DRAFT Sensitivity Case Results and Assumptions

November 5, 2010

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.*

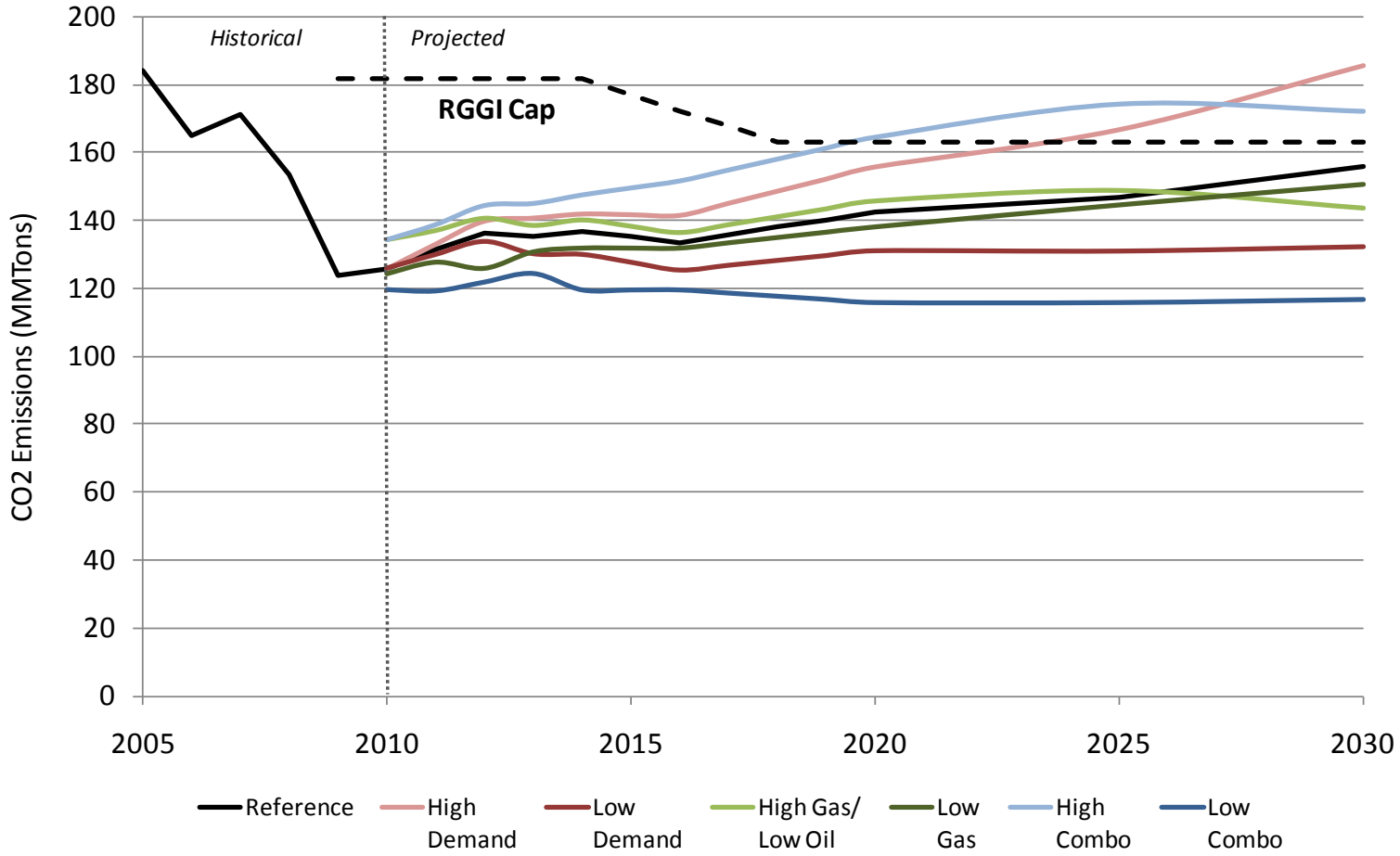
DRAFT RGGI Sensitivity Case Results

- The following slides present select projections from the latest RGGI Reference Case and draft sensitivity cases, based on assumptions in place as of November 1st .
- These projections are draft and may change as ICF makes refinements based on state review and input.
- The RGGI States specified 6 sensitivities for analysis:
  1. Higher Load Growth
  2. Lower Load Growth
  3. Higher Natural Gas Prices & Lower Oil Prices
  4. Lower Natural Gas Prices
  5. High Emissions Combination
  6. Low Emissions Combination
- This presentation describes the sensitivity assumptions and results for each related pair of cases (Load Growth, Fuel Prices and Combinations).
- The sensitivity case results are shown as compared to the Reference Case and then as compared to each other.
- The final section contains the proposed specifications for a Regulatory Sensitivity Case, which has not yet been analyzed.

RGGI CO_2 Emissions

Reference Case and All Sensitivity Cases

- The chart shows historical and projected CO_2 emissions for the RGGI states.



LOAD GROWTH SENSITIVITY CASES

DRAFT RGGI Sensitivity Case Specifications

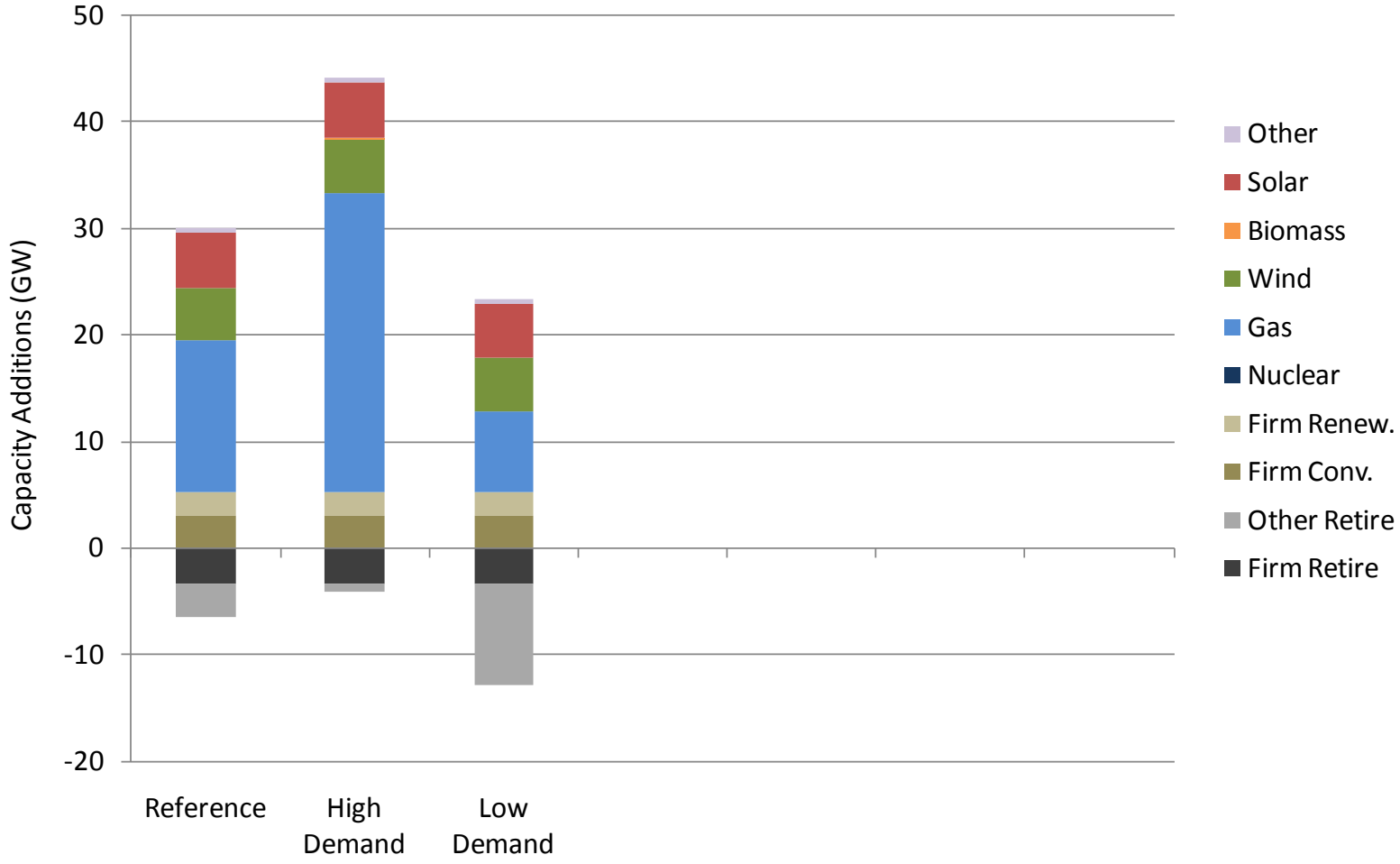
Load Growth Sensitivity Cases

Sensitivity Run	Category of Change	Components	Assumptions
1 **HIGH LOAD**	Higher load growth	• Economy • Weather • Additional load, e.g. Electric Vehicles	• Higher economic growth • EV 1% penetration rate per year of the current fleet. The forecast is 1.6% and 2.4% higher than the reference case in 2020 and 2030, respectively. • Weather proposal-10% increase over normalized weather • Includes reference case energy efficiency estimates • Above is estimated to result in average annual growth rate of 1.3% per year
2 **LOW LOAD**	Lower load growth	• Increased Energy Efficiency	• State by state calculation of more aggressive EE targets than reference case

