September 21, 2022

VIA ELECTRONIC SUBMISSION

Jeffrey R. Gaudiosi, Esq.
Executive Secretary
Public Utilities Regulatory Authority
Ten Franklin Square
New Britain, CT 06051

Docket No.: 22-08-05 – Annual Energy Storage Solutions Program Review – Year 2

Re: Comments of the Institute for Policy Integrity at NYU School of Law and WattTime

Dear Mr. Gaudiosi,

In response to the Public Utilities Regulatory Authority's (PURA) August 24, 2022 Notice of Request for Written Comments in the above-captioned proceeding, the Institute for Policy Integrity at NYU School of Law (Policy Integrity) and WattTime respectfully offer the attached comments.

Policy Integrity is a non-partisan think tank dedicated to improving the quality of governmental decisionmaking through advocacy and scholarship in the fields of administrative law, economics, and public policy. Policy Integrity participates regularly in proceedings before public utility commissions and has written numerous reports and articles on energy policy design.

WattTime is a non-profit entity that aims to provide research, education, and assistance on the environmental benefits of electricity use timing and advocates for a data-driven approach to solving environmental problems.

Respectfully submitted,

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STATE OF CONNECTICUT
PUBLIC UTILITIES REGULATORY AUTHORITY

ANNUAL ENERGY STORAGE SOLUTIONS PROGRAM REVIEW – YEAR 2	:	DOCKET NO. 22-08-05
	:	SEPTEMBER 21, 2022

JOINT COMMENTS OF INSTITUTE FOR POLICY INTEGRITY
AT NYU SCHOOL OF LAW AND WATTTIME

In response to the Public Utilities Regulatory Authority's (PURA) August 24, 2022 Notice of Request for Written Comments in the above-captioned proceeding,[1] the Institute for Policy Integrity at NYU School of Law (Policy Integrity)[2] and WattTime offer the following comments.

Energy storage will be a crucial part of the clean electricity grid of the future, and we applaud PURA as it continues supporting energy storage as part of its overarching decarbonization agenda. We broadly support the recommendations made by the Connecticut Green Bank (CGB) in the Annual Program Review for Energy Storage Solutions (Annual Review) on how to optimize emissions reductions in the Energy Storage Solutions Program (ESS Program).[3] We have also identified additional areas where small changes could result in further emissions reductions, both in the ESS Program and the EV Charging Program. In particular, PURA should direct the Program Administrators (CGB and/or the Electric Distribution Companies (EDCs)) to:

- develop detailed locational emissions data and to use it to target marketing towards high-emission regions with the greatest arbitrage opportunities;
- adopt a managed charging strategy for energy storage resources;
- incorporate marginal operating emissions rates considerations into the EV charging incentive program; and
- weigh societal benefits—such as improved public health and reduced climate impacts—in its benefit-cost analysis.

I. PURA should direct CGB to develop detailed emissions data and use it to target marketing towards high-emission regions with the greatest arbitrage opportunities.

In our January 2021 comments, we explained how developing more granular locational emissions data would allow PURA to better evaluate and understand how energy storage can be most effectively deployed to optimize emissions reductions.[4] We are pleased that CGB is

[1] Conn. Pub. Util. Reg. Auth., Notice of Request for Written Comments (Aug. 24, 2022) (Docket No. 22-08-05); Conn. Green Bank, UI, & Eversource, Annual Program Review for Energy Storage Solutions – Year 2 (Aug. 22, 2022) (Docket No. 22-08-05) [hereinafter Annual Review].

[2] No part of these comments purports to present the views, if any, of New York University or its School of Law.

[3] *See* Annual Review, *supra* note 1.

[4] Joint Comments of the Inst. of Pol'y Integrity at NYU School of Law and WattTime, Public Utilities Regulatory Authority (PURA) – Investigation into Distribution System Planning of the Electric Distribution Companies—Electric Storage 5–6 (Jan. 26, 2021) (Docket No. 17-12-03RE03) [hereinafter Pol'y. Integrity & WattTime Comments].

recommending that PURA do just that.[5] Access to locational data will result in a clearer understanding of the impacts of the ESS Program.

