February 24, 2021

New England States' Vision for a Clean, Affordable, and Reliable 21st Century Regional Electric Grid: Market Reforms

We appreciate the opportunity to provide comments in response to the New England States' Vision for a Clean, Affordable, and Reliable 21st Century Regional Electric Grid.

FirstLight Power (FirstLight) is a leading clean power producer and energy storage company in New England with a portfolio that includes 1.4 gigawatts (GW) of pumped-hydro storage, lithium-ion battery storage, hydroelectric generation, and solar generation. These local clean energy resources are a significant contribution to New England's existing zero-emissions electricity today, and provide significant support for the region's efforts to combat climate change and scale up clean energy resources.

Our assets in Massachusetts and Connecticut comprise the largest hydroelectric generation portfolio in the region, supplying New England communities with high paying local jobs and over $34 million in property taxes and local vendor contracts. Our largest asset, the Northfield Mountain pumped hydroelectric facility located in western Massachusetts, provides nearly 1,200 MW of emissions-free energy storage capacity and it serves as a critical asset to maintaining regional reliability on the New England electric grid.

As a leading clean energy producer with experience operating both large-scale renewable energy and storage assets, as well as distributed solar and battery storage projects here in New England, FirstLight submits these comments to help support and inform the States' efforts to advance its clean energy goals while maintaining a competitive and reliable grid.

FirstLight Strongly Supports the Decarbonization of the New England Electric Grid

FirstLight supports the New England States' collective efforts to decarbonize the electric sector, and we commend Governors Baker, Lamont, Mills, Raimondo, and Scott for their leadership in bringing this issue to the forefront. FirstLight also agrees with the premise of the Vision Statement that reliance on market-based mechanisms will drive the lowest cost outcomes, and agrees that a regional approach to integrating these clean energy resource goals into the

wholesale competitive markets will deliver multiple benefits for New England electricity customers. Our company's mission—to accelerate the decarbonization of the electric grid by owning, operating, and integrating large-scale renewable energy and storage assets to meet the region's growing clean energy needs and to deliver an electric system that is clean, reliable, affordable, and equitable—is substantially aligned to the States' New England Vision Statement and process.

In view of the increasingly ambitious clean energy goals of the New England states, FirstLight urges the States to recognize that decarbonization of the electric grid on the pace and scale that is needed to meet the emissions reductions targets will require "all hands on deck". Now is the time to undertake the work to create durable market structures that will deliver these outcomes. To create a system that is simultaneously clean, affordable and reliable, contributions will be needed from new and existing renewable resources, and new and existing storage resources, as well as energy efficiency and other demand-side resources.

Clearly, the current barriers to wholesale capacity market participation by new state-supported renewable resources will not serve this end. Likewise however, the current approach to exclusively supporting new resources (with a few exceptions) with public policy contracts will undermine the competitiveness of existing renewable resources and risk erosion of the significant baseline of renewables that are installed in New England today (which will require back-filling any losses with costlier new projects to hit the targets). Furthermore, under-utilization of existing pumped-hydro storage in New England, and failure to value contributions of new or existing storage in market structures, will slow the pace to cost-effectively and reliably integrate vast amounts of variable renewables. ***All of these outcomes are incompatible with meeting the clean energy targets established by the States.***

This is a critical moment of opportunity to level the playing field and provide market access for all resources that deliver what New England wants—clean and reliable electricity. FirstLight offers these comments to suggest important steps that will be needed to accomplish that goal.

1. Existing Zero-Carbon Resources Must be Included as Part of the Solution

FirstLight commends the detailed resource planning efforts that have been undertaken recently by many of the New England States. These reports collectively show that decarbonization of our electric grid is possible, and will deliver significant benefits to the states and the region. However, there is a risk looming in how most of these reports have modeled future scenarios.

Recently released state planning documents in Connecticut, Maine, and Massachusetts[1] have relied on modeling assumptions that existing zero-carbon resources will continue to contribute

[1] Connecticut Department of Energy and Environmental Protection, *Integrated Resources Plan: Pathways to Achieve a 100% Zero Carbon Electric Sector by 2040* (December 2020), State of Maine Governor's Energy Office, *State of Maine Renewable Energy Goals Market Assessment* (February 2021), Commonwealth of Massachusetts Executive Office of Energy and Environmental Affairs, *Energy Pathways to Deep Decarbonization: A Technical Report of the Massachusetts 2050 Decarbonization Roadmap Study* (December 2020)

to the system into the future. This unfortunately may not be the case if existing zero-carbon contributions are not equitably valued. Most zero-carbon resources involve high fixed costs and periodic reinvestment. If neither the wholesale market nor the state programs sufficiently value their clean energy contributions, some may need to consider retirement or deactivation, resulting in both the state and region slipping backward on clean energy goals.

