WORKING GROUP PRESENTATION FOR DISCUSSION PURPOSES
DO NOT QUOTE OR CITE AS RESULTS ARE SUBJECT TO CHANGE

Annual Energy Outlook 2013: Electricity Working Group Meeting 2 October 11, 2012

Electricity Working Group

Office of Electricity, Coal, Nuclear, and Renewables Analysis

Office of Energy Analysis

Key changes from AEO 2012

- Projection extended to 2040
- Representation of Clean Air Interstate Rule (CAIR) after U.S. Court of Appeals vacated Cross-State Air Pollution Rule (CSAPR)
- Continued to coordinate with Survey Team and Statistics Group to:
  - Update representation of planned capacity additions
  - Update representation of plant retirements
- Refined representation of the Mercury and Air Toxic Standards (MATS) to include oil steam units

AEO 2013 Relevant Assumptions

- MATS compliance (either retrofits or retirements) begins in 2016 (assuming a one-year reprieve)
- 30 states and the District of Columbia have enforceable Renewable Portfolio Standards (RPS)
- Wind production tax credits (PTC) expire at the end of 2012
- Solar investment tax credit (ITC) reverts from 30% to a permanent 10% ITC in 2016
- All other renewable technology tax credits expire at the end of 2013

AEO 2013 Nuclear Power Assumptions

- Assume Vogtle, VC Summer, & Watts Bar are completed
  - Vogtle Units 3 & 4 (2016 & 2017 online) and Summer Units 2 & 3 (2017 & 2018 online) each have COL's
  - Watts Bar reports an online date of 2015
- Same handling of retirements and uprates as AEO 2012
  - Assume 7.7GW of uprates, including the 1.2 GW reported to EIA
  - Assume 7.1GW of retirements, including the 2019 retirement of Oyster Creek
- No assumed additional retirements after 2035
  - Plants that reach their 60th year of operation during this time period completed construction after the Three Mile Island incident (i.e. many safety-related retrofits have already been completed)

SAIC Infrastructure Capital Cost of New Technologies

	Overnight Capital Cost (2012$/kW)		
	AEO 2012	New SAIC	% Change
Coal			
Advanced PC w/o CCS	$2,941	$2,934	0%
Advanced PC CCS	$4734	$4727	0%
IGCC w/o CCS	$3,330	$3,784	14%
IGCC CCS	$5,531	$6,599	19%
Natural Gas			
Conventional NGCC	$1,031	$917	-11%
Advanced NGCC	$1,037	$1,023	-1%
Advanced NGCC with CCS	$2,131	$2,095	-2%
Conventional CT	$1,007	$973	-3%
Advanced CT	$689	$676	-2%
Nuclear			
Nuclear	$5,518	$5,525	0%
Renewables			
Biomass	$3,991	$4,114	3%
MSW - Landfill Gas	$8,515	$8,312	-2%
Wind	$2,520	$2,214	-12%
Wind Offshore	$6,179	$6,230	1%
Solar Thermal	$4,852	$5,067	4%
Photovoltaic	$4,918	$3,873	-21%

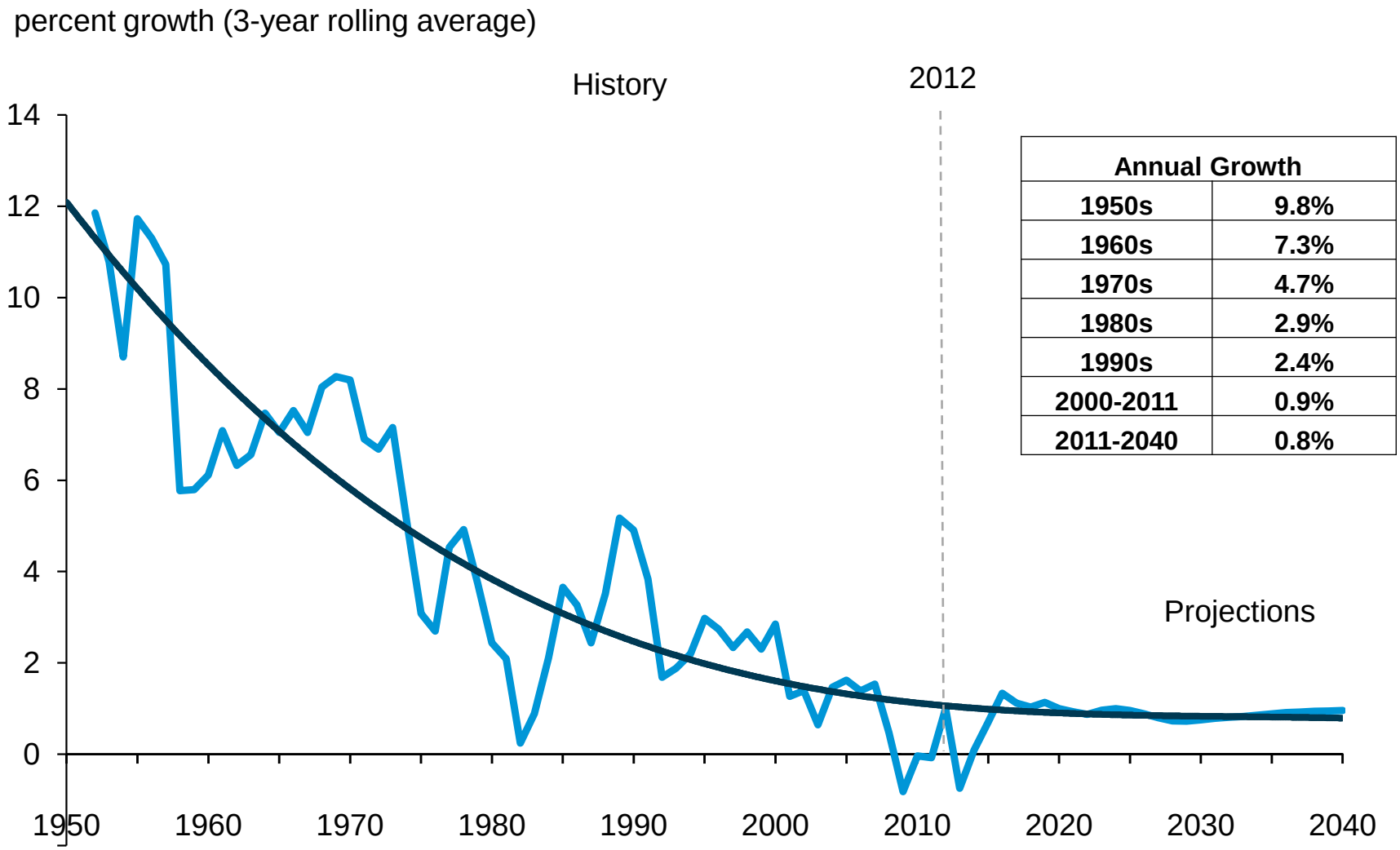
Preliminary Run Results

based on runs of 10/04/2012

Summary Results

- Demand slightly lower throughout the forecast, although the trend is the same
- Higher coal prices than AEO 2012, while natural gas prices are slightly lower
- Overall coal plant retirements roughly the same (more reported retirements)
- Increasing use of natural gas for electric generation
- Capacity additions continue to be dominated by natural gas and renewable technologies

