
EIA's Energy Outlook and Climate Change

Climate and Energy Imperatives for Future Naval Forces Symposium
The Johns Hopkins University Applied Physics Laboratory's Kossiakoff Center
March 23 2010, Laurel, MD

Phyllis D. Martin



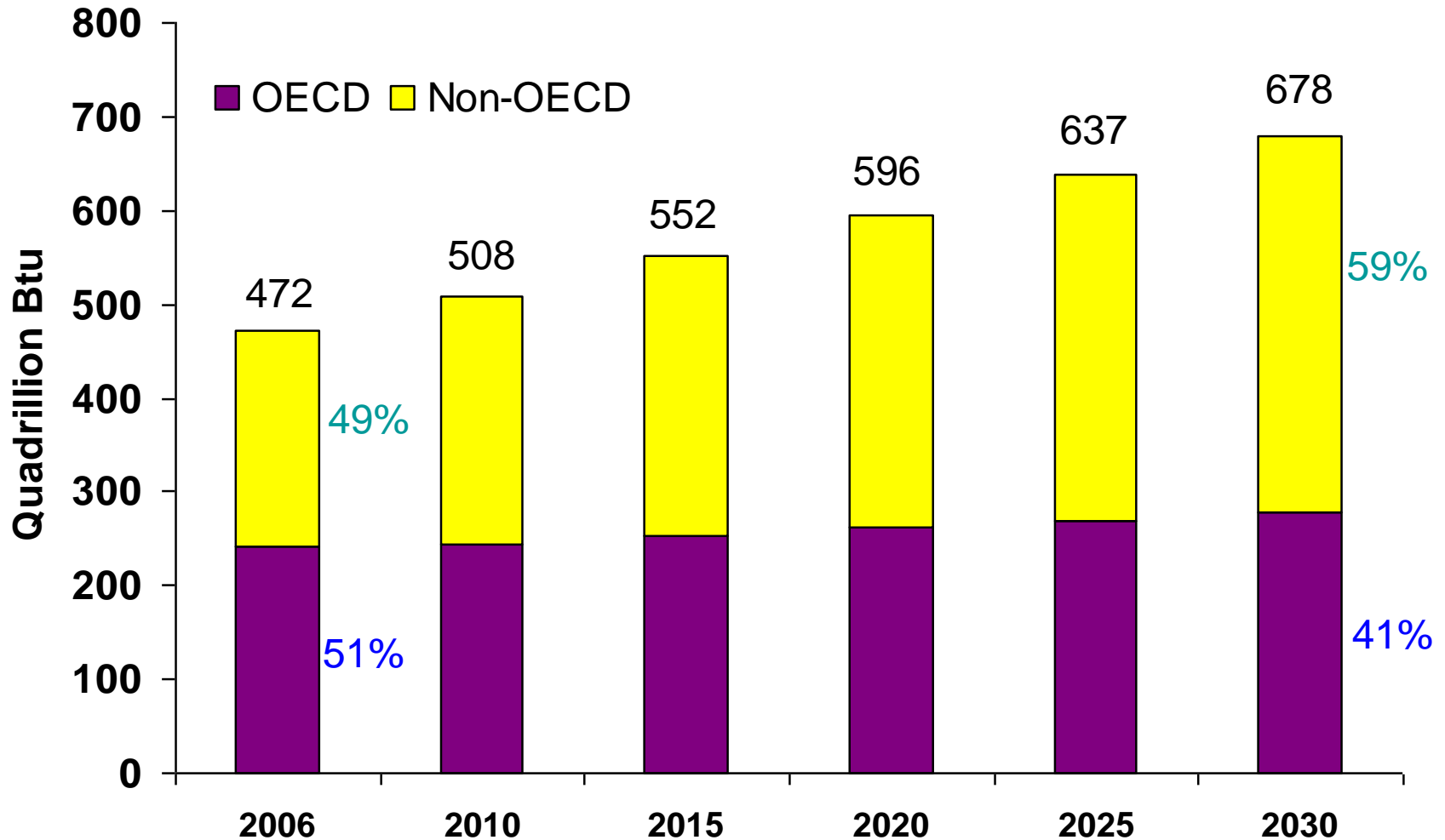
U.S. Energy Information Administration
Independent Statistics and Analysis

Overview

- Global energy outlook
- U.S. energy outlook
- EIA's analysis of HR 2454, the American Clean Energy and Security Act (ACESA)

The Global Energy Outlook

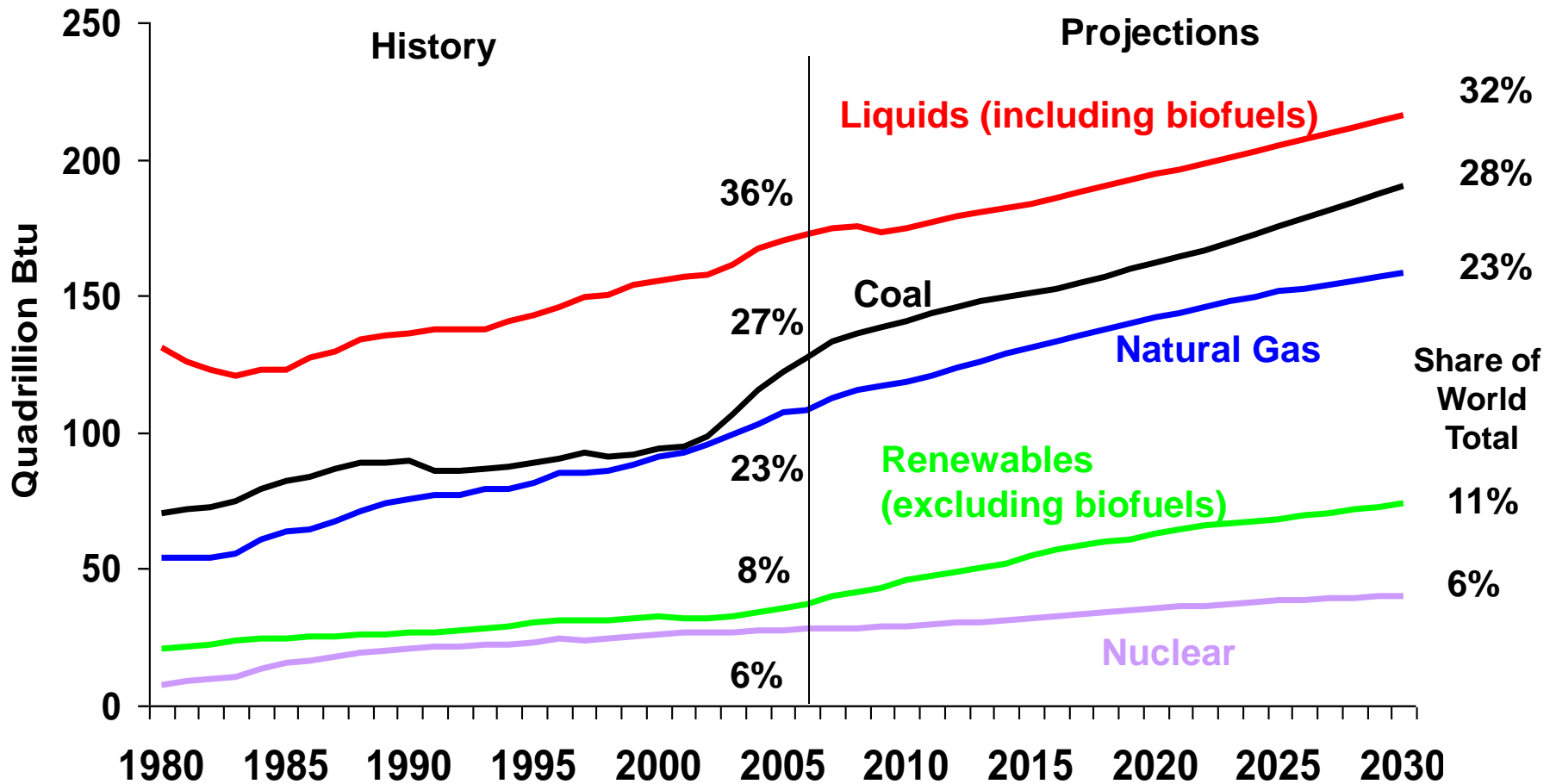
Non-OECD countries account for 82% of the increase in global energy use to 2030



Source: EIA International Energy Outlook 2009, Reference Case



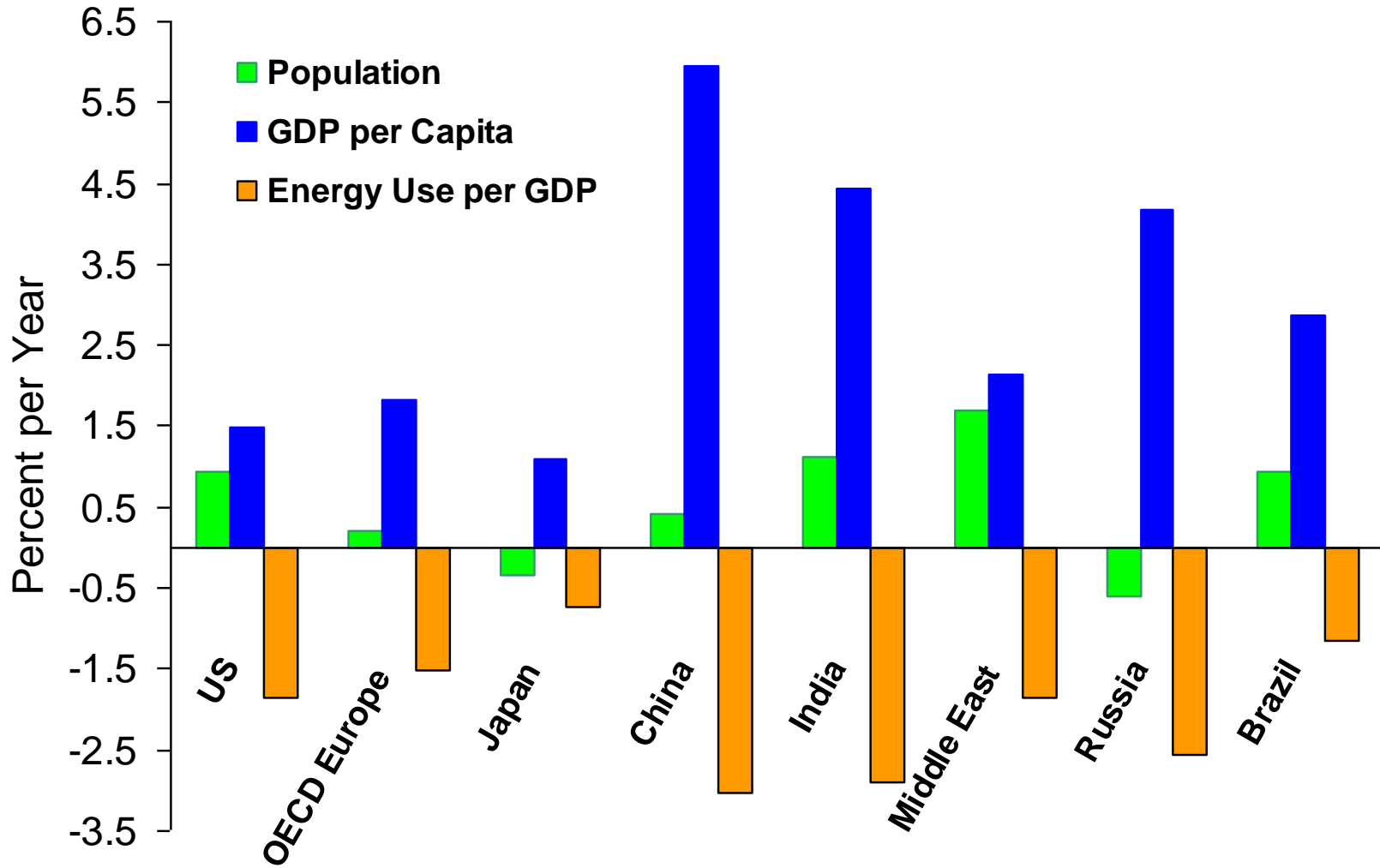
Renewables are the fastest growing energy source (but from a relatively small base)



