

Outlook for US Coal

**Presentation to Rail Energy Transportation
Advisory Committee of the Surface
Transportation Board at FERC**

December 1, 2009



Energy Information Administration
Official Energy Statistics from the U.S. Government

Energy Information Administration

- Statistical and analytical agency within the Department of Energy
 - www.eia.doe.gov
- Produces monthly short-term and annual long-term forecasts of U.S. and world energy markets
 - Short Term Energy Outlook
 - <http://www.eia.doe.gov/emeu/steo/pub/contents.html>
 - Annual Energy Outlook, 2009
 - <http://www.eia.doe.gov/oiaf/aeo/index.html>
 - International Energy Outlook, 2009
 - <http://www.eia.doe.gov/oiaf/ieo/index.html>
- Produces special analyses of emerging issues and the impacts of regulatory/legislative changes
 - http://www.eia.doe.gov/oiaf/service_rpts.htm
 - <http://www.eia.doe.gov/oiaf/analysis.htm>
- EIA's analyses and projections are independent, by law, and should not be seen as representing the views of the Department of Energy, the Administration, or any other organization.

Changes between Updated AEO2009 w/ ARRA and AEO2008

- Higher capital costs for electricity plants (31-34% higher for coal)
- 3% higher cost of capital for greenhouse gas intensive projects
- Regional Greenhouse Gas Initiative (RGGI) represented
- For renewables: PTC extended, ITC option, and loan guarantees (ARRA provisions)
- 1 gigawatt of coal w/ CCS assumed in 2017 (ARRA)

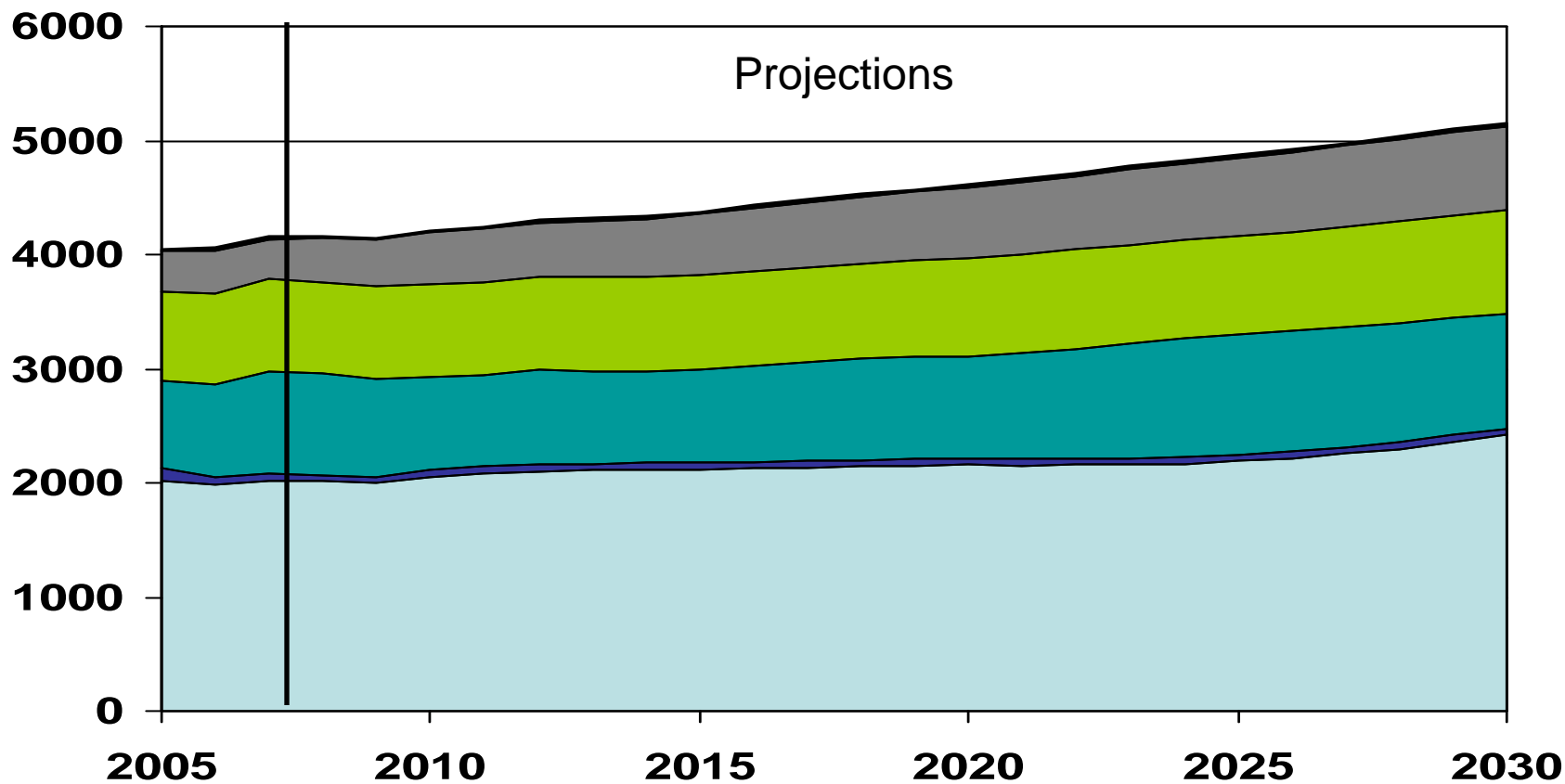
ARRA: American Recovery and Reinvestment Act or “Stimulus” Act