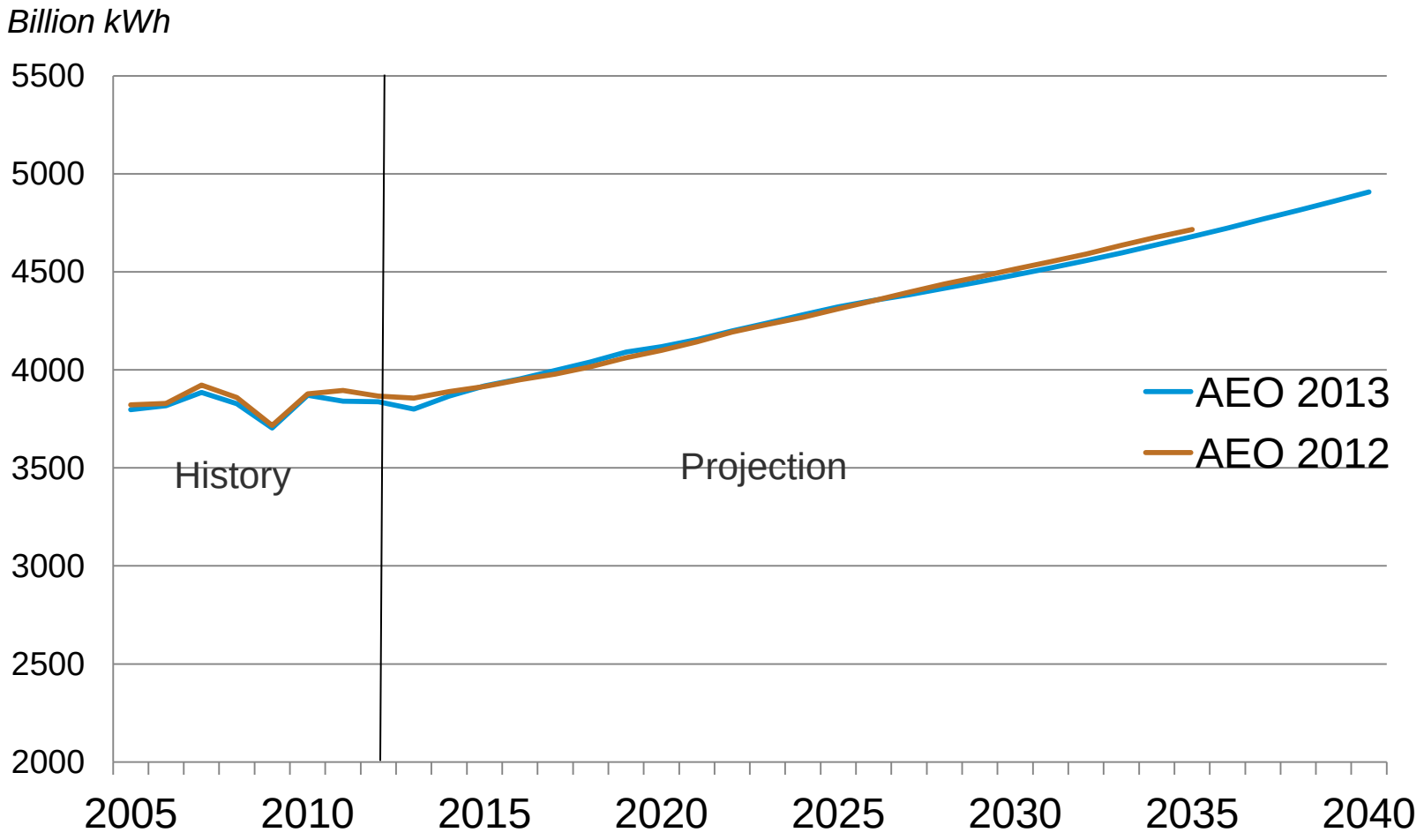
Annual Rate of Growth Continues to Slow



Annual Growth	
1950s	9.8%
1960s	7.3%
1970s	4.7%
1980s	2.9%
1990s	2.4%
2000-2011	0.9%
2011-2040	0.8%

Source: EIA, Annual Energy Outlook 2013, (preliminary), Annual Energy Review, 2013

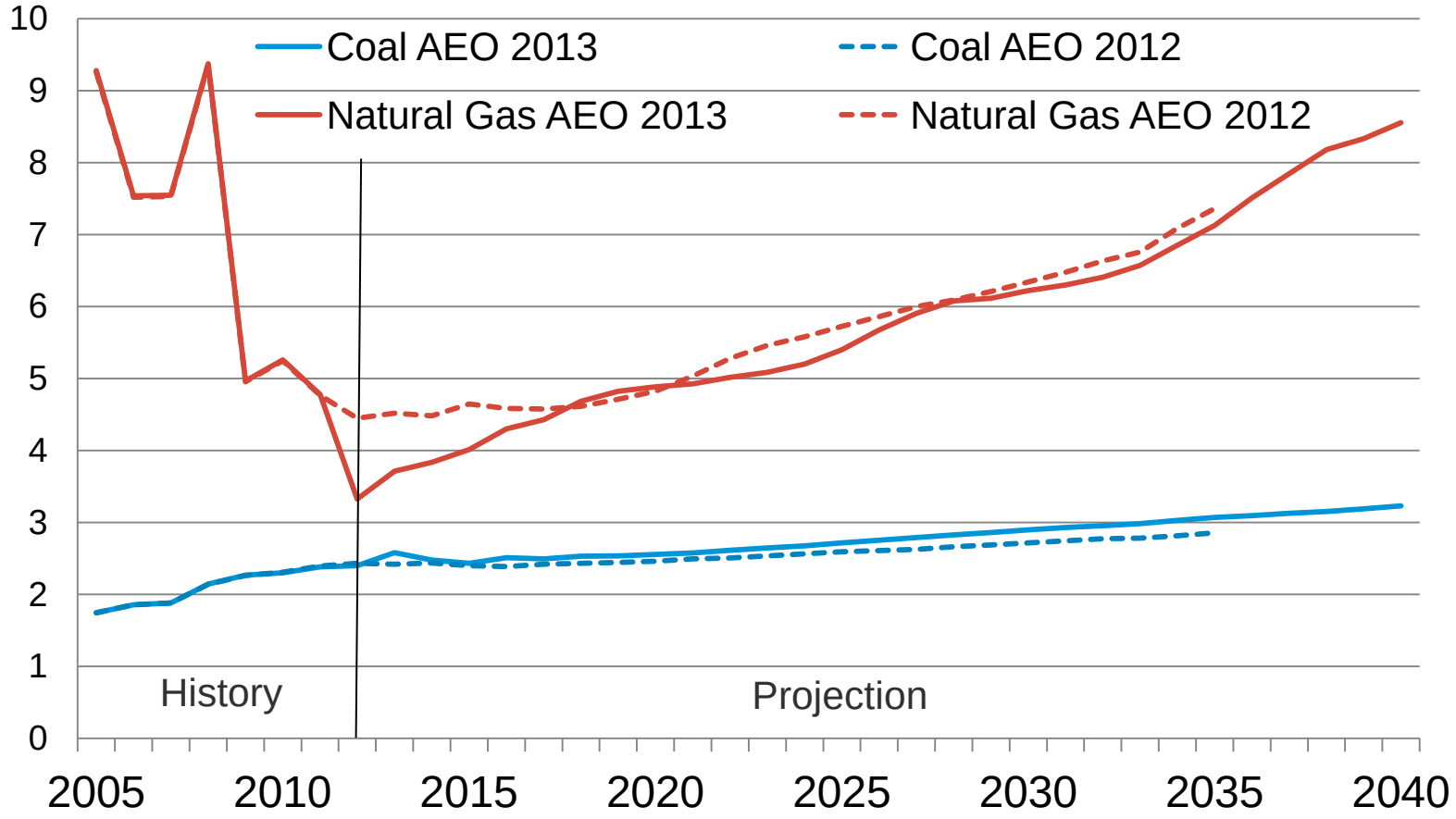
Total Electricity Sales



Source: EIA, Annual Energy Outlook 2013 (preliminary)

