
Effects of Climate Policy on U.S. Gas Consumption

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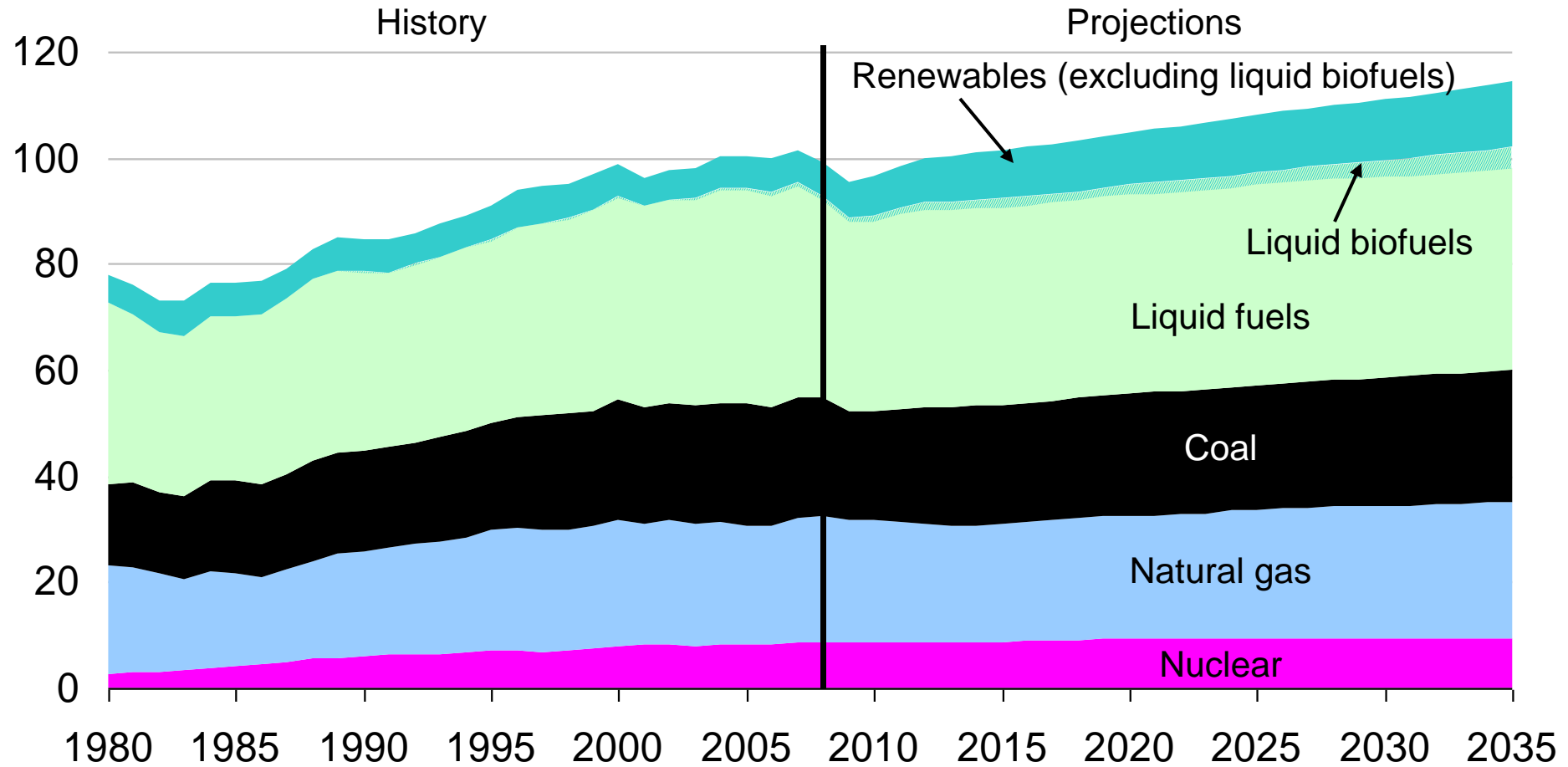
U.S. Energy Information Administration
Independent Statistics and Analysis

Overview

- Mid-term outlook for U.S. gas consumption
 - Gas consumption grows by 7 percent by 2035
 - Gas share of fuel mix declines from 24 to 22 percent by 2035
- Effects of climate policy on gas use will depend on the relative operating and levelized costs of different power generation technologies
- Analysis of the Waxman-Markey bill
 - Little effect on gas use in reference case
 - Results sensitive to availability and costs of nuclear power, coal with CCS, biomass, and offsets
 - Estimated swing between cases is 5 trillion cubic feet per year or 20 percent