Alternatively, in-region resources may be forced to look outside New England to find markets that fairly compensate these resources. New York in particular is moving aggressively to meet near-term electric-sector renewable goals (70% renewable energy by 2030 is required under New York law) and existing hydro, wind and solar resources in New England may very likely seek to export to the NY market if they are left out of a New England clean energy compensation program. Whether by retirement, deactivation, or exporting, New England is not well served to erode the baseline of existing zero-emissions resources, which only increases the challenge of meeting the ambitious goals of the states.[2]

We urge the states to increase and refine the focus on equitable compensation of existing zero-carbon resources and electric storage to move the region forward. Market reforms such as a Forward Clean Energy Market should equitably compensate all zero-carbon resources based on the value they provide to reliability, resiliency, and environmental objectives in order to ensure that the most cost effective zero-carbon resources are included in the generation mix on a sustainable basis going forward. Ideally, the FCEM premium would replace the reliance on the more bifurcated REC values arising from the different designs in each of the New England states' RPS programs and permit consistent compensation across clean energy resources in a manner that recognizes the different values presented by the timing of the clean energy delivery. In such a structure, the FCEM sale could require the assignment of the REC to the Electric Distribution Company for purposes of meeting the state RPS requirement.

To the extent that some form of transition were needed from the existing RPS driven framework to the full implementation of FCEM, a portion of the compensation required to meet specific RPS categories could occur as supplemental compensation through the RPS program. For example, given a higher cost of Offshore Wind (OSW) entry, it is possible that some portion of those costs could continue to be made through a combination of FCEM and the RPS program. Such extent of supplemental RPS compensation; however, would need to be balanced against fair compensation of all other clean energy resources and would decrease over time with decreased OSW cost of entry.

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[22] This pattern has already been observed in states (including Connecticut in New England) that were forced to support existing nuclear facilities with long-term contracts to maintain their zero-emissions generation. The New York experience illustrates the progression directly—first New York sought to support nuclear facilities with zero emissions credit contracts, and then more recently has issued an RFP for existing wind and hydro resources to participation to avoid risk that those resources would export to PJM or NE ISO. See https://www.governor.ny.gov/news/governor-cuomo-announces-new-competitive-program-retain-new-yorks-existing-renewable-energy. Now New England will face a similar risk if existing renewables are left out of the solution.

Such a balancing act should consider the relative cost difference for providing the same service. The comparison should be between apples and apples not apples and oranges. For example, while based on ISO-NE Offer Review Trigger Price analysis shows an approximately $14/kw-month difference between OSW and a standalone solar farm; their FCEM contributions are much different.[3] The solar farm provides maximum contribution at midday peak and wanes as evening peak approaches while the OSW resource profile is generally more consistent throughout the peak hours of the day.

A better comparison in that case may be the higher costs necessary to attract OSW beyond the costs needed to build both solar and storage capability to achieve similar contributions across all peak hours, including the super-peak (e.g., highest demand hours after netting for solar). For example, using the ISO-NE proposed ORTP values of OSW at approximately $14/kw-month[4] and combined solar and storage of approximately $7/kw-month[5], it may be reasonable to permit the differential, $7/kw-month, to be reflected in a supplemental payment through the state RPS program with the remainder reflected through the common FCEM compensation for all clean energy resources. This might be possible without unduly affecting the wholesale market operation since both ORTPs equal or exceed the Net Cost of New Entry (Net CONE), the point at which all qualified capacity is needed to meet the regional Net Installed Capacity Requirement (Net ICR).[6] To the extent that multi-year price lock price stability is deemed needed to support new clean energy resource investment, the same option should be provided for existing clean energy resources.

