PFPI
driven by data

Senator Benjamin Downing
Senate Chair, Joint Committee on Telecommunications Utilities and Energy
The State House, Room 413-F
Boston, MA 02133

Representative John Keenan
House Chair, Joint Committee on Telecommunications Utilities and Energy
The State House, Room 473-B
Boston, MA 02133

Re: Massachusetts Renewable Portfolio Standard (RPS) Draft Regulation on Woody Biomass Eligibility, 225 CMR 14.00

June 1, 2011

Dear Chairmen Downing and Keenan,

The Manomet Study was commissioned to identify the forest and carbon impacts from generating energy using woody biomass. The goal was to inform state policy on biomass power to ensure this technology is in congruence with the objectives and mandates of the Global Warming Solutions Act. While the DOER regulations should be recognized and commended as an attempt to make policy based on science, the final version of the regulations no longer fully conforms with the science behind Manomet, meaning biomass incentivized under these regulations will not achieve the goal of restricting biomass to truly low-carbon applications. These problems must be rectified in order to restore the Massachusetts regulations to the defensible, science-based principles that emerged from the Manomet process.

There are three main areas of concern, outlined here. We explore #3 in greater detail below:

1. The efficiency standard at which biomass burners are eligible for RECs is too low, and is not compatible with the assumptions that Manomet employed. Manomet's modeling assumed that biomass thermal only and combined heat and power (CHP) burners achieve 75% efficiency, similar to the efficiency achieved by thermal and CHP fossil fuel units. This high efficiency is what helps reduce the net emissions from biomass burning so that they are more comparable to emissions from fossil fuel burning units. Secretary Bowles stated the importance of efficiency in his July 7 2010 letter to DOER Commissioner Guidice, stating that "DOER will seek to ensure the maximum practicable efficiency standard reflects the goals of the Green Communities Act, which among other efficiency goals seeks to promote the use of combined heat and power having a *minimum* efficiency of 60% with a goal of increasing to 80% by 2020". By mandating 60% efficiency, the regulations do not yet attain the threshold that Manomet used; by providing incentives at 40%, Manomet's findings can hardly be said to apply.

2. The calculation of efficiency to include "merchantable bioproducts", while creative, is unorthodox and irrelevant to the calculation of efficiency of power generation. Energy efficiency for heat and power generation is calculated by governmental entities like the Energy Information Administration and the Environmental Protection agency as the ratio of the useful energy output to the energy input. It will does not serve Massachusetts, known as a center of intellectual rigor and high technology, to suddenly change the rules of the game, particularly when this change has apparently been enacted to benefit a particular industry. We encourage those interested in the correct method for calculating efficiency to visit EPA's "Combined Heat and Power Partnership"

page at http://www.epa.gov/chp/basic/methods.html. Visitors to this page, titled "Methods for Calculating Efficiency", will search in vain for any definition of efficiency other than those relevant for assessing the actual operational efficiency of a powerplant.

3. The carbon accounting provisions have been altered from those in the draft regulations, with serious consequences for the incentivization of biomass as a low carbon technology. The Manomet Study treated carbon emissions from forestry residues and tree harvesting separately, but the regulations and guidance as drafted do not. The rest of this letter concerns this matter.

The context for the DOER biomass regulations

It is generally accepted that carbon dioxide emissions from stand-alone electricity-generating biomass facilities are around 50% greater than from a coal plant, and 300 – 400% those at a natural gas plant. The problem arises partly because fossil fuels contain more energy per unit carbon than wood, and also because wood is about 50% water by weight, and before "useful energy" can be generated, the water must be heated and driven off, which consumes energy and degrades facility efficiency. Biomass burners that are operated for combined heat and power (CHP) or thermal only operate at efficiencies closer to those of fossil fuel burners, but the higher efficiency of these smaller biomass burners can be due in part to their using wood pellets or other dried wood as fuel. Drying this fuel and making pellets is an energy-intensive process which itself emits greenhouse gases.

