Fuel Prices for Electricity Generation: History, Projections, and Implications

for
Illinois Commerce Commission
Chicago, IL

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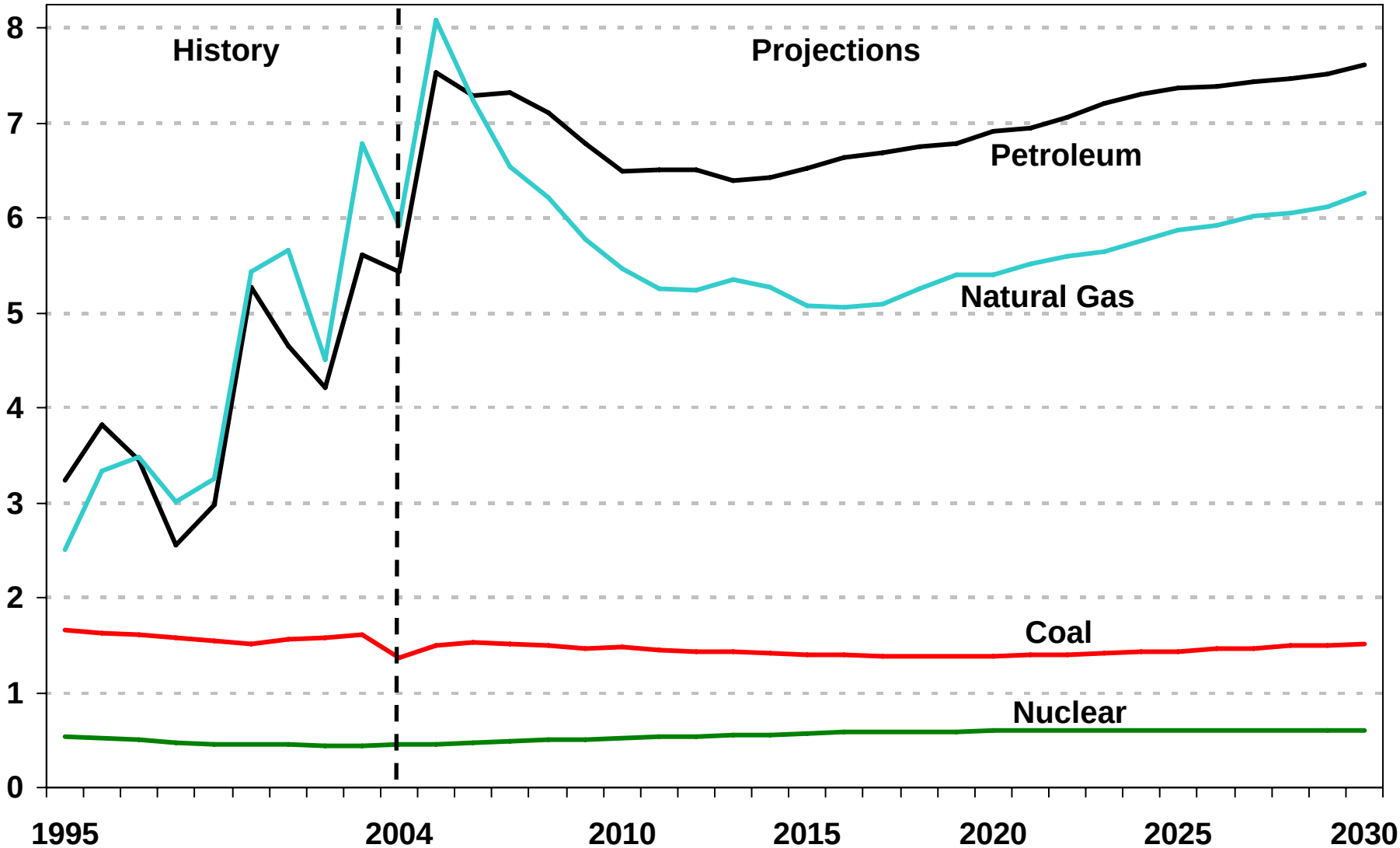
Outline

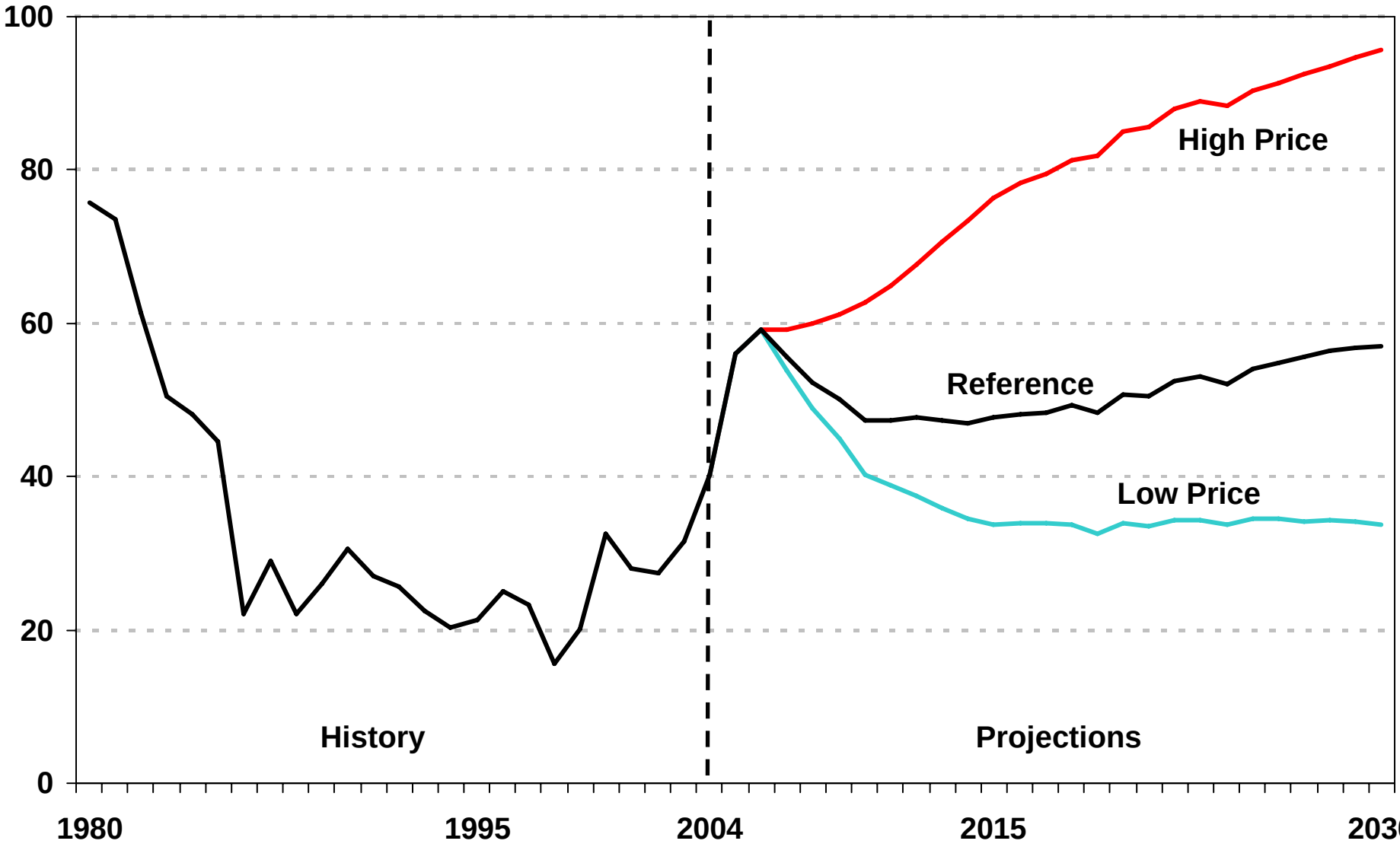
- Fuel Price Developments
- Electricity Mix: History and Projected Trends
- Fuel Production and Consumption
- Environmental Indicators

FUEL PRICES

Fuel Prices to Electricity Generators, 1995-2030
(2004 dollars per million Btu)



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



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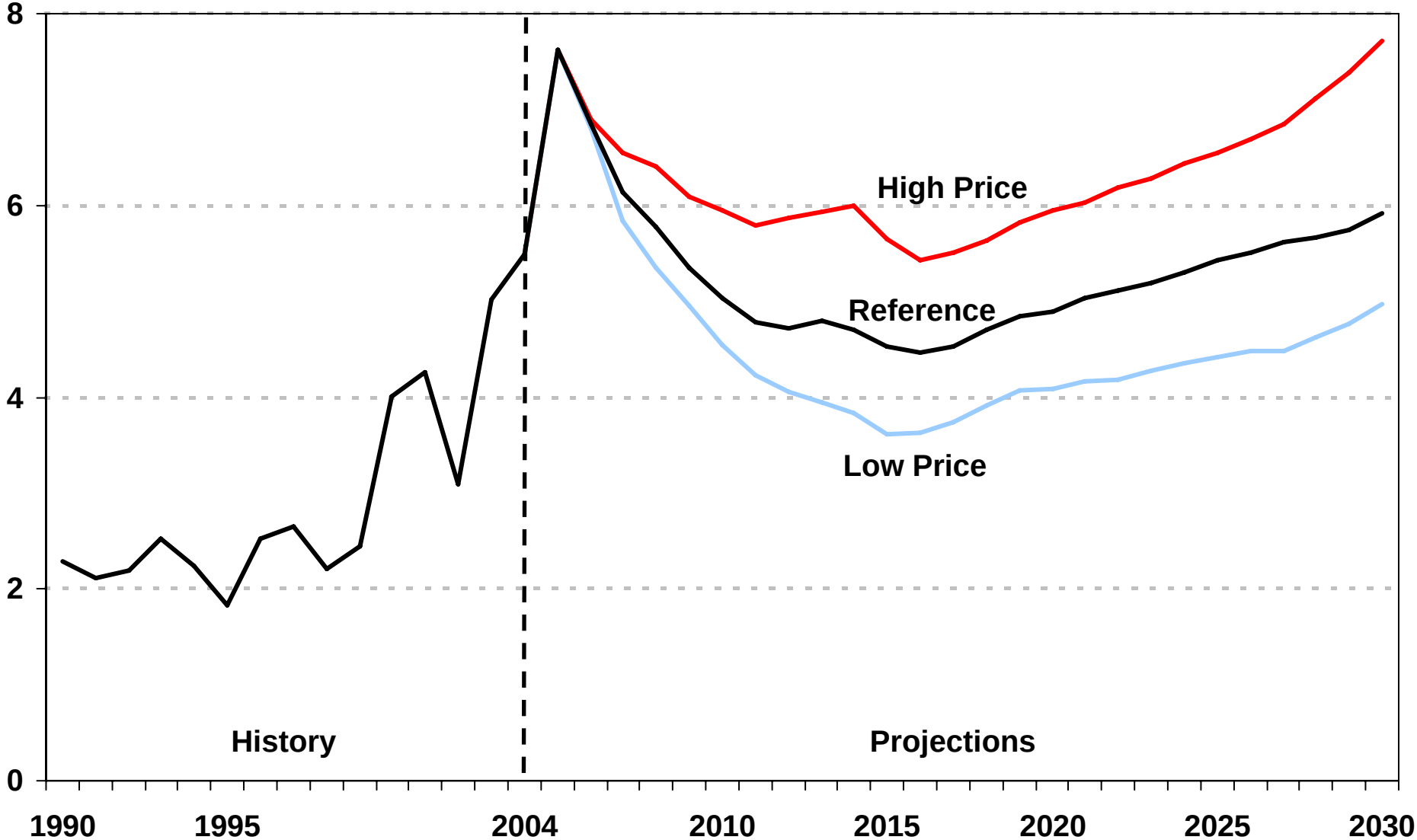
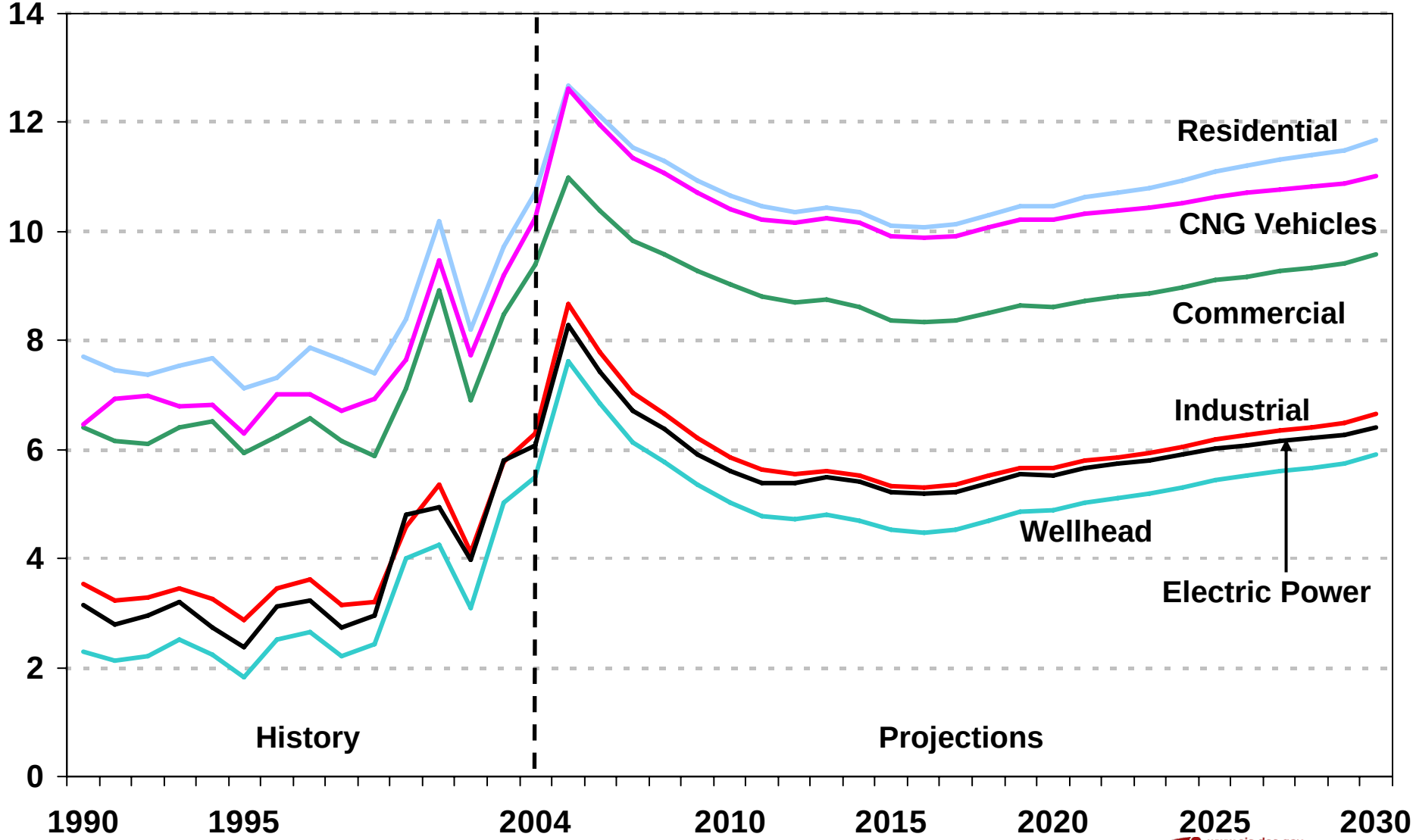
Oil and Natural Gas Prices