Changing Environmental Rules

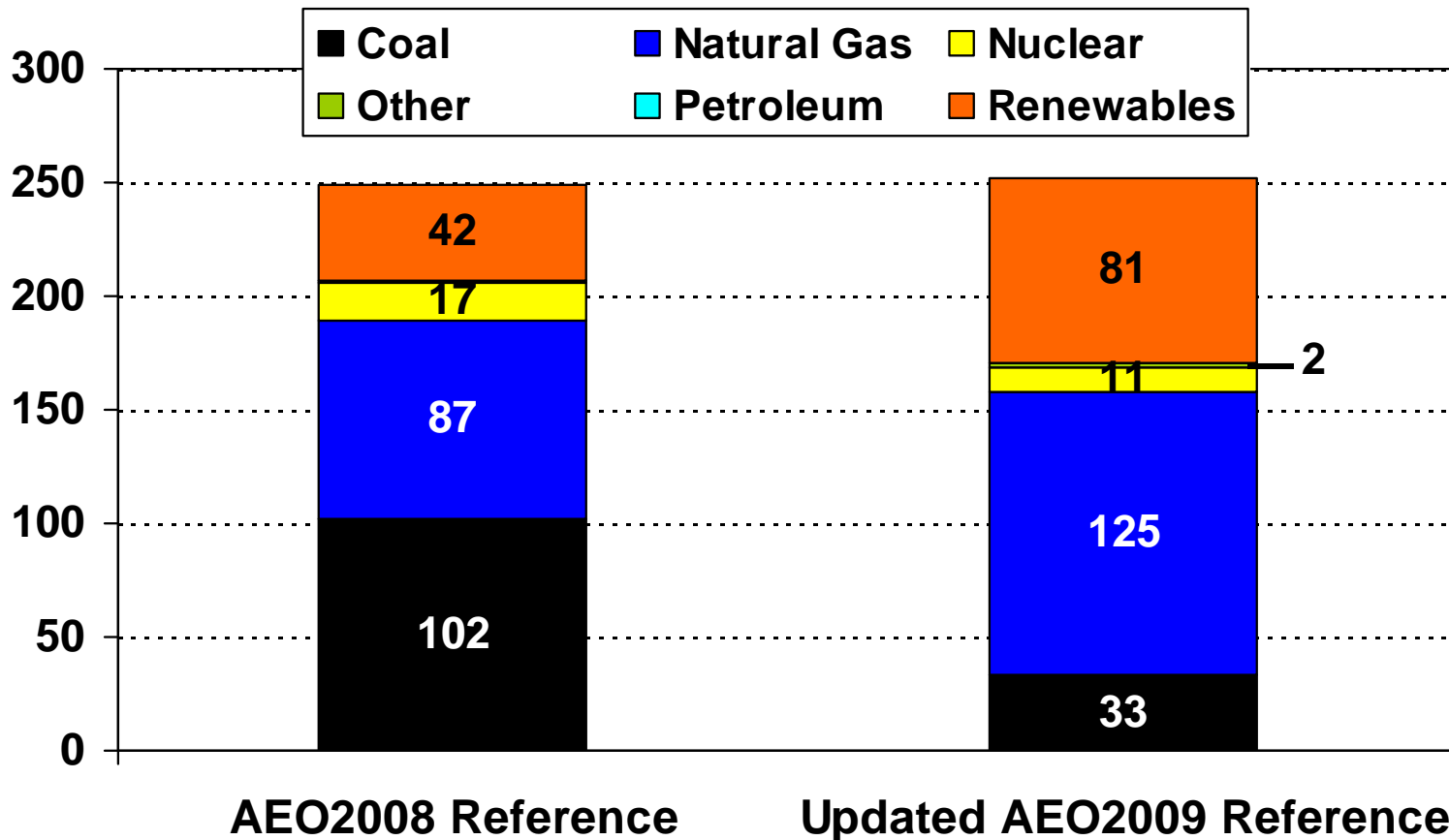
- **Clean Air Mercury Rule (CAMR) vacated on February 8, 2008**
 - Many States are continuing to pursue their own mercury reduction requirements but the situation is still evolving
 - AEO2009 modeled as BACT for these States (in AEO2008 was modeled as a cap-and-trade)
 - EPA is developing a new mercury control policy
- **Clean Air Interstate Rule (CAIR) (NO_x and SO₂) vacated on July 11, 2008**
 - Most States were counting on CAIR requirements to allow them to comply with the revised National Ambient Air Quality Standards (NAAQS) for ground level ozone and particulates
 - Temporarily reinstated on December 23, 2008
 - Modeled for Updated AEO2009 (w/ ARRA)

Reference Case Generation by Fuel

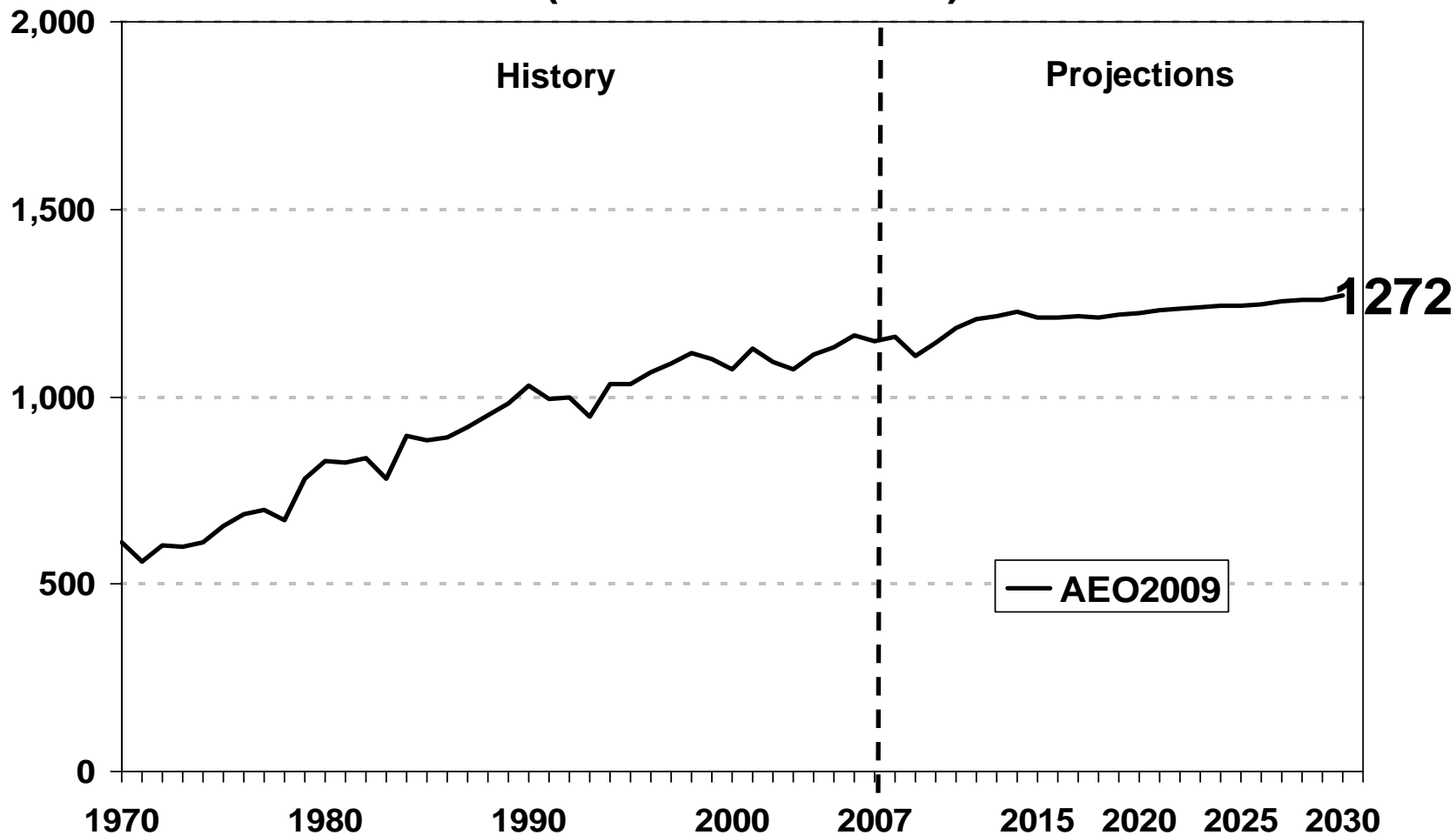
(billion kilowatthours)



Cumulative Electric Generating Capacity Additions, 2008-2030 (gigawatts)