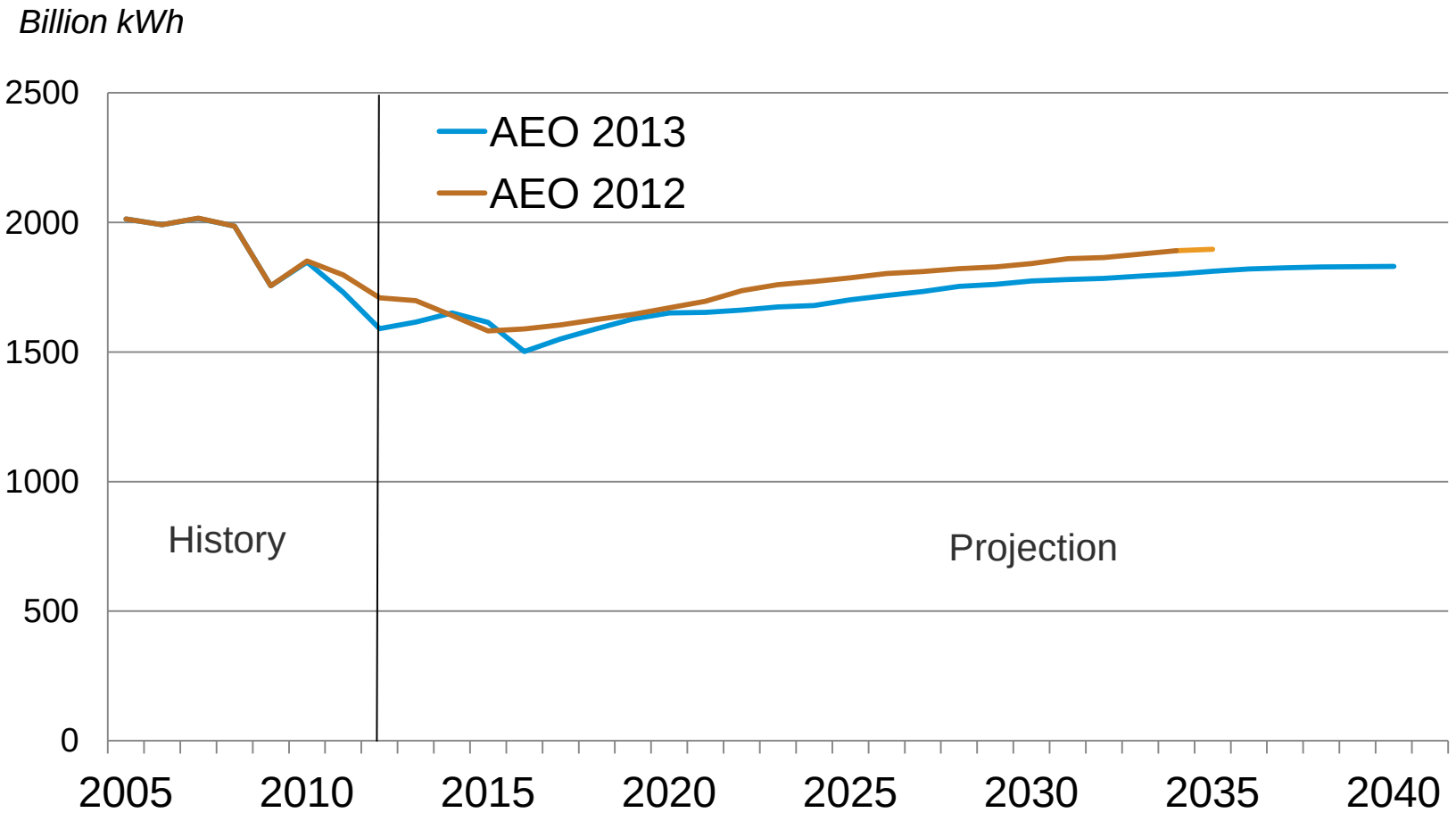
Power Sector Fuel Prices

2011$/MMBtu



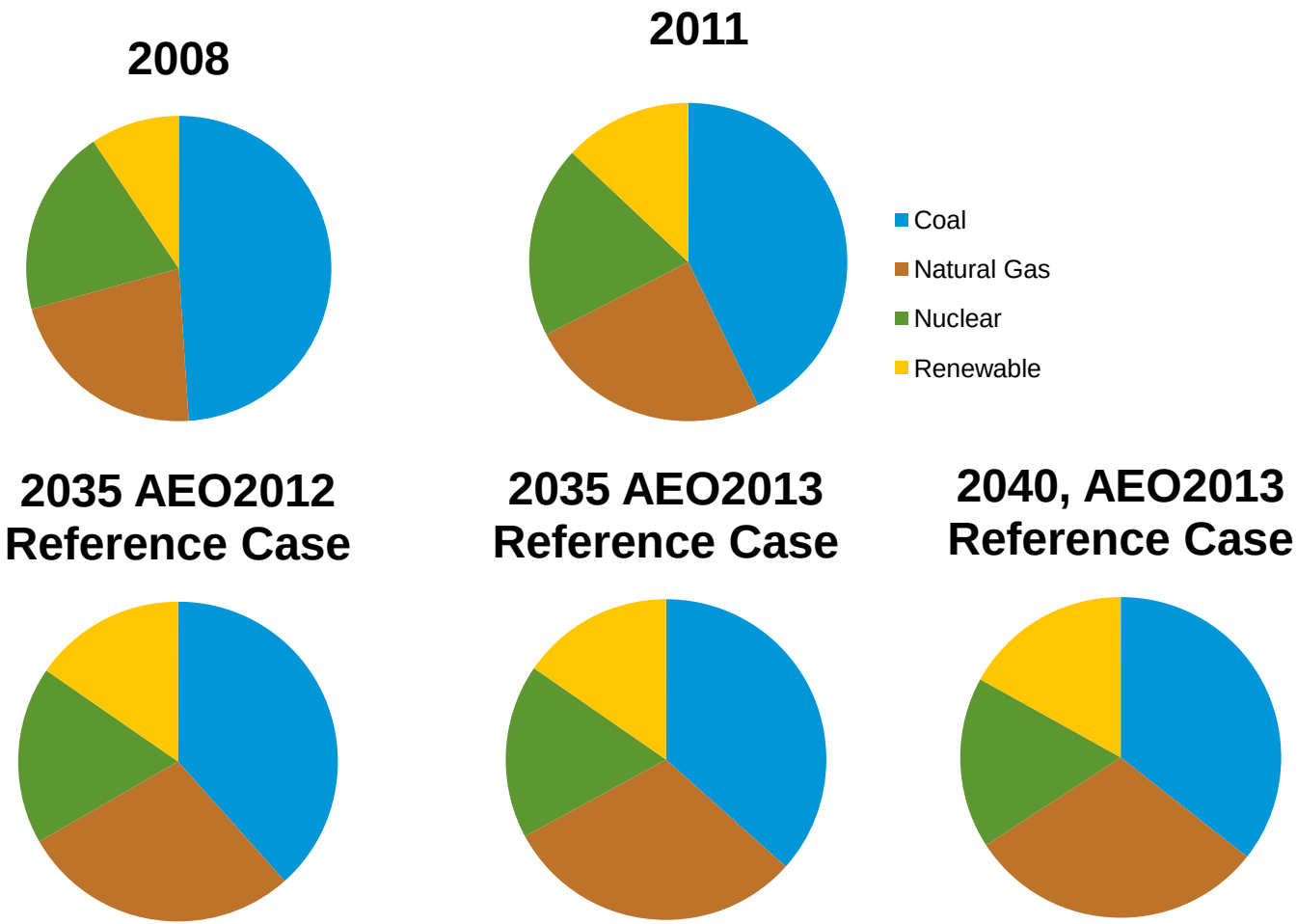
Source: EIA, Annual Energy Outlook 2013 (preliminary), AEO 2012: Full Release Reference Case

Coal Generation



Source: EIA, Annual Energy Outlook 2013 (preliminary), AEO 2012: Full Release Reference Case

Generation Shares by Fuel Source for 2008, 2011, 2035, and 2040

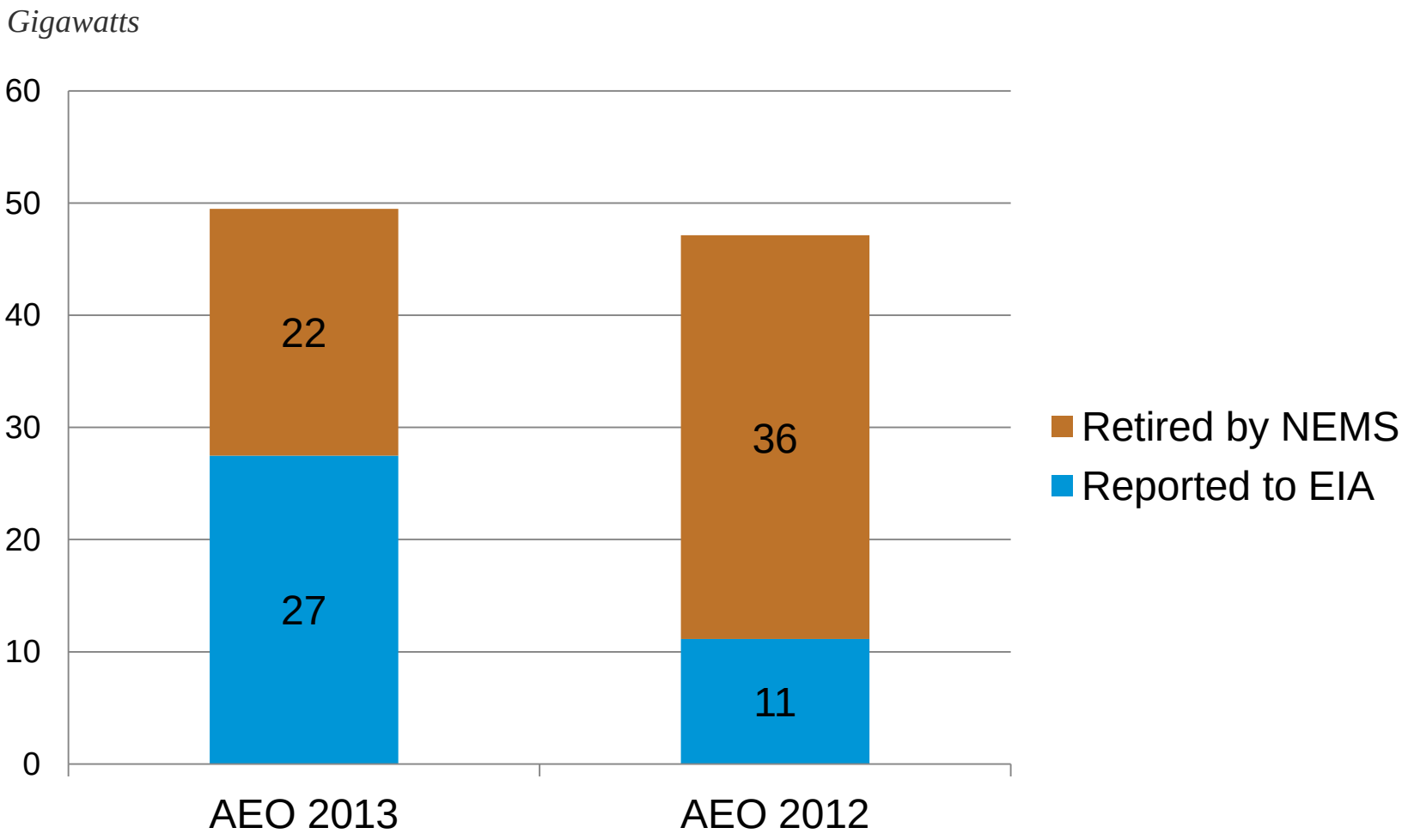


Source: EIA, Annual Energy Outlook 2013 (preliminary), AEO 2012: Full Release Reference Case

