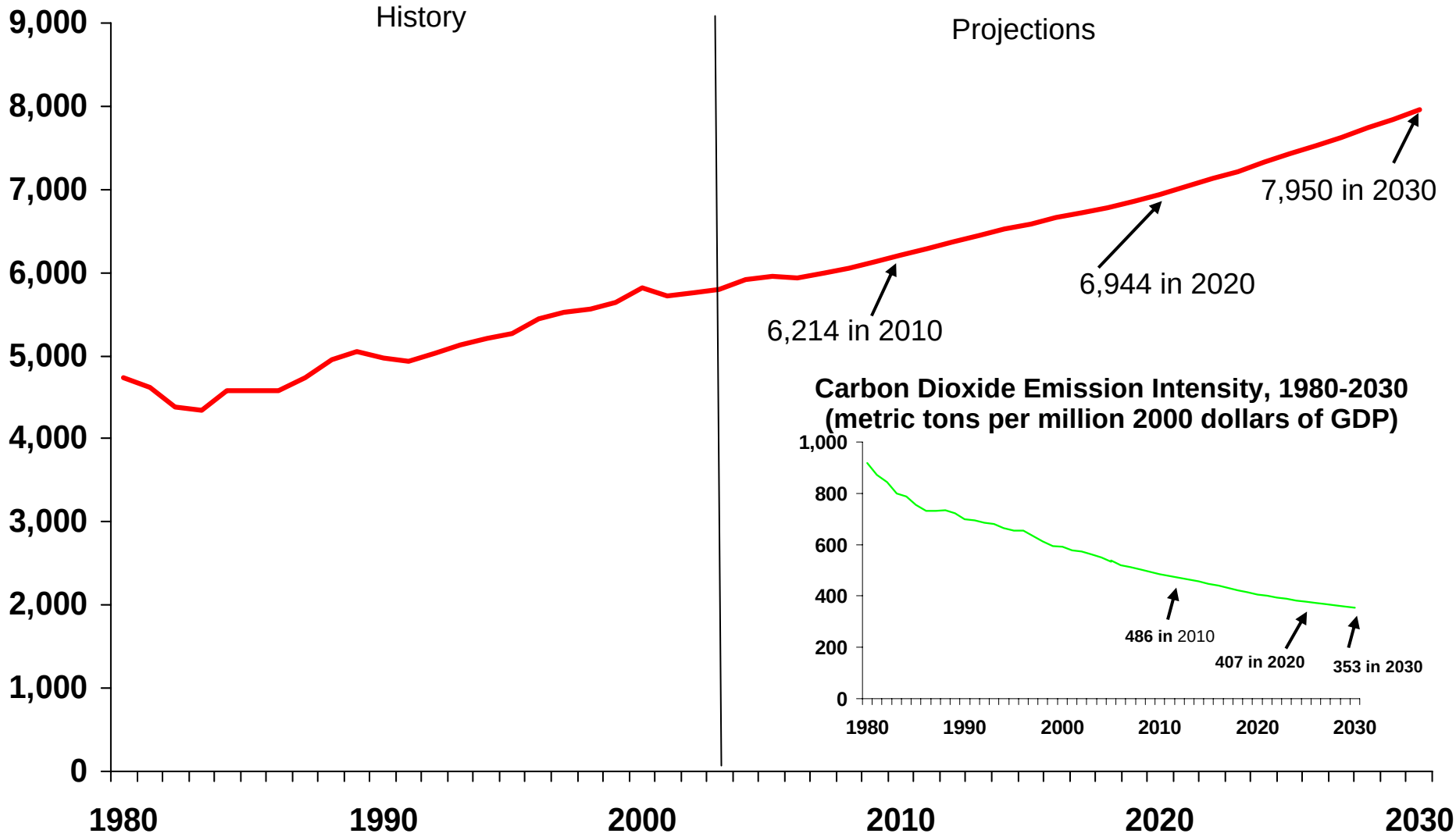
U.S. Energy-Related Carbon Dioxide Emissions, 1980-2030 (million metric tons)