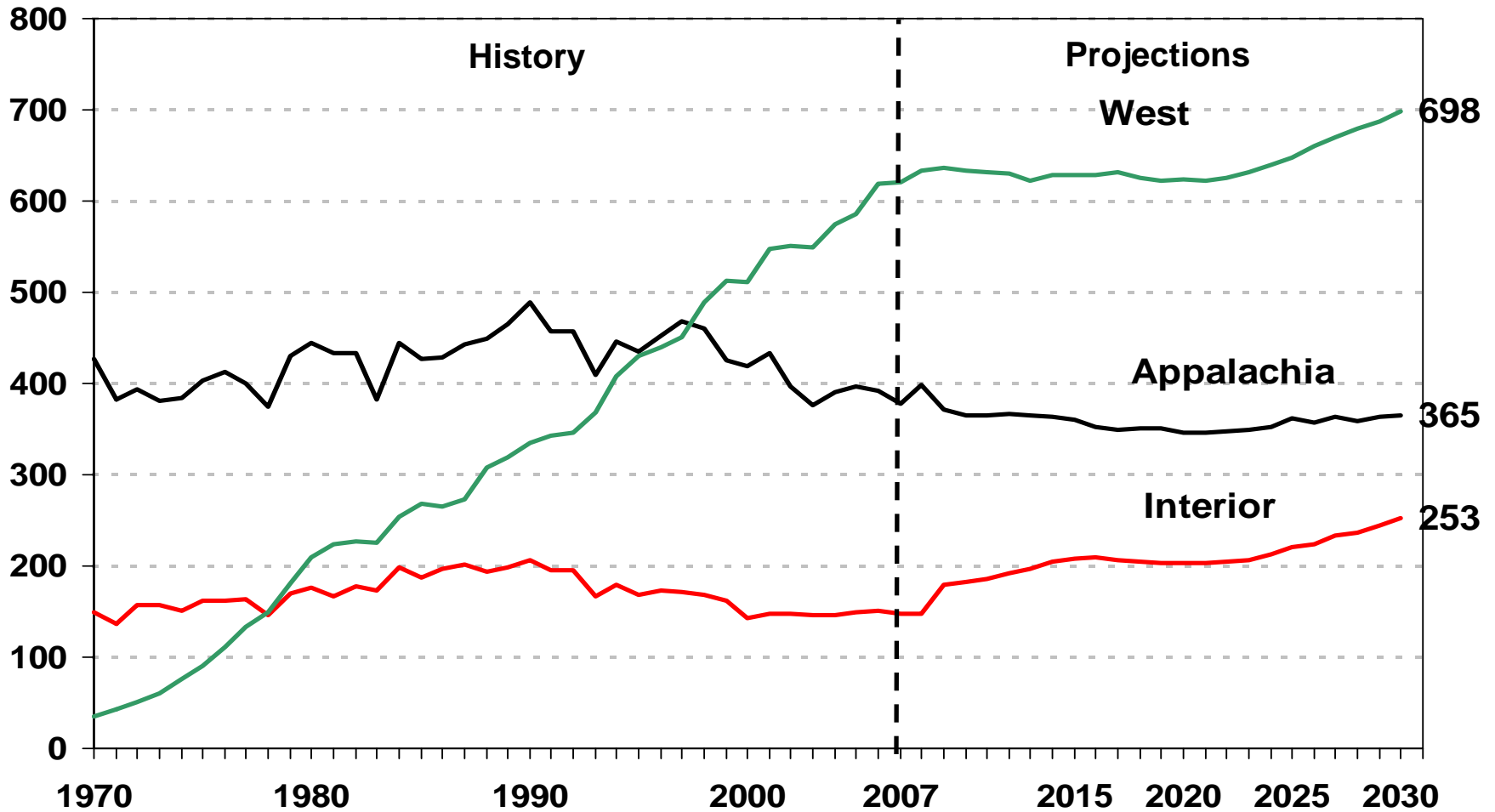


Total Coal Production, 1970-2030 (million short tons)

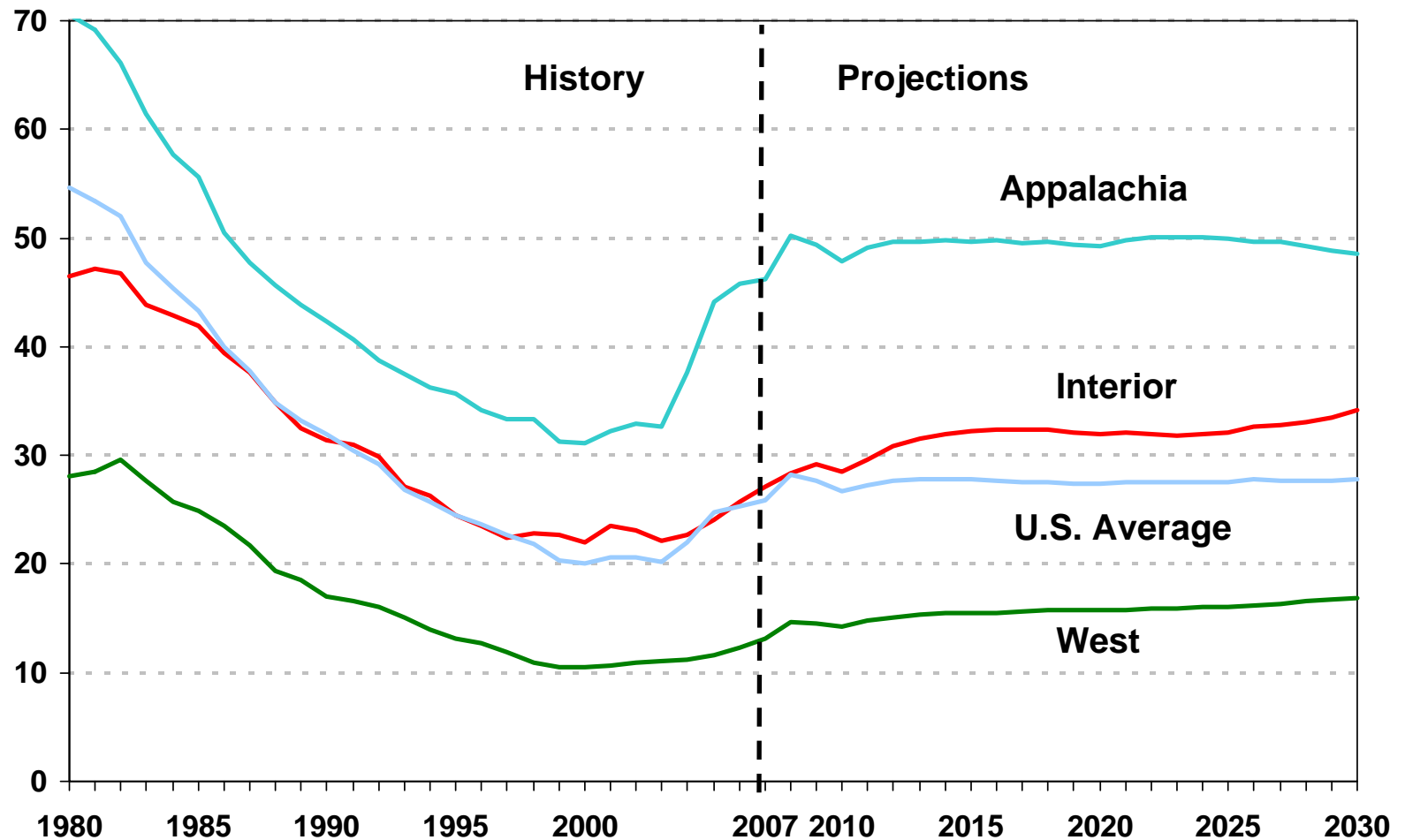


Source: Updated AEO2009 w/ ARRA (April 2009)

Regional Coal Production, 1970-2030 (million short tons)