Since it is not controversial that burning biomass for energy emits more CO2 than coal, oil, or natural gas, why has burning biomass for energy historically been considered carbon neutral? There are two main arguments:

1. The "waste" argument for forestry residues: since the tops and limbs of sawtimber left in place after a harvest decompose and emit CO2 over time, why not burn that material and generate energy? Leaving aside the fact that the emissions from burning are instantaneous, while decomposition CO2 is emitted over several years, eventually, the emissions from the two scenarios can be considered equivalent.

2. The "resequestration" argument: if we cut and burn trees for fuel, thereby releasing carbon, more trees will grow back and tie up the same amount of carbon from the atmosphere that was released.[1] Obviously, however, there is a huge time lag of decades between burning a tree and emitting the carbon, and growing the tree back; additionally, had the tree *not* been cut for fuel, it could have continued to grow and sequester carbon out of the atmosphere. This "carbon sink"

---

[1] An incorrect version of carbon accounting for biomass assumes that cutting and burning trees does not represent a net emission of carbon because some other part of the forest somewhere else is still growing and taking carbon dioxide out of the atmosphere and thereby compensating for the carbon emitted by biomass burning. The Manomet Study has been criticized for not taking this "landscape-level" perspective into account. However, this carbon uptake by the forest "elsewhere" is happening in the same way whether CO2 is being generated by burning biomass, or by burning fossil fuels, and therefore it has no net effect on carbon emissions. Cutting and burning trees over *here* does nothing to make forests over *there* grow faster to compensate. Another way to think about this is by using biofuels as an example. Say the food supply of a town is met by growing 100 acres of corn every year. If one year 25% of that corn is instead used for ethanol production, then only 75 acres are left to feed the town, and people will go hungry. Stating that forests "elsewhere on the landscape" will sequester the carbon released by biomass burning and thereby reduce net carbon emissions to zero is like saying that even if 25% of the corn in the town is used to make ethanol, the food supply will stay the same.

effect of forests is recognized in the greenhouse gas inventories published by the EPA and the State of Massachusetts.

The Manomet Study explored both the scenarios above to determine carbon impacts from biomass power, utilizing a Forest Service model of forest growth. The model treated carbon emissions from burning forestry residues (“waste” wood) for energy as if they’d be equivalent to decomposition emissions after about ten years if that material had been left onsite to decompose. However, recognizing the amount of wood required to fuel biomass development in Massachusetts far exceeded the amount available as forestry residues, the Manomet team also calculated the net carbon emissions from biomass energy when new trees are cut to provide biomass fuel.

The Manomet model calculated and compared carbon emissions from biomass with carbon emissions from fossil fuels by examining two scenarios:

1. A “business-as-usual” scenario where forests are cut for sawtimber, only, and power is generated from fossil fuels.

2. A “biomass” scenario where some biomass power replaces fossil fueled power. Under this scenario, forests are cut for sawtimber and then additional “low value” trees are harvested for biomass fuel, along with partial collection of the tops and branches generated in the harvest.

A key element of the Manomet approach, and part of what makes it scientifically valid, is the acknowledgement that forests are *currently* growing and *currently* sequestering carbon, and this baseline level of carbon sequestration must be taken into account. Thus in both the biomass and business-as-usual scenarios, the carbon dioxide emitted by energy generation is taken up by forests as they regrow after cutting. Because using biomass to generate energy emits more carbon than fossil fuels, this creates an initial “carbon debt”. Eventually, after a period of several years or even decades, enough of the additional carbon emitted by burning biomass has been recaptured so that “net” emissions for the biomass scenario are the same as net emissions in the fossil-fuel, business-as-usual scenario. Only after this threshold has been achieved – which may take decades – can biomass begin to show a lower net emission of carbon than fossil fuels.

Manomet’s calculations[2] of the time required for biomass energy to show equivalent emissions with energy produced from fossil fuels are presented below. As expected, the carbon “payback” times are much shorter when the fuels are confined to “residues that would decompose anyway”, as opposed to mixed wood, which is a combination of residues and additional whole tree harvesting. Note that even when replacing an oil thermal system, it still takes 15 – 30 years for biomass emissions under the mixed wood scenario to just achieve parity with emissions from oil. This is not “carbon neutrality” – this is simple equivalence with fossil fuels. When replacing a gas thermal system, the switch to biomass represents greater net carbon emissions for 60 – 90 years.

