



SUBMITTED ELECTRONICALLY

December 16, 2016

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

Re: Comments of Clean Energy Group to the Massachusetts Department of Energy Resources Regarding Whether to Adopt Targets for a Utility Energy Storage Mandate

Dear Commissioner Judson:

Clean Energy Group (CEG) is pleased to submit the following comments to the Massachusetts Department of Energy Resources (DOER) in support of its consideration to adopt targets for a binding energy storage utility procurement mandate, as per *An Act Relative to Energy Diversity, Chapter 188 of the Acts of 2016* ("Energy Diversity Act"). We presume that further stakeholder input would be sought by DOER as this process moves forward, and CEG looks forward to providing additional comments throughout that process. CEG also supports the comments expected to be filed by Union of Concerned Scientists, Acadia Center, and Northeast Clean Energy Council.

Clean Energy Group is a leading national, nonprofit advocacy organization working on innovative policy, technology, and finance programs in the areas of clean energy and climate change. CEG's Resilient Power Project has been working over the past three years to accelerate market development of clean energy resources paired with energy storage technologies for resilient power applications that serve low-income communities and vulnerable populations during disasters and power disruptions, and to address climate adaptation and mitigation goals through expansion of reliable renewable energy deployment.

Imposition of a mandate. CEG's position is that an ambitious utility mandate for energy storage procurement should be adopted, along with regulation to create a robust competitive energy storage market in the state, to provide for multiple social benefits from energy storage, and to guard against negative outcomes from such a mandate. Each of these issues is discussed below.

The *State of Charge* report, released in October 2016, argues persuasively for the many benefits of adding significant new energy storage capacity to the Massachusetts grid. These benefits include demand management, increased grid efficiency, avoidance of need for additional peaker plants, integration of renewables, support of grid modernization goals, enhanced reliability and resiliency, contributions toward the state's emissions reduction and clean energy goals, and cost reductions across energy, capacity, and ancillary services. The report concludes that an optimal

amount of storage added to the state's grid would result in benefits amounting to \$3.4 billion in savings and revenue; \$250 in regional system savings; a 10 percent reduction in the state's peak demand; and a more than 1 MMTCO_{2e} reduction in greenhouse gas emissions, which represents a significant portion of the state's statutory emission reductions targets set under the Global Warming Solutions Act.

The *State of Charge* report identifies 1.7 GW of advanced energy storage as the optimal amount to add to the state's grid, to produce the above benefits. However, the report's policy and program recommendations will only support an additional 600 MW of energy storage. It seems clear that a utility mandate is needed to move the state closer to its optimized target.

For these reasons, CEG strongly supports the establishment of a Massachusetts Energy Storage Procurement Mandate with binding targets for utilities.

Size of a mandate. Given the state's established policy goals of 600 MW of new storage, and the optimized target of 1.76 GW, the likely parameters for a utility procurement target are already in place, and it would make sense for the state to establish utility procurement targets in the 600 MW – 1.16 GW range. At a minimum, we recommend that utility procurement should match the state's policy target of 600 MW. This would result in a combined total of 1.2 GW of new, advanced energy storage on the Massachusetts grid. At maximum, utilities could be called upon to procure 1.16 GW, which in combination with the state's policy target, would result in the optimal 1.76 GW as established in the *State of Charge* report.

Although CEG supports a requirement for utility procurement of storage in the above-identified range, we do not believe that utilities should own all, or even most, of the storage capacity they procure under a state mandate; this important distinction is detailed at greater length below.

Concerns and principles. Along with strong support for a utility procurement mandate, below is a list of concerns about utility ownership of storage, and some principles that should be incorporated into the structure of a procurement program.

Limit Utility Ownership. A main concern is that utilities should not use their considerable market advantages to discourage or even prevent third-party or customer-owned energy storage from entering the Massachusetts market. This would be problematic for a number of reasons. Encouraging third-party-owned storage is important in order to develop a vibrant storage industry, to allow the placement of storage close to load, and to capture the full flexibility of storage for a wide number of applications. Allowing third-party delivered, customer-sited storage is important to enable behind-the-meter demand charge management and resiliency, and to allow customers to capture energy savings. Indeed, numerous studies have shown that many of the most valuable services provided by energy storage can best be provided from behind-the-meter (see RMI's "The Economics of Battery Storage" <http://www.rmi.org/Content/Files/RMI-TheEconomicsOfBatteryEnergyStorage-FullReport-FINAL.pdf>). These services include extending and protecting the value of rooftop solar, which is under widespread assault due to changes in utility rate tariffs (such as rising demand charges and time-varying rates) and declining NEM compensation rates. Utility-owned storage sited directly on the

transmission or distribution grids will not provide as many direct benefits to customers and social benefits as behind-the-meter systems.

