

DRAFT 2012 Reference Case and Sensitivity Results

August 13, 2012
(Updated)

Disclaimer – This presentation, prepared by ICF under contract with RGGI, Inc., is designed to support ongoing evaluation of state RGGI programs. The opinions, data and analysis contained in this report do not necessarily reflect those of RGGI, Inc. or any of the RGGI Participating States.

DRAFT 2012 Reference and Sensitivity Case Results

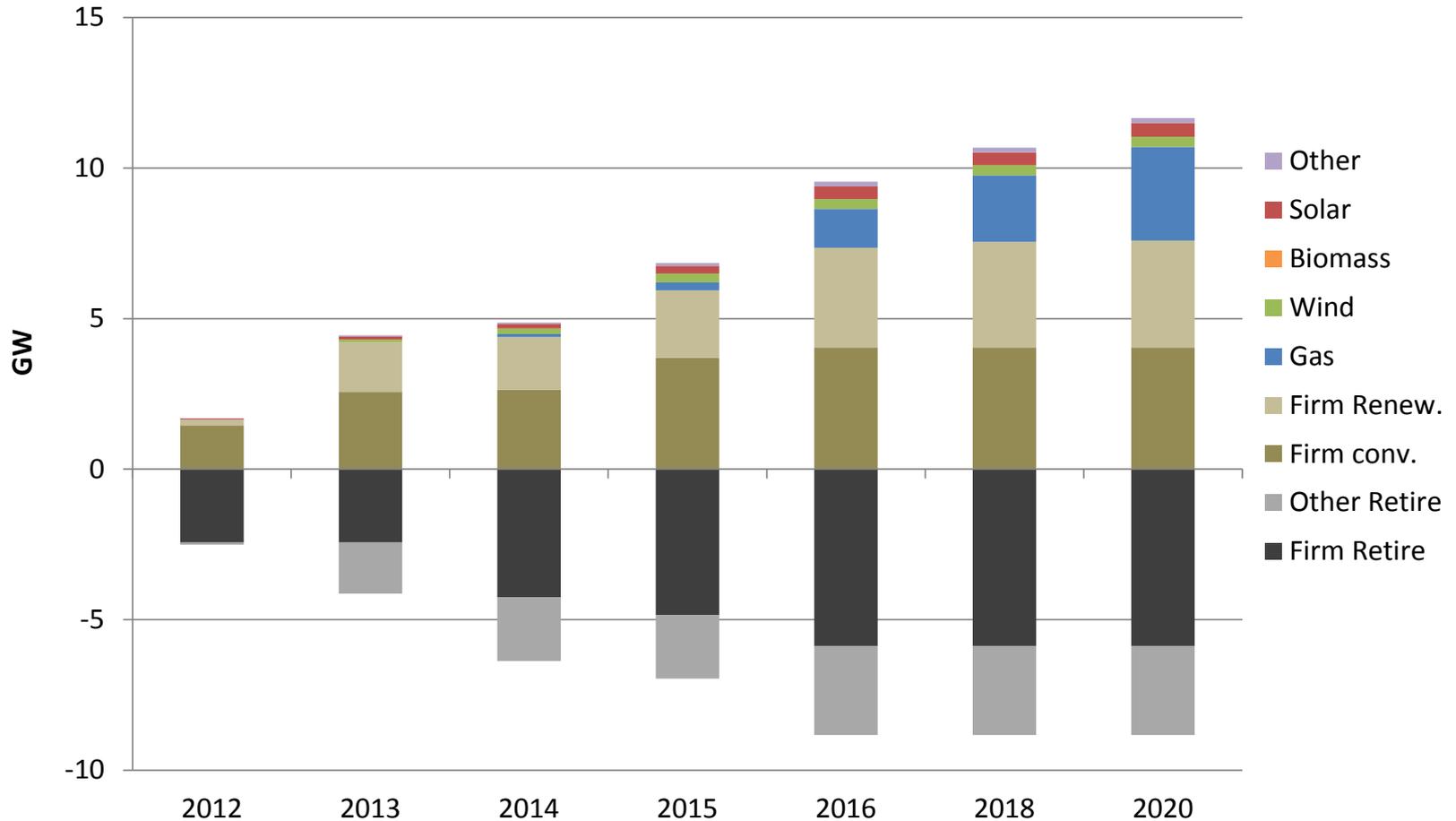
- The following slides present select projections from the latest RGGI Reference Case and draft sensitivity cases, based on assumptions in place as of August 9, 2012.
- These projections are draft and may change as ICF makes refinements based on review and input by the States.
- The RGGI States specified 2 sensitivity cases for analysis:
 1. High Emissions Combination
 2. Low Emissions Combination
- This presentation then summarizes the Reference Case projections and the results of the sensitivity cases and reviews any changes to the Reference Case and sensitivity assumptions presented in July 2012.
- Detailed Reference Case assumptions are summarized in accompanying materials