- **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, natural gas prices are determined in the North American market.**
- **Three key interrelated quesitons:**
  - **Elasticity of global supply of stranded natural gas**
  - **Potential competition between LNG and GTL markets**
  - **Value of foreign stranded natural gas at the wellhead**

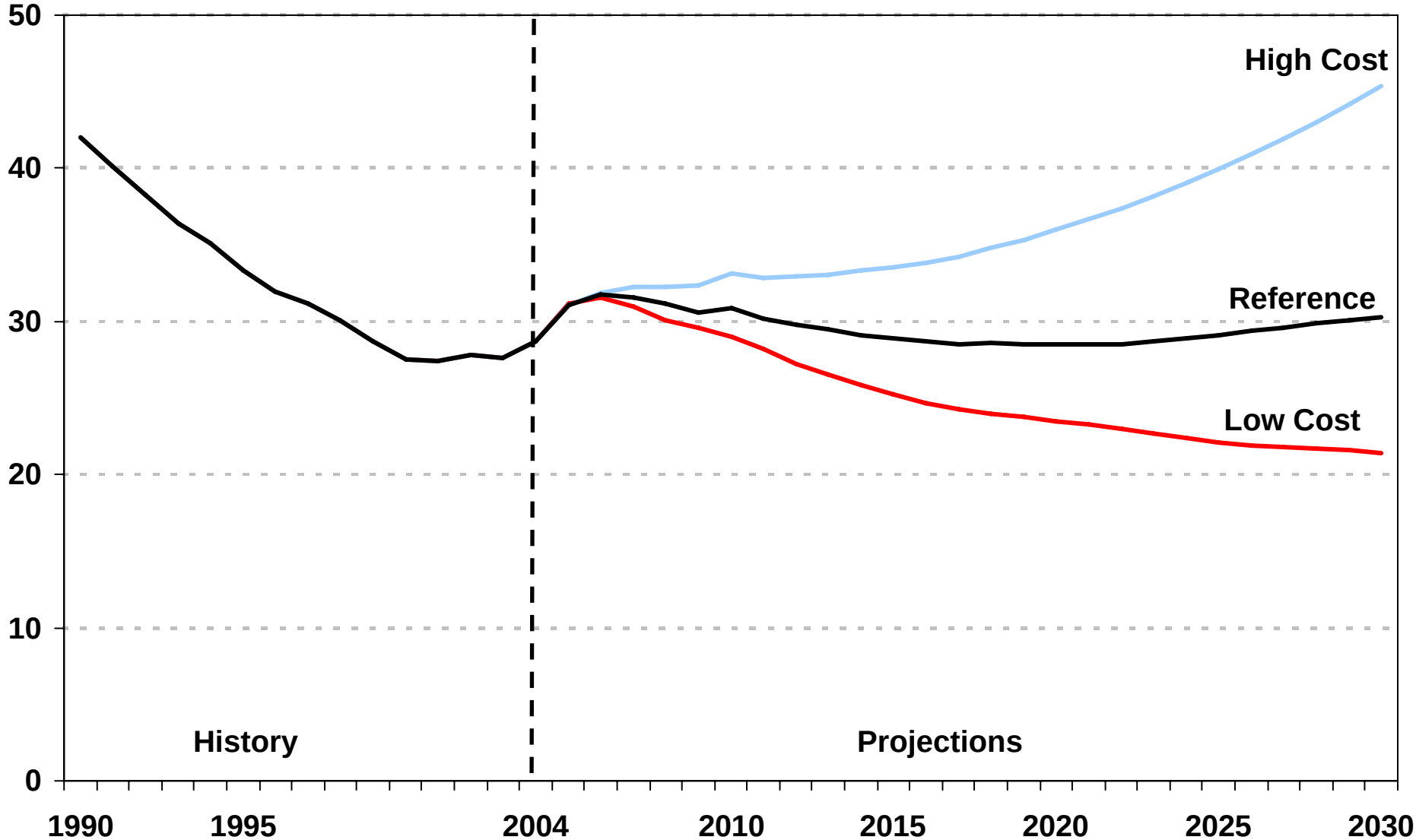
Lower 48 Natural Gas Wellhead Prices in Three Cases, 1990-2030 (2004 dollars per million cubic feet)



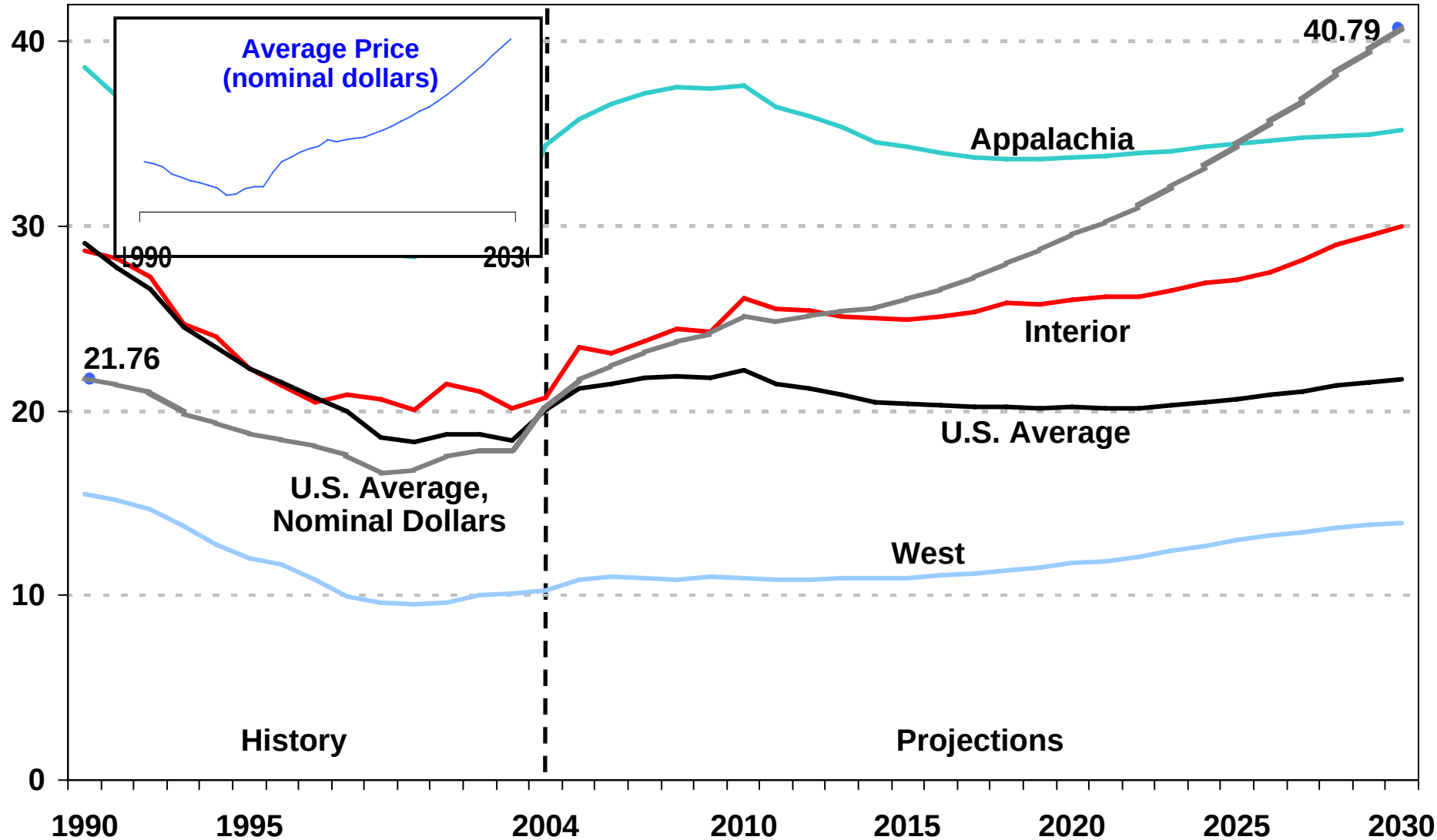
Natural Gas Prices by End-Use Sector, 1970-2030
(2004 dollars per thousand cubic feet)



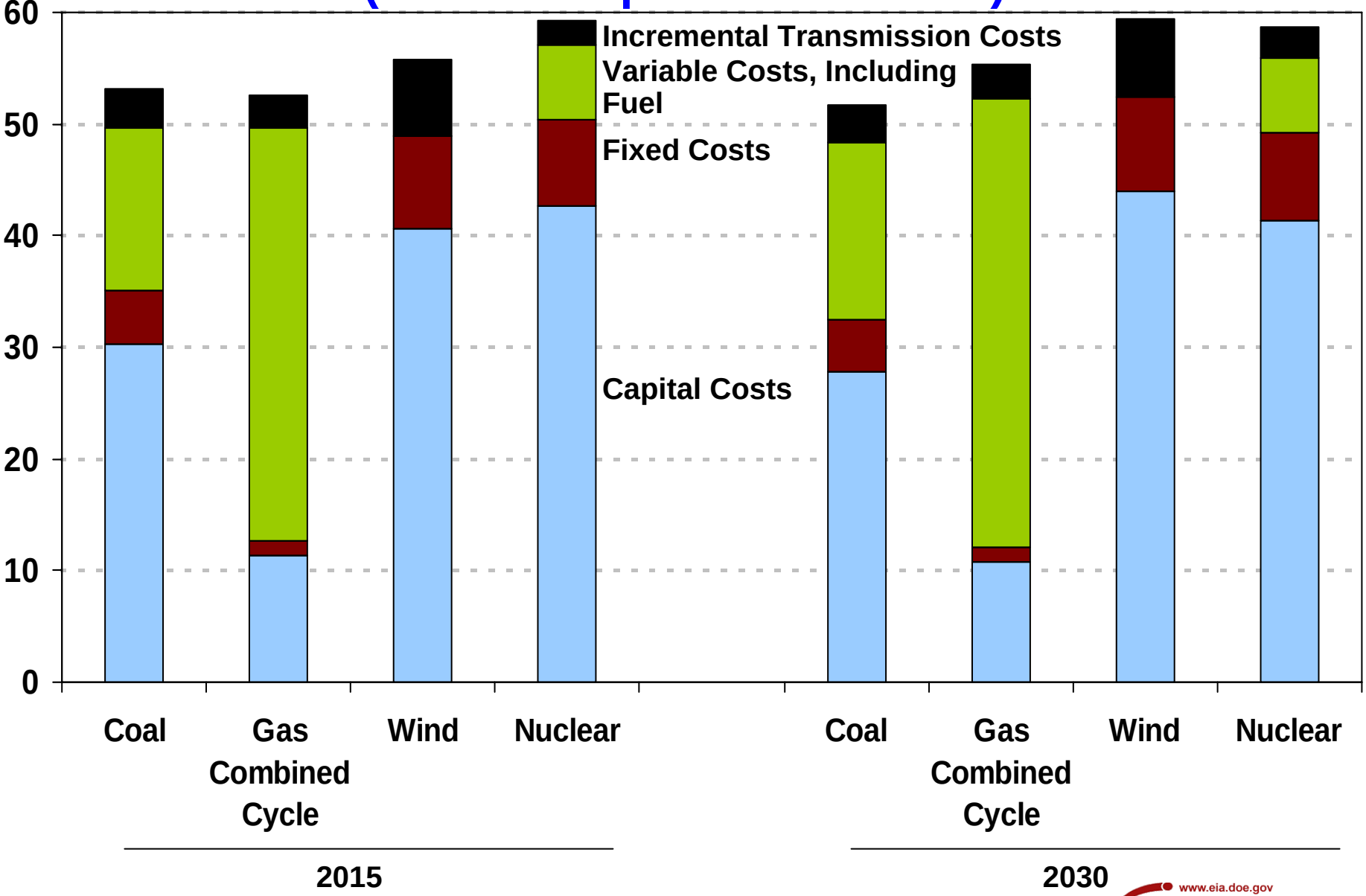
Average Delivered Coal Prices in Three Cost Cases, 1990-2030 (2004 dollars per short ton)



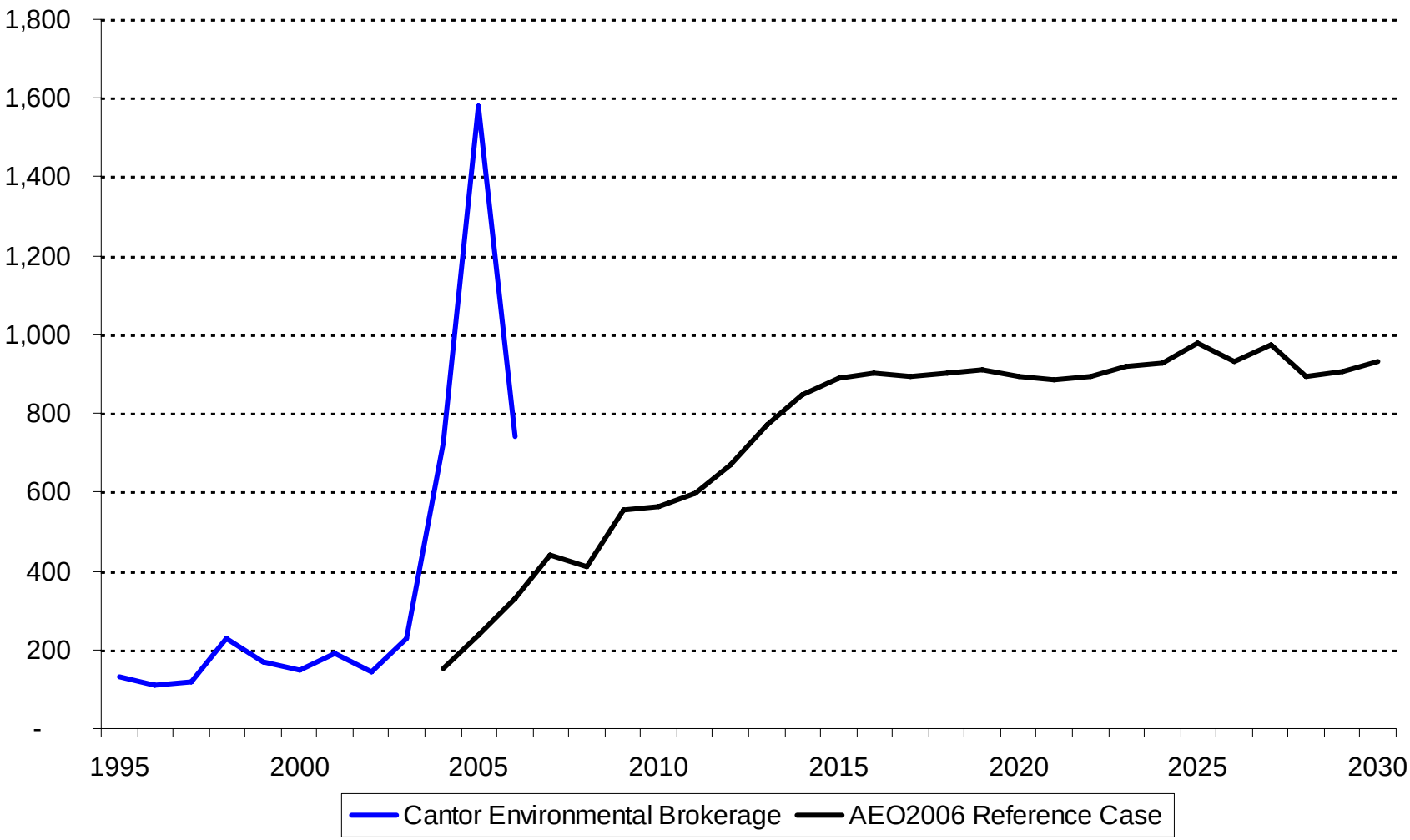
Average Minemouth Price of Coal by Region, 1990-2025 (2003 dollars per short ton)



