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Re: 225 CMR 14.00/15.00 RPS proposed changes

My name is Dr. Alexander Barron and I am an Assistant Professor of Environmental Science and Policy at Smith College. I am a Ph.D.-trained ecosystem ecologist who has published on forest biogeochemistry in the peer-reviewed literature. I have also spent the last decade crafting environmental policy as a Congressional aide, an official at the U.S. Environmental Protection Agency (EPA) and, most recently, as faculty at Smith College.[1] The views reflected in this comment are my own.

Thank you for the opportunity to submit comments on the proposed changes to the RPS regulation, focusing on changes to the 225 CMR 14.00 RPS Class I regulations. To the extent that similar changes have been made to the 225 CMR 15.00 RPS Class II regulations, these comments also apply.

In the interests of time, I have focused my comments on two key areas: Biomass and Hydropower.

Biomass

Setting effective policy for electricity or heat generated from renewable biomass is incredibly challenging due to the complex interactions of policy, forest carbon cycles and forest product markets. In 2011, the US Environmental Protection Agency(EPA) commissioned a review by its Science Advisory Board which found that: “Carbon neutrality cannot be assumed for all biomass energy a priori. There are circumstances in which biomass is grown, harvested and combusted in a carbon neutral fashion, carbon neutrality is not an appropriate a priori assumption; it is a conclusion that should be reached only after considering a particular feedstock’s production and consumption cycle.”[2] DOER deserves significant credit for being a world leader in policy design

[1] For bio, please see: https://www.smith.edu/academics/faculty/alexander-barron
[2] SAB (2012) SAB Review of EPA’s Accounting Framework for Biogenic CO2 Emissions from Stationary Sources. Pg 3. https://data.globalchange.gov/report/epa-sab-12-011

that reflects the science that not all biomass can be treated as carbon neutral (or of equivalent climate impact).

EPA has been working to develop an appropriate, peer-reviewed framework for biomass accounting for nearly a decade. However, even this ambitious effort has not yet produced policy-grade accounting protocols, which must be adapted to the specific goals and structure of a regulation.[3] The literature on biomass accounting remains complex - with papers in the same peer-reviewed journal just months apart in publication coming to widely different conclusions about the net carbon impacts.[4] The policy and technical space is sufficiently divided such that Resources for the Future and the Center for Climate and Energy Solutions recently launched a process to reconcile these views and develop an actionable framework.[5]

While more robust policy-appropriate frameworks are developed, DOER must grapple with the real uncertainties associated with biomass accounting and the associated downside risks - chiefly that biomass might not serve to reduce emissions as effectively as other RPS-eligible generation types. A 2016 study found that, under some market assumptions, the reduction in forest carbon stock outweighs savings relative to natural gas by 45 years (but with much shorter paybacks under other market assumptions).[6] These uncertainties means that a prospective analysis conducted today that indicates net payback over 20 or 30 years could, in retrospect, produce net increases in GHG emissions for much longer and leave Massachusetts with carbon debts that last until 2050 deadline in the Global Warming Solutions Act. The sensitivity to assumptions about changes in forest carbon stocks, regrowth rates, forest product market dynamics, and other parameters makes biomass unique among the generation sources under the current RPS.

These uncertainties are important on their own but also have important market interaction components. If the added flexibility for biomass increases the supply of qualifying biomass generation, it may suppress prices for Class I and/or Class II RECs - potentially reducing the incentive for other generators which have more certain carbon reduction benefits (e.g. hydro, wind, solar) to begin construction or operate.

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[3] SAB review of Framework for Assessing Biogenic CO2 Emissions from Stationary Sources (2019). EPA-SAB-19-002.

[4] Compare: Sternman et al. 2018 Reply to comment on `Does replacing coal with wood lower CO2 emissions? Dynamic lifecycle analysis of wood bioenergy' Environmental Research Letters 13(2) and Dwivedi et al. 2019 Is wood pellet-based electricity less carbon-intensive than coal-based electricity? It depends on perspectives, baselines, feedstocks, and forest management practices. Environmental Research Letters 14(2)

[5] Distribution list email from Land, Water, and Nature Program at Resources for the Future (RFF), 4/3/2019

[6] Cintas et al. (2017) Carbon balances of bioenergy systems using biomass from forests managed with long rotations: bridging the gap between stand and landscape assessments. Global Change Biology: Bioenergy. 9(7)1238-1251.

The lack of a widespread scientific consensus on an actionable framework for biomass accounting and the inherent uncertainty in the emissions benefits from biomass relative to other sources mean that DOER should adopt a conservative, analysis-based approach to accounting that guards against risk and is based on detailed, peer-reviewed analysis. The following paragraphs elaborate on this concept.

Technical Basis: The original 2012 regulations and the revised guidelines seem to have, to a large part, been based on the Manomet study[7]. Given the amount of research since that time in the peer-reviewed literature and the recent SAB recommendations on the EPA biomass accounting framework, it would be prudent to conduct a new, New England-specific study with sensitivity analysis before loosening requirements for biomass under the RPS. While climate change demands rapid action, biomass is one area where improper safeguards could lead to long-lasting carbon debts that increase climate impacts and conflict with state GHG goals.

Timeframe: I was unable to find a coherent explanation for the change in accounting period from 20 to 30 years in the provided materials. The EPA's science advisory board notes that "SAB favors selecting the time horizon for calculating the BAF to comport with the objective under consideration, which is generally dependent on the regulation mandating use of that particular BAF"[8] In the context of an RPS, biomass is competing in a marketplace with renewable resources like wind that have a *nearly instantaneous* payback of emissions reductions relative to the fossil fuels they displace[9] - suggesting a very short accounting period. In the face of uncertainty about paybacks (i.e. a particular harvest regime projected to achieve a 50% reduction relative to natural gas over 30 years may not do so in practice), DOER should maintain the current 20 year life-cycle period until it can more thoroughly analyze the potential range of carbon, ecological and forest product market implications of expanding the period.