2012 RGGI Reference Case Projections

Reference Case Projections

Cumulative Capacity Additions

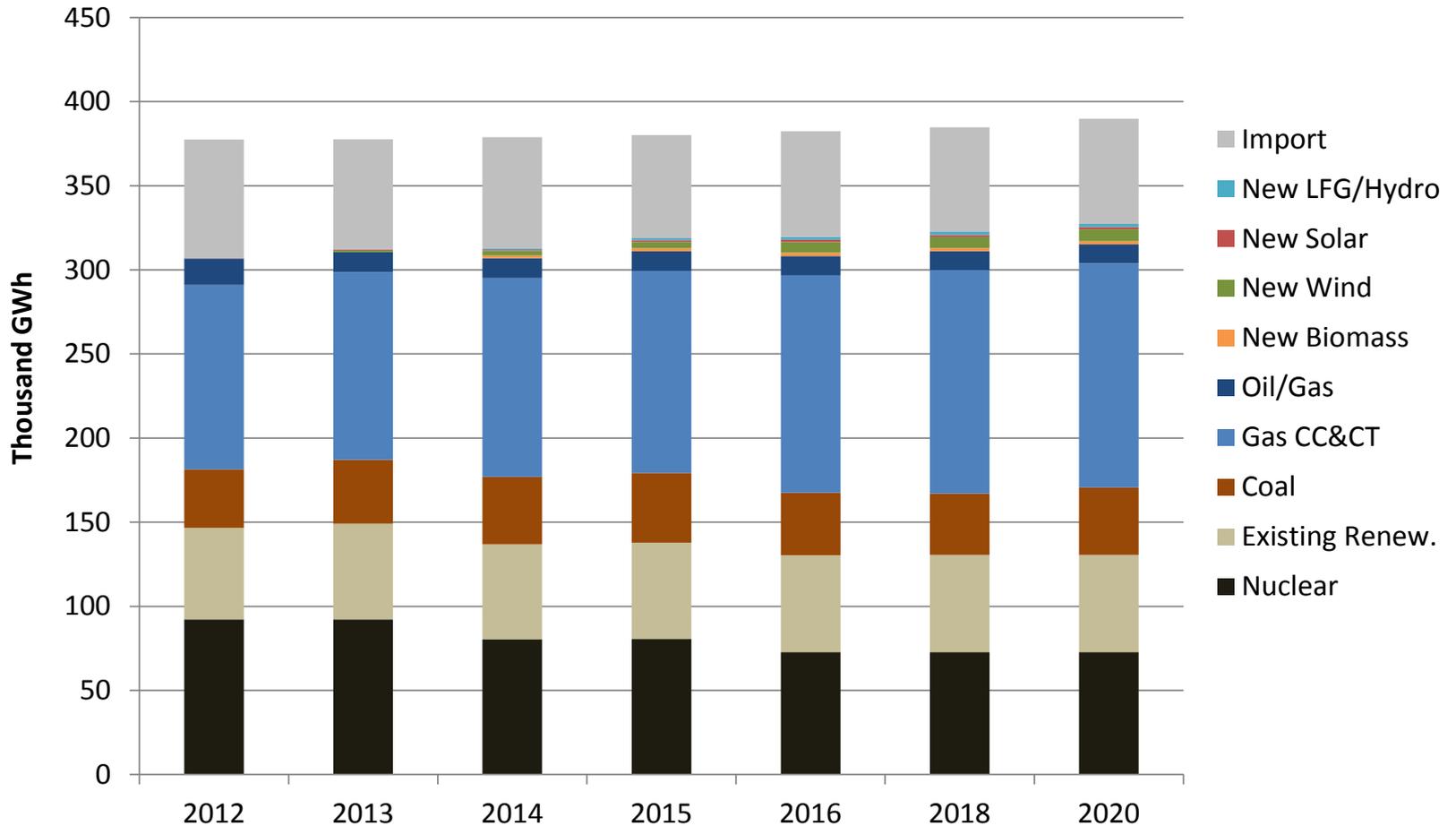
- The chart shows total firmly planned (“Firm”) and economic capacity additions by type and total retirements projected by IPM.



Reference Case Projections

RGGI Generation Mix

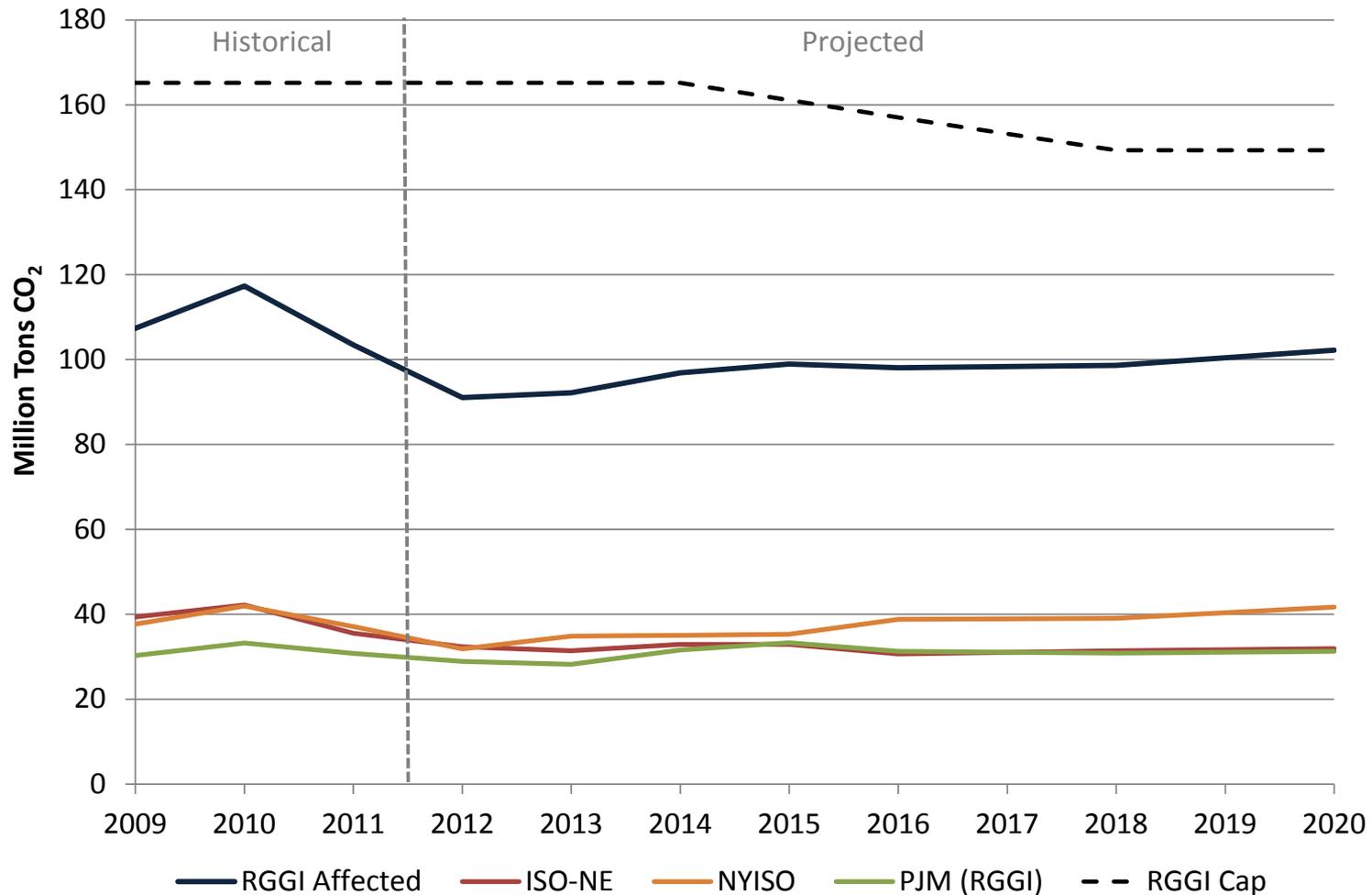
- The chart shows projected generation by type in the RGGI-affected states.



