Assessment of Revolution Wind Power Purchase Agreement

Prepared for Rhode Island Office of Energy Resources

March 26, 2026

Disclaimer

- This report has been prepared by Power Advisory LLC (Power Advisory) for the sole and exclusive purpose of providing market information and insight.
- Power Advisory takes no responsibility for the use of the report by third parties.
- This report contains opinions, conclusions and estimates made by Power Advisory using its professional judgment and reasonable care.
- Use of the report is subject to the following conditions:
    - Conditions may change over time and Power Advisory takes no responsibility for the impact that such changes may have on these opinions, conclusions or estimates set out in this report.
    - The report should be read as a whole.

Executive Summary

- Revolution Wind is a 704MW offshore wind project located 15 nautical miles southeast of Point Judith, Rhode Island. The project is anticipated to enter commercial operation later this year and begin delivering the 400MW that is under contract to Rhode Island Energy for a 20-year term.

- The Office of Energy Resources (OER) engaged Power Advisory to perform an independent assessment and comparison of the cost of energy and RECs under the project's Power Purchase Agreement (PPA) with their projected market value and to assess other project benefits. Power Advisory was engaged by OER advise it with the review of the Revolution Wind project and Power Purchase Agreement (PPA) in 2018. This work is effectively an update of that assessment using the same metrics.

- These benefits include displacing higher cost generation during critical winter peak demand periods when natural gas supplies are limited; electricity prices are highest, and oil-fired generation is needed to address natural gas supply constraints. During these periods offshore wind generation provides energy system reliability benefits and wholesale price reductions that reduce costs to customers and lowers greenhouse gas emissions.

    - Our analysis indicates that the project will provide Rhode Island customers with savings of $374 million over the 20-year PPA term on the cost of energy and RECs and an additional $139 million in terms of lower wholesale energy prices, offering residential customers a reduction in their electricity bills in the project's first full year of operation of from $4 to $10.

- In addition, the project will serve as a high energy output resource that provides needed energy supply when other new energy resources are increasingly difficult to permit and construct and have costs that are considerably higher than offered by Revolution Wind.

- The PPA will provide about one-fifth of the state's 100% renewable energy standard (based on electricity demand in the mid-2030s).

Contents

Introduction: Revolution Wind Project

- Revolution Wind is a 704MW offshore wind project located 15 nautical miles southeast of Point Judith, Rhode Island. The project is anticipated to enter commercial operation later this year and begin delivering the 400MW that is under contract to Rhode Island Energy for a 20-year term. Connecticut utilities have Power Purchase Agreements (PPAs) for the remaining 304MW of capacity available from the project.
    - Revolution Wind was originally developed by Deepwater Wind Holdings LLC (Deepwater Wind), the developer of Block Island Wind. At the time of Deepwater Wind's bid into Massachusetts' 83C procurement, Block Island Wind was the first and only commercially operating offshore wind facility in the United States. Deepwater Wind was acquired by Ørsted in 2018.
- Given the impending commercial operation of Revolution Wind, the Rhode Island Office of Energy Resources (OER) engaged Power Advisory to perform an independent assessment of the cost of energy and RECs under the project's PPA with Rhode Island Energy with the projected market value of the energy and RECs to be produced by the project over its 20-year PPA term.
    - Power Advisory was originally engaged by OER in 2018 to assist with the review of offshore wind proposals that had been submitted to Massachusetts in the 83C procurement that Rhode Island was reviewing to address its long-term energy requirements under the Affordable Clean Energy and Security (ACES) Act. Power Advisory's analysis is effectively an update of its assessment of the project performed in 2018 and released in 2019, with some additional information comparing the cost of Revolution Wind to the delivered cost of onshore wind.
- Revolution Wind was initially expected to reach commercial operation by January 15, 2024. Due to the federal permitting delays and other hurdles, the project is now expected to reach full commercial operation by the second half of 2026.

Revolution Wind Project: Benefits

- Presented herein is Power Advisory's comparison of the cost of energy and RECs from Revolution Wind's PPA with their projected market value over the 20-year term of the PPA. In addition, we also review other benefits offered by the Revolution Wind PPA and offshore wind generation more broadly including:

(1) the important role that offshore wind generation can play in displacing natural gas-fired generation during critical winter peak demand periods when natural gas supplies are limited; electricity prices are highest, and oil-fired generation is needed to address natural gas supply constraints. During these periods offshore wind generation provides energy system reliability benefits and wholesale price reductions, and lowers greenhouse gas emissions.

- Offshore wind provides a significant capacity benefit enhancing the reliability of electricity supply in both the summer and winter. Initial ISO-NE estimates suggest offshore wind will receive a capacity accreditation of about 30% of its installed capacity in summer and up to 70% in winter, i.e., a 500 MW offshore wind project will avoid the need for 150 MW in the summer and up to 350 MW in the winter of a hypothetical generating unit that is available all the time, reducing costs to customers.
- During the recent cold snap from January 24th to 31st, ISO-NE day ahead prices averaged $634/MWh (63¢/kWh) on the coldest day, and offshore wind operated at about a 58% capacity factor. During this 8-day period, had Revolution Wind been operational and Rhode Island Energy's contract with the project been active, it would have saved Rhode Island ratepayers about $14 million.
- During this 8-day cold snap, had Revolution Wind been operational it would have lowered generation-related greenhouse gas emissions in New England by 5.3%, offsetting 8.5% of oil-fired generation.

Revolution Wind Project: Benefits

(2) the PPA will provide about one-fifth of the state's 100% renewable energy standard based on forecast electricity demand in the mid-2030s.

(3) the greenhouse gas (GHG) emission reductions of 0.4 million tons per year from the Revolution Wind project, which represents a value of about $19 million per year based on the social cost of carbon established by the Biden Administration of $190/ton, after the cost of RGGI allowances and RECs have been netted.

- The cost of RGGI allowances are netted because these are already embedded in our electricity price forecast as a cost that fossil fuel generators need to pay and the REC value is deducted because it's effectively a charge to reflect the societal benefits of renewable energy as well as the costs of fossil generation.

(4) serving as a high energy output resource that provides needed energy supply when other new energy resources are increasingly difficult to permit and construct and have costs that are considerably higher than offered by Revolution Wind. In addition, as noted above it offers a valuable energy output profile that diversifies the region's electricity supply mix and by so doing reduces the supply and reliability risks during extreme weather events.

Each of these benefits is assessed in greater detail throughout this presentation.

Note: We offer a list of acronyms and key terms in the Appendix.

