

February 15, 2011

The Honorable Senator Bernie Sanders  
322 Dirksen Senate Office Building  
U.S. Senate  
Washington, D.C. 20510

Honorable Senator Sanders,

We appreciate your interest in biomass energy and thank you for co-sponsoring a briefing on this very important issue. The more robust the dialogue on renewable energy, the more likely we are to move quickly to a clean and sustainable energy future.

We understand that the panel presenting on February 17<sup>th</sup> consists chiefly of proponents of small-scale biomass, and we fully appreciate the differences in scale and potential impacts between these small facilities and utility-scale biomass power facilities. We find it troubling, however, that these proponents of small-scale biomass energy have done little to address the potential impacts of utility-scale power generation and large-scale wood-pellet manufacture on forests of Vermont and the region. It is important that the audience hears the full story about what the current explosion in proposed biomass electricity generation, pellet production and “energy wood” means for Vermont’s forests, air, and carbon balance, and we ask that the following issues be dealt with in full at the briefing:

### **Generating energy from wood emits more carbon than using fossil fuels**

Biomass emits more carbon dioxide than fossil fuels per unit energy produced, and is never a “carbon neutral” fuel. Biomass can *theoretically* be a “low carbon” fuel if it consists of materials that would have decomposed and emitted carbon dioxide anyway even if they weren’t burned (though burning these materials for energy emits carbon dioxide instantaneously, as opposed to over many years, as occurs during decomposition).<sup>1</sup>

However, as determined by the Massachusetts-commissioned Manomet Study, when living trees are cut to provide fuel, this increases carbon emissions for several decades compared to using fossil fuels.<sup>2</sup> For utility-scale biomass power plants, it takes at least forty years to regrow the forest enough to resequence net carbon emissions to the level that would have been emitted if coal had been burned, and more than ninety years to draw down net carbon emissions to the level of natural gas.

The difference in net carbon emissions between biomass and fossil fuels is smaller for high-efficiency thermal-only and combined heat and power facilities, but it still takes ten, twenty, or thirty years for the carbon payback to occur. This means that even at small, efficient facilities, biomass energy is actually *increasing* climate-warming gases in the atmosphere right when it is most urgent to reduce our carbon emissions.

The Biomass Energy Resource Center participated in the Manomet Study. The conclusion that net carbon emissions from biomass exceed those from fossil fuels for several decades created an

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<sup>1</sup> No matter what the genesis of the fuel, utility-scale biomass power generation emits around 150% the CO<sub>2</sub> of coal, and 300 – 400% the CO<sub>2</sub> of natural gas, per unit electricity generated.

<sup>2</sup> Commissioned by the State of Massachusetts to determine the carbon status of biomass power, the Manomet Study’s conclusions were incorporated by the State into draft regulations that restrict the eligibility of biomass power for renewable energy credits to those facilities that can demonstrate lifecycle carbon emissions no greater than 50% those of a natural gas facility, over a 20-year period.

uncomfortable situation for BERC, since it contradicted BERC's previous claims that burning wood was carbon neutral. We hope that BERC will not downplay the Manomet results at the briefing.

### **"Energy wood" demand already exceeds supply from Vermont's forests**

In order to avoid using commercial-grade timber and wood from old-growth forests for fuel, energy wood must be derived from two main sources:<sup>3</sup>

Logging residues: The tops, branches, and cull trees left over after commercial timber harvesting. This material is sometimes considered to be a "low carbon" source of fuel, since if left in the forest it would decompose over 10 – 25 years (in contrast, however, burning emits this carbon instantaneously).

- ❑ US Forest Service data for Vermont shows that the state generates about 522,000 green tons of logging residues annually. At most, one-half<sup>4</sup> of these may be available for use as fuel, or 261,000 tons.

Low-grade trees cut specifically for fuel. Unlike the residues from forestry operations, harvesting new trees for fuel dramatically increases carbon emissions relative to fossil fuels over the next 20 to 100 years, because this is *not* material that "would have decomposed anyway" – these are whole trees that were sequestering carbon, until they were cut.

