New Jersey Reference Case and Policy Scenario Results

January 3, 2019

Prepared by ICF for Rutgers University at the Request of the New Jersey Board of Public Utilities

NJ Reference Case and Policy Scenario Projections

- Rutgers University, under contract with the NJ BPU and at the NJ BPU's request, subcontracted with ICF to analyze the potential impacts of New Jersey's participation in the Regional Greenhouse Gas Initiative (RGGI) CO_2 reduction program.

- The NJ BPU and DEP specified the assumptions and scenario design for the analysis.

- The following slides present projections from the draft 2018 NJ Reference Case and Policy Scenario.

- Projections are based on assumptions as of October 1, 2018.
  - The assumptions have been updated from the 2017 RGGI Model Rule analysis for all states

IPM Model Design

- The following projections were developed using the Integrated Planning Model (IPM), the same model used by EPA in analyzing power sector impacts of environmental regulation.

- Models are schematic representations which are used to project trends.

- Model design features will impact projected results.

- One key feature of IPM is that it optimizes across the time horizon of the analysis, so it will act in the near-term in response to long-term requirements and costs.

- This optimization has two implications for the projections:
    - The projections assume that any allowance bank is exhausted within the timeframe of the analysis.
    - Projections in the near-term, including generation, emissions, and allowance pricing, can be a function of projections in later years of the analysis.

Case Definitions

- The Reference Case assumes that the RGGI program includes the existing 9 member states and that the cap and other specifications are consistent with the 2017 Model Rule.

- In the Policy Scenario, New Jersey and Virginia are both assumed to join the RGGI program in 2020 at starting caps of 18 and 28 million tons, respectively, and then follow the same cap decline path as in the RGGI 2017 Model Rule Policy Scenario through 2030.

- The following section compares select projections from the 2018 NJ Reference Case ("Ref") and Policy Scenario ("Policy").

Comparison of Reference Case and Policy Scenario Projections

DRAFT Policy Scenario Assumptions

| Assumption	Reference Case	Policy Scenario
Participating States	CT, DE, MA, MD, ME, NH, NY, RI, VT (9 states)	CT, DE, MA, MD, ME, NH, NY, RI, VT, NJ and VA (11 states)
RGGI Cap	Cap declines 3MM in 2021 and then 2.275MM per year thereafter through 2030 (adjusted cap in 2017-2025)	VA and NJ join RGGI in 2020, adding 46MM to the cap. Cap declines 4.235MM in 2021 and then 3.658MM per year thereafter through 2030 (adjusted cap in 2017-2025)
Bank Adjustment	21.9MM per year in 2017-2020 and then 17.6MM per year in 2021-2025	
CCR Quantity	10MM allowances in 2017-2020 and then 10% of the annual base cap in 2021 onwards	
ECR Quantity	10% of participating states' annual base caps in 2021 and onwards	
RGGI Trading	Trading of RGGI allowances among RGGI states	
Banking	Unlimited banking across the model horizon	

RGGI CO$_2$ Emission Budgets (Caps)