Analysis of Revolution Wind PPA

Wholesale Price Forecast Assumptions

- The analysis of contract costs and benefits used best available information on New England electricity generation and electricity demand and where possible was based on data from the New England electricity system operator (ISO-NE).
    - The electricity demand forecast is based on ISO-NE's 2025 Capacity, Energy, Load, and Transmission (CELT) Report.[1] The installed capacity assumptions for all generation technologies available in 2025 are based on the values in the 2025 CELT Report. Near term capacity additions reflect the results of recent state procurements including the forthcoming Northern Maine procurement and existing policy initiatives.
    - In mid-2025, ISO-NE released a 2035-2036 production cost model that was used to inform their Longer-Term Transmission Planning (LTTP) RFP. The LTTP 2036 resource mix was used to guide the development of our forward-looking supply assumptions, along with the capacity expansion modelling to establish the least-cost mix of new supply in the long term.

- This least-cost mix of new supply reflects the current project development environment where it is increasingly difficult to site and permit new clean energy generation resources. Future supply mix additions are based on the respective costs of the different available generation technologies, with capacity additions selected based on the lowest net cost after electricity market revenues are considered. The high costs of some technologies (offshore wind) and difficulty of developing others (onshore wind) effectively constraints the future resource mix and contributes to escalating wholesale electricity prices.[2] With no new wind resources after the 1,200 MW provided by the Northern Maine procurement in 2035, solar and battery storage are relied upon to provide increased energy and capacity requirements. If the Northern Maine procurement results in the development of less than 1,200 MW of land-based wind the value offered by Revolution Wind would be higher than we have forecast.

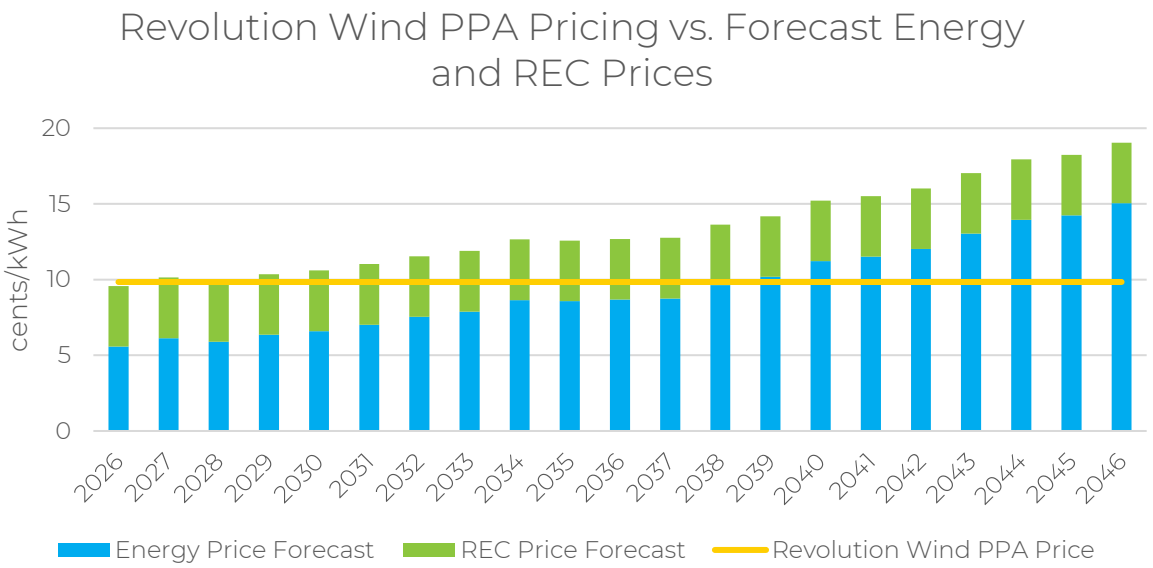
1. 2025 CELT Report, ISO New England.
2. Offshore wind costs for the mid 2030s (the first year the resource is assumed to be available) are based on recent costs and are assumed to decline by in 12% real terms over the next 10 years.

Revolution Wind Direct Benefits: Updated Analysis

- Revolution Wind's PPA with Rhode Island Energy provides a flat (non-escalating) price of $98.425/MWh ($9.8425 cents per kWh) over the 20-year term. As shown below, the PPA offers savings to customers starting in 2027, with the contract price less than the value of energy and RECs produced. Savings increase significantly over the contract term. While additional clean energy additions beyond what we've assumed would reduce projected future savings offered, they wouldn't change the fact that the project yields savings in its first full year of commercial operation. Energy prices in 2026 are lower because the project reaches commercial operation in the second half of 2026 and doesn't realize higher winter energy prices in 2026.

- The updated analysis that we have performed clearly indicates that the economics of the Revolution Wind PPA are dramatically more compelling today than when the project was first selected by Rhode Island with the PPA offering total net direct benefits of $374 million over its 20-year term.

- Power Advisory estimated these direct net benefits by comparing the contract price paid by Rhode Island customers (the straight yellow line on graph) with the forecast of the market value of the energy and RECs (green and yellow bars) produced by the project over the twenty-year term of the PPA. This analysis of direct benefits doesn't consider societal benefits.



Data sourced from Power Advisory's internal energy and REC forecast models.

Revolution Wind Direct Benefits: Updated Analysis

Year	Wholesale Energy Price Forecast (¢/kWh)	REC Price Forecast (¢/kWh)	Revolution Wind PPA (¢/kWh)	Savings (¢/kWh)	Cumulative Net Benefits (2026 $millions)
2027	6.1¢	4.0¢	9.8¢	0.3¢	$2.3
2030	6.6¢	4.0¢	9.8¢	0.7¢	$19.0
2035	8.6¢	4.0¢	9.8¢	2.7¢	$113.0
2040	11.2¢	4.0¢	9.8¢	5.4¢	$225.3
2046	15.0¢	4.0¢	9.8¢	9.2¢	$374.2

Data sourced from Power Advisory's internal energy and REC forecast models.
Totals may not add due to rounding.

Changes in ISO-New England Market Fundamentals Since 2018

- In the intervening eight years since the analysis of the Revolution Wind PPA was conducted for the proceeding before the Rhode Island Public Utilities Commission, market fundamentals in the ISO-New England market have changed markedly. As indicated on page 27 of this presentation, some of the clean energy resources that were under contract have not been developed due to unanticipated increases in project costs and interest rates, permitting challenges, delays in securing interconnection approvals, and it has become increasingly difficult to develop new clean energy resources. The inflationary impacts associated with the pandemic have increased the costs of clean energy technology, with the required contract pricing for offshore wind projects increasing by well over 50%.