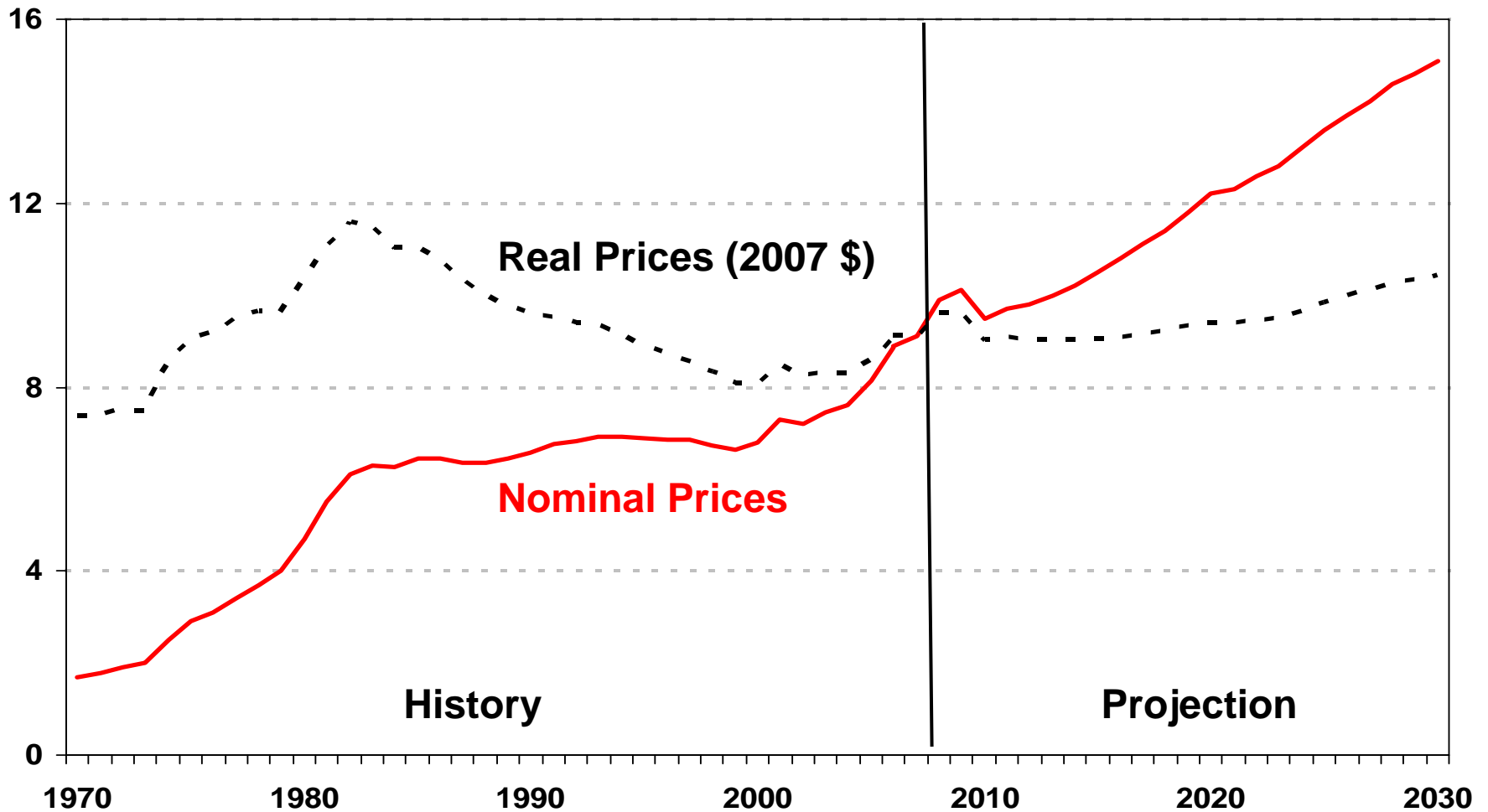


Average Minemouth Price of Coal by Region, 1980-2030 (2007 dollars per short ton)



Reference Case Electricity Prices

(cents per kilowatthour)



**Analysis of the
Waxman-Markey
American Clean Energy and Security
Act of 2009**

Key Provisions of ACESA

Represented:

- Cap-and-trade for GHGs (excluding hydrofluorocarbons (HFCs))
- Combined efficiency and renewable electricity standard (CERES) for electricity sellers,
- CCS demonstration and early deployment program
- Residential and Commercial Federal building code revisions
- Lighting and other appliances efficiency standards
- Technology improvements driven by the Centers for Energy and Environmental Knowledge and Outreach
- Smart grid peak savings program
- Domestic and international offset use

Not Represented:

- Clean Energy Deployment Administration
- Strategic allowance reserve
- Separate cap-and-trade program for HFCs
- GHG performance standards for activities not subject to the cap-and-trade program
- Distribution of allowances to coal merchant plants
- New efficiency standards for transportation equipment
- Effects of increased investment in energy research and development

Main Analysis Cases

Case Name	Assumptions
Reference	<i>Updated AEO2009 Reference Case, which includes the provisions of the American Recovery and Reinvestment Act.</i>
Policy Cases	
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 of 11, 2, and 6 thousand megawatts, respectively. Also no international offsets.

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

Targets

Reductions relative to 2005 levels

2012 (3%)

Electricity generators

Liquid fuel refiners and importers

Fluorinated gas manufacturers

2014

Industrial sources that emit greater than 25,000 tons of CO₂-equivalent emissions

2016

Retail natural gas distribution manufacturers

2020 (17%)

2030 (42%)

2050 (83%) *

*EIA's analysis only extends through 2030.

Who gets allowances?

- Electricity and natural gas distribution utilities, low-income consumers, State efficiency programs, rebate programs, energy-intensive industries, and other specified purposes

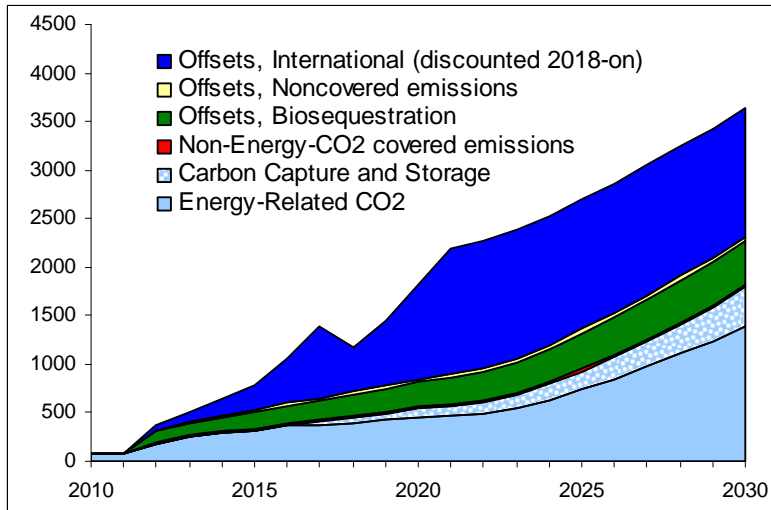
Key Findings

- Coal use declines
- Consumer energy bills higher and household consumption lower – mainly after 2025
- GDP lower – mainly after 2025
- Most energy-related CO2 emission reductions occur in electricity sector
- Coal use without CCS is displaced by low- and no-emissions technologies including nuclear, renewables and fossil plants with CCS
- Generally, the availability of offsets or low/no carbon technologies significantly moderates costs.
- Consumers reduce energy demand.
- Combined Efficiency and Renewable Energy Standard (CERES) is exceeded.
- Output-based allocation of allowances to energy-intensive industries provides more than enough resources to offset their higher energy costs over the 2014 to 2028 period. As a result, these sectors do not experience disproportionate adverse economic impacts relative to other industries.