In addition, given the rapidly developing storage industry, the state will receive the most benefit by preventing a situation where utilities can monopolize storage ownership. Instead, the state should provide for open markets where third-party owners and aggregators can provide innovations in storage technology and controls, applications, and financing (similar to what has happened in the solar industry).

There are several good examples of regulation from other states that protect the position of third-party and customer-owned energy storage and restricts how, where, and why utilities can own storage.

For example, the California Public Utility Commission's decision adopting the state's energy storage procurement framework limits utility ownership to no more than 50 percent of storage assets procured to satisfy the utility mandate targets:

*“As determined in D.12-08-016, the definition of energy storage system utilized in this proceeding is the one articulated in Section 2835(a). This definition is intended to embrace a mix of ownership models and contribute to a diverse portfolio that can encourage competition, innovation, partnerships, and affordability. It is true that LSEs, given their statutory responsibility, have proven experience, capability, and history, to ensure reliability goals are met. However, as we have seen with specific opportunities such as “distributed peaker” projects or transmission upgrades within FERC jurisdiction, there is room to allow for different types of economic or policy driven storage projects that meet different needs, cost requirements, and other criteria. Therefore, *we do not believe it makes sense to allow 100% utility ownership in T & D without first determining which specific applications or circumstances are best suited for utility ownership versus third-party providers.**

In light of the above, we find that the utility ownership of storage projects should not exceed 50 percent of all storage across all three grid domains at this time. In other words, utilities may own no more than half of all of the storage projects they propose to count toward the MW target, regardless of whether it is interconnected at the transmission or distribution level, or on the customer side of the meter. We believe that setting this limit will ensure that any viable market options are not preempted.” (emphasis added)

See: <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M078/K929/78929853.pdf>

Additionally, California's new AB 2868 includes similarly restrictive language regarding utility ownership of storage:

“The commission may approve, or modify and approve, programs and investments of an electrical corporation in distributed energy storage systems with appropriate energy storage management systems and reasonable mechanisms for

cost recovery, if they are consistent with the requirements of this section and *do not unreasonably limit or impair the ability of nonutility enterprises to market and deploy energy storage systems.*” -2838.2. (c(1)) (emphasis added). See, https://leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=201520160AB2868

AB 2838 also states, “No more than 25 percent of the capacity of distributed energy storage systems approved for programs and investments pursuant to this section shall be provided by behind-the-meter systems.” We believe this cap was intended to limit utility ownership of customer-sited storage.

Clean Energy Group does not recommend capping the percentage of utility-procured storage that could reside behind the customer meter in Massachusetts. However, we do urge DOER to limit utility ownership to some percentage of the overall procurement mandate – perhaps to the 50 percent level set in California as a default position. In other words, we believe utilities should be able to own some, but not all, of the storage capacity procured to meet state capacity targets. This would apply to storage on the transmission grid, the distribution grid, or behind customer meters.

Finally, on this point, CEG also believes that setting limits on how much of an overall energy storage procurement target can be owned by electric utilities is supported by the specific language of the Energy Diversity Act and by the general laws of the state of Massachusetts.

The Energy Diversity Act refers to “targets for electric companies *to procure* viable and cost-effective energy storage systems...” (emphasis added). The reference to “procure” obviously contemplates a variety of ownership and non-ownership situations — a utility that procures a service from another party contracts from another party that owns a product.

If the legislature wanted the DOER to develop a target only for utility-owned storage, it would not have used the word “procure” but would have simply mandated that the target referred to utility “owned or operated” systems or offered similar utility-ownership language.

Moreover, the term “procure” is thus defined in the Massachusetts general laws, Title III, Chapter 30B (Uniform Procurement Act):

“Procurement, buying, purchasing, renting, leasing, or otherwise acquiring a supply or service, and all functions that pertain to the obtaining of a supply or service, including description of requirements, selection and solicitation of sources, preparation and award of contract, and all phases of contract administration.”