2. Building a Fully Decarbonized Electric Grid That Puts Reliability Front and Center

While offshore wind and solar resources are largely variable and non-dispatchable, when operated in concert with other clean energy resources they can provide a portfolio approach to meeting system needs with as much clean, zero-emissions generation as possible. For example, pondage hydro and pumped-hydro storage provide the ability to schedule clean energy when it is the most valuable, both for reliability and for emission reduction purposes. Currently, neither the wholesale capacity market nor state RPS programs recognize the value of being able to schedule clean energy to meet the most valuable demands (e.g., peak needs) from these resources, or to optimize emission reduction contributions. As a result, the emission reduction improvements possible from these resources are under-utilized (as discussed further below). This opportunity will be even more valuable with increasing investment in clean energy

[3] February 9, 2021 presentation by Concentric Energy Advisors and Mott MacDonald to the NEPOOL Markets Committee entitled "ISO-NE ORTP Analysis" at slide 7.
[4] *Ibid*.
[5] February 24, 2021 presentation by ISO-NE to the NEPOOL Markets Committee entitled "Offer Review Trigger Prices - Revisions to address new Federal Investment Tax Credit provisions for certain technologies" at slide 13.
[6] Since all qualified capacity is needed at or above Net ICR, it may be reasonable to allow greater state flexibility for new entry in those situations. However, below Net ICR/Net CONE, the impact of significant decreases in capacity compensation to other clean capacity resources due to rapidly declining Marginal Reliability Impact (MRI) demand curve prices could disadvantage other clean energy resources where such entry is not supported by commonly applied FCEM prices.

resources by presenting the ability to reduce the use of fossil-resources to back-up and balance the variable output renewable energy contributions.

Success in achieving significant increases in new clean energy resource entry will bring with it further considerations. For example in recent years, significantly more solar projects are entering the ISO-NE interconnection queue. While very helpful to meeting more consumer demand with no-carbon resources, the additional resource adequacy contributions present diminishing qualified capacity contributions as the net peak load for the system is shifted later in the day. While the addition of short-duration batteries (e.g., 2-hour) offers initial help in meeting the remaining peak, those contributions also have diminishing returns as the need pushes deeper in to the net peak load hours and more duration is needed to meet the same resource adequacy contribution. Given this, the best outcomes for the states' consumers will be achieved by transporting clean energy delivered during periods of low demand (e.g., midday peak solar contributions, or possibly the highest clean generation periods of offshore wind) to periods of greater reliability or emission reduction needs using electric storage.[7] While the wholesale market and some state programs seem to target short duration (e.g., 2-hour storage charge) electric storage resources, deeper charge/discharge capability will be needed, a capability present, but currently underutilized at existing pumped storage facilities in New England.[8]

Significant longer duration storage exists today at the three existing pumped hydro facilities located in Massachusetts and Connecticut. All they need is the right compensation signal to optimize carbon reductions and reduce peak demand for fossil-fired resources during critical periods, an outcome possible by matching their charging with output from offshore wind and other large-scale renewables for delivery in periods that are more valuable. This highlights how important it is for the FCEM design to differentiate clean energy value by timing of clean energy delivery. Clean energy and storage transportation through the day are important complements that FCEM will need to recognize in order to deliver an efficient and reliable clean energy future for the region's electric consumers.

3. A Real-Life Example of What is Possible

FirstLight encourages the states and the region to pursue a solution like FCEM that utilizes a common product with differentiation of value based solely on the timing of delivery. FirstLight's

[7] Both the ISO-NE wholesale electric market and state programs are incentivizing short duration (i.e., 2-hour maximum charge) electric storage resources. While a 2-hour charge may initially be able to clip the peak-most net peak load hours, increased penetration of 2-hour electric storage will not be able to address the longer duration need to meet more of the net peak load hours' demand. See slide 15 of the ISO-NE December 11, 2020 presentation entitled "Draft 2021 Transportation Electrification Forecast" at https://www.iso-ne.com/static-assets/documents/2020/12/evf2021_draft_fcst.pdf.

[8] ISO-NE has announced its plans to assure proper alignment between resource adequacy contributions and qualified capacity value through an Effective Load Carrying Capability (ELCC) analysis. We expect the declining contributions of 2-hour storage to become evident in the upcoming ELCC analysis.

Northfield Mountain (an 1168-megawatt zero-emissions, fast-dispatch, nearly 8-hour duration energy storage asset) provides a clear illustration of what is possible along with the significant additional benefits that could be unlocked with such a time-differentiated compensation signal. While existing pumped hydro currently provides substantial contributions in the wholesale energy market, they could be asked to do much more. For example, Northfield Mountain, New England's largest energy storage facility operates at approximately 25% of its overall throughput capability on an annual basis. The simplest explanation for this underutilization is that the ISO-NE energy market was not designed to reflect the carbon reduction opportunities that can be achieved by moving clean energy at the time of renewable generation to a later time when it can have even greater success in curbing emissions.

