January 31, 2024

Agency: Massachusetts Department of Energy Resources (DOER)
Subject: Charging Forward Report and Recommendations
Email: thomas.ferguson@mass.gov

Re: Malta's comments on DOER's Charging Forward Report and Study

Dear Mr. Tom Ferguson,

Malta Inc. ("Malta") is a technology and solutions provider based in Cambridge, Massachusetts that develops and deploys both mid-duration energy storage (MDES) and long-duration energy storage (LDES) power plants. With our pumped heat energy storage (PHES) system, Malta offers MDES/LDES solutions that can provide grid capacity anywhere from 10 to 30 hours, as well as be operated to support more than 100 hours. Malta stands out as a synchronous MDES/LDES solution that can be flexibly sited within dense land footprints and quickly scaled, while offering additional benefits in the form of clean heat, workforce development, and other reliability attributes (*e.g.*, inertia, short circuit current).

Malta appreciates this opportunity to submit comments on the *Charging Forward* Report ("Report") developed by the Massachusetts Department of Energy Resources ("DOER"), which was informed by the *Charging Forward* Study ("Study") prepared by E3.

I. INTRODUCTION.

While the Study is not without its critiques, it summarized the growth of energy storage in the Commonwealth, highlighted existing mechanisms and barriers to energy storage deployment, and provided useful insight into the role and value of not only short-duration energy storage (SDES) but also MDES/LDES resources. Overall, Malta generally agrees with the key findings and conclusions of the Study, which point to the significant long-term value of MDES/LDES resources with increased renewables penetration and electrification, as well as the importance of diversity in supply resources for various reasons (*e.g.*, high commodity prices, safety, end-of-life considerations).[1]

However, given limitations in current mechanisms to value and compensate longer durations (beyond 4-6 hours) and other externalities (*e.g.*, resiliency) and the path dependencies and complementary nature of MDES/LDES with available renewable generation for clean charging energy, the Study suggested that MDES/LDES resources have limited net value at this time, as evidenced, for example, by the benefit-cost results.[2] At the same time, the Study clearly shows that MDES/LDES resources has significant long-term net value through 2050 as system and local capacity duration needs grow, the grid moves to a winter-peaking system, and offshore wind is

[1] Study at 33, 35-36
[2] Study at 52-53 and 70-71.

deployed to meet the Commonwealth's clean energy goals.[3] In sum, the Study highlights the limited near-term role yet recognizes the long-term net value of MDES/LDES, perhaps underlying DOER's more incremental and wait-and-see nature of policy and program design recommendations in the accompanying Report.

With this in mind, Malta focuses our comments on the recommendations to incentivize MDES/LDES storage deployment in the near term, which we view as instrumental to putting the Commonwealth on a trajectory to realize the benefits of MDES/LDES at scale in the long term. While the Study shows significant value to Massachusetts and the New England grid from MDES/LDES technologies, it does not capture the significant near-term benefits of MDES/LDES technologies, particularly for winter reliability. As a result, the Report's recommendations belie the urgency that is needed to develop a robust market for at-scale deployment of these technologies in Massachusetts in a timeframe that could adequately capture these benefits. Investing now to capture these near-term benefits is a no-regrets, win-win approach as near-term winter reliability concerns can be addressed while building out a key resource for renewable integration and optimization in support of a cost-effective net zero future.

II. MDES/LDES TECHNOLOGY COMMERCIALIZATION GRANTS.

Malta supports the technology commercialization grant funding recommended by DOER. As proposed, a subset of $50 million would be spread across four distinct programs, only one of which would support MDES/LDES. The Report said that "...many of these technologies require significant de-risking before commercialization." As such, "DOER proposes funding to support these technologies to reach commercial readiness, such that they will be on the grid and ready to provide reliable, safe operation when needed."[4] While supportive of the idea and the general outline of the program design, Malta recommends that the amount be significantly increased in order to be effective. Especially if the funding is designed to support commercialization and thus first "nth" of a kind deployments, further grant amounts are needed to buydown the capital costs of these technologies/projects, address the "missing money" gap, and address various early-stage costs of these technologies (*e.g.*, insurance, initial scaling). As a benchmark, for example, in 2022 and 2023, California authorized $330 million in grant funding entirely aimed at commercializing LDES in support of grid reliability.