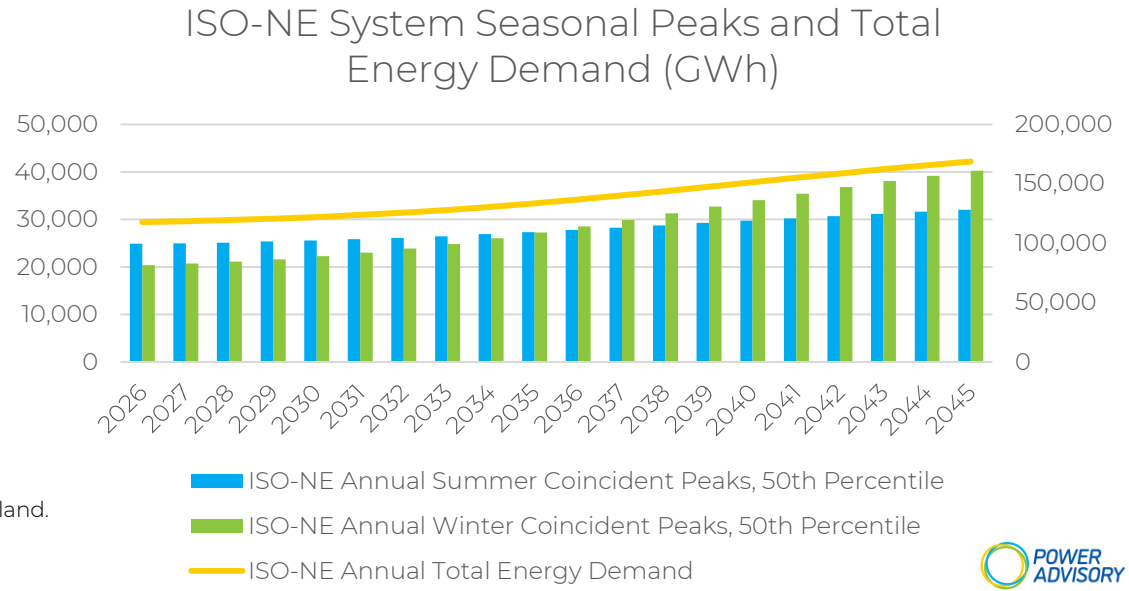
- The federal government has actively opposed the development of offshore wind, preventing the development of new offshore wind projects. In addition, the federal government policy reversals have contributed to a risk premium for offshore wind project development that has further increased pricing for offshore wind.

- Underlying natural gas prices, which are a critical determinant of electricity prices, have increased. In addition, little has been done to remedy winter natural gas supply constraints which cause energy price spikes, with many of the clean energy resource projects that were anticipated to reduce reliance on natural gas during the winter period cancelled.

- Furthermore, electricity demand growth has increased. The 2018 CELT Report, which the previous analysis of the Revolution Wind contract relied on, projected a 0.9% compound annual growth rate (CAGR) from 2018-2027, whereas the 2025 CELT Report projects a 1.8% CAGR for the 2025-2045 period, effectively doubling the growth rate of electricity requirements.

New England's Need for Additional Energy

- ISO-NE forecasts that the annual total electricity demand within their jurisdiction will grow 30% in the next 20 years, which creates a significant demand for the development of new generation resources.
- Historically, ISO-NE has reached its peak load during the summer, typically during times of extreme heat. However, driven largely by the electrification of building heating systems, ISO-NE forecasts that in the mid-2030s the system will switch to winter-peaking, underscoring the need to prioritize procurement of generation resources that perform reliably in the winter.
- Revolution Wind provides valuable capacity to meet load growth year-round, and offshore wind's stronger winter output aligns well with ISO-NE's anticipated switch to winter electricity peak demands.



Data used in graph sourced from 2025 CELT Report, ISO New England.

Energy System Reliability Benefits

- Offshore wind has relatively high capacity factors and is available in more hours than other intermittent resources such as land-based wind and solar.
    - Offshore wind also offers greater diversity value compared to other intermittent resources as its output profile is winter weighted and is potentially available around the clock, unlike solar resources
- ISO-NE is in the process of revising the methodology that will be used to establish the capacity value of offshore wind resources.
    - Initial results were released and found that wind, with no distinction between offshore and onshore wind, receives an accreditation value of 20% in summer and 36% in winter.[1]
    - ISO-NE notes that offshore wind performs better than onshore wind and provides disaggregated results.
    - If OSW has the best capacity value of the overall wind fleet (as is plausible given its higher capacity factor overall), the capacity value is about 30% in the summer and almost 70% in the winter.[2]

1. ISO-NE Impact Assessment, pg. 64.
2. ISO-NE Impact Assessment, pg. 109.

Benefits During Extreme Cold: Diverse Energy Supply

- As noted previously, ISO-NE's seasonal load growth patterns demonstrate a need for new, high-capacity factor generation in the winter months.

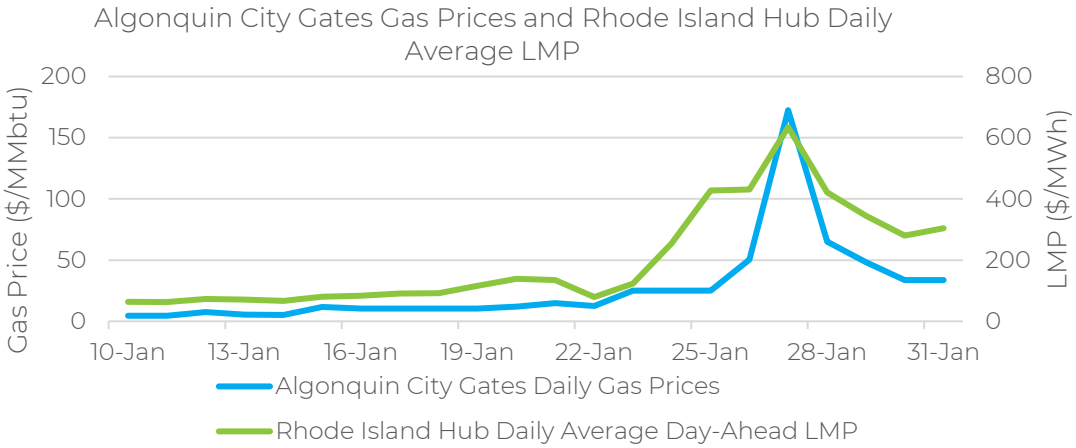
- Power Advisory's analysis, as subsequent slides detail, concludes that adding Revolution Wind to the supply mix will enhance supply reliability during extreme cold weather events when the electricity grid is under the most stress; reduce reliance on natural gas particularly during winter weather events and assist the region in addressing natural gas supply constraints, resulting in lower wholesale energy prices and lower greenhouse gas emissions. While additional quantities of offshore and onshore wind can reduce New England's reliance on natural gas-fired generation, without new dispatchable high energy output resources the region will continue to be rely on natural gas-fired generation to provide its flexible resource needs.
    - ISO-NE's 2025 Regional System Plan expands on this point and provides further direction on the resource alternatives needed to eliminate reliance on fossil fuels noting:

      "To entirely avoid generation that burns fossil fuels, the future system will require vast quantities of seasonal storage, or a firm supply of zero-carbon fuel. Although the technology for zero-carbon dispatchable generation exists, the expense of necessary retrofits to existing generators, fuel delivery upgrades, and an uncertain storage and supply chain may be significant barriers to deployment at scale. A technology or fuel that requires minimal generator modification and little to no pipeline/storage upgrades could be most cost-effective."[1]

[1] ISO-NE 2025 Regional System Plan, p. 69.