The RGGI program carried 108MM banked allowances into 2018, which is not reflected in the 2018 cap shown below. Both the Reference Case and Policy Scenario include a 21.9MM per year cap adjustment in 2018-2020. The 2021-2025 bank adjustment is in the range of 88MM in both cases. The 2020 cap in the Policy Scenario is 46MM higher than the Reference Case, reflecting the addition of Virginia and New Jersey to the program.
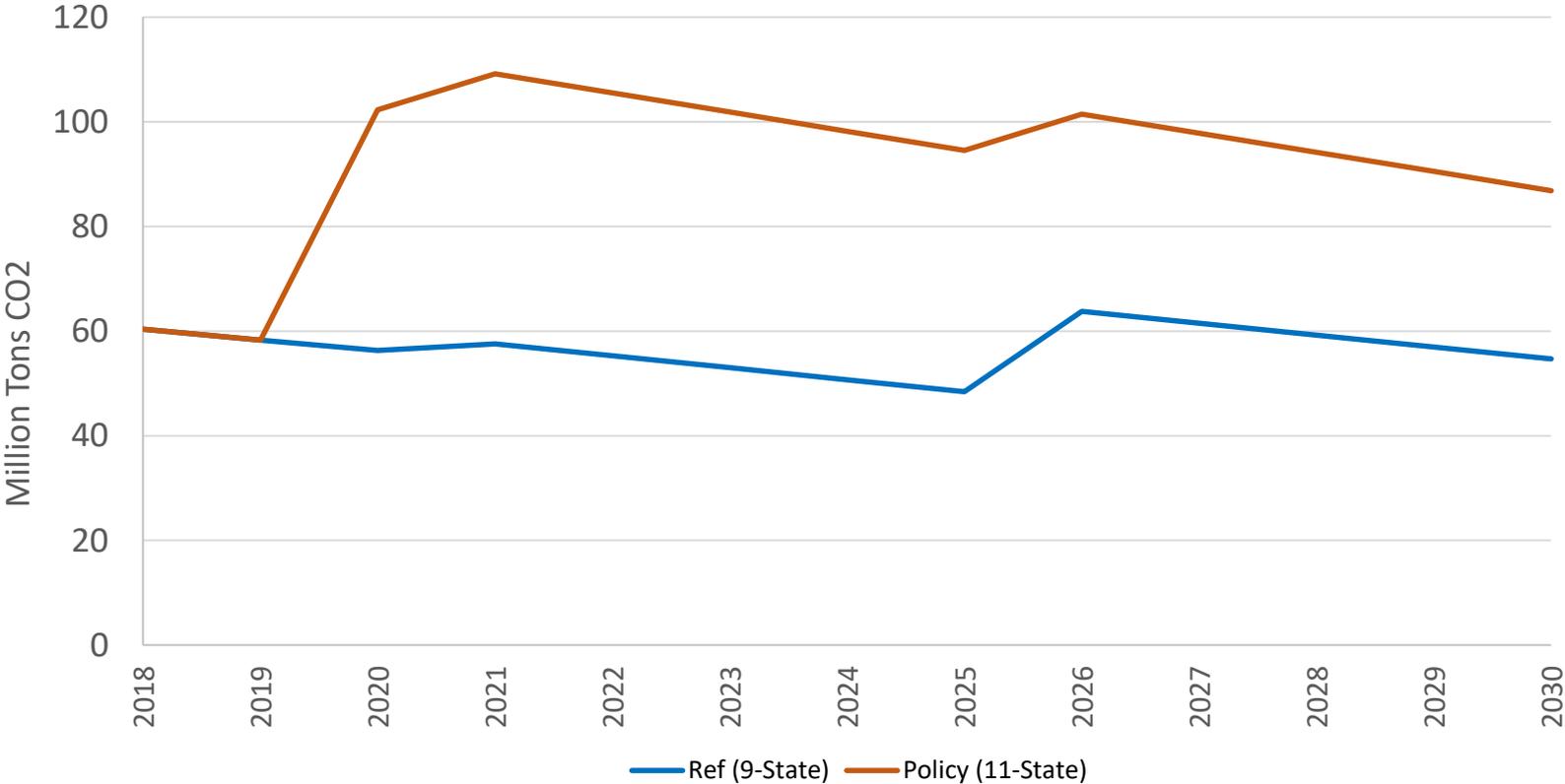
New Jersey Cumulative Capacity Additions and Retirements