Reference Case Projections

CO₂ Emissions

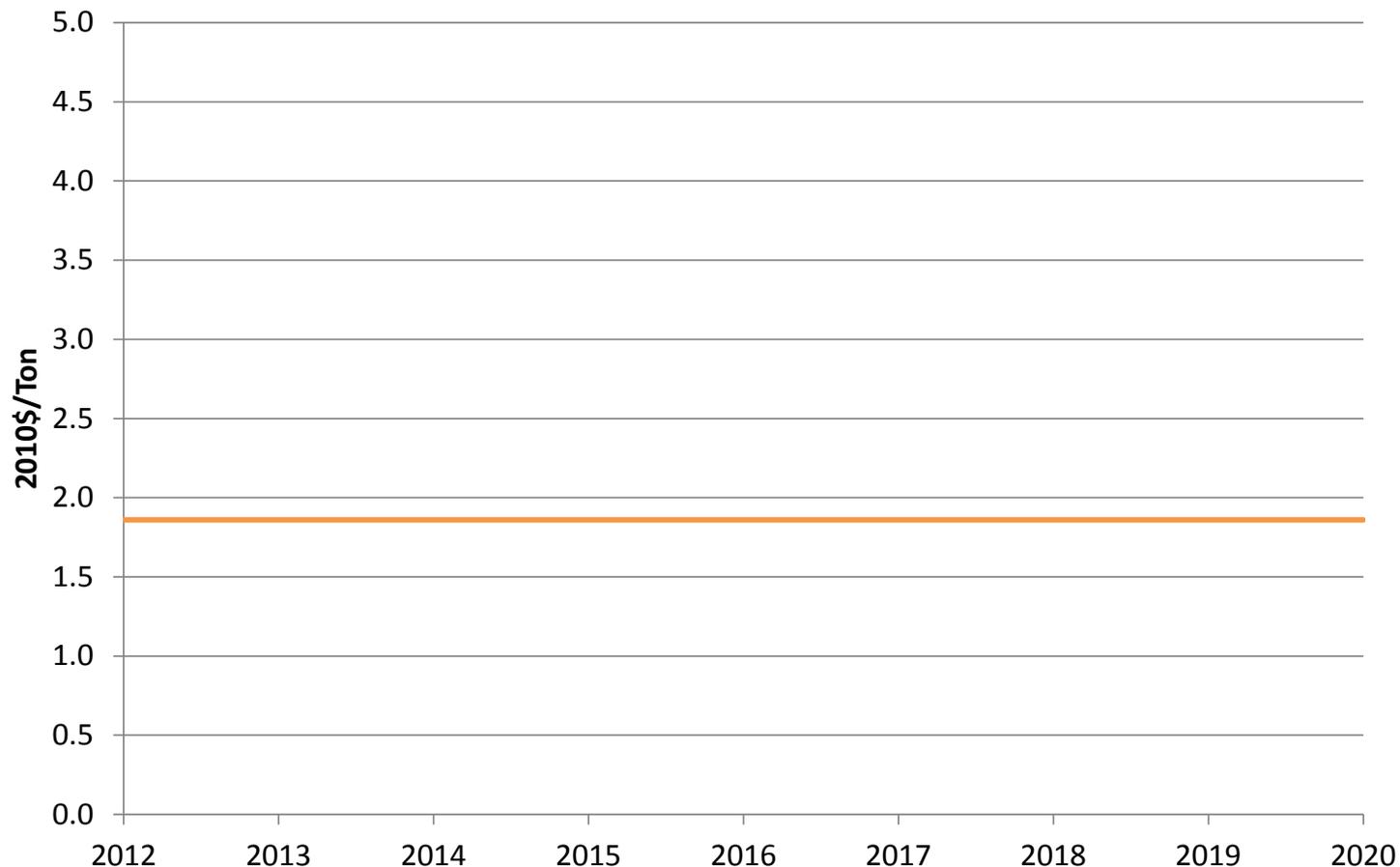
- The chart shows historical and projected CO₂ emissions for the RGGI states and by ISO.



Reference Case Projections

RGGI Allowance Price

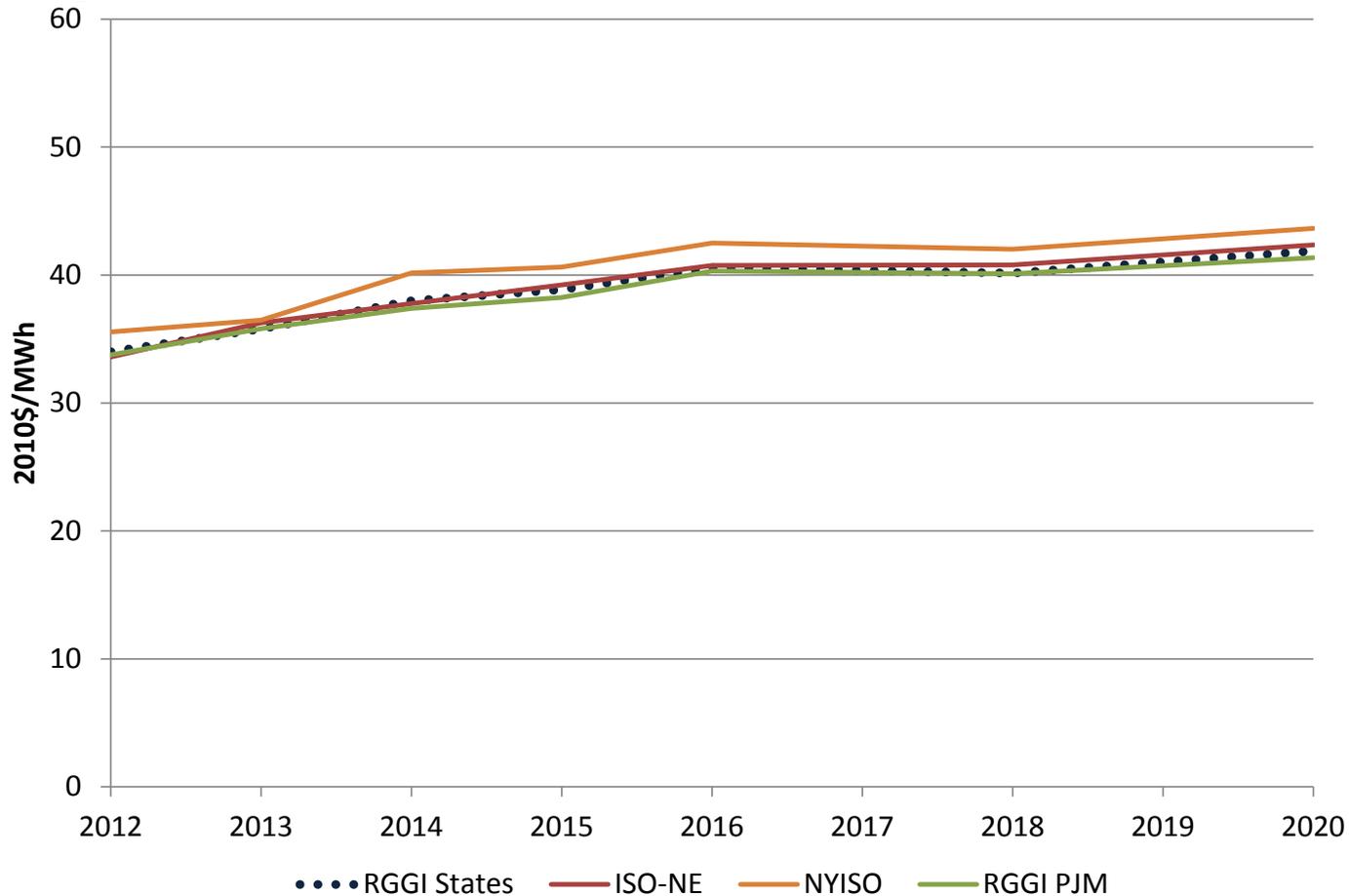
- RGGI emissions are projected to remain below the cap over the time horizon of the analysis, so the projected prices are set by the auction price floor.