Source: EIA International Energy Outlook 2009, Reference Case

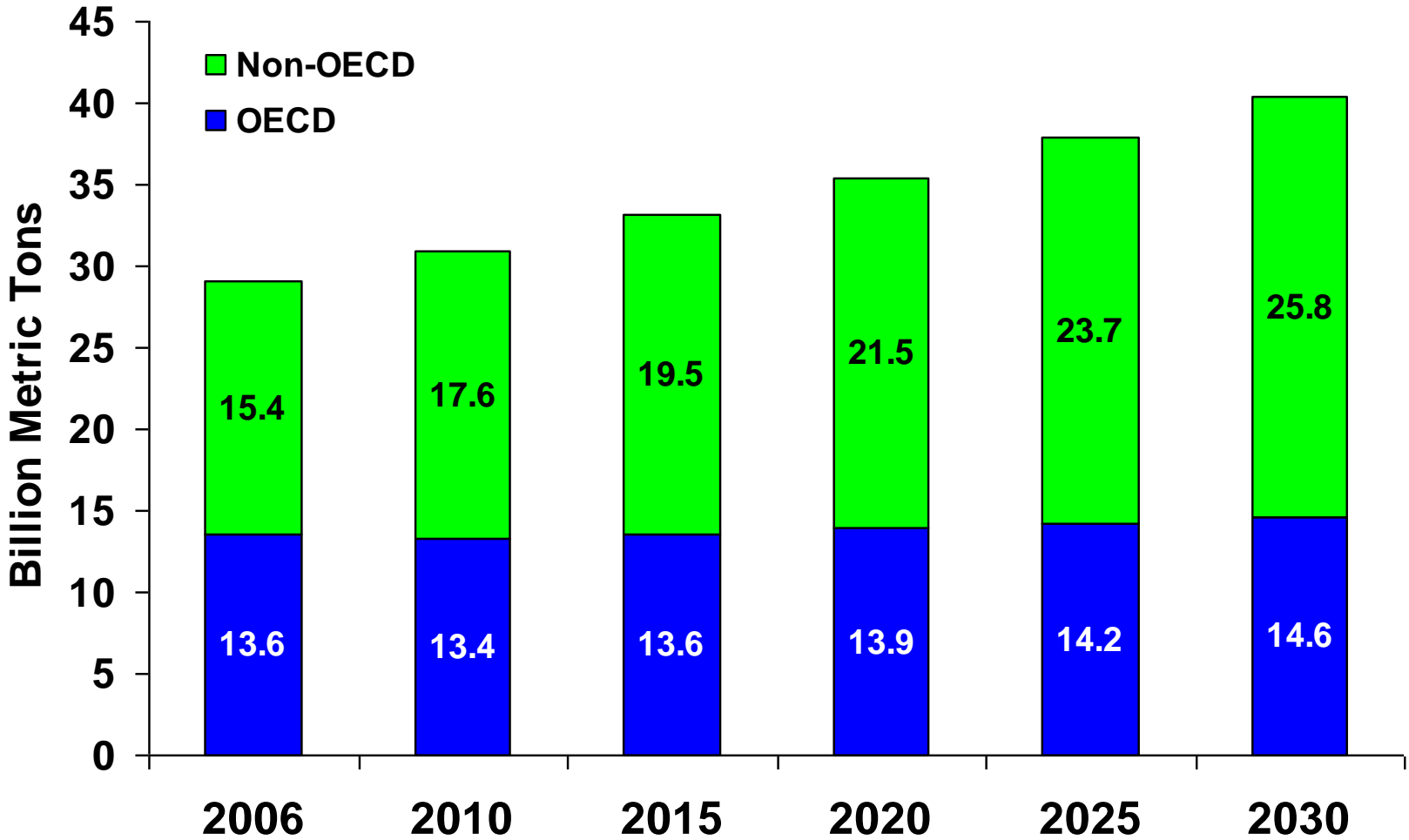


Growth in worldwide economic activity, and population growth in some regions, drives increased energy use



Source: US: Published AEO2009 (March 2009); ROW: GDP Assumptions based on IHS Global Insight, Inc.; Population from UN World Population Prospects (2006 Revision)

Absent new policies, energy-related CO₂ emissions grow 39% between 2006 and 2030 in EIA's reference case



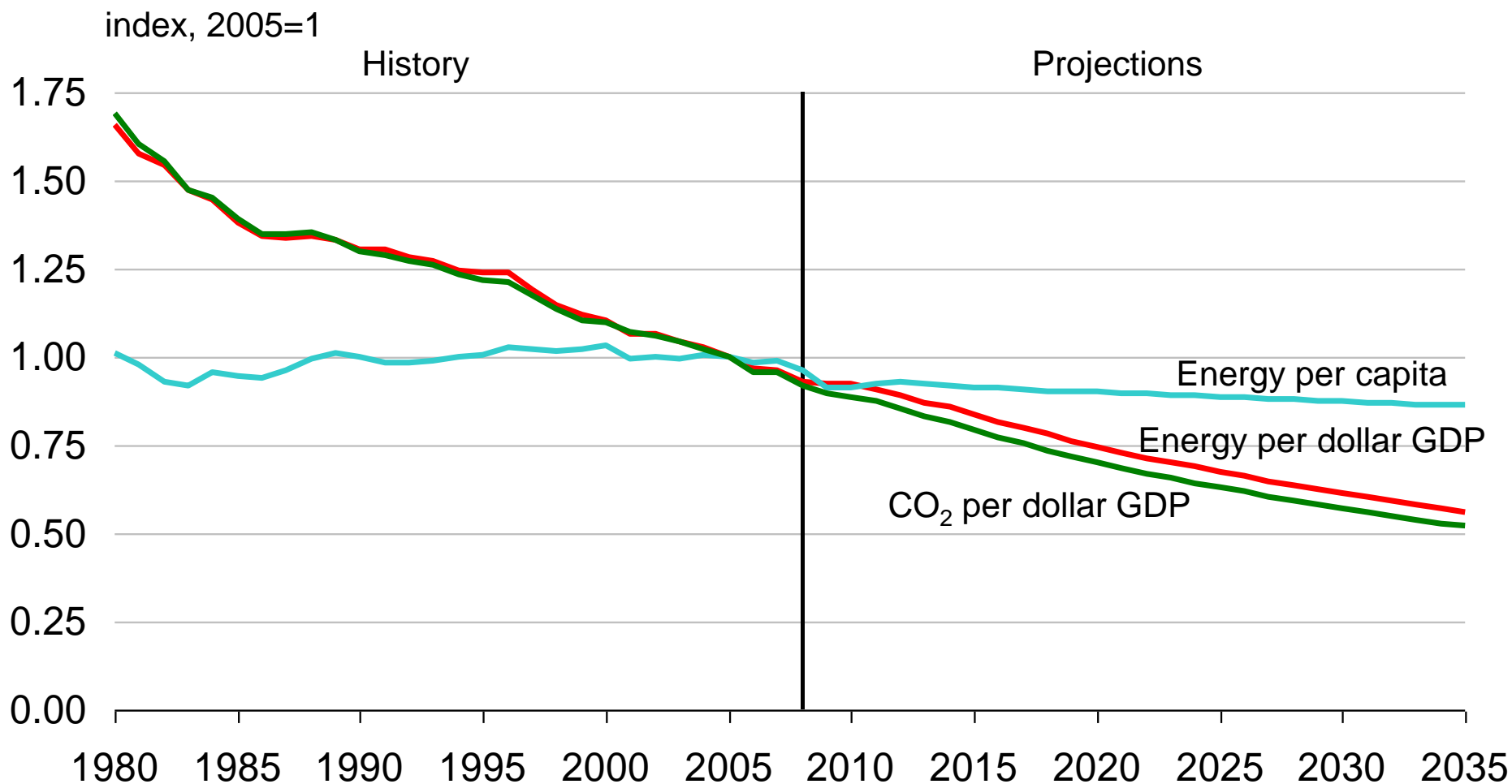
Source: EIA International Energy Outlook 2009, Reference Case



The U.S. Energy Outlook



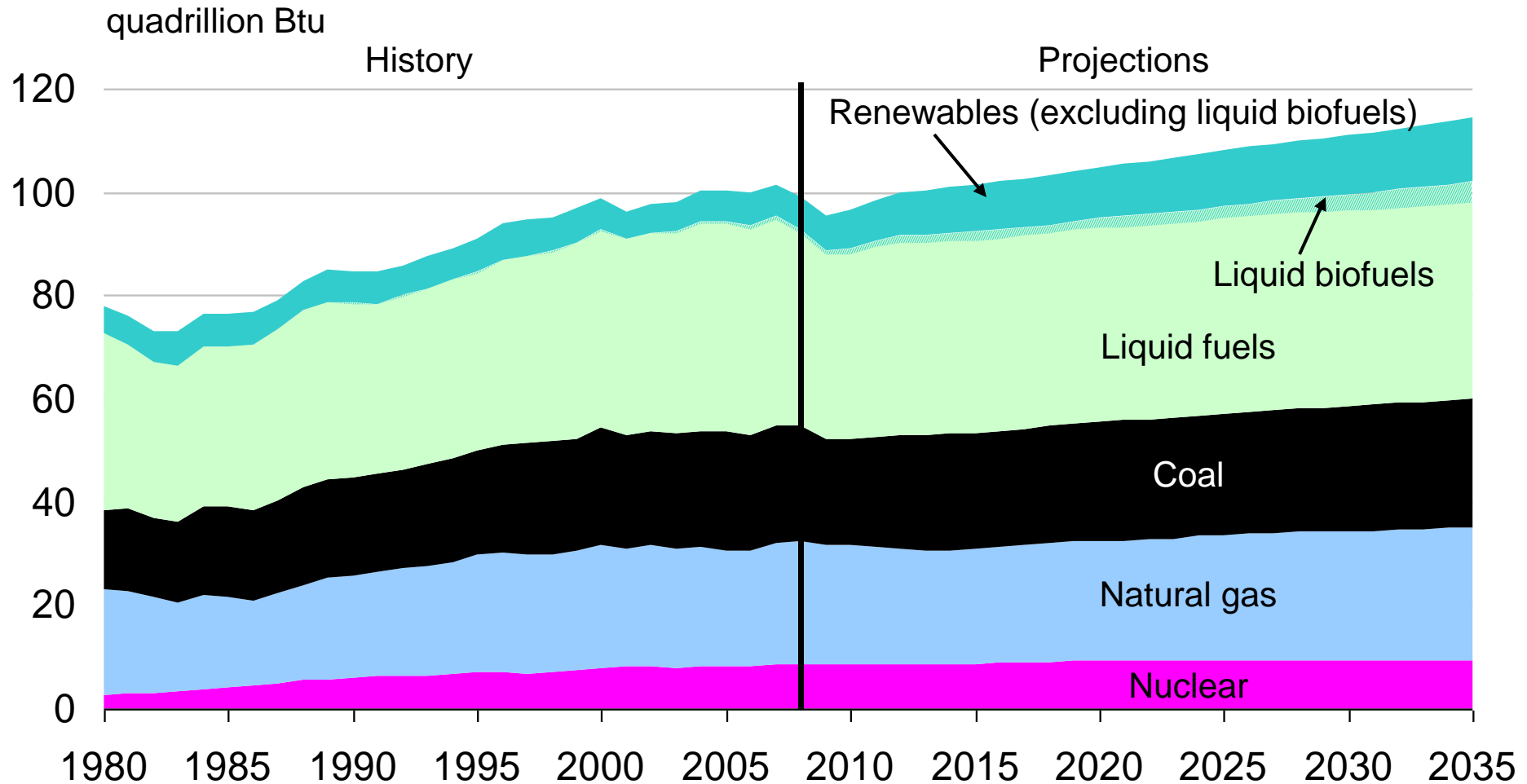
Energy and CO₂ per dollar GDP continue to decline; per capita energy use also declines