- ❑ BERC's recent analysis<sup>5</sup> of "net available low-grade growth" in Vermont estimates that 894,900 green tons are available annually, after firewood and other uses taken into account. (This estimate is just 61% of the 1,466,982 tons that BERC said were available in 2007,<sup>6</sup> an estimate that has been widely cited by biomass developers and BERC itself)

These combined sources of fuel might be sufficient to provide fuel for a variety of small biomass-burning facilities in Vermont, assuming that citizens and policy-makers are not troubled that replacing oil and gas with biomass increases carbon emissions over current levels from fossil fuel use. However, as demonstrated in the following figure, demand for energy wood from existing and proposed facilities in Vermont actually far exceeds supply, meaning forest cutting will need to increase dramatically to meet demand. Demand for biomass fuel will far exceed even commercial sawtimber harvests in Vermont.

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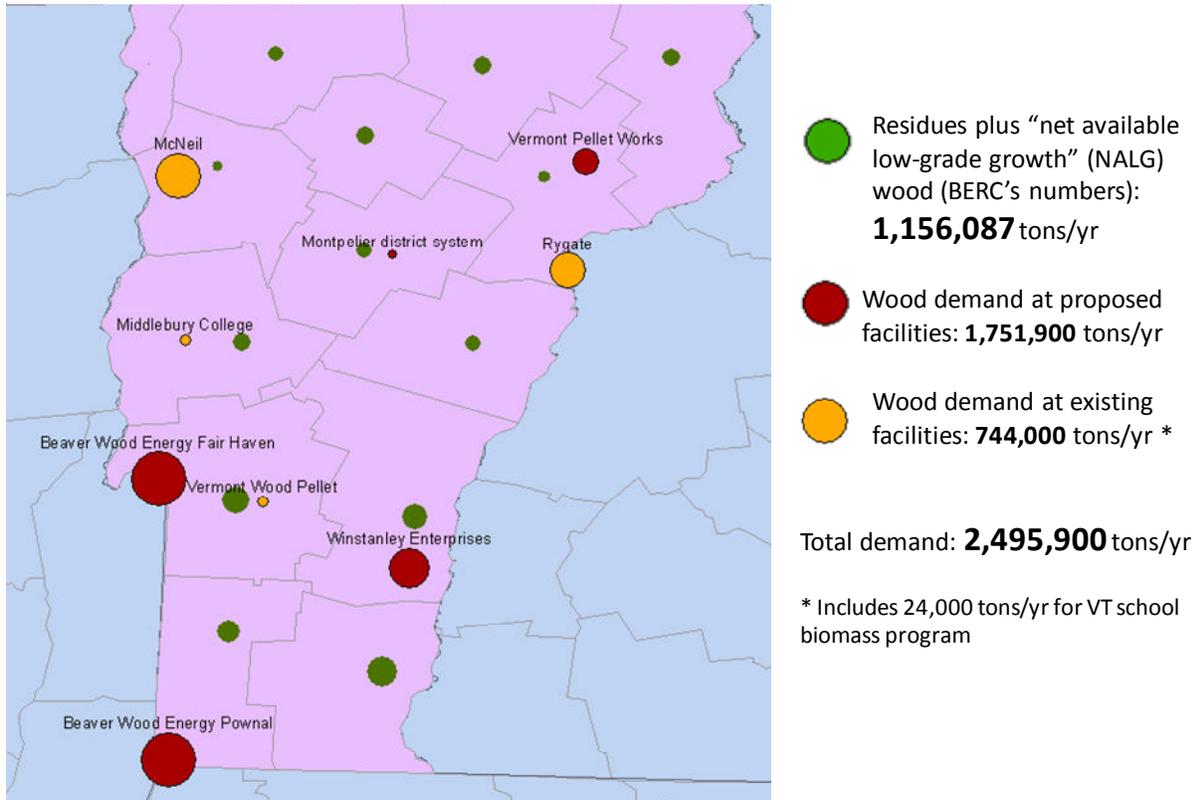
<sup>3</sup> Some mill residues are used for fuel by existing biomass plants in Vermont, but it is generally accepted that this material often has higher value uses. USFS data indicate that Vermont generates around 200,000 tons/yr.

<sup>4</sup> It is important to retain low-diameter material on-site, to maintain soil nutrient stocks and build soil carbon. For nutrient-poor soils, much more than one-half of residues should be retained.