Benefits During Extreme Cold: Mitigating Natural Gas Constraints

- During the winter season, natural gas pipelines serving New England are often running at capacity to address natural gas demand for both heating and electricity generation. During prolonged cold weather events, pipeline constraints limit the natural gas supplies available to generators, with competition among competing prospective users resulting in price spikes which are passed on to both electricity and natural gas consumers.
- These natural gas price spikes from pipeline constraints translate into wholesale electricity price spikes because natural gas-fired generators are the marginal electricity supply resource over three-quarters of the time in ISO-NE.[1]
- Increased offshore wind generation will reduce reliance on natural gas-fired generation, insulating Rhode Island ratepayers from electricity price volatility in winter months.
- In addition, there is also a benefit to natural gas customers in terms of reduced demand for natural gas that will contribute to lower natural gas prices during these extreme weather events.

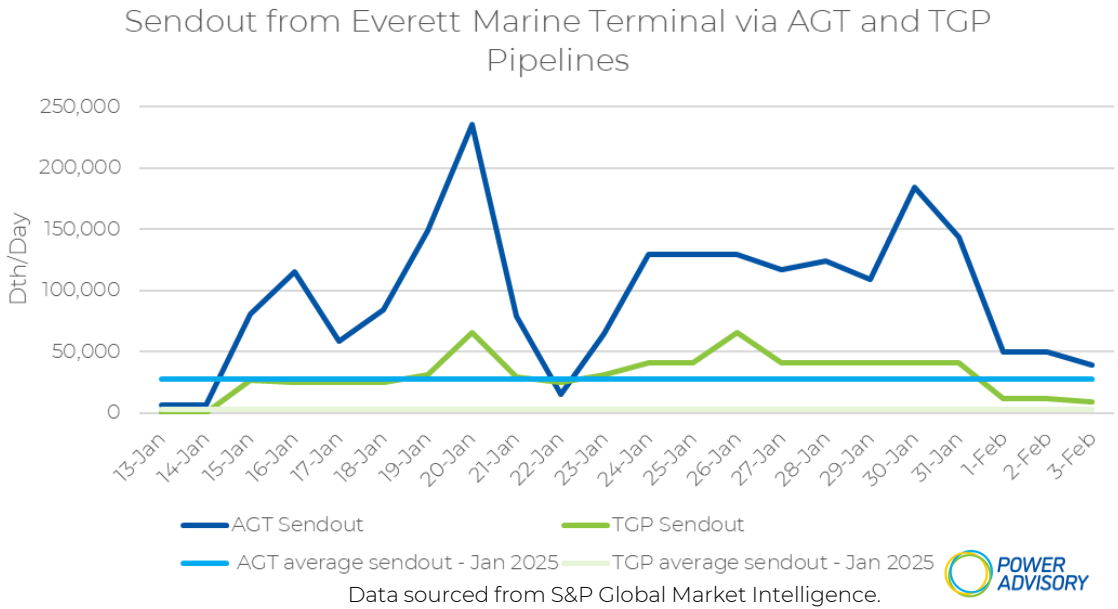


Data sourced from S&P Global Market Intelligence.

1. 2024 ISO-NE Electric Generator Air Emissions Results, ISO-NE.

Benefits During Extreme Cold: Everett Marine Liquid Natural Gas Terminal

- The Everett Marine Liquid Natural Gas Terminal (EMT), which provides natural gas to New England directly into the Boston load center when pipeline capacity is constrained and natural gas prices increase, is scheduled to close in 2030 due to high costs and the closure of the Mystic Generating Station, which was its primary customer. EMT supplies natural gas to two gas transmission pipelines in the region, Algonquin (AGT) and Tennessee (TGP).
- EMT is frequently called upon during extreme winter weather events to provide natural gas supplies that are essential to maintaining resource adequacy. The graph to the right shows pipeline supply (sendout) during a "normal" winter month (January 2025, light blue and green) compared to pipeline utilization during an extreme cold weather event (Winter storm Fern in January 2026, darker blue and green).
- Without EMT, natural gas supply during extreme winter events will face even greater constraints. This increases the urgency of securing alternative resources that offer additional generation during such events, like offshore wind.



Data sourced from S&P Global Market Intelligence.

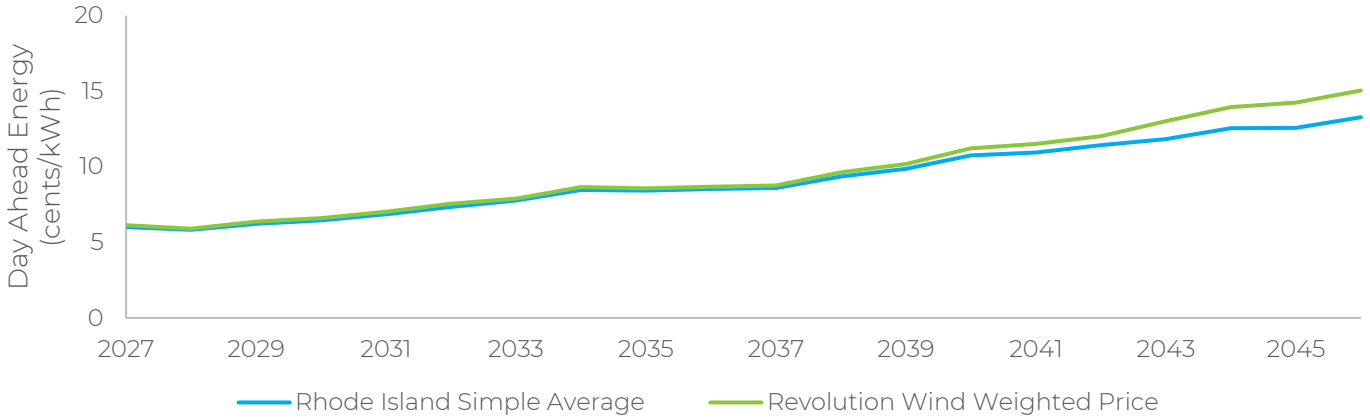
Benefits During Extreme Cold: Emission Reductions and Customer Savings

- Power Advisory conducted an analysis of market conditions in the 8-day cold snap from January 24th-January 31st to understand how the inclusion of Revolution Wind in the supply mix would have impacted energy prices, electricity generation-driven greenhouse gas emissions, and electricity supply resource adequacy.
- On January 25th, 2026, ISO-NE experienced its highest winter peak load (20,127MW) since 2019. Average Day-Ahead prices peaked on January 27th at $634/MWh (63¢/kWh).
  - Due to sustained low temperatures, the high loads extended well beyond the winter storm itself.
  - Dual-fuel generators switched to oil by January 23rd, providing 40% of total generation on January 25th. Reflecting the higher GHG emissions from oil, electricity generation emissions increased by 112%, while total load during this period increased by only 8.5%.
- Power Advisory analysis indicates that Revolution Wind would have been operating at about a 58% capacity factor and would have reduced gas- and oil-fired generation GHG emissions by 5.3% across all of ISO-NE during this 8-day stretch. It would have done this by offsetting 8.5% of the oil-fired generation that was operating in light of natural gas fuel shortages and high heating load.
- In just this 8-day cold snap, Revolution Wind would have saved Rhode Island ratepayers $14.4 million in energy costs.