Coal Plant Retirements

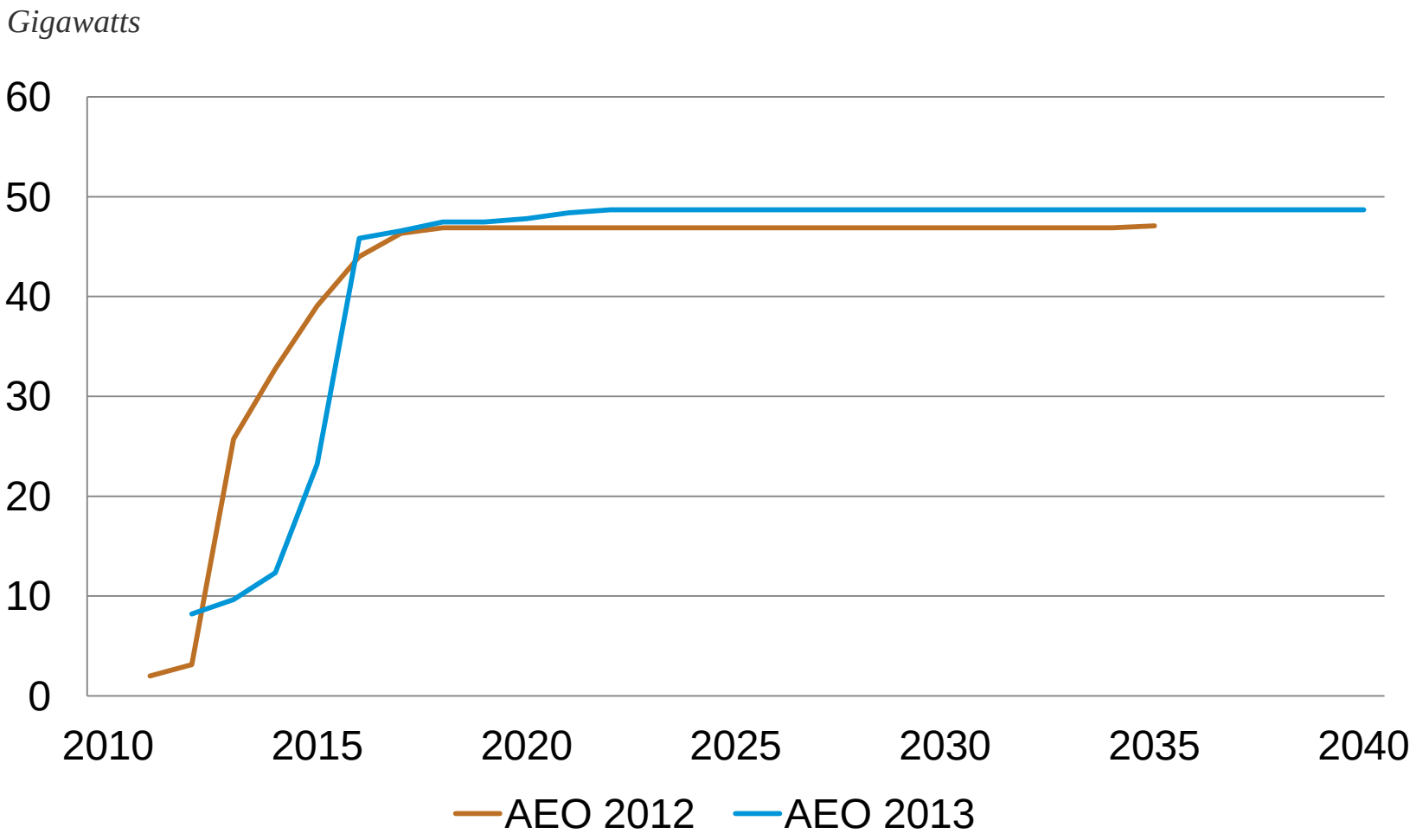
- 27.5 GW's of retirements reported to EIA through 2021
- Additional 22 GW's of retirements through the NEMS model
- Coal retirements and natural gas use are sensitive to several key factors, particularly electricity demand, natural gas prices and coal prices, and environmental regulations
- Slightly higher amount of capacity retired by 2035 than in AEO 2012

Coal Plant Retirements through 2035



Source: EIA, Annual Energy Outlook 2013 (preliminary), AEO 2012: Full Release Reference Case

Coal Plant Retirements



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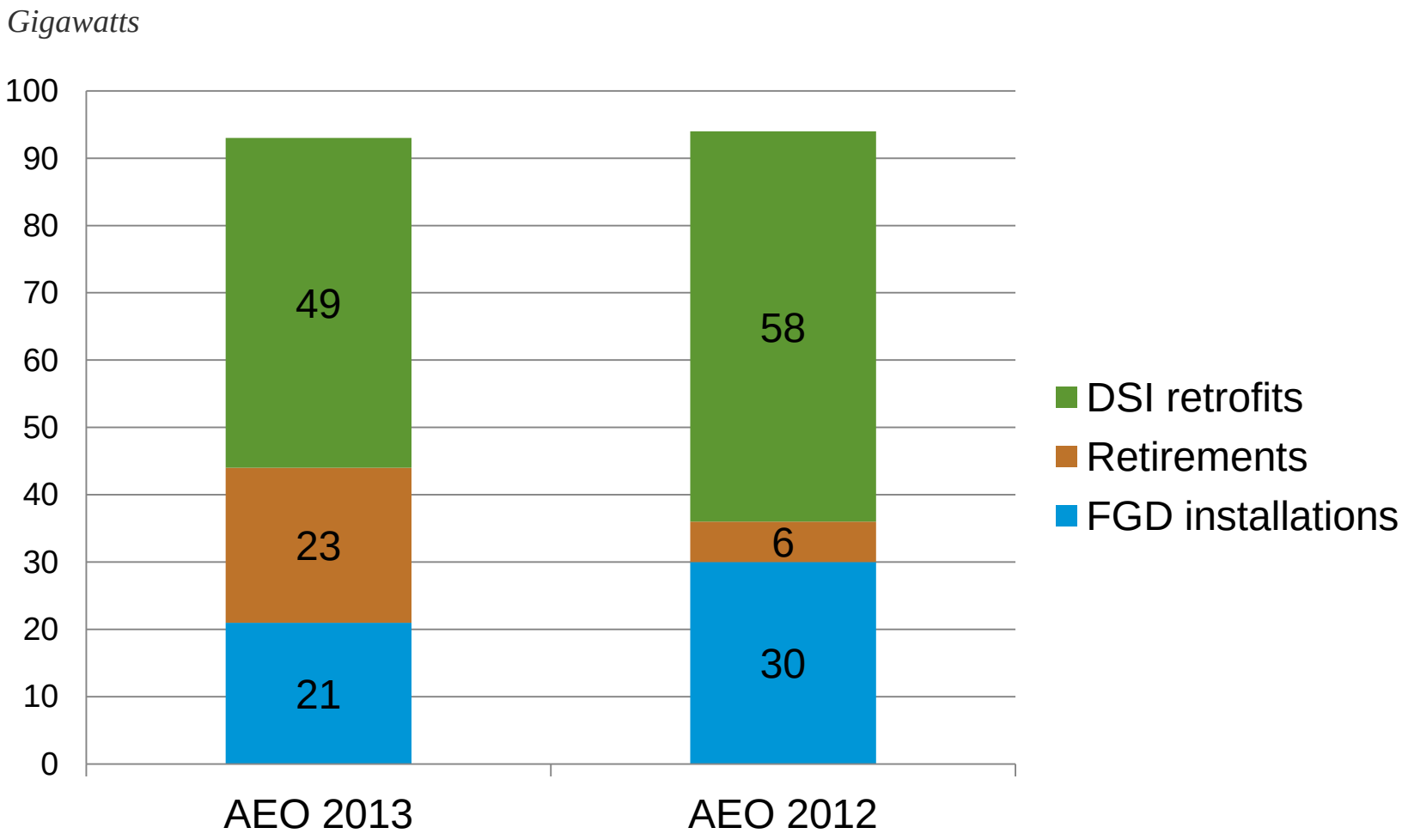
Compliance Actions in the First Year of MATS Implementation