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

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

- **(S) <u>Improved vehicle efficiency</u>: lowers GHG emissions and oil demand/imports (=more energy security?)**
- **(S/C) <u>Biomass</u>: should it back out coal used in electricity generation or oil used in transport fuels?**
- **(C) <u>Coal to liquids</u>: reduces oil import dependence, but not helpful on GHGs**
- **(S/C) <u>CO2 sequestration requirements</u>: 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

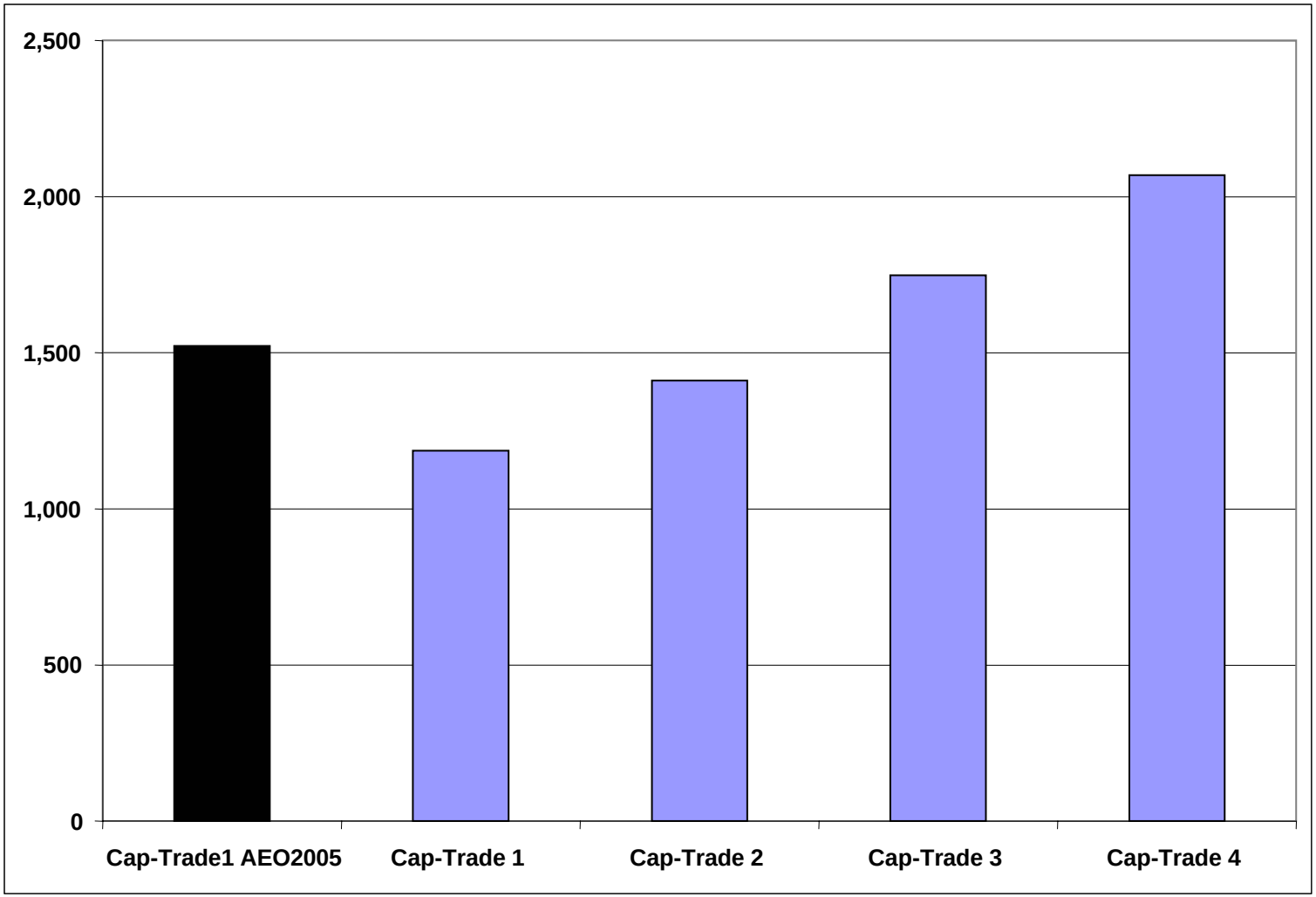
- **As previously noted, EIA Reference Case projections are generally based on existing laws and policies.**
- **In recent reports, EIA has examined the energy implications of alternative cap and trade programs for greenhouse gas (GHG) emissions.**
- **The electricity sector, particularly projected coal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