Based on this definition and the wording of the Energy Diversity Act, DOER clearly is empowered to mandate various types of utility procurement of energy storage resources,

both through outright ownership and via contractual arrangements with third-party or customer owners. To these ends, CEG urges DOER not only to limit utility ownership within an overall capacity target, but also to limit utility ownership within each of several sub-categories of storage resources, as explained below.

Divide an overall procurement target into categories with minimum requirements for procurement and a cap on utility ownership in each category. Beyond this ownership question, it is clear that energy storage can perform different, but equally important, tasks in different locations on the grid and that has implications for the mandate.

Clean Energy Group would urge DOER to divide the overall procurement target between these three broad resource categories: transmission, distribution and customer-sited storage. This is the approach used in California, as shown in the following table.

Storage Grid Domain (Point of Interconnection)	2014	2016	2018	2020	Total
Southern California Edison					
Transmission	50	65	85	110	310
Distribution	30	40	50	65	185
Customer	10	15	25	35	85
Subtotal SCE	90	120	160	210	580
Pacific Gas and Electric					
Transmission	50	65	85	110	310
Distribution	30	40	50	65	185
Customer	10	15	25	35	85
Subtotal PG&E	90	120	160	210	580
San Diego Gas & Electric					
Transmission	10	15	22	33	80
Distribution	7	10	15	23	55
Customer	3	5	8	14	30
Subtotal SDG&E	20	30	45	70	165
Total – all 3 utilities	200	270	365	490	1,325

Alternatively, DOER could take a less prescriptive approach by setting minimal targets for each category of storage. For example, a utility could be required to procure at least 500 MW of transmission-based storage, at least 200 MW of distribution-based storage, and at least 100 MW of customer-sited storage, with some minimum percentage of each category to be owned by a non-utility entity.

The percentage of allowed utility ownership for each of these three categories should be separately capped. For example, DOER might allow utilities to own 70 percent of transmission grid storage resources, 50 percent of distribution grid storage resources, and 40 percent of customer-sited storage resources, for purposes of satisfying capacity targets – with an overall 50 percent limitation on utility ownership across all categories. This

will help to support open markets for third-party ownership of storage in all three categories.

Require Social Benefits under Utility Ownership. In addition to encouraging competition by preserving the ability of non-utility companies to enter the energy storage market in Massachusetts, it would be prudent for the state to require that utility-procured, and particularly utility-owned, storage will serve social purposes beyond simple cost savings for utilities. These social purposes are outlined below.

Low- and Moderate-Income Benefits. Specifically, the mandate should be structured to ensure that a specific percentage of utility-procured and utility-owned energy storage be deployed to benefit low-income and otherwise underserved communities. These markets should include community facilities and affordable housing.

Precedence for this type of requirement can be found in Massachusetts' 2008 Green Communities Act, which mandates that no less than 10 percent of electric efficiency expenditures and 20 percent of gas expenditures be devoted to the low-income sector. Additionally, the state's SRECI program prioritizes solar installations located at low- or moderate-income housing by awarding those projects full SREC value.

California, the energy storage leader to date, has also begun to require energy storage equity in its legislative requirements. It recently addressed this energy storage equity issue in AB 2868, stating that "the commission shall prioritize those programs and investments that provide distributed energy storage systems to public sector and low-income customers." Moreover, various parties to another California rulemaking proceeding implementing AB 693, which provides funding for clean energy in affordable housing, have argued for inclusion of energy storage as eligible for incentives under the program when incorporated with a solar energy system (see http://chpc.net/wp-content/uploads/2016/08/R14-07-002_NonprofitSolarCoalitionProposal2016_08_03Final.pdf).

Similarly, New York's REV Track 1 proceeding recognizes the potential need for authorizing utility ownership of distributed energy resources (DER), including energy storage, to adequately reach low- and moderate-income customers:

"Utility ownership of DER will only be allowed under the following circumstances: 1) procurement of DER has been solicited to meet a system need, and a utility has demonstrated that competitive alternatives proposed by nonutility parties are clearly inadequate or more costly than a traditional utility infrastructure alternative; 2) a project consists of energy storage integrated into distribution system architecture; 3) *a project will enable low or moderate income residential customers to benefit from DER where markets are not likely to satisfy the need;* or 4) a project is being sponsored for demonstration purposes." <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7b0B599D87-445B-4197-9815-24C27623A6A0%7d>

Clean Energy Group has done numerous studies to confirm the economic benefits of deploying solar and energy storage in affordable housing as one example of ensuring low-income communities benefit from emerging storage markets (see www.resilient-power.org and studies cited therein such as *Closing the California Clean Energy Divide* at <http://www.cleanegroup.org/ceg-resources/resource/closing-the-california-clean-energy-divide/>).

