



RGGI

Electricity Sector Modeling Results

***RPS Sensitivity & Very High Emissions Reference
and Package Cases***

October 26, 2005

ICF Consulting

Outline

- RGGI Reference Case with 50% RPS Sensitivity
- RGGI Very High Emissions Reference Case
- RGGI Very High Emissions Reference and Package Cases
- RGGI Very High Emissions Package Cases & Standard Package Case

**RGGI Reference Case with
50% RPS Sensitivity**

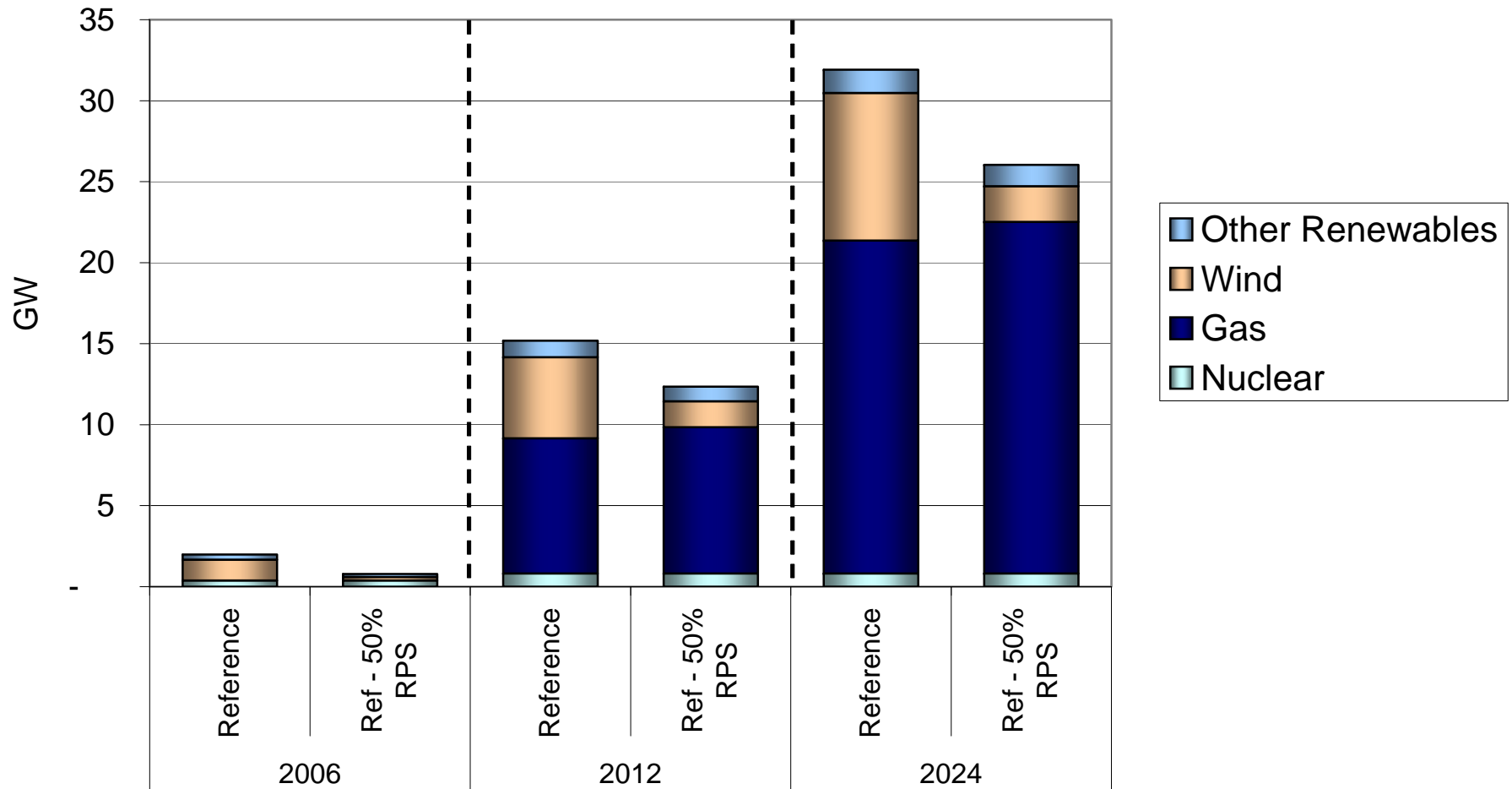
RPS Sensitivity Overview

- The Reference Case 50% RPS Sensitivity Case includes two changes to the Reference Case:
 - The RPS generation requirement is set to 50% of Reference Case levels in every year;
 - The RGGI states can generate no more than that 50% level, even if incremental renewable builds would be economic; and
 - Renewable capacity additions in New Hampshire are limited to 85 MW cumulatively in 2010 with no additional capacity permitted beyond 2010.