Enhanced Value of Energy from Revolution Wind

- The figure below compares the hourly average wholesale energy price in Rhode Island with the weighted average price that Revolution Wind is forecast to receive. As can be seen the weighted average price that Revolution Wind is forecast to receive is slightly higher than the Rhode Island average wholesale energy price throughout the analysis period, with these differences increasing significantly in the last eight years of the analysis period.

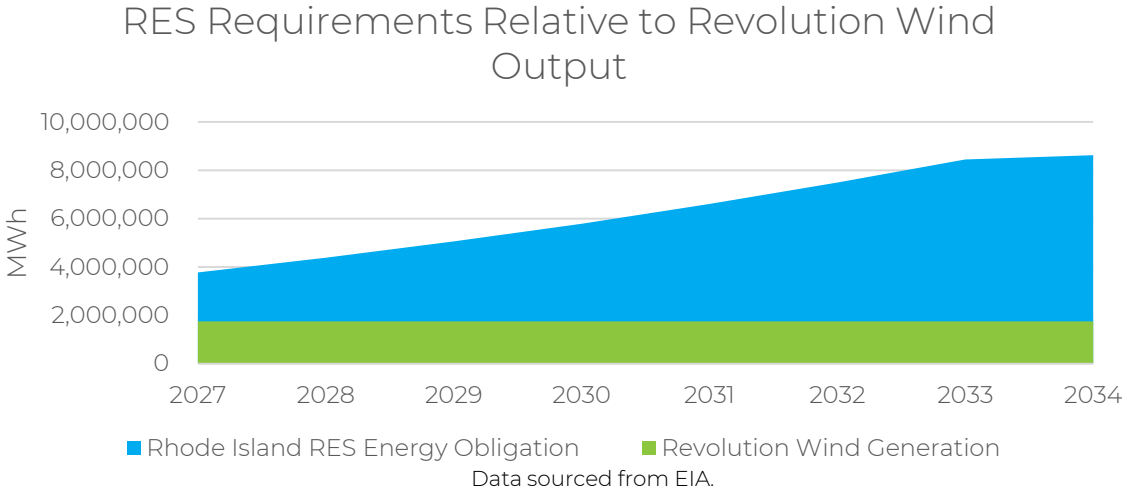
- The fact that Revolution Wind realizes higher energy revenues that Rhode Island's hourly wholesale energy price indicates that Revolution Wind's output is during hours when wholesale energy prices are higher, demonstrating the higher value of its output. This is quantitative support for the diversity value of the project's output, i.e., the value associated with operating in hours when other low-cost resources are unavailable.



Data sourced from Power Advisory's internal price forecast models.

Rhode Island RES and New England REC Market

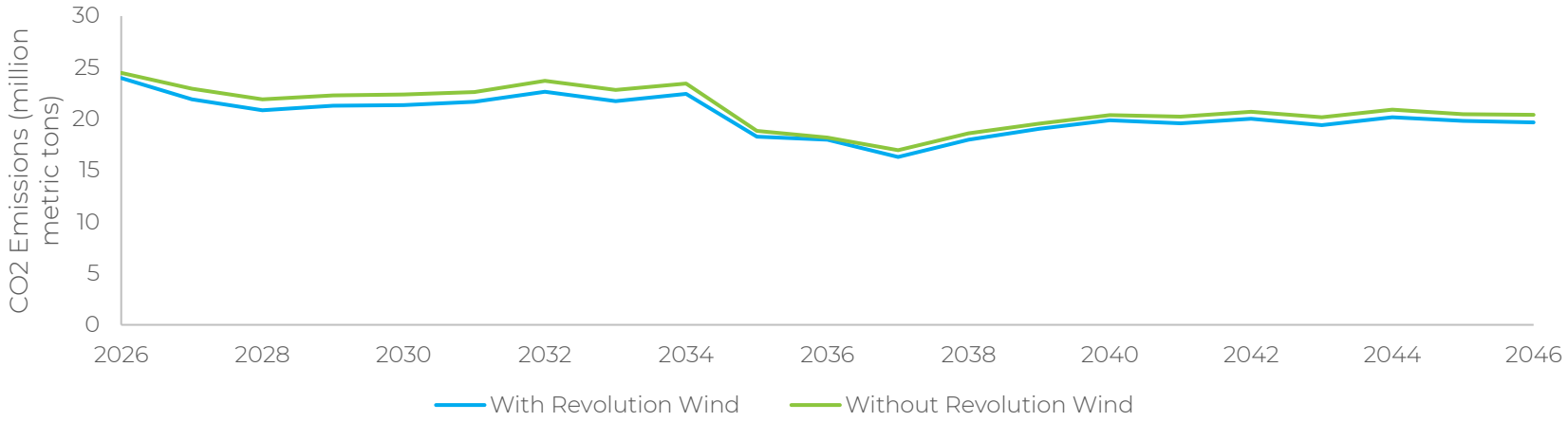
- Revolution Wind will allow Rhode Island to make substantial progress towards fulfilling its Renewable Energy Standard (RES), providing about one-fifth of the state's 100% renewable energy standard based on electricity demand in the mid-2030s. . Power Advisory understands that prior analysis regarding RES compliance costs considered the contribution provided by Revolution Wind. Therefore, no further reductions in RES compliance costs are anticipated.



Data sourced from EIA.

- Graph shows the proportion of Rhode Island's RES supplied by Revolution Wind as the standard exists in March 2026. Future updates to the RES may change these ratios. However, they wouldn't impact the New England REC market price forecast because the market is forecast to be in deficit throughout the forecast horizon even if changes are made to the RES to delay Rhode Island's 100% renewable energy target.

Value of GHG Emission Reductions



Data sourced from Power Advisory's internal greenhouse gas emission forecast model.

- Rhode Island 400 MW from Revolution Wind reduces carbon dioxide emissions by 0.43 million tons per year on average.
- Some of the value of this emission reduction is already reflected in the contract economics through the value of RECs generated by the project and the cost of RGGI (regional Greenhouse Gas Initiative) allowances embedded in the energy market price forecast.
- Applying a social cost of carbon of $190 per metric ton[1] (2023 dollars), the value of avoided carbon dioxide net of REC value and RGGI allowances is about $19 million per year.