Based on these considerations and existing Massachusetts policy, CEG suggests requiring that at least 10 percent of mandated utility-procured energy storage be deployed to benefit low-income customers, a number that should be refined, and perhaps increased, during the rulemaking process. To ensure this is achieved, we also suggest that, in line with the state's new Affordable Access to Clean and Efficient Energy Initiative, an Alternative Compliance Payment (ACP) fund should be established by DOER in connection with a utility mandate, and that a portion of this ACP fund should be dedicated to providing energy storage benefits to low- and moderate-income (LMI) communities, in collaboration with the state's other energy agencies and with the Department of Housing and Community Development. For more on this see the section on ACP fund development, below.

Additional Social Purposes for Storage. DOER also should provide that the energy storage procurement mandate serves other social purposes in addition to reaching LMI communities. Other social purposes that should be prioritized include resiliency, reliability, and public health.

Clean Energy Group proposes several specific recommendations to promote these social purposes.

- *Resiliency.* Massachusetts has already recognized the resiliency value of energy storage systems through DOER's Community Clean Energy Resiliency Initiative. We recommend that the mandate include siting requirements or guidance to ensure that utility procurement/ownership of energy storage that will increase the resiliency of communities and/or reliability of the electric grid during power disruptions, such as severe weather, be prioritized or additionally incentivized. Such energy storage systems would need to be configured to allow for grid independent operation.
- *Public Health.* We recommend that energy storage resources deployed and dispatched to displace fossil-fuel generation also be prioritized, particularly resources displacing high-emissions peaker plants. Research by PSE Healthy Energy found that proper siting and dispatch of energy storage resources could significantly improve public health by reducing reliance on peaker plants, which typically emit local air pollutants at a higher rate than baseload generation (<http://www.sciencedirect.com/science/article/pii/S0301421516302798>). Disadvantaged communities, where peaker plants are predominately located, were found to have the greatest potential to benefit from these local air pollutant reductions. Such a mandate should include a utility requirement to conduct or have

conducted a similar analysis to determine the extent to which energy storage can reduce peaker plant emissions in disadvantaged communities in the Commonwealth.

- *Baseload Replacement.* Along with peaker plant displacement, energy storage is increasingly being deployed to replace baseload generation. For example, the California utility Pacific Gas & Electric recently proposed replacing the 2,240-megawatt Diablo Canyon nuclear facility with a combination of renewables, energy storage, and efficiency (<http://www.pge.com/includes/docs/pdfs/safety/dcpp/diablo-canyon-retirement-joint-proposal-application.pdf>). We urge DOER to structure the mandate in such a way to require prioritization of energy storage resources deployed to replace generation from retiring power plants in any future regulatory or resource planning proceedings.
- *Collocation with Renewables.* CEG also recommends that the mandate require the utilities to collocate energy storage, where possible, with existing or planned renewable projects. Collocation of renewables and storage maximizes emissions reduction benefits. Collocation has the added benefit of smoothing variable renewable resources and adding flexibility and control to how and when renewably generated energy is consumed or exported to the grid, increasing grid reliability. For these reasons, we recommend encouraging the collocation of utility-procured energy storage and renewable resources.

Alternative Compliance Structure as Enforcement Mechanism. In developing a utility procurement requirement, we urge DOER to establish an ACP mechanism, whereby utilities falling below the prescribed target would pay into a fund that DOER could use to directly support energy storage deployment. This would be similar to well-established ACP structures used by Massachusetts and many other states in existing renewable portfolio standard programs.

An ACP fund would provide opportunities for the state to directly support energy storage in high-value applications and locations that might not be served by utility procurement. A primary example of this is the need to provide the benefits of energy storage, especially paired with solar PV, to LMI communities through behind-the-meter systems in community facilities and affordable housing. We suggest that a portion of an ACP fund be dedicated to this purpose, in line with the Massachusetts Affordable Access to Clean and Efficient Energy Initiative. To achieve this goal, DOER should collaborate with the state's other energy agencies and with the Department of Housing and Community Development.

Other Policy Mechanisms to Build the Storage Market. The *State of Charge* report made an important point about building the energy storage market in the state: a mandate alone, no matter how structured, is insufficient to build a robust energy storage market that will deliver all the possible economic, environmental and public health benefits the technology can deliver. We want to underscore that point in these comments with a particular reference to California.

