February 5, 2019

Commissioner Judith Judson
Massachusetts Department of Energy Resources
100 Cambridge Street, Suite 1020
Boston, MA 02114

Re: Clean Peak Standard (CPS) Stakeholder Questions

Dear Commissioner Judson:

Stem, Inc offers the following comments regarding the Clean Peak Standard (CPS) program design elements identified in your January 15 stakeholder questionnaire. As this will be the first program of its kind in the nation, we believe that Massachusetts has both the opportunity and challenge to set good precedent in design principles for a successful clean peak initiative.

Other than the original innovator of the Clean Peak concept, Stem is likely the country's most experienced stakeholder in the design of Clean Peak policies and the associated emissions accounting methodologies. Stem has been the "go to" design thought leader for policy staff, advocates and trade associations in all the major Clean Peak conversations to date, including California legislation, Arizona regulatory proceedings, and the New York energy storage roadmap development.

Stem appreciates the opportunities in the past to offer our input to DOER staff on this subject and has worked with the both the Energy Storage Association(ESA) and Northeast Clean Energy Council (NECEC) on responding to these questions. Thus, the following comments are meant to complement and add to the submissions from those organizations.

Overview

In Stem's experience, the design of Clean Peak policy is most efficient and effective when several key principles are kept in mind:

- The top priority objective is clear. The core public policy purpose of a Clean Peak policy is to reduce emissions associated with supplying energy to meet peak demand. Reducing costs associated with peak demand is a close secondary purpose, but mechanisms that reduce peak costs without reducing emissions should be separated into a distinct program.

- Initial implementation is as simple as possible. Clean Peak programs can quickly become arbitrarily complex as stakeholders add more secondary objectives. Focus on the top priority objectives allows relatively simple program design with minimal risk of unintended consequences.

- Program eligibility and emissions accounting are fully distinct. Most Clean Peak conversations have mixed the concepts of technology participation eligibility and accounting for how "clean" a technology is from an emissions standpoint. For clarity and simplicity, these rules should be defined independently. Therefore, eligibility rules should be technology neutral to the extent allowed by statute, and technology distinctions are made in the accounting of how much of a Clean Peak Certificate is

earned for each MWh of energy discharged/reduced during a Clean Peak window.

- Renewable energy "shifted" to peak windows is not necessarily "clean". Almost every Clean Peak design conversation has started with the misconception that charging storage from a co-located renewable generator and discharging that energy during peak is 100% clean, reducing emissions. Rules designed around this misconception risk program failure and wasted ratepayer money that fails to reduce emissions.

Stem's answers to the posed questions below will demonstrate how Stem believes these principles are best applied to the Massachusetts Clean Peak Standard (CPS) program within the bounds of the authorizing statute. Where Stem's position is essentially the same as ESA or NECEC, those submissions are referenced or the questions are omitted.

Clean Peak Resource

Clean peak resource is defined as "a qualified RPS resource, a qualified energy storage system or a demand response resource that generates, dispatches or discharges electricity to the electric distribution system during seasonal peak periods, or alternatively, reduces load on said system."

1. Should only resources interconnected to the electric distribution system be eligible to qualify, or should resources connected to the transmission system also be eligible to qualify?

While Stem supports the eligibility of as many resources as possible that can help meet the program objectives, as a legal principle, Stem supports the plain reading of the statute. The "electric distribution system" is defined elsewhere in Massachusetts statute and should be interpreted in the same manner here.

2. Should DOER interpret the use of the term "electric distribution system" to mean that only facilities on the electric distribution system in the Commonwealth should be eligible to qualify as clean peak resources under the CPS? Should the CPS also include all distribution and/or transmission level resources connected in the ISO-NE control area? Should it include adjacent Control Areas such as NYISO, Quebec, or New Brunswick?

Because the Commonwealth's ratepayers are funding the compensation for Clean Peak Certificates (CPCs), eligibility should be limited to resources that have a direct effect on the costs Commonwealth ratepayers bear to meet peak demand.

Demand Response Resource

Demand response resource is defined as "changes in electric usage by end-use customers in the commonwealth from their normal consumption patterns in response to: (i) changes in the price of electricity over time, including, but not limited to, time-of-use rates for residential and small commercial and industrial customers; or (ii) incentive payments designed to induce lower electricity use at times of high wholesale market prices or when system reliability is jeopardized."

3. What types of resources should be included in this definition?

Stem supports the NECEC interpretation of this definition.

Eligibility and emissions should be distinguished by the definition, however.