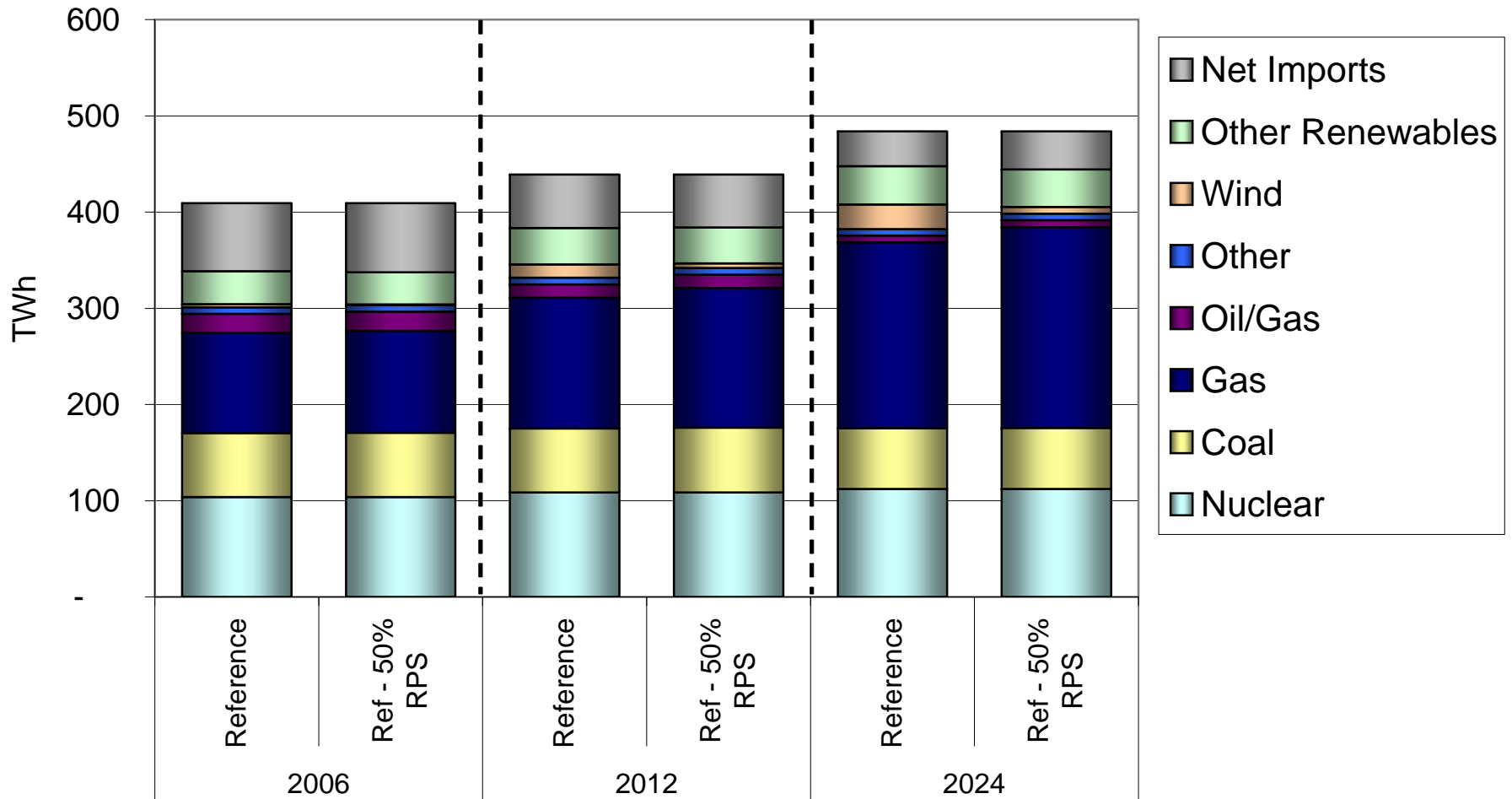
RGGI Capacity Additions

Reference v. Reference w/ 50% RPS



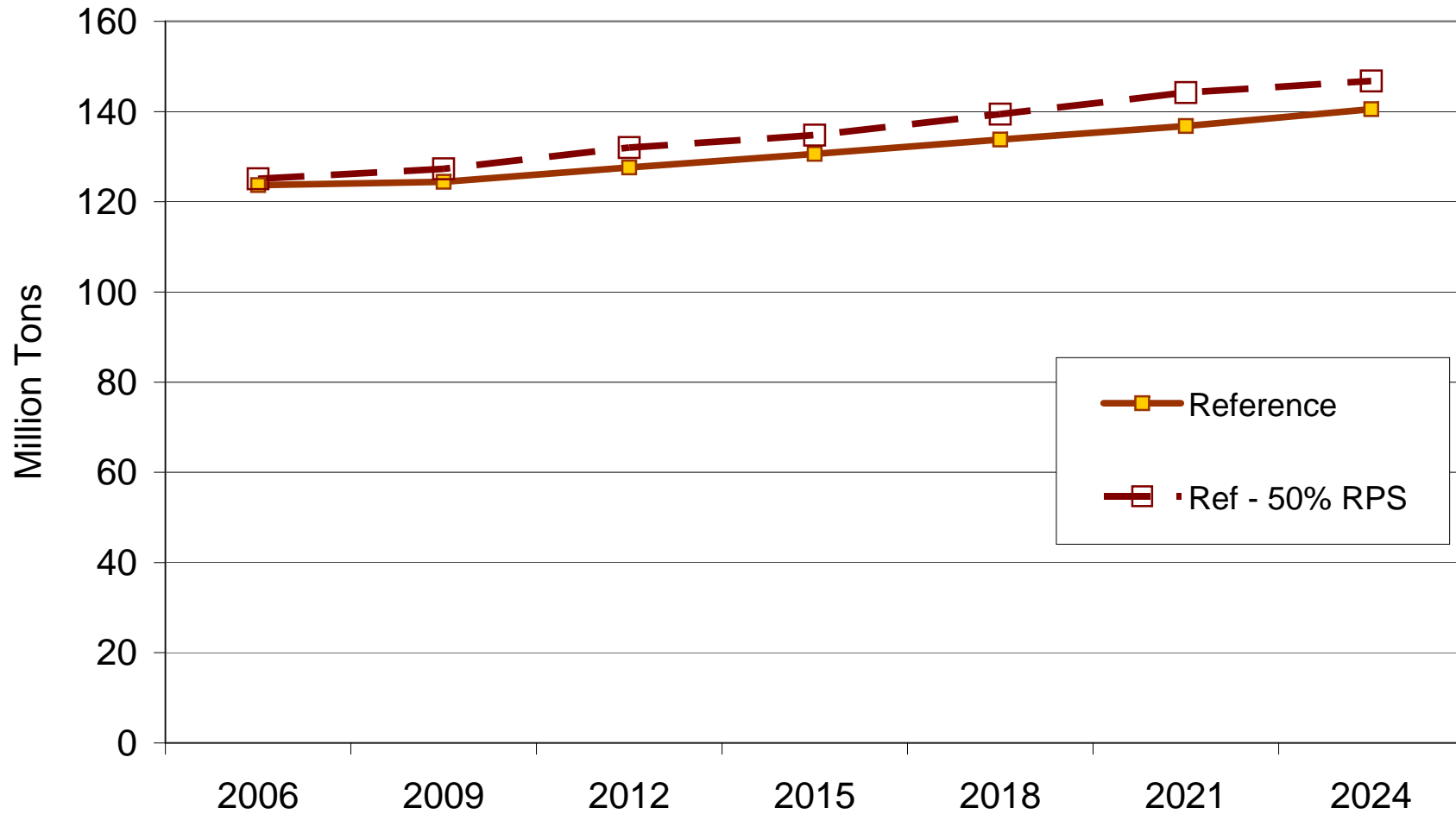
RGGI Generation Mix

Reference v. Reference w/ 50% RPS



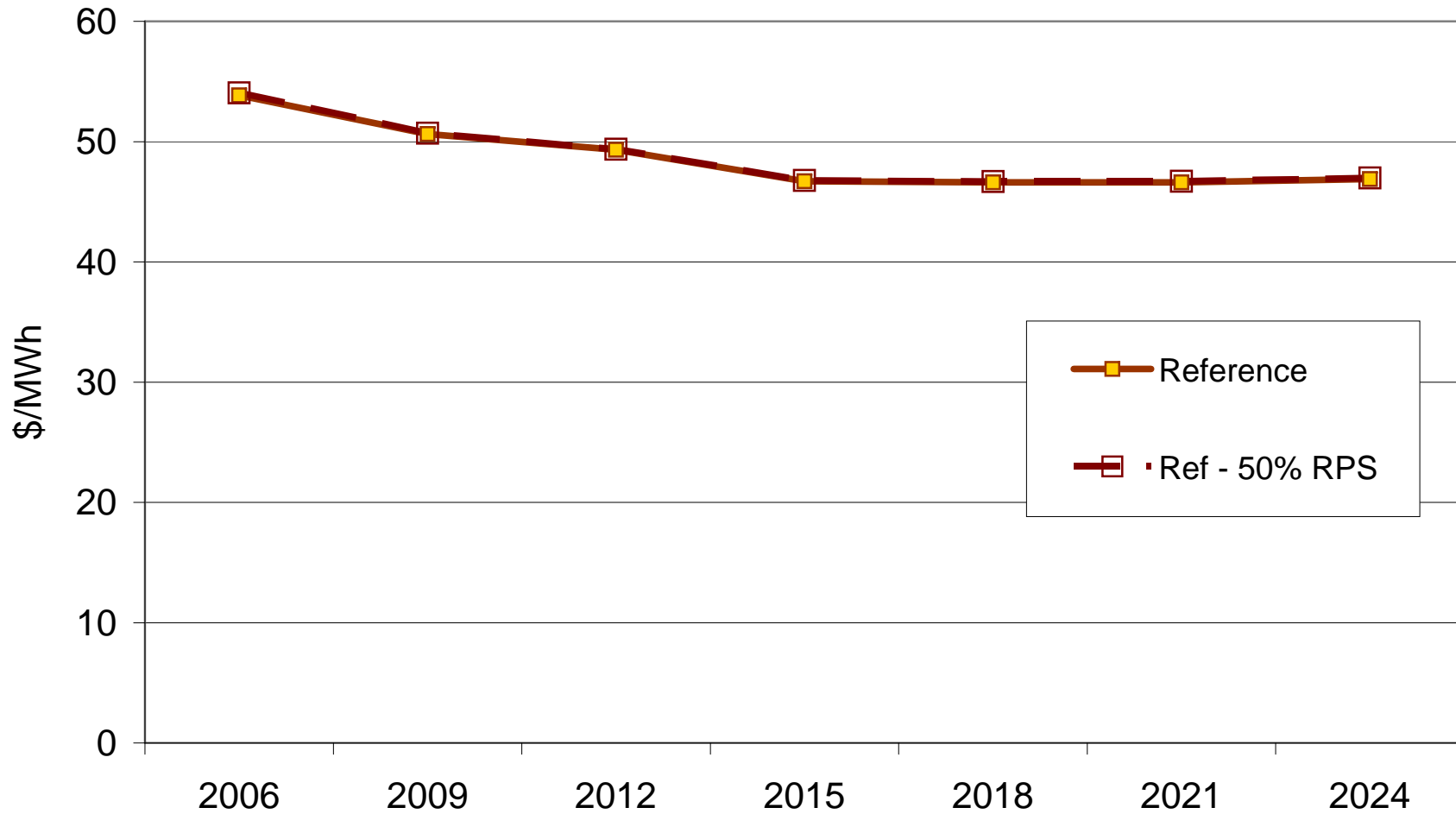
RGGI Emissions

Reference v. Reference w/ 50% RPS



RGGI Energy Prices

Reference v. Reference w/ 50% RPS

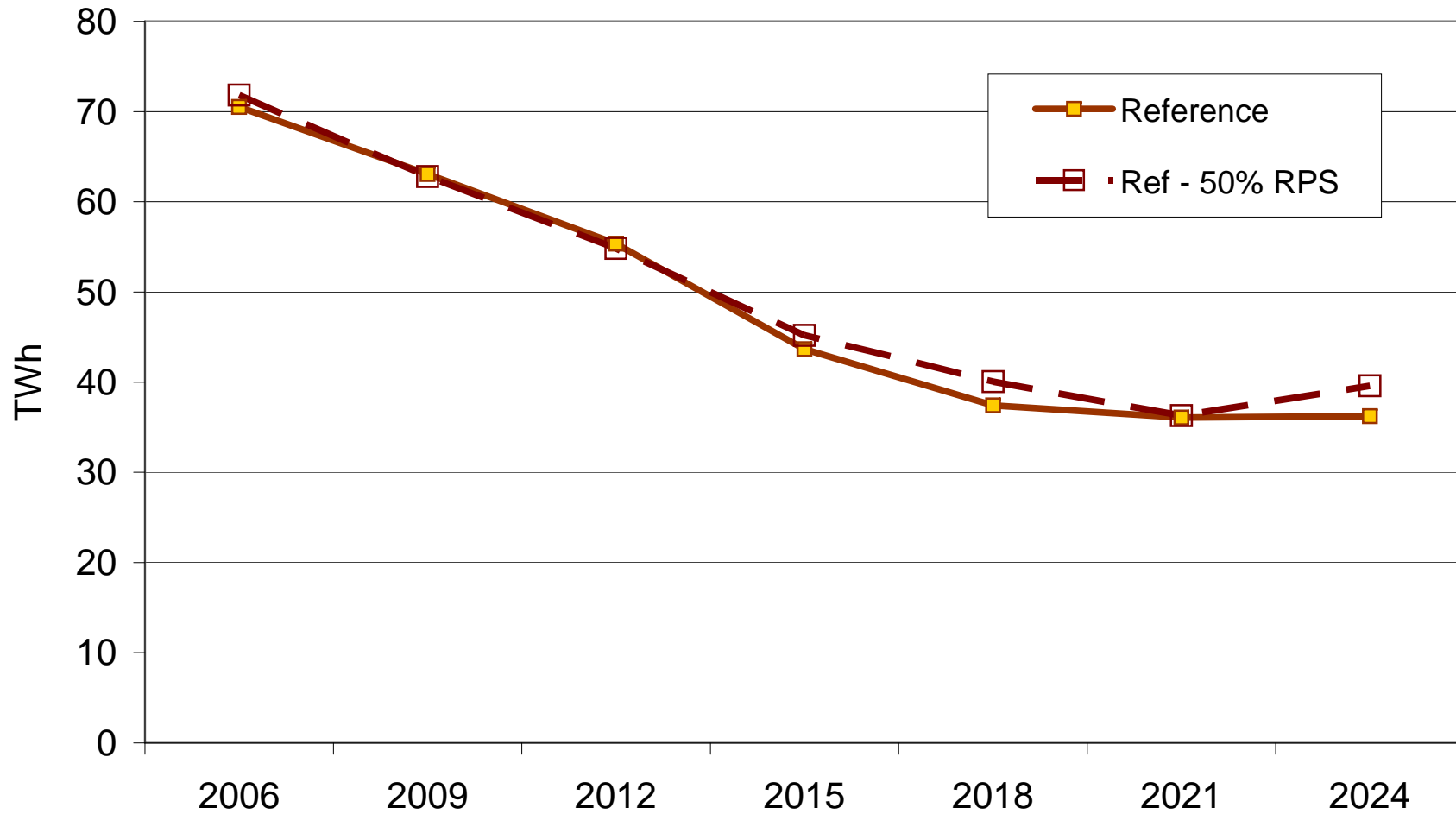


NOTE: Energy prices as shown here include annual capacity payments spread over hours of the year.