Reference Case Projections

Wholesale Electricity Prices

- The chart shows projected weighted-average wholesale electricity prices* for the ISOs and the RGGI states as a whole. These prices are not indicative of a particular hub in each region but are instead an average of all the regions included in IPM.

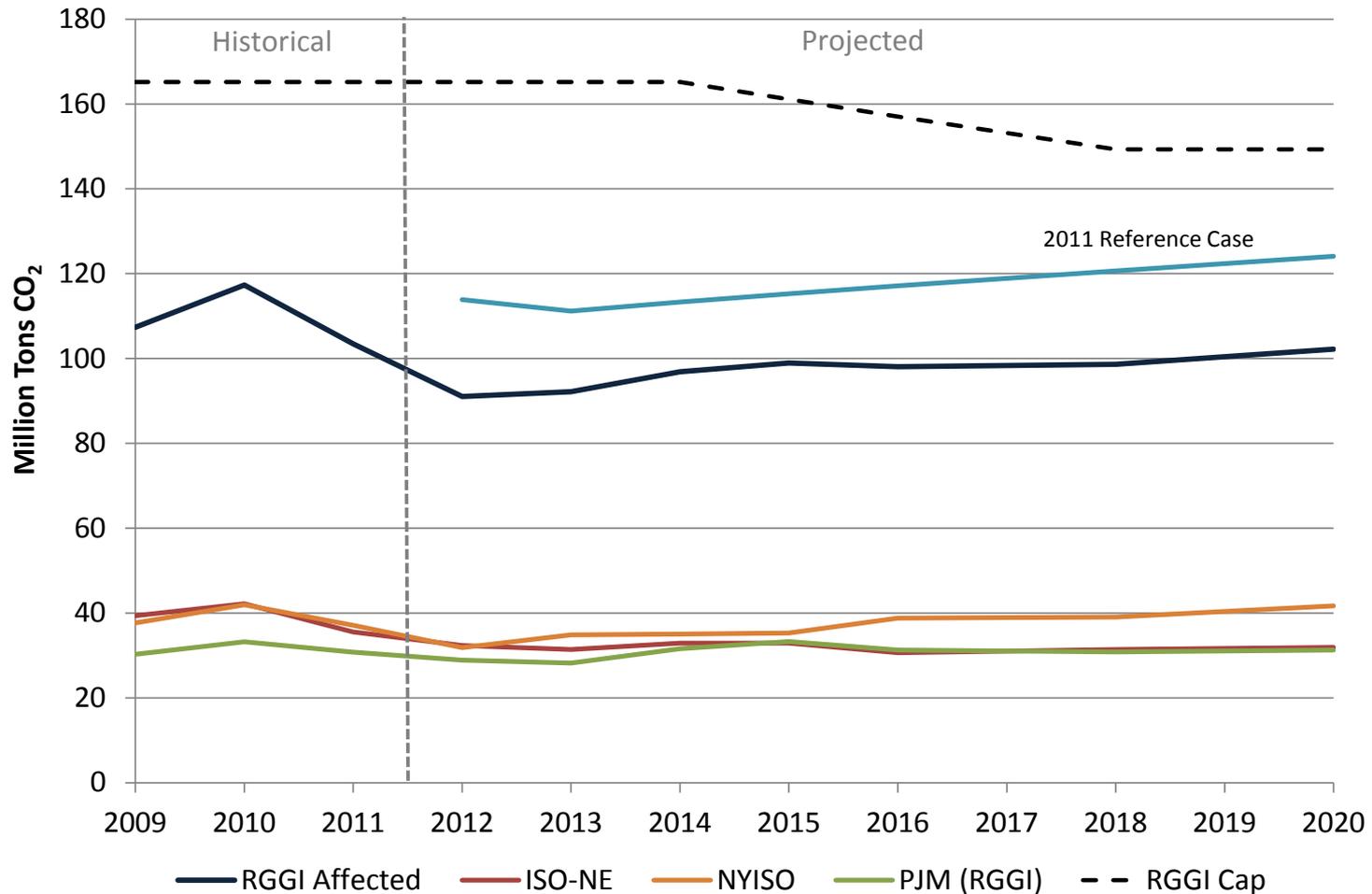


* IPM also projects capacity prices by region, which are not included here.

Reference Case Projections

CO₂ Emissions

- The chart shows historical and projected CO₂ emissions for the RGGI states and by ISO.