This chart shows the distribution of capacity additions and retirements by capacity type. By 2030, NJ adds 3.5 GW of offshore wind capacity and 2 GW of storage, in addition to about 650 MW of gas-fired capacity and 400 MW of Grid-supplied solar. There is no difference between the Reference and Policy Cases. Nearly 2 GW of capacity retires by 2030.
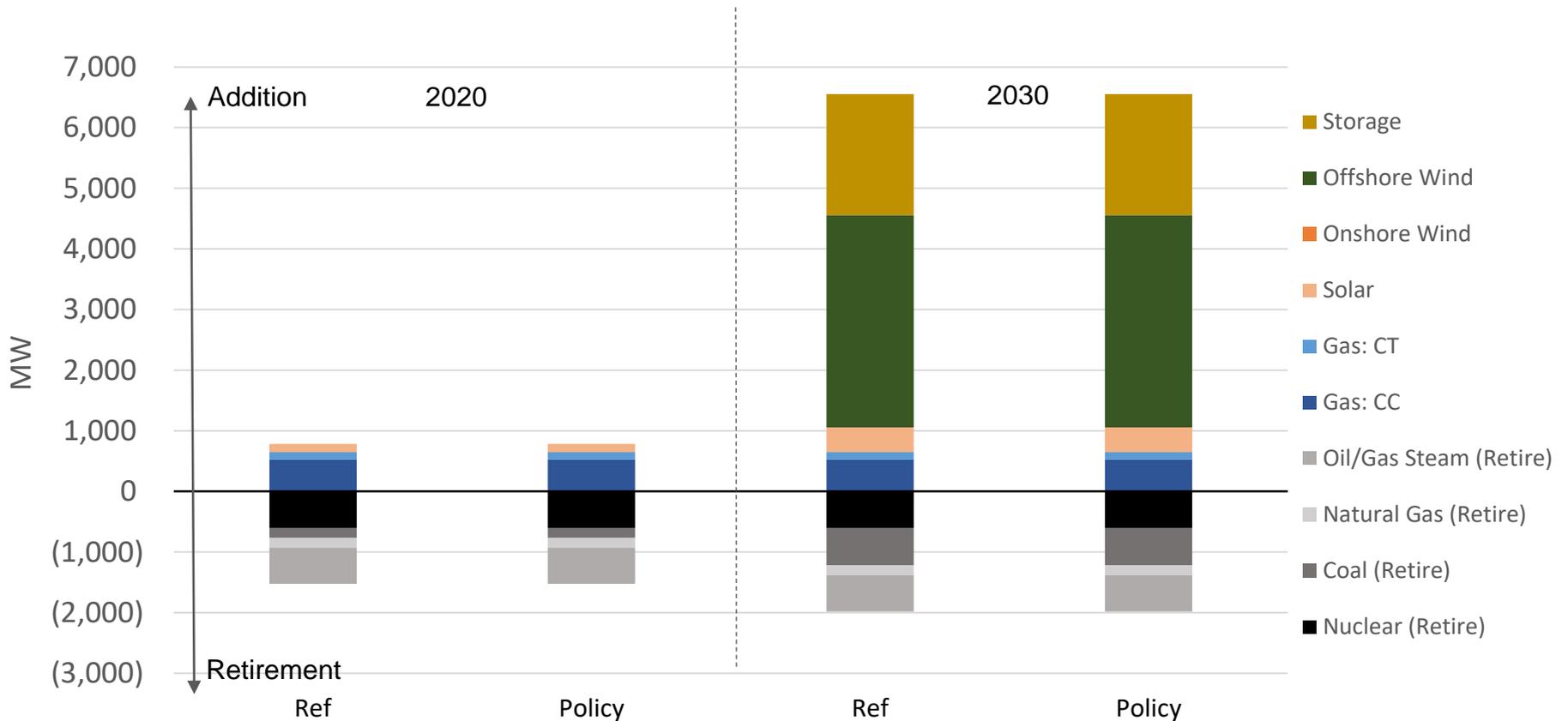
1. The 650 MW of fossil generation listed as capacity additions were operating in 2018. All fossil units that were included in the modeling assumptions were operating in 2018.
2. The ICF/RU RGGI modeling for solar only depicts the utility or grid-scale solar supply portion. The majority of the solar capacity for New Jersey is behind the meter and therefore not modeled as supply.
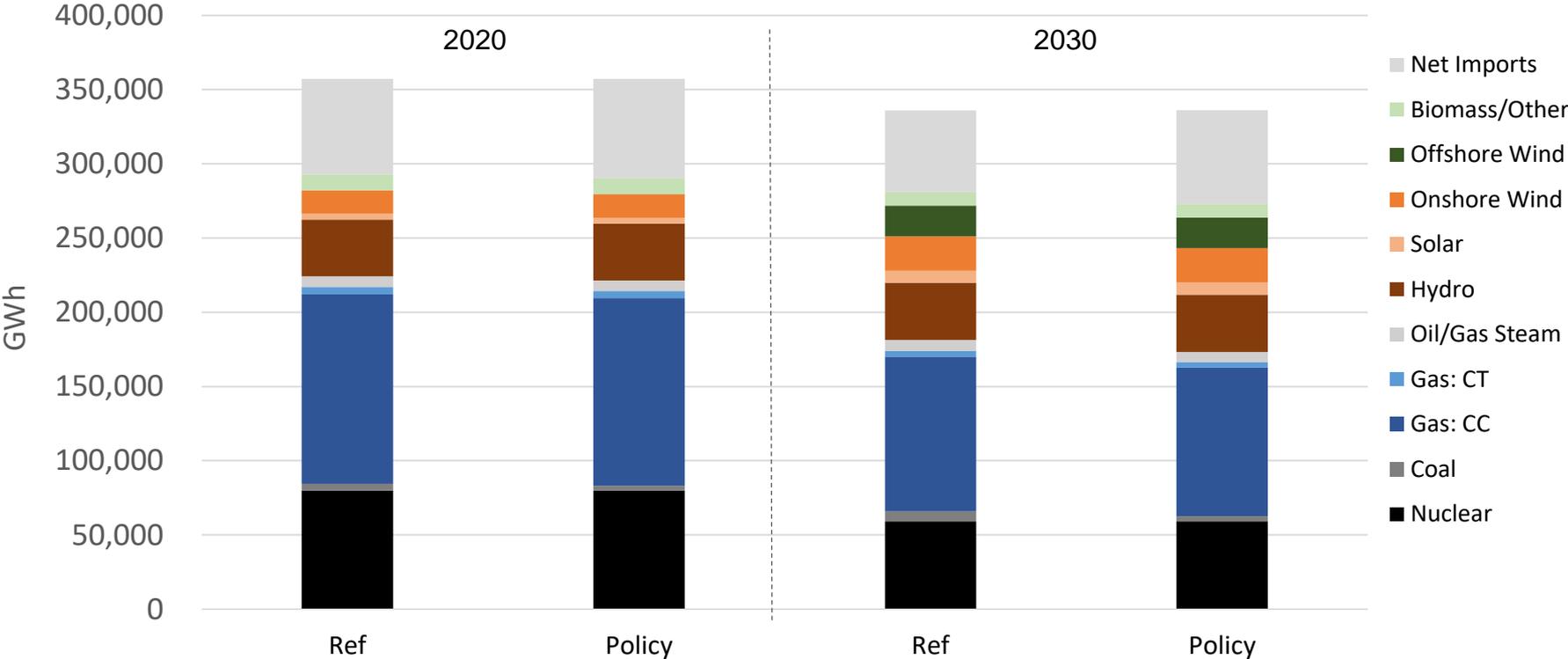
New Jersey Generation Mix