[2] Walker, Thomas. Manomet & Biomass: Moving Beyond the Soundbite. Presentation to USDA Bioelectricity and GHG Workshop, November 15, 2010.

Massachusetts Carbon Recovery Summary
Emissions from Continuous Operation

Years to Achieve Equal Flux with Fossil Fuels				
Harvest Scenario	**Fossil Fuel Technology**			
	Oil (#6), Thermal	**Coal, Electric**	**Gas, Thermal**	**Gas, Electric**
Mixed Wood	15-30	45-75	60-90	>90
Logging Residues Only	<5	10	10	30

In all likelihood, the carbon "payback" times for biomass energy are even longer in reality than in the idealized system that Manomet modeled. For instance, a key assumption in the Manomet model that ensures forests can resequester equivalent carbon released by biomass burning is that following harvesting, forests are allowed to regrow and are not recut until the carbon released by biomass harvesting has been resequestered, a process that takes decades. The Manomet Study states

> "So, over a long period of time, biomass harvests have an opportunity to recover a large portion of the carbon volume removed during the harvest. However, this assumes no future harvests in the stand as well as an absence of any significant disturbance event. *Both are unlikely*." (p. 86)

Given that Manomet employed two separate means of accounting for carbon emissions from biomass sourced from forestry residues, versus whole trees, it is extremely problematic that the DOER regulations allow up to 40% of harvested biomass – including whole trees – to be treated as if it all has the same net carbon emissions as residues, with a carbon half-life of five years. Manomet defined "forest derived residues" as the tops and branches of harvested trees, exclusively – this being the material that is low-diameter, relatively fast to decompose, and would not have continued to grow and store carbon and can therefore legitimately be modeled as having a carbon half-life of about five years. The outcome of the carbon modeling that Manomet performed depended on this definition of residues. However, the DOER regulations and associated guidance have completely redefined "residues" to include large categories of materials that are not residues, but are standing trees – the very category of biomass that Manomet identified as requiring separate carbon accounting, due to the large carbon debt incurred when trees are cut and burned. The new categories of "residues" in the DOER regulations include:

- Unacceptable growing stock which is defined as trees considered structurally weak or have low vigor and do not have the potential to eventually yield a 12 foot sawlog or survive for at least the next 10 years.

- Trees removed during thinning operations, the purpose of which is to reduce stand density and enhance diameter growth and volume of the residual stand

In the above, DOER has invented a new definition of "residues" that is completely at odds with the accepted definitions in the forestry world, which consider residues to be materials that *remain after a harvest* – not living trees that are identified up front as "unmerchantable", or as candidates for thinning. Manomet's definition of this material as only including tops and limbs was a slightly stricter definition than that sometimes employed, but note that the definition of forestry residues from the US Forest Service, which is restricted to material left on a site after a harvest and defined as

> "wood volume other than growing stock cut or knocked down during harvest but left on the ground. This volume is net of wet rot or advanced dry rot and excludes old punky logs; consists of material sound enough to chip; includes downed dead and cull trees, tops above the 4–inch growing–stock top, and smaller than 5 inches d.b.h. (diameter at breast height); excludes stumps and limbs."[3]

By including whole categories of living, standing trees, DOER has thus invented a definition of residues that is completely at odds with the standard definition employed by the Forest Service.
Contrary to DOER's new and expansive definition of residues, existing biomass facilities also distinguish true logging residues and whole tree harvesting as separate categories. For instance, the webpage[4] for the McNeil biomass plant in Vermont states "Seventy percent of the wood chips that fuel the McNeil Station are called whole-tree chips and come from low quality trees and harvest residues." Note the differentiation between "low quality trees" **and** "harvest residues".

The McNeil website goes on to state (emphasis added)

> "Based on figures published by the U.S. Forest Service, **half of Vermont's forest inventory is wood that has no potential for manufacturing quality products** such as woodenware or furniture. This unusable wood consists largely of **poorly formed trees** and treetops left behind after trees have been conventionally harvested as sawlogs or pulpwood."