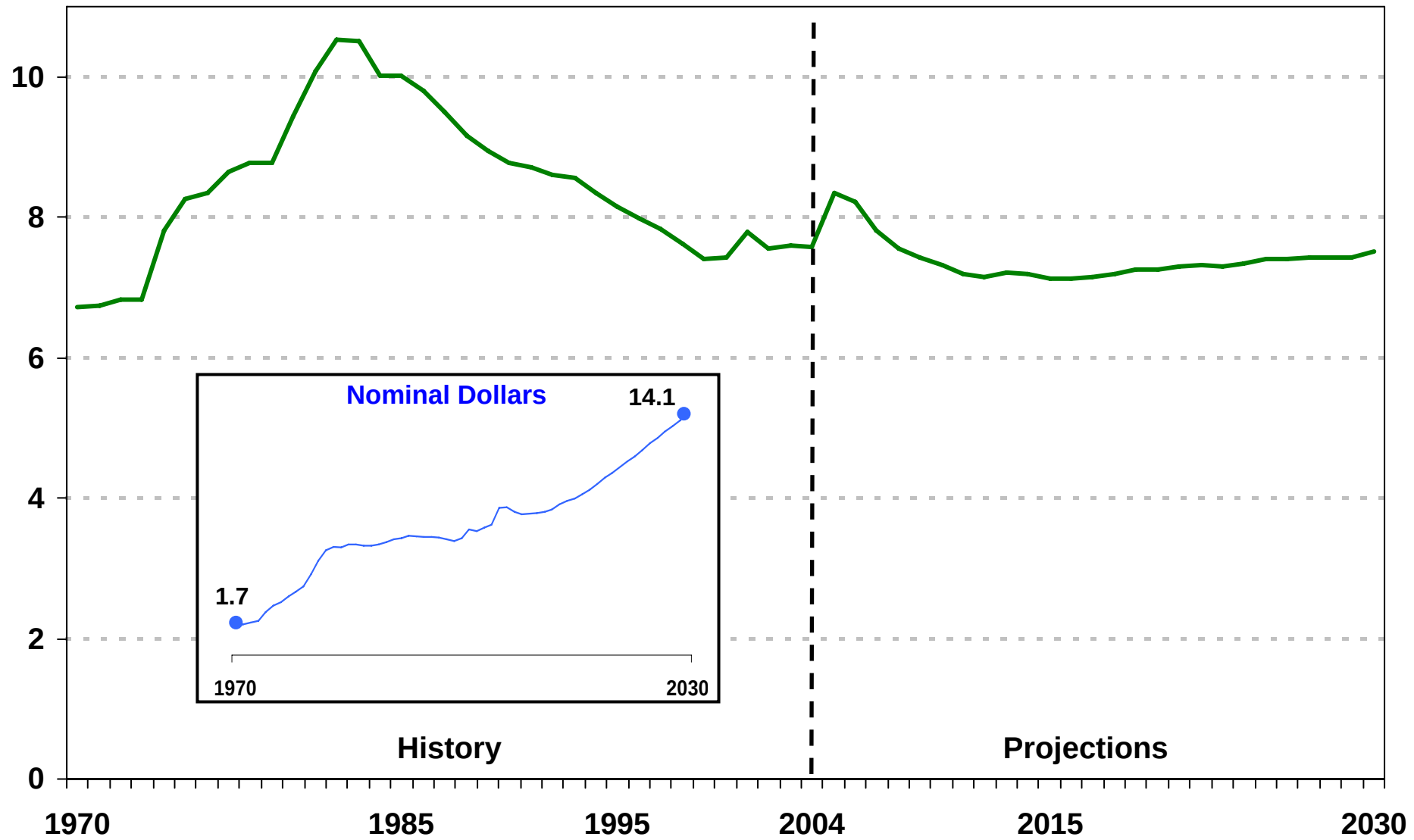
Levelized Electricity Costs for New Plants, 2015 and 2030 (2004 mills per kilowatthour)



Sulfur Dioxide Allowance Prices

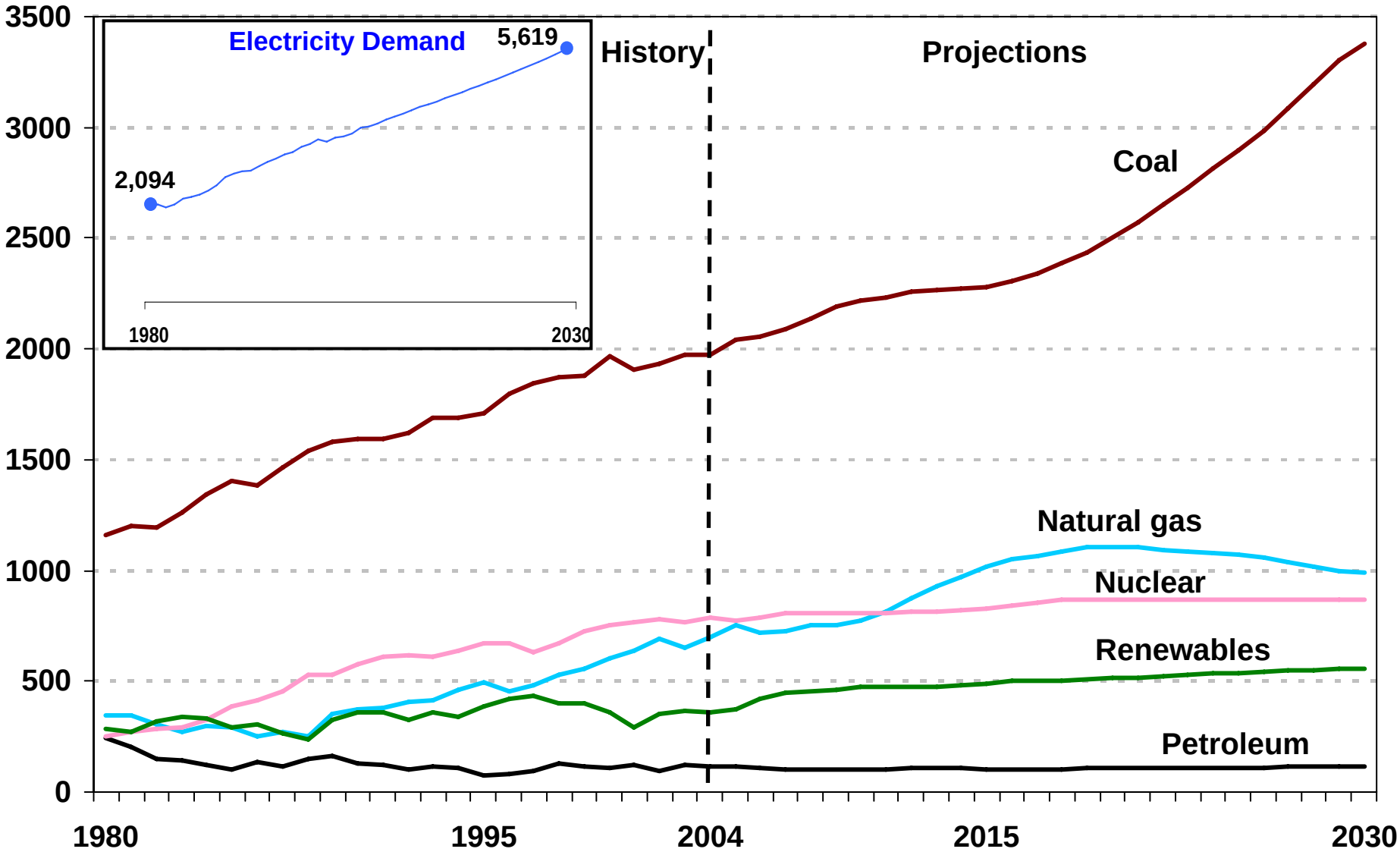


Average U.S. Retail Electricity Prices, 1970-2030 (2004 cents per kilowatthour)



ELECTRICITY SECTOR IMPLICATIONS

Electricity Generation by Fuel, 1980-2030
(billion kilowatthours)



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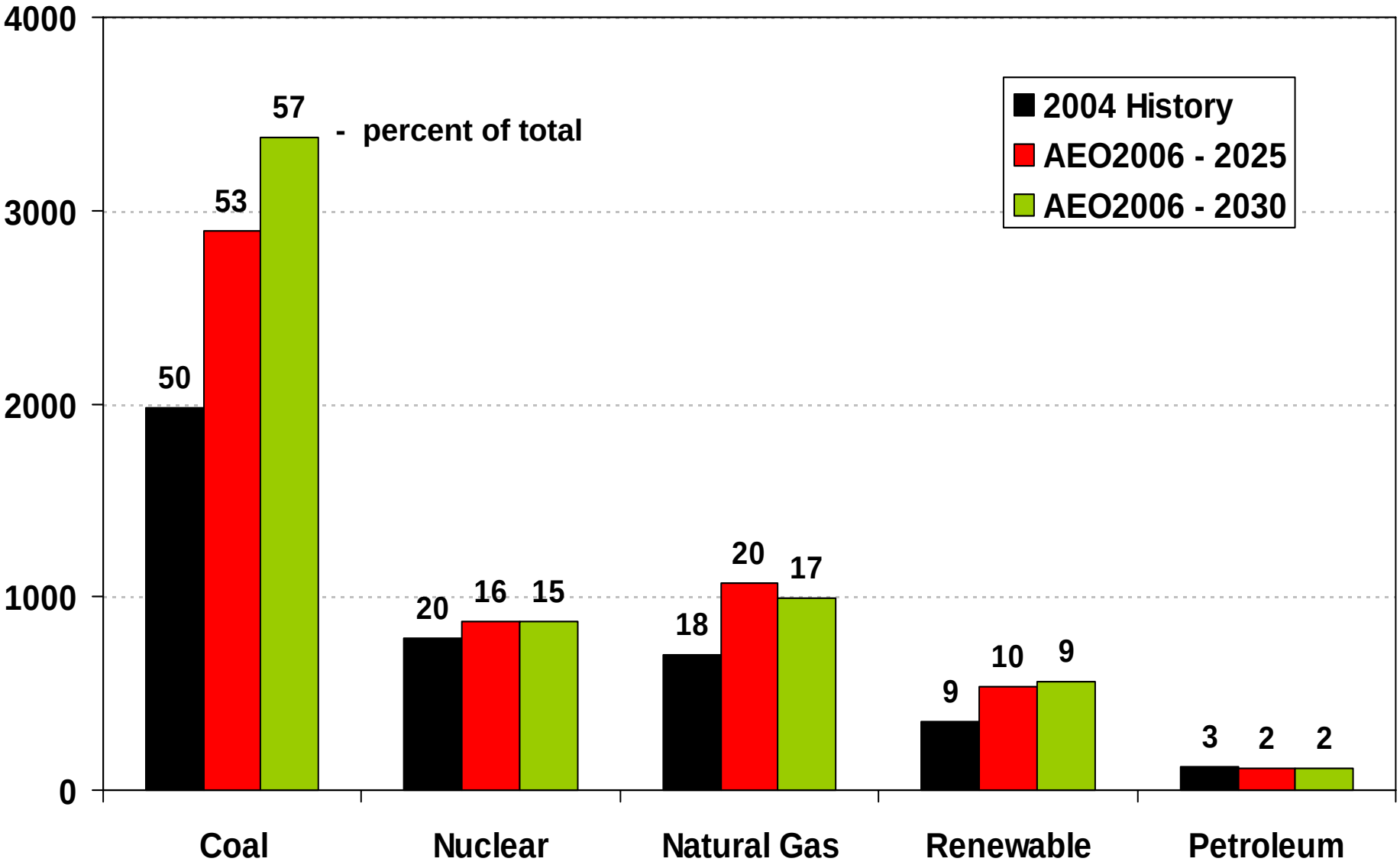
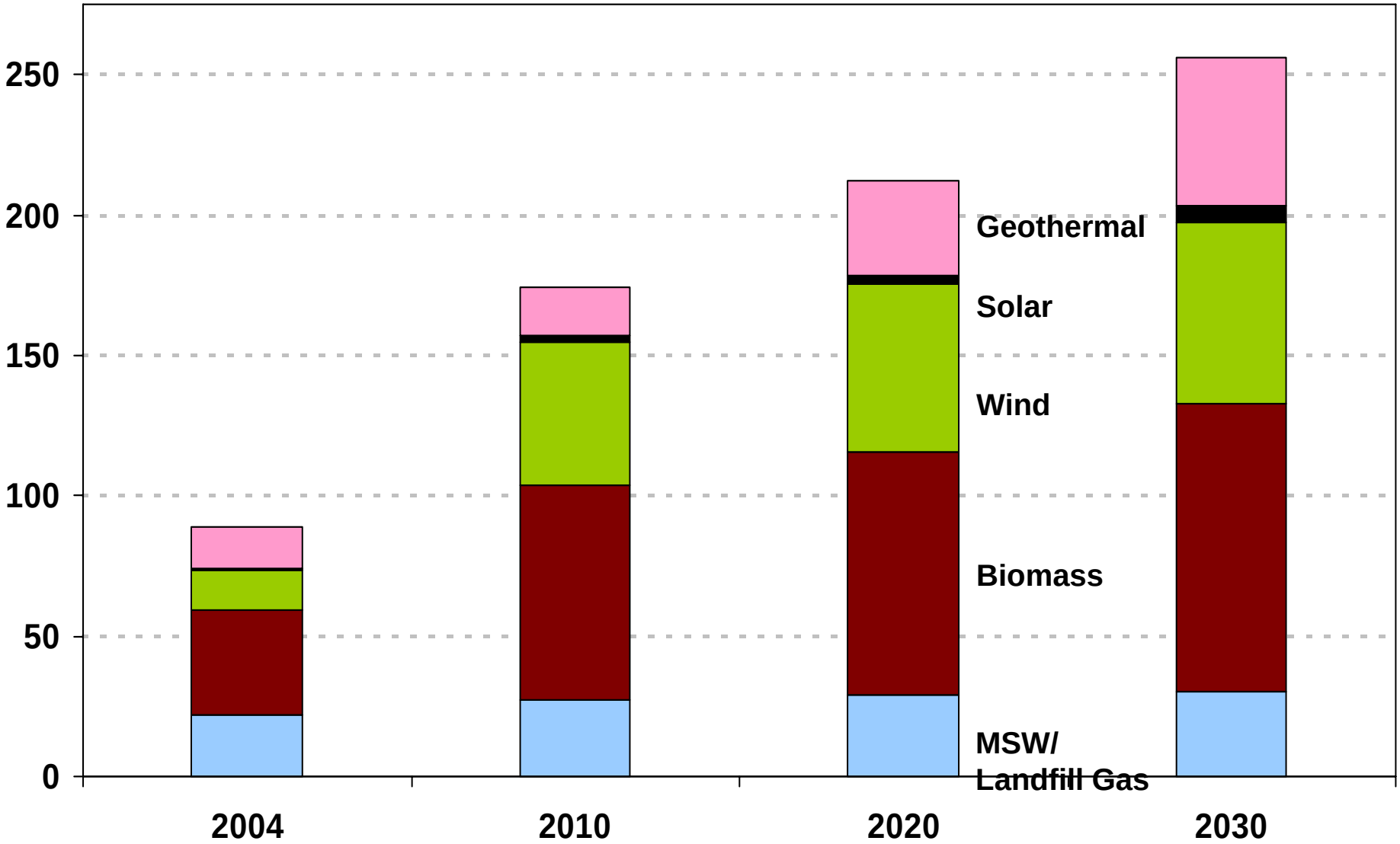
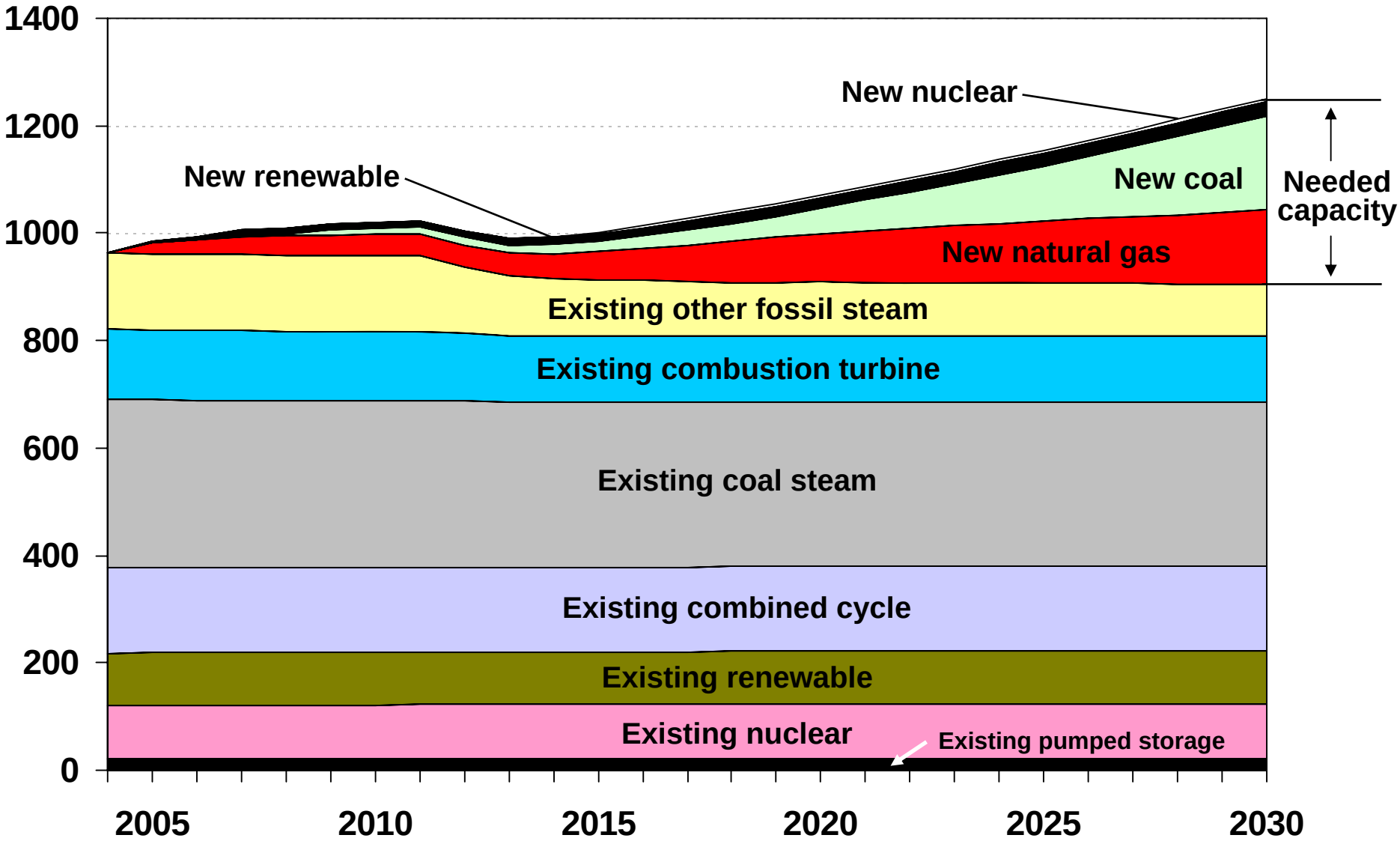
Electricity Generation by Fuel, 2004, 2025, and 2030 (billion kilowatthours)