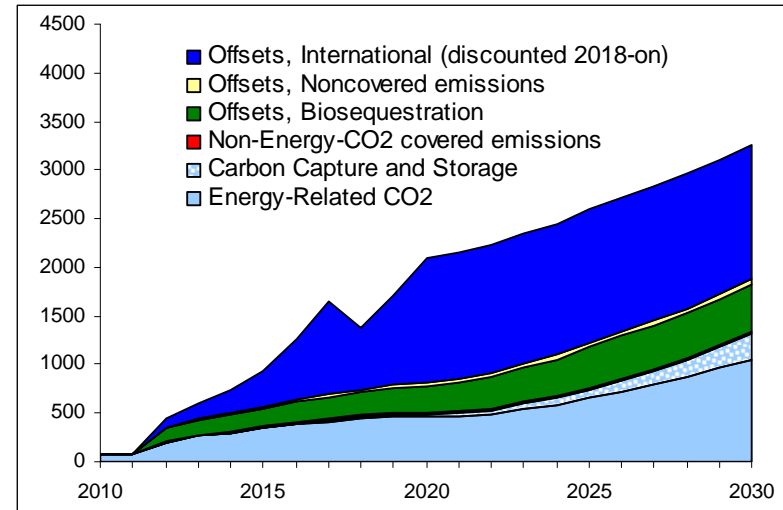
Compliance Sources by Year

Energy Sector Contribution (2 bottom blue wedges) Varies With Availability of Offsets and Low-Emitting Generating Technologies