Combining the startling statistic that one half of Vermont's trees are potential future biomass fuel (a finding that many would only be too happy to apply to Massachusetts forests), with DOER's definition of "unacceptable growing stock" and "thinning" *candidate* trees as "residues", and adding to this DOER's revision that now qualifies 40% of a harvest as eligible biomass, instead of 15% as stated in the draft regulations, it is clear that the revised DOER regulations leave the door wide open to exactly the kind of biomass harvesting that the Manomet Study identified as having the greatest carbon emissions. It cannot be stated too strongly that the DOER definition of residues and the expansion of eligible biomass to a "take" of 40% of harvested volume, both inserted after the draft regulations went out for comment and never subjected to public review and scrutiny, not only departs from the standard definition of residues but also throws away fundamentally important protections offered by the initial draft of the regulations. Severely compounding the error, to estimate all this material as if it has a carbon half-life of five years

[3] Smith, W.B., et al. 2007. Forest Resources of the United States, 2007. United States Forest Service, Gen.Tech Report WO-78. December, 2008.
[4] https://www.burlingtonelectric.com/page.php?pid=75&name=mcneil

(essentially treating it as if carbon emissions are negligible) is completely unsupportable under the Manomet science framework.

If the DOER regulations are to allow whole trees to be harvested for biomass, then the calculation of carbon emissions *must* employ "Manomet style" carbon accounting that acknowledges the substantial carbon debt that whole tree harvesting incurs, as shown by the "mixed wood" scenarios in the Manomet table above. Anything short of this renders the whole exercise – the $200,000 or so spent by the State on Manomet, the countless hours of citizens working on this issue, the doubtless great efforts by DOER to produce the regulations – as a useless exercise, a "going through the motions" of doing science, but then ignoring the results.

Further, if whole trees are to be included as eligible biomass fuel, the DOER regulations need to include provisions to ensure that forests are not recut until carbon sequestration is complete, to address Manomet's caveats about the difference between the real world, and their idealized model. In fact, the State of New York did recently just set standards for "eligible biomass" under the CO2 Budget Trading Program which make this very requirement:

> Land(s) will remain in a forested state for a time period sufficient to re-sequester the carbon dioxide (CO2) released through the combustion of the biomass, as described below (the "Carbon Re-Sequestration Criterion").[5]

If, like New York, the State of Massachusetts is willing to set up a program that will ensure that lands harvested for biomass remain forested and uncut pending full resequestration of the carbon released by biomass burning, a condition that it should be noted is <u>necessary but not sufficient</u> to ensure that biomass sourced from whole trees is indeed a "low carbon fuel"; *and* the carbon accounting provisions are adjusted to reflect the longer carbon payback times when whole trees are harvested to provide biomass fuel, then some whole tree harvesting can legitimately be included in the regulations. If the State is unwilling to add such protections to the regulations, then we strongly suggest that returning to the original provision that no more than 15% of harvested materials should be considered as eligible biomass fuel.

While the 15% provision is not perfect, it provides a measure of protection and is justifiable under the Manomet framework. Holding eligible biomass to 15% of harvested material equates to one-half of the approximately 30% of total harvest weight comprised by tops and branches, which is the material that would decompose and emit CO2 anyway under a business-as-usual, non biomass scenario. There are many precedents for the 15% provision, and virtually none for the scenarios that the current version of the DOER regulations include, where 30 – 40% of harvested material (corresponding to 100% of residues, where "residues is defined as new whole-tree harvesting, plus even additional biomass provided by thinning) is considered "low-carbon" and thus eligible biomass. In the following matrix, any cell containing "30" or "40" permits 100% residue removal (the 40% corresponds to 100% residue removal, which could under this framework be comprised of whole tree harvests, with even an additional 10% of whole-tree harvest eligible on top of that).