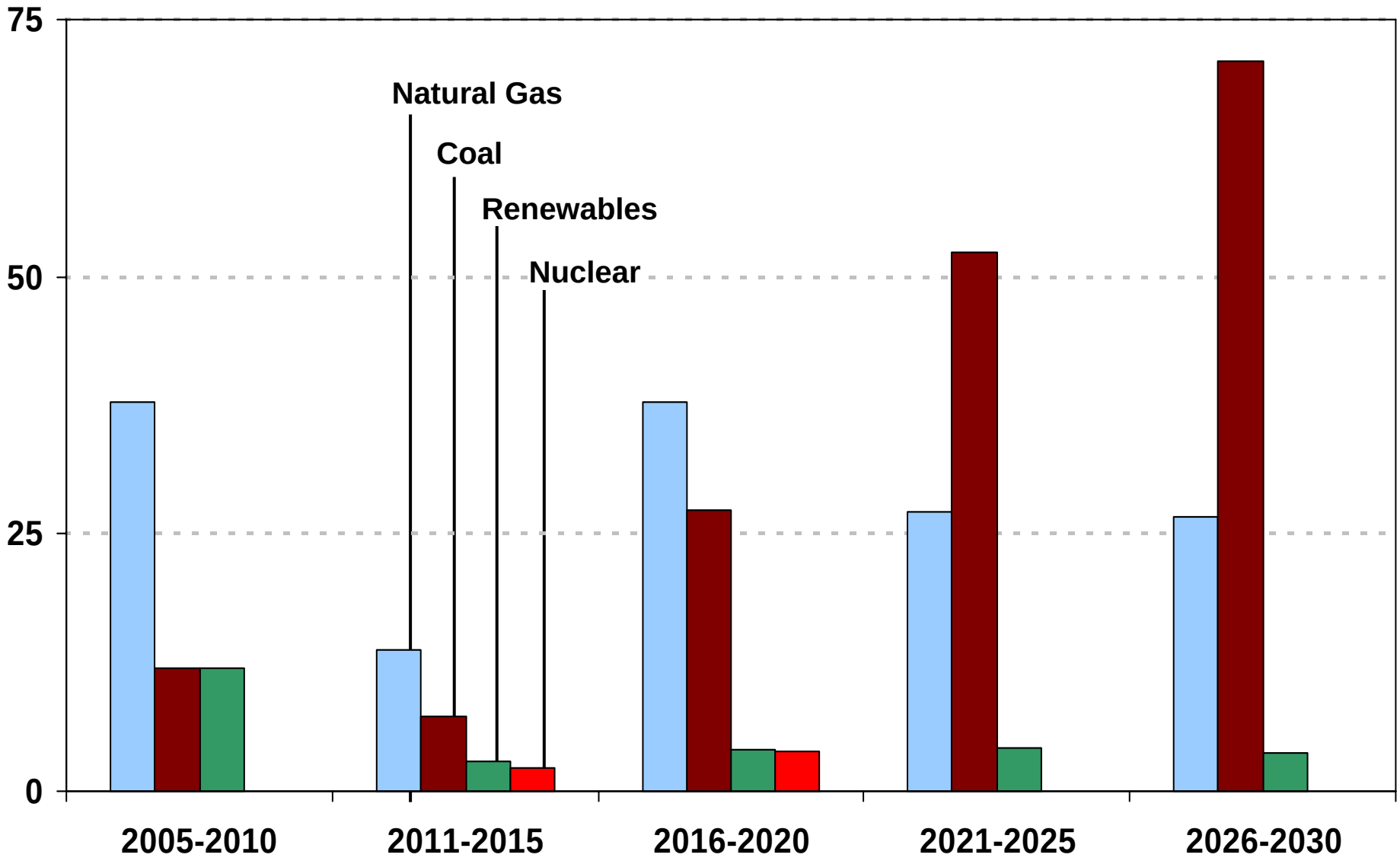
Nonhydroelectric Renewable Electricity Generation by Energy Source, 2004-2030 (billion kilowatthours)



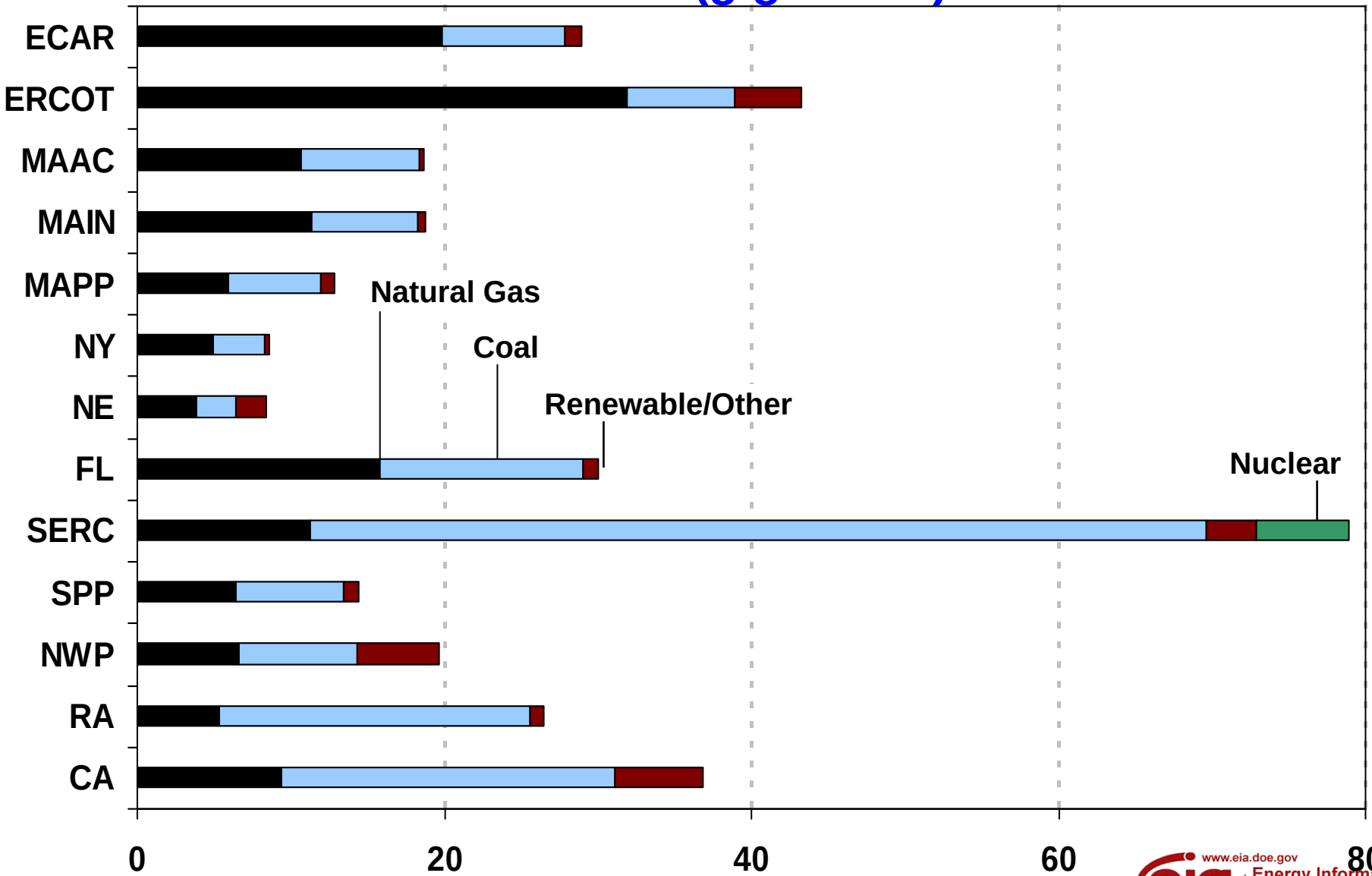
Electricity Generating Capacity including Combined Heat and Power, 2004-2030 (gigawatts)



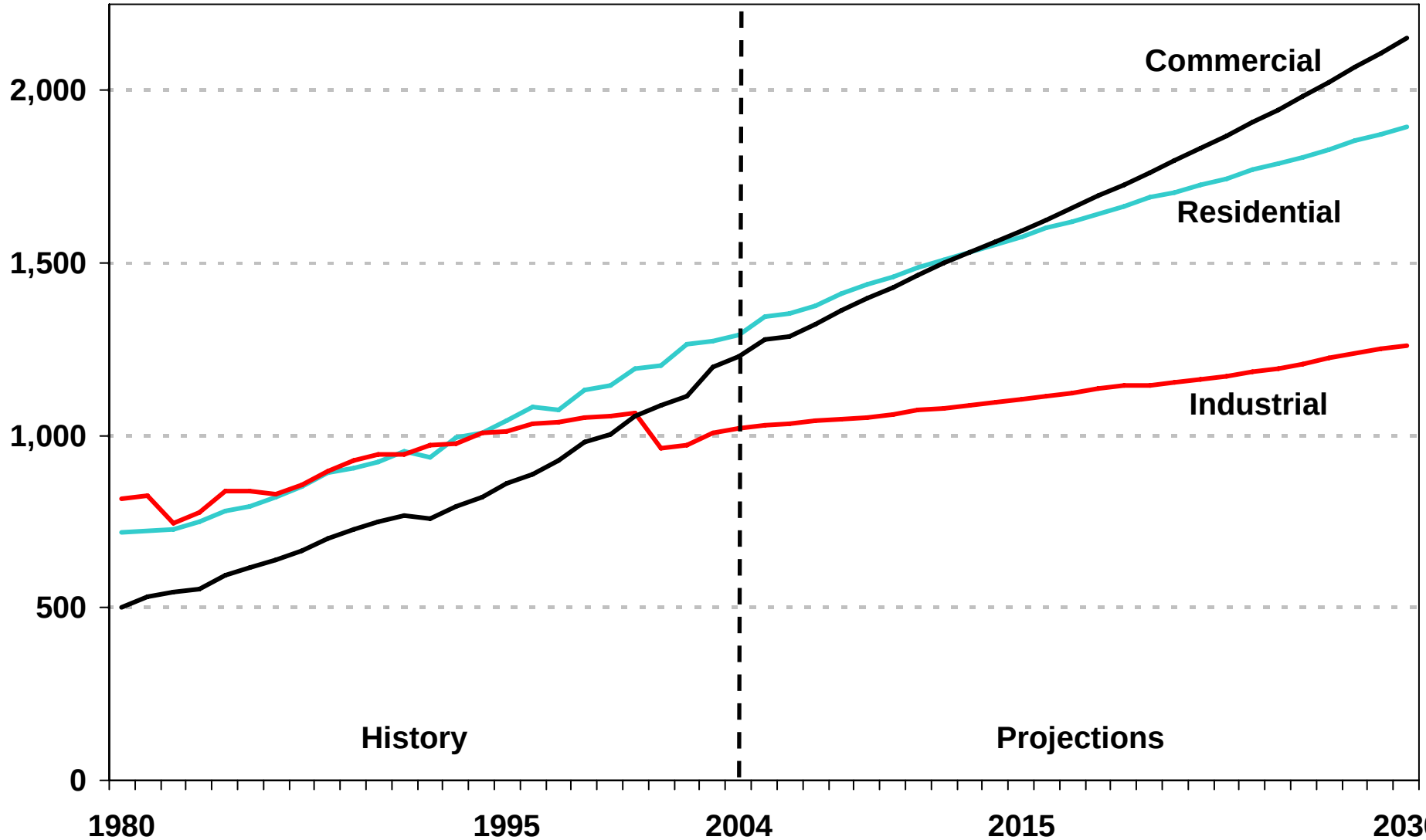
Electricity Generation Capacity Additions by Fuel Type, Including Combined Heat and Power, 2005-2030 (gigawatts)



