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May 8, 2020

Michael J. Barrett, Senate Chairman
Thomas A. Golden, House Chairman
State House
Boston, MA 02133

RE: Proposed Regulation, 225 C.M.R. 21.00 *et seq*., for Clean Peak Energy Portfolio Standard

Dear Chairmen Barrett and Golden,

The Massachusetts Attorney General's Office (AGO) appreciates efforts by the Department of Energy Resources (DOER) to develop its Clean Peak Energy Standards (CPS). The AGO recognizes the challenges of meeting the Commonwealth's ambitious climate targets and supports DOER's and the Legislature's efforts to increase renewable energy generation, reduce reliance on expensive and polluting fossil fuels, and meet the Commonwealth's obligations under the Global Warming Solutions Act (GWSA). As the Joint Committee on Telecommunications, Utilities and Energy (Committee) considers DOER's draft regulation, the AGO offers the following comments and recommendations for your consideration.

The AGO actively participated in DOER's stakeholder outreach efforts and submitted comments on the draft CPS regulation in October 2019.[1] The AGO comments provided possible enhancements and clarifications to the draft regulation and voiced concern that the qualification methods for CPS resources outlined in the draft regulation were insufficiently rigorous to effectuate the CPS program goal of increasing clean energy during peak periods. The AGO comments also provided evidence that the proposed regulation might increase power-sector emissions.[2] Such an increase in emissions would make it more difficult for the Commonwealth

[1] Attorney General's Office Comments to the Department of Energy Resources regarding Proposed Regulation, 225 C.M.R. 21.00 *et seq*., Clean Peak Energy Portfolio Standard (CPS), (October 30, 2019) ("AGO Comments").

[2] AGO Comments, at 5-7.

to meet the important emissions-reduction goals of the GWSA and could endanger the state's national leadership in efforts to reduce greenhouse gases.[3]

While the AGO appreciates DOER's subsequent revisions to the draft CPS regulation, the AGO remains concerned that, as presented to the Committee, this CPS will dramatically increase costs without providing commensurate benefits.

As addressed further below, the AGO encourages the Committee to recommend that DOER effectuate the necessary changes to its final regulation in order to:

1) Subject the CPS to a rigorous ratepayer impact analysis and require that the program yield net benefits, including greenhouse gas and other pollutant emission reduction benefits, to consumers.
2) Ensure that energy storage participating in the CPS program (a) is charged from clean resources; and (b) does not contribute to an increase in power-sector emissions.
3) Slow the rollout of the CPS program by modifying the schedule in section 21.07(1)(a).

A) Additional effort is needed to assess whether the CPS will actually provide ratepayer benefits, including in the form of greenhouse gas and other pollution emission reductions.

Over the past two years, DOER has spent significant time and effort developing its Clean Peak program. Today, however, it remains uncertain whether customers will benefit from the program proposed. The CPS proposal is expected to cost $1.5 billion over ten years (a 30 percent increase over DOER's August 2019 estimates.).[4]

Yet, the ratepayer benefits identified by DOER remain opaque. DOER suggests that the program will offer $1.8 billion in benefits, but because DOER did not publish its pricing model, its impact assessment, or even the impact assessment methodology, it is impossible to determine whether the estimated costs and benefits are accurate, reasonable, or prudent. More work – and transparency – is needed to ensure that the identified benefits are real and accurate, and that ratepayers will benefit from this program.[5]

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[3] NEPGA v. DEP. *e.g.,* The GWSA "is designed to make Massachusetts a national, and even international, leader in the efforts to reduce the greenhouse gas emissions that cause climate change." *New England Power Generators Ass'n, Inc.*, 480 Mass. at 399.

[4] The proposed regulations have direct cost of $1.5bn, between 2020-2030, while the draft regulations cost $1.138 (an increase of 30percent). At the same time, the revisions lead to a two percent increase in expected benefits (such as they are). Cf. Draft Regulation Summary at 39. Available at: https://www.mass.gov/doc/drafts-cps-reg-summary-presentation/download.

[5] It is the AGO's understanding that the CPS ratepayer impact assessment relies on third-party research of unrelated programs, rather than an assessment of the program DOER has actually designed. *Consultant Report.* at 16 ("Simplified Task 5 cost-benefit analysis approach and shifted primary responsibility of analysis to DOER, utilizing benchmark measures and relying on recent studies [such as State of Charge,

B) The regulation fails to ensure that storage is charged from clean resources

In the AGO's October comments, the AGO expressed concern that the "qualification methods [for energy storage] outlined in the draft regulation do not appear to be sufficiently rigorous to effectuate the CPS program goal of increasing clean energy during peak periods."[6]

The CPS eligibility requirements do not ensure that storage is charged from clean resources. As discussed in the AGO Comments, the draft regulation fails to require CPS technology to rely on clean generation in order to achieve the underlying goal of supporting efforts to reduce the Commonwealth's air emissions reductions goals.[7] The Committee should request changes to the draft regulations, consistent with the AGO's initial recommendations, to minimize the use of non-clean generation.