Source: *Annual Energy Outlook 2010*



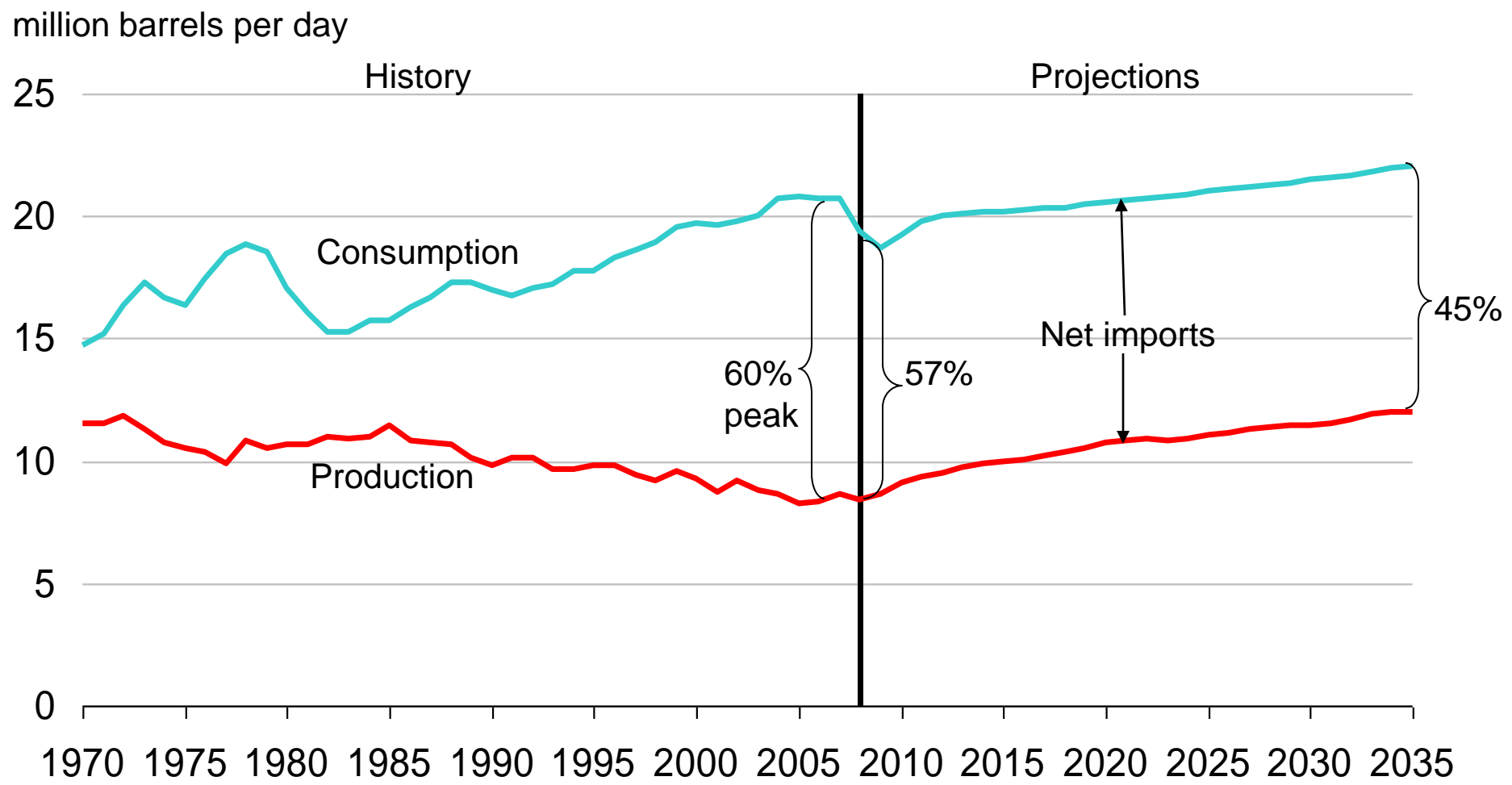
Non-fossil energy use grows rapidly, but fossil fuels still provide 78 percent of total energy use in 2035



Source: *Annual Energy Outlook 2010*



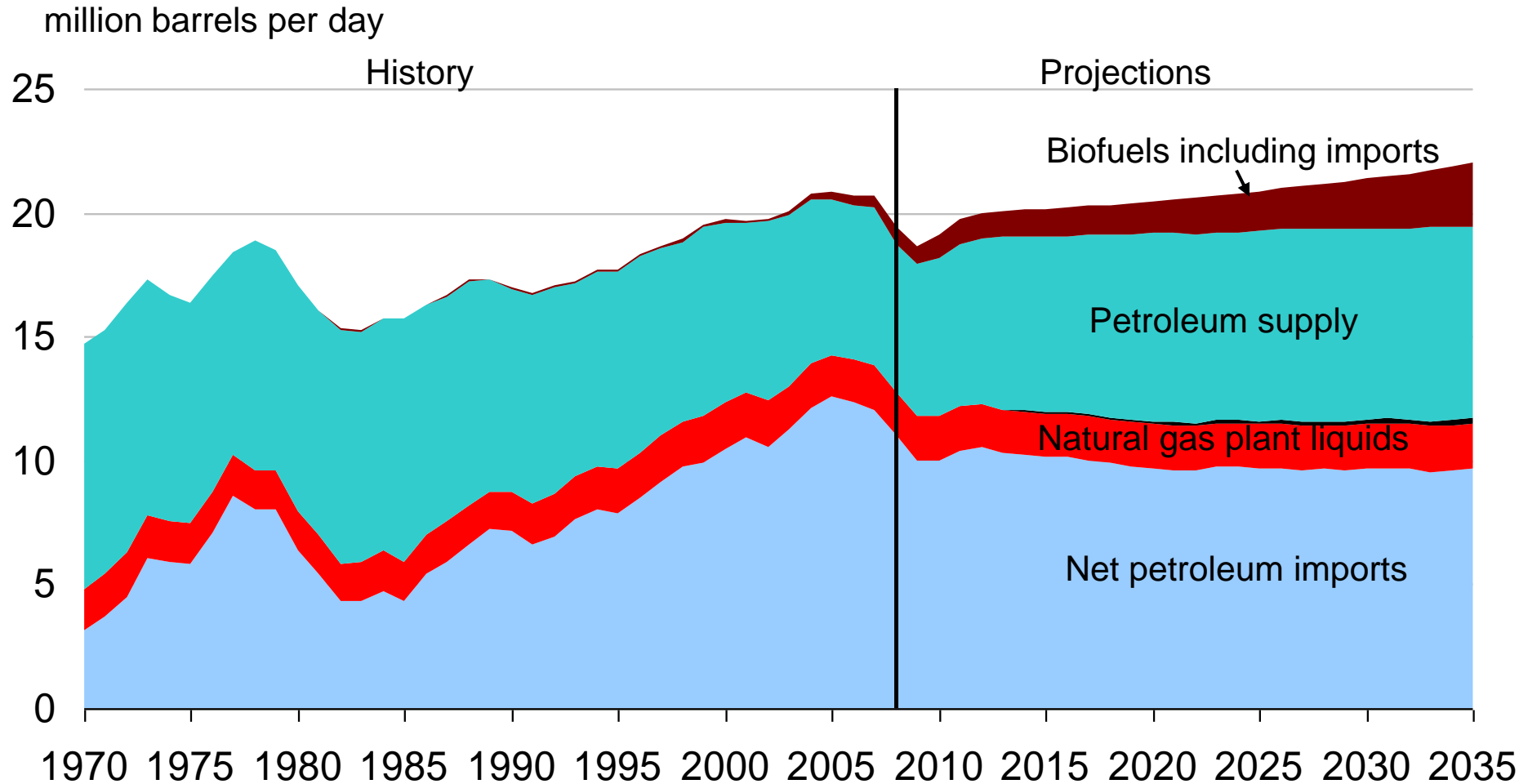
U.S. reliance on imported liquid fuels is reduced by increased domestic production and greater fuel efficiency



Source: Annual Energy Outlook 2010



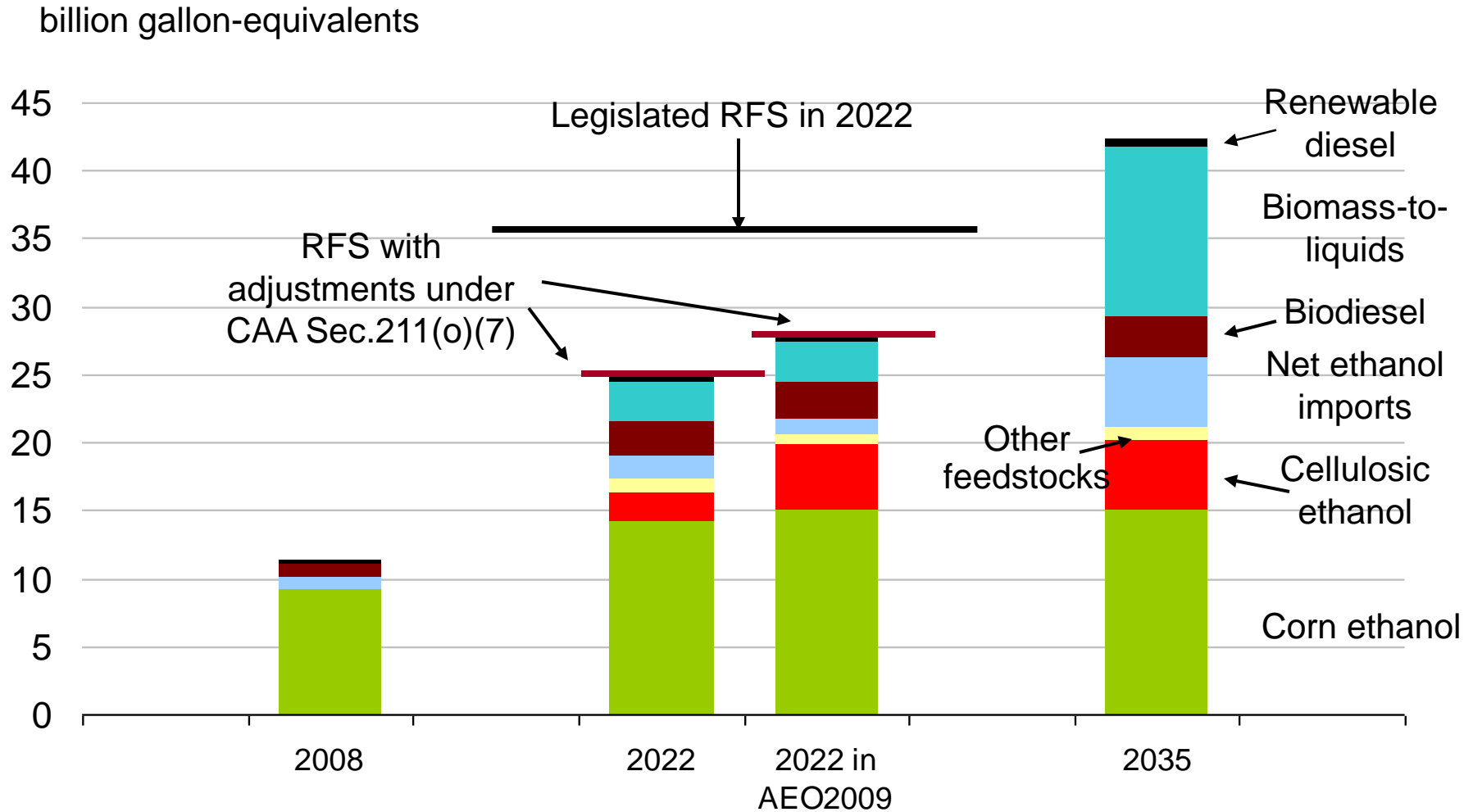
Biofuels meet most of the growth in liquid fuels supply



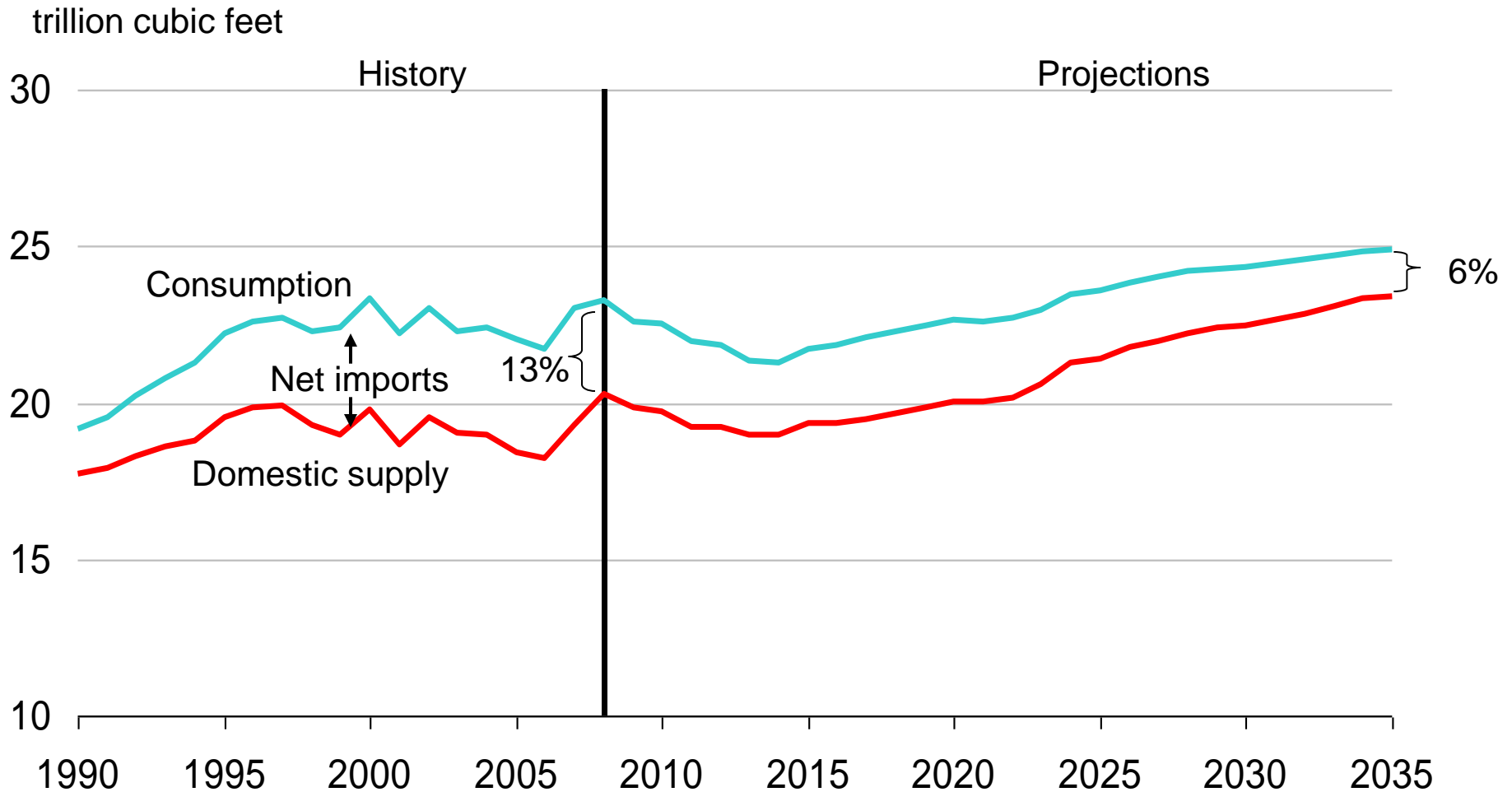
Source: Annual Energy Outlook 2010



Biofuels grow, but fall short of the 36 billion gallon RFS target in 2022, exceed it in 2035



