

TESTIMONY OF THE
PARTNERSHIP FOR POLICY INTEGRITY
AND
THE PROJECT FOR ENERGY ACCOUNTABILITY
Regarding
Proposed Substitute Bill No. 1138 (LCO No. 4767)
An Act Concerning Connecticut's Clean Energy Goals

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Chairwoman Reed, Chairman Duff, and Members of the Energy and Technology Committee:

The Partnership for Policy Integrity (PFPI) and the Project for Energy Accountability (PEA) appreciate the opportunity to comment on Proposed Substitute Bill No. 1138 (LCO No. 4767), An Act Concerning Connecticut's Clean Energy Goals.

PFPI is a Massachusetts-based organization that uses science, policy analysis and strategic communications to promote sound energy policy. PEA is a Massachusetts-based non-profit organization whose mission includes educating the public about the health and environmental impacts of energy choices. For over 4 years, PEA and PFPI have worked together and with other organizations nation-wide on research and education involving the air and environmental impacts of biomass energy.

As interested parties and neighbors to the north who provided extensive input to Massachusetts' new regulations concerning biomass power eligibility for that state's Renewable Portfolio Standard,¹ we hope you will accept our testimony on the biomass energy provisions in Bill 1138.

While we support the goals of increasing clean power, and agree with the Department of Energy and Environmental Protection (DEEP) that too much of Connecticut's renewable energy currently comes from dirty out of state biomass energy facilities,² we feel that Bill 1138 as currently written does not truly address the problems with greenhouse gas and air pollutant emissions from biomass energy. Both our organizations have worked extensively on biomass energy issues in Massachusetts, where the state committed to a science-based analysis of bioenergy greenhouse gas emissions and ultimately translated the findings into policy. We encourage DEEP and the Connecticut legislature to step back from Bill 1138 and first conduct a similar study of biopower greenhouse gas emissions, as well as air pollutant emissions, that can inform the proper role for bioenergy in Connecticut's Renewable Portfolio Standard.

¹ <http://www.mass.gov/eea/pr-2012/120817-pr-biomass.html>

² Connecticut Department of Energy and Environmental Protection, March 18, 2013. Restructuring Connecticut's Renewable Portfolio Standard (executive summary).

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Biomass power plants emit greenhouse gases

Is Connecticut serious about reducing greenhouse gas emissions from the power sector? The state’s greenhouse gas law indicates that the answer is yes:

*On June 2, 2008, Connecticut Governor Jodi Rell signed into law House Bill 5600, which sets a statewide Greenhouse Gas (GHG) emissions reduction target of **10 percent below 1990 levels by 2020**. Additionally, barring intervention at the federal level or through the Regional Greenhouse Gas Initiative (RGGI), **the act requires an 80 percent GHG reduction below 2001 levels by 2050**. Connecticut is one of ten states participating in RGGI, which is set to launch a regional CO₂ cap-and-trade program on January 1, 2009.*³

However, inclusion of biomass power in the state’s RPS can present a real threat to these goals, because biomass power emits more greenhouse gases than fossil fuels.

Stack emissions (pounds CO₂ per megawatt-hour) from biomass and fossil fueled power

	lb CO ₂ emitted per mmbtu heat input	facility efficiency	mmbtu heat input required per MWh	lb CO ₂ emitted per MWh
gas combined cycle	117.1	0.45	7.54	883
gas steam turbine	117.1	0.33	10.40	1,218
coal steam turbine	205.6	0.34	10.15	2,086
biomass steam turbine	213	0.24	14.22	3,029

³ <http://www.c2es.org/sites/default/modules/usmap/pdf.php?file=5902>

Simple physics dictates that a biopower plant emits more than 300 percent the carbon dioxide of a new natural gas plant. Yet until recently, biopower has been treated as having zero emissions. This is based on two ideas – first, that “sustainable” biomass can be carbon neutral so that growing trees can take up CO₂ released by burning; and second, that burning “waste” materials that would otherwise decompose and emit carbon does not increase net emissions.