NJ load declines from 2020 to 2030, which, combined with offshore wind capacity additions, offsets the state's imports and some gas generation by 2030 in both cases. The 2030 load projections include the effects of Electric Vehicle and Energy Efficiency. In the Policy Scenario, NJ net exports are lower by 2030, although it remains a net exporter, as gas generation backs off to help the state comply with the RGGI cap.
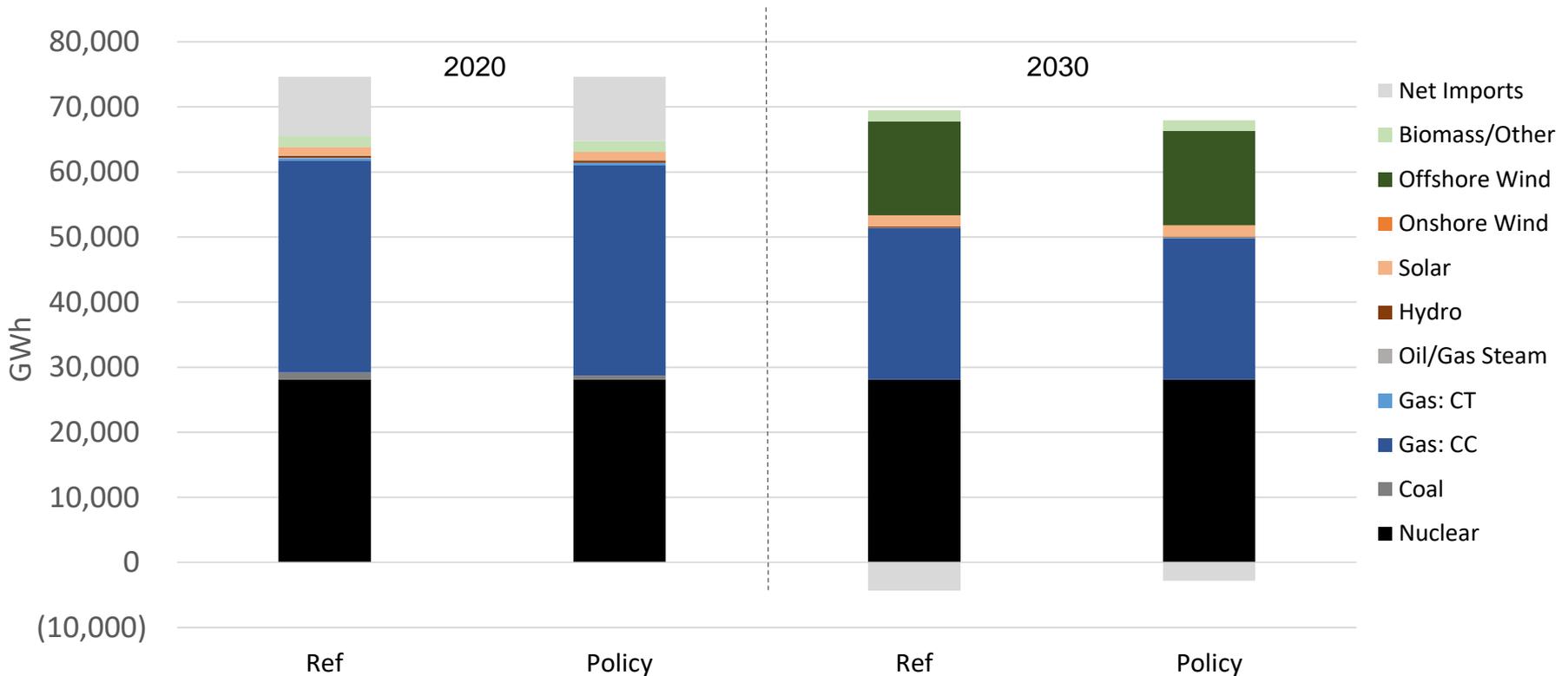
9-state RGGI Generation Mix