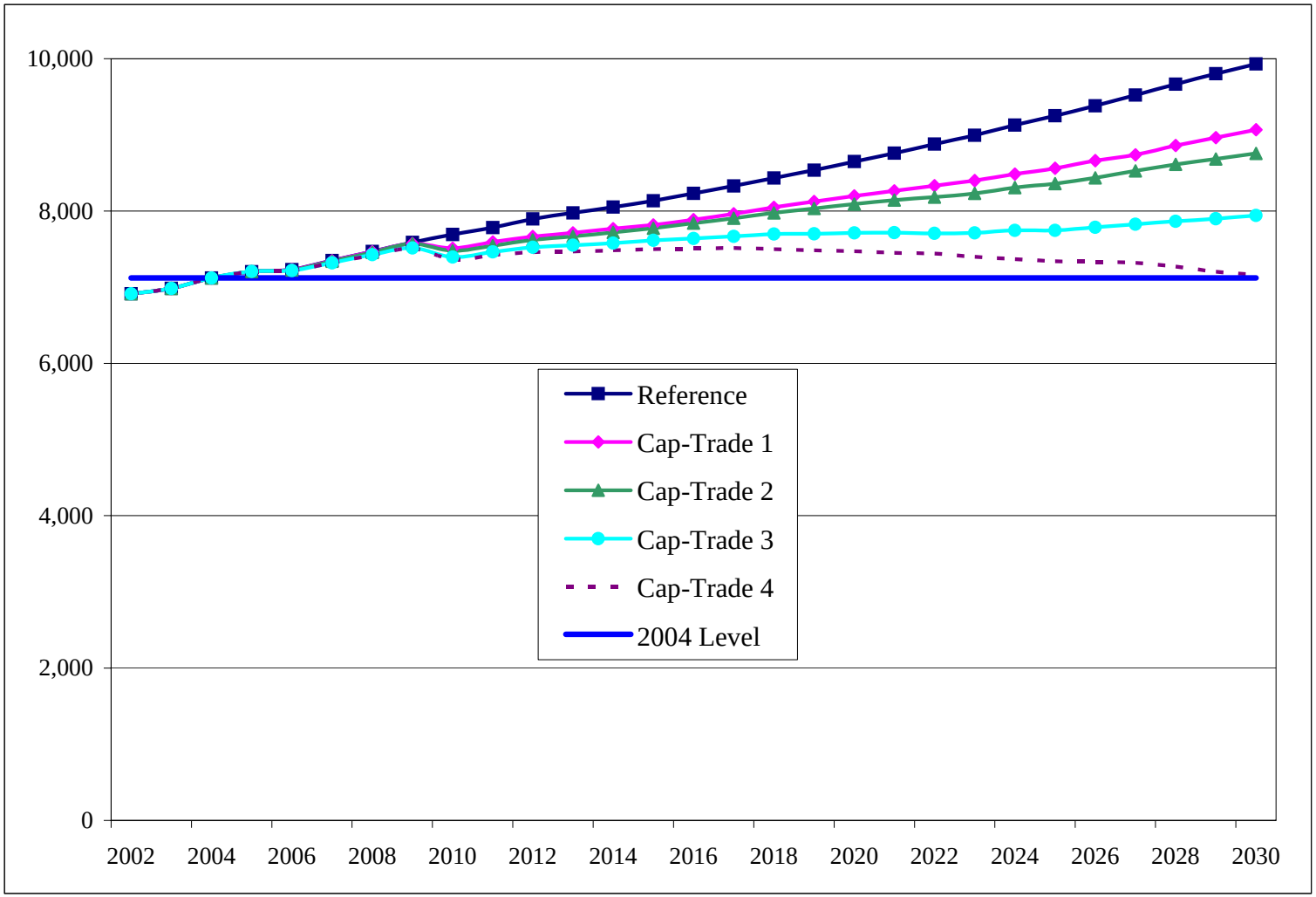
- A $25/ton CO_2 permit price raises gasoline prices by about 23 cents/gallon.