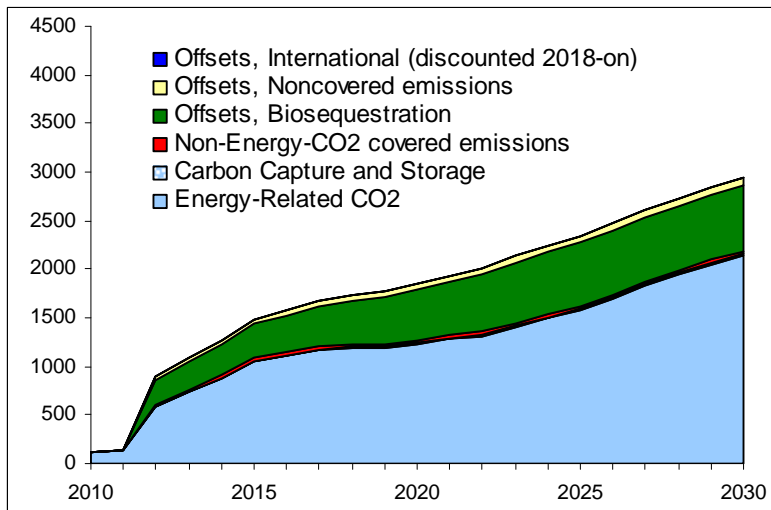
Basic



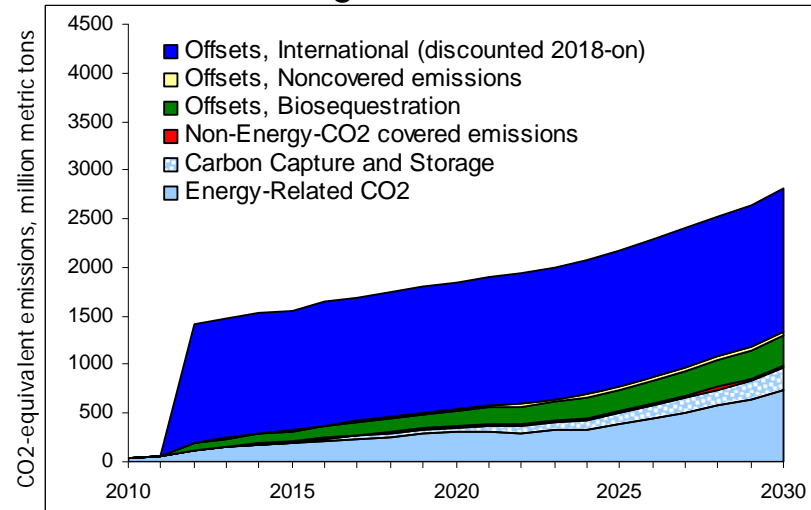
High Cost



No International/Limited



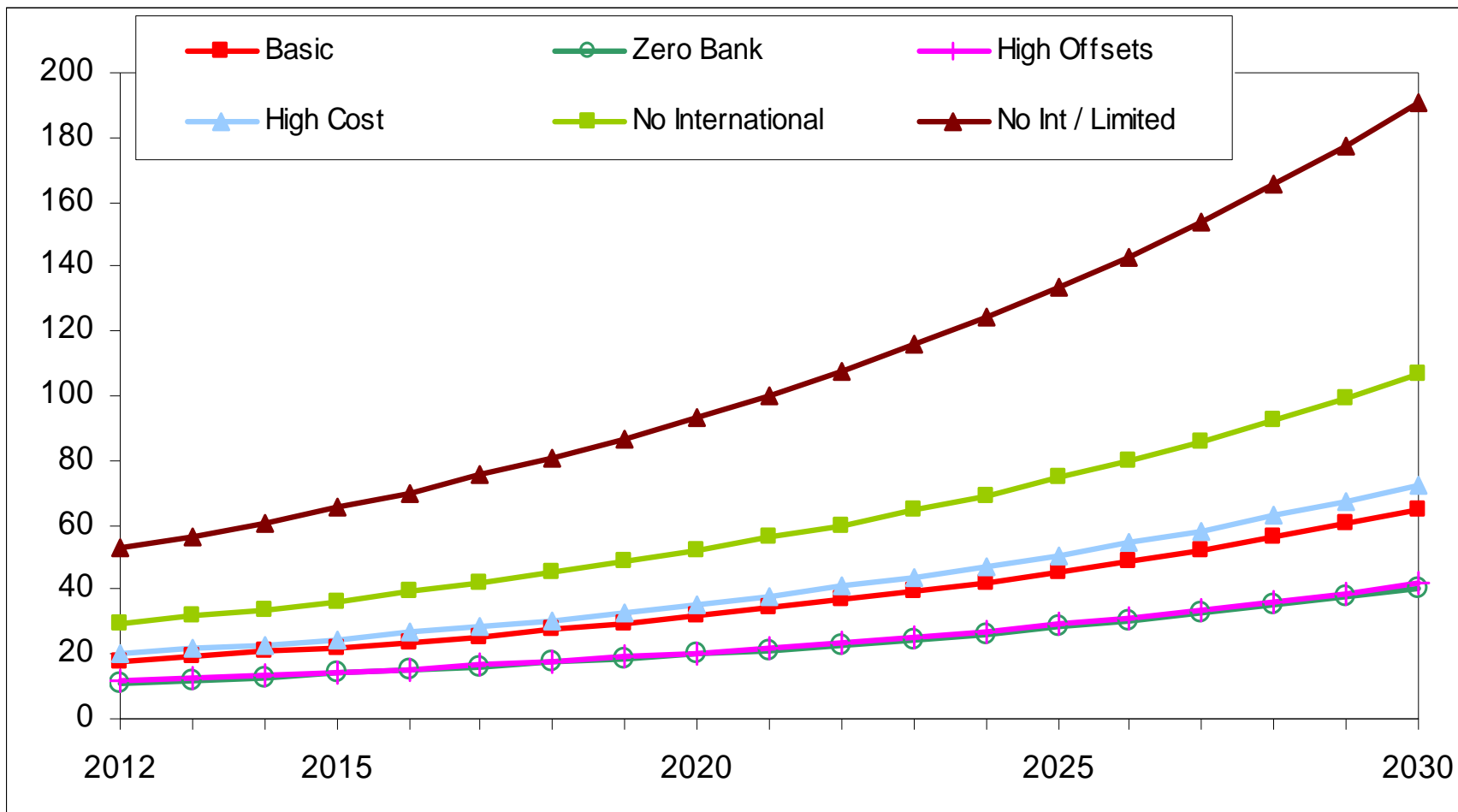
High Offsets



Projected Allowance Prices

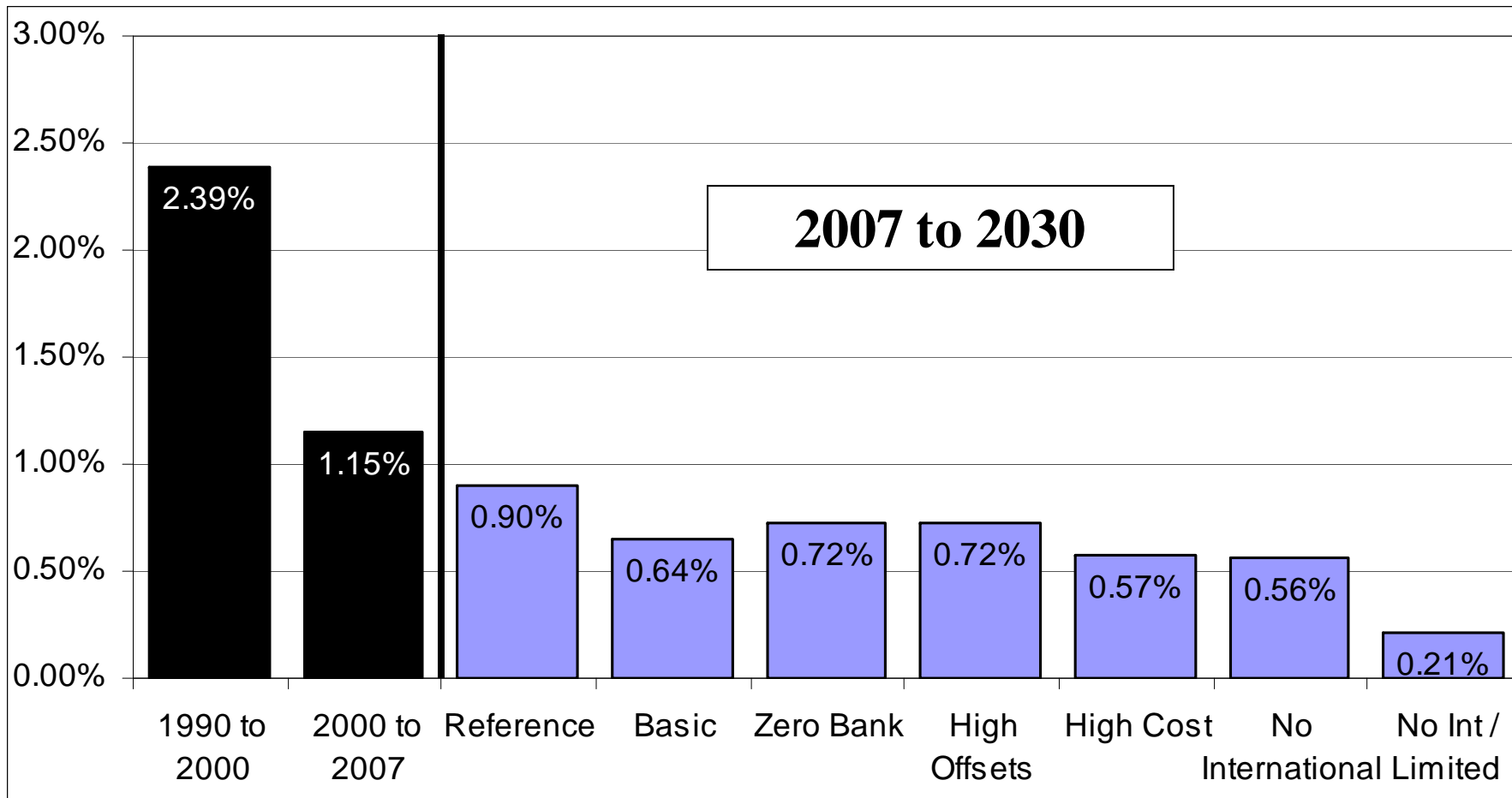
Depend on the availability of offsets and low- and no- carbon electricity generation technologies

(2007 dollars per metric ton CO₂-equivalent)



Annual Percent Growth in Electricity Use

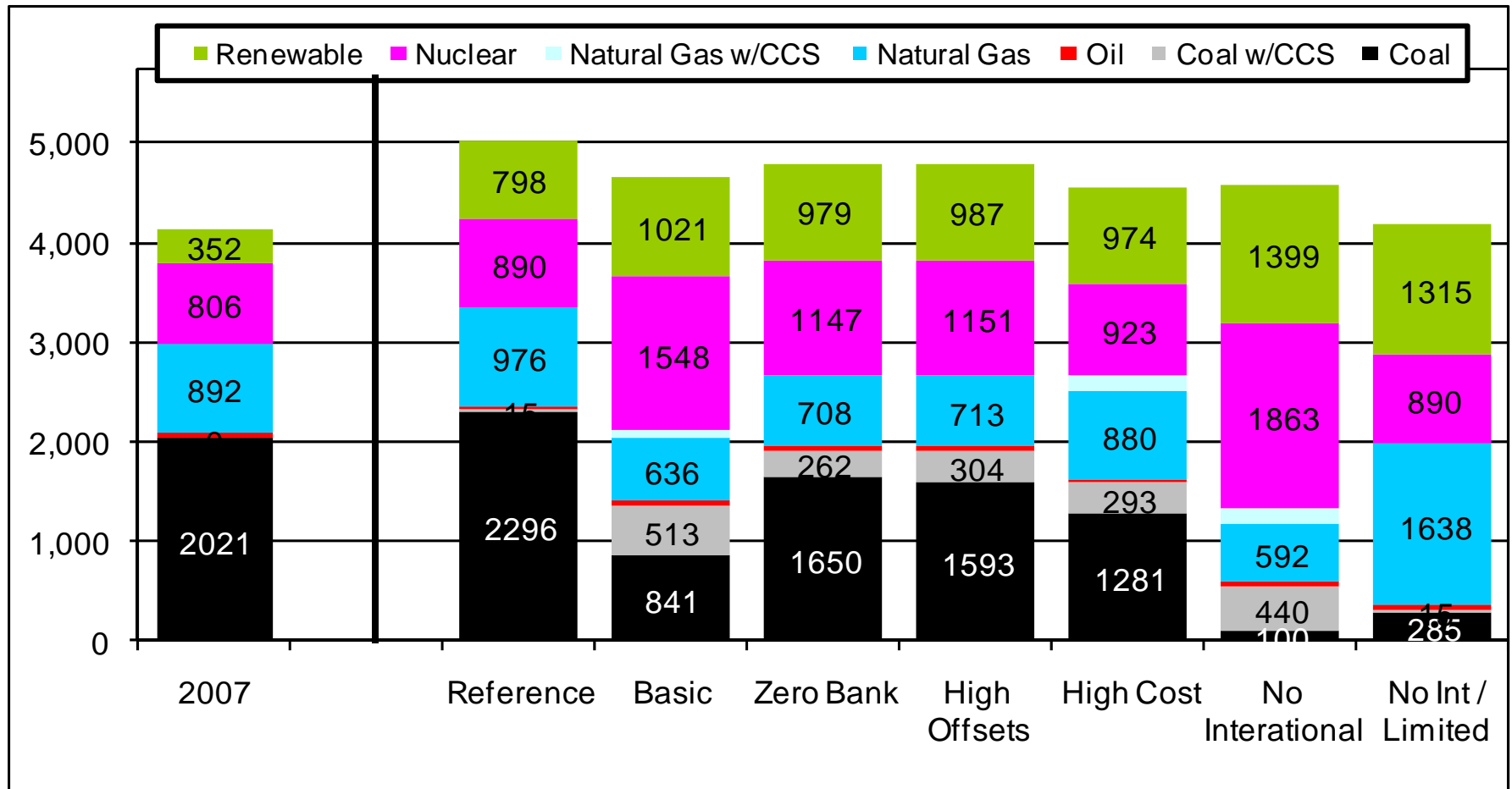
Efficiency programs and higher electricity prices slow electricity demand growth



2030 Generation by Fuel

Generally shifts from coal with CCS to nuclear, renewables, and fossil with CCS, though natural gas use grows if the use of those options are limited