<sup>5</sup> Biomass Energy Resource Center, 2010. Vermont Wood Fuel Supply Study, 2010 Update (available at [http://www.biomasscenter.org/images/stories/VTWFSUpdate2010\\_.pdf](http://www.biomasscenter.org/images/stories/VTWFSUpdate2010_.pdf))

<sup>6</sup> Executive summary containing the 2007 estimate is available at [http://www.biomasscenter.org/pdfs/VT\\_Wood\\_Fuel\\_Supply\\_Study\\_execsumm.pdf](http://www.biomasscenter.org/pdfs/VT_Wood_Fuel_Supply_Study_execsumm.pdf)

**Wood demand at proposed facilities in Vermont exceeds supply; demand at existing and proposed facilities is more than *double* the supply**



**Burning wood for energy increases air pollution**

Replacing fossil fuels with biomass doesn’t just increase carbon pollution – it emits particulate matter, nitrogen oxides, and carbon monoxide at similar or higher levels than from oil and coal burning, and emissions far exceed those from natural gas. The McNeil biomass energy plant is already Vermont’s biggest polluter, but at least another three facilities are proposed in the state that will rival it for pollution output.

EPA’s draft “boiler rule” standards<sup>7</sup>, issued as a legal requirement under the Clean Air Act, illustrate this problem. While small biomass burners are held to the same particulate matter emission limit as coal,<sup>8</sup> the standards for “major source” biomass burners allow them to emit:

- 8 times more particulates than coal
- 66 times more acid gases than coal
- up to 80 times more carbon monoxide than coal
- up to 233 times more dioxins than coal

<sup>7</sup> Federal Register, Friday, June 4, 2010. Environmental Protection Agency, 40 CFR Part 63. National emission standards for hazardous air pollutants for major sources: industrial, commercial, and institutional boilers and process heaters; proposed rule. (EPA’s final boiler rule is due out in February 2011; the Agency has indicated that the final standards will likely be weaker than the rules as proposed.)

<sup>8</sup> In a letter to EPA on the boiler rule, the Biomass Energy Resource Center has requested that EPA loosen the standards even further, so that the small burners which EPA wants to perform as well as coal burners would be allowed to emit more than 8 times the particulate pollution limit that EPA proposed for both coal and biomass.

- (the only pollutant regulated under this rule where coal emits more is mercury).

EPA based these proposed limits on the “best performing” (lowest emitting) facilities that already exist, so what this says is that EPA acknowledges that burning biomass is dirtier than coal, and that it will stay that way for a long time under these new rules. Even so, the biomass industry has responded by claiming that these minimal standards will put it out of business.

### **Where’s the balance?**

When taxpayers and ratepayers learn these facts about biomass energy, they ask why they are being required to subsidize something that’s dirtier than coal in the name of renewable energy. We can understand why schools, hospitals, towns, and even states want to reduce dependence on oil - we live and work in these places too. Many people do believe that small-scale biomass energy may have a *limited* role to play in displacing fossil fuels, but given the steeply mounting costs in increased forest cutting, carbon emissions, and air pollution as the proportion of energy from biomass increases, it’s important to be realistic about what that role can be.

Many people understand at a fundamental level that a civilization that burns its forests for energy is on the way out. Indeed all over the country, wherever biomass facilities are proposed, people are objecting to the idea that forests – *their* forests – should be opened up to energy extraction. They object when they learn that biomass energy isn’t carbon neutral as they’ve been told, but that it actually increases carbon emissions compared to fossil fuels for several years, if not decades, with only a thin hope that the carbon released will be re-sequestered in re-growing forests.<sup>9</sup> Citizens can do the math – and when they see how low efficiency biomass power generation requires exploiting our forests, they wonder why policy-makers aren’t doing the math, too. They especially wonder why policy-makers seem intent on providing an ever-increasing raft of taxpayer and ratepayer subsidies to an industry that appears to need them forever.

We hope this letter will encourage balance, and we urge those who read it to dig a little deeper into the full story on biomass.

Sincerely,

Prof. William Moomaw, PhD  
Director, Center for International Environment and Resource Policy, Tufts University

Prof. Lara Shore-Sheppard, PhD  
Department of Economics, Williams College  
Concerned Citizens of Pownal

Dr. Mary S. Booth, PhD  
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<sup>9</sup> Are policy-makers and landowners ready to *guarantee* that they won’t recut forests for decades, until all the carbon emitted by biomass burning has been re-sequestered? This is what is required for biomass to achieve “low carbon” status.