Any DR resource that can reduce load during the defined windows should be allowed to participate in the program. However, within DR technologies, a distinction should be made both in how the MWh are counted in the clean peak windows and the emissions impact of any associated load increase that happened to effectuate the load decrease.

Any credit for reducing demand during a clean peak window must be measured against a baseline. The DR industry has well established baseline methodologies for determining what the load "would have been" but for the behavior change prompted by the program. For simplicity sake, any DR resource seeking compensation as a clean peak resource needs to establish a baseline for the clean peak windows in the year before it begins participation.

Furthermore, for emissions accounting, DR resources must establish a load baseline for times before and after the clean peak windows so that the program can properly account for any load increase that was done in order to enable the load decrease in the clean peak window.

Example: Air conditioning units doing "pre-cooling" to reduce demand during peak times. For eligibility, this type of DR resource is reducing peak during the required windows. But from an emissions accounting standpoint, that reduction was not 100% clean, because emissions were increased earlier in the day.

4. Should electric vehicles (EVs) qualify?

Yes, EVs should qualify as clean peak resources if they operate to reduce their charging load during clean peak windows. However, unlike traditional DR, EVs are only reducing the load that they themselves put on the system. So, again, credit for reducing demand must also be measured against a baseline. In this case, the baseline is this specific EV's charging behavior in the previous year's windows. This necessarily limits the eligibility of EVs to those vehicles that have been charging at that location for at least one year.

And for emissions accounting, for EV's, every clean peak reduction in demand is associated with an increase in demand in another period. This must be tracked in order to credit the appropriate amount of CPCs.

5. How should DOER interpret the inclusion of different types of rate designs in this definition?

Stem supports the NECEC position here.

6. Should this definition only be limited to active demand response?

Stem supports the NECEC position here.

7. Should standalone energy storage resources (i.e. not directly connected to another resource type) be eligible to qualify as demand response resources? What requirements, if any should standalone energy storage resources face in order to qualify as demand response resources?

Stem supports the NECEC position here.

Note however, that different than traditional DR or EV smart charging, BTM storage discharge

during clean peak windows does not need to be measured against a previous baseline. Since storage can be directly metered, the discharge from the storage is exactly the reduction in demand seen by the grid.

Emissions accounting for these resources should follow the same methodology as that for Qualified Energy Storage resources described below

Qualified Energy Storage System

Qualified energy storage system is defined as "an energy storage system, as defined in section 1 of chapter 164, that commenced commercial operation or provided incremental new capacity at an existing energy storage system on or after January 1, 2019; provided, however, that such system operates primarily to store and discharge renewable energy as defined in said section 1 of said chapter 164."

9. How should DOER define what constitutes "incremental new capacity at an existing energy storage system"?

Stem has no answer at this time.

10. How should DOER interpret the requirement that a Qualified Energy Storage System operate "primarily to store and discharge renewable energy"?

Stem strongly urges the DOER to interpret this requirement within the third principle specified above. The eligibility of energy storage systems should be distinct and un-related to how "clean" the storage discharge is and thus how CPCs are earned. Overall, the DOER should interpret this requirement to mean that a Qualified Energy Storage System, *when it is acting as one within the CPS program*, should be primarily charging with renewable energy. Storage is inherently a multi-use resource, so when it's being used for other purposes, the CPS requirements should not apply.

Stem recommends that a storage system should be allowed to meet this eligibility requirement in any one of three ways:

- An energy storage system that is co-located with a non-RPS renewable energy generator demonstrates that it charges from the co-located renewable resource during the CPC accounting period in an amount of MWh that is 125% of the MWh discharged for CPCs.(125% accounts for the roundtrip energy losses)
    - Note that energy storage co-located with an RPS eligible generator qualifies as a Clean Peak resource already

- An energy storage system that is not co-located with a renewable energy resource may purchase and retire Massachusetts Class I Renewable Energy Certifications (RECs) of an amount at least 125% of the MWh discharged for CPCs.

- An energy storage system that is not co-located with a renewable energy resource may demonstrate that, based on the ISO-NE energy mix percentages during the hours when the storage system is charging, the system was charged with an amount of renewable energy at least 125% of the MWh discharged for CPCs.

a. Would alignment with the federal ITC requirement that storage is eligible for a credit as long as the battery is charged by a renewable energy system more than 75 percent of the time be appropriate?

Eligibility for the CPS should be unrelated to the federal ITC requirement.

b. If not directly physically or electrically connected to a renewable energy resource, how can the qualified energy storage system demonstrate that it operates primarily to store and discharge renewable energy? Purchase and retirement of RECs? Some other means?