RGGI Net Imports

Reference v. Reference w/ 50% RPS



**RGGI Very High Emissions
Reference Case**

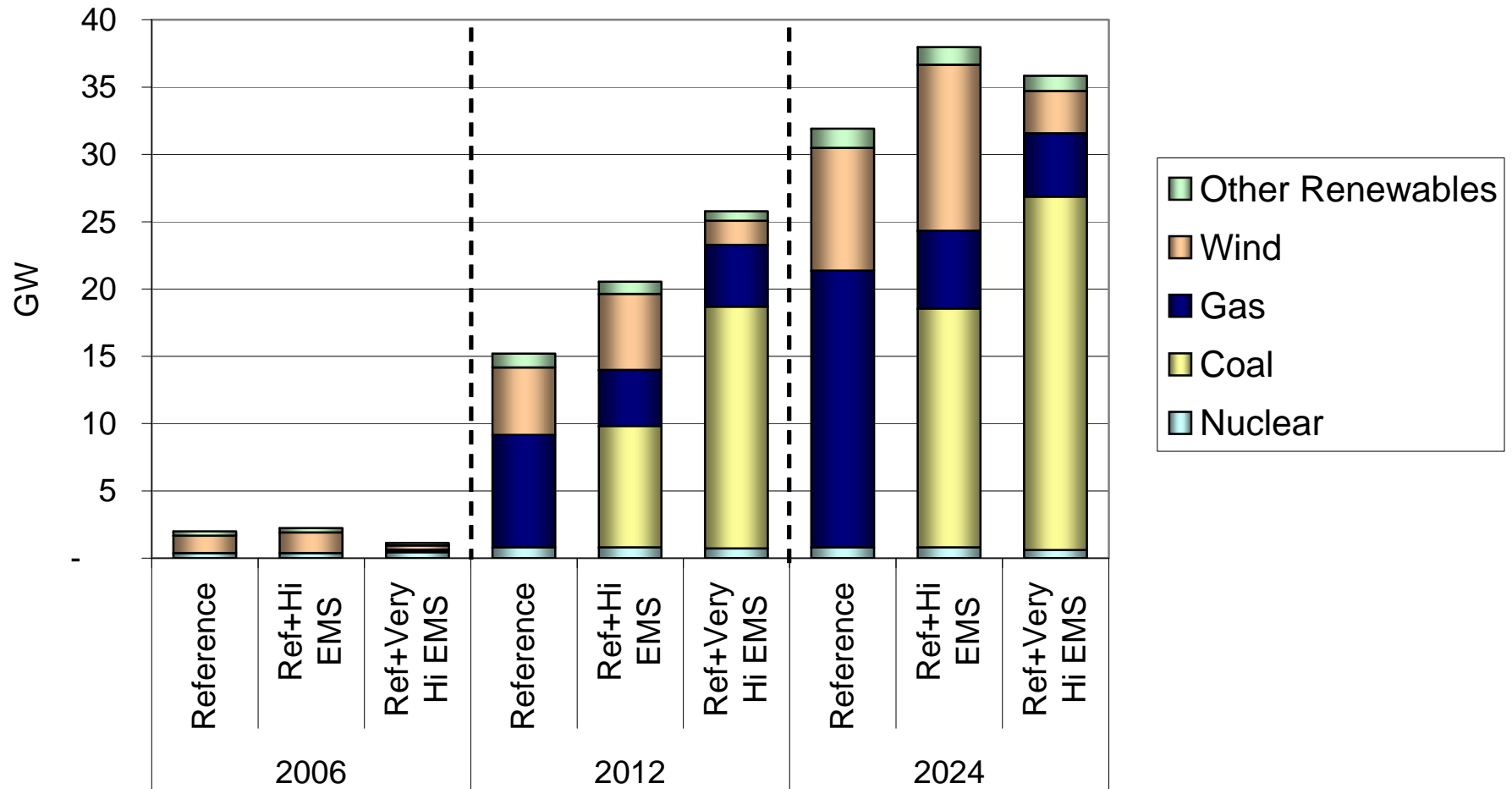
compared to

Reference & High Emissions Reference Cases

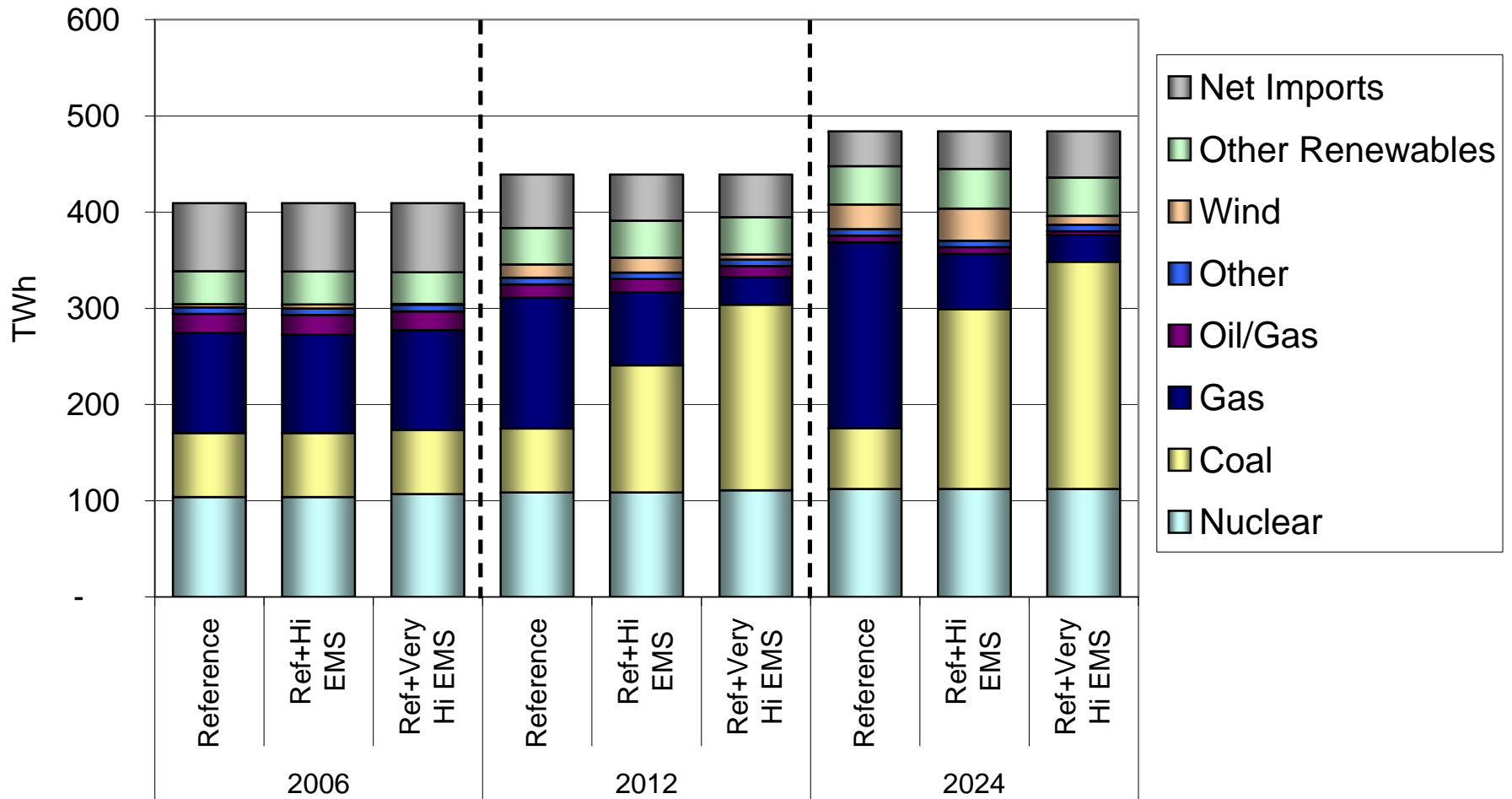
Very High Emissions Case Overview

- The Very High Emissions Reference Case is based on the 50% RPS Reference Case above and assumes:
 - Sustained \$11/MMBtu Henry Hub natural gas prices throughout the time horizon;
 - Coal builds allowed in RGGI;
 - As in the 50% RPS Case, renewables generation in RGGI constrained at the 50% RPS levels, even when otherwise economic; and
 - Limited renewable builds in New Hampshire.
- The results of the Very High Emissions Reference Case are compared below to the RGGI Reference Case and the High Emissions Reference Case (with \$7/MMBtu sustained gas prices).