Electricity Generation Capacity Additions, Including Combined Heat and Power, by Region and Fuel, 2005-2030 (gigawatts)

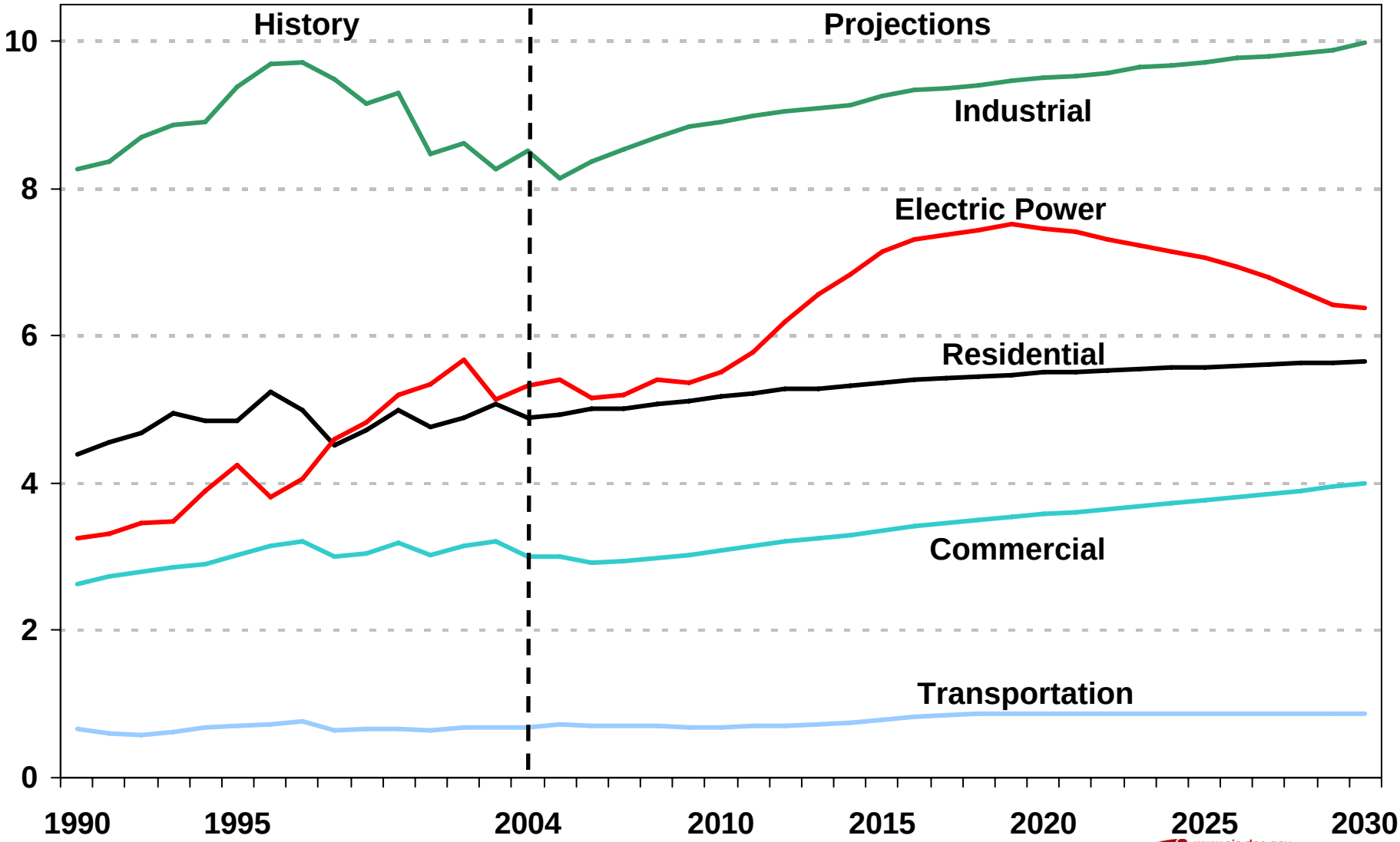


Annual Electricity Sales by Sector, 1980-2030 (billion kilowatthours)

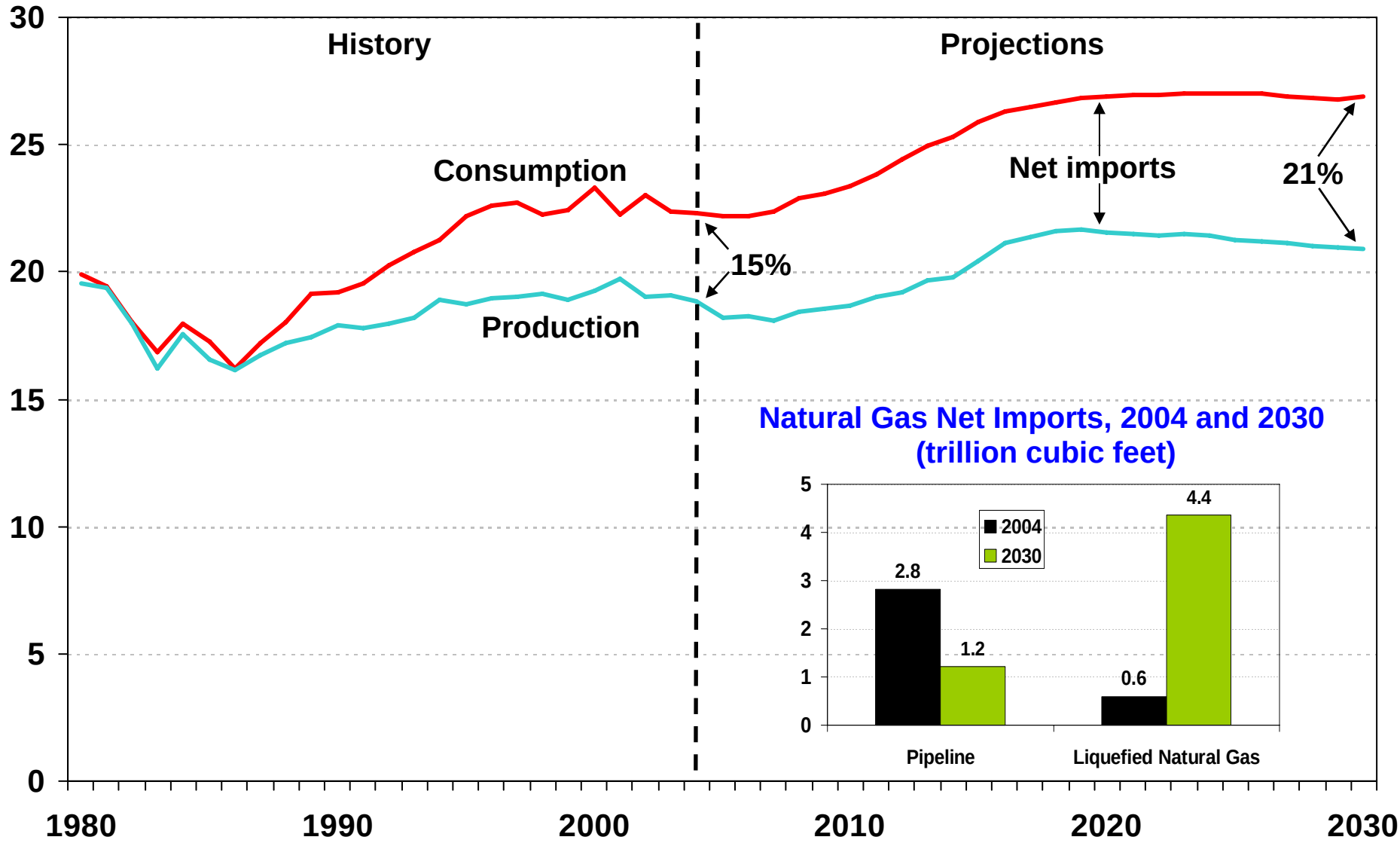


IMPLICATIONS FOR FUEL PRODUCTION AND CONSUMPTION

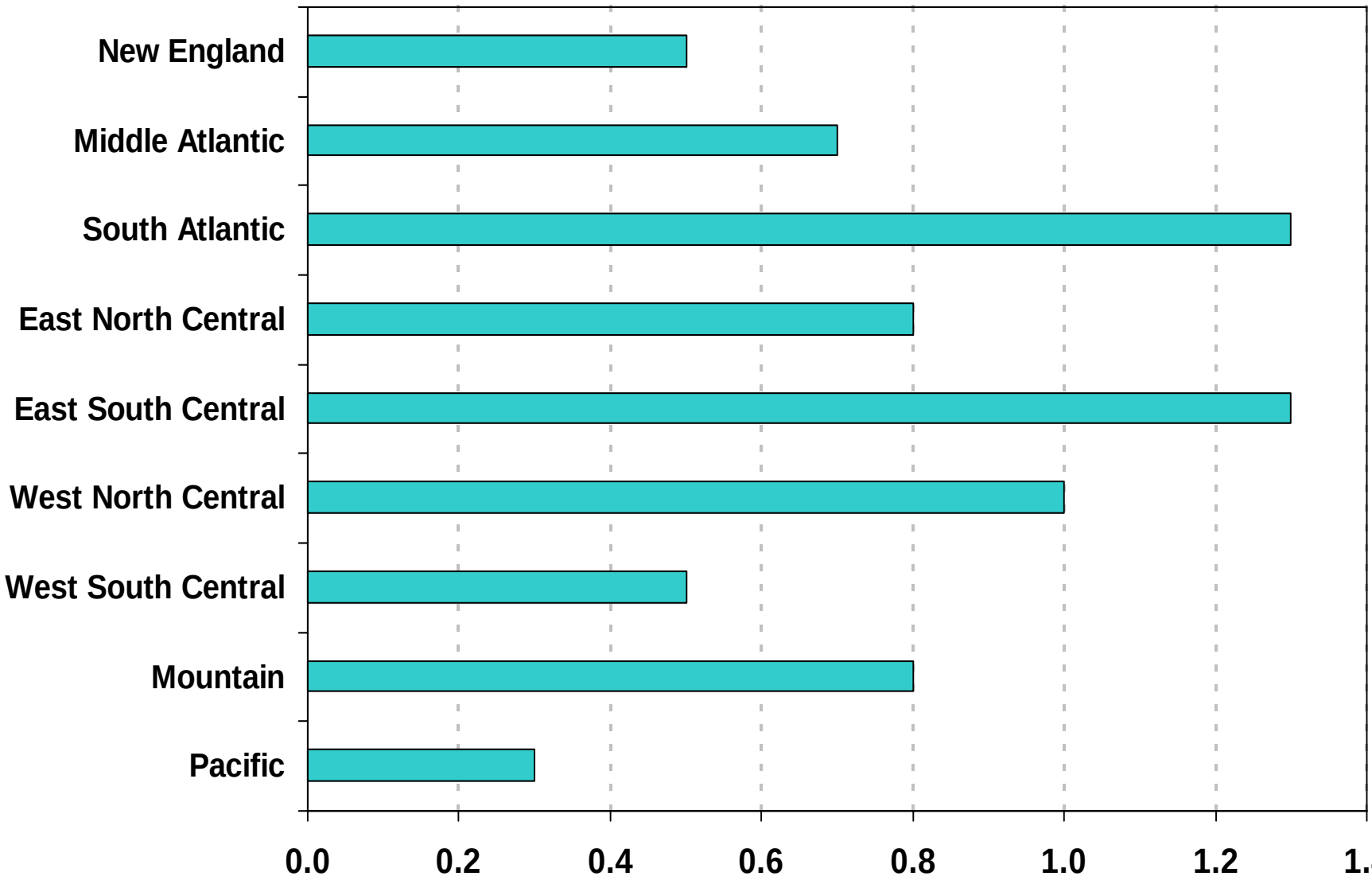
Natural Gas Consumption by Sector, 1990-2030 (trillion cubic feet)