III. MDES/LDES PROCUREMENT AND TARGETS.

DOER's recommendation to "reserve" its procurement authority for MDES/LDES because "the need for MDES and LDES is not immediate" runs counter to these findings of significant value and to the many conclusions in the Report that these technologies must be supported now in order to build their commercial availability in a relevant timeframe. For example, the Study "demonstrated that the ability of energy storage to provide critical electric grid needs grows over time, meaning

[3] Study at 78, 107-108, and 120.
[4] Report at 16.

that these technologies must be supported now such that when the need arises, there will be commercially deployed, safe, and reliable systems ready to fulfill that need."[5] In other words, Malta believes that some incremental procurement of MDES and LDES needs to occur in the near term to support the long-term future scale up of the MDES/LDES market in the Commonwealth. A more gradual buildup of procurement and deployment over time of MDES/LDES projects is more tenable than a sudden, rapid, and large-scale procurement of these projects in future years given the lead time required either for commercialization, manufacturing scale up, or project development.

To maximize value, we believe that MDES/LDES should have its own direct procurement pathway that is not reliant in pairing with OSW. In addition, we believe there should be clarity on the procurement timeline and capacity target rather than just a placeholder for a potential procurement. Simply put, if MDES/LDES is seen to have value, it should be procured via its own mechanism, similar to what is being proposed in other jurisdictions, such as the UK, which is suggesting a cap-and-floor mechanism for MDES/LDES. Without clarity, Massachusetts will struggle to attract MDES/LDES projects and therefore will see limited value in return.

Along these lines, Malta observes that "DOER recommends the following interim targets to the 2050 CECP Energy Storage Benchmark: 250 MW of energy storage in Massachusetts for every 1 GW of deployed renewables [by 2030 and] 200 MW of energy storage in Massachusetts for every 1 GW of deployed renewables , inclusive of at least 1 GW of MDES or LDES [by 2035]."[6] The Report further states: "[s]ince the Study anticipates there will be about 12 GW of renewables online in Massachusetts by 2030, the 2030 target for storage in the state should be 3,000 MW and based on the significant value identified in the Study, a large portion of that should be MDES/LDES. To procure this portion, we recommended a storage capacity target, denominated in GWh."

Malta understands that the Study shows the diversity benefit and complementary nature of renewables, particularly offshore wind, with LDES resources. As a result, DOER appears to want to couple the targets and procurement of renewables with energy storage. However, Malta believes that these targets require much more flexibility than what is currently proposed to tie storage procurement with renewables deployment. Unless co-located, the deployment timelines for renewables and storage may occur on different timelines, which is particularly challenging for less "routine" resources such as offshore wind and MDES/LDES. For this reason, Malta recommends storage procurement targets without such contingencies or at least with more flexibility.

For a least-regrets approach on MDES/LDES, we also propose taking a portion of 2030 target for storage for MDES/LDES and procuring it separately from offshore wind. Specifically, we suggest a **25 GWh storage capacity target** for MDES/LDES projects in service by 2030. Like energy storage at large, Malta believes that it is important to set targets for MDES/LDES to provide a market signal and investment certainty for project development, as well as catalyze the development of policies, programs, and wholesale market designs and products to advance the procurement and operations of these resources. By setting a target denominated in GWh for MDES/LDES with at least 8 hours in duration, procurement will also be optimized for total energy duration from new storage capacity. For example, rather than setting a target for LDES with minimum 100 hours of duration, a GWh target would allow for optimized duration of storage

[5] Report at 12.
[6] Report at 18.

resources optimized to grid needs. If a particular location has a 2,000 MWh need, it could be met by a 20-MW, 100-hour LDES resource or 100 MW, 20-hour LDES resource operated at a derated 20 MW. Since the median duration of system resource needs range from 8-19 hours,[7] a GWh target would better signal the resource attributes needed.

IV. STANDALONE BULK STORAGE PROGRAM.

Malta supports the development of a capacity incentive program to accelerate the deployment of energy storage in the Commonwealth.[8] As highlighted in the Study, there is currently low value in energy and emissions arbitrage, and the lack of long-term revenue streams poses challenges to project financing and deployment.[9] These challenges are more pronounced for MDES/LDES resources.