The potential additional value that could be unlocked by better leveraging this large-scale facility is compelling. In a study published by Energyzt, LLC in June 2020, the firm concluded that operating just two of Northfield Mountain's four units more frequently would produce over $410 million in consumer savings between 2022 and 2030.[9] Additionally the same regimen would reduce carbon emissions by an average of 180,000 metric tonnes annually.[10] These values do not account for an increased use of the other pumped hydro facilities located in New England. Absent a well-designed market structure (e.g., FCEM with delivery time-differentiated value), the existing large-scale pumped hydro facilities will remain underutilized and the value opportunities they present will not be realized[11].

Leaving pumped hydro on the sidelines not only slows the region's pace to a decarbonized supply mix, it also exacerbates the harms New England residents' experience (in the form of impacts from air emissions) from ongoing reliance on fossil generation. An FCEM designed to recognize the differentiation in value based on the timing of clean energy delivery could provide a market signal to more fully employ the existing pumped hydro storage capability to deliver greater clean energy value. It will improve the ability to use the market to move power where there is a higher portion of renewable generation (like offshore wind) from periods of excess (off-peak) to the times when that supply is needed each day (peak).

Importantly, increasing pumped hydroelectric storage from its current under-utilization would immediately reduce the fossil-fuel power emissions that make up the majority of supply during peak hours—a result that will have substantial and immediate air quality benefits for New England communities and families, particularly for those communities that are already over-burdened by air pollution.

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[9] Energyzt, LLC, *Northfield Mountain Pumped Storage: Assessment of Contract Benefits in an Increasingly Renewable Region* (June 2020), 35.

[10] Ibid. 34.

[11] Recently filed legislation by Massachusetts Representative Thomas Golden (HD. 3292) and Senator Julian Cyr (SD 1687) would establish a process by which the Commonwealth would leverage bilateral contracts to develop new large-scale energy storage and ensure that existing large-scale energy storage will be dispatched in coordination with large-scale renewable resources to capture environmental and economic value. These bills may serve as a model strategy to capture the States goals in the near-term while market reforms are under construction.

4. New England Market Reforms to Tackle the Retirement Problem

With the New England states appropriately focused on achieving market-based clean energy entry to meet their goals, it is also important to assure that the ISO-NE market has efficient retirement signals. Improving market entry without assuring efficient market exit will ultimately prove unhelpful to the fleet of clean energy resources (because prices will remain depressed and undercompensate clean energy resources) as well as undermine the needed backstop and balancing fleet of other resources. This concern is not hypothetical—the existing wholesale capacity markets actually discourages rarely used resources to retire once they reach that point of obsolescence. FirstLight can observe this problem firsthand. FirstLight's kerosene fired Tunnel Jet peaking facility is actually among the most economic resources in the ISO-NE capacity market given its very low operation and maintenance expenses, a product of minimal operation during each Commitment Period. FirstLight encourages the New England states to recognize that successful evolution of the New England grid to achieve state clean energy goals requires changes to assure efficient market exit as much as assuring efficient new market entry by clean resources.

Absent an effective retirement signal, such obsolete resources are encouraged to remain in the Forward Capacity Market (FCM) to collect capacity payments in exchange for providing very little system value, which is the current state of affairs. As stated in the Connecticut Draft IRP (with respect to fossil peaking units in Connecticut):

> Most of these older units run on residual oil, and their technology is so inefficient and costly to operate that they run infrequently, producing less than 1.8 percent of the electricity, yet 3 percent of the CO_2 emissions and 28 percent of the NOx emissions in Connecticut's large fossil-fuel generating fleet. These units receive revenue streams through the ISO-NE capacity market. There does not seem to be evidence that the Pay for Performance (PFP) program instituted by ISO-NE is affecting the retirement decisions of resources, as the region has seen minimal retirements since PFP has been in place.[12]

A review of the regional data reveals a similar story. For example, despite oil generators receiving 20% of capacity revenues in ISO-NE, they only supply 0.52% of energy on average. Coal's declining capacity is also reflected in generation declines to less than 0.1% of generation in 2020, though it still receives 1.5% of the capacity revenues.[13] By contrast, while renewables

[12] Connecticut Department of Energy and Environmental Protection, *Integrated Resources Plan: Pathways to Achieve a 100% Zero Carbon Electric Sector by 2040,* 106 (December 2020).