C) The CPS may increase emissions, not decrease them

In the AGO's October comments, the AGO expressed concerns that the CPS may increase the Commonwealth's net carbon emissions. To substantiate this point, the AGO computed the expected emissions of an energy storage device charging and discharging according to DOER's prescribed periods (§ 21.05(1)(a)(2)(c)) and 21.05(3)-(4).). That analysis found that on average, CPS storage devices would "*increase* emissions by 94 to 143 lbs/MWh-stored."[8]

Comments from the academic researchers submitted to DOER aligned with the AGO findings. These researchers simulated how a battery may plausibly perform under CPS and found that it would *increase* emissions.[9] The researcher comments stress that their findings comport with the broader academic literature on storage-induced emissions as well as California's actual experience with storage *increasing* emissions.[10]

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and Avoided Energy Supply Components in New England: 2018 Report] rather than modeled results to estimate benefits."). Available at: https://www.mass.gov/doc/clean-peak-standard-final-consultant-report. For example, DOER assumed that energy storage would yield the same level of carbon benefits irrespective of how the battery is operated, where the battery is located, the duration of the battery, and other factors that are well known to affect carbon emissions. The financial impacts appear to have been modeled in similar fashion.

[6] AGO Comments at 4.

[7] AGO Comments, at 3-7.

[8] AGO Comments at 6-7.

[9] Policy Integrity Comments at 4-6.

[10] Id at 2-4.

In its *Reply to Comments*, DOER seeks to address concerns (AGO's included) that the CPS could increase emissions.[11] First, DOER critiques reliance on assessments of the CPS that rely on marginal emissions rates.[12] This position is inconsistent with one of the core tenants of economic theory, namely, that incentives act "on the margin."[13] DOER provides qualitative comments that show that the CPS peak periods align with periods of high load and that charging periods align with periods when renewables tend to generate the most electricity. What is missing from the DOER analysis is a showing that if resources participate as desired, the CPS will reduce emissions, now or in the future. Even if the benefits are borne out, the AGO points out that the Commonwealth would receive more substantial emissions and market benefits if it spent a portion of the CPS's expected $1.5 billion price tag on an expanded RPS or targeted renewables procurements.[14]

The AGO re-ran its calculations using DOER's preferred metric (average emissions rate) and found the same directional results that it did in October: storage operating under the CPS would increase regional emissions by 21 to 47 lbs/MWh- stored (see appendix).[15]
DOER did not conduct the analysis necessary to support its claims that CPS will reduce emissions. Its presumption of emissions reductions run contrary to (a) the AGO's October 2019 analysis of the CPS regulation; (b) comments and analysis by academic experts at Columbia University and New York University; (c) the AGO's supplemental analysis of CPS using DOER's preferred emissions metric (see attached); (d) the broader academic literature on

[11] DOER *Reponse to Comments* at 2-6.

[12] Id.

[13] This claim is especially strong in power markets. If a battery starts charging itself, some power plant on the system must ramp up its output to provide that charging electricity. Note that in power systems, when a battery starts to charge, only one power plant will increase its output, rather than having all power plants increase output by a much smaller amount. Conversely, when a battery discharges itself, all else equal, a power plant on the system reduces its output by the same amount (after accounting for storage losses). *See* https://www.iso-ne.com/about/what-we-do/in-depth/how-resources-are-selected-and-prices-are-set.

[14] *See generally*, DOER Offshore Wind Study (May 2019).

[15] See Appendix.

emissions induced by energy storage;[16] and (e) the historic experience of storage emissions from other jurisdictions. [17]

If the Clean Peak Standard were simply a battery storage incentive program, perhaps these findings about emissions impacts would be irrelevant. However, the very purpose stated by the regulations in question call for "Clean Peak Resources contribute to the Commonwealth's environmental protection goals concerning air emissions…"[18] The AGO recommends that the Committee ask DOER to conduct an open and transparent impact analysis which demonstrates that its proposed program will actually reduce emissions. Ideally, this analysis would model how the costs and benefits of the CPS change over time, as more renewables come onto the system. In addition, the AGO recommends that the Committee consider modifying the proposed regulation to codify the emissions goals in statute.[19]

D) Conclusion

The AGO is concerned that the proposed CPS will increase direct ratepayer costs by $1.5 billion over the next decade but will offer few consumer benefits in return. Therefore, the AGO recommends that, in drafting its report and recommendations for DOER, the Committee ask DOER to produce a robust assessment of its program. In the meantime, the AGO encourages the Committee to recommend reduced CPS procurement targets to the statutory minimum of 0.25 percent in Section 21.07(1) until DOER has demonstrated that the CPS program will offer benefits—including monetized emissions reduction benefits—to ratepayers in excess of its costs.