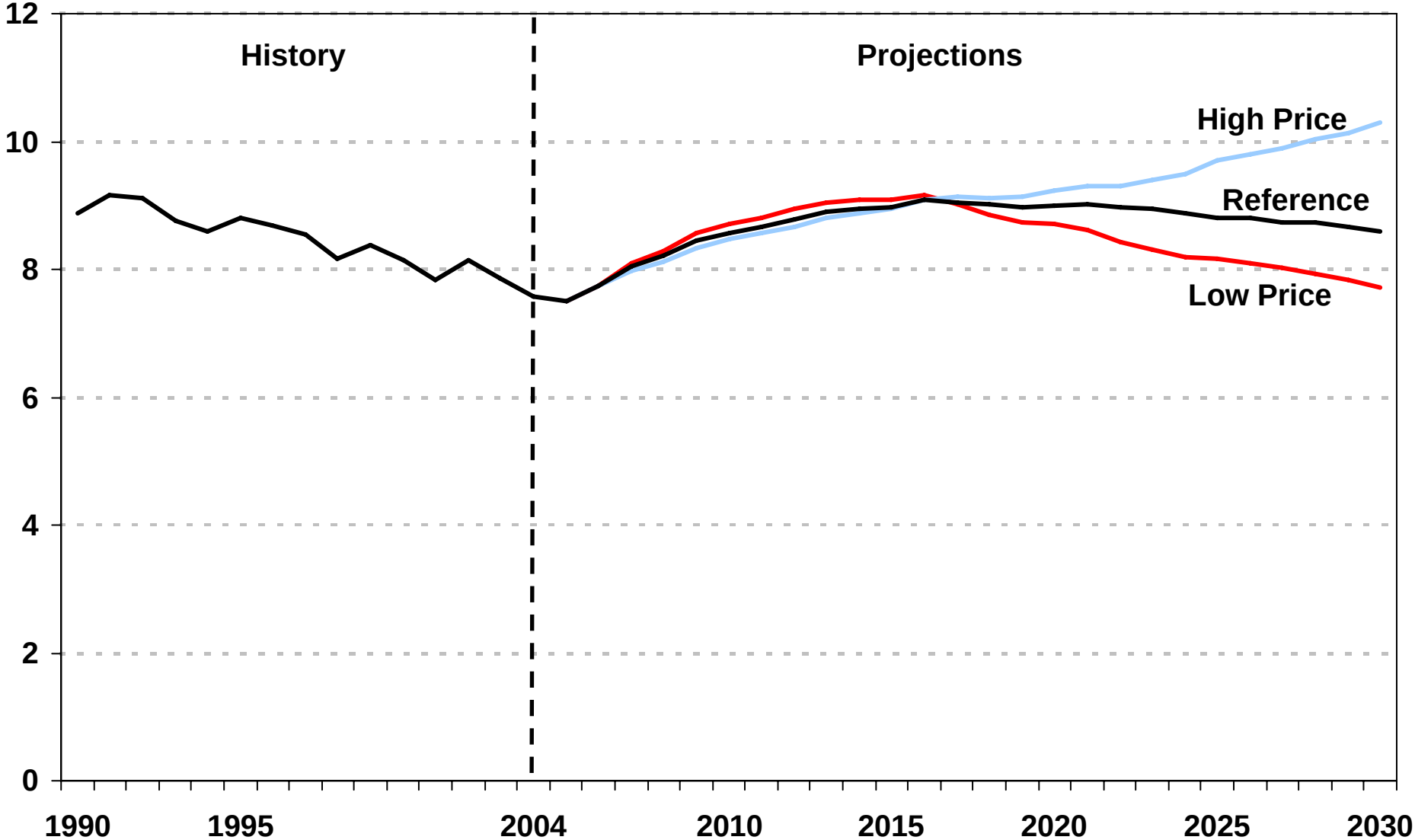
Natural Gas Production, Consumption, and Imports, 1980-2030 (trillion cubic feet)



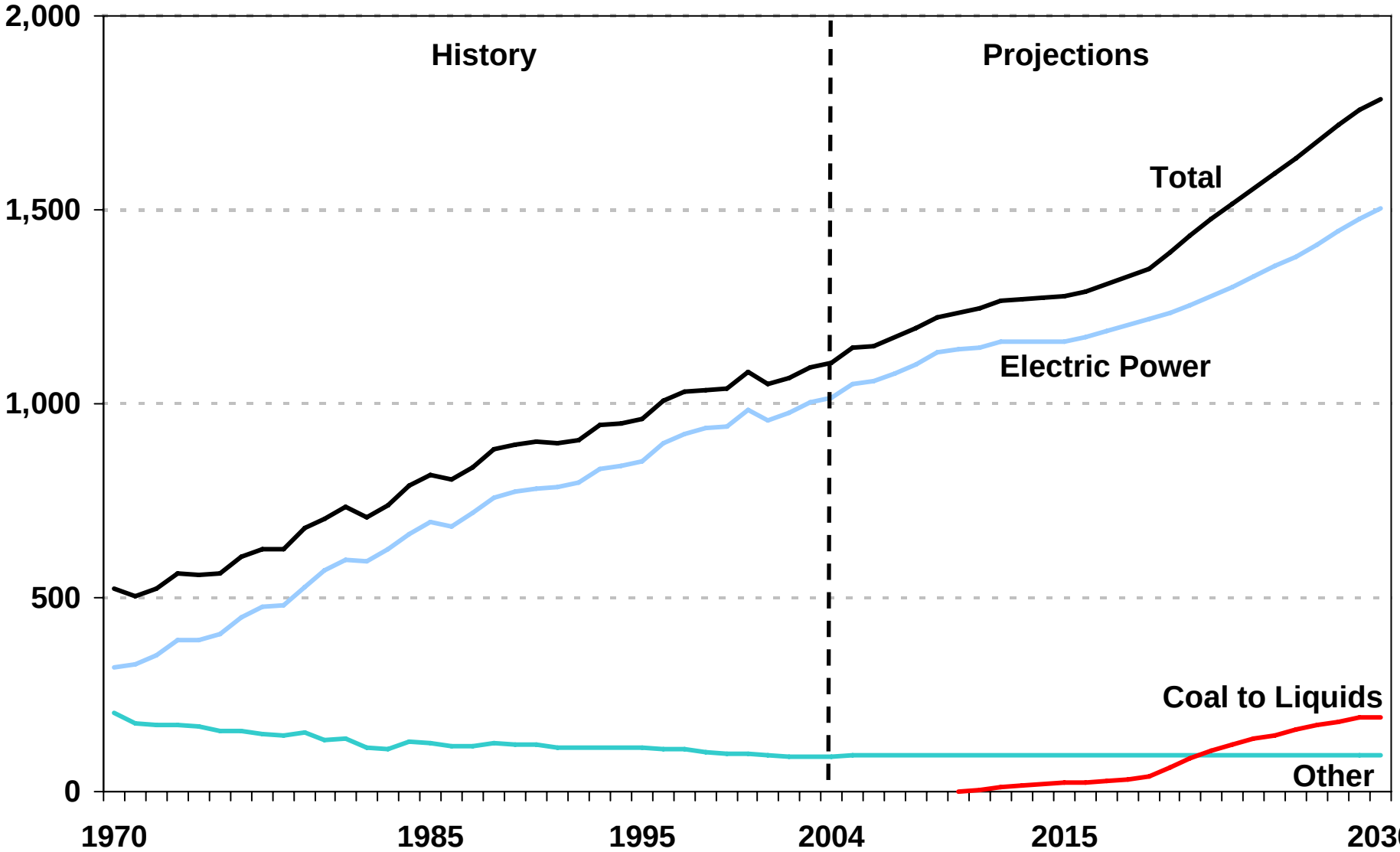
Increases in Natural Gas Consumption by Census Division, 2004-2030 (percent per year)



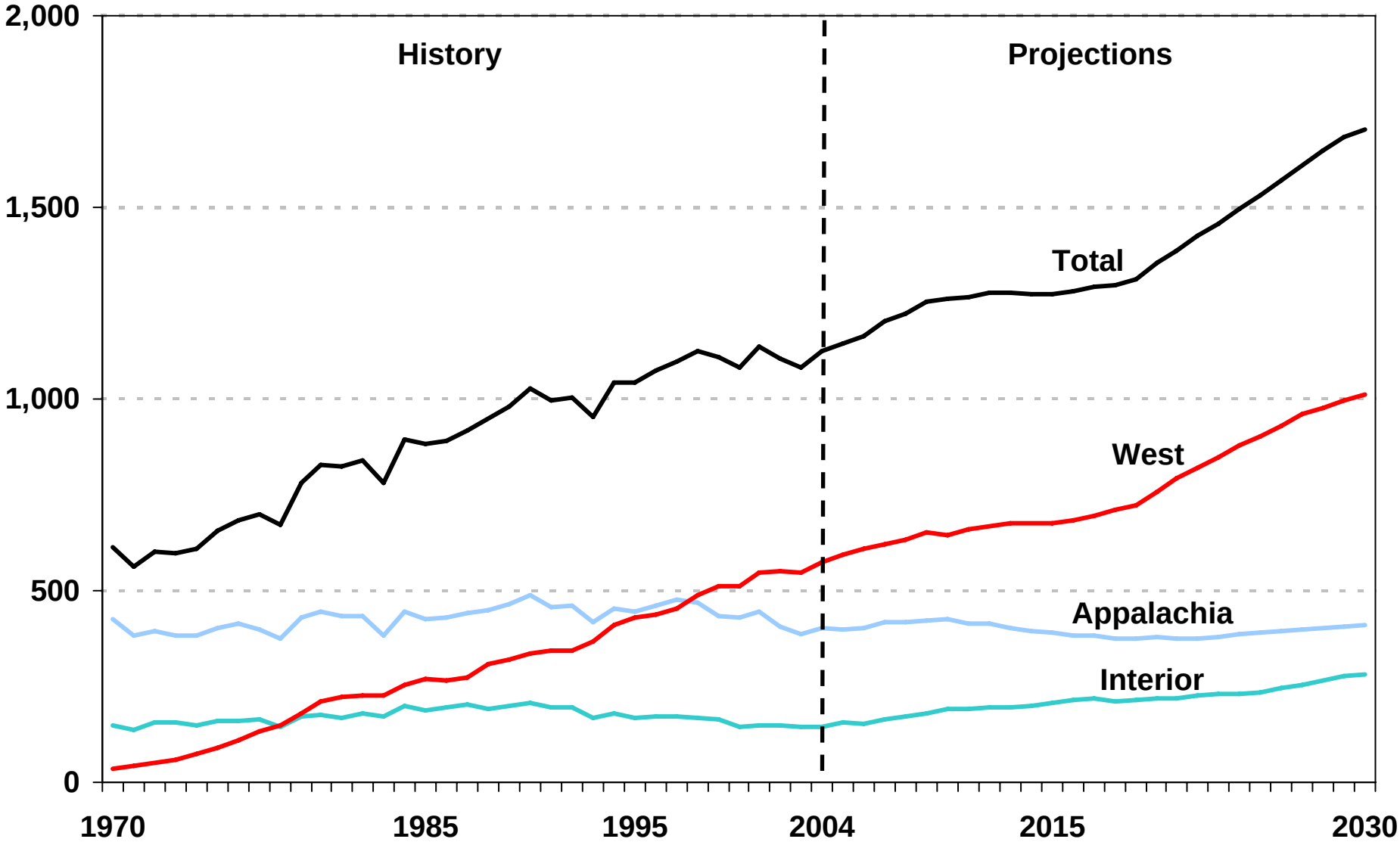
Total U.S. Petroleum Production in Three Oil Price Cases, 1990-2030 (million barrels per day)



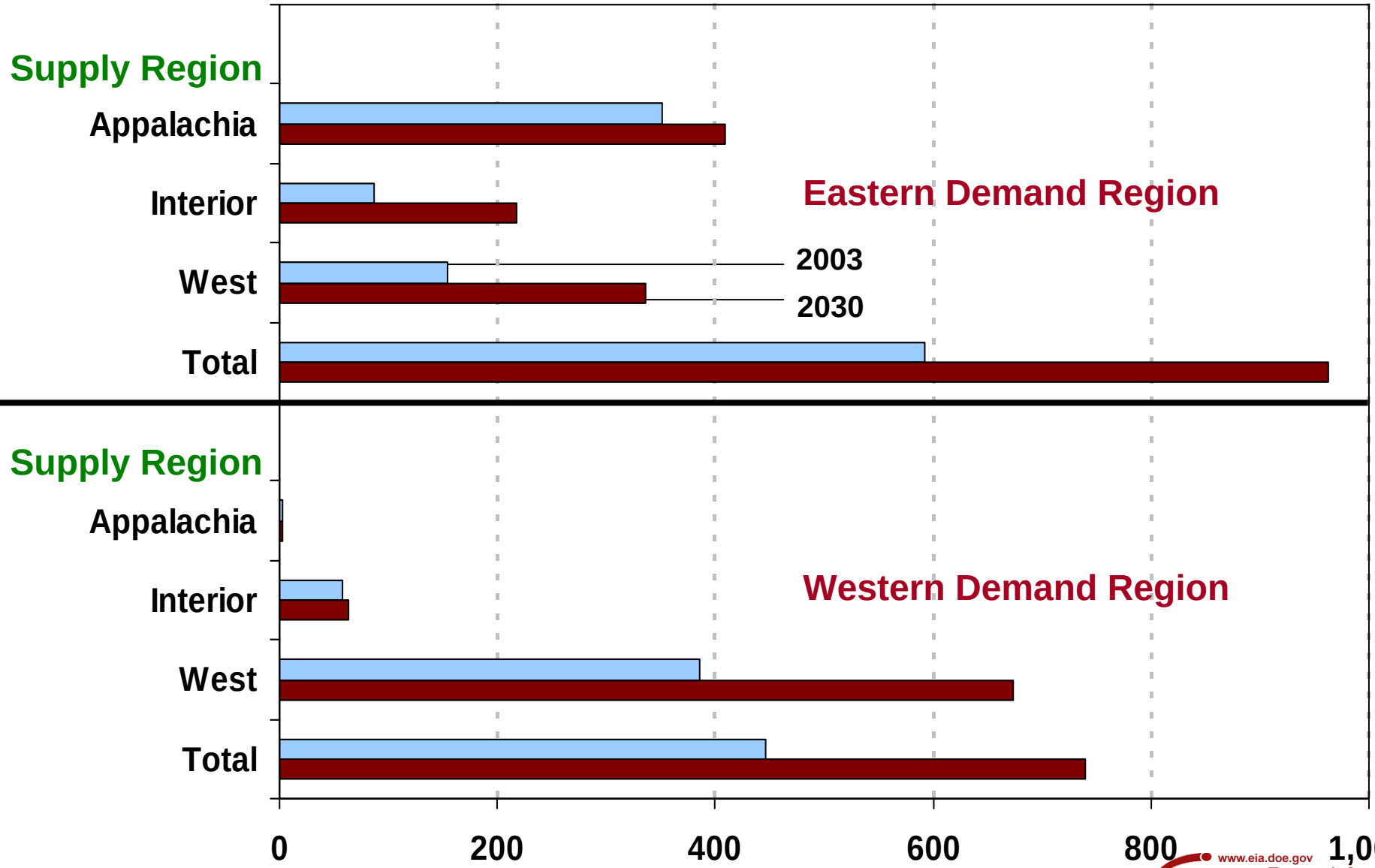
Coal Consumption by Sector, 1970-2030
(million short tons)