In the Policy Scenario, net imports to the 9-state RGGI region increase relative to the Reference Case to offset declines in coal and gas generation needed to comply with the RGGI cap.

New Jersey CO$_2$ Emissions

This chart shows NJ CO$_2$ emissions from electricity generation. Reference Case emissions decline in response to reductions in demand and the addition of offshore wind and solar. Emissions are lower in the Policy Scenario as a result of NJ joining the RGGI cap.
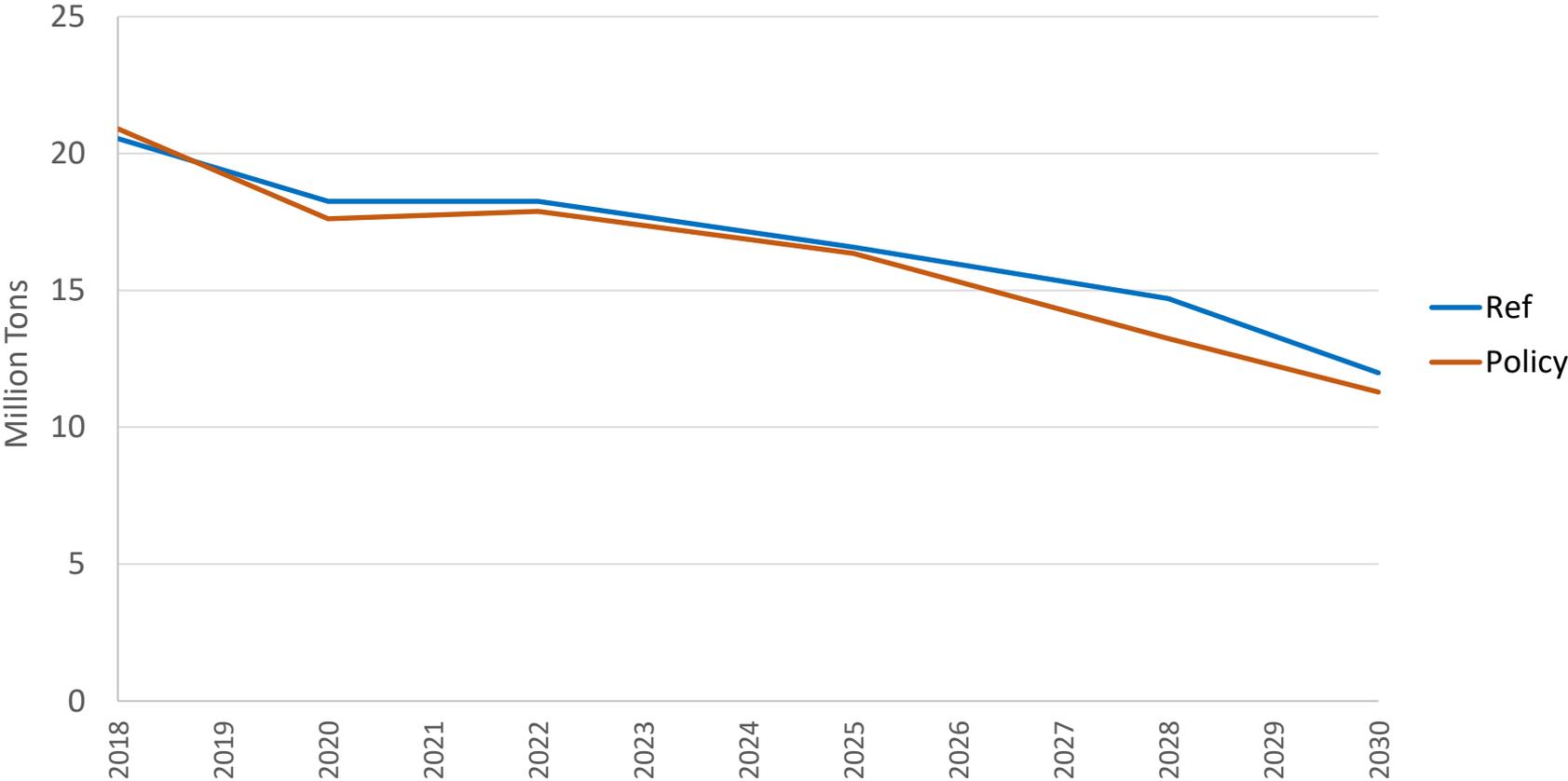
RGGI Program CO$_2$ Emissions