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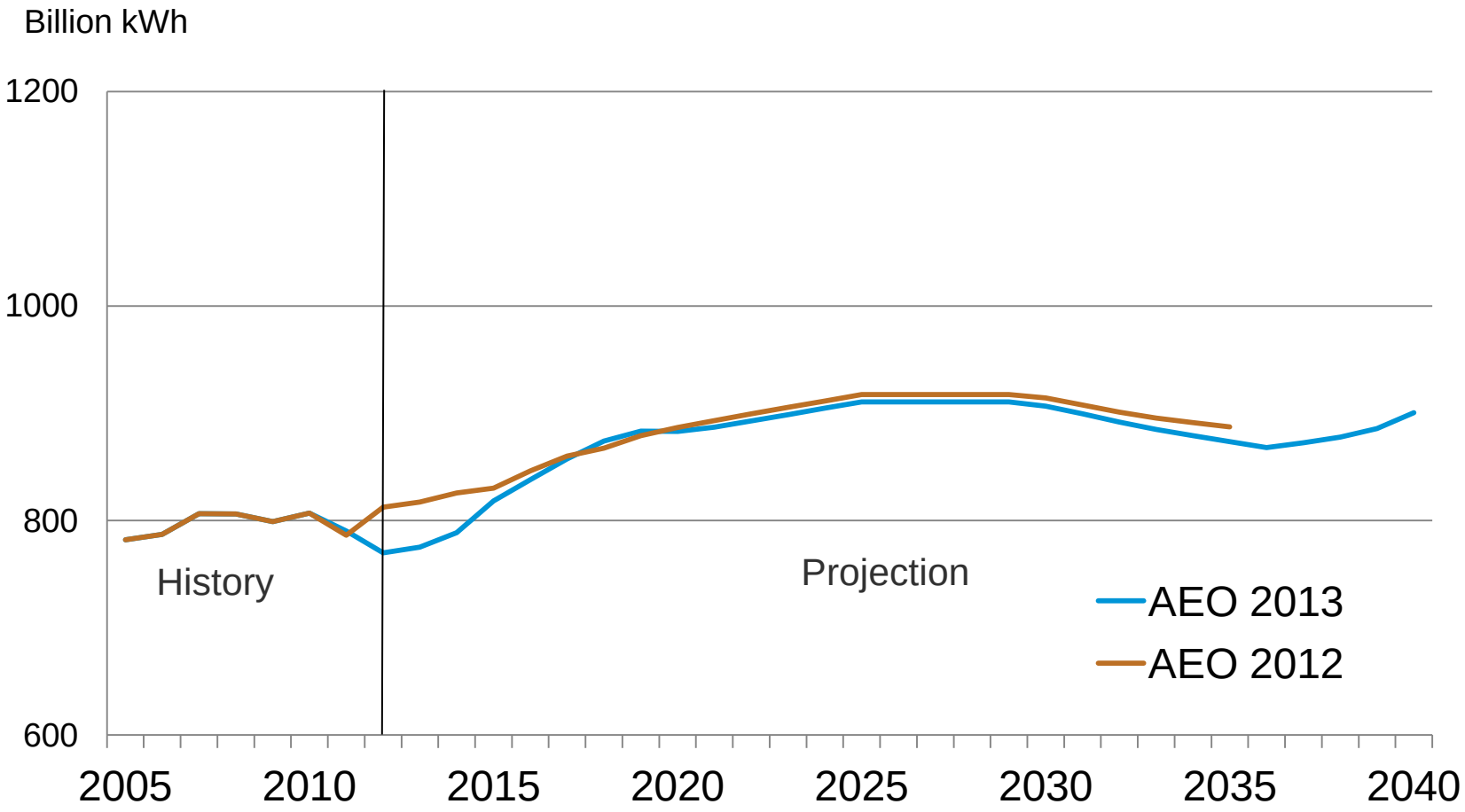
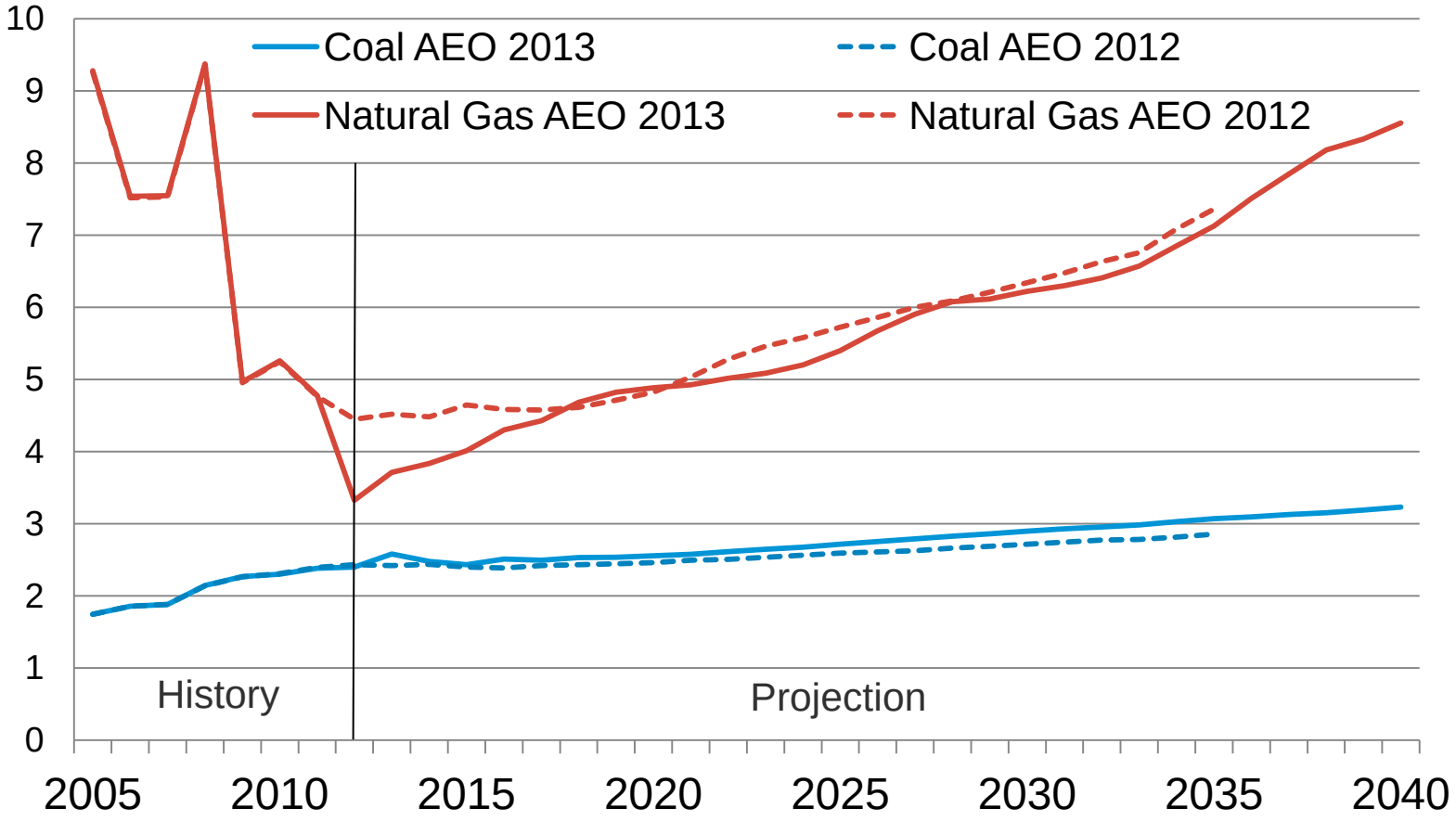
Nuclear Generation



Source: EIA, Annual Energy Outlook 2013 (preliminary), AEO 2012: Full Release Reference Case