Please see response to Question 10

Qualified RPS Resource

Qualified RPS Resource is defined as "a renewable energy generating source, as defined in subsection (c) or in subsection (d) of section 11F that has: (i) installed a qualified energy storage system at its facility; or (ii) commenced commercial operation on or after January 1, 2019."

12. Given the requirement that RPS resources that commenced commercial operation prior to 2019 must be paired with a qualified energy storage system in order to qualify for the CPS, what, if any, requirements should DOER adopt regarding how much energy storage needs to be installed?

a. Should there be a minimum percentage threshold on the ratio of the size of the energy storage to the size of the renewable resource (e.g. minimum installed storage capacity equal to 25% or more than installed renewable capacity)?

Notwithstanding the determination that the current CPS compliance Baseline prior to 2019 was zero, the DOER will need to decide how to account for pre-existing RPS resource generation that was already occurring during the clean peak windows. If this issue is not resolved, then any pre-existing RPS resource can add an energy storage system that does nothing, and the resource would earn Clean Peak Certificates.

It seems logical then that any pre-existing RPS resource that registers to participate in the CPS would need to demonstrate a baseline of production in previous years. Much like DR, this resource would then earn CPCs based on deliveries beyond that baseline.

If such a solution is implemented, then the question of minimum size of an added energy storage system is moot. Resources will add as much energy storage as is needed to make a profit on the cost of the installation.

Generation of Certificates

Some clean peak resources may only be capable of generating clean peak certificates during a portion of a seasonal peak period. For example, a solar resource trying to deliver energy for the duration of a summer seasonal peak period that lasts from 6-9 PM may generate a significant number of certificates in the early part of that window compared to the latter.

19. Should only resources that can provide value for the entire duration of a peak period be able

to generate certificates?

No. This would add needless complexity to the program. CPCs should be earned for every MWh delivered/reduced during the clean peak windows.

20. Should there be different values provided to resources that can provide value for a portion of a peak period versus the entire peak period? If so, how should DOER differentiate these value streams?

No. Determining those values becomes very complex and would result in a strong likelihood of significant administrative complications. Stem is aware that this design element has been proposed in other Clean Peak conversations, but there has not been a convincing emissions or costs justification for this added complexity.

Value of Certificates

Based on the high-level principles described above, Stem contends that any Clean Peak program should adjust the value of Clean Peak Certificates (CPCs) based on proper accounting of the emissions reductions achieved by each MWh of delivery/reduction during clean peak windows. Again, not all MWh during those windows are equivalent in terms of emissions benefits and to meet the primary objective of the CPS, the program should ensure the accounting is correct.

Stem proposes an initial accounting methodology concept below with the commitment to work further with the DOER on finalizing the design.

The basic formula for the emissions impact of a clean peak MWh is as follows:

Emission reduction (lbs of CO2) =

*[Delivery during window (MWh) * Grid marginal emissions rate during delivery] –*

[*Associated load increase (MWh) * Grid marginal emissions rate during increase]*

where grid Marginal Emissions Rate (MER) is typically measured in lbs CO2 / MWh

Note that this formula is the same regardless of whether the resource's load increase (e.g. storage charging) is supplied by a co-located renewable energy generator.

The simplest way to incorporate this accounting in the value of CPCs is to assign 1 CPC for each MWh of "100% clean" energy and then provide a percentage of a CPC for other MWhs based on how "clean" those are.

A MWh delivered/reduced during a clean peak window is "100% clean" if the emissions increase resulting from the load increase is zero. This condition can be satisfied in two ways

- The resource increases load/charges at a time when the marginal emissions rate of the grid is zero. This typically only occurs during hours when the grid is experiencing overgeneration of renewables
- The resource retires 1 MWh of zero emissions credits (such as RECs)

- Note that if a storage device charges from a REC-eligible co-located generator such that the REC is not earned, this is equivalent to purchasing and retiring a REC

Accounting of any resource that is less than “100% clean” requires accounting of the marginal emission rate of the grid at all hours that the resource is increasing load. However, creating and providing a marginal emissions rate data stream is likely more complex and costly than it’s worth for the initial implementation of the CPS.

Instead, Stem proposes that in defining the Clean Peak windows the DOER also define a set of “charging” windows and an CPC percentage value for each. For example, if the resource is charging from midnight to 5am, the resource earns 80% CPC for each MWh, whereas noon-5pm charging might earn 35% CPC.

Conclusion

Stem appreciates the opportunity to provide these comments and looks forward to continuing to work with DOER and other stakeholders throughout the remainder of the program design and rulemaking process in 2019.

Sincerely,

Ted Ko
Director of Policy, Stem, Inc.

Cc: Mike Judge, DOER
Will Lauwers, DOER