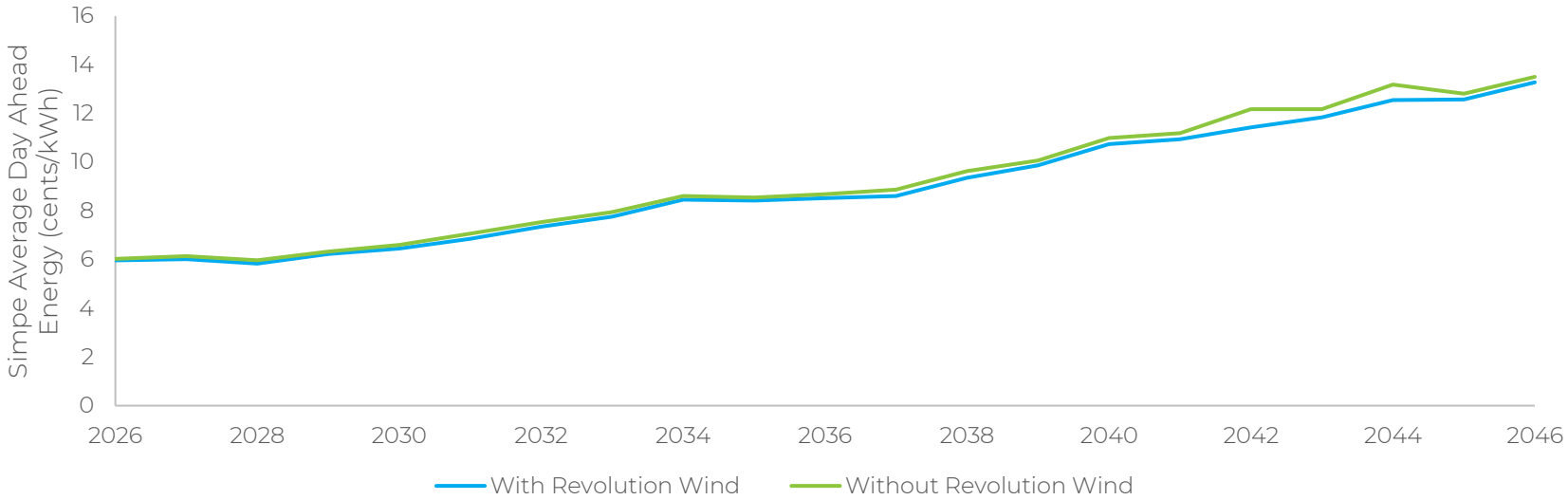
1. Interagency Working Group on the Social Cost of Greenhouse Gases, Environmental Protection Agency, 2023.

Rhode Island Customer Savings

Wholesale Energy Price Reductions

- Wholesale electricity prices in New England are established based on the price offered by the highest cost resource needed to serve electricity demand in that hour. Therefore, adding low marginal cost electricity resources such as Revolution Wind will displace higher cost resources and reduce wholesale energy prices. Our analysis indicates that the low marginal cost energy from Revolution Wind will reduce average wholesale prices from 2026 to 2046 by 0.24 cents/kWh (2.6%).

- This represents an economic value to Rhode Island customers of about $139 million over the 20-year contract term.



Data sourced from Power Advisory's internal price forecast model.

Calculating Rhode Island Customer Bill Savings

- The next page presents the projected electricity bill savings for a typical Rhode Island residential customer using 500 kWh per month. These customer savings are estimated by comparing the contract price for Revolution Wind with our forecast of the wholesale energy price and cost of RECs required to comply with Rhode Island's RES.
    - When calculating the savings from Revolution Wind it is not appropriate to compare the contract price for Revolution Wind directly with cost of Last Resort Service provided by Rhode Island Energy. Last Resort Service reflects the cost of other electricity products and services that are not offered by Revolution Wind that are required to provide a full requirements service to customers.
- The increased customer savings provided by Revolution Wind are attributable to higher electricity prices from higher natural gas prices and higher electricity demand growth along with reduced supply from new renewable energy resources, both of which result in increased utilization of existing fossil fuel generating resources; and higher REC prices from reduced renewable energy resources.

Rhode Island Customer Bill Savings

- A range of residential customer bill savings is calculated. The low end of the range reflects savings from avoided energy and REC purchases net of contract costs, spread across total load in Rhode Island.[1] The high end of the range also includes the impact of wholesale energy price suppression discussed on the previous page.
    - Monthly savings are based on an assumed typical residential customer using 500 kWh per month, and relative bill reduction is based on residential rates for Rhode Island presented by the EIA.[2]

Year	$/Month Savings (Low to High End Scenarios)	% Bill Reduction (Low to High End Scenarios)
2027	$0.31 to $0.82	0.10% to 0.27%
2030	$0.74 to $1.3	0.23% to 0.40%
2035	$2.2 to $2.5	0.62% to 0.70%
2040	$3.44 to $3.72	0.88% to 0.95%
2045	$4.28 to $4.63	0.99% to 1.07%

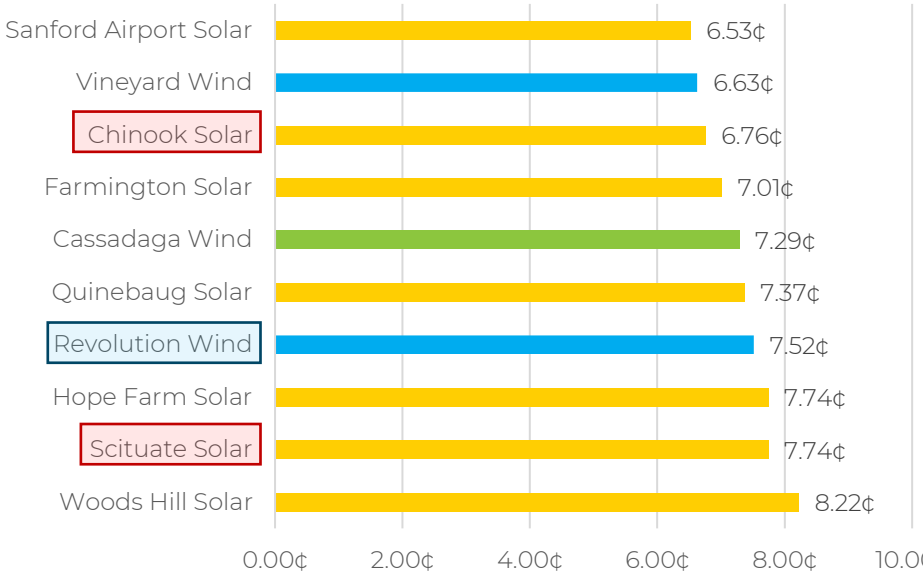
1. 2025 Load Forecast, ISO-NE.
2. 2024 Electric Power Annual Report, EIA, Table 2.10.