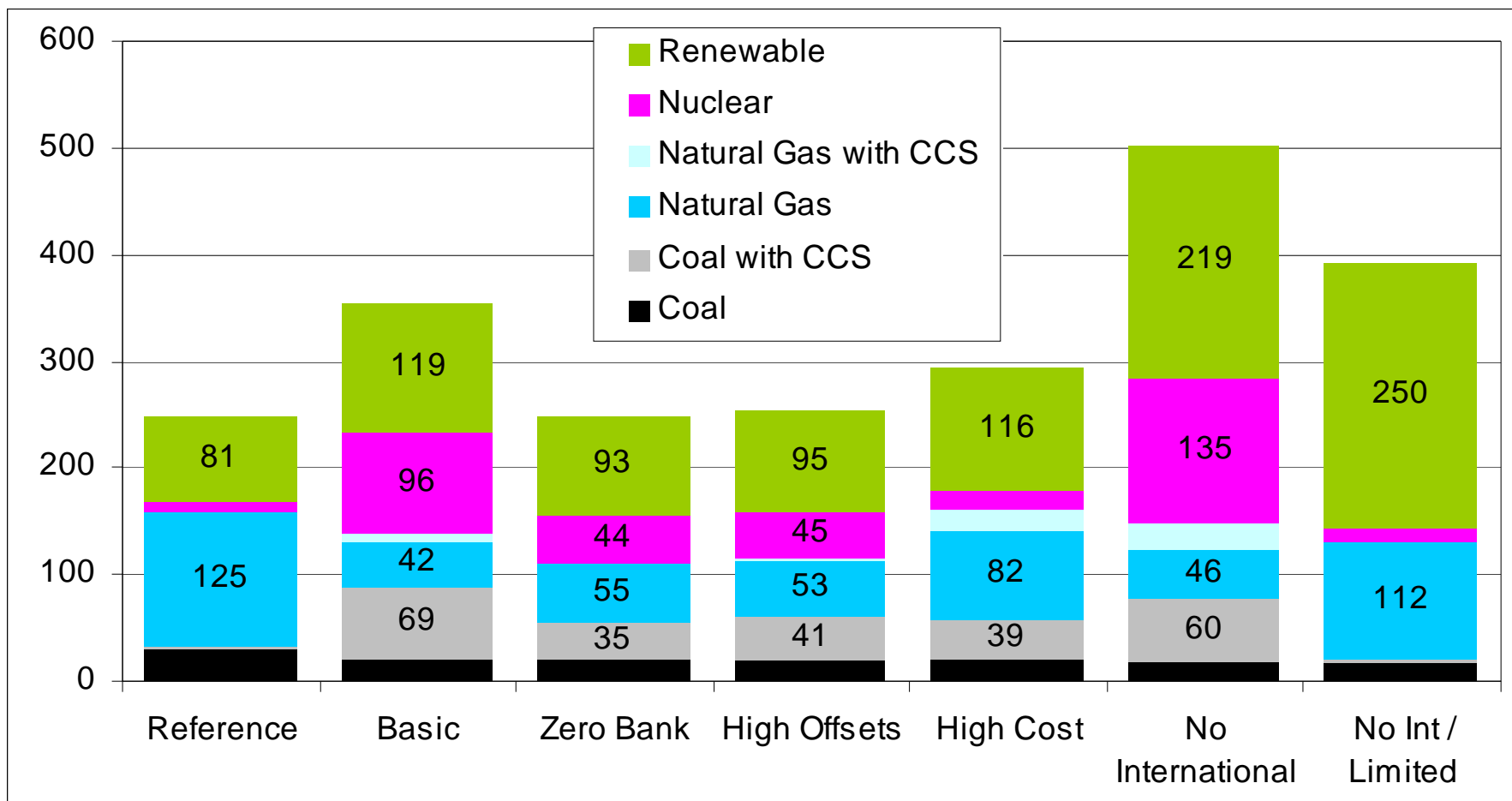
(billion kilowatthours)



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

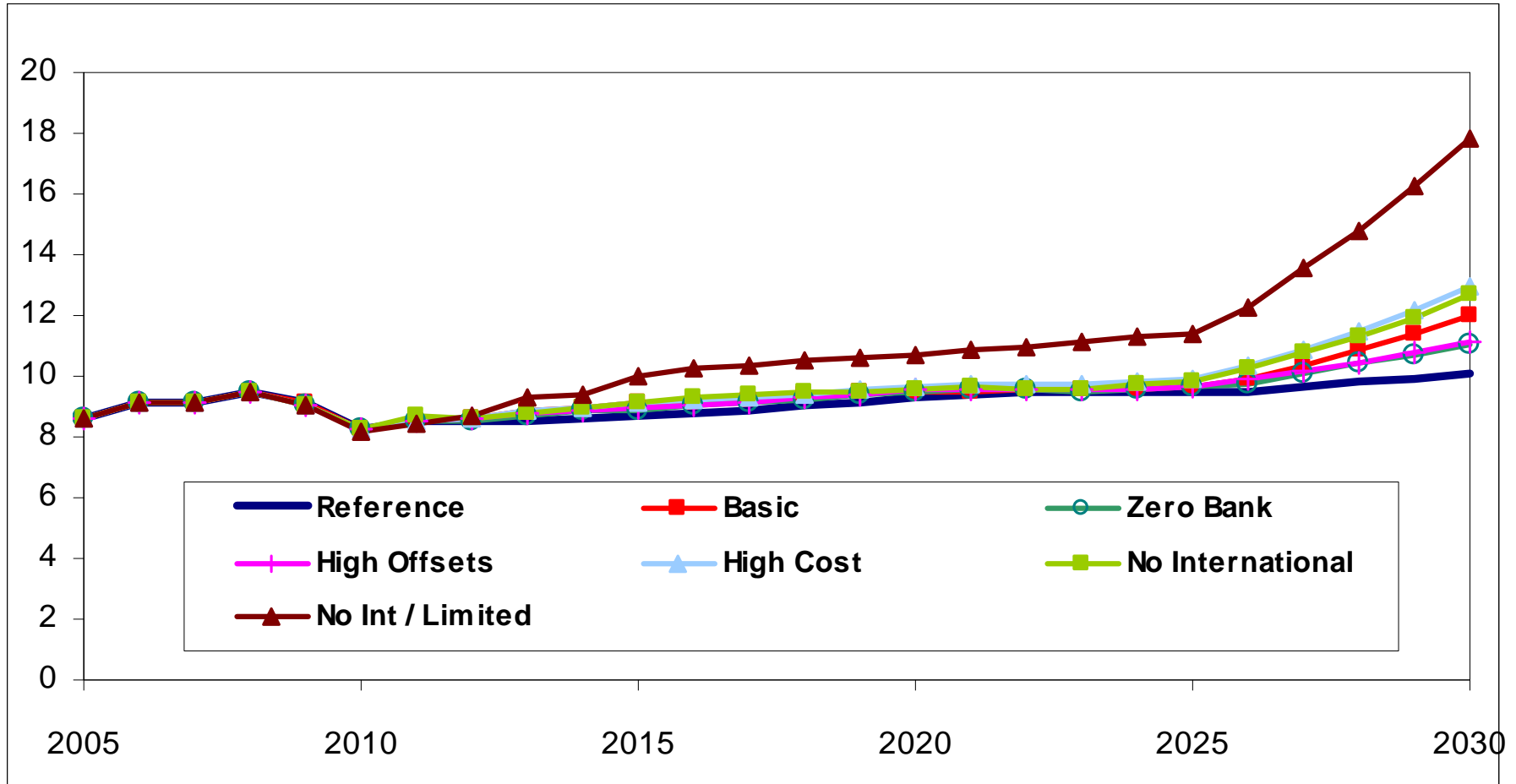
(thousand megawatts)