Consistent with our comments above on taking actions now to support some no-regrets MDES/LDES procurement rather than waiting until a future time, Malta recommends that the Standalone Bulk Storage Program incorporate elements that will enable the participation of MDES/LDES resources. Some of these elements may include:

- **Capacity incentives should be incrementally higher commensurate with longer durations:** In the forthcoming DOER Staff Proposal, Malta recommends that capacity incentives of this program establish a higher incentive value for longer durations; otherwise, capacity incentives could equate 4-hour and 8-hour or more storage resources despite the capability to provide capacity across more hours of the day. At minimum, the program could be designed to establish multipliers for storage that can provide duration beyond four hours. For example, a 2x multiplier could be applied to the $/kW capacity incentive for 8-hour storage, equivalent to paying two 4-hour storage resources the base incentive level. Multipliers need not be linearly increasing with duration, reflecting the diminishing returns of each incremental duration from a daily cycling and arbitrage perspective.
- **Resiliency adders should be considered:** Resiliency value is limited to behind-the-meter (BTM) storage resources in the proposed Resiliency Program, but Malta recommends that DOER staff consider a resiliency adder for in-front-of-the-meter (IFOM) transmission- and distribution-connected storage resources as well, which will highlight the value that MDES/LDES resources can provide. Though the study highlighted no resiliency value for the transmission-connected 8-hour storage use case,[10] it could be a location-specific factor where transmission contingencies could occur. It may also occur if the supply-side capacity is being planned for extreme weather events, such as cold snaps (*e.g.*, 1-in-20 or 1-in-25 weather events), which extend beyond the standard 1-in-10 reliability planning standards and are not necessarily location specific. Especially with extreme cold winters and the

[7] Study at 119.
[8] Report at 15.
[9] Study at 52-53 and 61.
[10] Study at 73.

vulnerabilities of the gas pipeline supply infrastructure, it would be reasonable to consider incentive adders to be placed on energy storage resources in this program that could provide resiliency in these cases.

- **Electrification adders should be considered:** For thermal storage resources that can charge with electricity and discharge with both electricity and heat, adders should be considered to recognize the fuel-switching benefits from fossil-fueled gas/heat to electrified heat. Rather than separately procuring electrified heat, there may be some storage resources that can offer these dual benefits in advancing Massachusetts' Clean Heat Standard and its storage deployment goals.
- **Grid stability adders should be considered:** In addition to resiliency and avoided emissions, other grid stability attributes such as inertia and short circuit current represent externalities not currently compensated in organized markets. Whereas these "services" have been provided for "free" from thermal generation resources, it is critical to a deep-decarbonized future that many of these attributes be retained with the decarbonized fleet. These attributes would be lost with heavy reliance on inverter-based resources, but some procurement and compensation for these attributes will better balance the storage mix.
- **The minimum roundtrip efficiency requirement should be eliminated or modified:** This minimum requirement is not specified, but it should be eliminated or modified to accommodate lower roundtrip efficiency storage resources that may nonetheless fit the use case, where high levels of roundtrip efficiency are not required (*e.g.*, resiliency, clean heat byproduct).

There may not be significant MDES/LDES participation in the program at this time, but Malta recommends that the program nonetheless be inclusive of opportunities for MDES/LDES projects to participate in the program and be supported with incentives that are more commensurate with the value that it provides in the near and long term. With many MDES/LDES assets having 20- to 30-year useful lives, the lesser value in the near term will eventually turn to higher value over the long term and well before the end of life of the project.

V. CLEAN PEAK STANDARD.

With respect to the Clean Peak Standard (CPS), we welcome the recommendation to review the program. To ensure that Massachusetts is not limited to just SDES projects, we look forward to working together on a program that can properly compensate MDES/LDES resources, such as by extending the requirement beyond four hours. Some ideas for consideration may include a Clean MDES/LDES Reserves Standard, which captures the benefit of avoided emissions from operating clean stored energy during contingency-related outages, extreme events, and multi-day renewable droughts that would otherwise be covered by firm fossil resources.

VI. ENERGY STORAGE SITING.

Given the limited land available in the Commonwealth, energy storage resources with dense capacity and energy footprints (*e.g.*, kW and kWh per square foot) will likely be needed in a deep-decarbonized future, where renewables and SDES overbuild is not feasible. The Study recognizes these questions on how MDES/LDES could be optimally sited to fit within an existing plant's location or where it could support offshore wind integration.[11] As such, Malta recommends that the siting-related recommends extend to where and how MDES/LDES could be sited to optimize its attributes.

VII. CONCLUSION.

Malta thanks the DOER for the opportunity to offer these comments and responses regarding the *Charging Forward* Report and Study. Please do not hesitate to reach out if you have questions or wish to discuss any of the comments or responses above.

Sincerely,

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[11] Study at 35 and 37.