The Annual Review, however, suggests using the data to "identify and prioritize deployment in high-emission regions."[6] While high-emission regions—particularly regions with high levels of pollutants that impact human health—should be prioritized for emissions reduction efforts such as increased renewable generation, improved appliance efficiency, or other strategies, it is important to recognize that energy storage can lead to emissions *increases* if deployed to regions with emissions that are consistently high, day-long and year-round.

The ability of energy storage to reduce emissions—even in areas with high emissions—is fundamentally an exercise in arbitrage. Energy storage can reduce pollution if there is a sufficiently high differential in the marginal operating emissions rate (MOER) of the grid between the time of charging and the time of discharging. If the MOER is low when the storage resource is charged and high when the storage resource is discharged, energy storage will reduce emissions. If the MOER is roughly constant between charging and discharging, inefficiencies in battery performance can lead to a net *increase* in emissions.[7]

Similarly, inefficiencies in battery performance can lead to a net increase in emissions even when the MOER is lower at the time of charging than at the time of discharging, if the emissions reductions from shifting generation are not large enough to make up for losses in output from battery performance. For this reason, it is important that additional energy storage is deployed not necessarily towards the highest emissions regions, but rather towards the high-emission regions where there is a sufficiently high differential between the region's peak and trough of emissions such that energy storage will reduce, rather than increase, overall emissions. CGB should prioritize marketing resources for these high-differential areas.

However, it is important to recognize that energy storage can provide other grid benefits beyond emissions reductions, such as improved grid reliability.[8] In addition, large amounts of bulk energy storage will be necessary in a world with high renewable penetration.[9] In targeting marketing, CGB should balance long-run benefits from these other considerations against any potential short-run increases in emissions.

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[5] Annual Review, *supra* note 1, at 31.

[6] *Id.*

[7] *See* MADISON CONDON, RICHARD REVESZ & BURÇIN ÜNEL, INST. FOR POL'Y INTEGRITY, MANAGING THE FUTURE OF ENERGY STORAGE: IMPLICATIONS FOR GREENHOUSE GAS EMISSIONS (2018), https://policyintegrity.org/publications/detail/managing-the-future-of-energy-storage. *See also* OPTIMIZING EMISSIONS, ENERGY STORAGE SOLUTIONS, 4 (Aug. 22, 2022) (Docket No. 17-12-03RE03) (Attachment 6 to the Motion to Comply with Order 20) (explaining that emissions increases may occur when the round-trip efficiency losses form storage are greater than the differential in emissions between charging and discharging).

[8] *See* CONDON ET AL., *supra* note 7, at 6; Jeffrey Shrader et al., *(Not so) Clean Peak Energy Standards*, ENERGY, June 15, 2021, at 10–11.

[9] Shrader, *supra* note 8, at 10–11.

II. PURA should direct CGB to adopt a managed charging strategy for the ESS Program.

CGB's recommendation to shift to a managed charging structure will result in a more effective energy storage program that better optimizes emissions reductions both now and in the future.[10] PURA should accept CGB's recommendation.

Per WattTime's analysis, cited in the Annual Review, unmanaged charging could increase grid emissions by up to 3.8%, relative to a baseline scenario with no charging program.[11] In contrast, managed charging could lead to emissions reductions of nearly 8%—approximately eight times the emissions reductions from an overnight charging approach.[12] CGB further notes that this will increase the program's societal benefits by $11/kW-EES, relative to overnight charging.[13]

Moving to a managed charging program will align the program with PURA's explicit directive to "maximize the long-term environmental benefits of electric storage by reducing emissions associated with fossil-based peaking generation."[14]

III. PURA should direct the Program Administrators to consider marginal operating emissions rates in the EV charging incentive program.