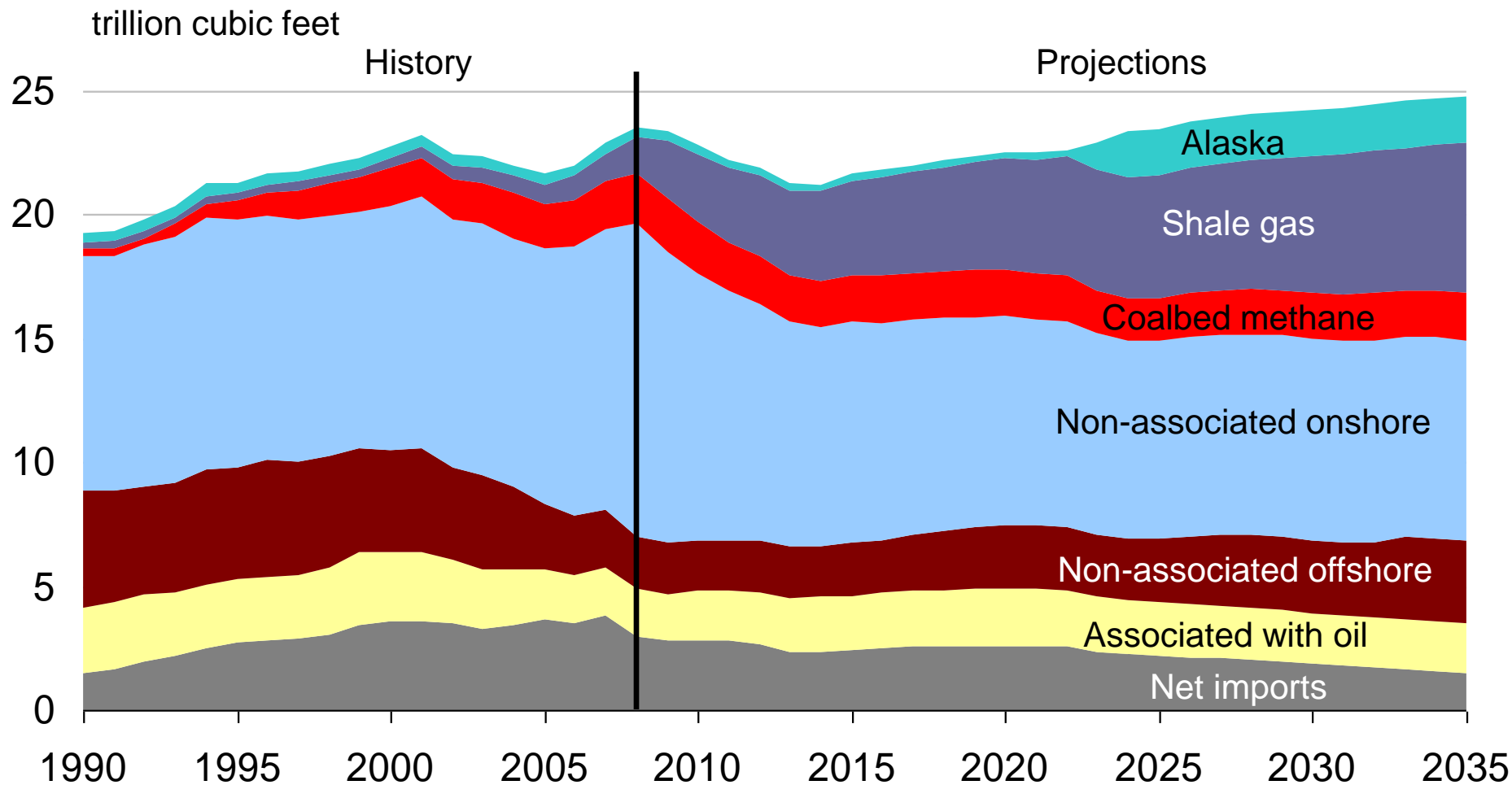
Import share of natural gas supply declines as domestic supply grows



Source: *Annual Energy Outlook 2010*



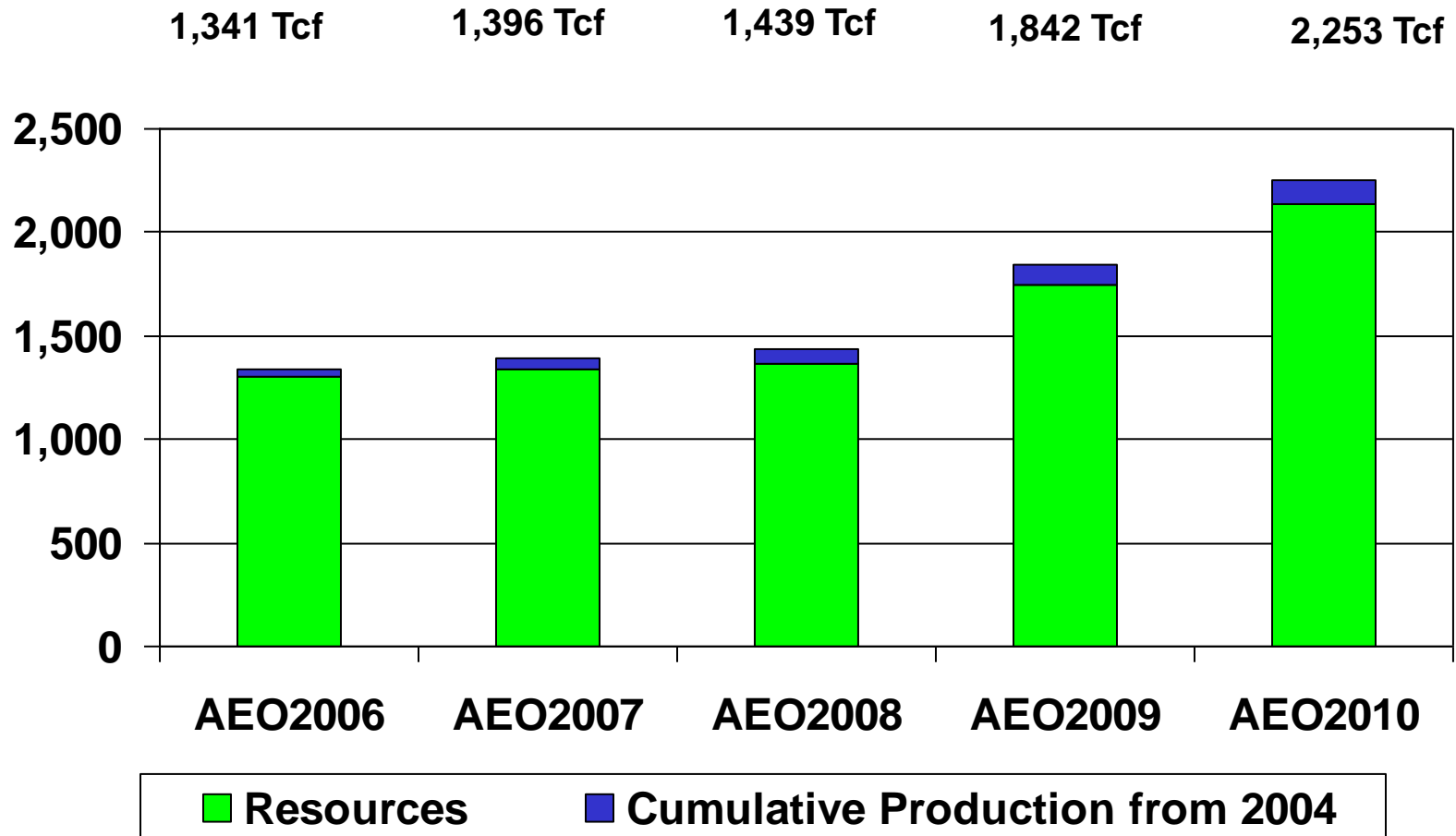
Shale gas and Alaska production offset declines in supply to meet consumption growth and lower import needs



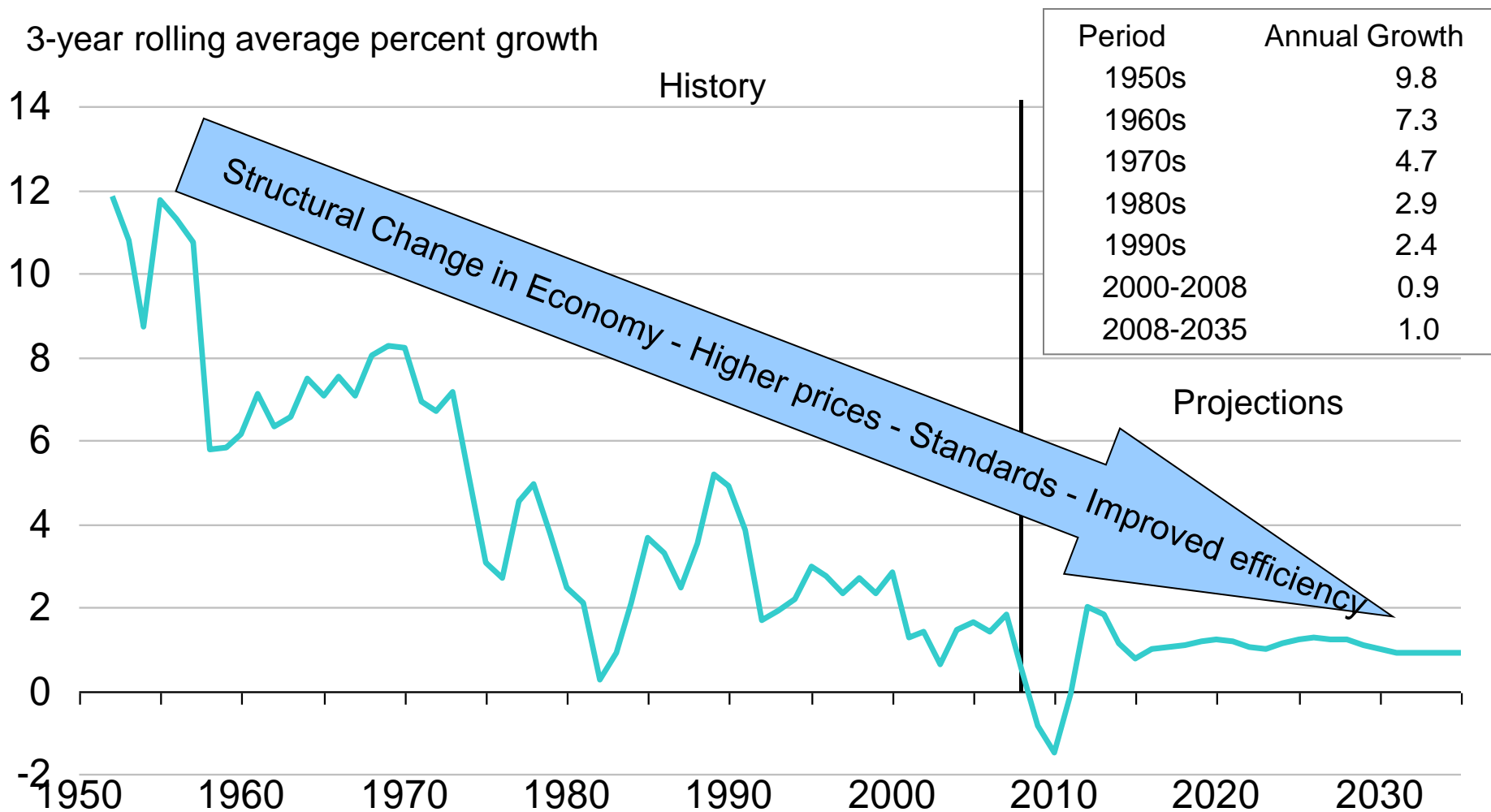
Source: *Annual Energy Outlook 2010*



Annual Energy Outlook Natural Gas Resources And Production (trillion cubic feet)