2012 Reference Case: RGGI CO₂ Emissions Projections Lower

- Projected CO₂ emissions have fallen 20% in 2012 relative to the previous Reference Case and have fallen 18% cumulatively from 2012-2020 relative to previous Reference Case
- The projected emissions reduction occurs across all RGGI states
- RGGI emissions for the first 2 quarters of 2012 are approximately 40 Million Tons
- The difference in the projections is a result of changing market forces, particularly relative fuel prices, and other factors impacting the operation of fossil capacity in the region.
 - Higher coal prices and much lower gas prices, relative to previous analysis, displace coal generation.
 - Assumed gas prices are lower, and average coal prices across the U.S. are higher.
 - Updated demand assumptions, including lower projected demand in PJM in 2012 frees up generation for export to RGGI.

2012 Reference Case: RGGI CO₂ Emissions Projections Lower

- The changes in relative fuel prices also contribute to lower emissions over the next decade.
- The firm coal unit retirements, as well as further economic retirements driven by the combination of environmental regulation and fuel prices, also put downward pressure on emissions, relative to previous analysis.
- Firm additions of new combined cycle capacity in eastern non RGGI PJM in 2015 also offset longer-term capacity additions previously projected in the RGGI region in 2020, also contributing to lower RGGI emissions.

RGGI Sensitivity Case Descriptions & Projections

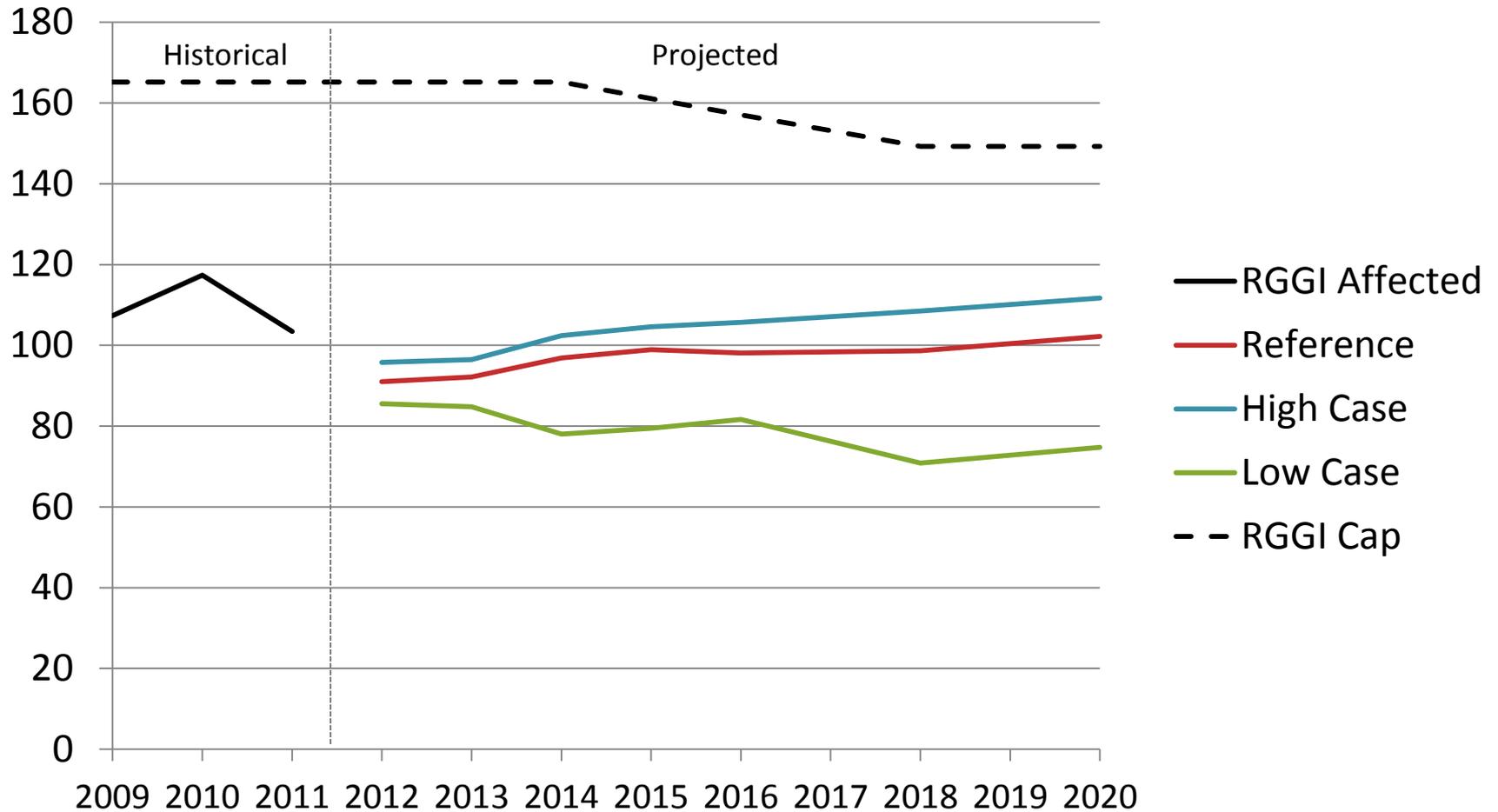
Sensitivity Analyses Assumptions (updated 1/8/13)

- The sensitivity analyses vary natural gas prices, electricity demand and generation sources.
- The table below summarizes the proposed assumptions for the sensitivity cases
 - Natural gas prices for the cases are taken from high and low natural gas resource scenarios for AEO EIA 2012
 - Electric demand based on a combination of historical variation in load and projected differences by EIA and ISOs.

	Natural Gas Price Assumption	Demand Assumption	Generation
Higher Emissions Case	EIA “Low Estimated Ultimate Recovery” Scenario, resulting in gas prices 16% higher than Reference Case levels by 2020	Demand 3% higher than Reference in near-term, 4% higher in long-term	
Lower Emissions Case	EIA “High Technically Recoverable Resources” Scenario, resulting in gas prices 35% lower than Reference Case levels by 2020	Demand 3% lower than Reference in near-term, 4% lower in long-term	Increase nuclear generation (2,600MW)

Sensitivity Case Projections (updated 1/8/13)