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



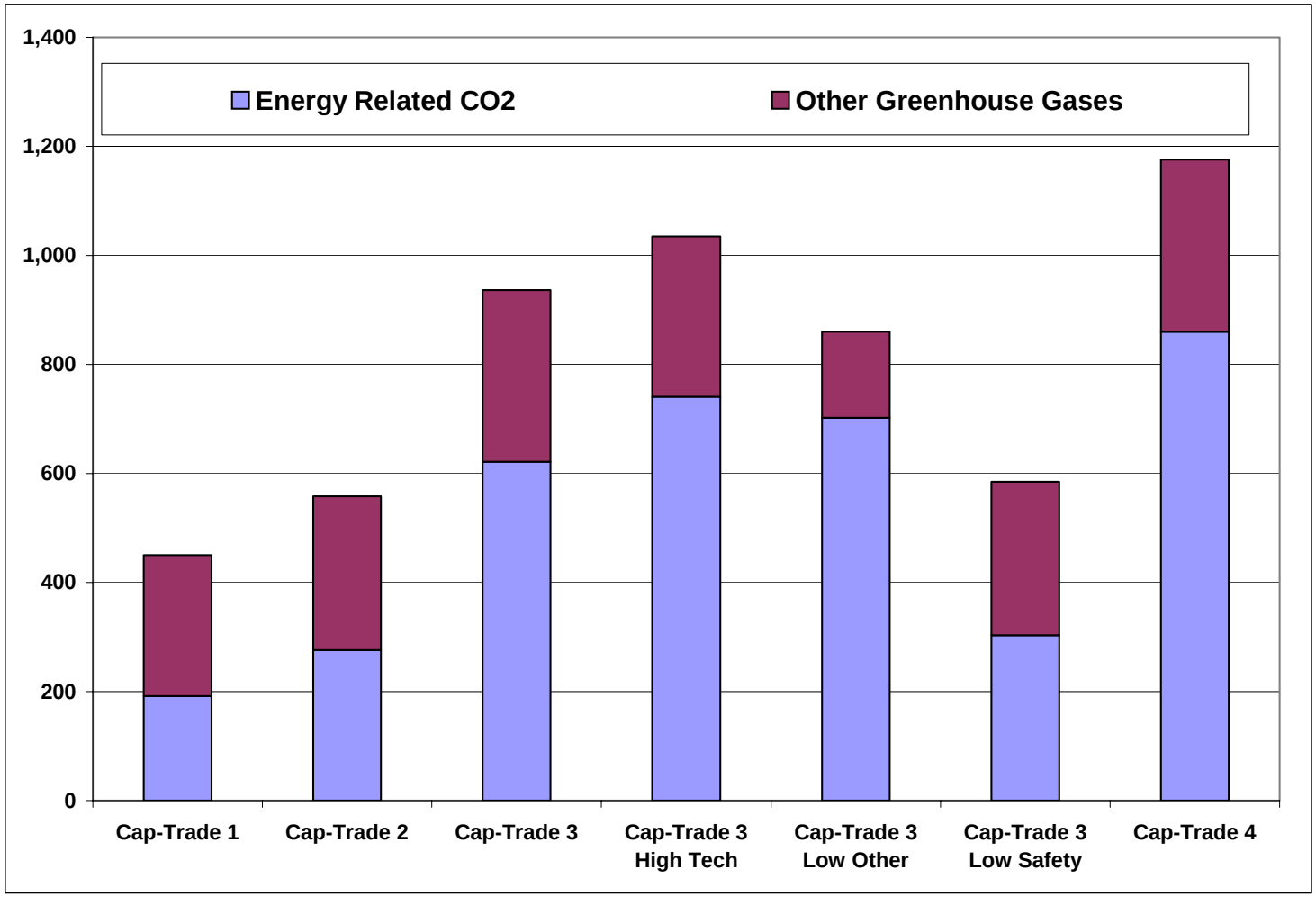
- Higher projected energy prices have reduced projected U.S.CO_2 emissions