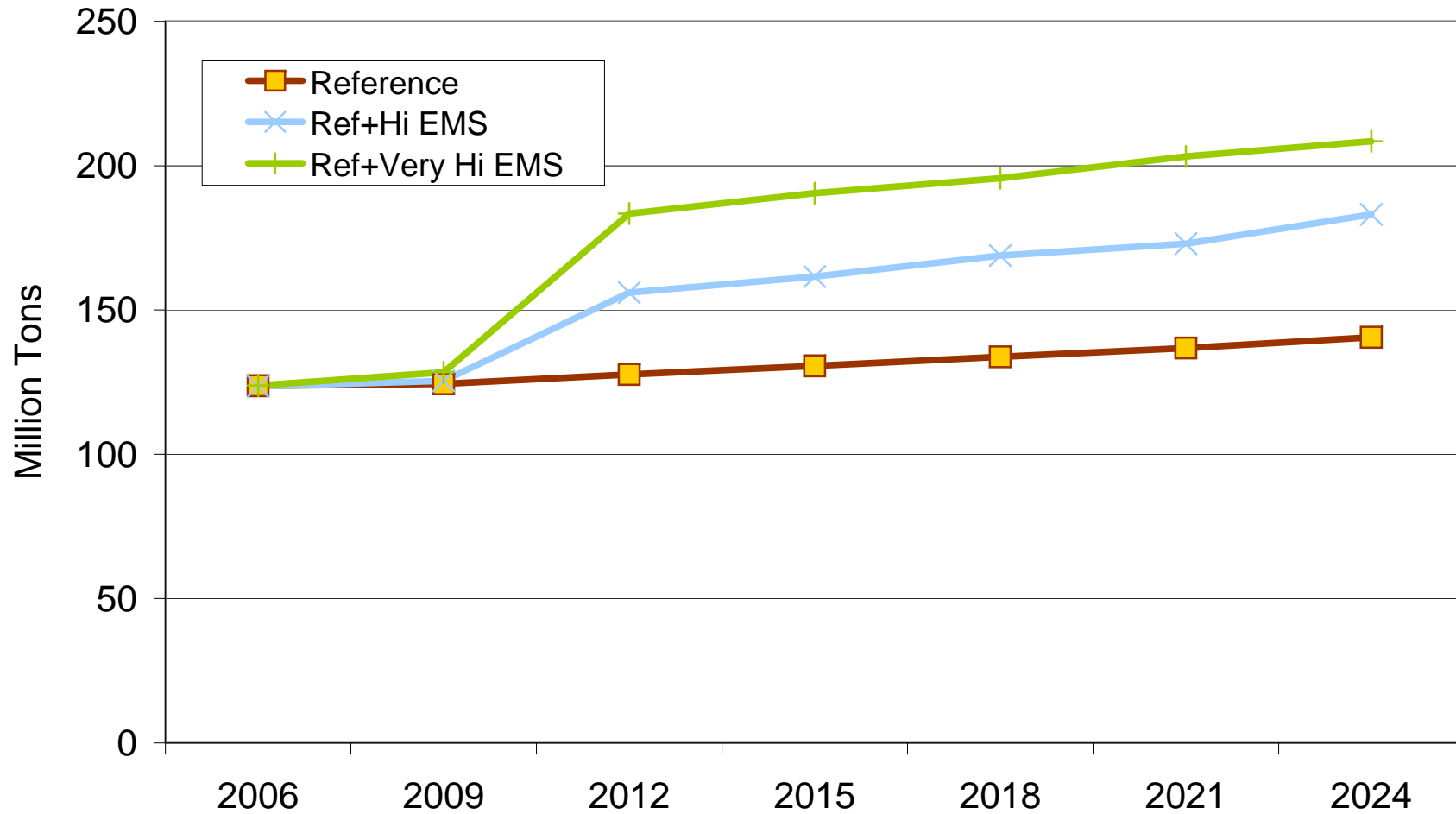
RGGI Capacity Additions



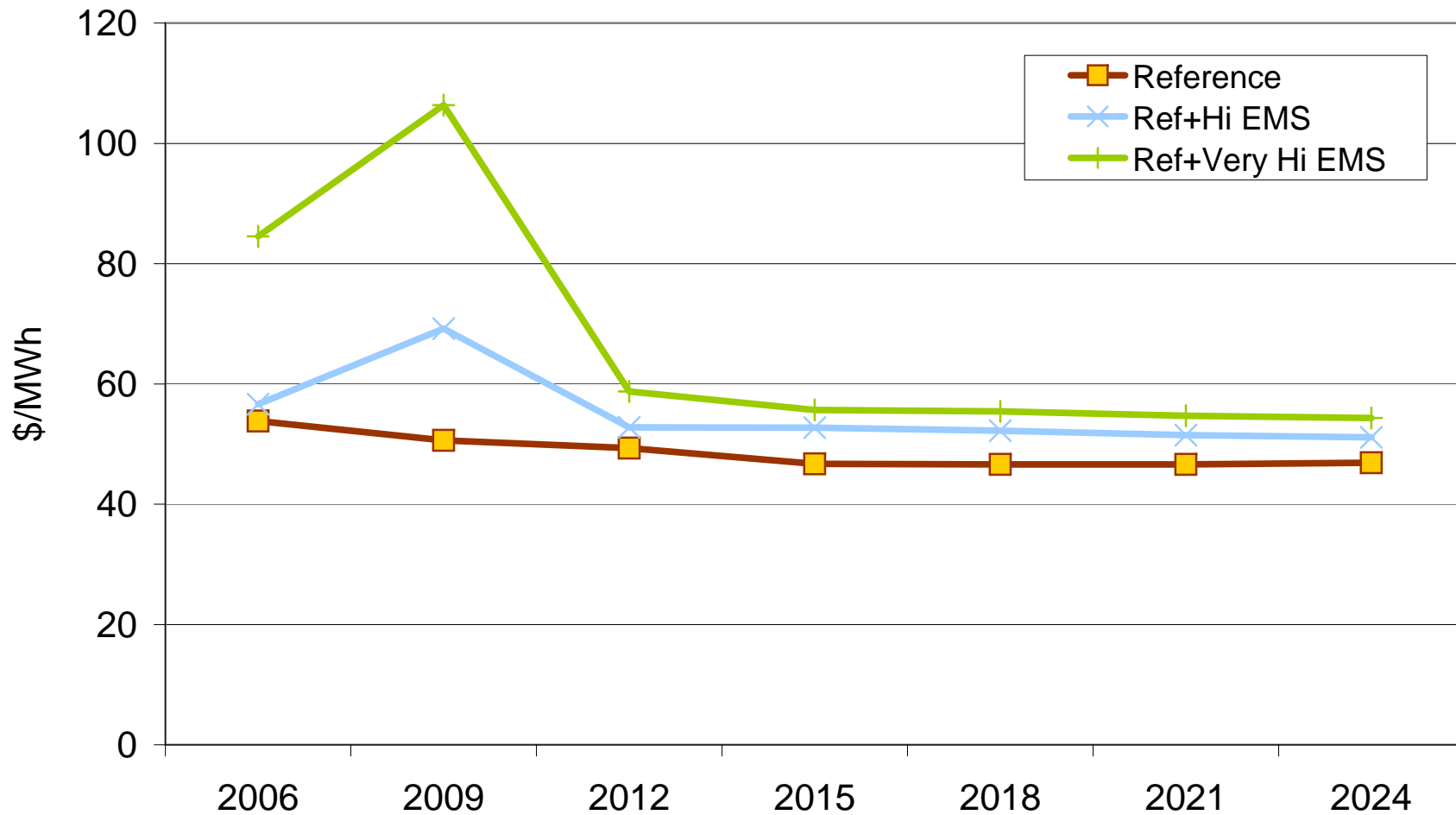
RGGI Generation Mix



RGGI Emissions

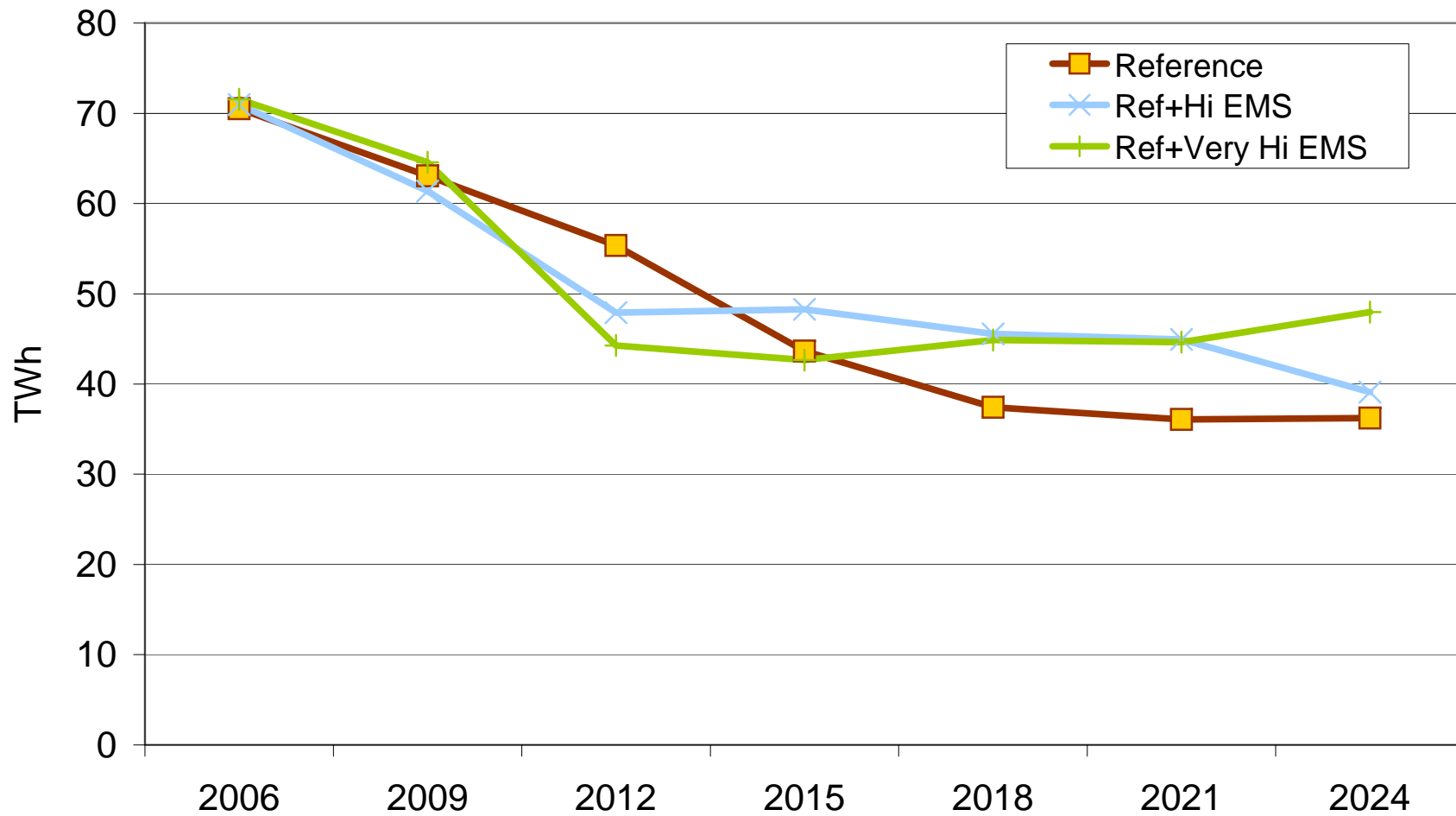


RGGI Energy Prices



NOTE: Energy prices as shown here include annual capacity payments spread over hours of the year.

RGGI Net Imports

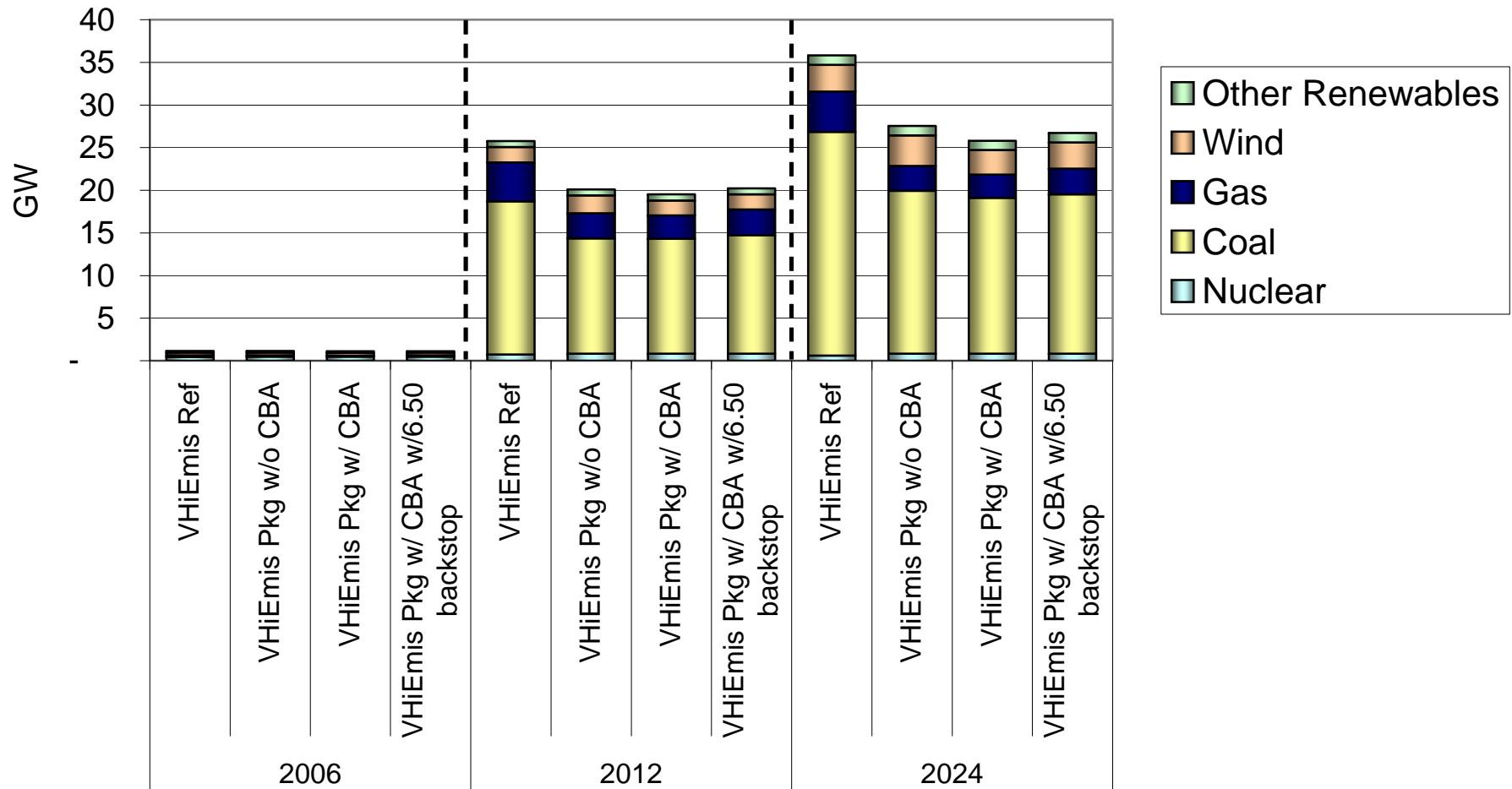


**RGGI Very High Emissions
Reference & Package Cases**

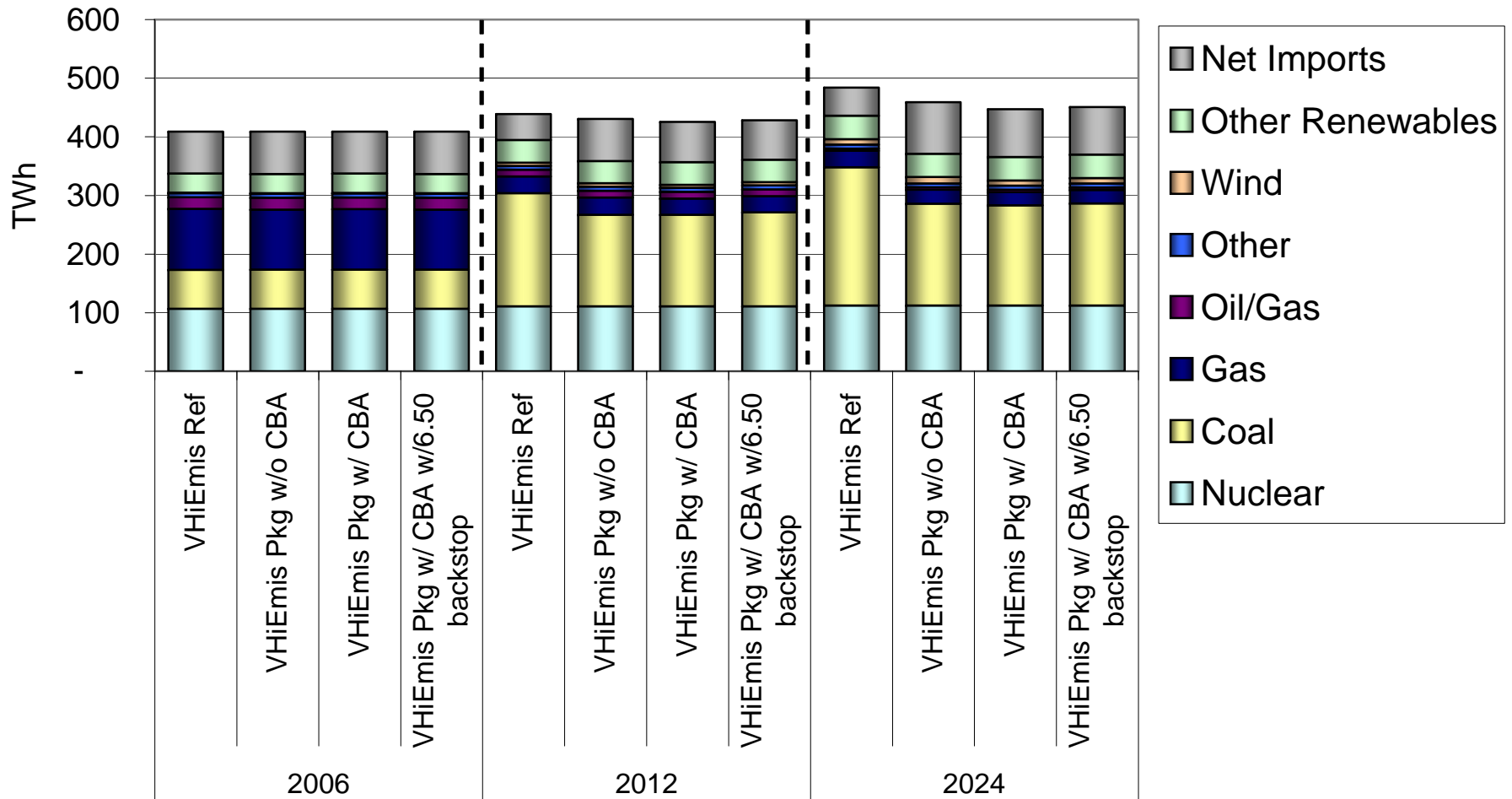
Very High Emissions Package Cases Overview

- Three policy scenarios were run off of the Very High Emissions Reference Case. In each of these cases, the Package was defined as:
 - CO₂ cap phasing from stabilization at current levels beginning in 2008 to 10% below current levels in 2020;
 - Offsets limited to 50% of required reductions (Very High Reference emissions minus cap levels) in each year; and
 - Sustained efficiency investment at “1x” levels (except in “with CBA” cases, as described below).
- The three Very High Emissions Package Cases were:
 - Package without CBA – assumes Package requirements above without any adjustment made for funds dedicated to CBA;
 - Package with CBA – assumes same as above with 25% of allocation value dedicated to incremental energy efficiency investment; and
 - Package with CBA with unlimited offsets at \$6.50/ton – assumes same as Package with CBA case except that an unlimited number of offsets are available for \$6.50/ton, effectively providing a backstop to the CO₂ allowance price. (NOTE: CBA value in this case differs from that above because of different CO₂ allowance price trajectories.)