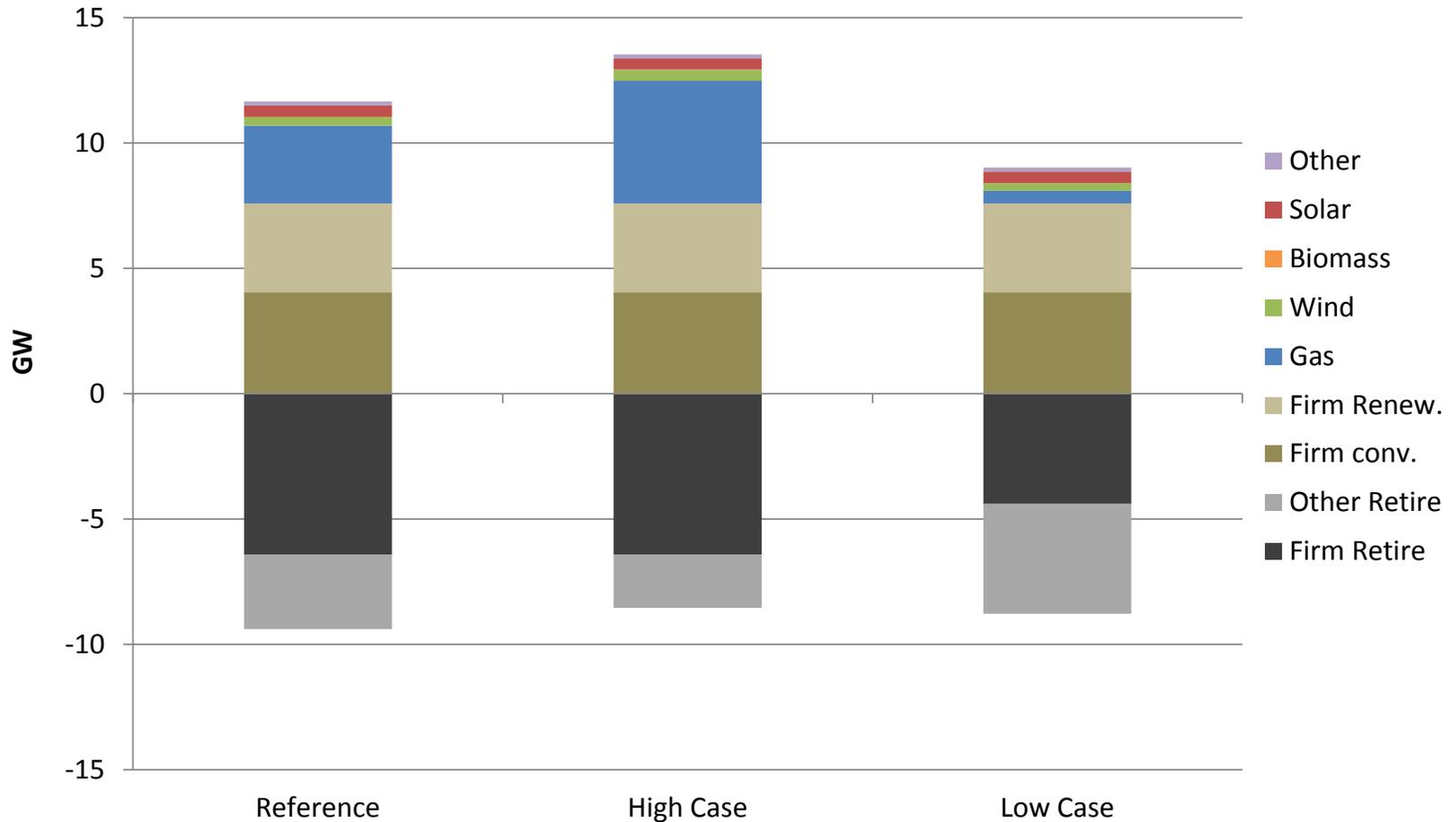
CO₂ Emissions



Sensitivity Case Projections

Cumulative Capacity Additions by 2020

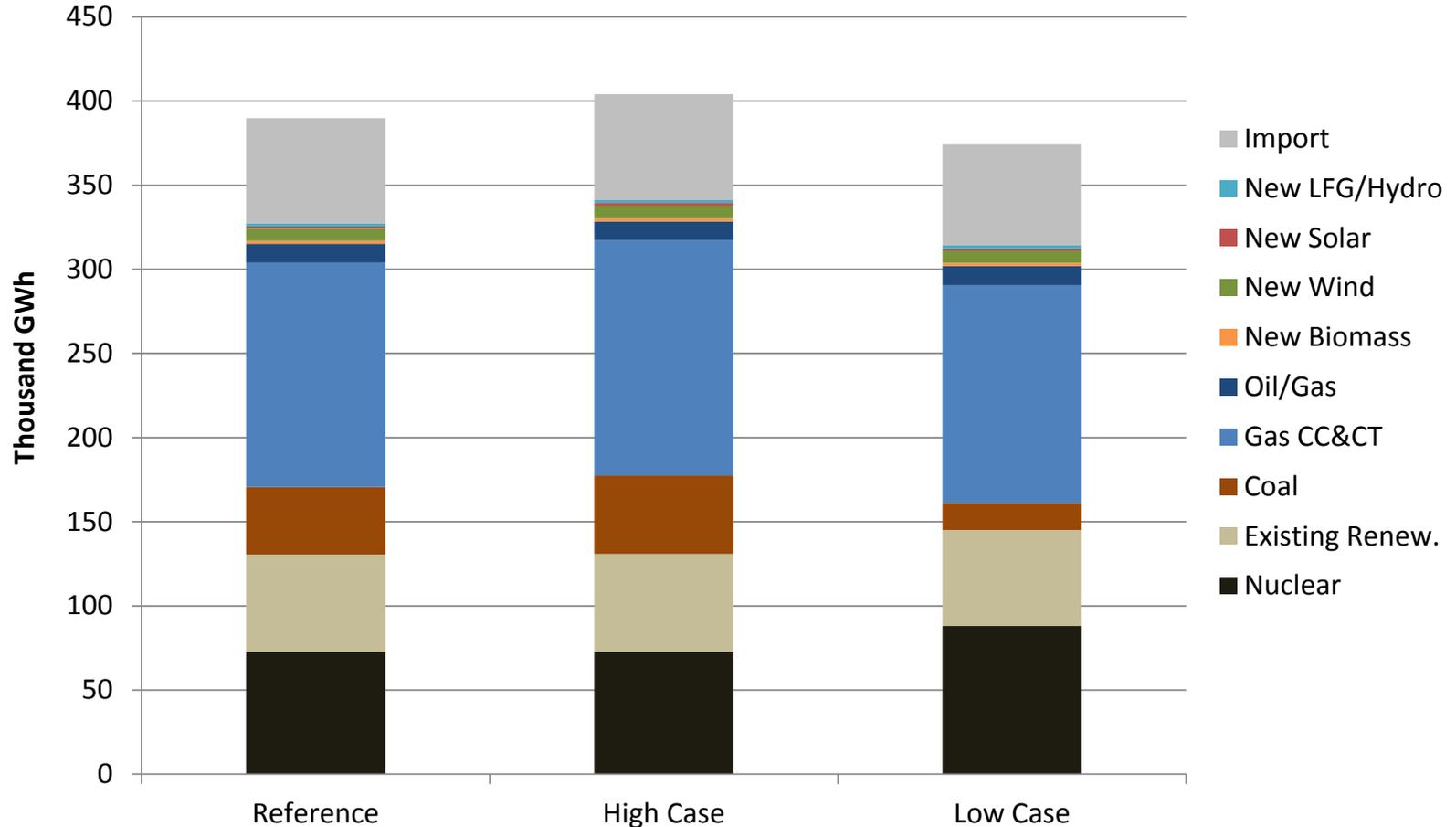
- The chart shows total firmly planned (“Firm”) and economic capacity additions by type and total retirements projected by IPM.