Total GHG Emissions in Alternative Cases
(million metric tons CO_2 equivalent)



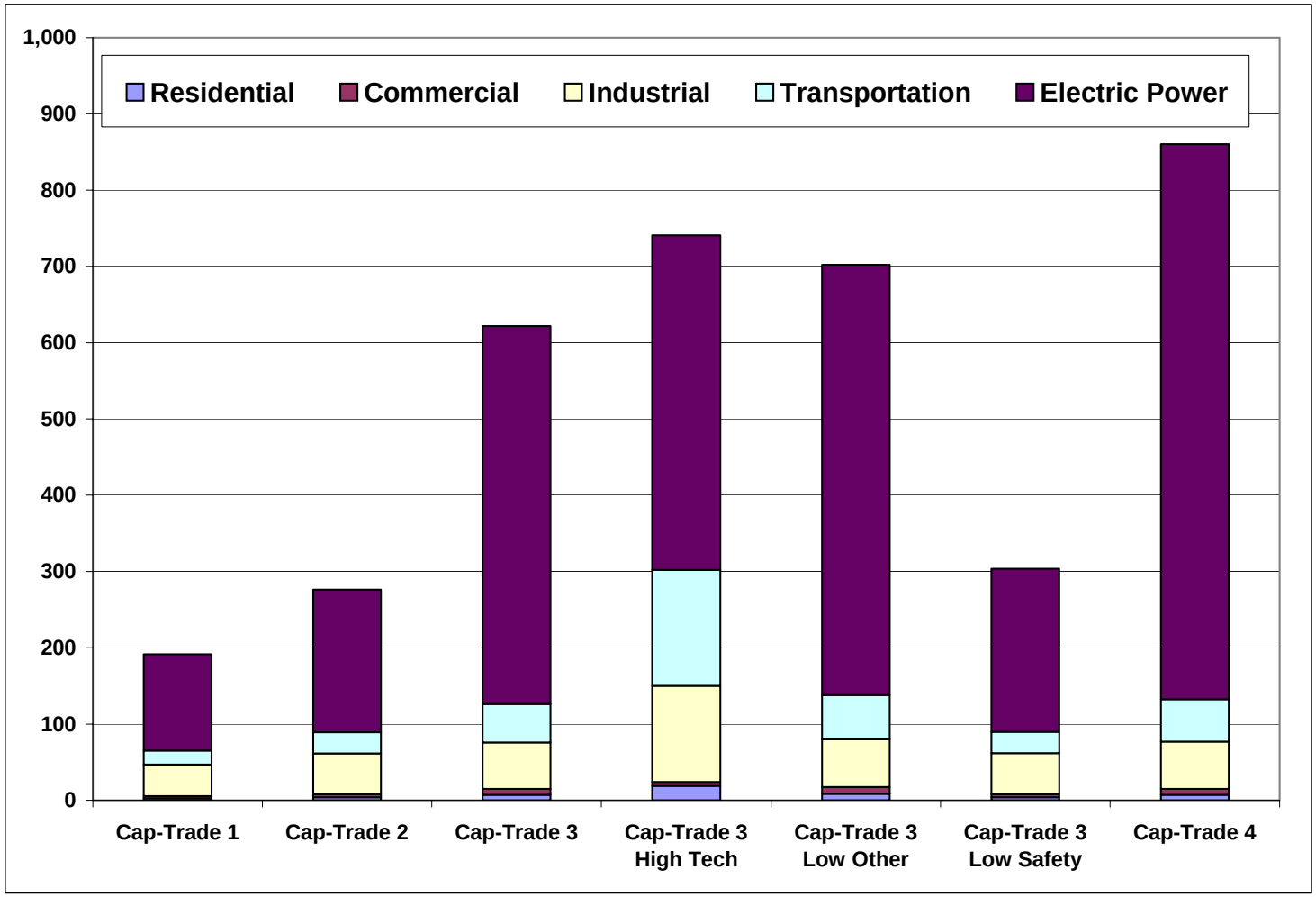
- The toughest program examined returns emissions to the 2004 level by 2030

GHG Emissions Reduction in 2020 in Alternative Cases (million metric tons CO_2 equivalent)