This chart shows two groupings of RGGI emissions each for the Reference Case and Policy Scenario: "9 states" reflects emissions for the current 9 RGGI member states and "11 states" adds emissions for New Jersey and Virginia. In both groupings, emissions are lower in the Policy Scenario, but by a wider margin in the 11-state grouping.
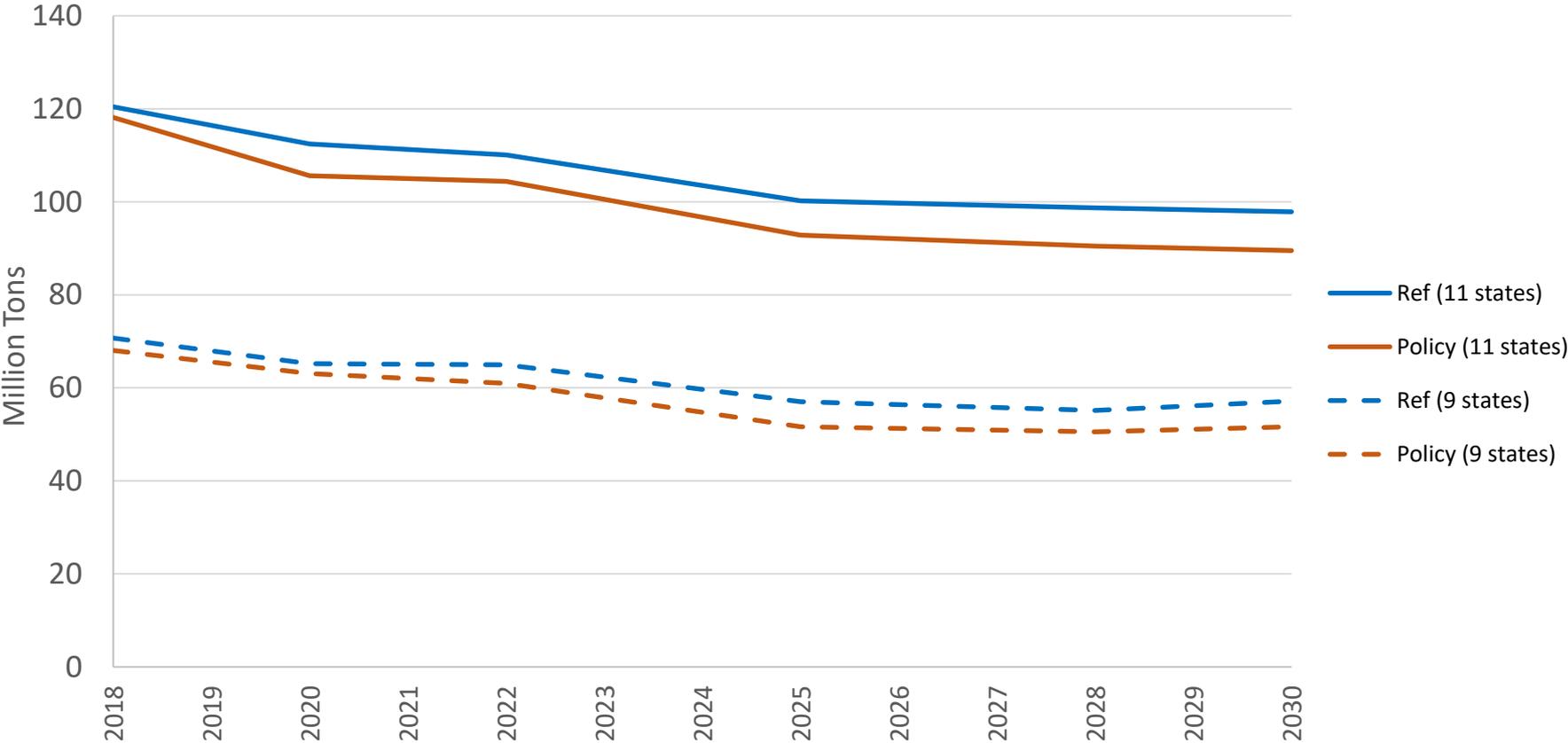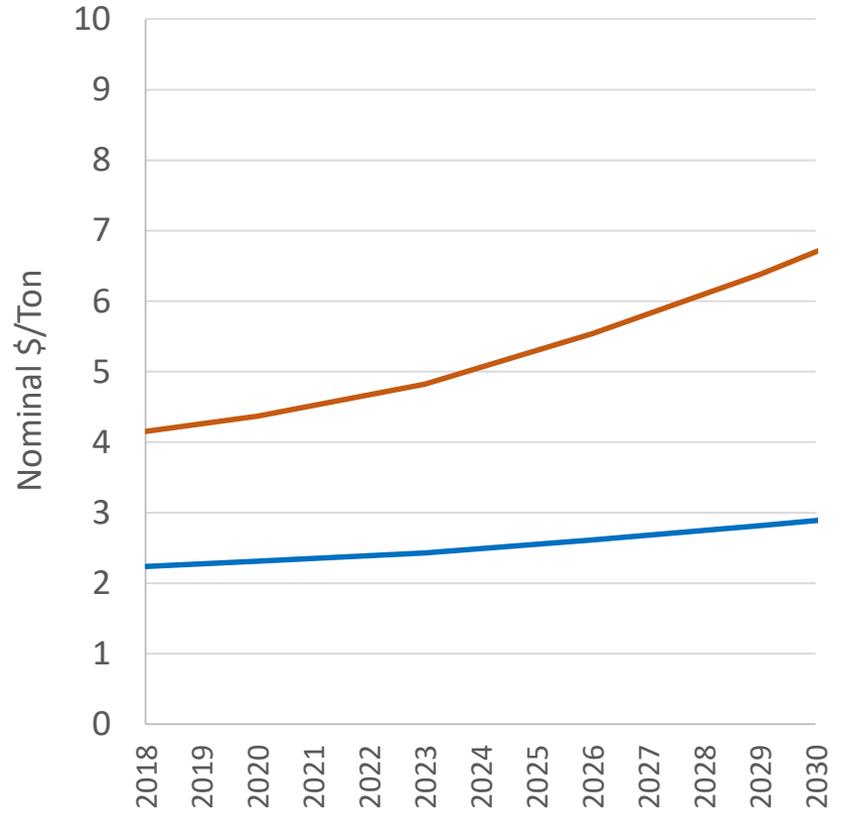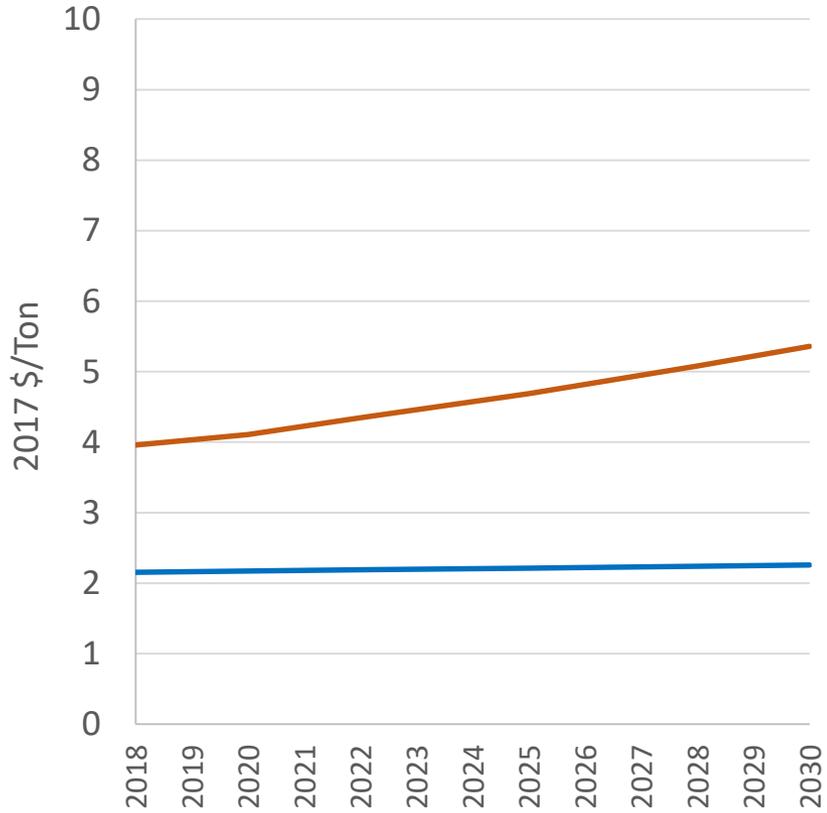
New Jersey Firm Power Prices