In the *AEO2010* Reference case, gas accounts for 22 percent of the fuel mix in 2035

domestic energy supply
quadrillion Btu

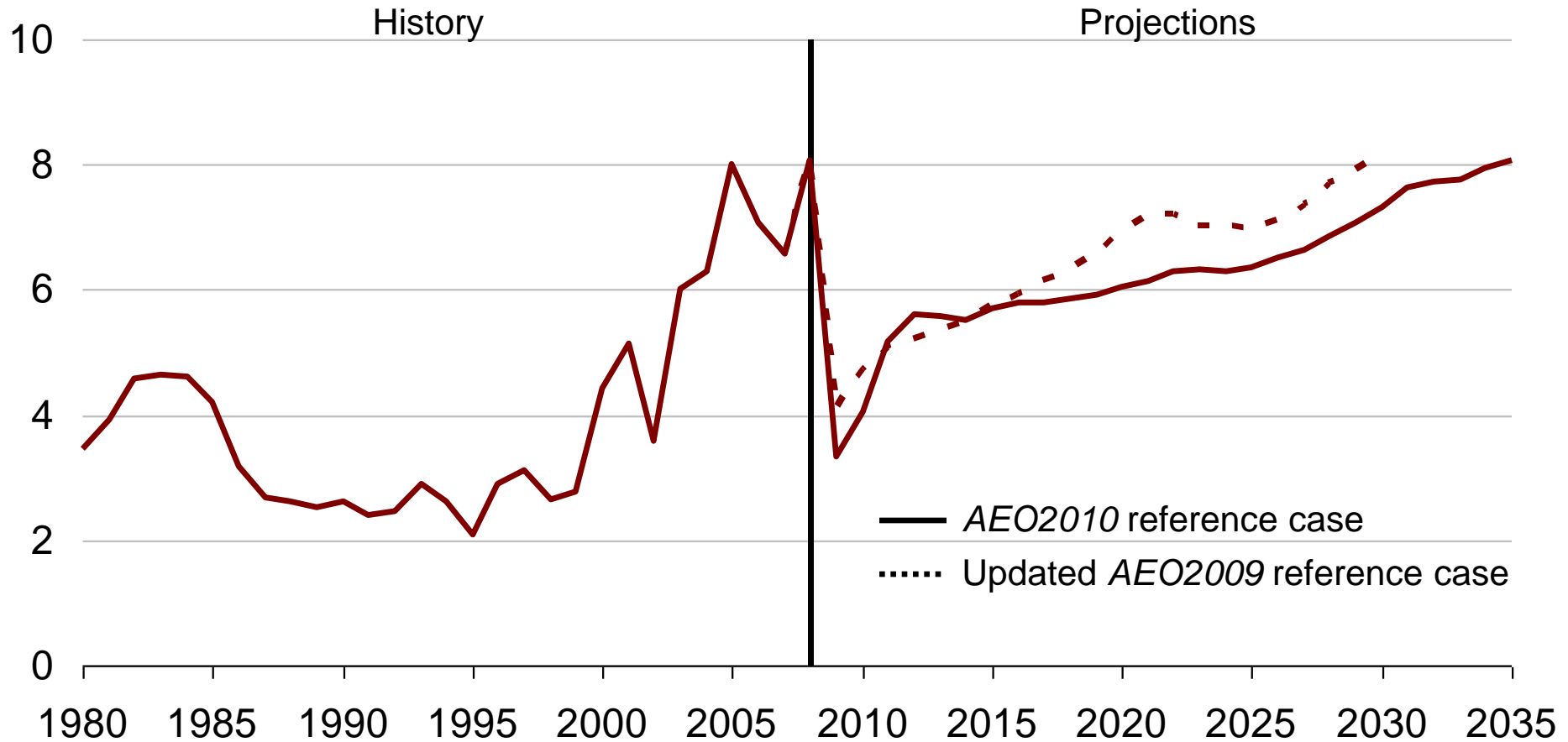


Source: *Annual Energy Outlook 2010*



The cost of new shale gas production strongly influences future wellhead gas prices