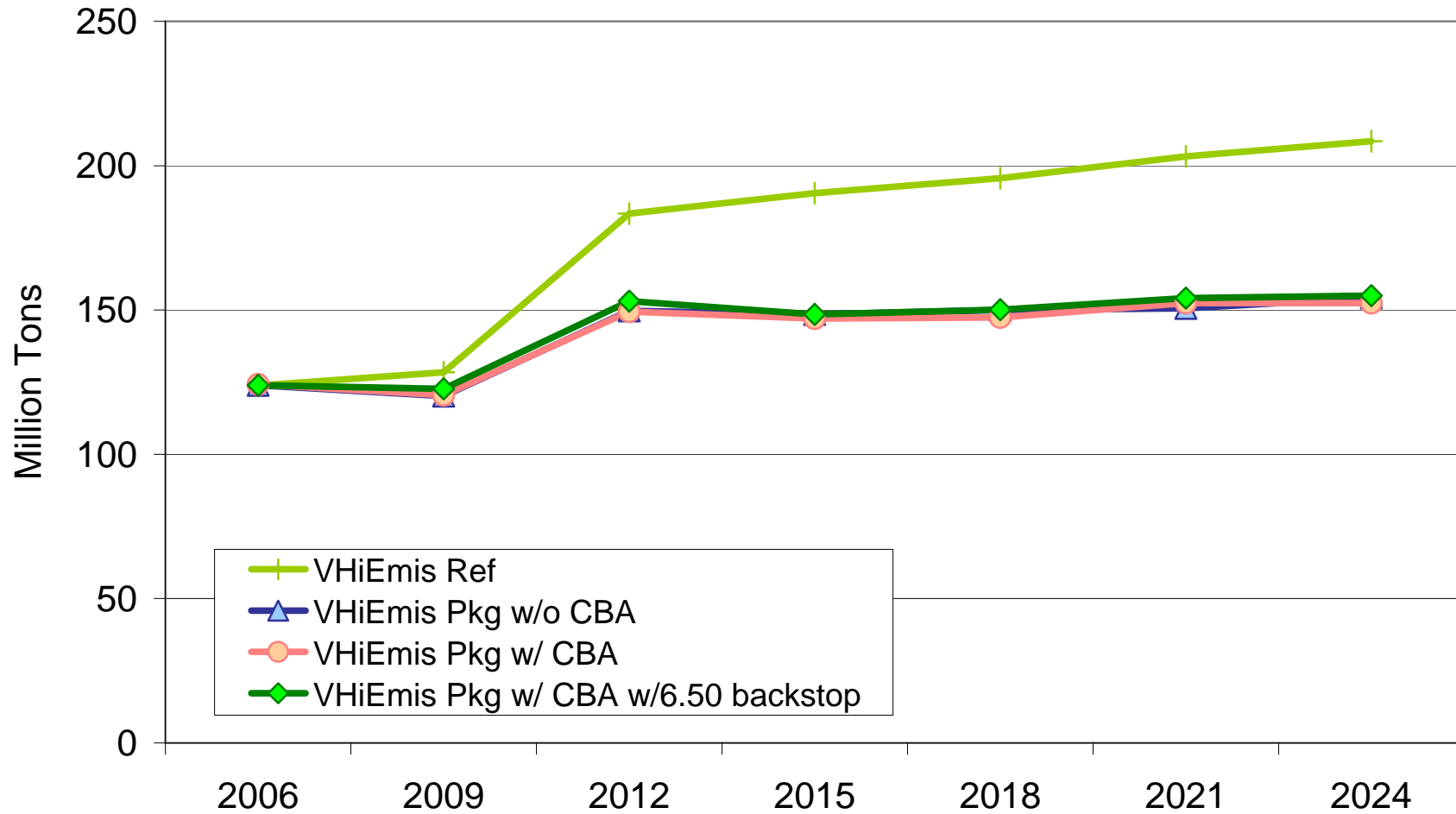
RGGI Capacity Additions



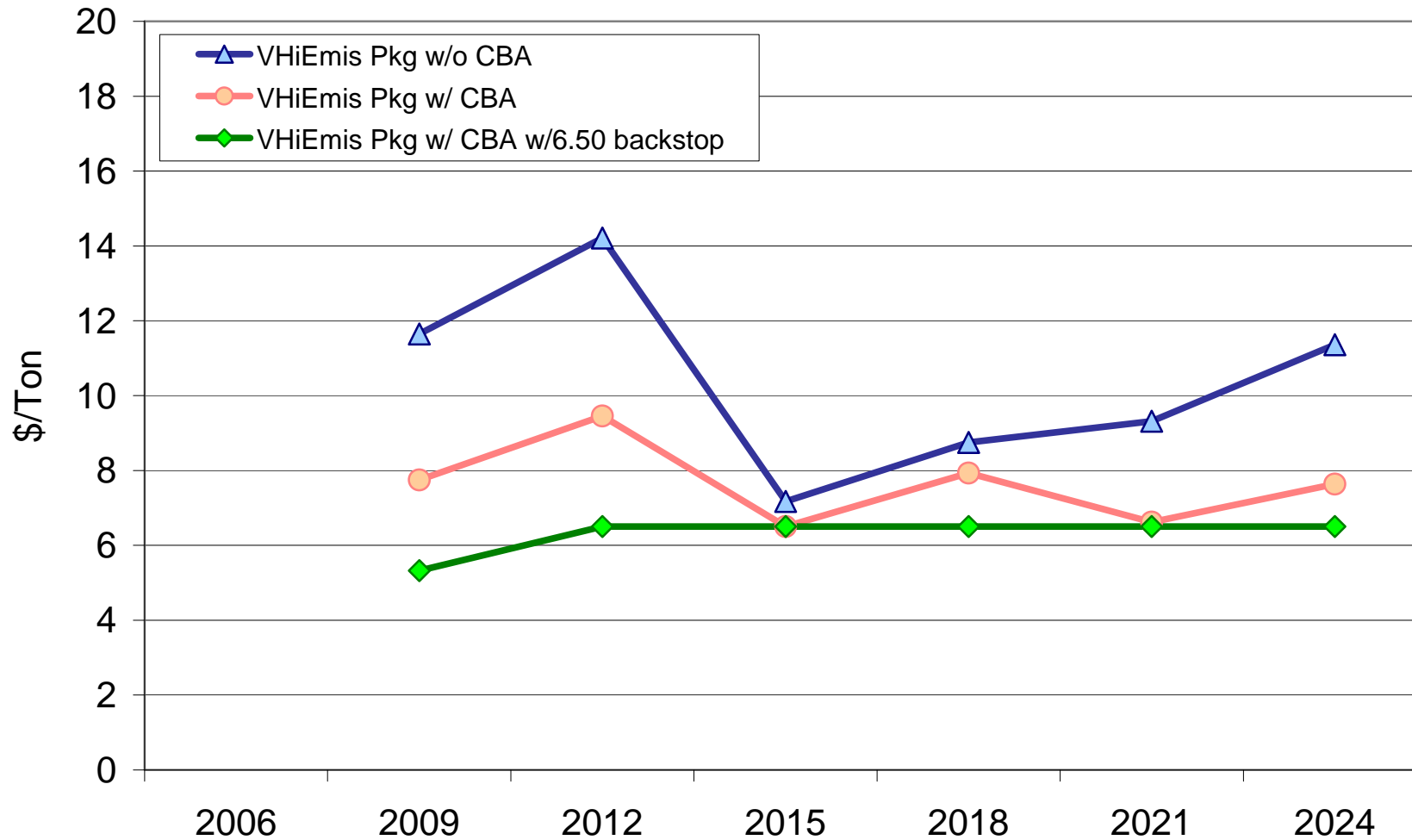
RGGI Generation Mix



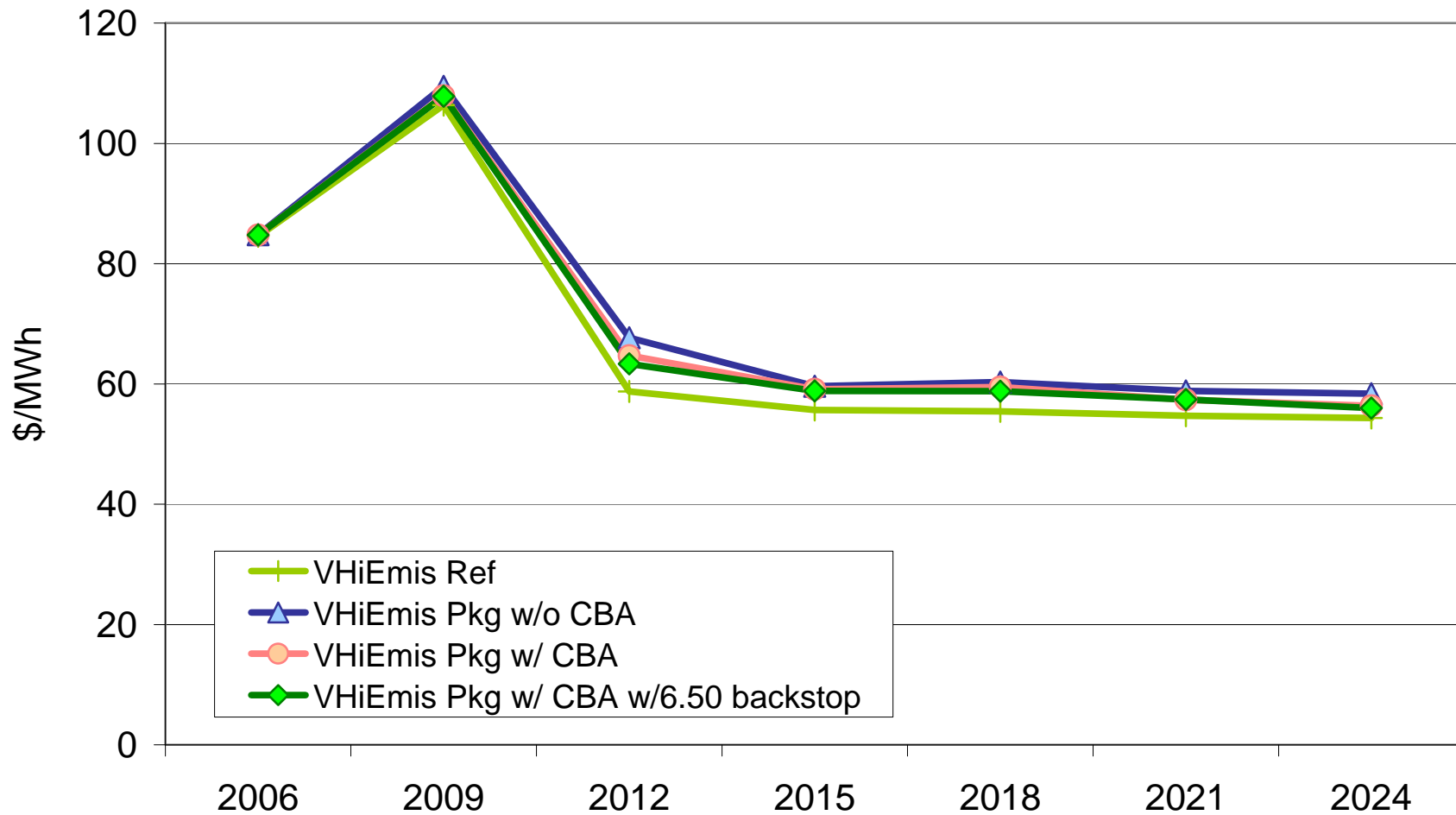
RGGI Emissions



RGGI CO₂ Allowance Prices

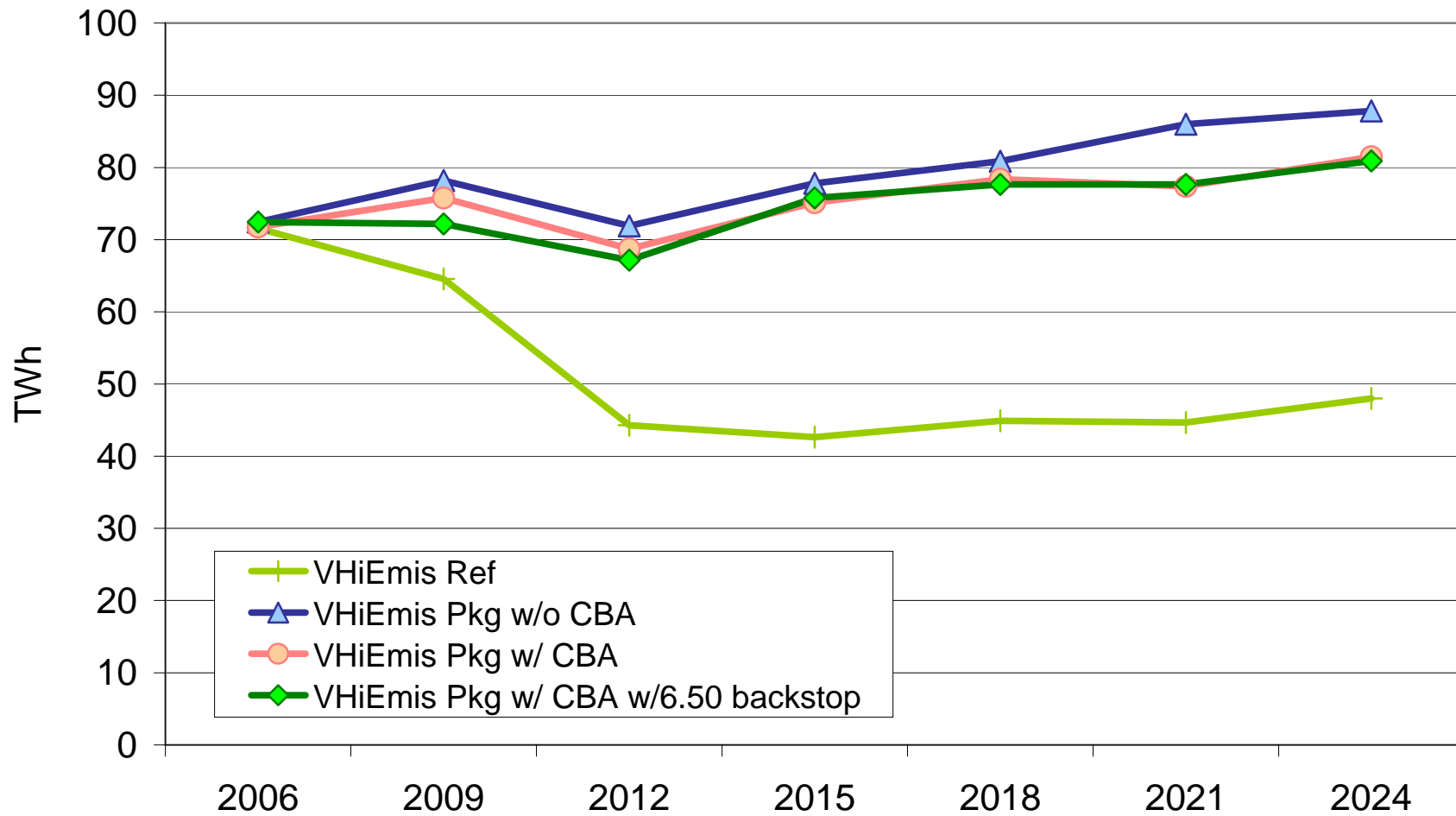


RGGI Energy Prices



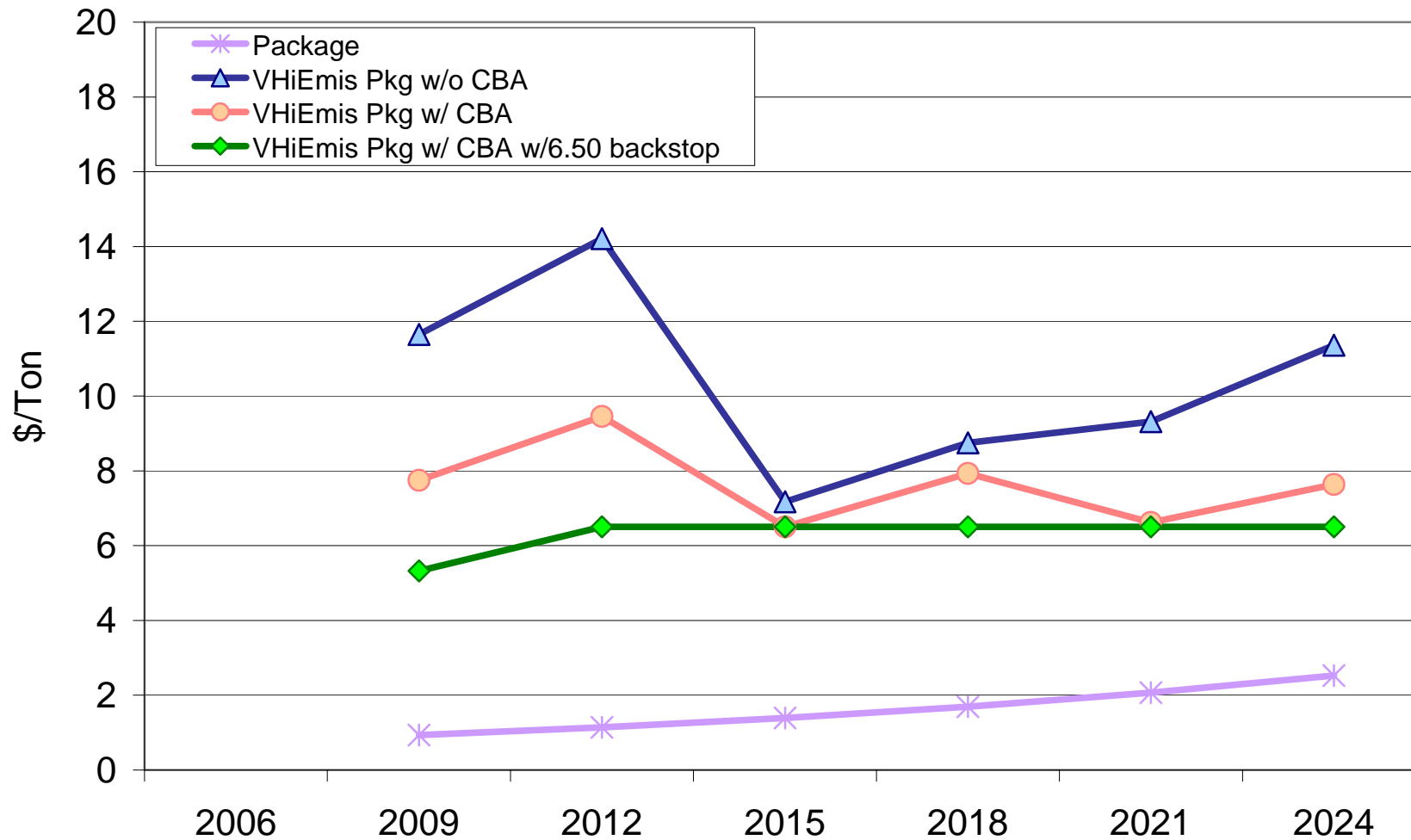
NOTE: Energy prices as shown here include annual capacity payments spread over hours of the year.