Sensitivity Case Projections

RGGI Generation Mix in 2020

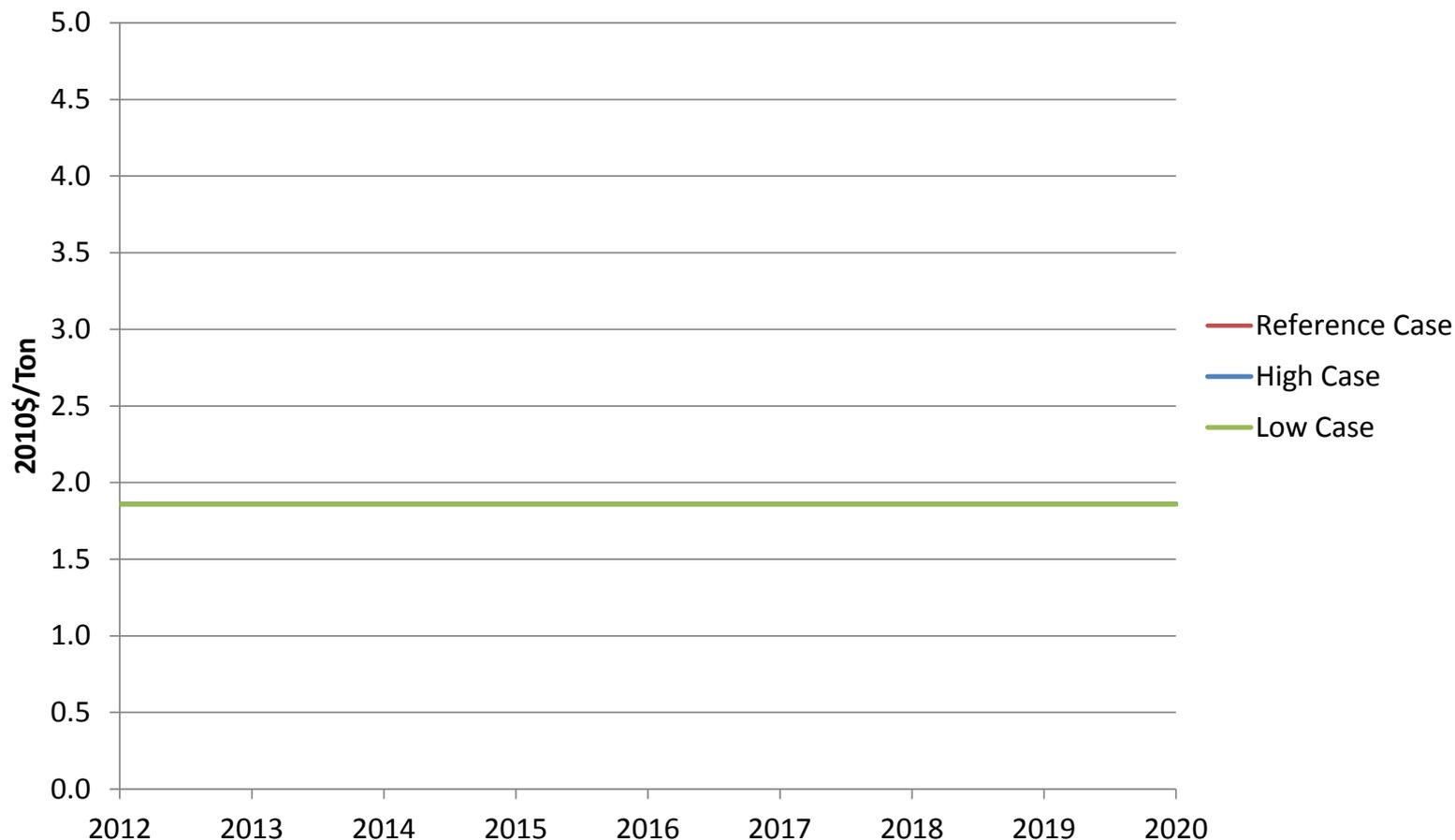
- The chart shows projected generation by type in the RGGI-affected states.