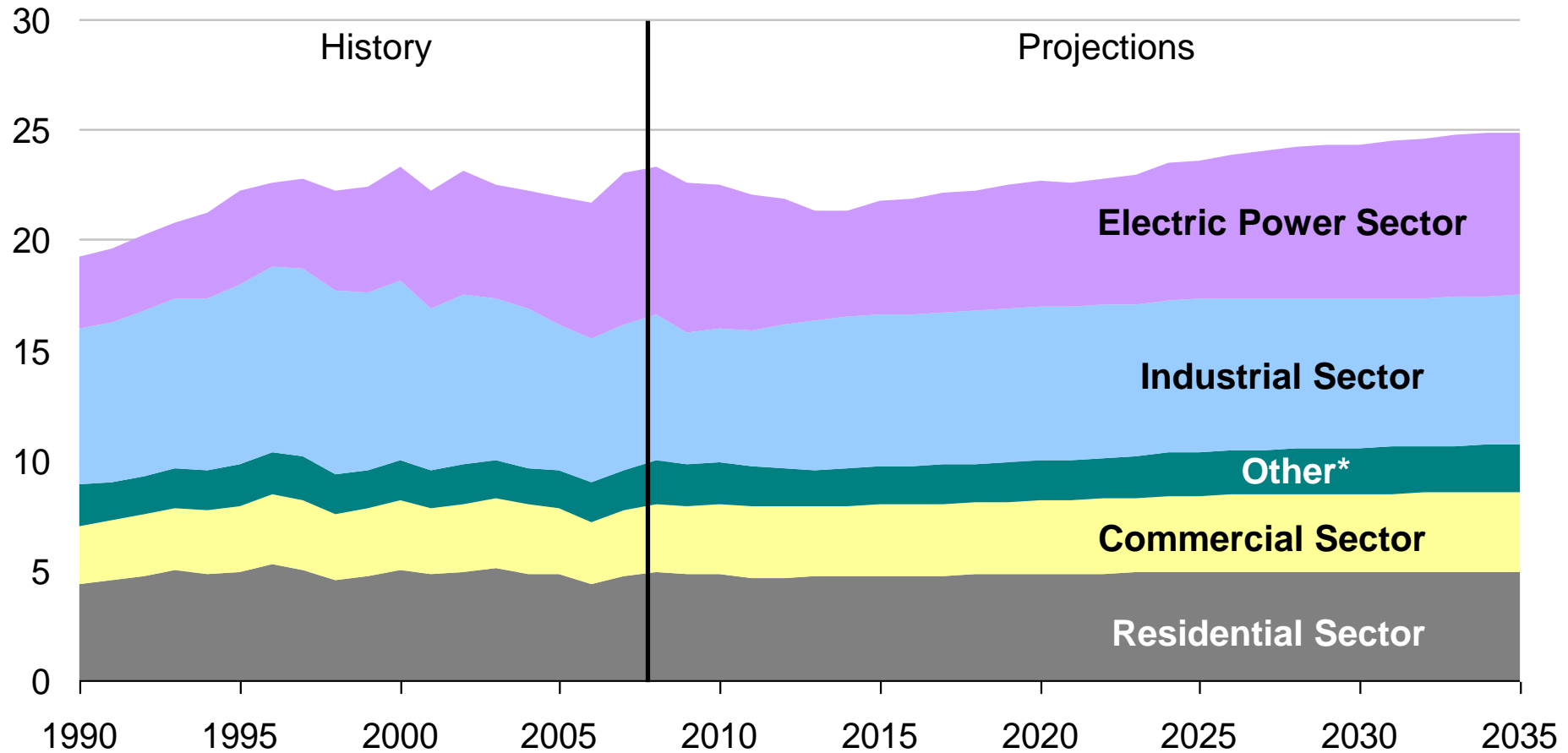
U.S. wellhead natural gas price
2008 dollars per thousand cubic feet



Source: *Annual Energy Outlook 2010*

Although gas consumption grows in all sectors, the strongest growth is in the power sector