Electricity Prices

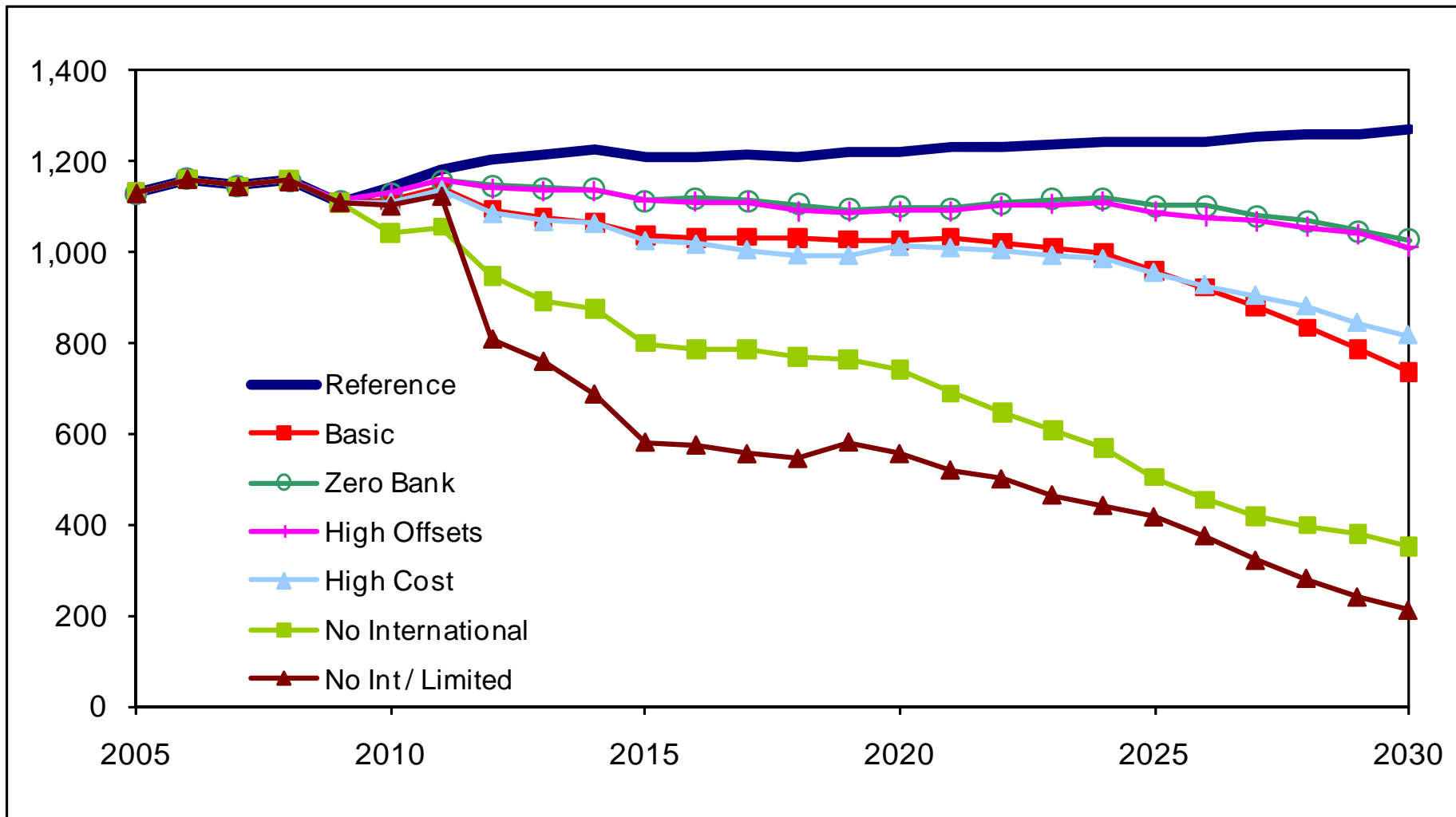
Stay near Reference Case level through 2025 in all but one case, then rise to higher levels through 2030

(2007 cents per kilowatthour, all sectors average)



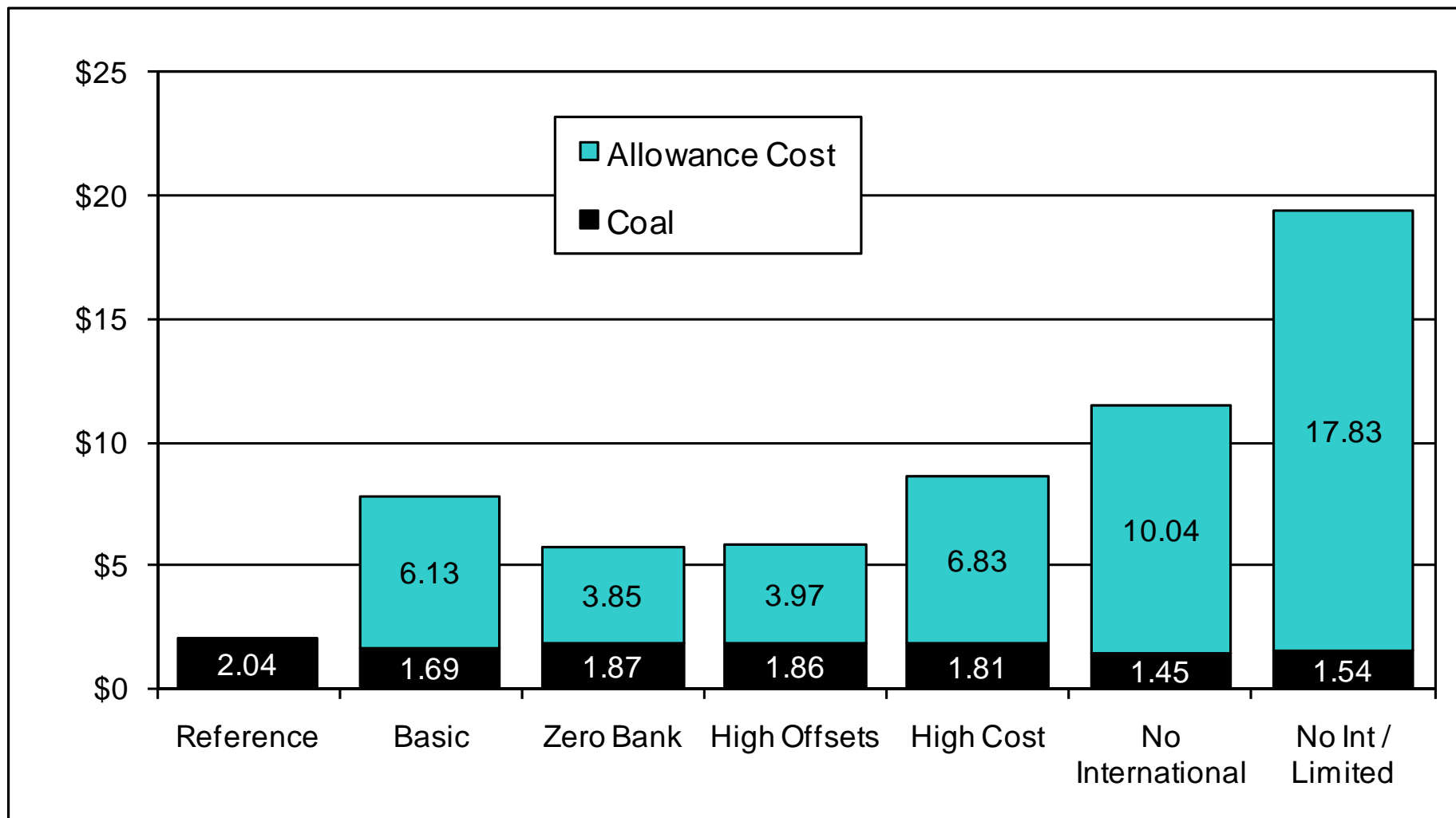
Coal Production

(million tons)



2030 Coal Prices to Generators

(2007 dollars per million Btu)



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