Growth in electricity use continues to slow

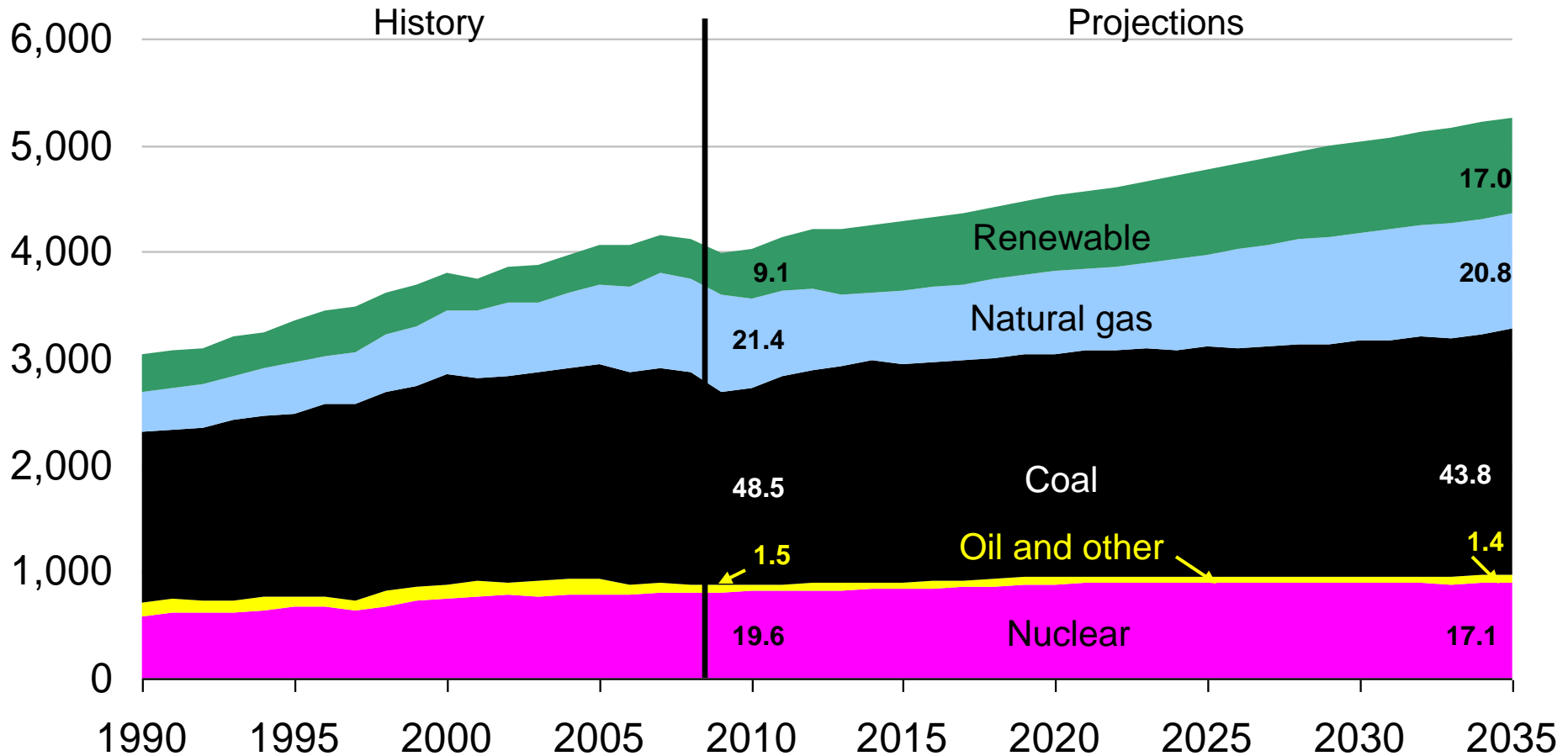


Source: *Annual Energy Outlook 2010*



Renewables gain electricity market share; coal share declines

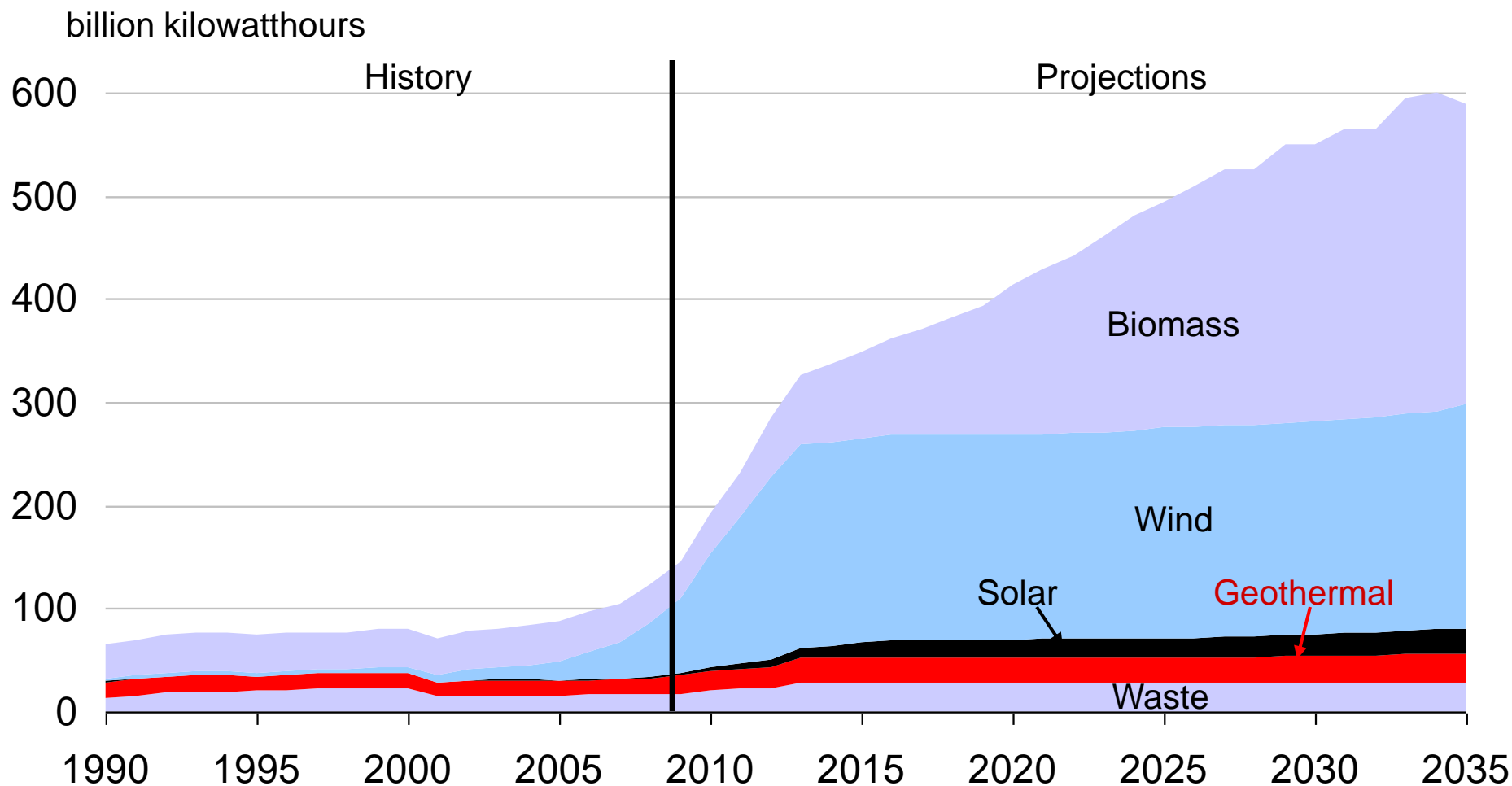
billion kilowatthours and percent shares



Source: Annual Energy Outlook 2010



Nonhydropower renewable sources meet 41% of total electricity generation growth from 2008 to 2035

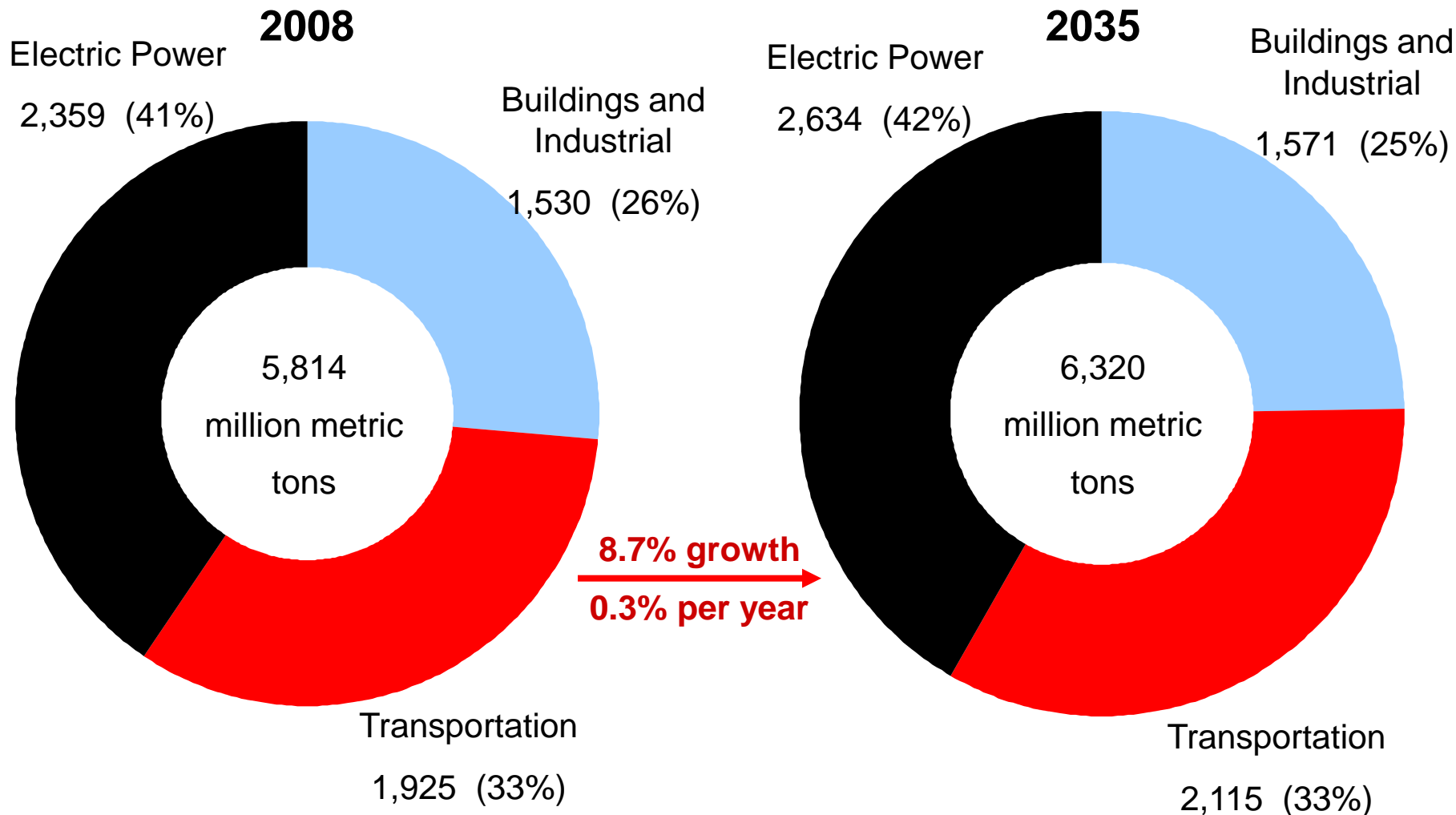


Richard Newell, SAIS, December 14, 2009

Source: *Annual Energy Outlook 2010*

Phyllis Martin, Climate and Energy Imperatives for Future Naval Forces Symposium, March 2010

Assuming no new policies, growth in energy-related CO₂ is driven by electricity and transportation fuel use



Source: Annual Energy Outlook 2010

What if policies change?