U.S. gas consumption
trillion cubic feet



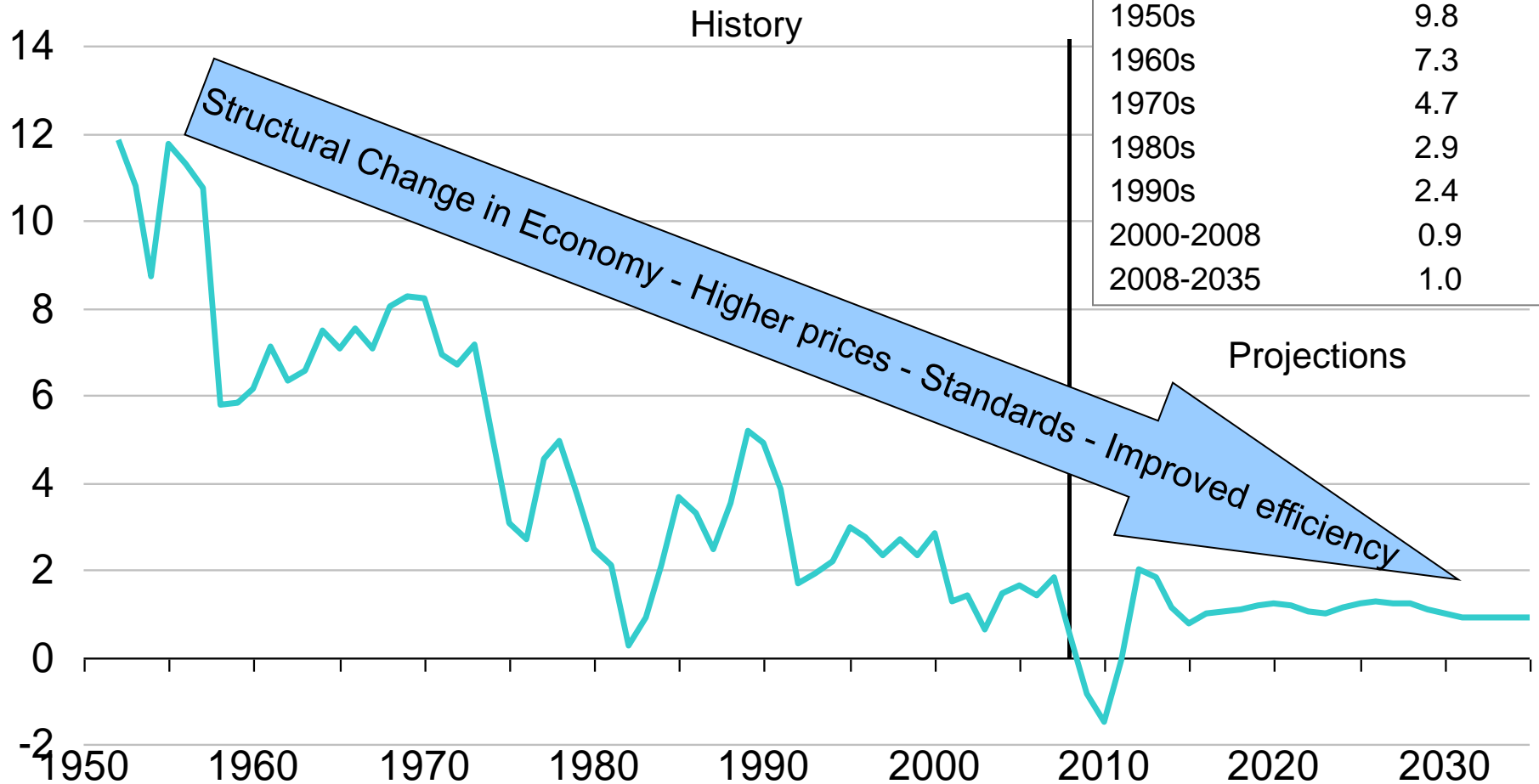
*- natural gas used for transport, pipelines, and lease and plant fuel

Source: EIA, *Annual Energy Outlook 2010*



Slow growth in U.S. electricity demand limits the growth of gas consumption in the power sector

annual change in U.S. electricity consumption
3-year rolling average percentage growth