RGGI Cumulative Capacity Changes by 2030

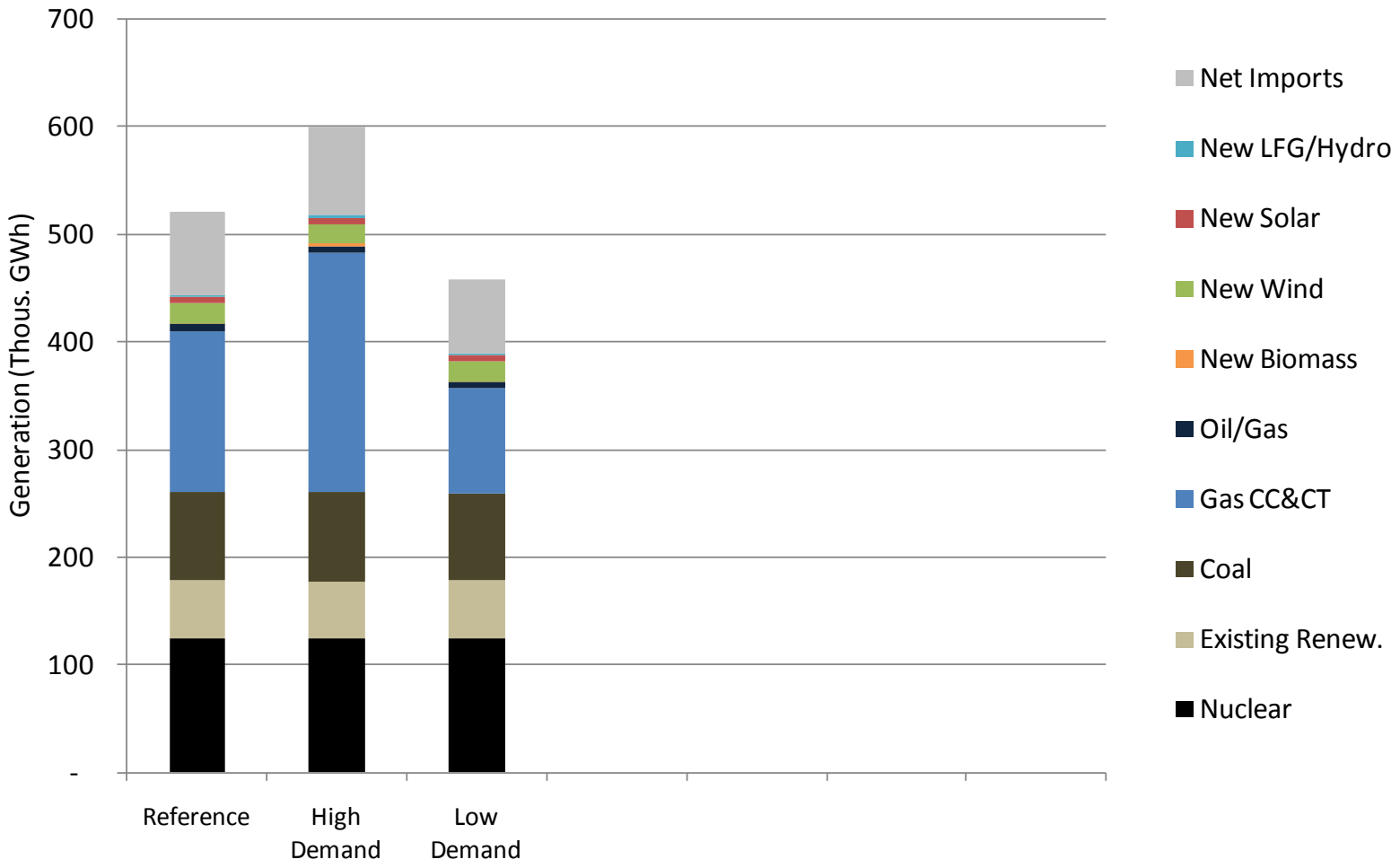
Reference Case and Load Growth Sensitivity Cases

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



RGGI Generation Mix in 2030

Reference Case and Load Growth Sensitivity Cases



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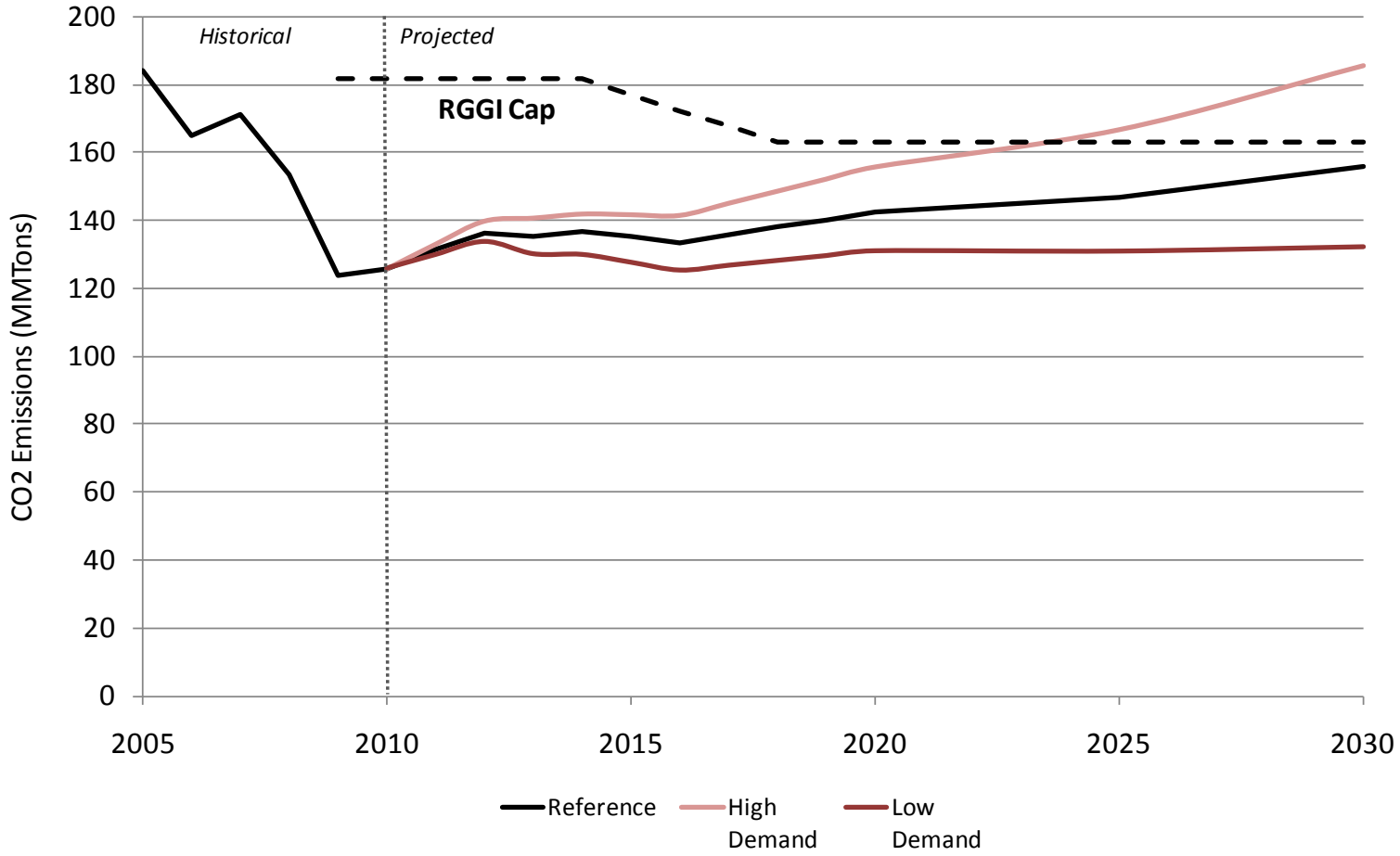