---

[5] New York State Department of Environmental Conservation, Division of Air Resources.: DAR-12/"Sustainably Harvested" determination for purposes of "Eligible Biomass", part 242. 12/1/10

Soil Class and Eligible Residue Matrix

	Soil Drainage Class						
Soil Class Name	Excessively Drained	Somewhat Excessively Drained	Well Drained	Moderately Well Drained	Somewhat Poorly Drained	Poorly Drained	Very Poorly Drained
Sandy	0	0	0	0	0	0	0
Loamy Sand	0	15	30	15	10	0	0
Sandy Loam	0	15	40	30	20	0	0
Fine Sandy Loam	0	20	40	30	20	0	0
Very Fine Sandy Loam	0	20	40	30	15	0	0
Loam	0	20	40	30	15	0	0
Silt Loam	0	20	40	30	15	0	0
Silt	0	20	40	30	15	0	0
Clay Loam	0	20	40	30	15	0	0
Sandy Clay Loam	0	15	40	20	15	0	0
Silty Clay Loam	0	15	40	20	15	0	0
Sandy Clay	0	15	40	20	15	0	0
Silty Clay	0	15	40	20	10	0	0
Clay	0	15	30	15	0	0	0

The provisions in the DOER regulations allowing 100% removal of logging residues on certain soils is not supported by the best science, or indeed apparently any science. Contrast DOER's guidelines to the biomass harvesting guidelines from other states and forestry organizations:

1. A presentation[6] from the Wisconsin Department of Natural Resources states, under "guidelines proposed primarily to address soil nutrient concerns", that all harvests should retain 1/3 of harvested fine woody debris on site, if possible well-distributed throughout the site.

2. Pennsylvania's biomass harvesting guidance[7] states that "A range of 15-30% of *pre-harvest biomass* – depending on soil type, forest composition and other factors – should always be left on site to buffer against nutrient depletion, erosion, loss of wildlife habitat and other factors. This would translate, for example, into leaving one out of every 3 to 6 harvested trees per acre on the forest floor."

3. A Forest Service biomass availability assessment for the entire Southeast,[8] home to the majority of the Nation's timber industry, assumes that no more than 60% of logging *residues* are recoverable as biomass.

---

[6] Wisconsin Department of Natural Resources, Division of Forestry. 2008. Proposed biomass harvesting guidelines and rationale: Soil nutrient considerations.
[7] Pennsylvania Department of Conservation and Natural Resources, Bureau of Forestry. 2007. Guidance on harvesting woody biomass for energy in Pennsylvania.
[8] Conner, R. and Johnson, T. 2011. Estimates of biomass in logging redidue and standing residual inventory following tree-harvest activity on timberland acres in the Southern Region. USDA Forest Service, Southern Research Station Resource Bulletin SRS-169.

4. Minnesota's biomass harvesting guidelines[9] state that "the overall goal of fine woody debris retention is to retain about one-third of fine woody debris on site"; however the guideline document contains multiple caveats and provisions when more protective measures are recommended.

5. The Massachusetts DCR "Forest Vision" report,[10] the result of a several month process involving an expert Technical Steering Committee, a large Stakeholder Advisory Committee, and five public forums involving more than 500 participants and 450 written submissions, produced a report that excludes removal of forestry residues from state lands. The report states

   Based on a recent analysis (Kelty, D'Amato, & Barten, 2008) and input from the AGS, the TSC recognizes that the expansion of biomass energy facilities in the state poses a potentially significant risk to many ecosystem services that are critical to maintain on DCR forests. Our woodland zone recommendations reflect a conservative approach for avoiding adverse impacts of biomass removals through a ***general prohibition on removal of tops and branches****, a technique that could diminish nutrient levels and organic matter or degrade wildlife habitat. As discussed above, the TSC wishes to be clear that in light of the many uncertainties about the potential ecosystem impacts of biomass harvesting, a cautious approach -- requiring that forestry residues be left in place to build soil carbon and protect nutrient stocks and habitat -- is called for to ensure the sustainable delivery of ecosystem services from DCR's woodlands. As part of DCR's adaptive management policies, these restrictions should be re-evaluated periodically in the light of new science that may more clearly identify risks. However, DCR would need to be assured through* ***sound scientific evaluation and after public input*** *that permitting or promoting biomass harvesting on state woodlands could be done in a sustainable manner that would not degrade other ecosystem services.*

6. Finally, a Forest Guild document[11] titled "Forest biomass retention and harvesting guidelines for the Northeast" states (emphasis added)