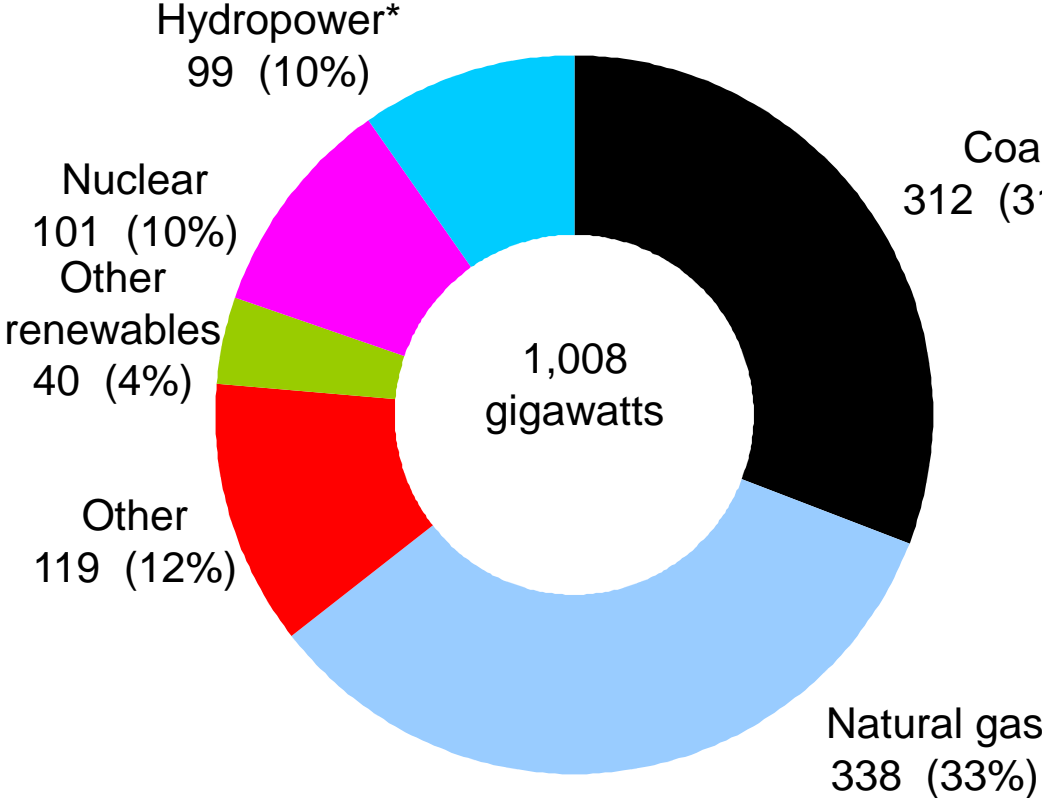


Source: Annual Energy Outlook 2010

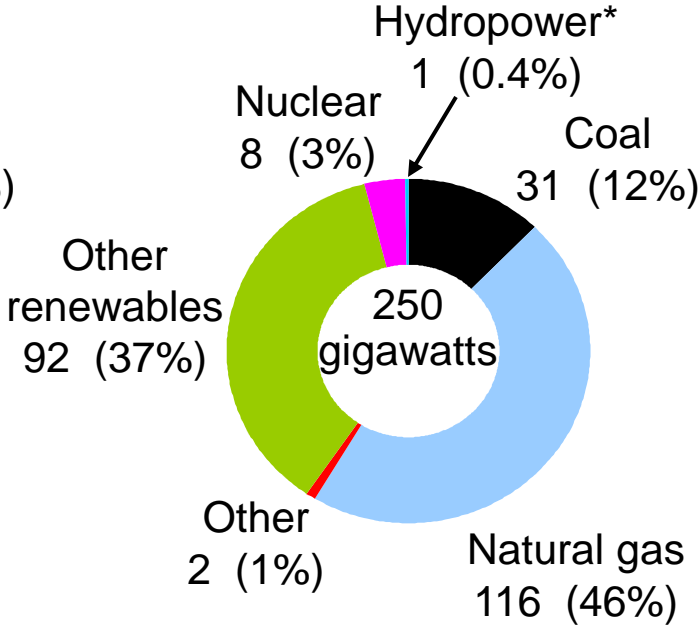


Gas-fired generation and renewables account for the majority of the required power generation capacity additions