Data sourced from Power Advisory's internal price forecast model.

Resource Cost Comparison

Cost Comparison at the Time of Contracting in 2018

- At the time of contracting in 2018, the cost of Revolution Wind compared favorably with other clean energy project. The figure below provides a comparison of Revolution Wind with other clean energy projects contracted around 2018 in the Tri-State procurement by National Grid (real levelized 2018 ¢/kWh).



Data sourced from publicly available contract proceedings and filings.

- Chinook Solar and Scituate Solar were ultimately cancelled due to a combination of interconnection delays, project cost increases, opposition to the proposed land-use, and unanticipated transmission costs. This further emphasizes the reasonableness and strength of investment into Revolution Wind, which is anticipated to achieve commercial operation in the second half of 2026.

- The remaining projects did ultimately achieve commercial operation. Quinebaug Solar faced permitting hurdles that resulted in major redesign and significantly delayed commercial operation. Vineyard Wind is partially operational. Much like Revolution Wind, it has faced regulatory and permitting hurdles throughout its development and construction.

Solar projects are depicted in yellow, offshore wind in blue, and onshore wind in green.

Comparison with other offshore wind projects

- The table below shows that Revolution Wind and Vineyard Wind offer costs that are about 50% less than the two other offshore wind projects that are currently under construction in the region, i.e., Empire Wind and Sunrise Wind.
    - While Commonwealth Wind and Mayflower Wind offered lower costs, both projects were cancelled because the contract price was too low to cover project costs and provide an adequate return to investors after offshore wind costs increased dramatically after the Ukrainian War as a result of supply chain constraints, higher interest rates and higher underlying inflation.

Project	Project Size	Contract Price (cents/KWh, nominal levelized)	Status
Vineyard Wind	800MW	8.84	Final Construction
Revolution Wind	704MW	9.8425	Final Construction
Commonwealth Wind	1,200MW	9.16	Cancelled
Mayflower Wind	1,200MW	7.78	Cancelled
Empire Wind	810MW	19.85	Under Construction
Sunrise Wind	924MW	14.6	Under Construction

Data sourced from publicly available contract proceedings and filings.

Cost Comparison: Onshore Wind

- Revolution Wind's contract pricing is favorable to comparable capacity procurement of onshore wind.
- In New England, expanding offshore wind capacity requires transmission development, as evidenced by the ongoing Northern Maine procurement. This procurement is contracting for transmission facilities to deliver 1,200 MW of onshore wind to the ISO-NE grid, increasing the delivered cost of this energy. Five states are participating.

	Onshore Wind	Revolution Wind
Levelized Cost of Energy	10.9¢/kWh	9.8425¢/kWh
All-in Delivered Cost	12.9¢/kWh	9.8425¢/kWh

Data sourced from Power Advisory's internal LCOE model.

Ongoing Challenges to Energy Development in New England

- In addition, to the project's favorable costs relative to electricity market prices and various reliability benefits, Revolution Wind offers Rhode Island and the region 704 MW of high capacity factor energy at a time when it is increasingly difficult to develop and construct new electric generating resources, in spite of the region's need for additional generating capacity given higher electricity demand growth.

- New large-scale solar and storage projects are receiving significant opposition in many jurisdictions (on a state and local level) that is limiting project development. Given local opposition and land-use conflicts in New England, large scale land-based wind projects can be built only in Maine and most of this development is limited to Northern Maine where there are fewer land use conflicts. Land requirements are making it increasingly difficult to site solar projects in Southern New England.

    - The Johnston Winsor III Solar Project is an example of the challenges of siting and permitting utility scale solar projects in Southern New England.

- Local resistance typically stems from siting and permitting concerns such as:

    - Environmental concerns about the use of forests, farmland, wetlands, or other ecologically important environments for siting energy projects. Similarly, historic or cultural concerns regarding siting on historical sites or Indigenous lands.

    - Safety concerns surrounding electrical and fire risks, especially for storage projects, and stormwater runoff mitigation.

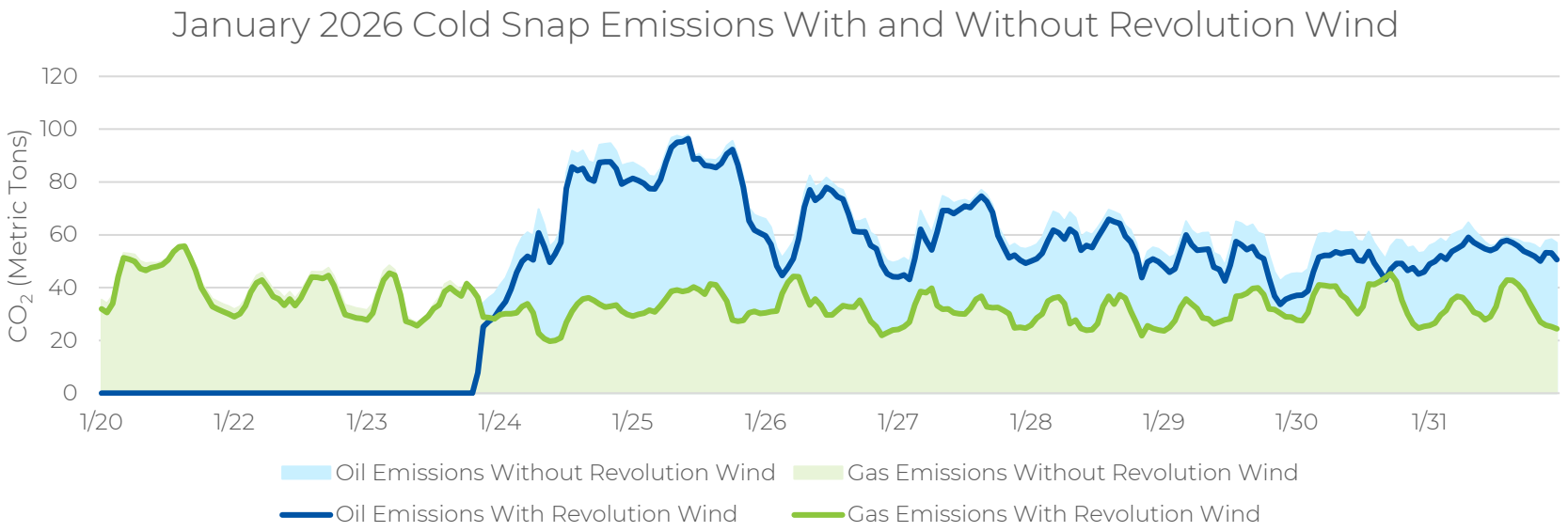
    - Visual impacts on scenic, rural, or historical landscapes.