   "The following recommendations are applicable across a range of forest types in the Northeast. However, different forest types naturally develop different densities of snags, DWM, and large downed logs. Unfortunately, even after an exhaustive review of the current science there is ***too much uncertainty to provide specific targets for each forest type****. The recommendations in this section set* ***minimum retention targets necessary for adequate wildlife habitat and to maintain the integrity of ecological process such as soil nutrient cycling****.* ***Wherever possible, exceed the targets as a buffer against the limitations of current research****.*

   In areas that do not qualify as low-nutrient sites, where 1/3 of the basal area is being removed on a 15- to 20-year cutting cycle, it is our professional judgment that retaining 1/4 to 1/3 of tops and limbs will limit the risk of nutrient depletion and other negative impacts in most forest and soil types. Additional retention of tops and limbs may be

---

[9] Minnesota Forest Resources Council, 2007. Biomass harvesting guidelines for forestlands, brushlands, and open lands.

[10] http://www.mass.gov/dcr/news/publicmeetings/tsc_final_recommendations.htm

[11] Forest Guild Biomass Working Group. 2010. Forest biomass retention and harvesting guidelines for the Northeast. Forest Guild, Santa Fe, NM.

> *necessary when harvests remove more trees or harvests are more frequent. Similarly where the nutrient capital is deficient or the nutrient status is unknown increased retention of tops, branches, needles, and leaves is recommended."*

Calcium, an element essential for proper cell and leaf function and therefore the healthy function of forests, is identified as being of special concern in the Northeast. Another document published by the Forest Guild, "Ecology of Dead Wood,"[12] states that acidic precipitation can leach calcium from soils even without harvesting, and cites evidence that it can take 50 – 70 years for natural replenishment to restore calcium removed by harvesting.

Since the Forest Guild is on record saying there isn't enough science to set good guidelines for forestry residue retention, and since studies exist to show that calcium replenishment (a requirement for "sustainable" harvesting) can take decades longer than the average harvest cycle, how is DOER justified in supporting incentives for removing up to 100% of harvested residues? Isn't this kind of forestry policy-making better left to biologists, ecologists, and foresters? And why have the DOER regulations so obviously ignored the recommendations of the State-sponsored Forest Visioning report that **no** residues be removed from state lands?

As a solution to the grave problems with the regulations we have identified in this letter, we endorse the recommendations put forward in the joint letter from the Conservation Law Foundation and Biomass Accountability Project, et al. These are reproduced at the end of this letter. We do endorse the complete prohibition of residue collection on sensitive soils, but wish to especially emphasize the importance that a *maximum* of 50% of residues be considered "eligible" biomass in other soil categories, and that "residues" be characterized at a minimum using the Forest Service definition, but more preferably as the Manomet Study defined the term, to assure that this important component of the policy reflects the science and assumptions behind the study.

We are certain that the Legislature is as proud as we are to hail from a state that has identified a problem, commissioned a credible study, and endeavored to make policy in response to the study's findings. This is surely the model for how sound public policy should be made. However, the initial version of the DOER biomass regulations was far closer to this ideal, as well as to the original intent of the letter issued by Secretary Ian Bowles outlining future regulations, than is the current version of the regulations. The last-minute changes, and the issuance of a carbon accounting tool with *no* public or science input from outside, despite the promise that these regulations would be crafted via an open, public process, threaten the integrity of the regulations as a reflection of the Manomet findings and of Secretary Bowles careful vision. If these issues are not addressed the regulations will not be supportable.

Recommendations for revisions to the DOER biomass regulations:

- **Restore the 15% limit on the amount of harvested wood that can be used as biomass fuel. 225 CMR 14.05(8)(a)(4):**

There should be a strict, objective, enforceable limit of 15% on the amount of wood that can be removed from a forest for use as RPS-eligible biomass fuel. The September, 2010 draft regulations set a 15% limit, which is consistent with the Manomet Report and seeks to ensure that a minimum of 50% of tree tops and limbs are left in the forest to provide essential ecological services,

[12] Evans, A. and Kelty, M. 2010. Ecology of dead wood in the Northeast. Forest Guild, Santa Fe, NM.