RGGI Net Imports

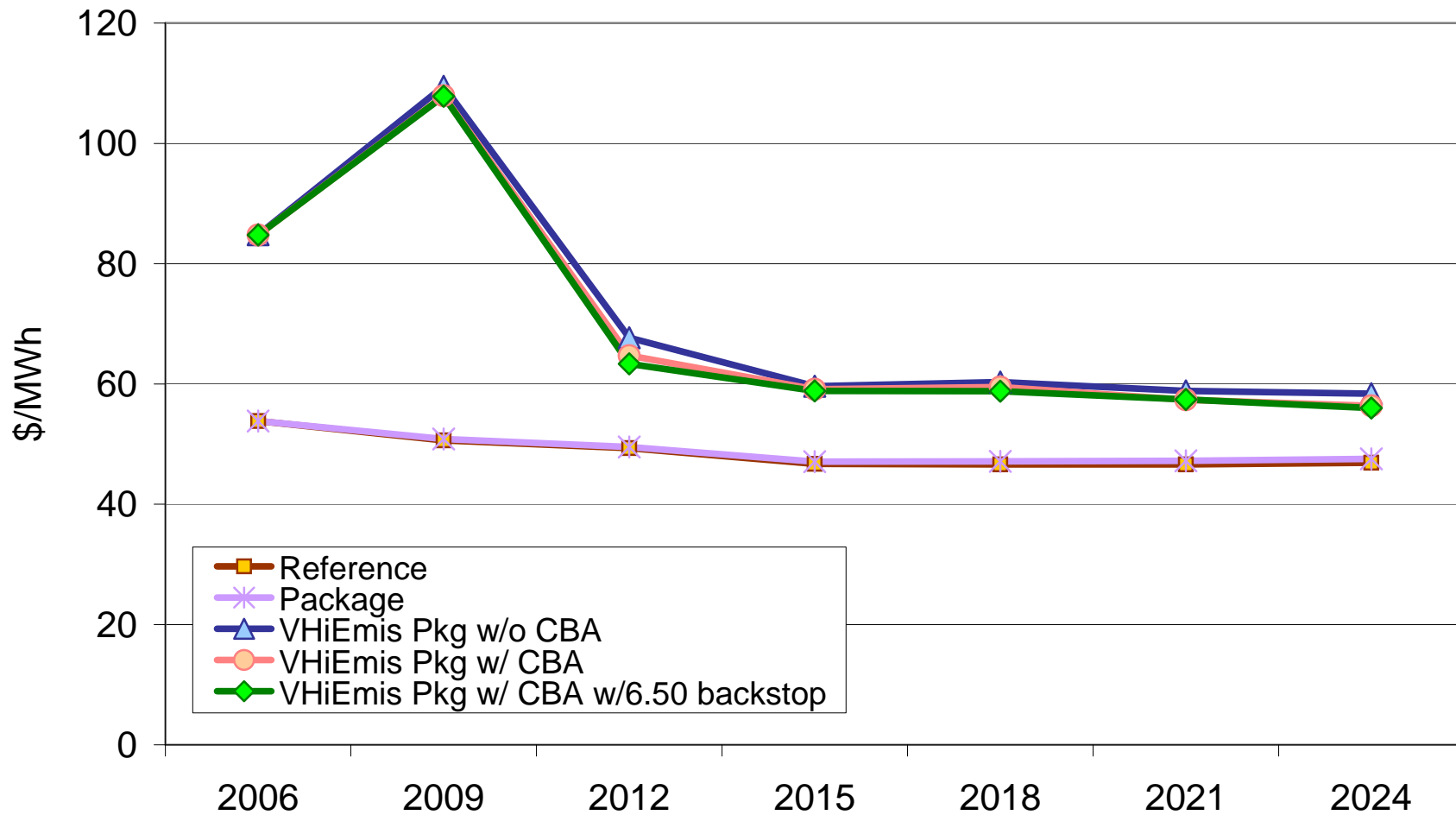


**RGGI Very High Emissions
Package Cases**
compared to
Package Case

RGGI CO₂ Prices

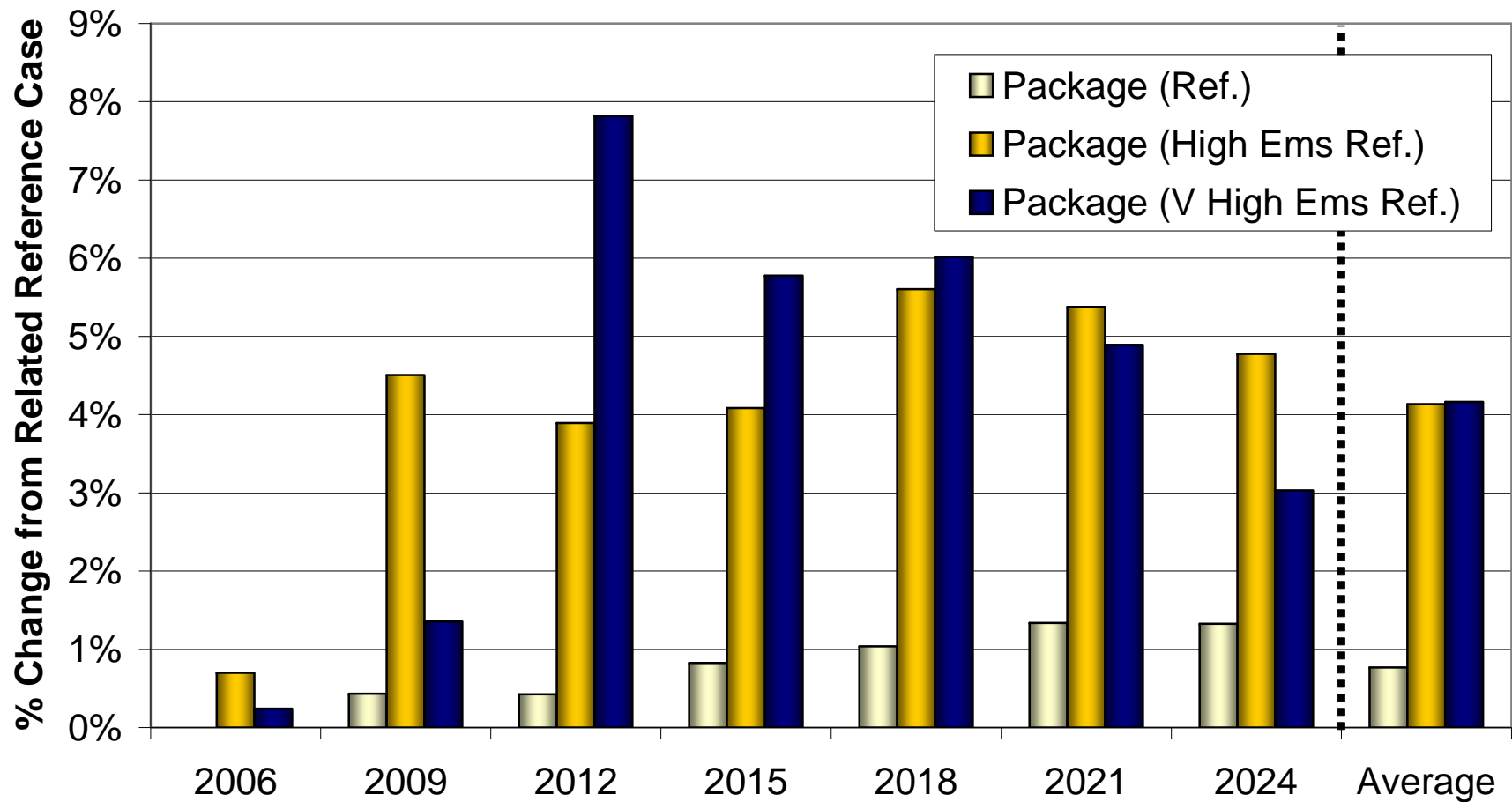


RGGI Energy Prices

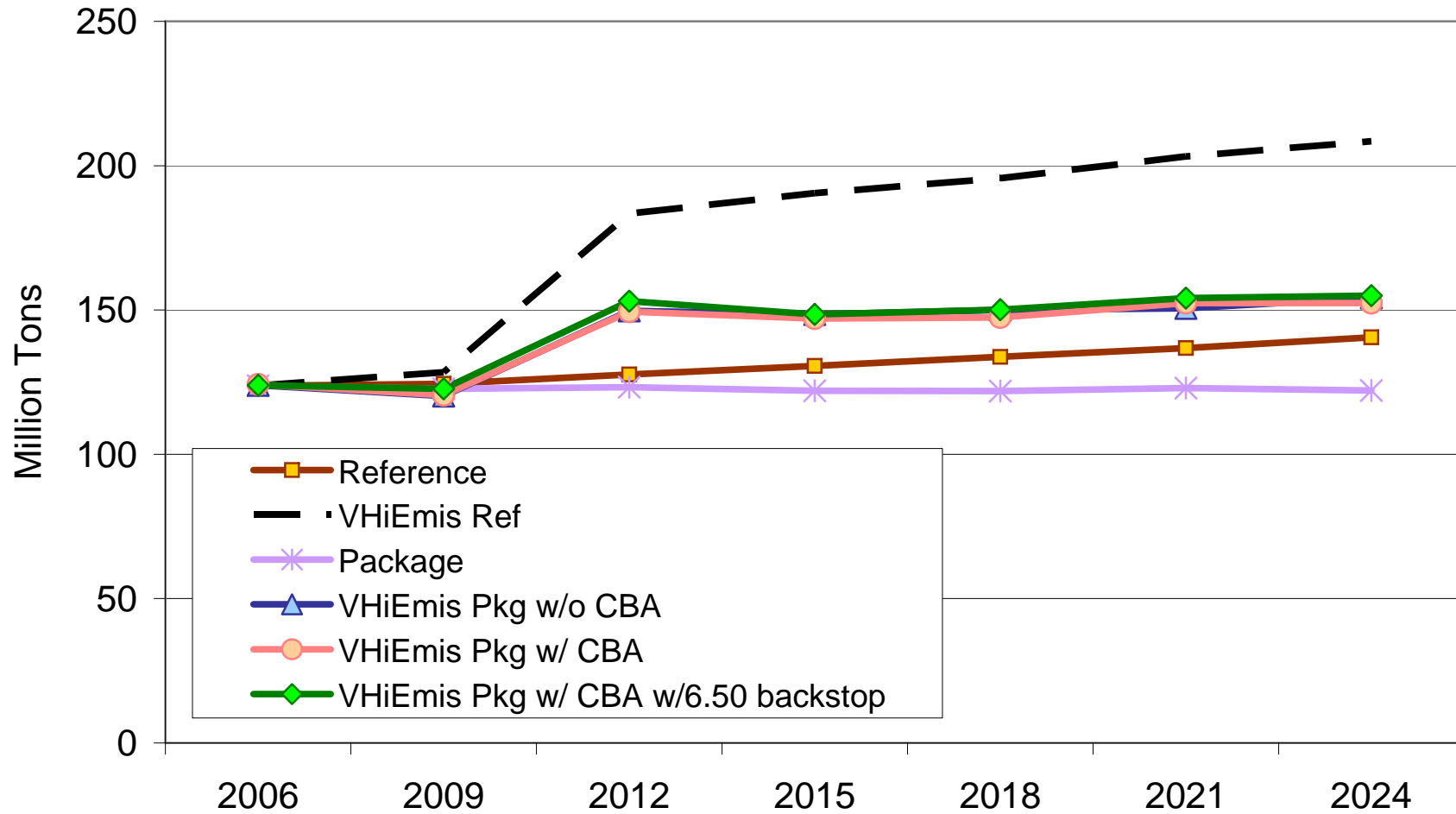


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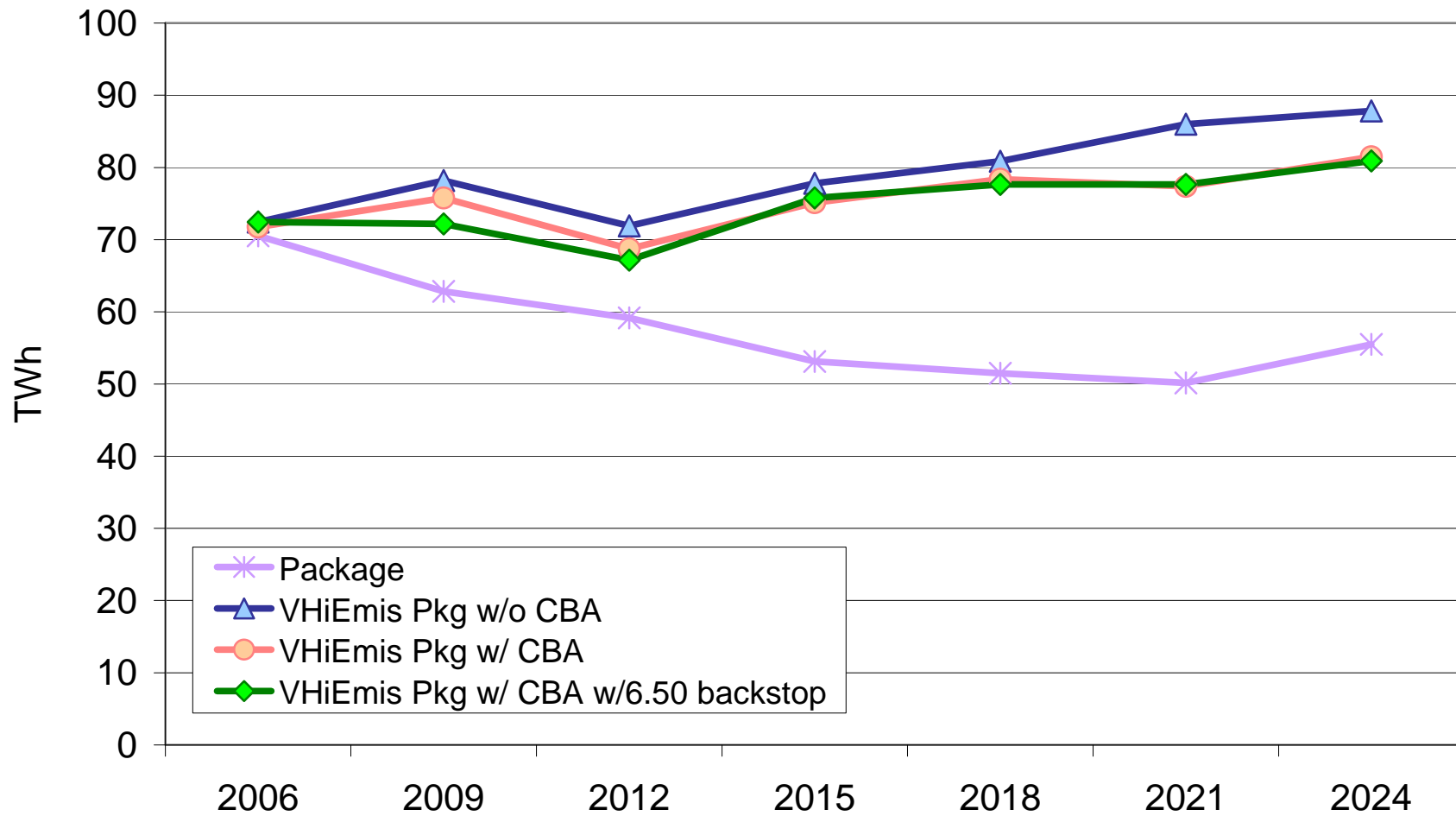
Change in RGGI Energy Prices Relative to Related Reference Cases