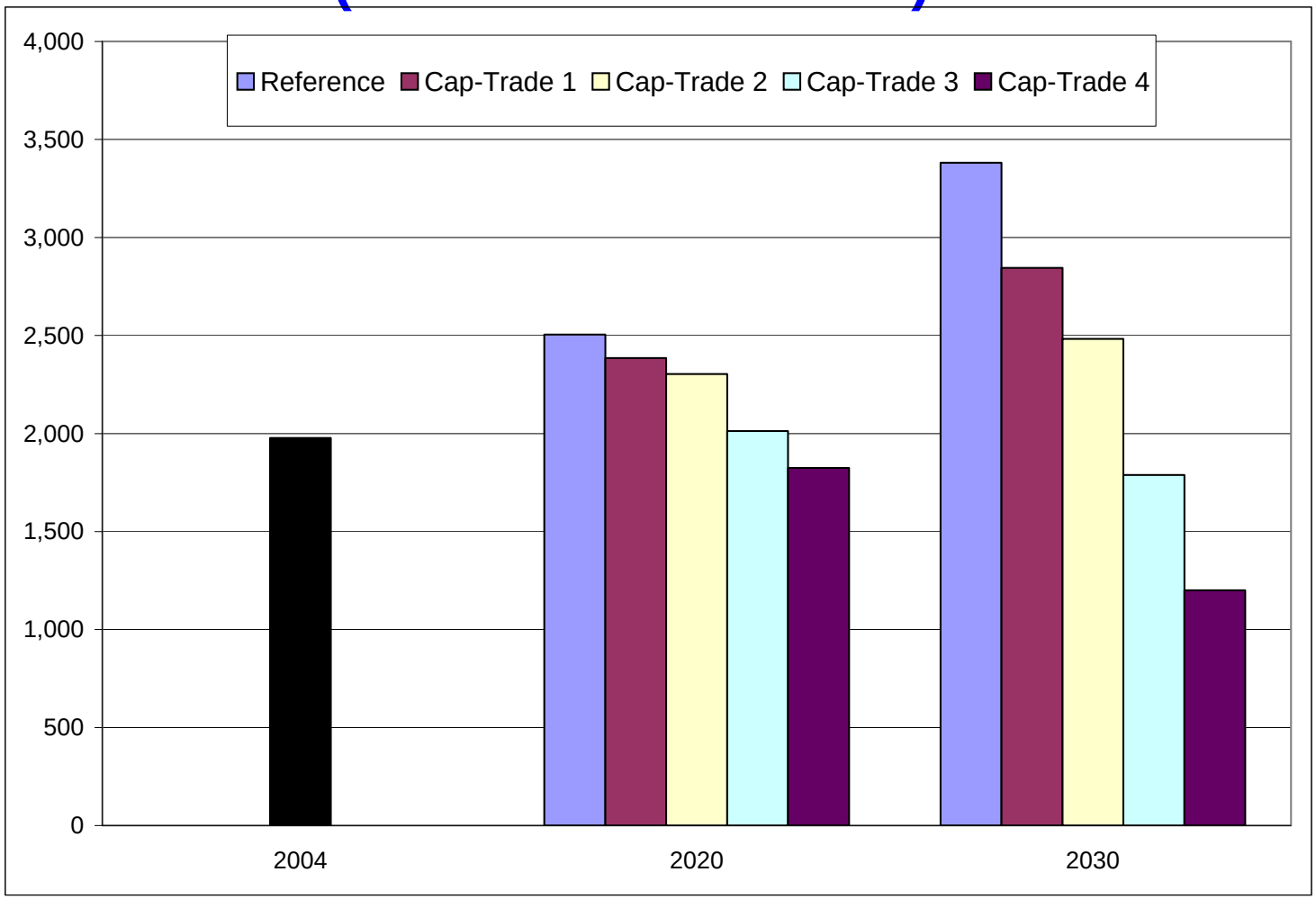
- EPA sees significant opportunity for low-cost reduction of non-energy GHGs

Energy-Related CO_2 Emissions Reductions in 2020 (million metric tons CO_2)



- 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

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Official Energy Statistics from the U.S. Government

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