such as habitat and replenishment of soil nutrients. The 15% limit also limits wood taken as biomass fuel to that portion of the harvest identified by the Manomet Study as having "low" net carbon emissions."[13] This is critical. The May 2011 proposed final regulations eliminate the 15% limit and replace it with an allowable range of 0 to 40%, which would allow *all* harvested tree tops and limbs to be removed from forests in many circumstances – contrary to the Manomet Study and Forest Guild guidance.[14]

- **Definitions of "Eligible Biomass Woody Fuel" should be tightened.** 225 CMR 14.02

The proposed final regulations inappropriately allow whole trees removed from a forest in a thinning operation to qualify as woody biomass fuel. This is inconsistent with the carbon accounting framework of the Manomet Study, which treated forest "residues" separately from whole trees.

- **Set a minimum efficiency standard of 60% for all units and do not provide partial renewable energy credits.** 225 CMR 14.05(8)(c)(3)

The proposed final regulations, like the previous draft, provide partial renewable energy credits at 40% efficiency despite former EEA Secretary Ian Bowles' strong recommendation that a 60% efficiency standard be set consistent with the Green Communities Act. The Manomet Study notably calculated carbon emissions from heat-led combined heat and power systems operating at *75%* efficiency. It is unwise to qualify inefficient biomass facilities because they will waste a finite fuel resource and divert this resource away from use in more efficient applications, such as commercially available thermal energy units that can operate at 80 to 90% efficiency, where the fuel being displaced is generally fossil fuel derived heating oil. Consistent with the Green Communities Act, the regulations should set a 60% efficiency threshold now that escalates to 80% efficiency by 2020, without granting partial credits, as proposed, for far less efficient units. Partial credits are beyond the scope of statutory authority: either the facility is an eligible renewable energy unit or it isn't – the statute contemplates no "partially" eligible units.

- **Exclude the "energy value" of "Merchantable bio-products" in calculating efficiency.** 225 CMR 14.05(c)(2)

The regulations improperly include the energy value of "merchantable bio-products" in calculating the efficiency of biomass units. We are unaware of any other regulatory system that includes this element in making such calculations. Further, "merchantable bio-products" are not reasonably related to the RPS statute's definition that requires "advanced biomass *power* conversion" units. In the absence of the RPS, there is already is an economic incentive to produce "merchantable" bio-products for sale. Allowing them to be included in the efficiency calculation provides a further market incentive without an adequate justification. Removing "merchantable bio-products" from the calculation will also considerably simplify the regulations and reduce the burden on DOER with respect to eligibility determinations.

---

[14] The Forest Guild guidelines provide: "*In areas that do not qualify as low-nutrient sites, where 1/3 of the basal area is being removed on a 15- to 20-year cutting cycle, it is our professional judgment that retaining 1/4 to 1/3 of tops and limbs will limit the risk of nutrient depletion and other negative impacts in most forest and soil types. Additional retention of tops and limbs may be necessary when harvests remove more trees or harvests are more frequent. Similarly where the nutrient capital is deficient or the nutrient status is unknown (probably describes many if not most soils), increased retention of tops, branches, needles, and leaves is recommended*." Forest Biomass Retention and Harvesting Guidelines for the Northeast, May, 2010.

- • **Correct the "Guideline for Lifecycle Analysis"**

Together with the revised regulations, DOER introduced a corresponding carbon accounting tool, never previously released for public review or comment, that treats all biomass fuel as "residues" having a carbon half-life of 5 years – irrespective of the actual carbon profile of any particular source. For example, whole trees that are cut for the purposes of "thinning" or in connection with conversion of forests to agriculture (but that otherwise would have continued to grow and sequester carbon) are treated the same as tree tops and branches from felled sawtimber (that otherwise would have released carbon dioxide as they decayed over time). **This approach is flatly at odds with the science, including the core findings of the Manomet Study, and will fail to ensure that only "low emissions" biomass facilities are eligible for incentives.** The guidelines need to be corrected such that they draw clear distinctions between various types of biomass resources and calculate their respective lifecycle GHG emissions accordingly.

Thank you very much for the opportunity to comment.

Mary S. Booth, PhD.
Partnership for Policy Integrity