As proposed, the Connecticut Electric Vehicle Charging Program, administered by two EDCs (Eversource and the United Illuminating Company) will be structured as a two-tier incentive system, designed to encourage customers to charge their vehicles during certain times of day.[15] The first tier will provide $10/month to customers who charge "at least 80% of the time during off-peak hours (defined as noon to 8pm)" and the second tier will provide $20/month to customers who allow the EDCs to actively manage charging schedules.[16]

While WattTime's current analysis suggests that the peak emissions period falls inside the noon to 8pm period, emissions typically remain high through midnight.[17] In order to optimize emissions reductions by encouraging charging when marginal emissions are low, PURA should consider defining the Tier 1 off-peak hours to avoid high-emission periods. In so doing, PURA should take advantage of localized data, as peak emissions periods may vary by location and

[10] Annual Review, *supra* note 1, at 31–32.

[11] *Id.* at 32.

[12] *Id.*

[13] *Id.*

[14] Conn. Pub. Util. Reg. Auth., Decision, Annual Review of the Electric Storage Program – Year 1, 3 (Dec. 8, 2021) (Docket No. 21-08-05).

[15] Annual Review, *supra* note 1, at 33.

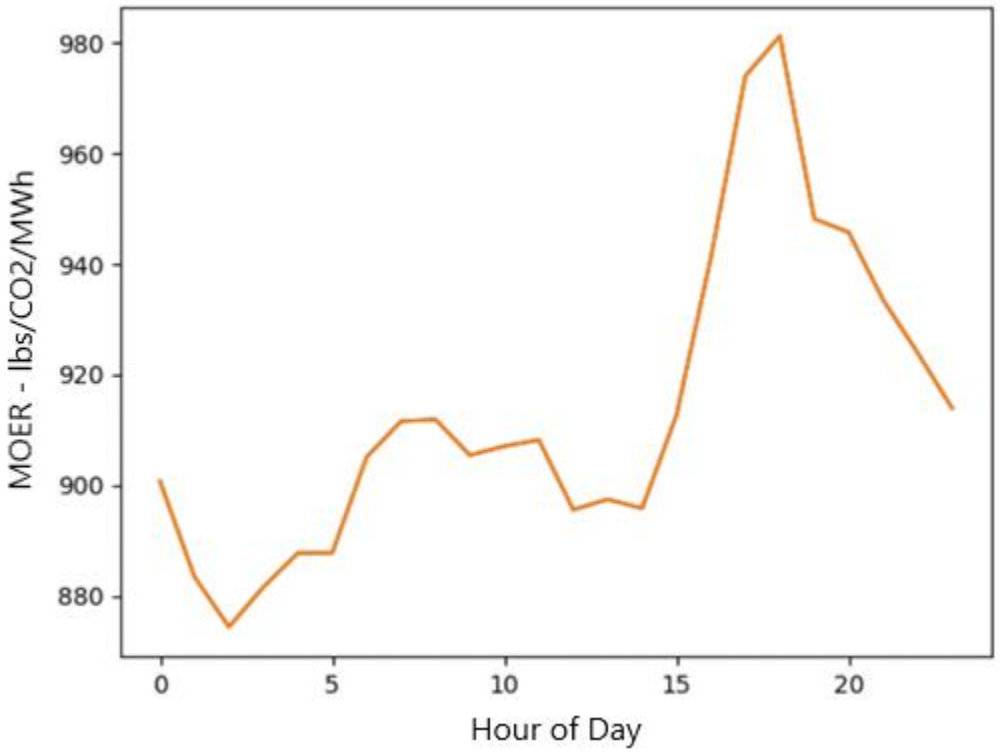
[16] *Id.* Please note, given that EDCs define 12pm to 8pm as a *peak* period, rather than an off-peak period, *see* BENEFIT-COST ANALYSIS, ENERGY STORAGE SOLUTIONS 15 (Aug. 22, 2022) (Docket No. 17-12-03RE03) (Attachment 5 to the Motion to Comply with Order 20), it is possible that this may be a misstatement, and that 12pm to 8pm is meant to be the peak period. If that is the case, our recommendation to re-evaluate the charging window with regards to emissions reductions becomes even more pressing.