Renewable Fuels
Standards

Production Tax Credits

Appliance Efficiency
Standards

Greenhouse Gas Cap and Trade Program

Renewable Portfolio Standards

Investment Tax Credits

Corporate Average Fuel
Economy Standards

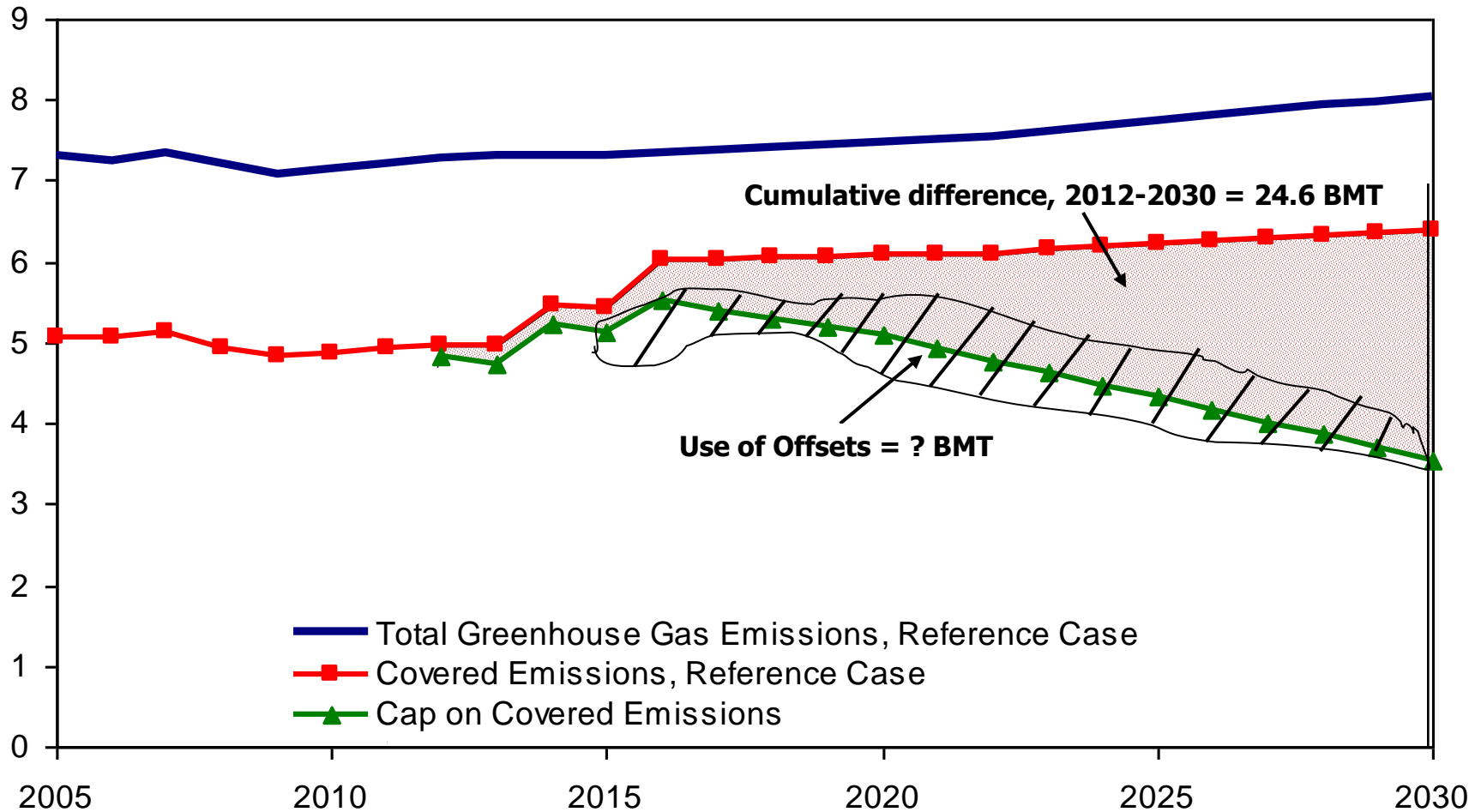


EIA Analysis of HR 2454

The American Clean Energy and Security Act (ACESA)

ACESA requires 24.6- billion-metric-ton reduction in covered GHG emissions over 2012-2030; actual reductions could be smaller or larger depending on the use of offsets and banking behavior

CO₂-equivalent emissions, billion metric tons



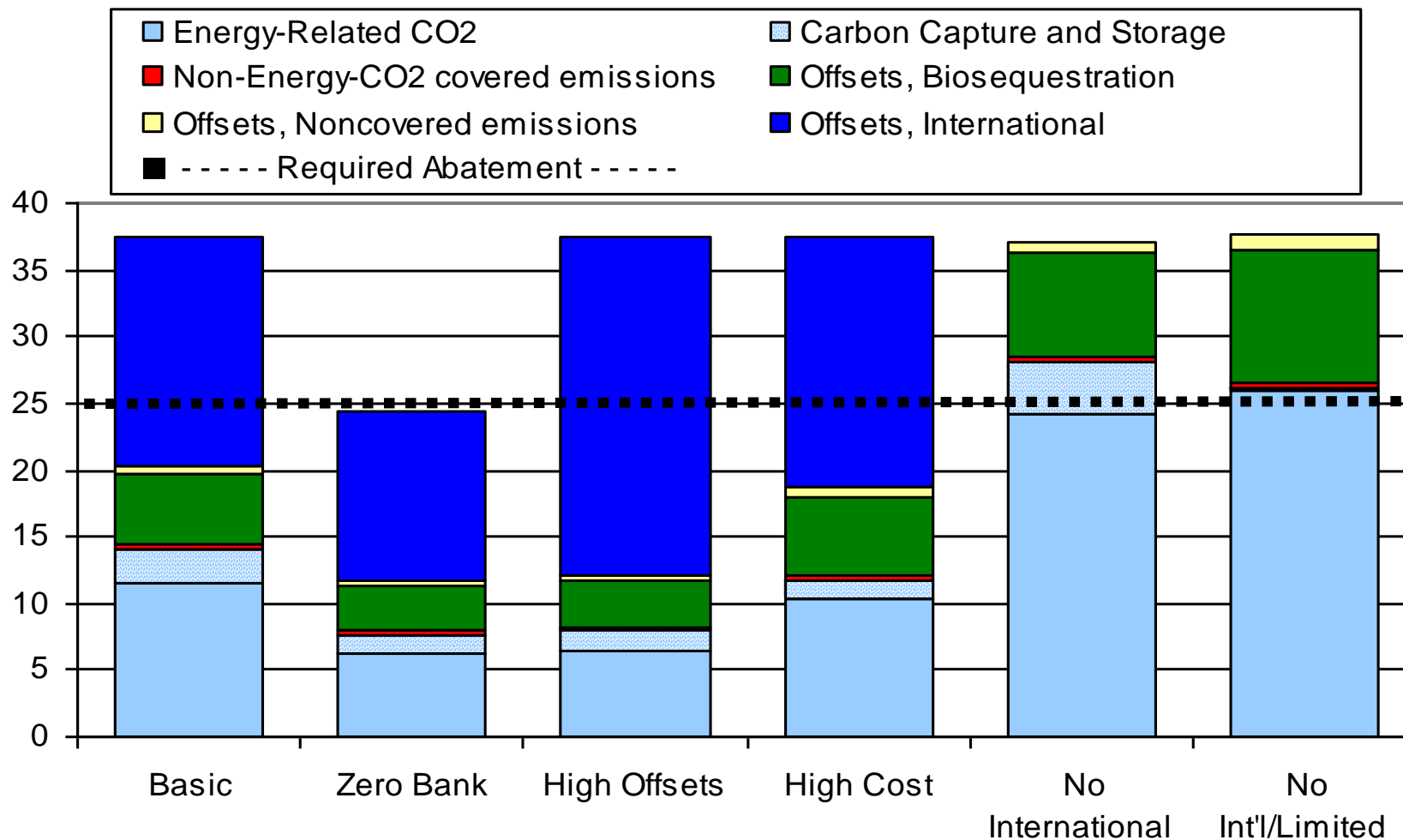
Main cases in EIA's analysis

Case Name	Assumptions
Basic	Integrated analysis of all of the modeled provisions of ACESA.
Zero Bank	Same as Basic but no carryover of allowances beyond 2030. Proxy for major low- no-carbon energy technology breakthroughs with significant market impacts after 2030
High Offsets	Same as Basic but assumes increased use of international offsets.
High Cost	Same as Basic but assumes that nuclear, fossil with CCS and biomass gasification costs are 50 % higher
No International	Same as Basic but assumes international offsets are too expensive or unable to meet the requirements for use
No International / Limited	Same as Basic but limits additions of nuclear, fossil with CCS and biomass to reference case levels. Also no international offsets.

* Additional report cases examine impacts of high technology assumptions, limited supply technology availability, the recent proposal to modify CAFE standards, a lower banking discount rate, and more aggressive banking through 2030.

Energy sector reductions (2 bottom sections) vary with availability of offsets and low-emitting generation options

Cumulative compliance, 2012-2030 (billion metric tons)

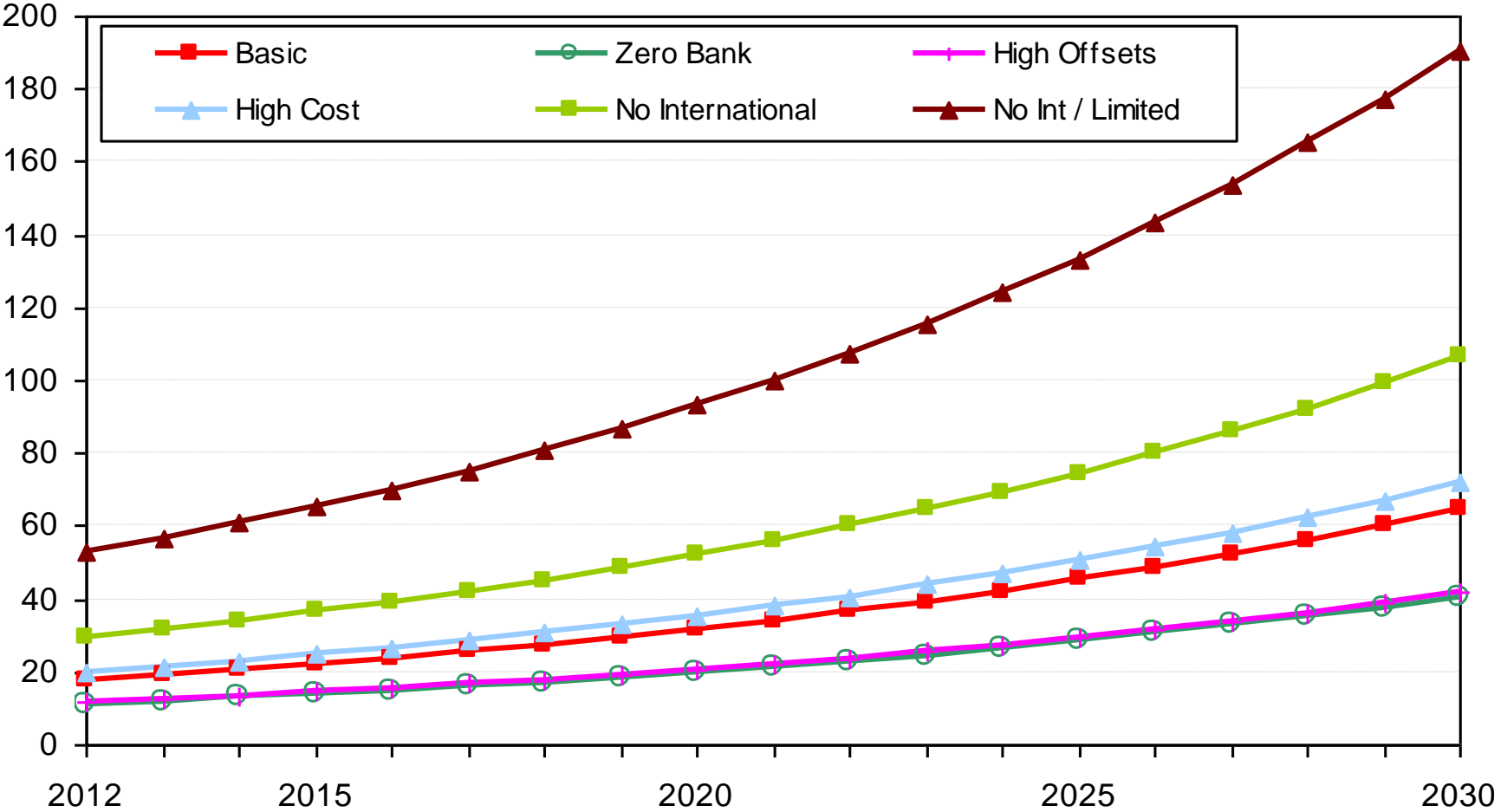


Source: EIA Analysis of the American Clean Energy and Security Act of 2009



Projected allowance prices depend on the availability of offsets and low/no carbon electricity generation technologies

(2007 dollars per metric ton CO₂-equivalent)