FUEL PRICE SENSITIVITY CASES

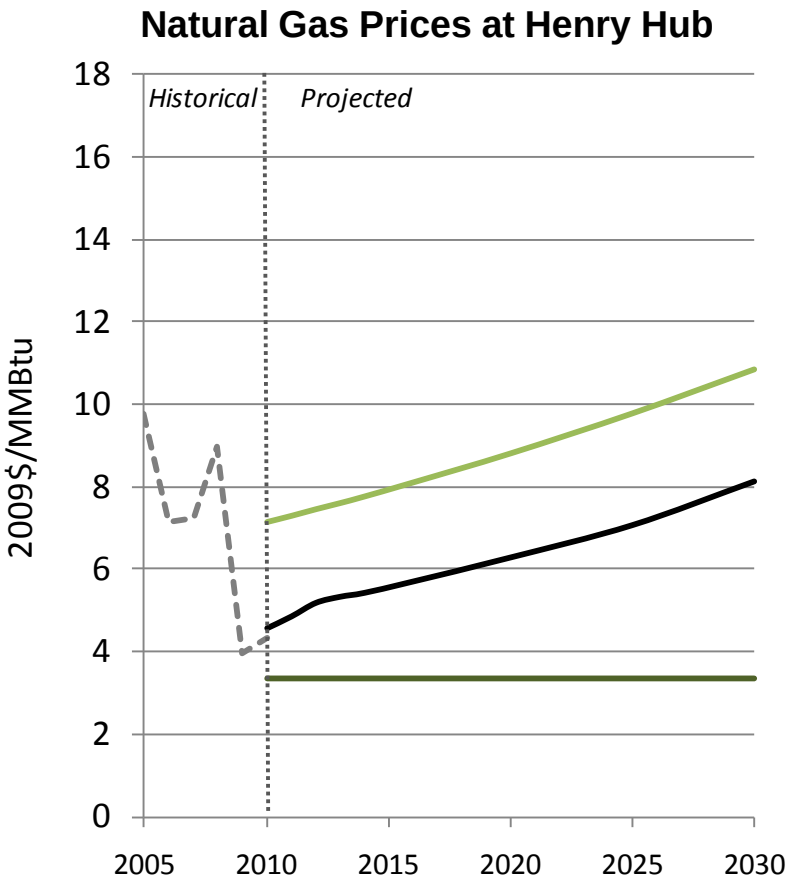
DRAFT RGGI Sensitivity Case Specifications

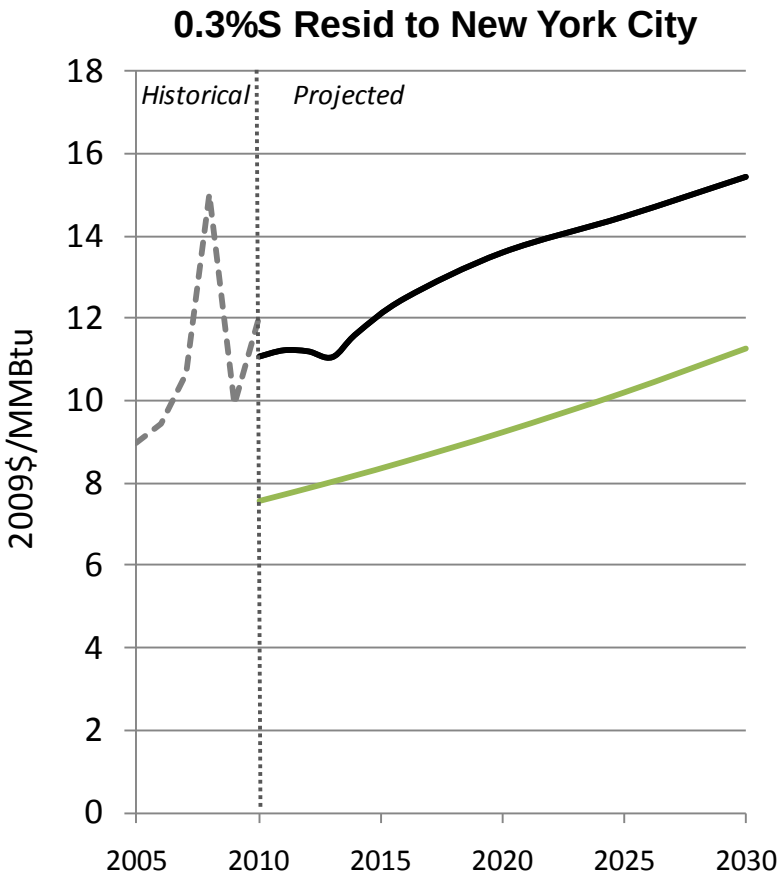
Fuel Price Sensitivity Cases

Sensitivity Run	Category of Change	Components	Assumptions
3 HIGH GAS/ LOW OIL	High natural gas prices and low oil prices	• High relative natural gas prices • Low relative oil prices	• Use oil (↓) and natural gas (↑) price differential • Price differential set such that dual-fuel EGUs burn oil
4 LOW GAS	Low natural gas prices	• Low relative natural gas prices	• Use differential of approximately $1.50/MMBtu, on average, between delivered coal and gas to the RGGI region • Use Henry Hub gas price of $3.35/MMBtu (2009$) in every year

Fuel Price Sensitivity Cases

Natural Gas and Oil Price Assumptions





Historical — Reference — High Gas/ Low Oil — Low Gas

RGGI Cumulative Capacity Changes by 2030

Reference Case and Fuel Price Sensitivity Cases

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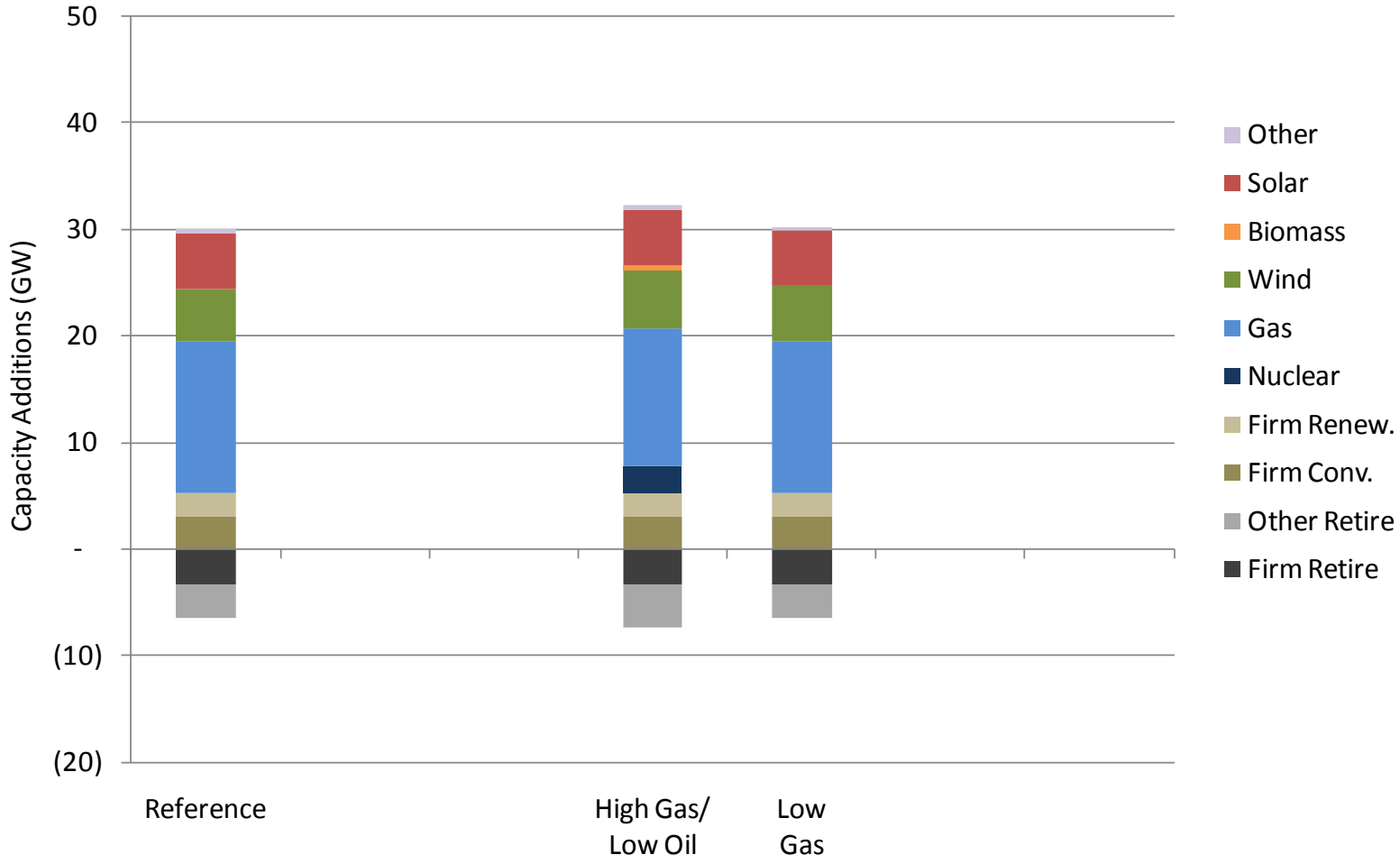
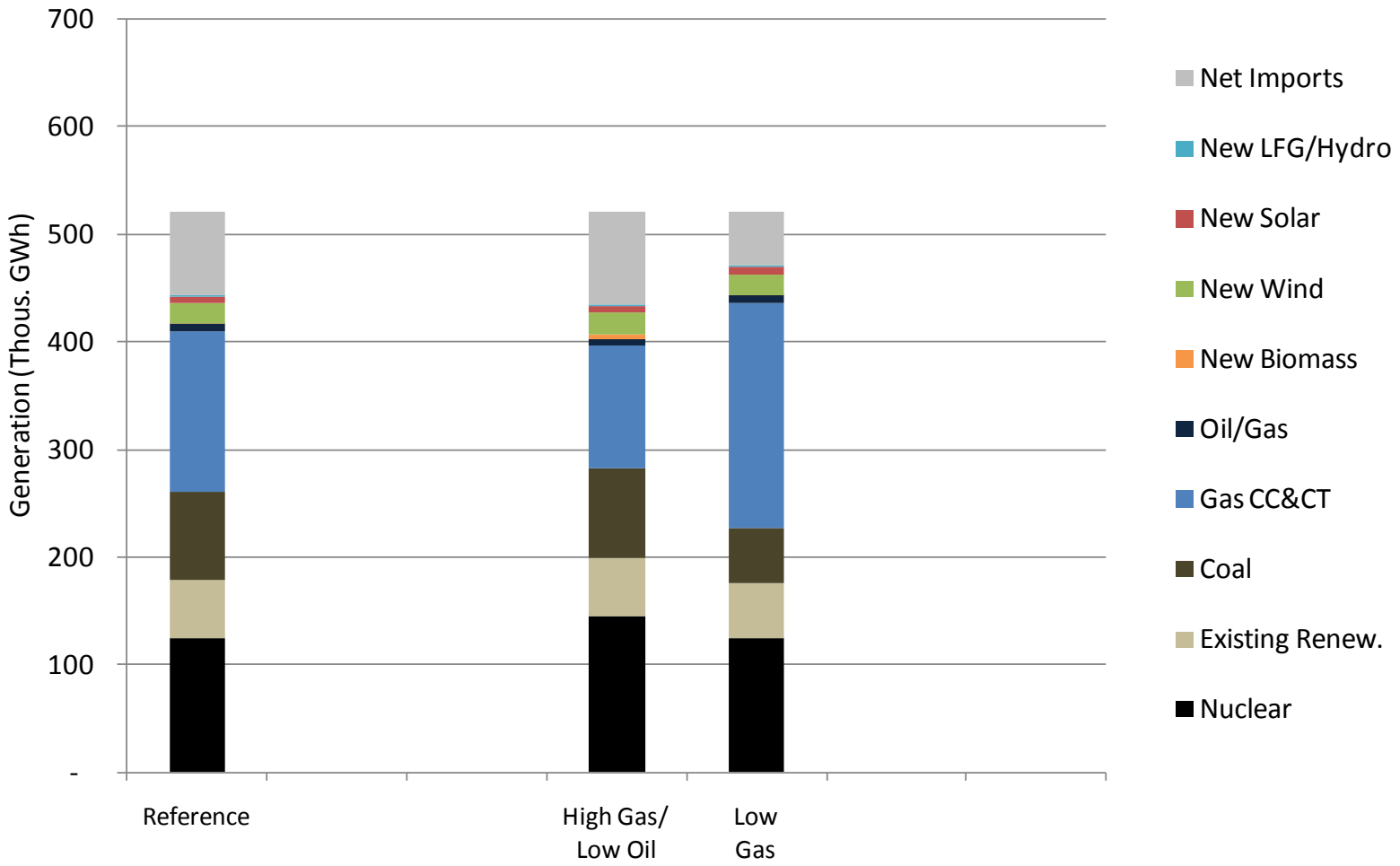