2008 capacity



Capacity additions 2008 to 2035



* Includes pumped storage

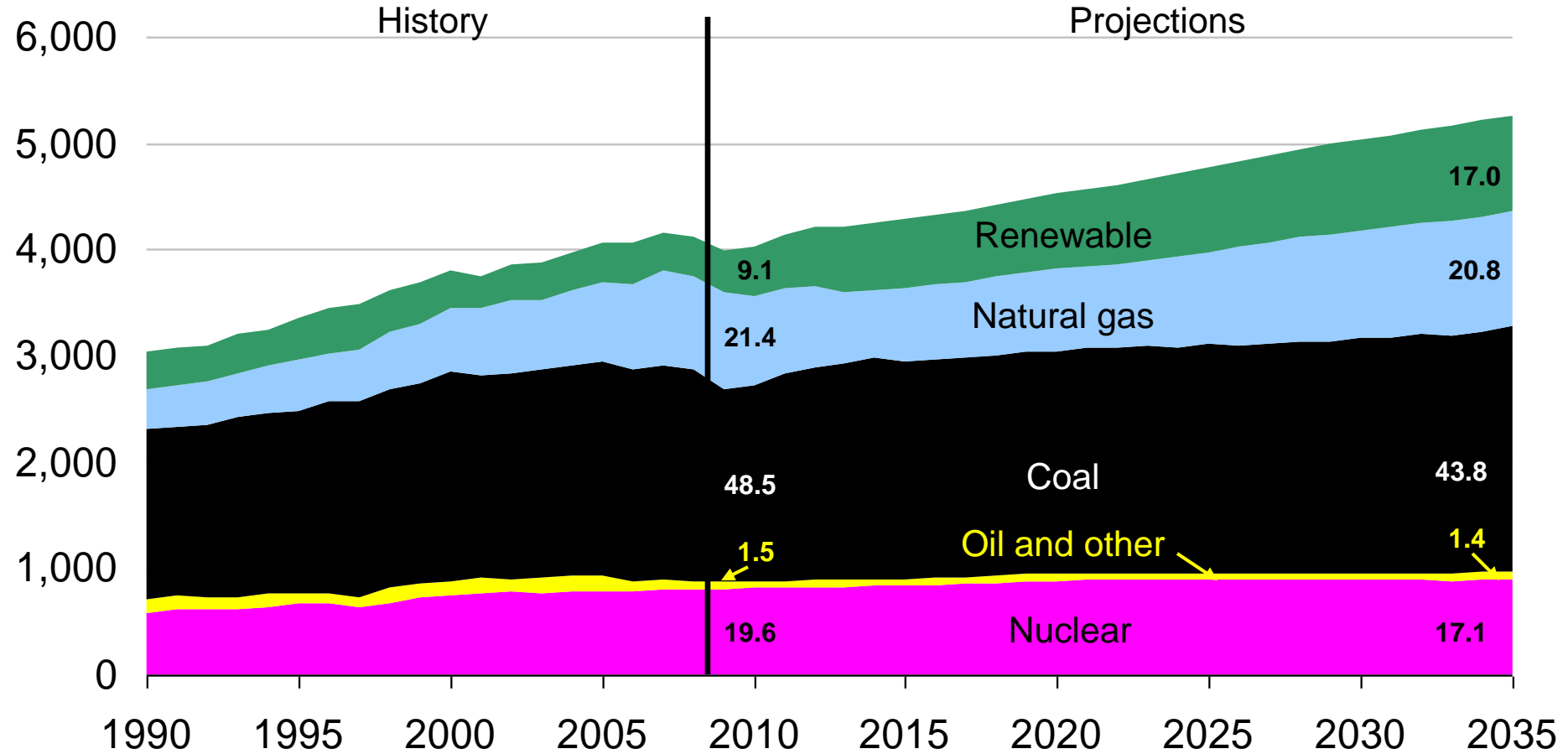
Source: *Annual Energy Outlook 2010*



Renewables gain electricity market share, mostly at the expense of coal

net electricity generation

billion kilowatthours and percent shares



Source: Annual Energy Outlook 2010



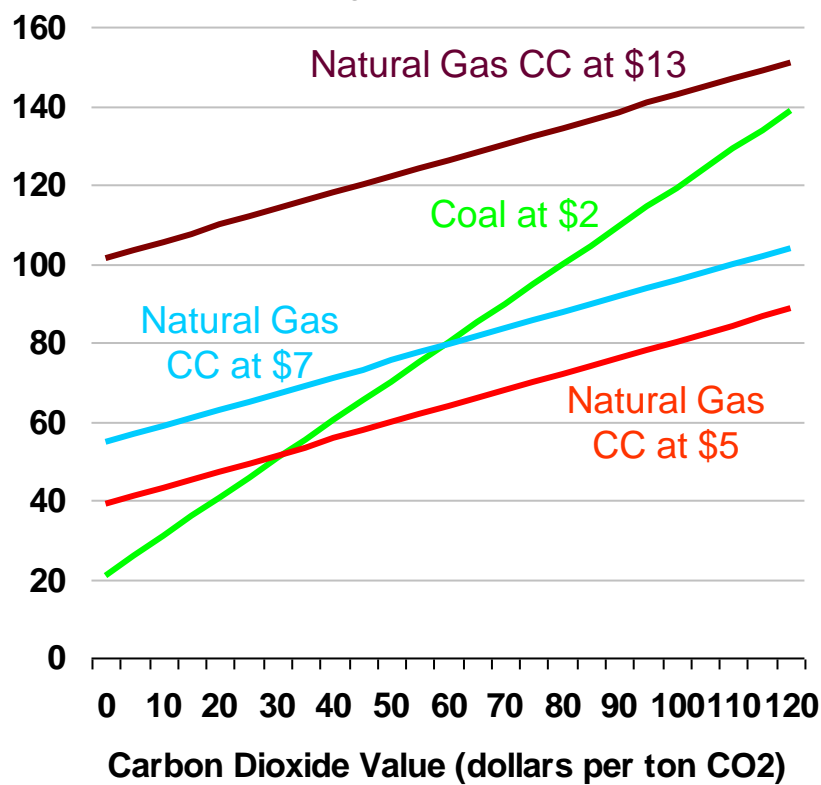
Estimating the effects of climate policy on gas consumption