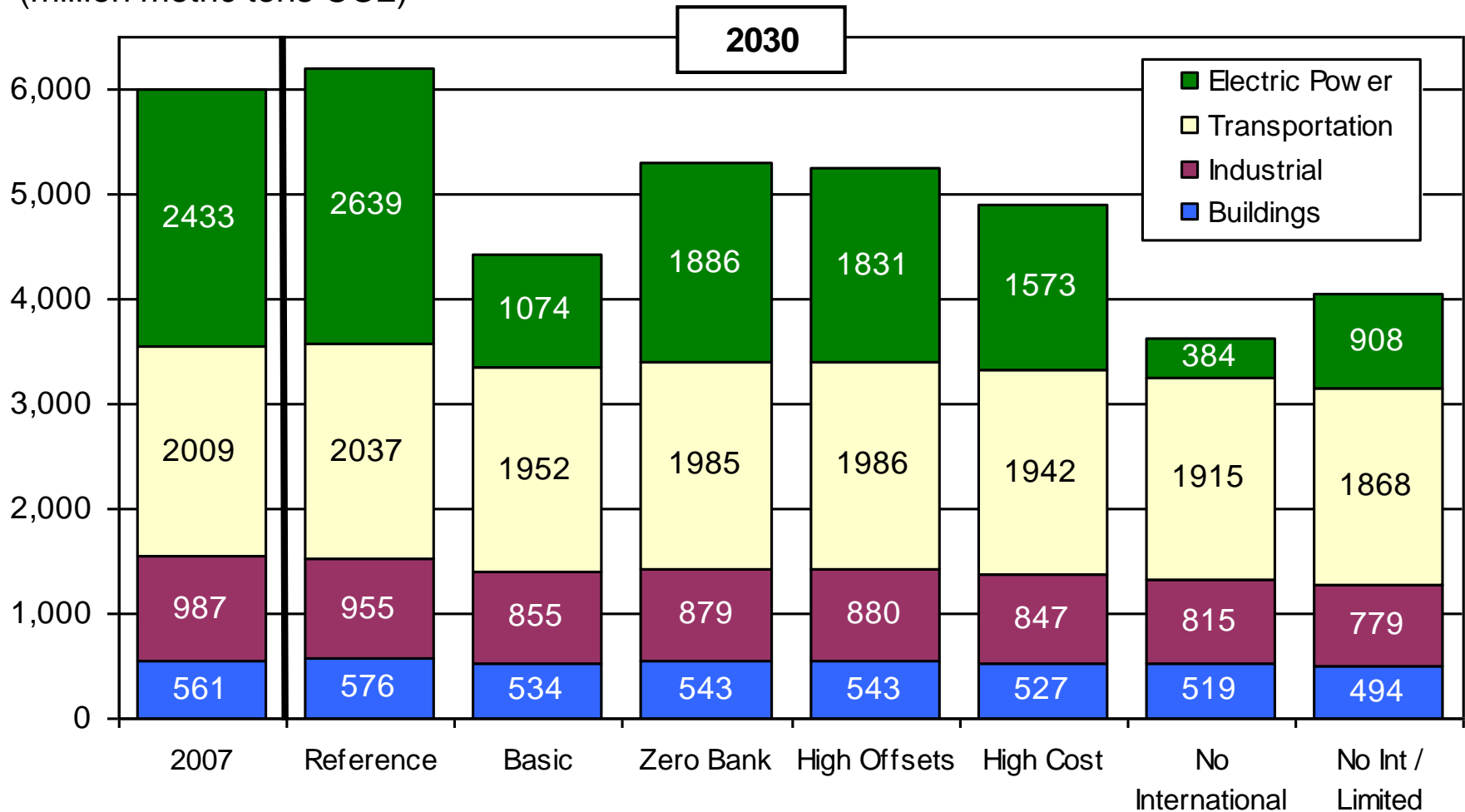


Source: EIA Analysis of the American Clean Energy and Security Act of 2009



The electricity sector dominates projected reductions in energy-related CO₂ emissions

(million metric tons CO₂)

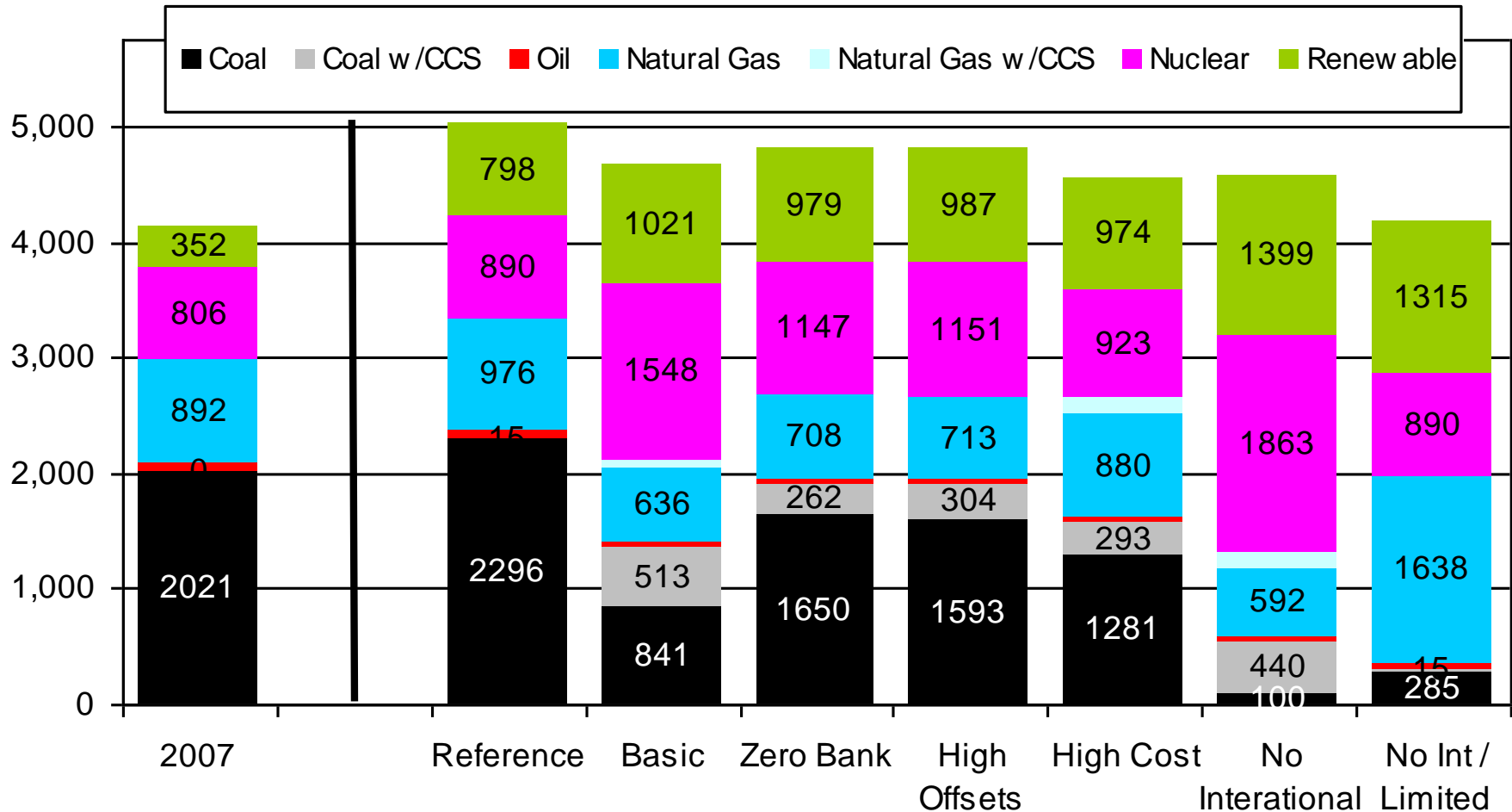


Source: EIA Analysis of the American Clean Energy and Security Act of 2009



Generation by 2030 shifts from conventional coal to nuclear, renewables, and fossil+CCS, though natural gas use grows dramatically if other options are limited

(billion kilowatthours)



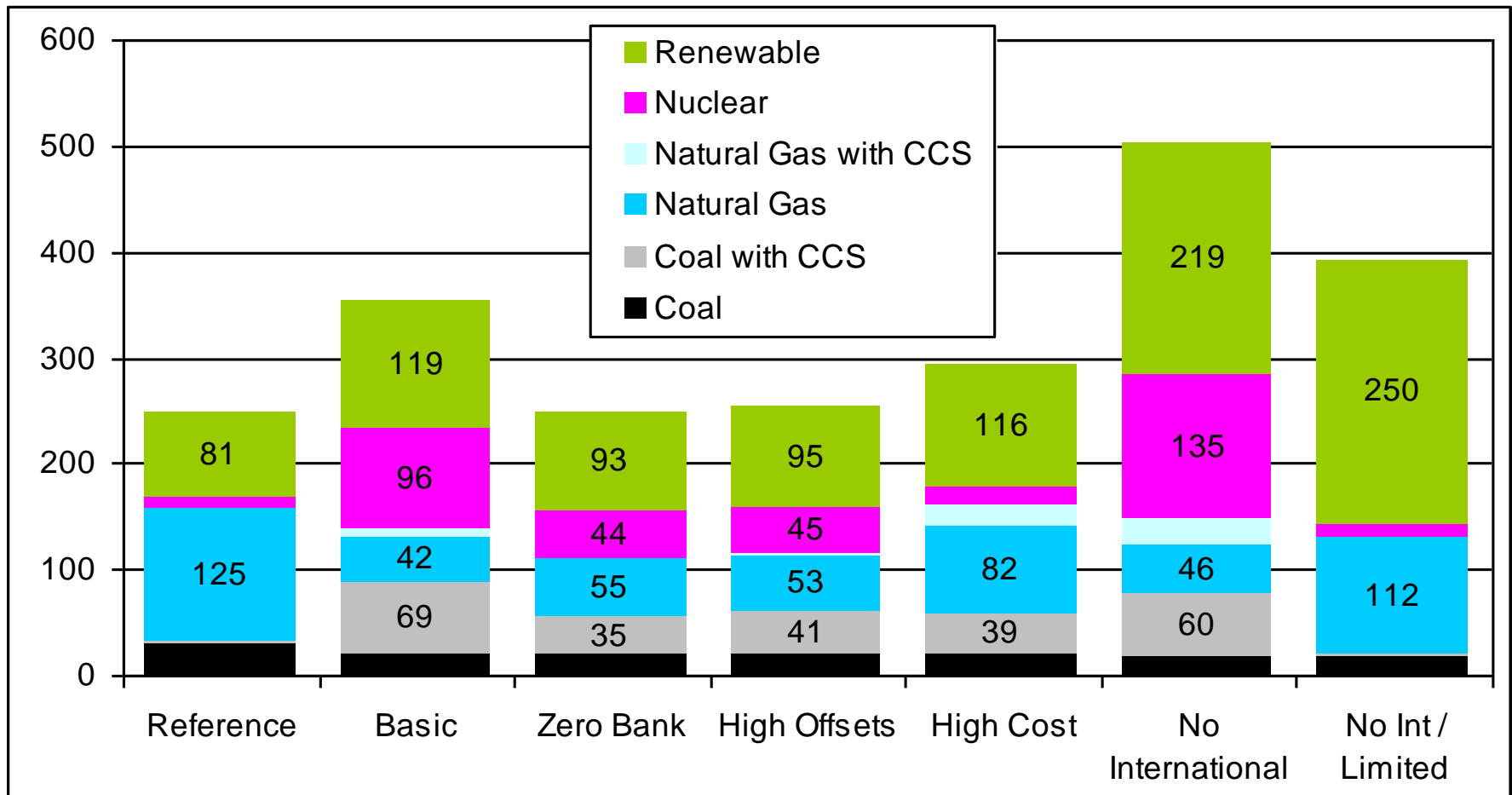
Source: EIA Analysis of the American Clean Energy and Security Act of 2009



Capacity Additions, 2008 to 2030

Generally dominated by mix of nuclear, renewables, and fossil with CCS, though natural gas options are more important if those options are limited

(thousand megawatts)