Sensitivity Case Projections

RGGI Allowance Price

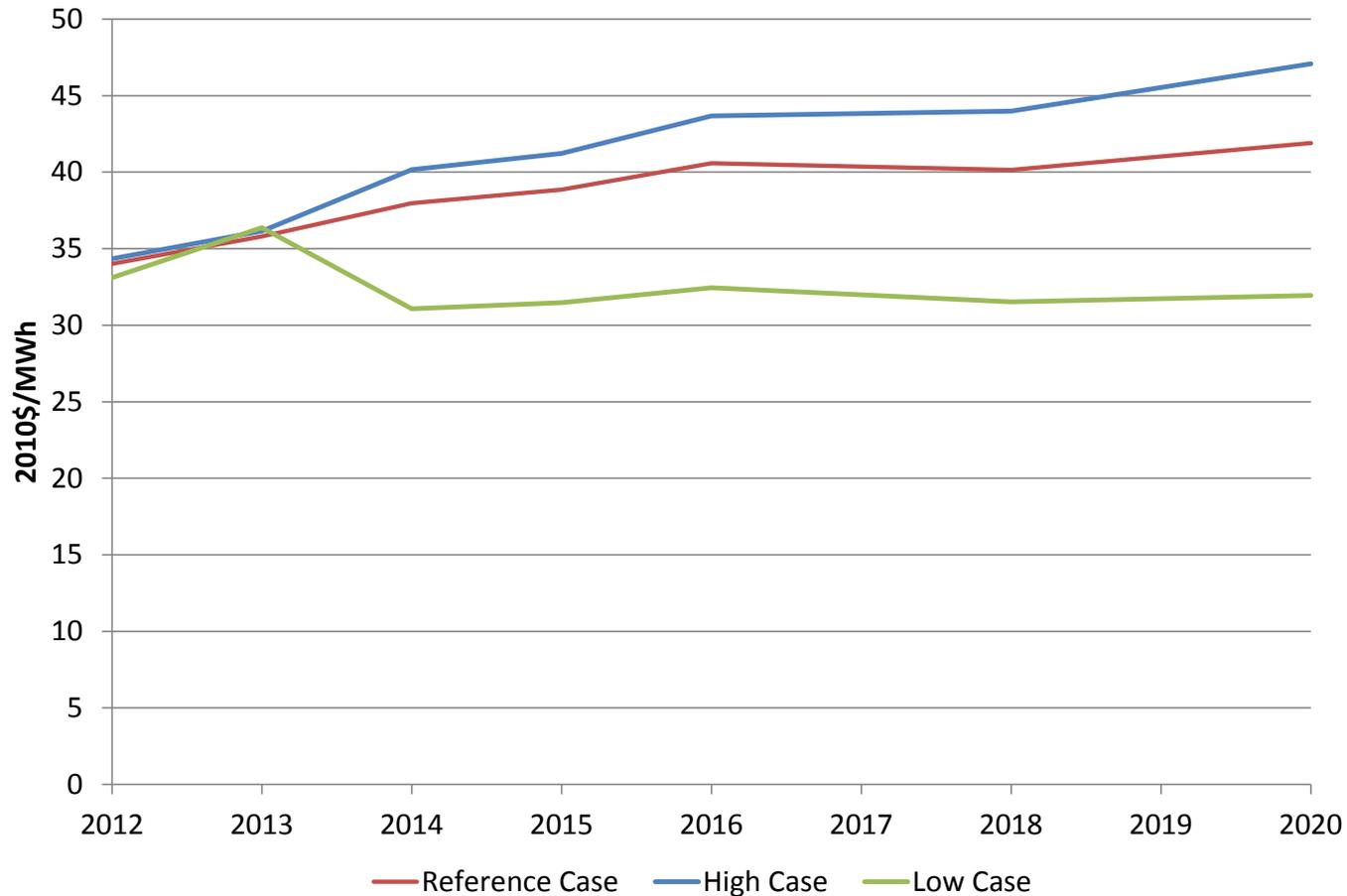
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Sensitivity Case Projections

Wholesale Electricity Prices

- The chart shows projected weighted-average wholesale electricity prices* for the ISOs and the RGGI states as a whole. These prices are not indicative of a particular hub in each region but are instead an average of all the regions included in IPM.



* IPM also projects capacity prices by region, which are not included here.

Reference Case Assumptions- Updates

Offsets Assumptions

■ DESCRIPTION

- Offsets are CO₂-equivalent emission reductions generated by eligible projects in sectors not affected by the RGGI program. Eligible categories are:
 - Landfill Gas
 - Agricultural Methane
 - SF₆
 - Afforestation
 - End-Use Energy Efficiency
- Offsets can be used to meet 3.3% of a compliance obligation; this increases to 5% at a stage one trigger event (\$7); and 10% at a stage two trigger event (\$10). International offsets are only eligible following a stage two trigger event.

Offsets Assumptions

■ 2011 RGGI REFERENCE CASE ASSUMPTIONS

- (Domestic) EPA Marginal Abatement Curves (MACs), for Landfill Gas, Agricultural Methane, SF₆ and Afforestation, adjusted for RGGI
- (International) Offsets available at market prices, based on World Bank report

■ 2012 PROPOSED APPROACH

- (Domestic) EPA Marginal Abatement Curves (MACs), for Landfill Gas, Agricultural Methane, SF₆ and Afforestation, adjusted for RGGI.
 - Model conservatively assumes no domestic offsets will be available for use in the RGGI market until CO₂ allowance prices reach \$10/ton.
 - States considered market research on potential supply and prices, transactional costs for project developers, and the potential demand from other regulatory offset programs in selecting the \$10/ton assumption above.
- (International) Offsets projected price to be \$8 from 2013-2020, based on recent Point Carbon historical and projected data. International offsets are only eligible following a stage two trigger event.

Firmly Planned Generation and Retirements

Unit-specific Retirements in NYISO and ISO-NE

Plant Name	Units	State	Nameplate Capacity (MW)	Fuel Type	Modeled Retire Year
Dunkirk Generating Station	1-4	NY	535	Coal	2012
AES Westover	8	NY	81	Coal	2012
AES Greenidge	4	NY	104	Coal	2012
Bowline Point	2	NY	417 [^]	Oil/Gas	2012
Far Rockaway	4	NY	107	Oil/Gas	2012
Astoria	2,4	NY	543	Oil/Gas	2012
Glenwood	4,5	NY	225	Oil/Gas	2012
Astoria Gas Turbines	10,11	NY	34	Oil/Gas	2012
EF Barrett	7	NY	18	Gas	2012
Beebee	13	NY	18	Gas	2012
Ravenswood	3,4	NY	35	Gas	2012
Binghamton Cogeneration	1	NY	48	Gas	2012
Indian Point	2	NY	1,020	Nuclear	2013
Indian Point	3	NY	1,025	Nuclear	2015

Plant Name	Units	State	Nameplate Capacity (MW)	Fuel Type	Modeled Retire Year
Salem Harbor	1,2	MA	160	Coal	2012
Salem Harbor	3,4	MA	587	Coal/Oil&Gas	2015
Vermont Yankee	1	VT	628	Nuclear	2014*

[^]Bowline 2 has reduced output to 150 MW

*subject to Vermont Public Service Board process and ongoing legal action.

Additional Comments

- Any additional comments are requested by August 20th 4:00 PM to allow for consideration as the states continue IPM modeling.
- Written comments should be submitted via email to info@rggi.org.
- Program review meetings materials and anticipated schedule for 2012 program review available at http://www.rrgi.org/design/program_review