RGGI Generation Mix in 2030

Reference Case and Fuel Price Sensitivity Cases



RGGI CO_2 Emissions

Reference Case and Fuel Price Sensitivity Cases

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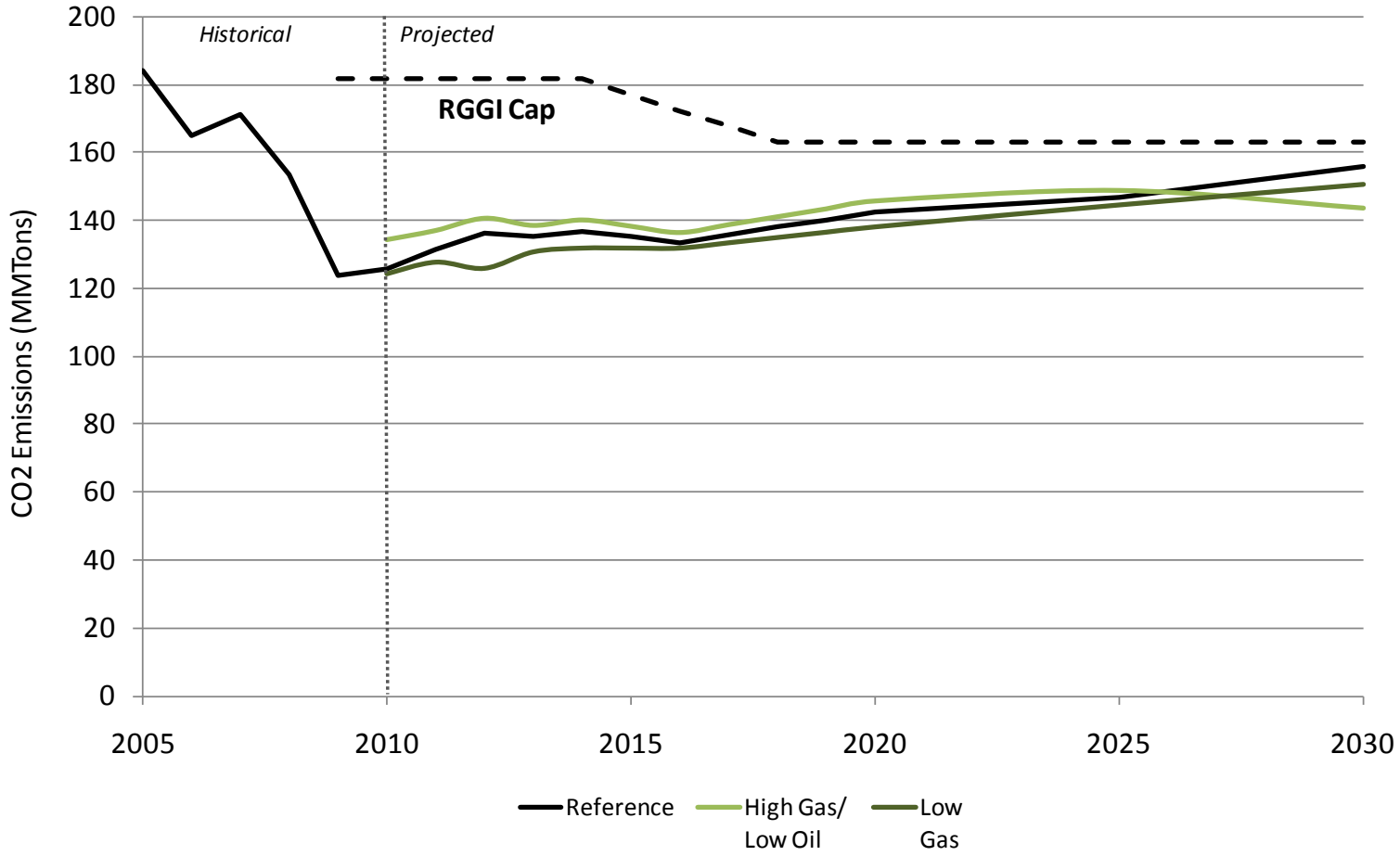