- Important to estimate the competitive position of gas in both existing and new power plants.
 - Gas prices have to be relative low or carbon prices relative high for existing gas-fired plants to dispatch ahead of existing coal-fired power plants
 - Given its mature technology, short-lead times, and relatively low capital costs, gas-fired generation is very competitive for new power plants over a wide range of gas and carbon prices.
- Effects are also sensitive to the availability and costs of nuclear power, coal with CCS, biomass, and offsets.

Climate Policy Impact on Operating Costs: OLD vs. OLD

Fuel Cost for Existing Coal and Combined Cycle Natural Gas Units with a Value Placed on Carbon Dioxide Emissions

2008 dollars per megawatthour

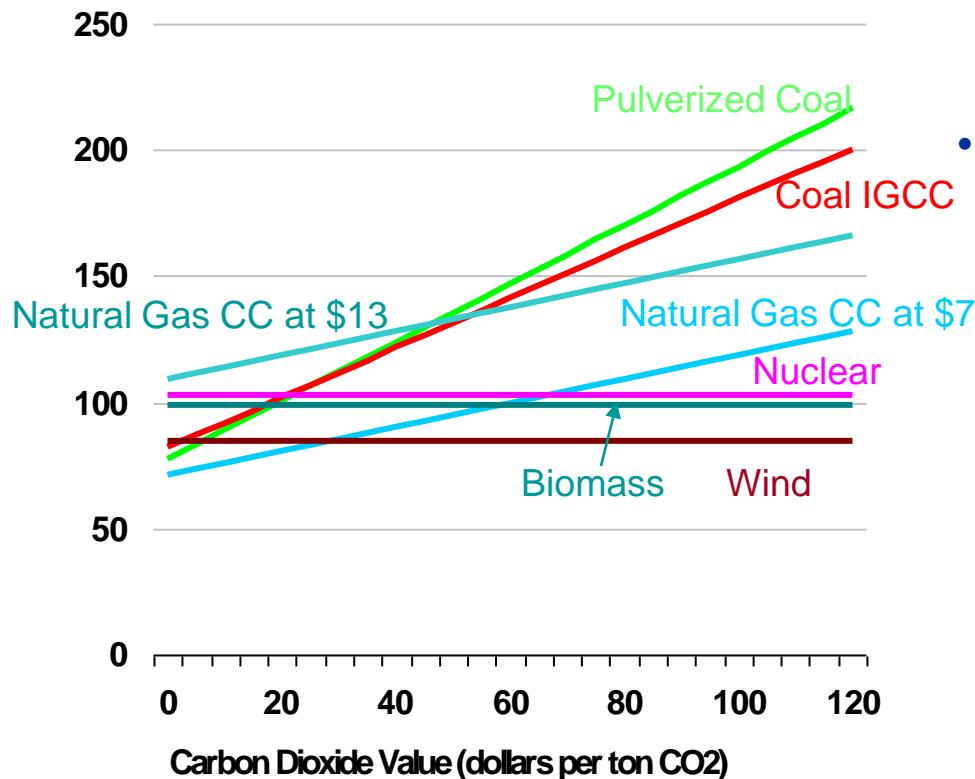


- Climate policies affect the operating costs of both coal-fired and natural-gas-fired power plants
- OLD vs. OLD: The “crossover point” for least-cost dispatch of coal and natural gas capacity depends on both fuel prices and the carbon value. As natural gas prices increase, the “crossover” occurs at a higher carbon value.
- NEW (not shown) vs. OLD: Carbon values may eventually get high enough to make the capital plus operating costs of new no-carbon generation cheaper than the operating only costs of an existing generation unit. At that point, operators will want to retire the existing unit.