Appendix

Acronyms and Definitions

- **All-in delivered cost:** The cost of a generation resource that includes the cost of delivering the project's energy to customers considering associated transmission costs.
- **Capacity:** The maximum amount of electricity a power system or individual generator can produce or deliver.
- **GHG:** Greenhouse Gas
- **kW/kWh**: Kilowatt and Kilowatt hour; measurements of power and energy.
- **Levelized cost of energy:** Cost of building and operating a generation resource over its entire lifetime, expressed on a per unit basis of electricity it produces.
- **LMP:** Locational Marginal Price; The price of electricity at a specific location on the transmission system, including marginal cost, transmission congestion and losses.
- **Marginal cost:** The cost of producing the next additional unit of electricity, which typically reflects fuel and operating costs.
- **Marginal resource:** The last generator dispatched to meet electricity demand at any given moment, the costs of which is used to set the market price for electricity in competitive wholesale electricity markets like ISO-New England.
- **MW/MWh:** Megawatt and megawatt hour; measurements of power and energy.
- **Nominal levelized price:** Average price of a contract over its full duration without adjustments for inflation but including any contractual escalations or changes.
- **OSW:** Offshore wind.
- **PPA:** Power Purchase Agreement; Long term contract for the sale of electricity between power generator and user.
- **Real levelized price:** Average price of a contract over its full duration, expressed so as to adjust for the impact of inflation.
- **RECs:** Renewable Energy Certificates; tradable certificates representing the environmental attributes of 1MWh of electricity generated from a renewable resource.
- **RGGI:** Regional Greenhouse Gas Initiative; cooperative program that caps carbon dioxide emissions from electricity generator and allows emissions trading.
- **Wholesale energy price:** Price of electricity bought and sold in bulk on the energy market, which, unlike LMP, is not tied to a singular delivery point.

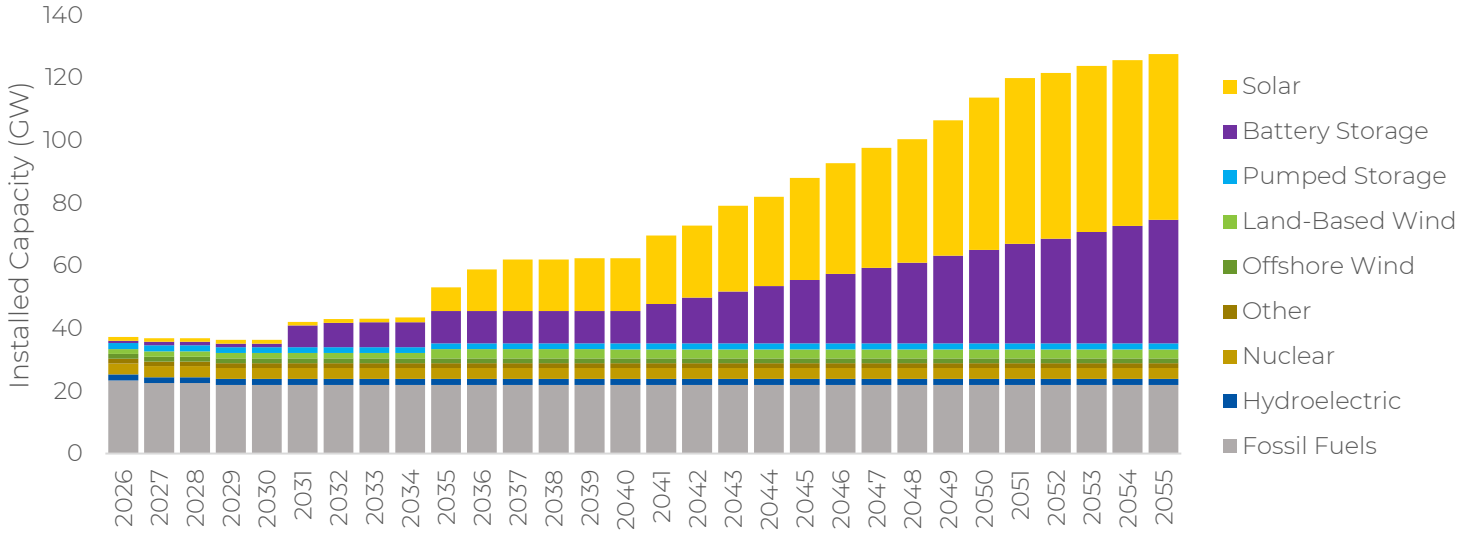
Benefits During Extreme Cold: Emissions Reductions



Data sourced from S&P Global Market Intelligence.

New England Capacity Expansion Modeling Results

- The figure below shows the assumptions regarding New England's overall capacity mix over the forecast horizon. New capacity resources were added based on their relative net cost after energy and REC market revenues were considered.



Data sourced from Power Advisory's internal capacity expansion forecast model.

- Solar and storage provide the majority of capacity additions; even with available REC revenue, energy prices are not high enough to support investment in offshore wind.

New England REC Forecast Methodology

- The REC forecast is based on an annual supply/demand assessment of RECs generated versus RECs required for the New England market as a whole.
    - If the REC market is just met or under-supplied relative to the required volume of RECs, RECs are projected to be valued at close to the alternative compliance payment (ACP) level of $40/MWh.
    - If there are excess RECs, prices fall based on the carrying cost of retaining RECs for future sale.
        - In essence, if RECs must be carried for 3 years before the REC demand rises to meet REC supply, the price would be discounted to equate the current REC price with the future REC price.
        - A 10% annual discount rate is applied in this process.
    - If the market does not come back into balance within 5 years, RECs are priced at a floor price based on the national Green E REC (currently about $3/MWh). Green E RECs are traded nationally and often used for voluntary renewable energy purchase compliance purposes, but are relatively low cost given the broad market over which they are traded.
- Given that the long-term capacity expansion is driven by wholesale market economics, falling REC prices would be expected to trigger a slow-down in renewable build and if REC prices fall below the level needed to support renewable investment, no renewable capacity would be added in that year.
    - This is the mechanism that sets the equilibrium REC price in the long-term.

New England Class I REC Price Forecast

- The REC market reflects that there is a persistent under supply of RECs in the forecast given constraints on renewable project development.
- This is a result of the forecast build of renewables in the capacity expansion model.
  - Offshore wind and solar are added to the resource mix when energy market revenues plus REC sales exceed the cost to build. Given capacity accreditation risks and ISO-NE CAR, we assume that little value is assigned to capacity revenues.
  - As more solar is added to the system, the energy market revenues realized by the resource decline as increasingly low cost resources are displaced.
  - With this loss of energy market revenues the cost of solar is greater than its energy and REC market revenues, resulting in not enough solar being added to meet New England RPS targets.
- No new offshore wind projects are being added to the resource mix because its expected cost remains above its market value throughout the forecast.

John Dalton
President
jdalton@poweradvisoryllc.com
978.831.3368

Kris Aksomitis
Director
kaksomitis@poweradvisoryllc.com

Julia Barton
Consultant
jbarton@poweradvisoryllc.com