EMISSIONS COMBINATION SENSITIVITY CASES

DRAFT RGGI Sensitivity Case Specifications

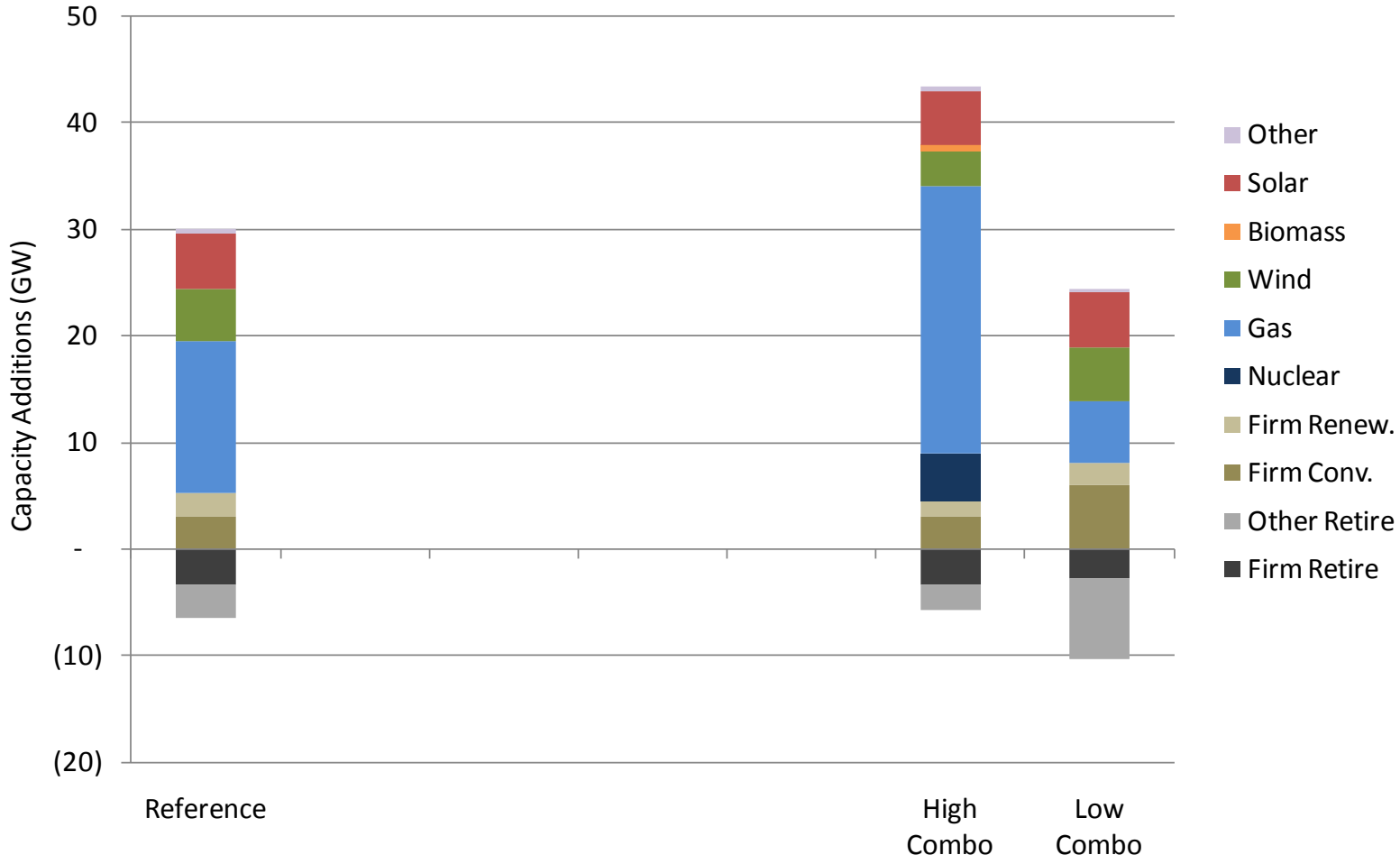
Emissions Combination Sensitivity Cases

Sensitivity Run	Category of Change	Components	Assumptions
5 HIGH EMISSIONS COMBO	Electric Demand Growth	Load in RGGI states	Taken from High Load Sensitivity
	Natural Gas Prices	Henry Hub prices	Taken from High Gas / Low Oil Sensitivity
	Generation Capacity	Nuclear Capacity	No changes from Reference Case assumptions
		Renewable Capacity	Do not include Cape Wind or Bluewater Wind projects
			Lower renewable deployment by 50%
	Transmission Capability	PATH and MAPP transmission lines	Do not include lines
6 LOW EMISSIONS COMBO	Electric Demand Growth	Load in RGGI states	Taken from Low Load Sensitivity
	Natural Gas Prices	Henry Hub prices	Taken from Low Gas Sensitivity
	Generation Capacity	Nuclear Capacity	New unit at Calvert Cliffs in 2020
			New unit at Hope Creek/Salem in 2020
			Vermont Yankee does not retire
		Renewable Capacity	No changes from Reference Case assumptions
	Transmission Capability	PATH and MAPP transmission lines	No changes from Reference Case assumptions

RGGI Cumulative Capacity Changes by 2030

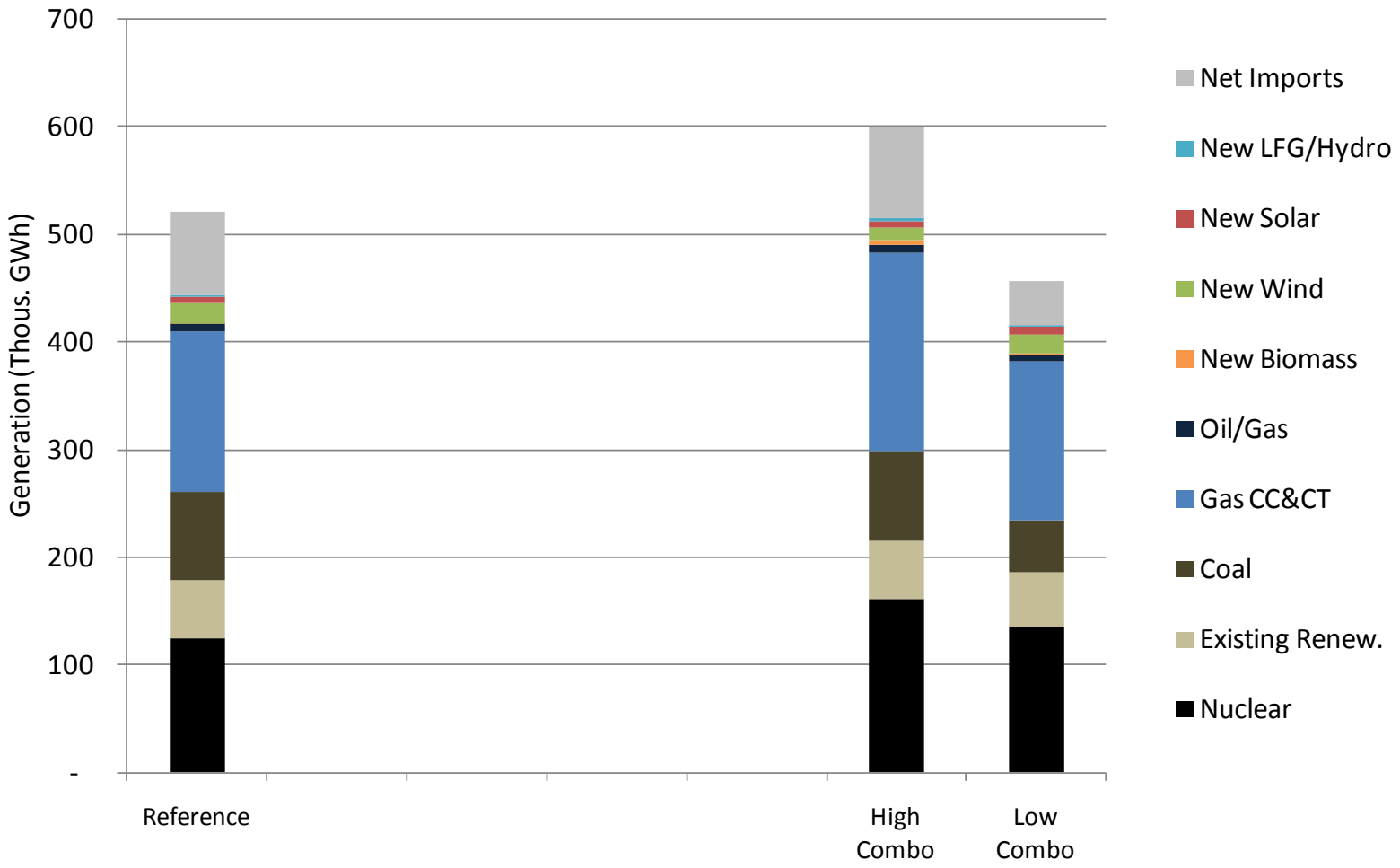
Reference Case and Emissions Combination Sensitivity Cases