[13] Per average generation and capacity supply obligation by obligation month between 2017 and 2020 per ISO-NE, *Forward Capacity Auction Capacity Obligations* at https://www.iso-ne.com/static-assets/documents/2018/02/fca_obligations.xlsx and ISO-NE *Daily Generation by Fuel Type* at https://www.iso-ne.com/isoexpress/web/reports/operations/-/tree/daily-gen-fuel-type

such as hydropower received up to 16% of capacity revenues, they provide 18.7% of energy on average.

The reality is that many obsolete resources are paid the same capacity payment as resources that are more actively employed, yet they may never be called on to provide any real value to the system or do any of the "work" to keep the system running. The current FCM design promotes this inefficiency, as the obsolete resources require little maintenance (due to little, if any, work required of them), pushing capacity prices below levels sustainable in the end by the marginal resources actively supporting the system. FirstLight recognizes that capacity payments and payments for energy production compensate different values. Nonetheless, it is undeniable that the mismatch in capacity payments and production noted above are not effectively channeling scarce electric ratepayer funds to the resources we need and instead channeling funds to the least desired resources.

Restoring a meaningful retirement signal is fundamental to efficiently achieving state policy goals. Doing so will provide the following benefits to the system:

- Encouraging resources presenting the highest cost energy options, which often correspond with the highest greenhouse gas emissions rates per megawatt-hour, to cease operation. Even if the capacity sale obligation does not lead too much, if any, economic dispatch of that high emissions rate power, the capacity supply obligation requires the resource to run at least two times per year to meet capacity market audit requirements.[14]
- Encouraging obsolete resource retirement will free valuable, underutilized, interconnection space for new clean energy and energy storage projects. Making this existing infrastructure available to clean energy resources will minimize the amount of new investment in transmission and other grid upgrades, saving consumers money by more efficiently utilizing the existing system infrastructure.
- Many of New England's biggest sources of greenhouse gas emissions were sited close to environmental justice communities, disproportionately affecting those communities through their emissions[15]. Replacing these resources with renewable assets and electric storage can provide economic benefits to communities in the form of new investment and property taxes.
- Market rules encouraging efficient retirements will support the market outcomes that attract and retain the full set of resources needed to meet state policy, both the new

[14] While the very high price of their energy dispatch will minimize their economically dispatched generation, the capacity sale requires them to operate at least twice per year to perform claimed capability audits for ISO-NE. Additional high emission self-dispatch may occur to address the risk of Pay-for-Performance charges if system conditions reflect a risk of scarcity event. For dirty resources with fast start capability, further self-dispatch may be needed to perform audits to demonstrate or restore fast start ratings, a prerequisite for getting additional compensation from the Forward Reserve Market. Hence, even if not really needed to meet system reliability, consumers are being required to pay these dirty resources to produce the emissions they do not want.

[15] Connecticut Department of Energy and Environmental Protection, *Integrated Resources Plan: Pathways to Achieve a 100% Zero Carbon Electric Sector by 2040,* 106 (December 2020).

and existing clean energy resources and the back-up/balancing resources needed to integrate them.

5. **The Time is Now to Embrace the Market Structures We Need to Achieve the States' emission reduction goals Net Zero by 2050**

The goals established by the New England States are important to facing the challenge of climate change head on, and they are appropriately aggressive in the timeframes they seek to achieve clean energy progress. However, we must also recognize that time is short and the challenges are complex. FirstLight therefore commends the states for expressing a preference to resolve these important regional market issues[16] sooner rather than later in recognition of these short time periods, and urges an ongoing focus on prioritizing this effort to achieve durable outcomes that will benefit all New Englanders and put our region on a path to a clean energy powered future.

Thank you for your consideration of these comments.

Sincerely,

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[16] While the market reform section of the New England Energy Vision process was understandably focused on facilitating entry, there are complementary reforms that are needed to achieve the goals efficiently and reliably. Indeed, some of the ISO-NE's other priorities such as ELCC, review of Net ICR to consider delivery uncertainty, sufficient ancillary service markets (including day ahead operating reserves), are important complementary pieces to the evolution of the grid to meet decarbonization goals.