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[16] E.g., Hittinger, E., Azevedo, I., 2015. Bulk Energy Storage Increases United States Electricity System Emissions. Environ. Sci. Tech 49 (5), 3203–3210. https://doi.org/10.1021/es505027p. Lin, Y., Johnson, J.X., Mathieu, J.L., 2016. Emissions impacts of using energy storage for power system reserves. Appl. Energy 168, 444–456. https://doi.org/10.1016/j.apenergy.2016.01.061. Fisher, M., Apt, J., 2017. Emissions and economics of behind-the-meter electricity storage. Environ. Sci. Technol. 51 (3), 1094–1101. https://doi.org/10.1021/acs.est.6b03536. R T Carson, K Novan. The private and social economics of bulk electricity storage. Journal of Economics and Management, volume 66, issue 3, p. 404 – 423.

[17] California SGIP Impact Evaluation (2018), p 1-7, https://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy/Energy_Programs/Demand_Side_Management/Customer_Gen_and_Storage/SGIP%20Advanced%20Energy%20Storage%20Impact%20Evaluation.pdf. Cf. https://policyintegrity.org/files/publications/Managing_the_Future_of_Energy_Storage.pdf

[18] 225 C.M.R. 21.01

[19] California has found that storage procured through the Self Generation Incentive Program was increasing carbon emissions contrary to the goals of that program. The program has been modified to make incentive payments contingent on verifiable emissions reductions. See *2020 Handbook* for details: https://www.selfgenca.com/home/resources/ .

Thank you for your attention to these comments. The AGO respectfully requests the Committee include in its report and recommendations to DOER the changes offered herein. If you have any questions, please do not hesitate to contact Elizabeth Mahony at Elizabeth.l.mahony@mass.gov.

Sincerely,

/s/ Rebecca Tepper

Rebecca Tepper
Chief, Energy and Telecommunications Division

Appendix: CPS Carbon Emissions assuming *Average Emissions Rates*

In its reply to comments, DOER argues that the AGO method of calculating emissions impact of CPS using *marginal emissions rates* is incorrect.[20] The Department appears to prefer the use of the *average emissions rate* instead.[21] While the AGO does not agree that the average emission rate is the correct metric to use to measure induced emissions, in this Appendix the AGO recomputes the emissions data it provided in Table 1 of its October 2019 comments using DOER's method. As detailed below, calculating induced emissions using both average and marginal emissions rates show the same directional result: the proposed CPS will increase system emissions.

Estimating Emissions using the DOER CPS periods

Hourly emissions data for power-plants larger than 25 MW must be reported to the EPA.[22] ISO-NE provides hourly load data.[23]

First, for each hour of the period 2014-2018, sum CO2 emissions across all power plants in the six new England states. This approach will miss some number of small power plants -- but seems to align with how DOER generated its figure. This calculation possible emissions from imported electricity.

Second, calculate the average emissions rate by dividing hourly regional emissions by hourly system load.

Third, categorize each hour into one of four seasons: Winter = Dec-Feb; Spring = March-May; Summer = June-Aug; Fall = Sept-Nov. The details of DOERs split months are immaterial. Forth, further categorize each hour into a "charging hour", "discharging hour" or "other hour", based on DOER's proposed periods.

Finally, take the simple average of each hour's average emissions rate from Step 3; grouped by the seasons and periods in Step 3 and Step 4. This provides the typical emissions found during periods where DOER permits charging and periods when DOER permits discharging.

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[20] DOER, *Response to* Comments, at 2.

[21] As storage devices must be charged from *something* the only way to assess carbon emissions is to model the kind of energy used to charge the device and the kind of energy which was displaced when the storage is discharged. Induced emissions from energy storage can be estimated using marginal emissions rates, average emissions rates, or via counterfactual production cost modeling. When DOER discusses how storage charging periods are mapped to times when renewables have high output or how peak periods have the highest total emissions (*Reponse to Comments*), they are implicitly relying the average emissions rate metric.

[22] https://ampd.epa.gov/ampd/

[23] https://www.iso-ne.com/isoexpress/web/reports/load-and-demand/-/tree/zone-info

With emissions rates in hand, compute how much system emissions would change if storage charged and discharged as DOER prefers, assuming that the battery has 85% round-trip efficiency (in line with lithium ion batteries) and that losses are symmetric on charging and discharging. (See Table).

From the right columns, in each season emissions will increase if storage charges in the approved windows, and discharges in the compliance windows. From this table, storage participating in the CPS increase regional emissions by 21bs/MWh to 47 lbs/MWh.

Time		**Avg Emissions (lbs/MWh)**		**Storage Induced Emissions (lbs/MWh)**	
Season	**CPS Period**	**2014-2018**	**2018**	**2014-2018**	**2018**
Fall	Charge	448.5	457.15	42.13	46.62
	Discharge	481.95	487.26		
	Other	440.24	446.88		
Spring	Charge	409.91	333.71	48.70	20.72
	Discharge	429.42	370.13		
	Other	397.31	326.36		
Summer	Charge	483.14	459.84	57.92	41.43
	Discharge	505.58	496.05		
	Other	463.17	446.35		
Winter	Charge	432.97	392.19	36.48	25.07
	Discharge	469.81	434.21		
	Other	449.76	413.24		

Storage Emissions = (charge rate / one-way efficiency) - (discharge rate * one-way efficiency)