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



RGGI Generation Mix in 2030

Reference Case and Emissions Combination Sensitivity Cases



RGGI CO_2 Emissions

Reference Case and Emissions Combination Sensitivity Cases

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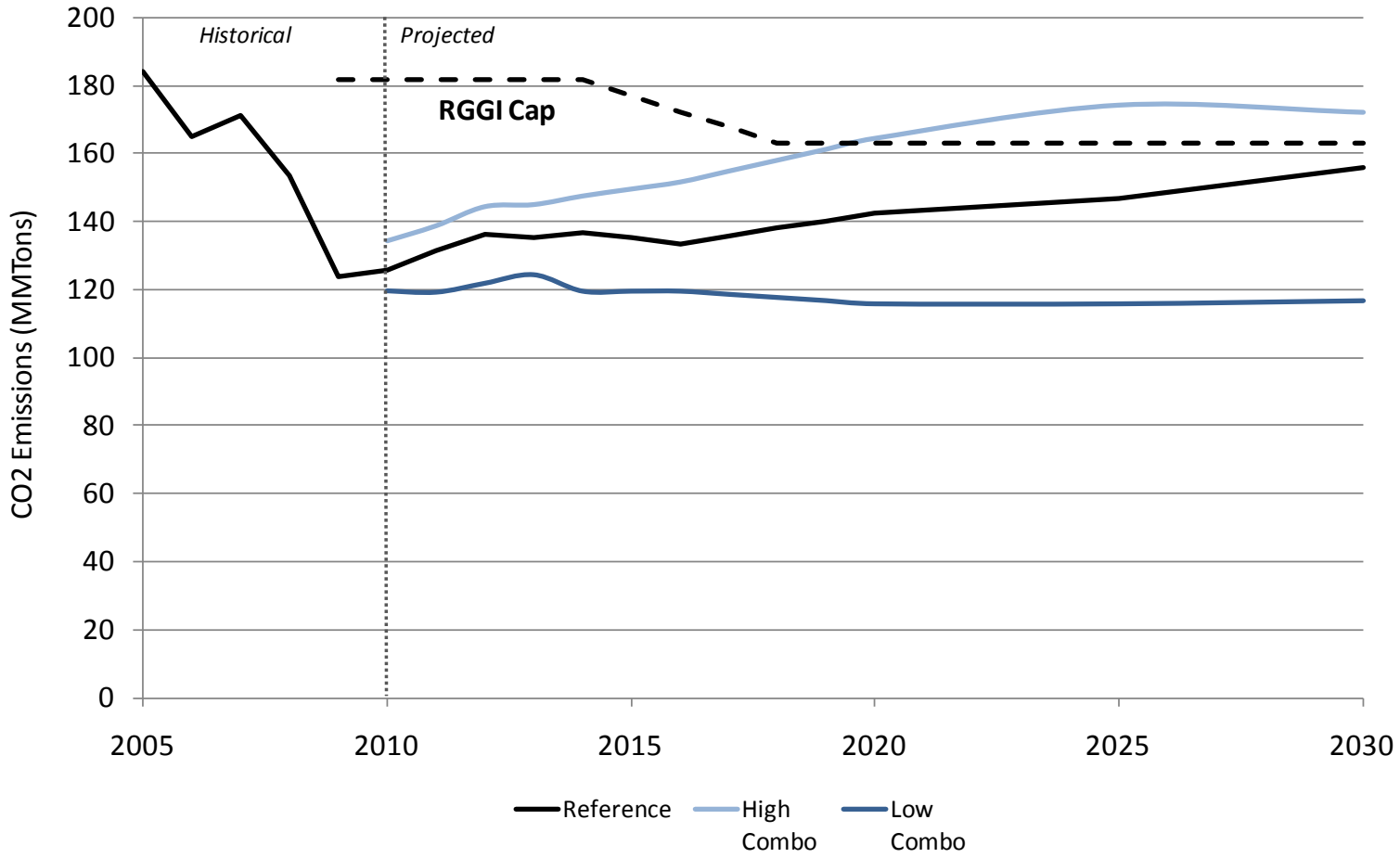

ALL SENSITIVITY CASES

RGGI Cumulative Capacity Changes by 2030

Reference Case and All Sensitivity Cases

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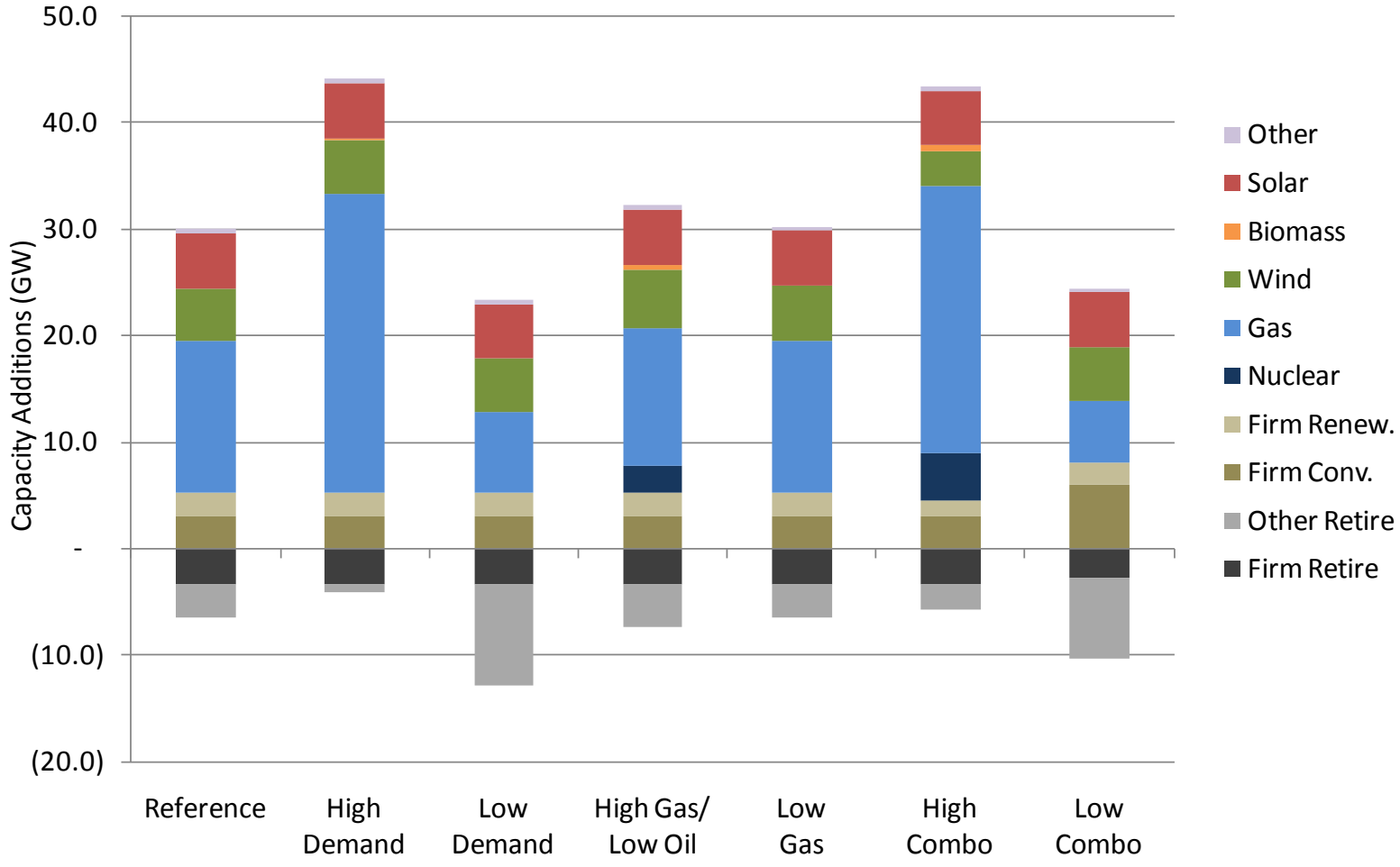
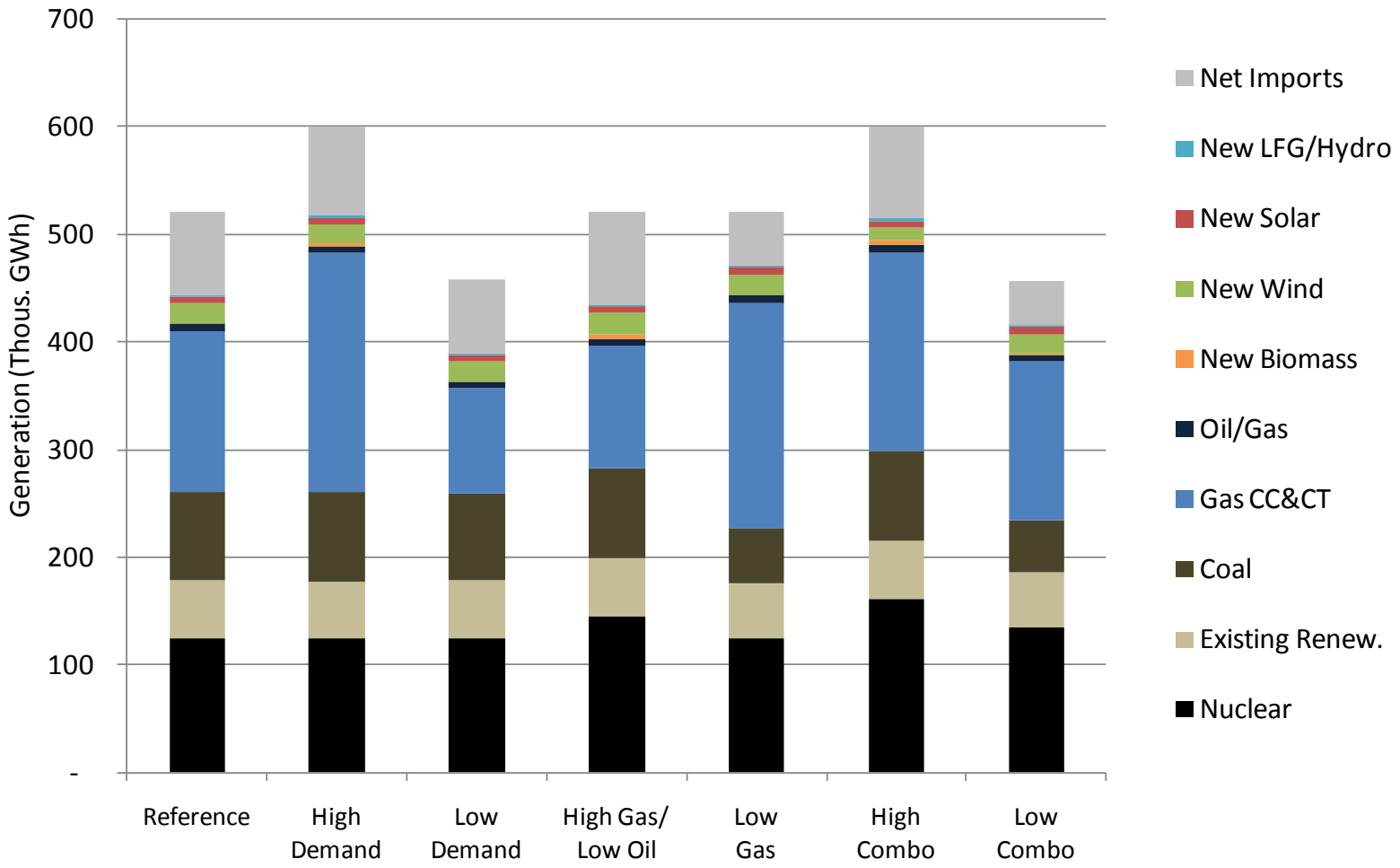