Climate Policy Impact on Levelized Cost: NEW vs.OLD/ NEW

Levelized Costs for New Plants in 2025 with a Value Placed on Carbon Dioxide Emissions

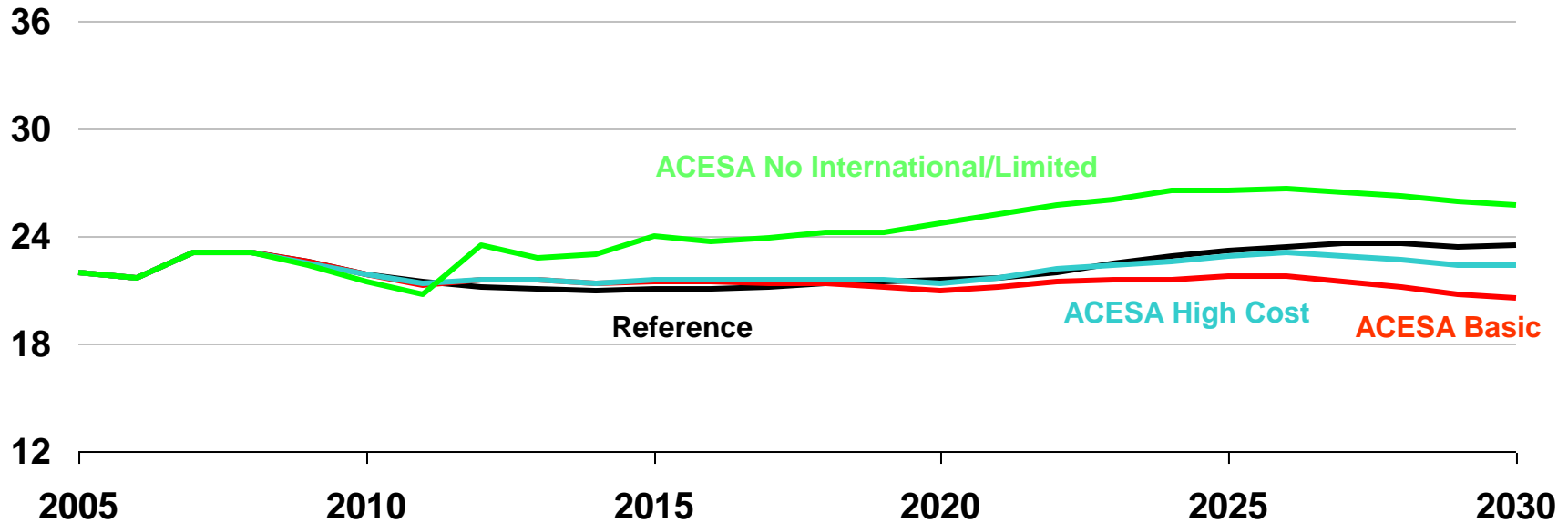
2008 dollars per megawatthour



- Levelized cost, which considers both capital and operating costs, is a useful metric for new plants.
- The crossing points for tradeoffs among technologies in “NEW vs. NEW” capacity decisions generally occur at lower carbon dioxide values than the crossing points for “OLD vs. OLD” dispatch decisions.

Different cost assumptions about offsets and non-gas power generation cause gas use to swing 20% between cases

U.S. natural gas consumption
trillion cubic feet per year



- Major emissions reductions in electricity generation require EXISTING coal capacity to be retired in favor of NEW generation capacity
- Conventional coal generation declines and renewables grow, in all climate policy cases.
- The level of natural gas generation is sensitive to the availability and costs of nuclear power, coal with CCS, biomass, and offsets.

Source: *Energy Market and Economic Impacts of H.R. 2454 (August 2009)*

For more information

U.S. Energy Information Administration home page www.eia.gov

Short-Term Energy Outlook www.eia.gov/emeu/steo/pub/contents.html

Annual Energy Outlook www.eia.gov/oiaf/aeo/index.html

International Energy Outlook www.eia.gov/oiaf/ieo/index.html

Monthly Energy Review www.eia.gov/emeu/mer/contents.html

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