These charts show the projected average annual firm (energy + capacity) prices in constant 2017 and nominal dollars.
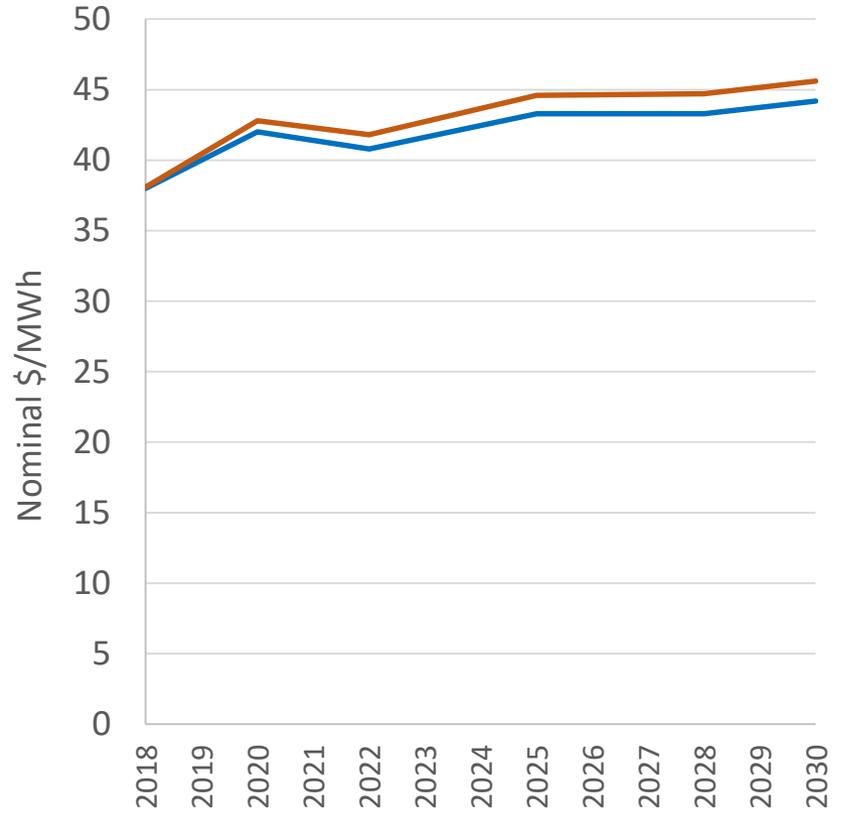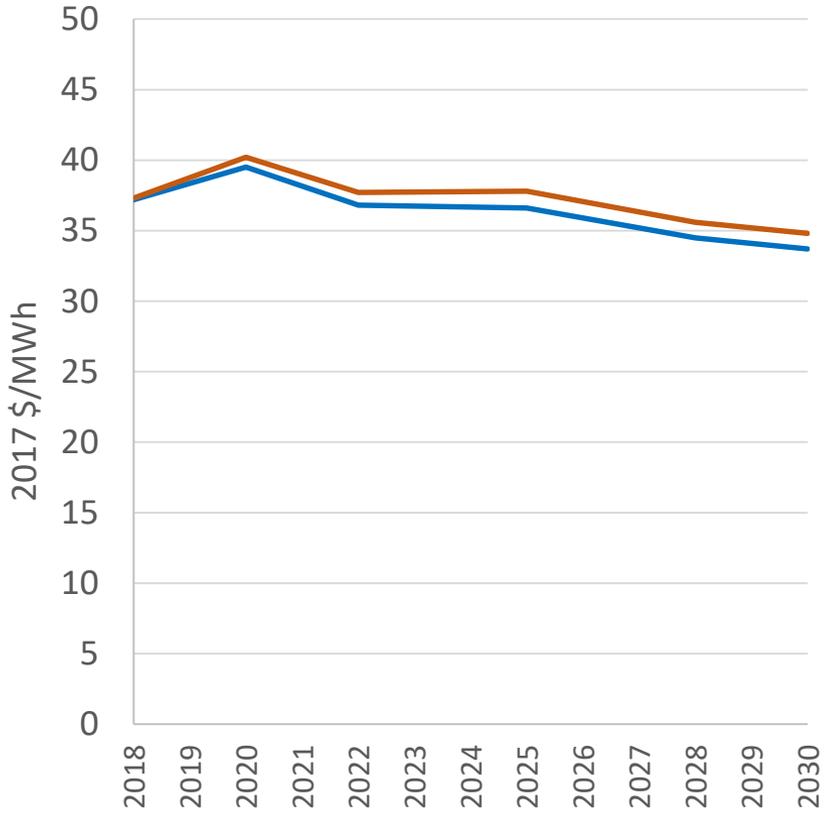
RGGI Allowance Prices

These charts show the projected RGGI allowance price in constant 2017 and nominal dollars.