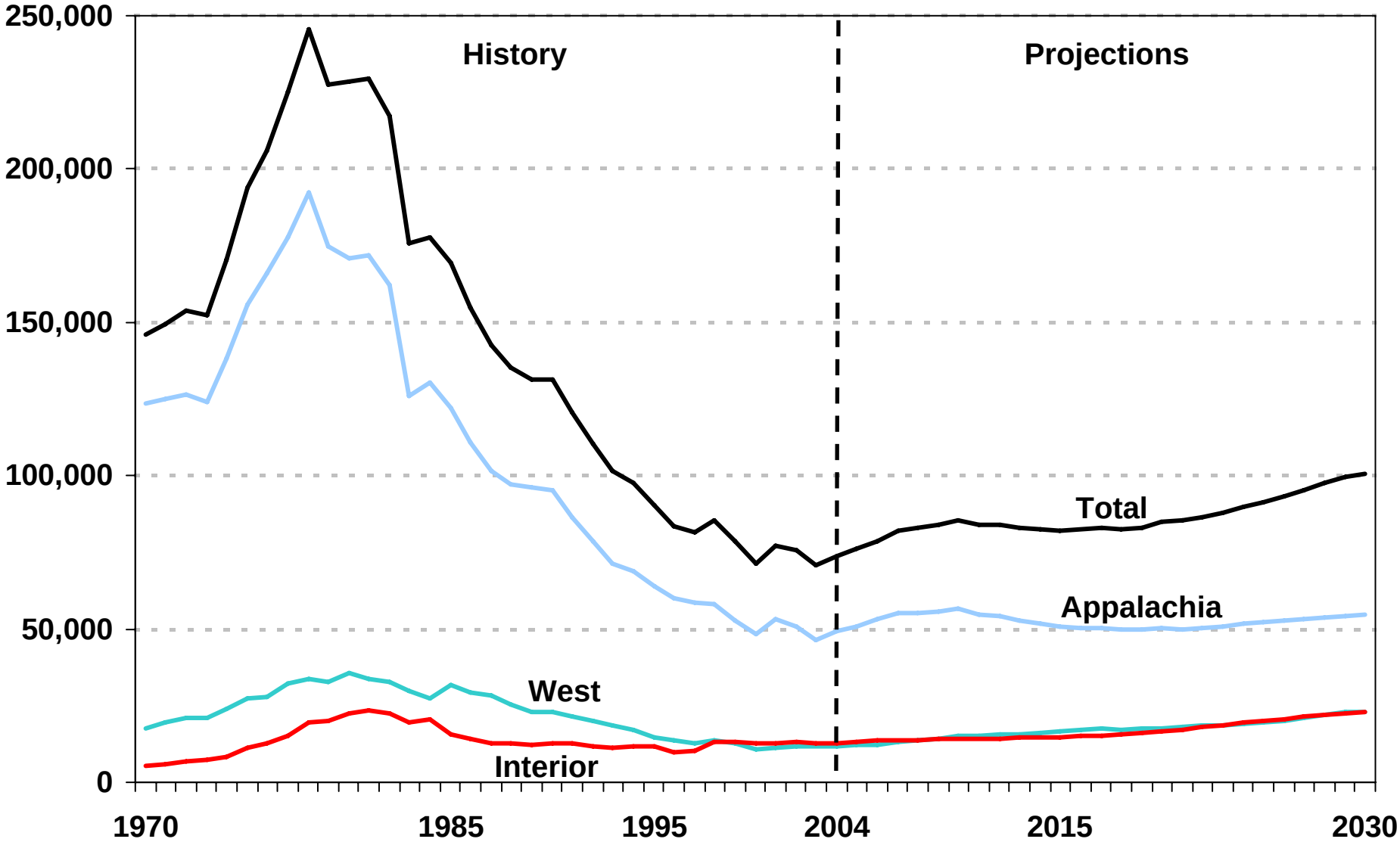
Coal Production by Region, 1970-2030
(million short tons)



Distribution of Domestic Coal by Demand and Supply Region, 2003 and 2030 (million short tons)

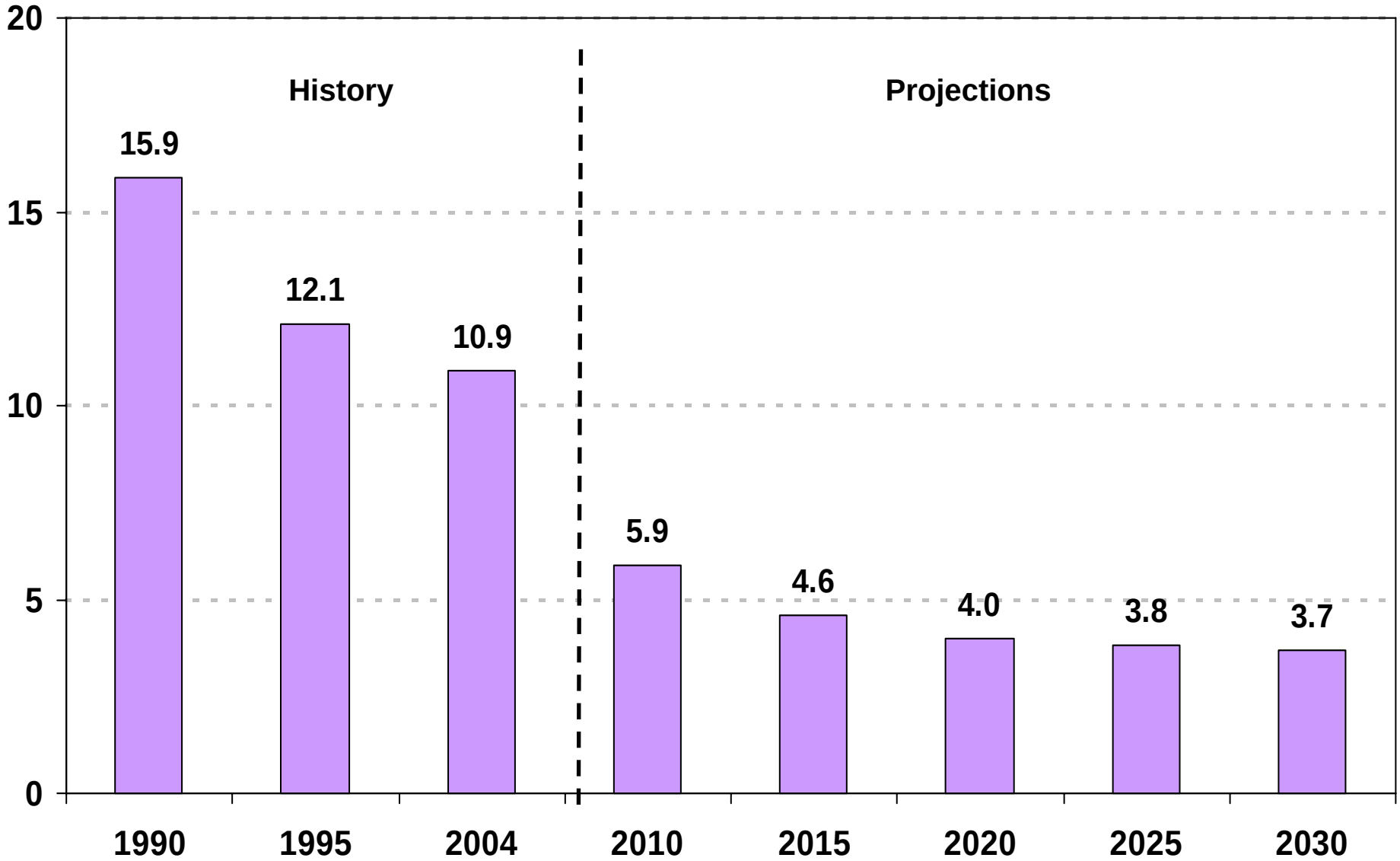


U.S. Coal Mine Employment by Region, 1970-2030 (number of jobs)

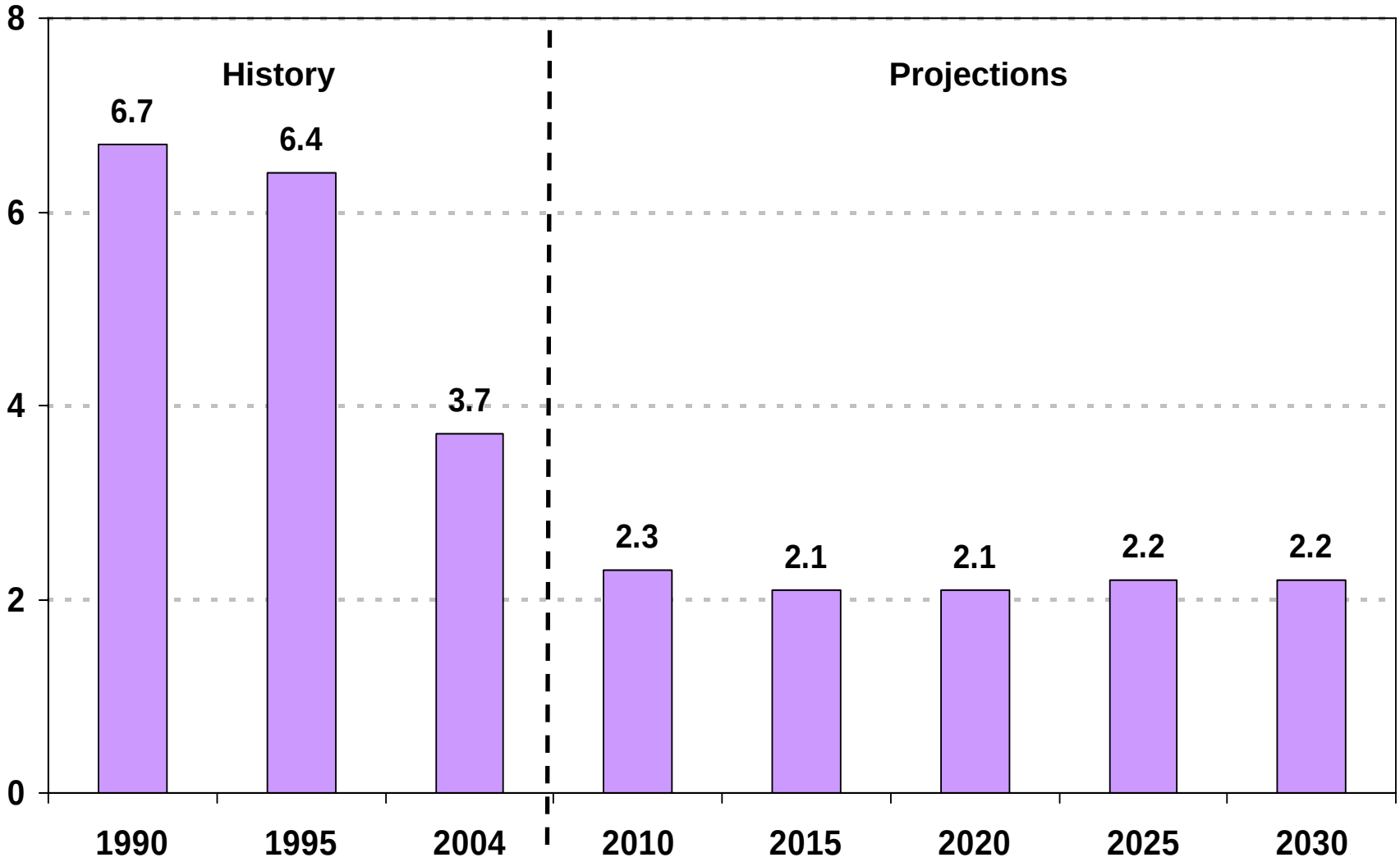


ENVIRONMENTAL INDICATORS

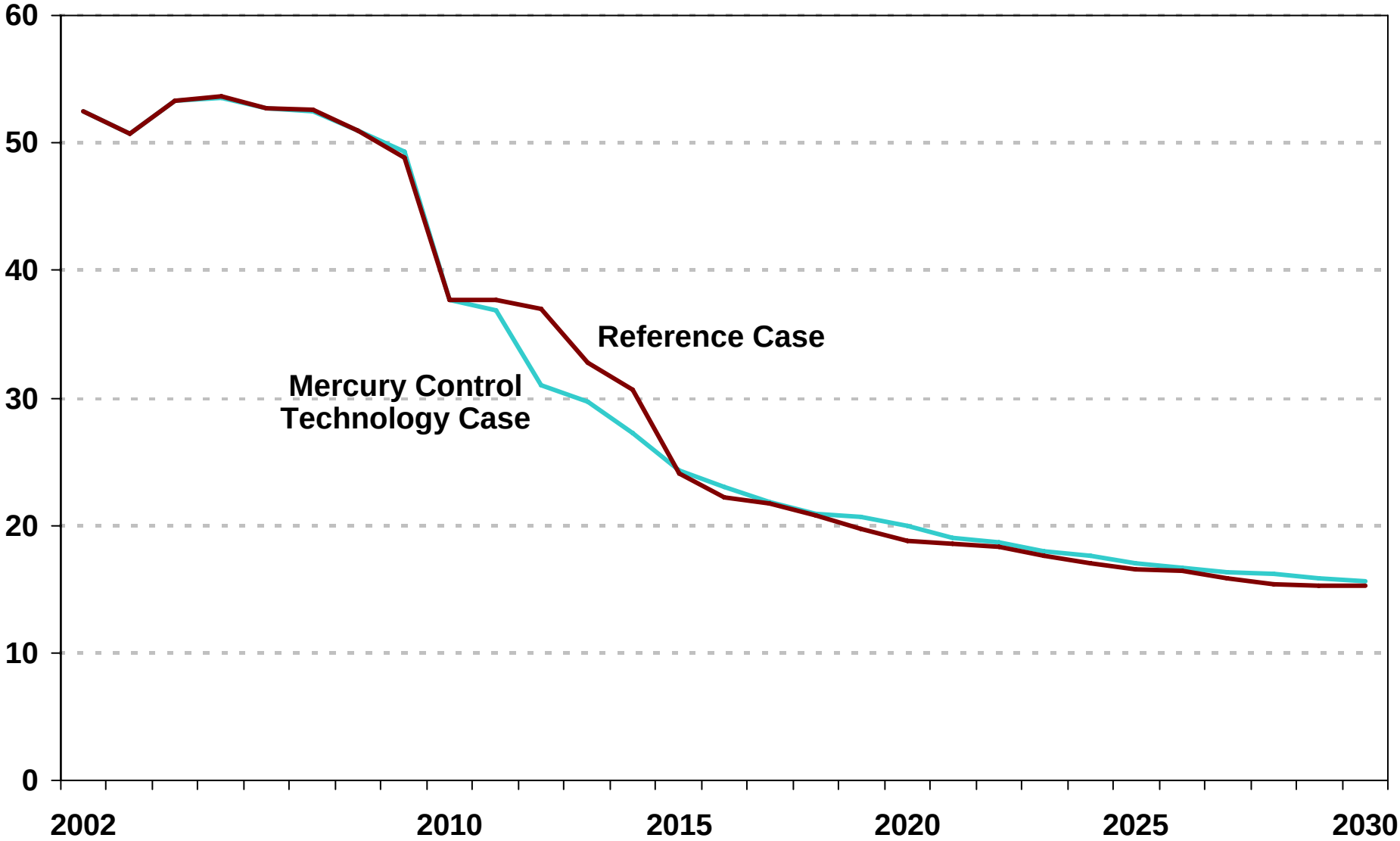
Sulfur Dioxide Emissions from Electricity Generation, 1990-2030 (million short tons)