Efficiency: DOER describes changes to the efficiency standards as intended to "simplify and streamline requirements and reflect the significant differences between the lifecycle greenhouse gas impacts of utilizing these different types of woody biomass."[10] While focusing on source-side impacts of fuel changes, this proposed change underweights the impact of use-side characteristics on the lifecycle greenhouse gas emissions. Higher efficiency and co-generation reduces the payback period for biomass generation and serves as an important hedge against uncertainties in biomass accounting. DOER should not loosen this efficiency threshold without

[7] Manomet Center for Conservation Sciences. 2010. Massachusetts Biomass Sustainability and Carbon Policy Study: Report to the Commonwealth of Massachusetts Department of Energy Resources. Walker, T. (Ed.). Contributors: Cardellichio, P., Colnes, A., Gunn, J., Kittler, B., Perschel, R., Recchia, C., Saah, D., and Walker, T. Natural Capital Initiative Report NCI-2010- 03. Brunswick, Maine.
[8] SAB (2019) pg 2.
[9] Payback periods for wind on a life cycle basis are typically a few months. See: Smoucha EA, Fitzpatrick K, Buckingham S, Knox OGG (2016) Life Cycle Analysis of the Embodied Carbon Emissions from 14 Wind Turbines with Rated Powers between 50 Kw and 3.4 Mw. J Fundam Renewable Energy Appl 6:211.doi:10.4172/20904541.1000211
[10] DOER RPS/APS Stakeholder Announcement

an analysis of which facilities may be affected and what system-scale impact this would have on GHG emissions.

Forest Impact Assessment: 14.05(8)(g) calls for a forest impact assessment from 2020 through 2025. These kind of system-scale evaluations are critical to understanding the impacts of biomass energy and how reality may differ from what is modeled in a spreadsheet. However, the revisions appear to remove language that would provide transparent annual reporting on this assessment and require changes if it identifies issues with the accuracy of the Greenhouse Gas Analysis Guidelines - both provisions should be retained to ensure that this information is used to rapidly improve the current framework with new data. The language of the assessment should explicitly include reference to carbon stocks: "will conduct an assessment of the impacts on Massachusetts and regional forests *(including above- and belowground carbon stocks)*"

Co-pollutants: Given the significant environmental justice concerns arising in communities about air quality impacts associated with biomass facilities and the fact that these facilities have higher emissions than many other RPS energy sources, DOER should consider adding additional requirements to ensure that any new or existing biomass facilities incentivized by changes to the RPS are not exacerbating or significantly responsible for maintaining existing inequities in air quality impacts. Adding this safeguard *in* the RPS instead of deferring to DEP permitting will ensure consistent treatment and safeguards for both in and out-of-state facilities.

Hydropower

The proposed addition of 14.05(1)(a)6(h) and 15.05(1)(a)6(h) states that recertification by the Low Impact Hydropower Institute (LIHI) is not required to retain a Statement of Qualification. This appears to set up a loophole that could undermine the important policy goals of LIHI certification.

Certifications from LIHI serve an important policy purpose: to minimize negative environmental impacts from hydropower projects on fish passage, water quality, endangered species and other factors. Requirements may go beyond what FERC requires (e.g. eel ladders). LIHI certifications are good for at least 5 years.[11] During this time there may be significant changes to flow conditions, operational conditions, available ecological data, or other important information that could require the facility to make change to be consistent with best practices, which may also have evolved during that time period and been reflected in new guidelines from LIHI. Some sort of change is, to my understanding, common in the recertification process. Recertification will also, critically, help detect non-compliance in the original criteria. The proposed language creates an opportunity for the applicant to only take steps required for

[11] Low Impact Hydropower Institute 2016 Low Impact Hydropower Certification Handbook, Renewal of Certification. https://lowimpacthydro.org/wp-content/uploads/2019/01/2nd-Edition-Handbook-Rev-2.03-2018-12-20-1.pdf

certification and immediately lapse into non-compliance on any operational aspects. The benefits of LIHI certification and any future benefits in response to changing conditions or evolving practice can only be maintained if 14.05(a)6(h) is modified to clarify that certification *is* in fact required to retain a Statement of Qualification.

Cost does not seem to be a notable barrier to LIHI recertification as a) many facilities throughout New England are LIHI certified[12] and b) REC income has the potential to cover these costs. The GZA Geo Environmental consultant report referenced in DOE materials[13] does not, based on my review, provide any analysis that this recertification is a significant operational cost. The consultant report identifies that LIHI certification may be duplicative with FERC certification for newer facilities but at least one survey respondent (USFWS) did not agree and no detailed analysis is presented ensuring that all aspects of LIHI certification are redundant[14]. The same report notes that LIHI adds value for existing facilities[15]. In short, relevant facilities should be required to maintain LIHI certification while to be eligible under the RPS.

Thank you for your time and consideration.

Alexander Barron, Ph.D.

[12] https://lowimpacthydro.org/certified-facilities/
[13] GZA GeoEnvironmental (2016) https://www.mass.gov/files/documents/2016/11/xk/reportonpermitting2016-830.pdf
[14] GZA GeoEnvironmental (2016) " ...suggested by some survey respondents that the LIHI process of low impact certification is redundant for projects authorized after 1986." pg 21
[15] GZA GeoEnvironmental (2016) "LIHI helps improve environmental conditions at project with FERC Exemptions which never come up for renewal" pg. 22