Both these ideas are fallacies that ignore the urgency – recognized in Connecticut’s global warming legislation – of reducing greenhouse gas emissions now. Burning a tree takes minutes, while regrowing it takes decades, and similarly, decomposition takes years to decades (and in the case of forestry wood, builds soil carbon) while burning “waste” wood is instantaneous.

Net greenhouse gas emissions from biopower are “worse than coal”

The State of Massachusetts commissioned the Manomet Study to examine the net greenhouse gas impacts of burning both “waste” forestry wood (known as “logging residues”) and trees specifically harvested for biomass fuel. The study found that the greenhouse gas emissions of burning even waste wood can be severe, mostly because of the low efficiency (at best, ~24 percent) of standalone biomass power plants. It is now widely accepted by the scientific community, and increasingly by policymakers, that even taking forest regrowth into consideration, “net” emissions from biomass electricity plants fueled by “mixed” wood (a combination of waste tops and branches and new whole tree harvesting) exceed those from coal plants for more than 40 years, and those from natural gas for more than 90 years.

Manomet Study: Net CO₂ emissions from biopower exceed coal for >45 years⁴

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

A modeling study conducted in the Southeast, which assumed that biomass energy facilities would be fueled by fast-growing plantation forests, also concluded that the “carbon debt” created by such harvesting takes 35 -50 years to recover.⁵

“Sustainable” does not mean “carbon neutral”

The language concerning sustainability in the bill has been changed from talking about “sustainable biomass” facilities to talking about biomass facilities that “use sustainable fuel”.

Neither one of these phrases actually seems to be defined. Our search of the DEEP website turned up the following:

⁴ Walker, T. "Manomet & Biomass: Moving Beyond the Soundbite". USDA Bioelectricity and GHG Workshop, Washington, DC. November 15, 2010.

⁵ Southeastern study available at <http://www.southernenvironment.org/uploads/publications/biomass-carbon-study-FINAL.pdf>

What is "sustainable biomass"?

*The term sustainable biomass has been defined in the Connecticut General Statutes Section 16-1(a)(45) as biomass that is cultivated and harvested in a sustainable manner.*⁶

Sustainability is not only undefined, there is no language in the bill that ensures it can be achieved or enforced, rendering it nothing more than rhetoric. In contrast, the new Massachusetts biomass rules impose actual sustainability standards that prevent harvesting from stripping forests clean and protect forests on low-nutrient soils from over-exploitation. We urge the State of Connecticut to put in place very rigorous standards that operationalize these aspects of "sustainability".

The minimum definition of "sustainable" harvesting is that cutting rates not exceed growth rates, but even when this is the case, biopower carbon emissions are not carbon neutral, because removing trees that were sequestering CO₂, and simultaneously increasing CO₂ emissions compared to fossil fuels (see table above), means that net CO₂ emissions can do nothing but increase.

Connecticut policy appears confused as to which kinds of biomass fuels are desirable. Bill 1138 prohibits construction and demolition waste, with the exception of its use at the Plainfield Renewable Energy plant,⁷ which contrasts with promotion elsewhere of that plant as being fueled only by "environmentally acceptable" wastes.⁸ These kinds of questions could be resolved if the state committed to a science-based study of biopower impacts before rewriting RPS policy.

Bill 1138 ignores bioenergy greenhouse gas emissions

In the absence of any study that characterizes full biopower lifecycle greenhouse gas emissions, promoting "waste" burning biomass plants like the Plainfield Renewable Energy construction and demolition debris gasifier simply uncritically endorses the blanket idea that "biomass is carbon neutral". In doing so, the state continues to incentivize "renewable" energy that emits more greenhouse gases than the fossil fueled sources that are replaced. In fact, both the EPA's model for assessing greenhouse gas emissions from landfilling and incineration,⁹ and a study by the Tellus Institute that was commissioned by the State of Massachusetts,¹⁰ conclude that incineration of waste wood emits more CO₂ than alternative fates, particularly when landfills have methane capture.