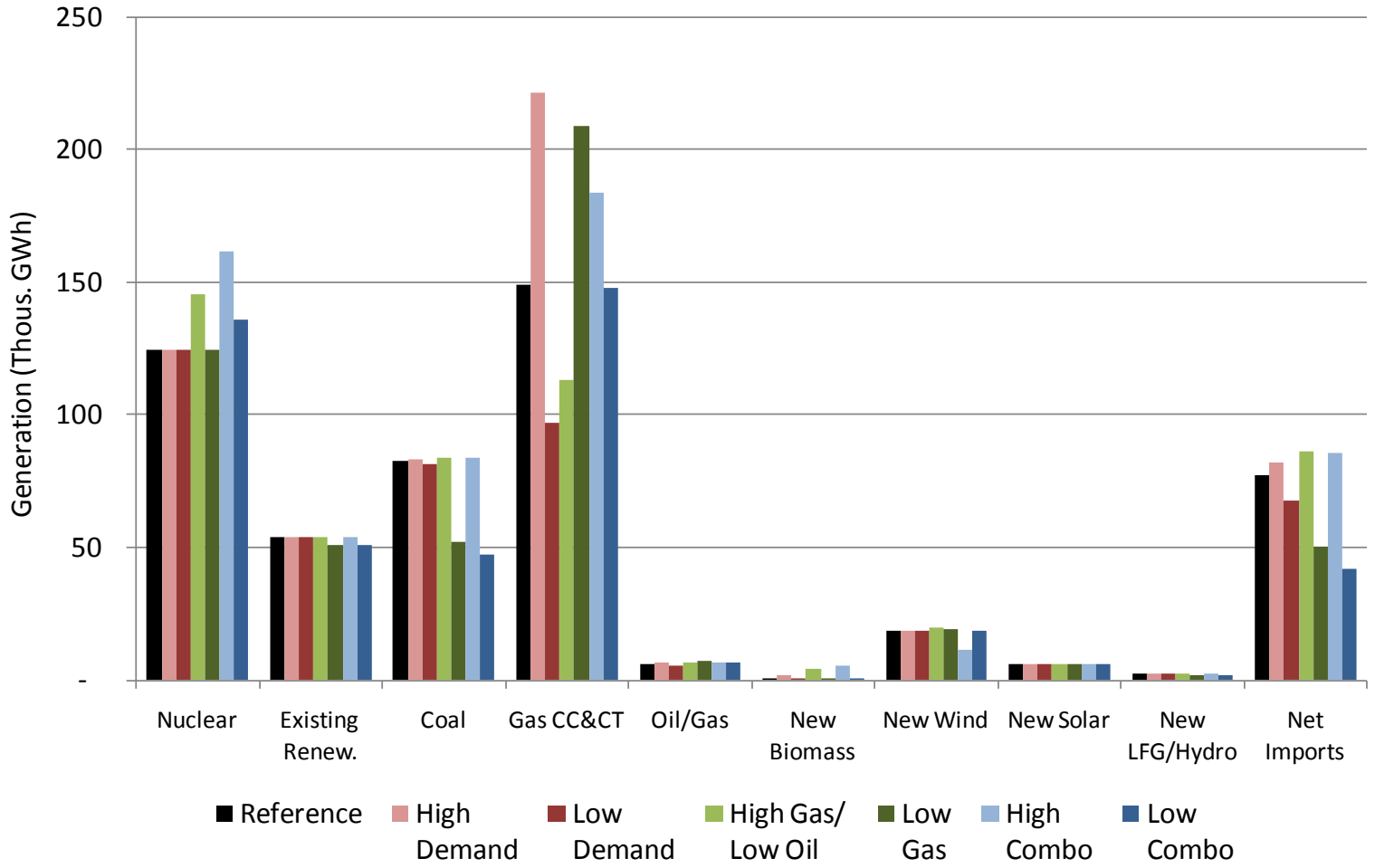
RGGI Generation Mix in 2030

Reference Case and All Sensitivity Cases



RGGI Generation Mix by Type in 2030

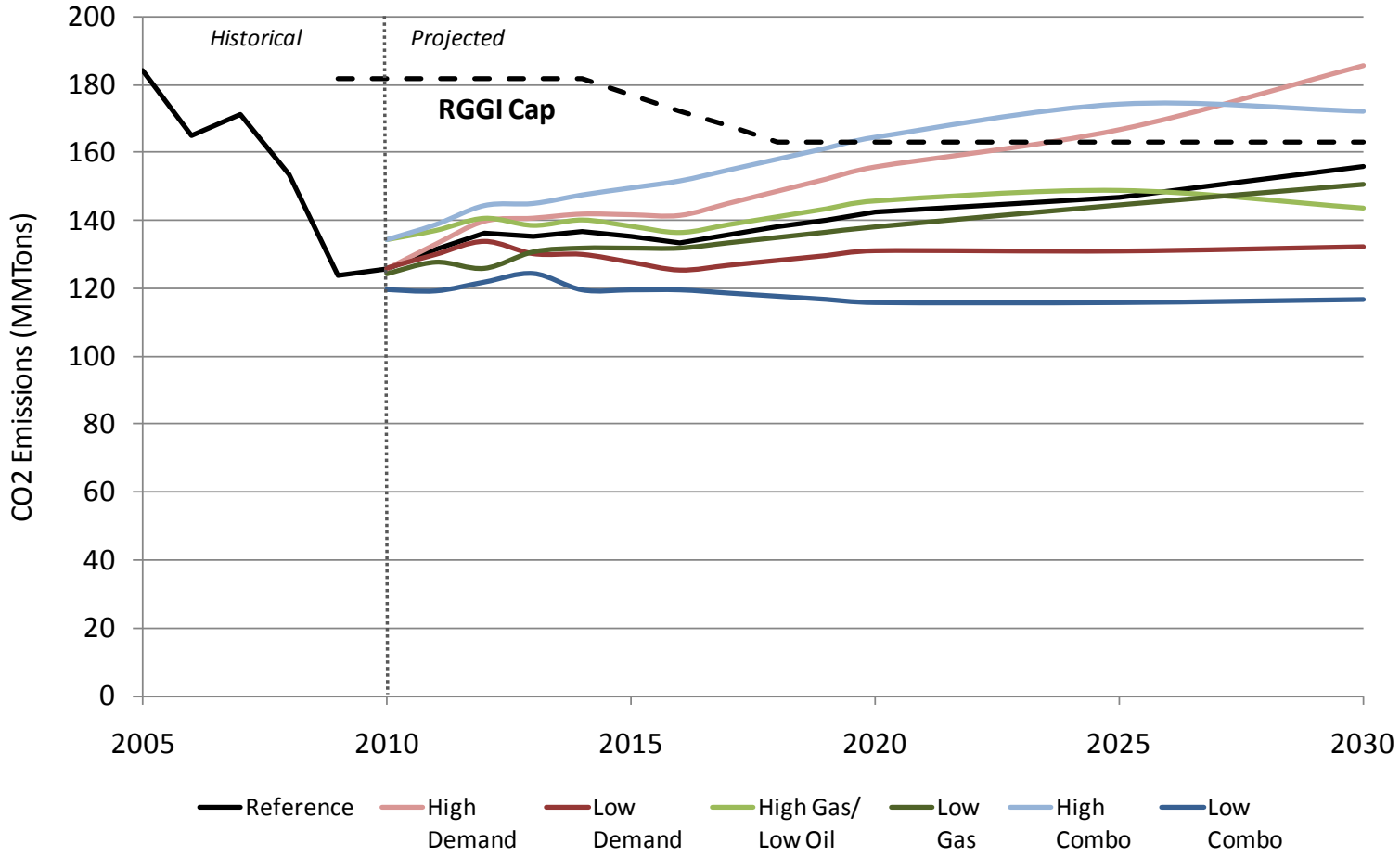
Reference Case and All Sensitivity Cases