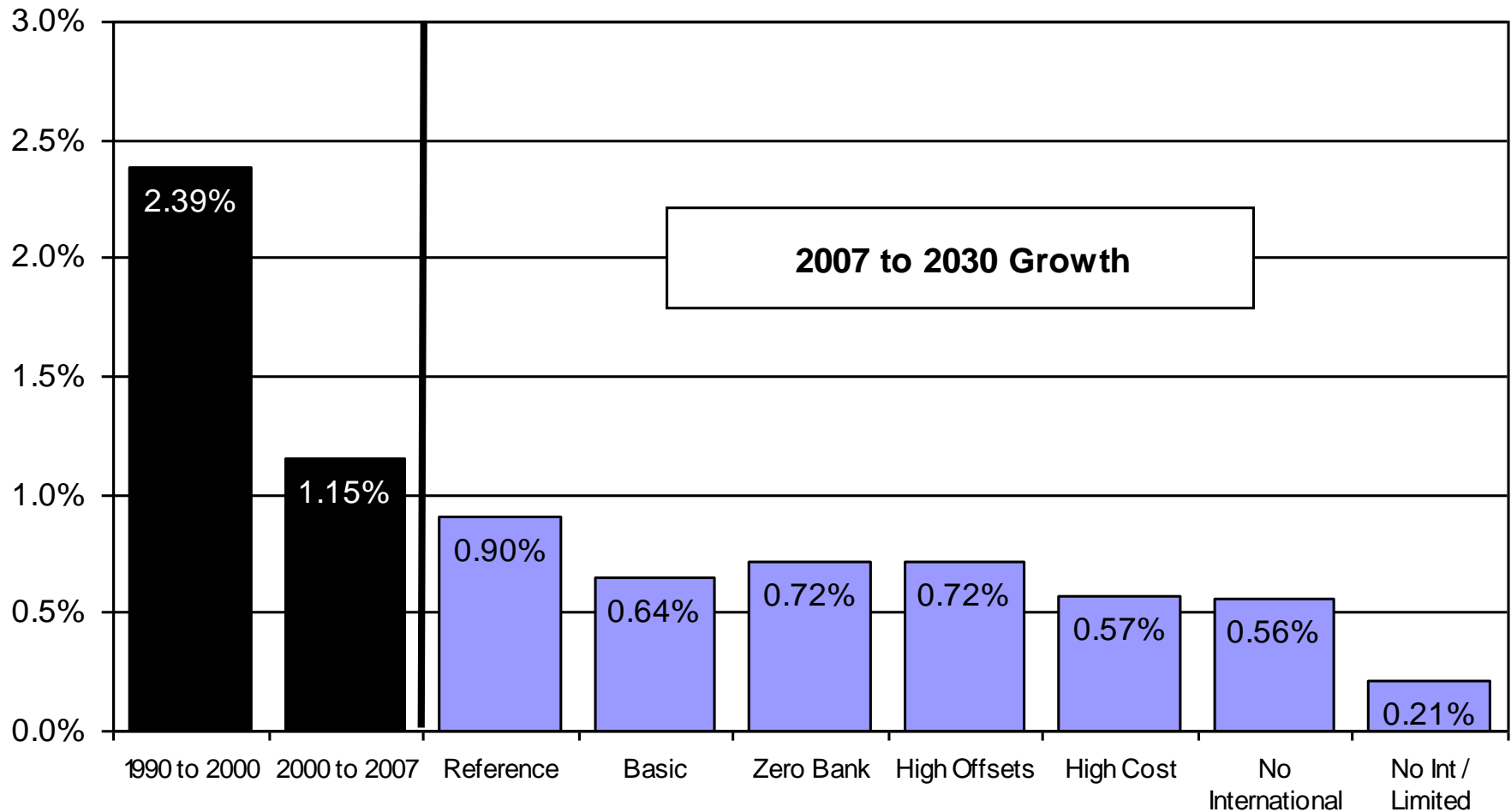


Source: EIA Analysis of the American Clean Energy and Security Act of 2009



Efficiency programs and higher electricity prices reduce electricity demand growth

Annual percent growth in electricity use

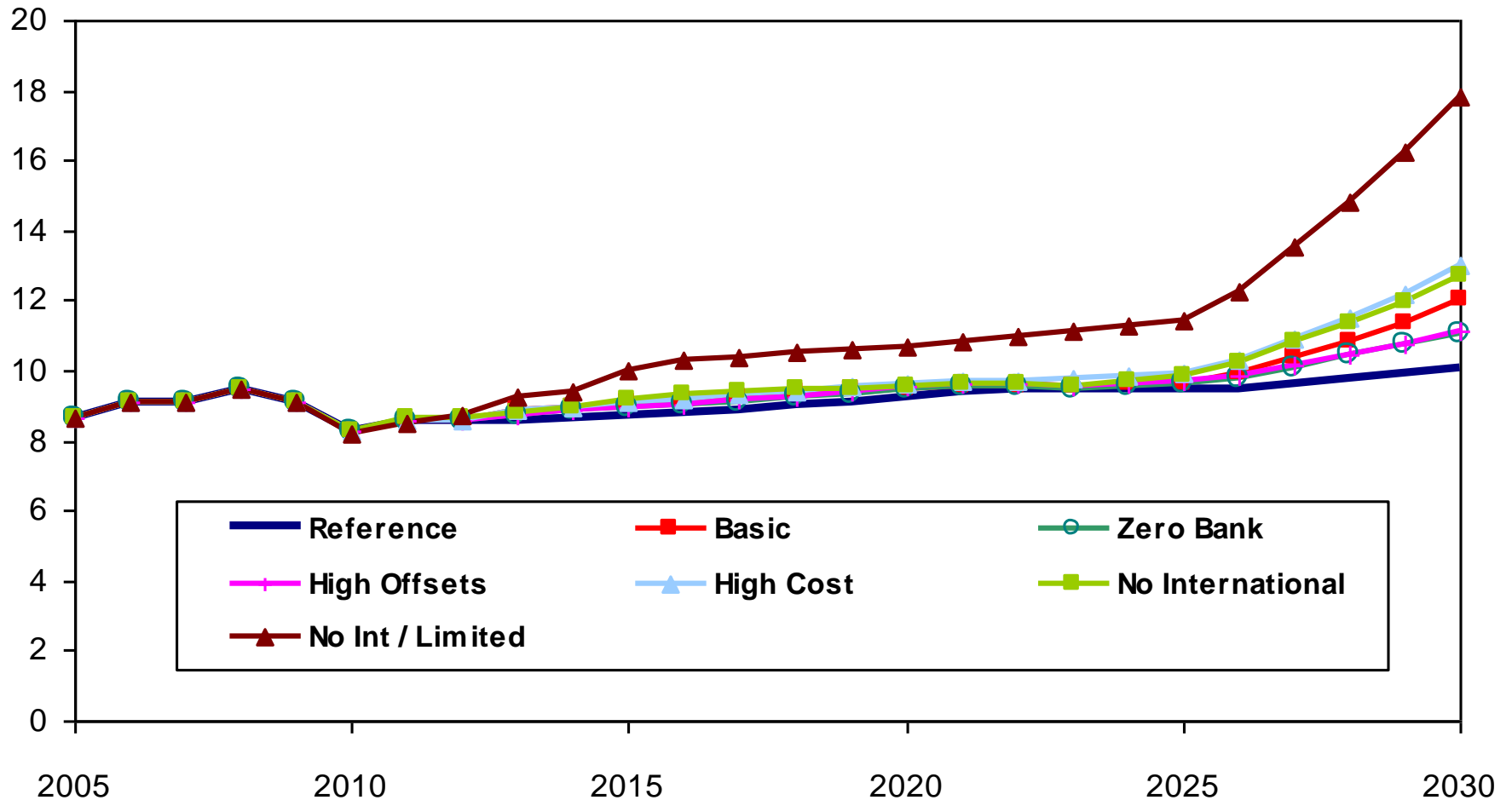


Source: EIA Analysis of the American Clean Energy and Security Act of 2009



Electricity prices stay near baseline through 2025 in all but one case, then rise to higher levels through 2030

(2007 cents per kilowatthour, all sectors average)

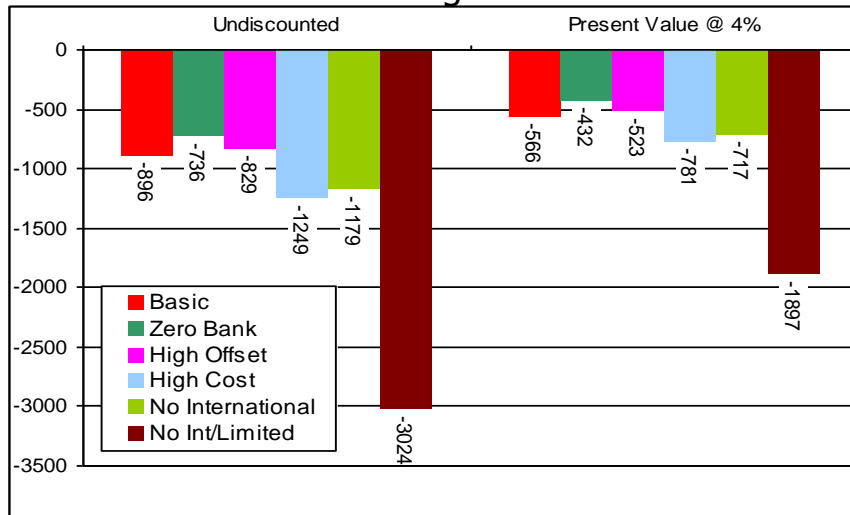


Source: EIA Analysis of the American Clean Energy and Security Act of 2009

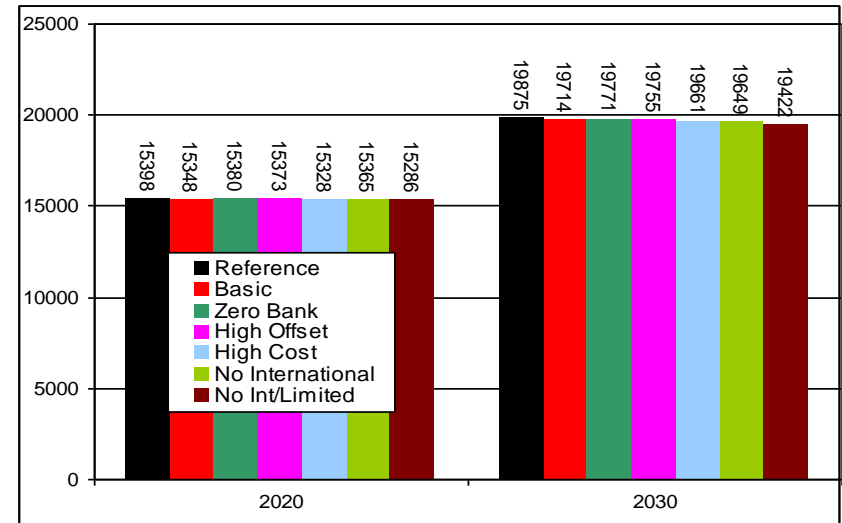


Present-value GDP losses over 2012-2030 range from 0.2% to 0.4%; consumption losses range from 0.1% to 0.3% in 5 analysis cases. Impacts are much higher in the No International/Limited Alternatives case.

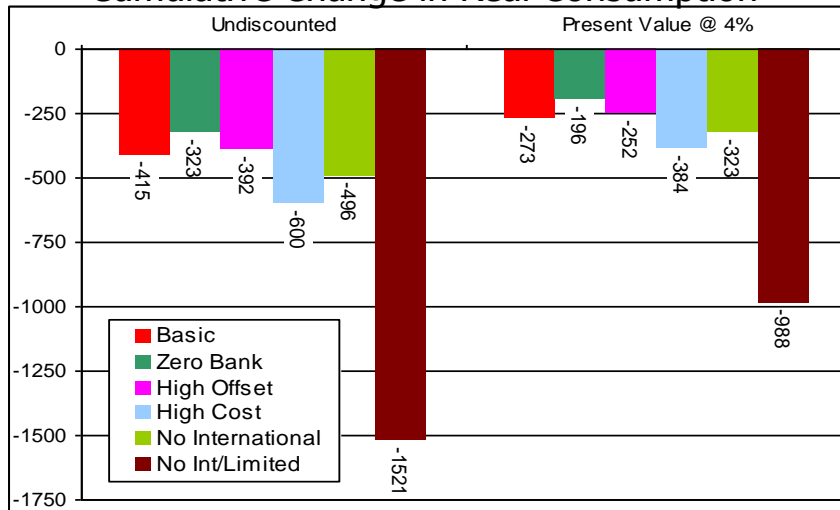
Cumulative Change in Real GDP



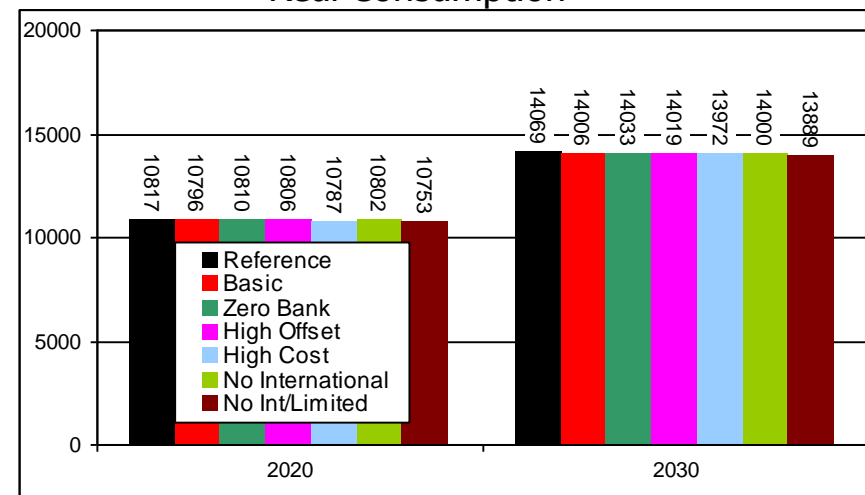
Real GDP



Cumulative Change in Real Consumption



Real Consumption



Source: EIA Analysis of the American Clean Energy and Security Act of 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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