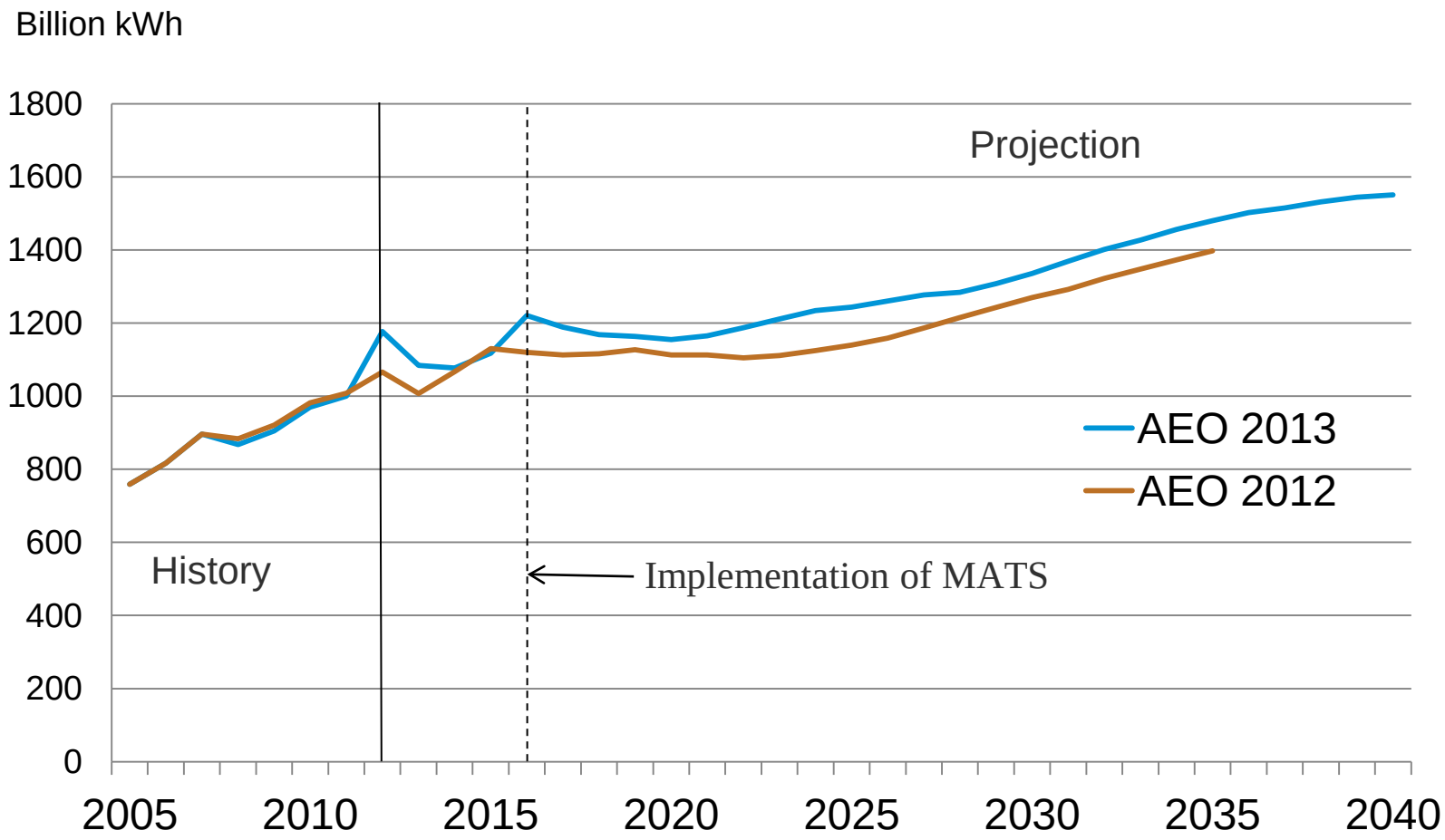
Power Sector Fuel Prices

2011$/MMBtu



Source: EIA, Annual Energy Outlook 2013 (preliminary), AEO 2012: Full Release Reference Case

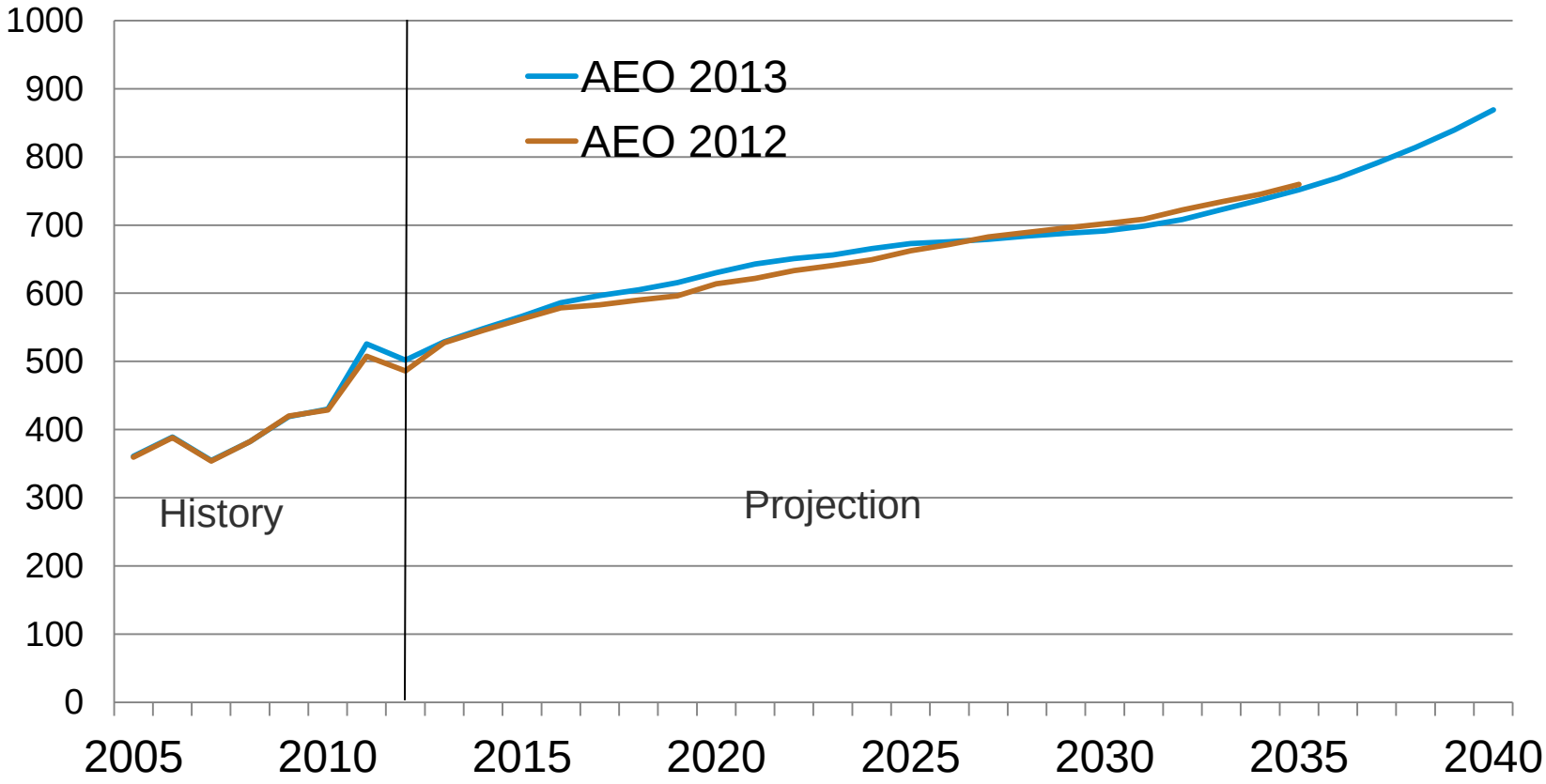
Natural Gas Generation



Source: EIA, Annual Energy Outlook 2013 (preliminary), AEO 2012: Full Release Reference Case