RGGI CO_2 Emissions

Reference Case and All Sensitivity Cases

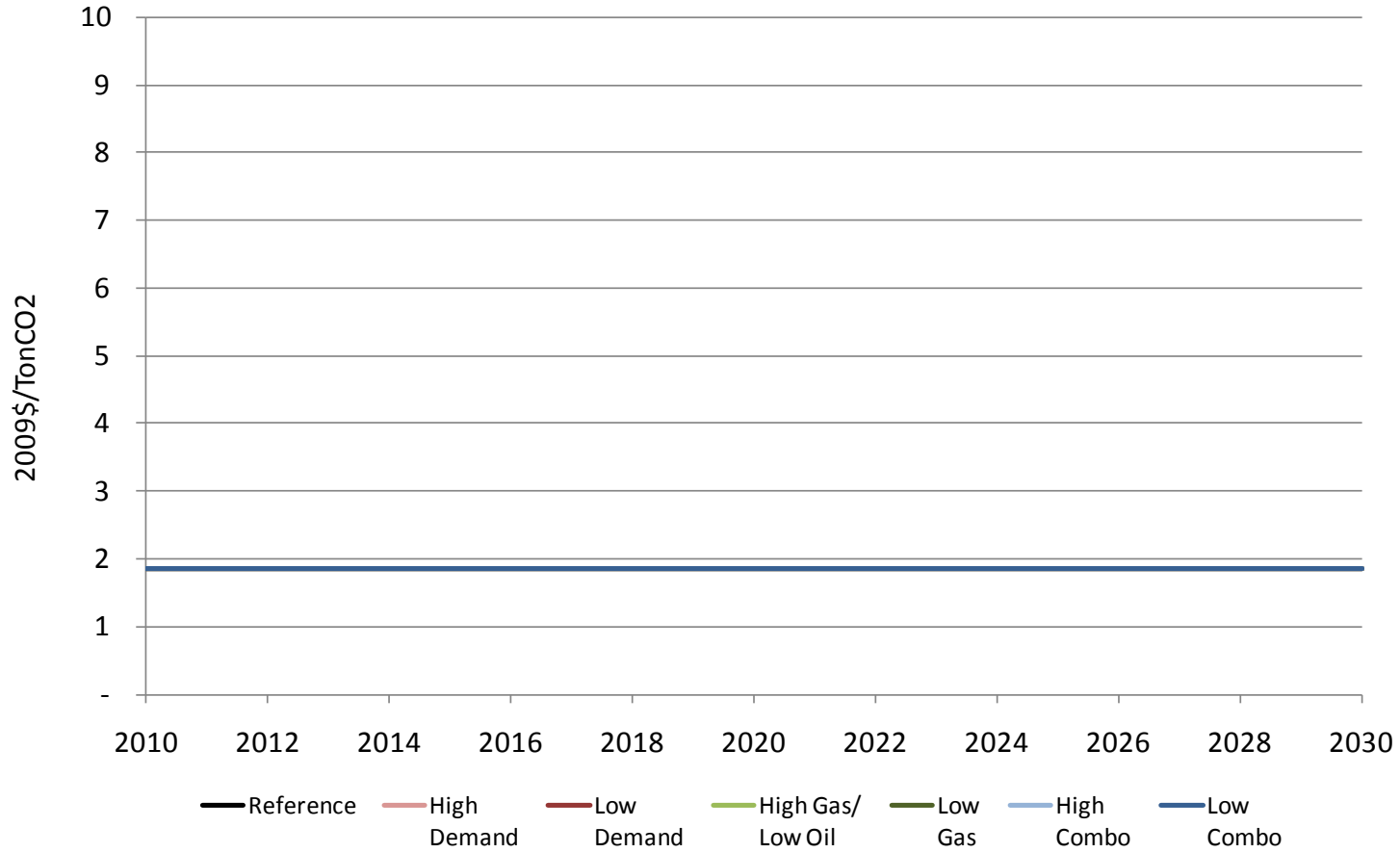
- The chart shows historical and projected CO_2 emissions for the RGGI states.



RGGI Allowance Price

Reference Case and All Sensitivity Cases

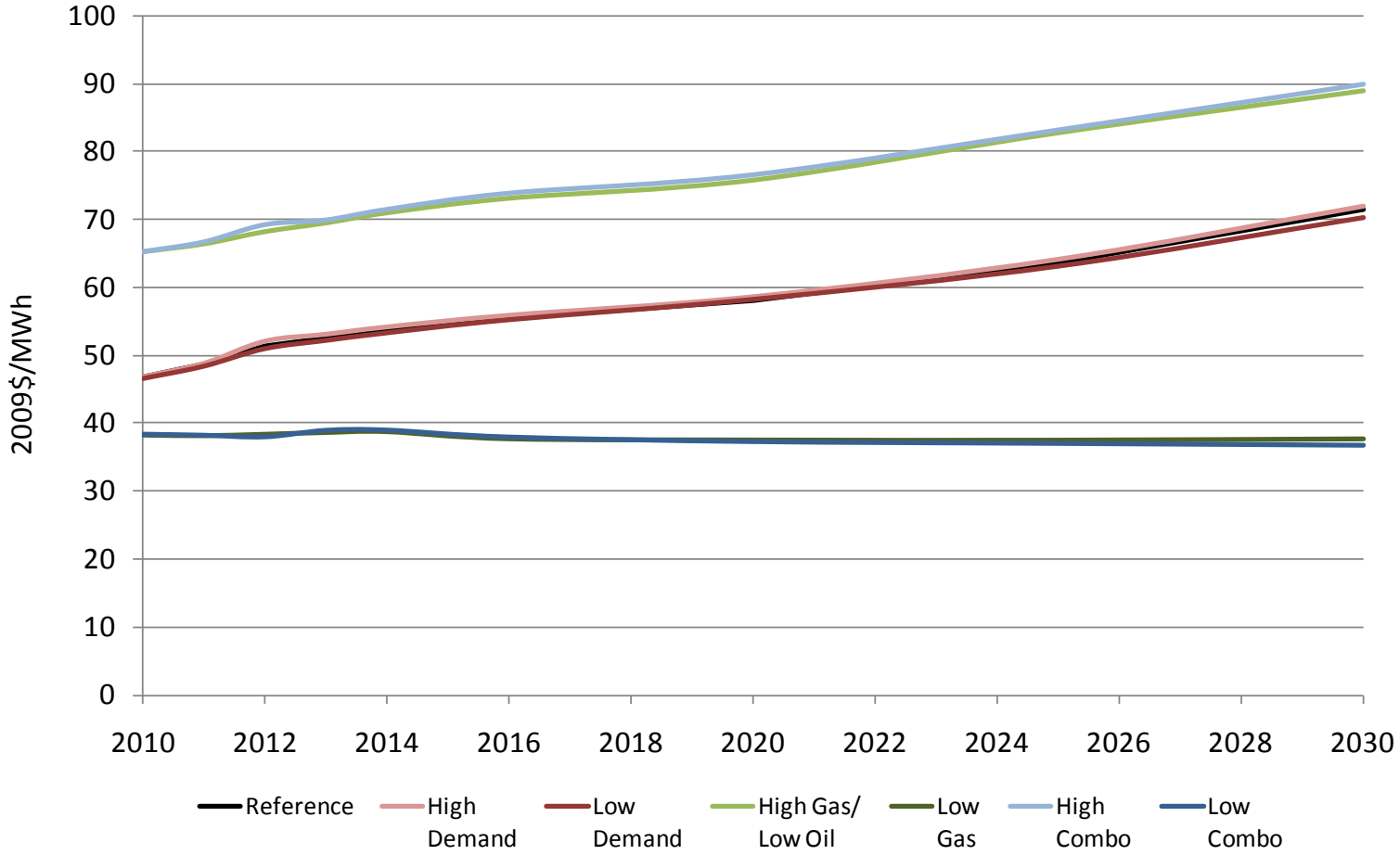
- RGGI emissions are projected to remain below the cap in most cases over the time horizon of the analysis, so projected prices in those cases are set by the auction price floor. Cases with emissions that exceed the cap in some years carry a sizable enough bank into those years to keep the price at the auction floor.



Wholesale Electricity Prices

Reference Case and All Sensitivity Cases

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



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

PROPOSED REGULATORY SENSITIVITY

DRAFT RGGI Sensitivity Case Specifications

Proposed Federal Regulatory Sensitivity Case

Sensitivity Run	Category of Change	Components	Assumptions
7 FEDERAL REGULATORY POLICY	**Federal Regulatory Policy**	Hazardous Air Pollutants (HAPs)	• Coal units must have in place scrubber, SCR, ACI and fabric filter by 2015. Oil/gas steam units are required to install a fabric filter, but will continue to meet minimum run requirements.
		Water Intake-316(b)	• Assume that all steam units (coal, nuclear, and oil/gas) that currently rely on once-through cooling must install a cooling tower by 2018. • Cooling tower costs based on NERC 2010 Special Reliability Scenario Assessment ($240 - $300 per gallon per minute) • State modifications to NERC cost data for individual plants
		Coal Combustion Residuals (CCR, ash)	• Plants with surface impoundments must convert to dry ash handling • EOP Group 2009 report cost data (also referred to in the NERC 2010 study) • Compliance date of 2015
		Ozone NAAQS	• New NAAQS standards are met with the SCR control requirement included in the HAPs compliance assumption.