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Kearsarge Energy
Clean Peak Standard Comments

Introduction:

Kearsarge Energy (“Kearsarge” or the “Company”) is a Boston, Massachusetts based solar and storage developer with over 100 MW of solar developed in the Commonwealth, Rhode Island and New York. Our portfolio of operating assets includes over 50 MW of SREC I and SREC II solar projects, and we have a pipeline of SMART solar projects coupled with storage currently in construction. We have been closely watching the Clean Peak Standard (“CPS”) develop over the last few years and we’re eagerly awaiting its finalization. While one of the most groundbreaking pieces of regulation to target harmful emissions in the United States, it is imperative that CPS is structured in a way that delivers maximum benefits to the Commonwealth at the lowest possible cost to ratepayers. It should also be structured in a way to achieve the benefits proposed by CPS in the most efficient deployment possible.

A. Concerns for Retrofits:

Kearsarge’s main points of concern include the fact that the currently proposed CPS Alternative Compliance Payment (“ACP”) levels do not provide the level of financial support necessary to motivate energy storage facilities to prioritize their dispatch models to satisfy CPS windows, and that retrofitted storage co-located with existing clean resources are further disadvantaged from participation in this program as explained in our comments below. As one of the largest owners of solar facilities in the Commonwealth, we have spent a considerable amount of time studying and modeling the proposed CPS regulation. Our analysis, detailed below, highlights the costs of implementing retrofit energy storage in comparison to forecasted revenue. Upon review, we have concluded that as currently constituted, there is not an economic case for retrofitting any of the roughly 2,400 MW of existing SREC I and SREC II facilities already operating. Our analysis is meant to provide the Department of Energy Resources (“DOER” or “Department”) with the necessary data to demonstrate a need to provide additional financial support in CPS for these resources if the Department wishes to influence the deployment of hundreds of MW of energy storage resources designed to “clean the peak.”

We also would like to highlight the many ways in which storage retrofits deliver additional benefits to Massachusetts’ residents and ratepayers by enabling the enhanced utilization of existing solar facilities, points of interconnection and infrastructure.

1. Financial Analysis – Revenue:

We have modeled the CPS program for the maximum available Clean Peak Energy Certificates (“CPECs”) generated in an annual period and compared that against the current pricing for the procurement and installation of a 1 MW/4 MWh battery storage system. The intent of this analysis is to demonstrate that for a retrofit battery energy storage system (“R-BESS”) co-located at an existing solar facility, current forecasted economics would result in a financial loss. If the Department’s intent is to have storage assets target the peak with clean resources, we request significant modifications to the program as proposed to ensure these assets are properly incentivized.

If a 1 MW/4 MWh battery storage facility were to target every Clean Peak hour over the course of a year, it would generate a total of 2,796 CPECs after discharging 1,040 MWhs. This considers both the winter and summer 3x multipliers and the 15x monthly peak multiplier. At the maximum possible price of a CPEC in Year 1 of \$30 (the current ACP level), that would generate a total of \$83,880 in CPS revenue. In addition to the CPS revenue, this battery storage facility could also receive Real Time LMP revenue and Capacity revenues. Based on a historical 12-month lookback of Real Time LMPs over the Clean Peak window would produce an average RT LMP of \$49.16/MWh for a total revenue of \$51,123. Finally, using the latest FCA #13 clearing price of \$3.80/kW-Month, the battery storage facility would receive an additional \$45,600 in Capacity revenues. This creates a total annual revenue of \$180,603 between these three revenue streams.

However, this Year 1 does not constitute a realistic forecast for baseline revenue for an R-BESS over its lifetime. This is due to: (i) the rapidly declining ACP rate and (ii) the fact that battery storage system efficiency and performance degrades with use. Using data from storage systems Kearsarge is currently developing under SMART, this degradation averages 1-3% per year with an end of life rating of 50-70% of original nameplate capacity rating in Year 20. Beyond this 50-70% degradation, most battery storage providers have stated that performance will not be guaranteed and will need extensive augmentation to provide operational certainty and avoid serious potential malfunctions with the battery storage facility. We have provided a summary of how the declining ACP and battery storage degradation curves impact overall revenue of the course of asset’s life:

Dispatch Year	Available Battery Storage Capacity	MWhs Discharged	CPECs Generated	RT Avg LMP	FCM Clearing Price	CPEC ACP	RT LMP Revenue	FCM Revenue	CPEC Revenue	Total Revenue
Year 1	100%	1,040,000	2,796	\$ 49.16	\$ 3.80	\$ 30.00	\$ 51,126	\$ 45,600	\$ 83,880	\$ 180,606
Year 2	98%	1,019,200	2,740	\$ 49.16	\$ 3.80	\$ 30.00	\$ 50,104	\$ 44,688	\$ 82,202	\$ 176,994
Year 3	96%	998,400	2,684	\$ 49.16	\$ 3.80	\$ 30.00	\$ 49,081	\$ 43,776	\$ 80,525	\$ 173,382
Year 4	94%	977,600	2,628	\$ 49.16	\$ 3.80	\$ 30.00	\$ 48,059	\$ 42,864	\$ 78,847	\$ 169,770
Year 5	92%	956,800	2,572	\$ 49.16	\$ 3.80	\$ 30.00	\$ 47,036	\$ 41,952	\$ 77,170	\$ 166,158
Year 6	90%	936,000	2,516	\$ 49.16	\$ 3.80	\$ 30.00	\$ 46,014	\$ 41,040	\$ 75,492	\$ 162,546
Year 7	88%	915,200	2,460	\$ 49.16	\$ 3.80	\$ 30.00	\$ 44,991	\$ 40,128	\$ 73,814	\$ 158,934
Year 8	86%	894,400	2,405	\$ 49.16	\$ 3.80	\$ 30.00	\$ 43,969	\$ 39,216	\$ 72,137	\$ 155,322
Year 9	84%	873,600	2,349	\$ 49.16	\$ 3.80	\$ 30.00	\$ 42,946	\$ 38,304	\$ 70,459	\$ 151,709
Year 10	82%	852,800	2,293	\$ 49.16	\$ 3.80	\$ 30.00	\$ 41,924	\$ 37,392	\$ 68,782	\$ 148,097
Year 11	80%	832,000	2,237	\$ 49.16	\$ 3.80	\$ 28.64	\$ 40,901	\$ 36,480	\$ 64,062	\$ 141,443
Year 12	78%	811,200	2,181	\$ 49.16	\$ 3.80	\$ 27.27	\$ 39,879	\$ 35,568	\$ 59,473	\$ 134,919
Year 13	76%	790,400	2,125	\$ 49.16	\$ 3.80	\$ 25.91	\$ 38,856	\$ 34,656	\$ 55,058	\$ 128,570
Year 14	74%	769,600	2,069	\$ 49.16	\$ 3.80	\$ 24.55	\$ 37,834	\$ 33,744	\$ 50,795	\$ 122,372
Year 15	72%	748,800	2,013	\$ 49.16	\$ 3.80	\$ 23.18	\$ 36,811	\$ 32,832	\$ 46,664	\$ 116,307
Year 16	70%	728,000	1,957	\$ 49.16	\$ 3.80	\$ 21.82	\$ 35,788	\$ 31,920	\$ 42,706	\$ 110,415
Year 17	68%	707,200	1,901	\$ 49.16	\$ 3.80	\$ 20.45	\$ 34,766	\$ 31,008	\$ 38,881	\$ 104,655
Year 18	66%	686,400	1,845	\$ 49.16	\$ 3.80	\$ 19.09	\$ 33,743	\$ 30,096	\$ 35,228	\$ 99,067
Year 19	64%	665,600	1,789	\$ 49.16	\$ 3.80	\$ 17.73	\$ 32,721	\$ 29,184	\$ 31,727	\$ 93,632
Year 20	62%	644,800	1,734	\$ 49.16	\$ 3.80	\$ 16.36	\$ 31,698	\$ 28,272	\$ 28,360	\$ 88,331
Total		16,848,000	45,295				\$ 828,248	\$ 738,720	\$ 1,216,262	\$ 2,783,229

As seen from the analysis above, the **total lifetime revenue** from a retrofitted battery storage facility would come out to **\$2,783,229**. This is based on a constant Real Time Locational Marginal Price ("RT LMP") and Forward Capacity Market ("FCM") Clearing price which can be debated as overly aggressive. FCM revenues are further at risk due to the high potential of ISO-NE treating a resource that receives CPS revenue a state-sponsored resource and therefore mitigating its ability to participate fully in the annual Forward Capacity Auctions. This also assumes hitting 100% of the Clean Peak hours every year which is highly unlikely given varying solar production and overall production risk which is clearly seen in recent SREC I and SREC II production statistics. Finally, this assumes CPECs will continue to be at currently proposed ACP level. All of these factors increase significantly the risk and uncertainty associated with this pro forma forecast.

2. Financial Analysis – Costs & Returns

Based on our analysis of current vendor proposals and data from battery storage facilities Kearsarge is currently constructing, the total cost, including capital expenditure and annual operating costs, to retrofit an SREC I or SREC II facility with a 1 MW / 4 MWh storage system over 20 years is **\$2,993,625**. As noted above, total revenues over the same period are forecasted to be **\$2,783,229**. Therefore, costs outstrip revenues by **\$210,396**. Given this dire economic picture, an R-BESS is of course not financeable. To achieve rates of return required by investors prepared to enter the developing market of solar and energy storage assets, the CPS will have to be modified significantly, as detailed below under Recommendations.