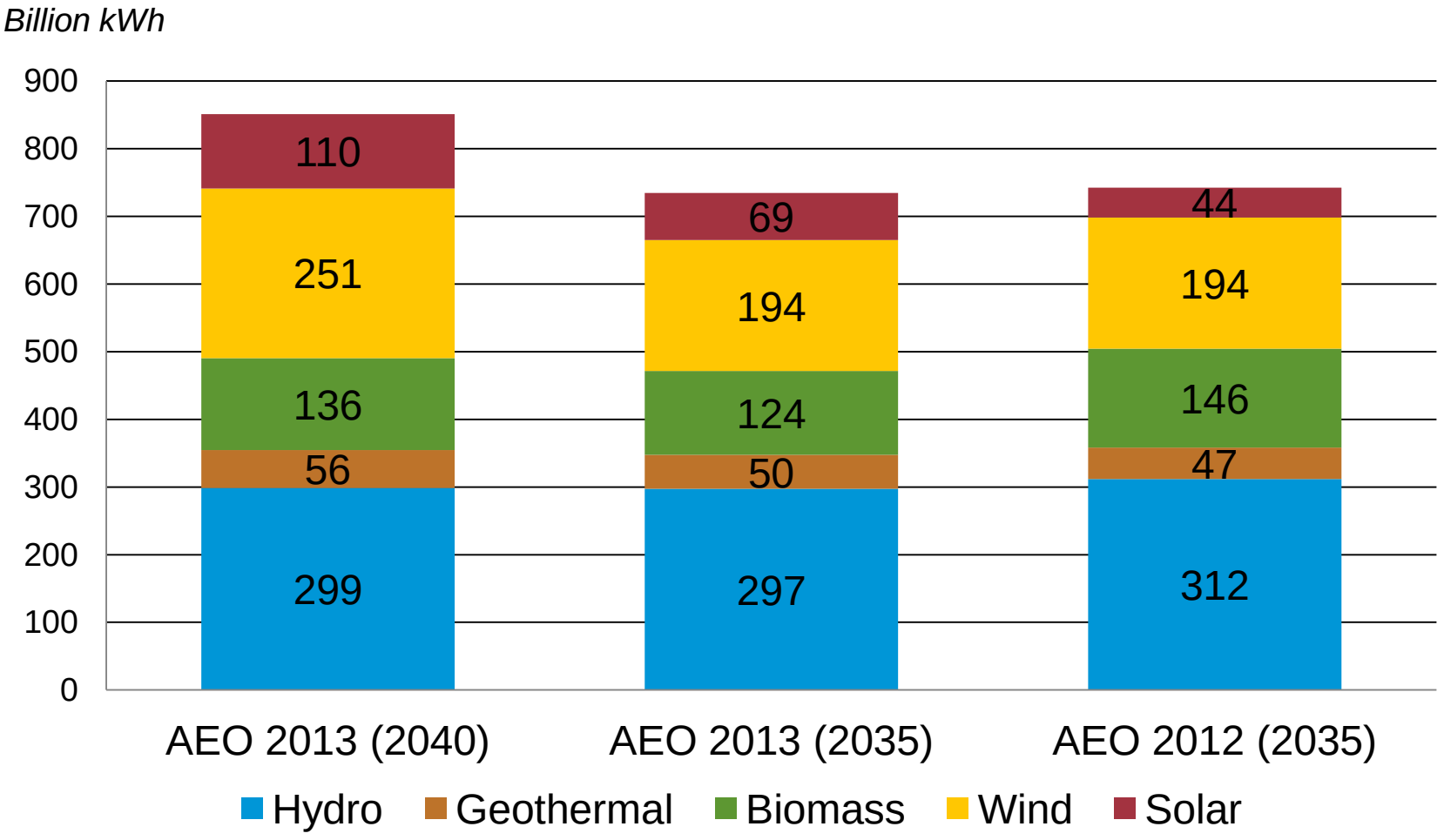
Renewable Generation

Billion kWh



Source: EIA, Annual Energy Outlook 2013 (preliminary), AEO 2012: Full Release Reference Case

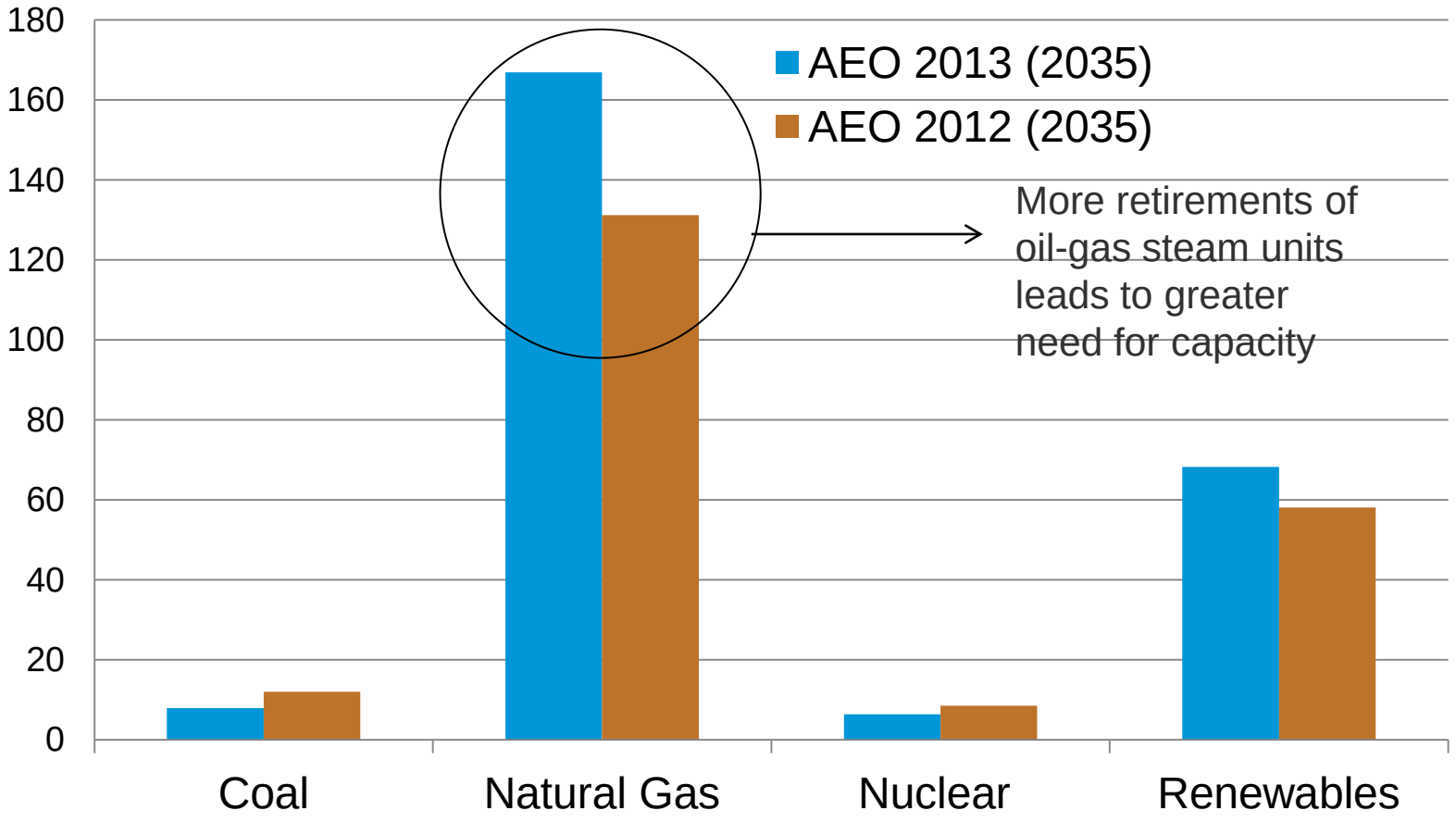
Renewable Generation Breakdown



Source: EIA, Annual Energy Outlook 2013 (preliminary), AEO 2012: Full Release Reference Case

Comparison of Capacity Additions through 2035 for AEO 2012 and AEO 2013

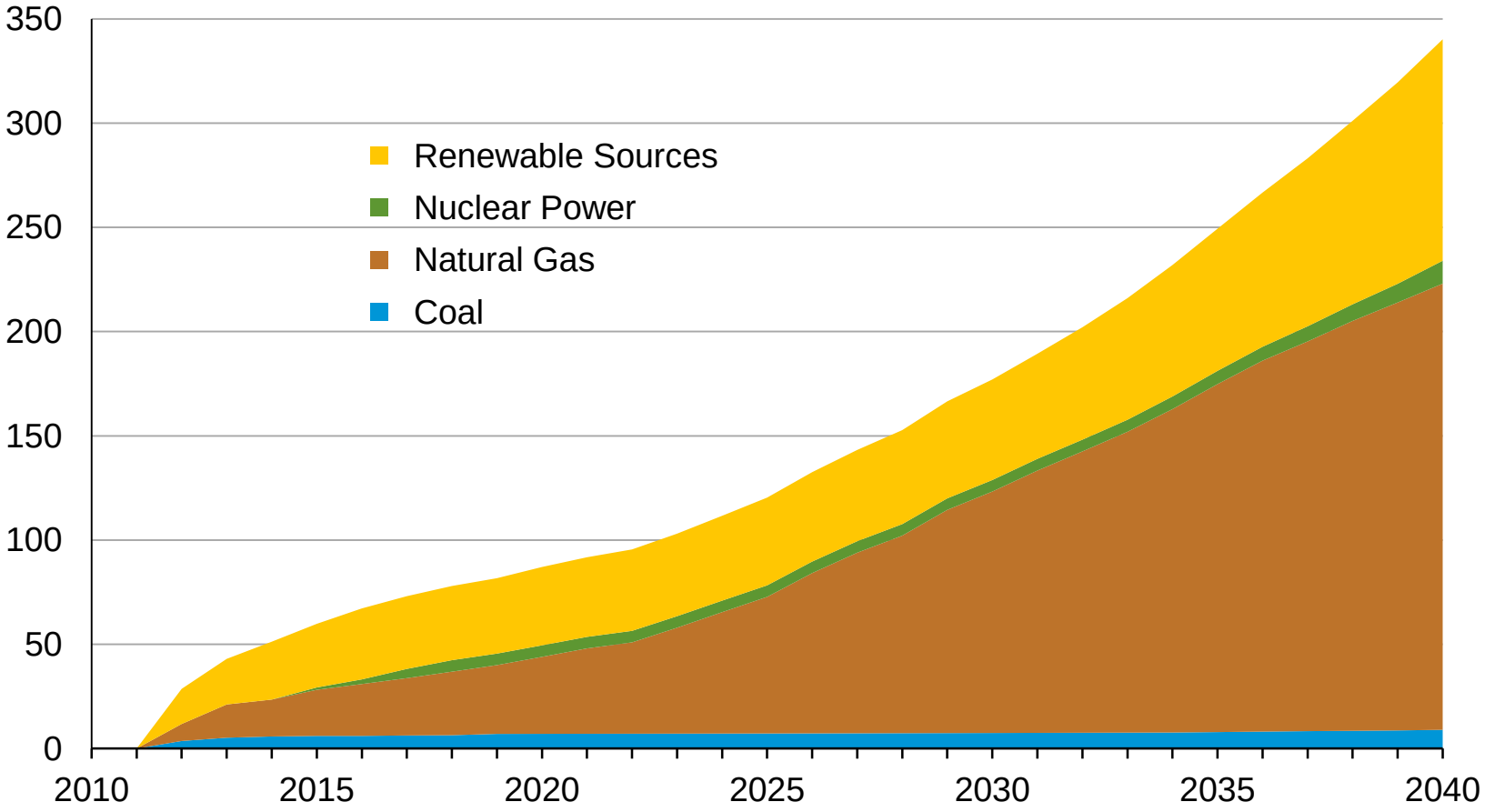
Gigawatts



Source: EIA, Annual Energy Outlook 2013 (preliminary), AEO 2012: Full Release Reference Case