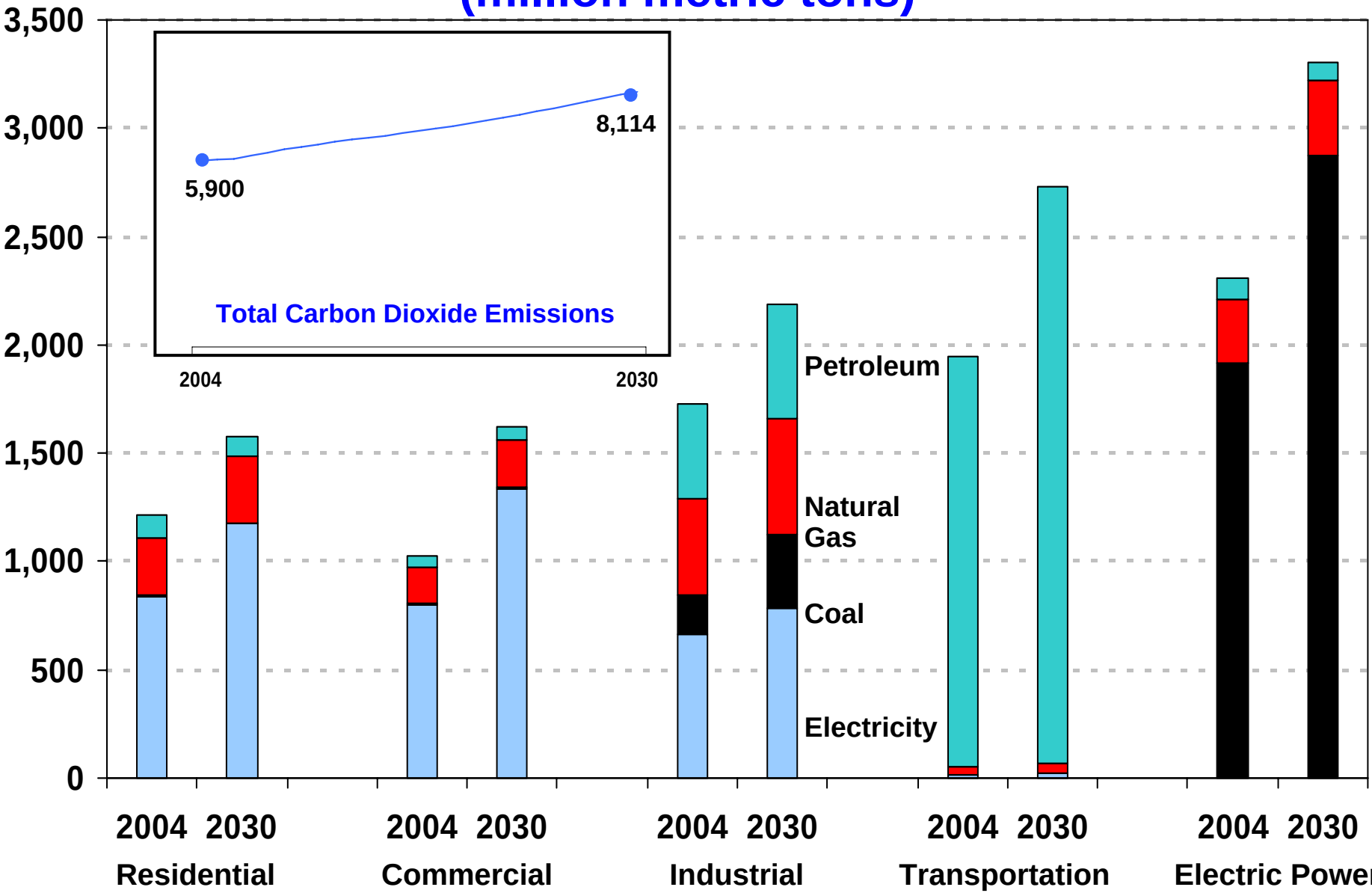
Nitrogen Oxide Emissions from Electricity Generation, 1990-2030 (million short tons)



Mercury Emissions from the Electricity Generation Sector, 2002-2030 (short tons)



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



Policy Changes Could Significantly Affect the Outlook for Electricity Markets

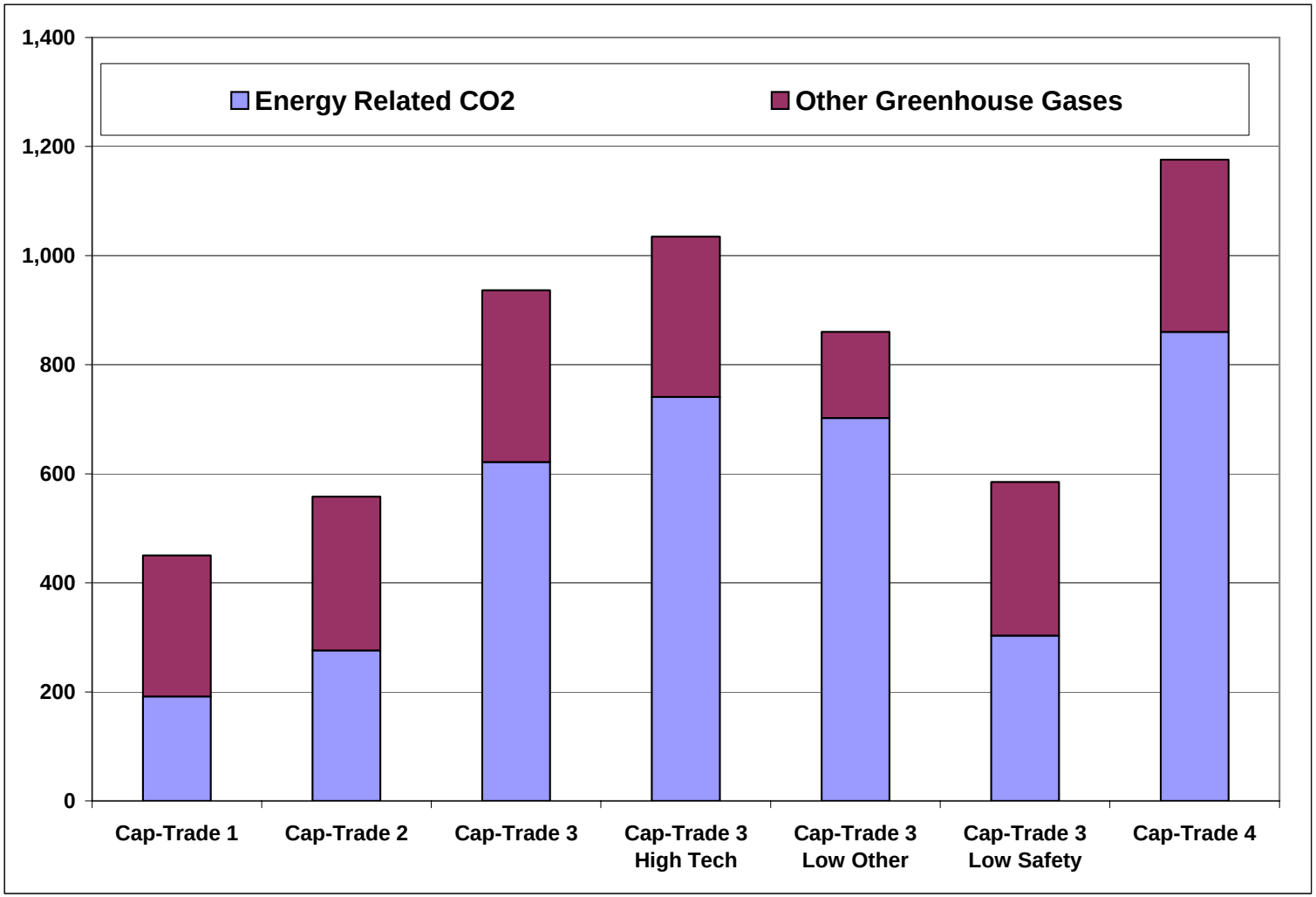
- As previously noted, EIA Reference Case projections are generally based on existing laws and policies.
- In a recent report, EIA examined the energy implications of alternative cap and trade programs for greenhouse gas emissions.
- The electricity sector, particularly projected coal use, was most significantly 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)	
	2010-2019	2020-2030	2010	2030
Cap-Trade 1	2.4	2.8	$ 6.16	$ 9.86
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

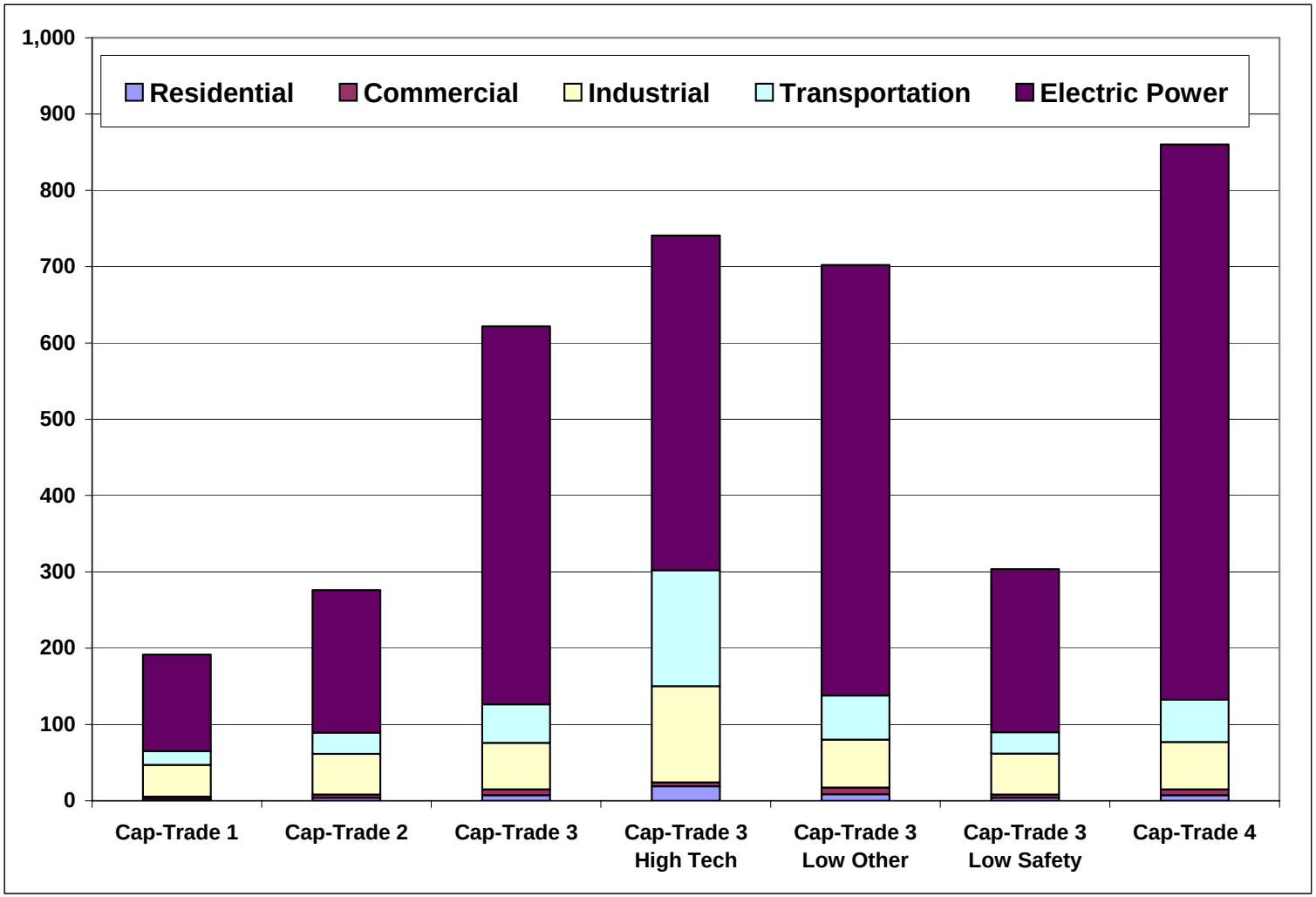
Greenhouse Gas Emissions Reductions in 2020 in Alternative Cases

(million metric tons CO_2 equivalent)



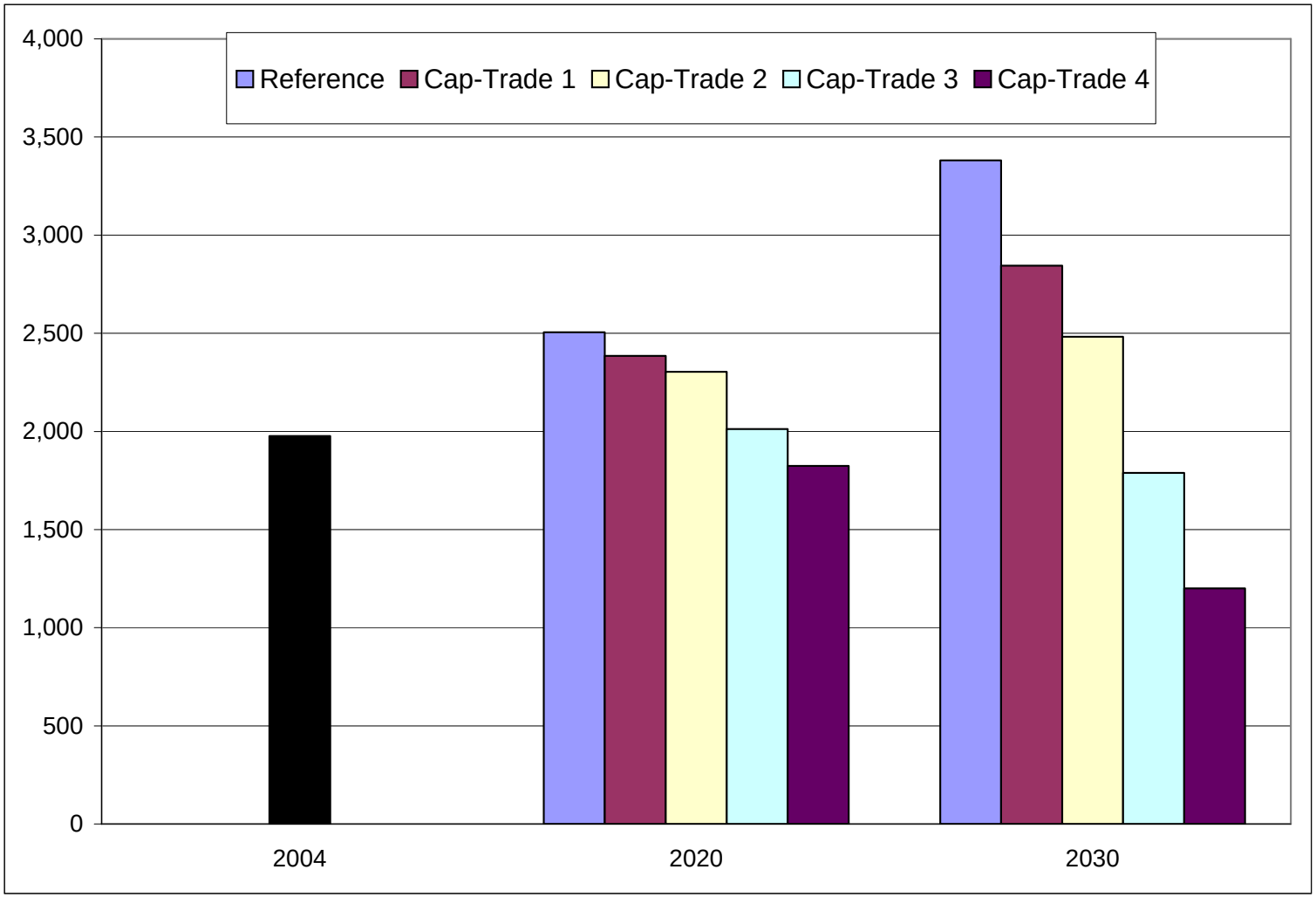
Energy Related CO_2 Emissions Reductions in 2020 in Alternative Cases

(million metric tons CO_2)



Coal Generation

(billion kilowatthours)



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