3. No Sources of Additional MA Program Revenue for R-BESS

Another important consideration is that an R-BESS would not be eligible to earn additional revenue streams available to new-build solar plus storage facilities in MA, namely those participating in SMART. SMART provides an additional revenue stream not included in this financial analysis by providing storage facilities a 20-year tariff-based funding mechanism in the form the SMART ESS Adder. This adder would be in addition to the revenues we analyzed and provides a significant level of investment-grade credit financing to support newly constructed solar plus storage facilities.

4. DPU 17-146 Further Limits R-BESS Revenue Potential

We understand the Department may not wish to incentivize any new energy storage facilities but rather may intend to influence energy storage facilities that will otherwise already be constructed based on other financing mechanisms such as SMART or ISO-NE wholesale market revenues, to prioritize dispatch to “clean the peak.” However, it is an important consideration that any wholesale revenue-driven “merchant” R-BESS would not be able to access key wholesale markets while simultaneously dispatching in the CPS program. Therefore, the likelihood of a “merchant” R-BESS that prioritizes “cleaning the peak” being financed and constructed is very low. This is because DPU 17-146 prohibits R-BESSs paired with a Net Metering facility from grid charging and therefore greatly limits their full participation in the ISO-NE wholesale markets, namely with the inability to provide Frequency Regulation. The associated revenues from Frequency Regulation would likely be the single largest ISO-NE revenue stream for a “merchant” energy storage facility.

B. Alternative Benefits of Retrofits:

Beyond the financial impact, it is important to recognize that retrofitted storage on existing clean resources would delivery many direct and indirect benefits and greatly speed up attaining the goals of the Clean Peak Standard.

1. Given the imperatives in the SMART program and 400 MW Review to reduce development on greenfield parcels, retrofits demonstrate the Commonwealth’s commitment to preserving open space and undeveloped land.
2. Reduce overall costs to residents and ratepayers by utilizing previously developed properties with existing energy generation infrastructure and zoning approvals in place.
3. Streamlined interconnection application process and reduced upgrade costs due to the use of existing points of interconnection and the potential for DC coupled energy storage systems to avoid potential substation impacts.

4. Increased pace of deployment to advance Massachusetts' goals to "clean the peak" as part of the CPS Program and achieve critical climate-related impacts.
5. Development costs will be reduced due to lower transaction costs in identifying new sites, negotiating new leases, submitting for local zoning/planning approvals.
6. Overall, the reduced total capital expenditure per new CPS asset highlighted above, and improved community support and integration, will expand the market and allow for more capital resources to be spent on additional ESS MW capacity across more sites in the Commonwealth, vs. more time, effort and dollars spent on deploying greenfield assets.
7. The result for the Commonwealth will be more MWs to "clean the peak" and generate economic activity and jobs, at a lower cost to ratepayers.

C. Recommendations:

Kearsarge is proposing three main recommendations that we believe would lead to a more effective implementation of the CPS while reducing overall ratepayer cost and achieve the goals of the CPS in the quickest and most efficient manner.

1. **Increased ACP Prices:** An increased ACP would provide more financial support not only to retrofits but all storage facilities looking to participate in CPS. At current proposed ACP levels, very few storage facilities would augment their dispatch to target Clean Peak windows given the opportunity to participate in other ISO-NE wholesale markets. Retrofits, as we've demonstrated above, would not be economic at current ACP levels.
2. **Retrofit Multiplier:** Like other multipliers proposed in CPS, a Retrofit Multiplier would seek to enhance the value for resources providing a tangible benefit above and beyond just dispatch during the Clean Peak windows. As stated earlier, these benefits include lower overall ratepayer costs, streamlined interconnection process, avoidance of community and neighbor concerns with greenfield development, and overall speed of deployment to meet the CPS goals.
3. **Coordination with 17-146:** Given the restrictions on retrofits paired with a Net Metering Facility from charging from the grid, retrofits will not have the benefits of "full" revenue potential in ISO-NE wholesale markets. Providing a Retrofit Multiplier would deliver the necessary additional revenue support for asset owners to consider storage retrofits on the roughly 2,400 MW of operating SREC I and SREC II resources in the Commonwealth.

D. Conclusion:

Kearsarge Energy is highly supportive of the Clean Peak Standard but believes there will be a great opportunity missed if there is not further consideration given to retrofits in the proposed regulation. Providing additional support to these resources would reduce overall ratepayer cost while utilizing the vast amount of clean generation Massachusetts has already funded over the last decade. We hope that these comments will help drive the most efficient and robust outcome of one of the most groundbreaking pieces of regulation aimed at targeting emissions.

Respectfully submitted,

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