[17] *See infra* Figure 1.

season,[18] and regularly revisit and—if necessary—update the hours in response to changes in the grid make-up.[19] Ensuring that the off-peak hours do not include high-emission periods would reduce the pollution and climate change impacts of the EV charging program, leading to greater social benefits.

Similarly, Tier 2's managed charging structure should take into account that the emissions of the grid can be dynamic and change every day. PURA should consider directing EDCs to actively manage Tier 2 charging based on the marginal emissions of the electric grid, similar to CGB's recommendations for managed charging for energy storage. This will help maximize the emissions reduction benefits of managed EV charging.

Figure 1: Mean Annual Marginal Emissions Rate by Hour in ISO-NE Connecticut



Source: WattTime Internal Analysis

IV. PURA should consider societal benefits as part of its benefit-cost analysis.

The current structure of the benefit-cost analysis (BCA) for the ESS Program focuses primarily on the Ratepayer Impact Measure (RIM).[20] RIM does not consider either societal impacts or non-energy impacts as benefits. CGB recommends that PURA consider incorporating non-RIM goals

[18] Annual Review, *supra* note 1, at 31.

[19] *Id.* at 30 ("this work is highly dependent on the future generation mix of ISO-NE as well as the variability of weather and climatic conditions that heavily impact the generation capabilities of wind and solar.")

[20] *Id.* at 32.

based on BCA metrics that include climate benefits and other societal benefits.[21] PURA should adopt this recommendation.

Decisionmakers can best determine whether a particular policy will improve upon the status quo by contemplating foreseeable costs and benefits to society as a whole. The RIM excludes critical societal benefits (or costs) of energy storage policies, such as changes in conventional air pollution and greenhouse gas emissions, that have direct effects on the health, safety, and comfort of ratepayers and non-ratepayers alike. PURA previously deliberated whether to include metrics that would take societal benefits into account and recognized that such considerations are "vitally important and informative," however, due to the importance of clear-cut cost-effectiveness goals, PURA set its initial BCA benchmarks based only on the RIM.[22] PURA should now set goals for other BCA metrics that incorporate societal welfare, such as the Societal Cost Test (SCT).[23] Weighing these elements of a program will allow PURA to reach socially optimal outcomes more effectively than would creating policies tailored to the RIM alone. It is possible, for example, that two alternative program designs could have RIMs that meet PURA's obligations to non-participating ratepayers, but that one program has much greater societal benefits than the other; considering additional BCA metrics would make it easier for PURA to identify the more societally beneficial option.

The following reports may assist in assessing these societal benefits:

- *Valuing Pollution Reductions: How to Monetize Greenhouse Gas and Local Air Pollutant Reductions from Distributed Energy Resources*;[24] and
- *Making the Most of Distributed Energy Resources: Subregional Estimates of the Environmental Value of Distributed Energy Resources in the United States*.[25]

[21] *Id.*; *see also* OPTIMIZING EMISSIONS, *supra* note 7, at 29–31.

[22] Final Decision 30–34 (July 28, 2021) (Docket No. 17-12-03RE03).

[23] Annual Review, *supra* note 1, at 32.

[24] JEFFREY SHRADER, BURÇIN ÜNEL & AVI ZEVIN, INST. FOR POL'Y INTEGRITY, VALUING POLLUTION REDUCTIONS: HOW TO MONETIZE GREENHOUSE GAS AND LOCAL AIR POLLUTANT REDUCTIONS FROM DISTRIBUTED ENERGY RESOURCES (2018), https://policyintegrity.org/publications/detail/valuing-pollution-reductions.

[25] MATT BUTNER, ILIANA PAUL & BURÇIN ÜNEL, INST. FOR POL'Y INTEGRITY, MAKING THE MOST OF DISTRIBUTED ENERGY RESOURCES: SUBREGIONAL ESTIMATES FOR THE ENVIRONMENTAL VALUE OF DISTRIBUTED ENERGY RESOURCES IN THE UNITED STATES (2020), https://policyintegrity.org/publications/detail/making-the-most-of-distributed-energy-resources.