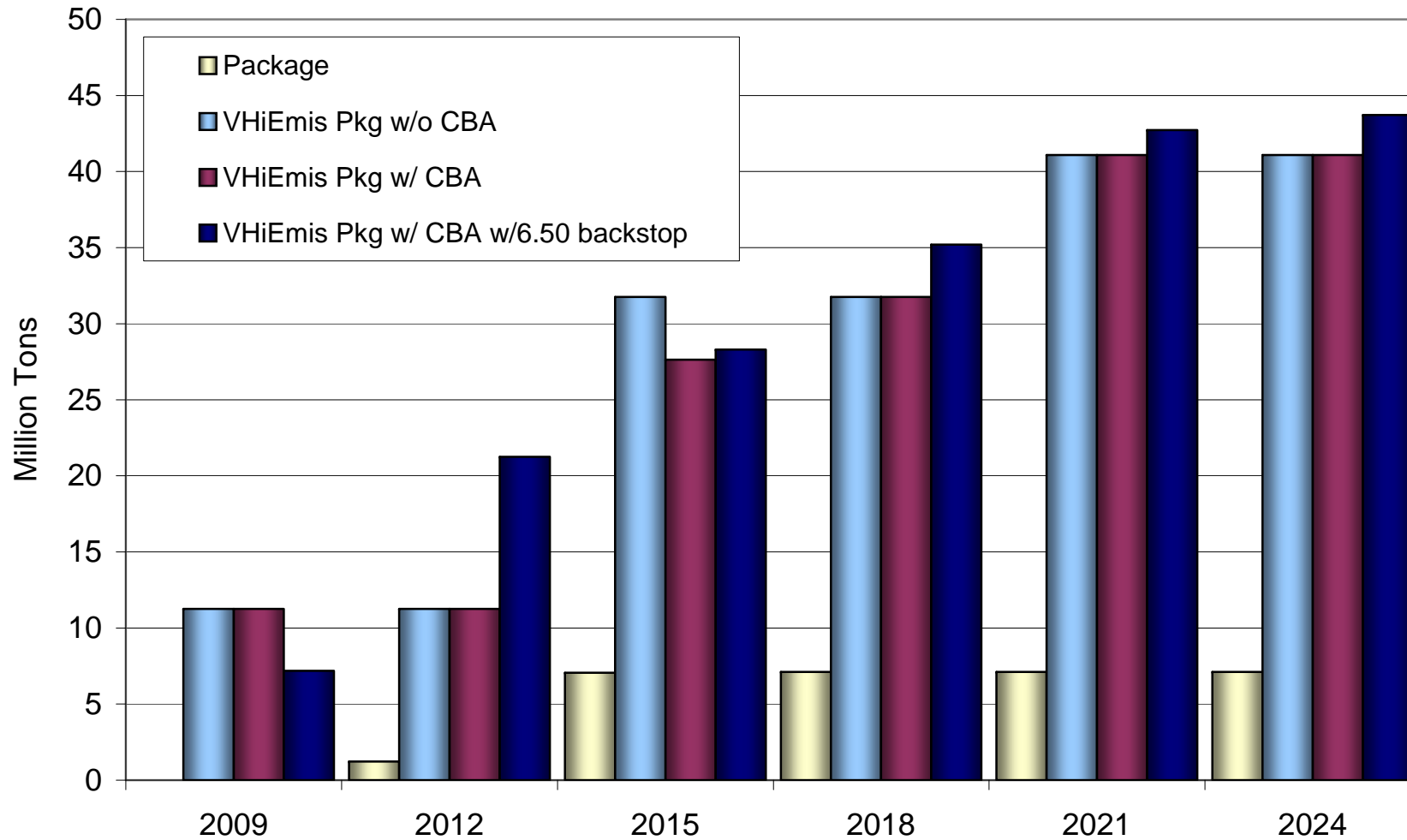
RGGI Emissions



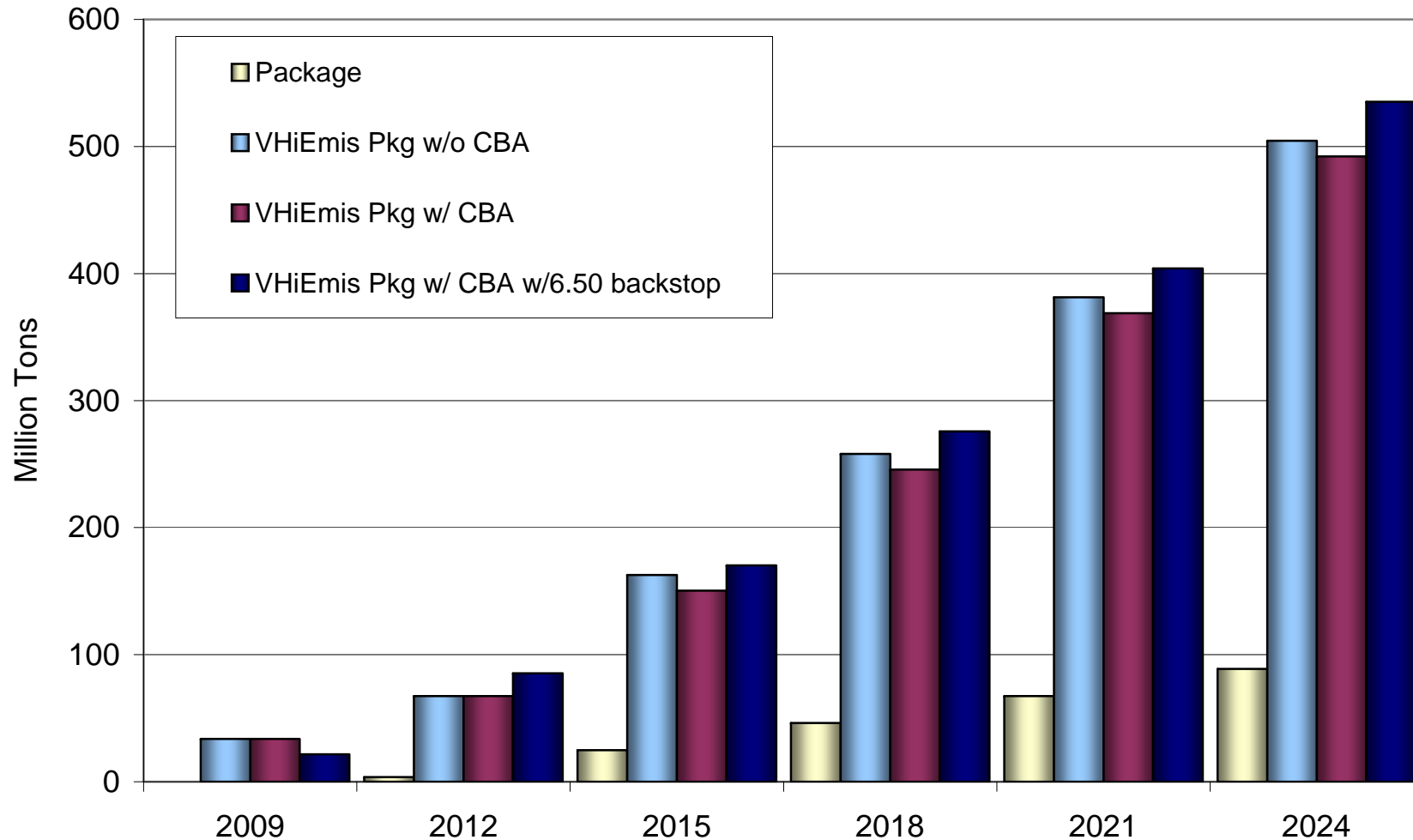
RGGI Net Imports



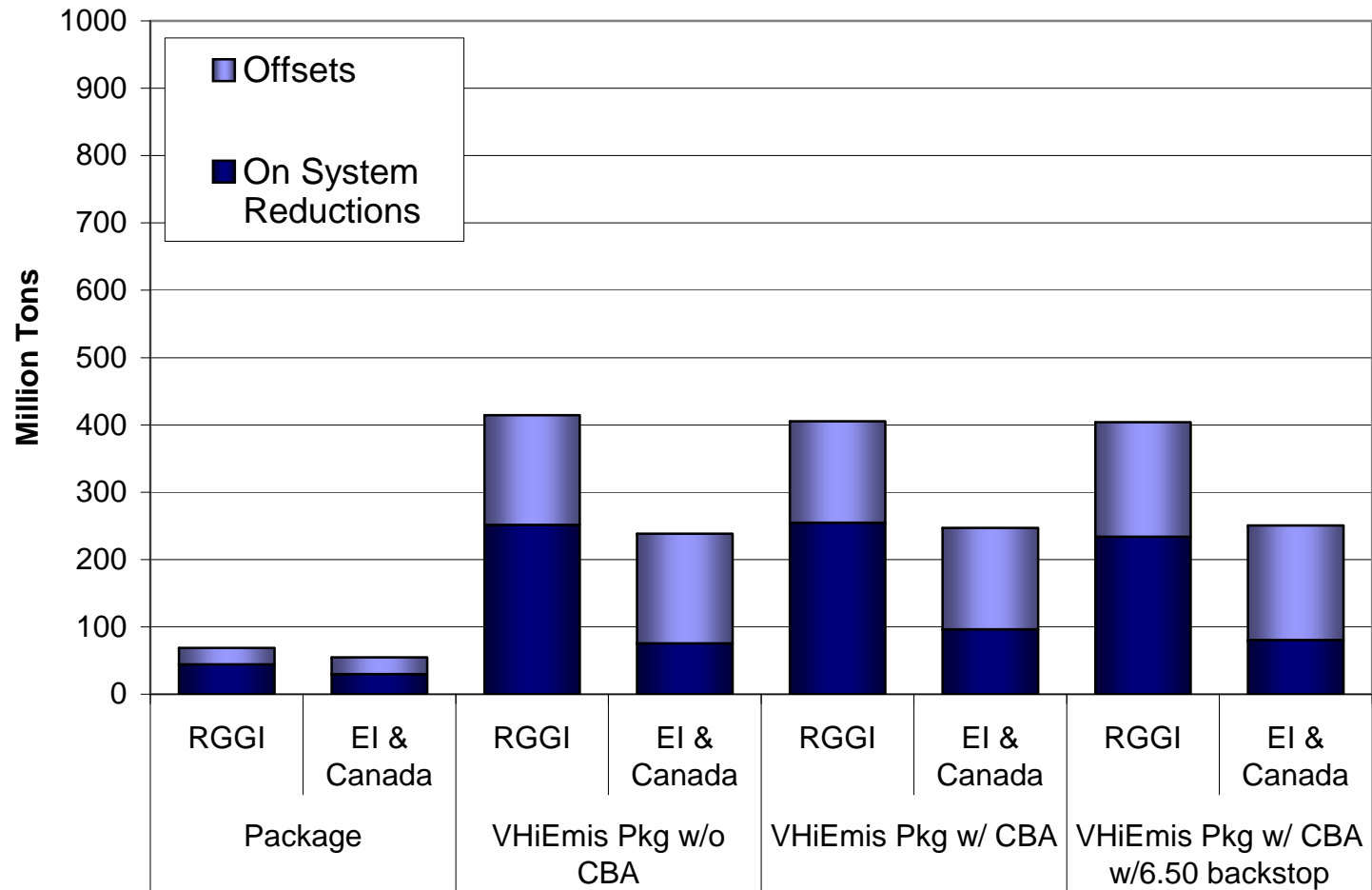
RGGI Annual Offsets



RGGI Cumulative Offsets



2015 Cumulative CO₂ Reductions RGGI and Eastern Interconnect/Canada



2021 Cumulative CO₂ Reductions RGGI and Eastern Interconnect/Canada