California now has begun to develop perhaps the most robust emerging market for energy storage in the country. But it has done this with much more than a utility energy storage

procurement mandate. The mandate was just a first step. California's success has been built on several policy strategies in addition to the utility mandate:

- First, the state has provided an ever-growing incentive program for storage technologies through its Self-Generation Incentive Program (SGIP). This program has now been expanded through legislation to provide upwards of \$80 million in incentives a year to bring down the capital costs of installing systems. In addition, new rules adopted this year dedicate 75 percent of the overall SGIP program budget to supporting energy storage deployment, with 15 percent of the energy storage budget carved out for residential projects (see Rulemaking 12-11-005, <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M163/K870/163870439.pdf>). This incentive program, without doubt, has been a key factor in the growth of the state's behind-the-meter energy storage market.
- Second, the SGIP incentive in particular has helped companies target demand charge reduction opportunities in the commercial and industrial sector (see <https://www.greentechmedia.com/articles/read/behind-the-meter-energy-storage-market-poised-for-exponential-growth>). The incentive program has been an essential driver of customer-sited energy storage targeting demand management in the state to date. In effect, the combination of targeted incentives and utility ratemaking has driven the market in ways unforeseen only a few years ago.
- Third, as noted above, the state has begun to incorporate energy equity into its legislative mandates on energy storage. For the first time in the country, the legislature has required that certain percentages of incentives or procurements target benefits to low-income communities. This has not yet had a significant effect, but it will likely do so over the coming years as projects get developed in low-income communities and expand into markets such as affordable housing.
- Fourth, the California utilities and the California Public Utilities Commission have increasingly viewed energy storage as key to grid planning and resource allocation, as noted by the replacement of the Diablo Canyon nuclear plant with renewables and energy storage. Regulatory policy making in California has slowly begun to elevate storage as a baseload level resource on par with conventional nuclear and fossil resources. That is a policy strategy that may well have the longest-term implications for the development of the technology market.

We make these points to highlight that imposing a utility mandate is only the beginning of what is needed to pursue an integrated policy approach to energy storage deployment in the state.

Rulemaking Process. CEG concludes these comments with a few thoughts on the process that might ensue if the DOER decides to implement a storage mandate through rulemaking. That process presumably would have to be completed by July 2017 to meet the legislative deadline for the adoption of procurement targets.

That short time frame suggests some options for completing the rulemaking process by that date.

There are two things that are likely true about that process. First, there are many issues about which parties – from NGOs to industry and utilities – can likely share common goals and strategies; indeed, there might be broad consensus on key fundamental energy storage procurement issues. Second, there are probably fewer issues about which true controversy might exist. If these two things are true, it suggests a few ways forward.

In a traditional manner, DOER could simply initiate the typical rulemaking process where it would publish a draft rule sometime in the spring (perhaps after a workshop or two) and parties would respond with varying degrees of support or disagreement. Such a process almost inevitably would result in many disputes among the parties once the rulemaking is complete, and in advance of the legislative date. That result could lead to litigation or other contentious actions, with issues not fully vetted or explored prior to issuance of a draft rule.

Alternatively, within such a tight timeframe, some form of consensus process could be explored. Either informally or under the umbrella of some DOER encouragement, the parties could attempt to set out their differences and resolve as many issues as possible before an issuance of a rule-making process. That process of consensus also could more clearly reveal the actual and immediate controversies that exist, and set them out with some specific issues for the DOER to address and attempt to resolve in the rulemaking. (Our understanding is that this type of process was used in California to overcome numerous utility objections to the initial implementation of the storage mandate.)

In other words, a consensus process akin to negotiated rulemaking could well reduce the areas of complex disagreement, shorten the time frame for dispute resolution, and lead to a streamlined rulemaking process. This may be possible to achieve because there are analogous markets in places like California that have operated for a number of years, and which can be looked to as reliable guideposts for policy making in Massachusetts. At least that is the promise of this more consensual approach. CEG offers this as a final suggestion for the various parties to consider going forward.

We appreciate the DOER's consideration of these comments and look forward to continuing to work with the Department on its energy storage efforts. We would be glad to discuss any of our recommendations with you or others at the Department.

Please do not hesitate to contact us if you have any questions.

Sincerely,



Lewis Milford
President



Seth Mullendore
Project Director



Todd Olinsky-Paul
Project Director

cc: Will Lauwers, DOER