Cumulative Capacity Additions by Fuel Type, AEO2013 Reference Case

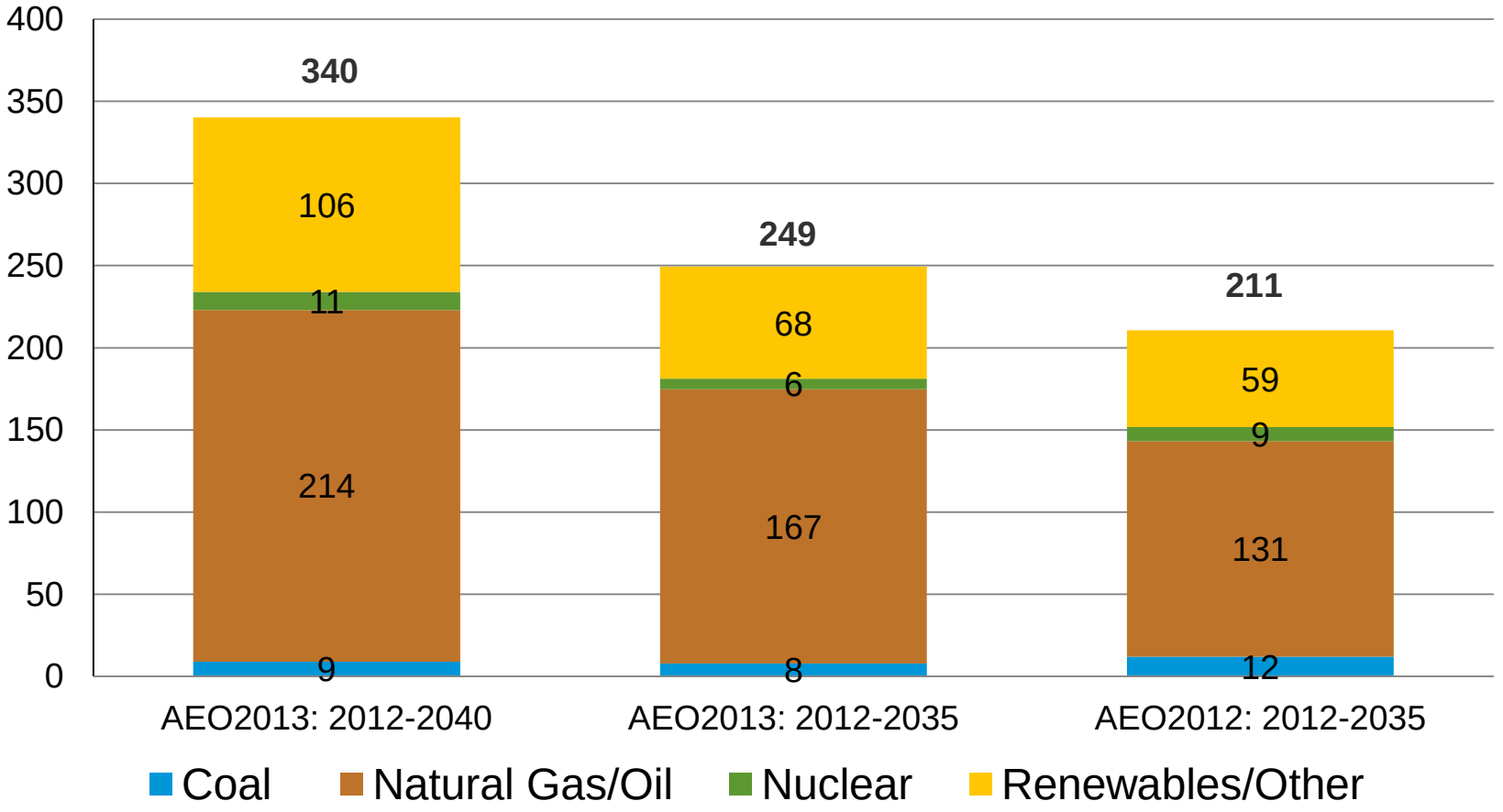
Gigawatts



Source: EIA, Annual Energy Outlook 2013 (preliminary)

Cumulative electricity generating capacity additions, 2012-2035 and 2012-2040

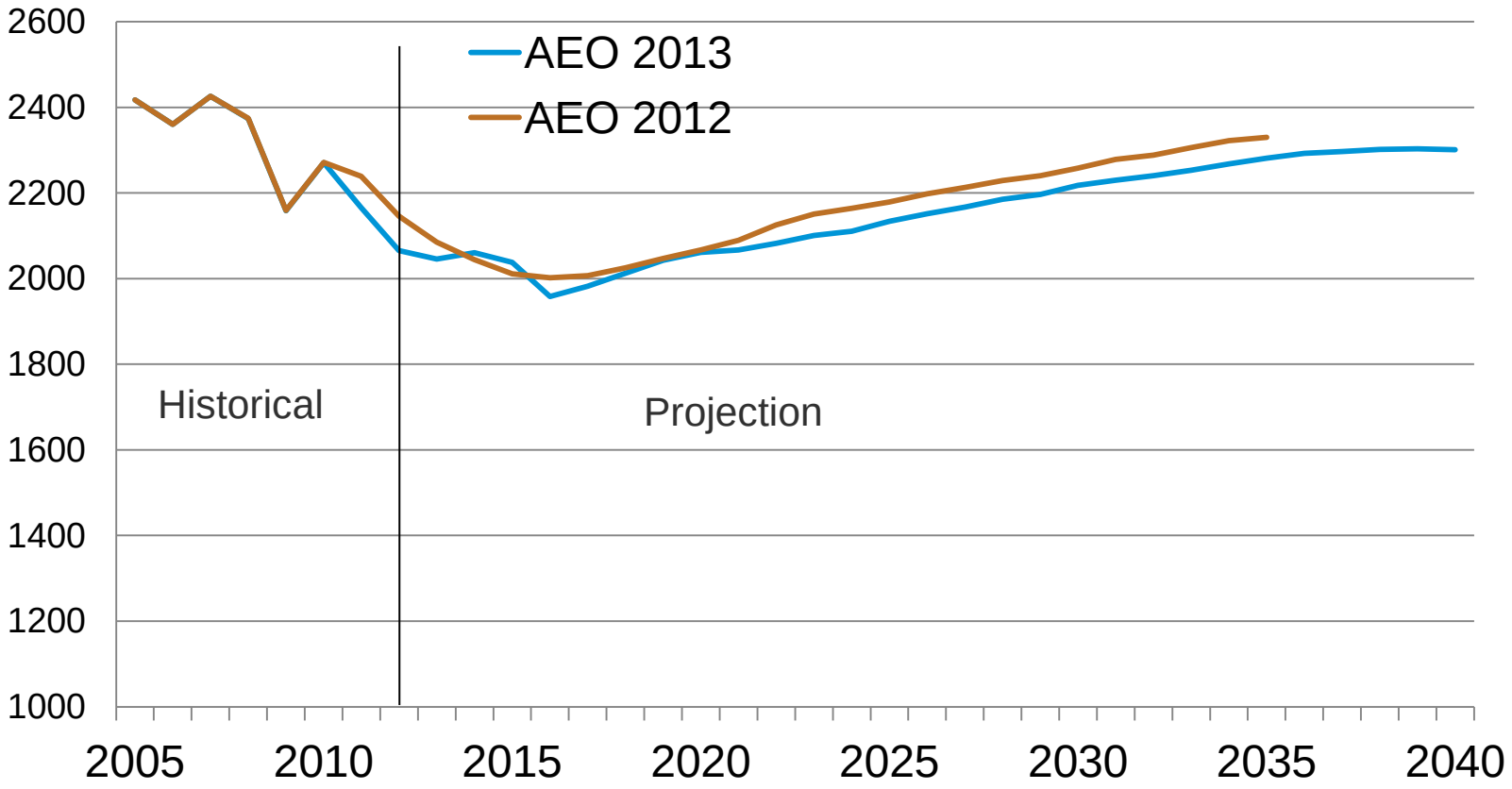
Gigawatts



Source: EIA, Annual Energy Outlook 2013 (preliminary) and Annual Energy Outlook 2012

CO_2 Emissions

Million metric tons



Source: EIA, Annual Energy Outlook 2013 (preliminary), AEO 2012: Full Release Reference Case

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For more information

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