Counting CO₂ emissions from transport ignores the enormous problem of stack emissions

The call to count emissions from transport of biomass under RGGI is not even close to adequate for determining net lifecycle emissions from bioenergy. Transportation emissions are only a fraction of total greenhouse emissions coming out of the stack – somewhere around 2 – 4 percent. Counting these emissions, while ignoring stack emissions in the absence of any study of their net greenhouse gas impact, is just silly. Such willful disregard of stack emissions is out of step with current science,

⁶ http://www.ct.gov/deep/cwp/view.asp?a=2708&q=323872&deepNav_GID=1763#sustainablebiomass

⁷ "except where (A) such biomass is used in a biomass gasification plant that received funding prior to May 1, 2006, from the Clean Energy Fund established pursuant to section 16-245n"

⁸ <http://www.ctcleanenergy.com/NewsEvents/PressRoom/tabid/118/ctl/ViewItem/mid/1364/ItemId/61/Default.aspx>

⁹ EPA webpage accessed March 2013: "Solid waste management and greenhouse gases"

(<http://www.epa.gov/climatechange/waste/SWMMGHGreport.html#background>). Combustion chapter of EPA WARM documentation available at: <http://www.epa.gov/climatechange/waste/downloads/Combustion.pdf>.

¹⁰ The Tellus Institute and Cascadia Consulting Group & Sound Resource Management, December, 2008, "Assessment of Materials Management Options for the Massachusetts Solid Waste Master Plan Review."

and increasingly, current policy. Further, including such emissions under the RGGI accounting is non-standard and unnecessarily interferes with RGGI accounting standards, potentially setting a bad precedent. RGGI does indeed need to be reformed to properly account for the carbon emissions from bioenergy, but in the meantime, a piecemeal approach is not helpful to the program.

The bill fails to protect forests from excessive harvesting for biomass fuel

The Manomet Study determined that harvesting and burning trees that would otherwise continue growing and sequestering carbon out of the atmosphere results in a large net emission of greenhouse gases from biopower. The provision in Bill 1138 that disqualifies biomass fuels from “old growth” is thus a step in the right direction, but contains so many flaws and exceptions, it is not effective. First, how is “old growth” defined? Are “future” old growth forests protected? Second, the law identifies significant exceptions to the “no old growth” rule:

“where (A) such biomass is used in a biomass gasification plant that received funding prior to May 1, 2006, from the Clean Energy Fund established pursuant to section 16-245n, or (B) the energy derived from such biomass is subject to a long-term power purchase contract pursuant to subdivision (2) of subsection (j) of section 16-244c entered into prior to May 1, 2006.”

The specific carve-out for the Plainfield Renewable Energy plant to use old growth is disturbing given that this plant is being advertised as simply running on “waste wood”.

Bioenergy CO₂ emissions are increasingly recognized in state and federal policy

Should Connecticut decide to conduct a full study of net greenhouse gas emissions from biomass power, the state would be in good company. A number of policies are recognizing that incentivizing biomass power is incompatible with efforts to reduce carbon emissions from the power sector.

Massachusetts biomass regulations

The Massachusetts regulations require facilities to be at least 50% efficient to qualify for one-half renewable energy credit per megawatt-hour, and 60% efficient to qualify for a full credit. The regulations require actual greenhouse gas accounting and recognize that different fuels have different net CO₂ impacts. The regulations also put in place rigorous “sustainable harvesting” requirements. (Our briefing on these rules can be found at <http://www.pfpi.net/massachusetts-new-biomass-regulations-what-do-they-mean>).

New York RGGI qualifying biomass

New York State interpreted the requirement that RGGI-qualifying biomass be “sustainable” to mean that net greenhouse gas impacts should be reduced. The state enacted rules include a necessary, but not sufficient, means for reducing greenhouse gas emissions from bioenergy, with a carbon re-sequestration criterion that

*“may be demonstrated via a legally binding permanent conservation easement, or some other Department-approved land-use instrument, that documents that forest-based, woody biomass and unadulterated wood and wood residues are from forest land that will be **maintained in a forested state for:***

(a) A time period, as supported by a demonstration to the Department, **that is sufficient to re-sequester the CO₂ that was released through the combustion of the biomass**. For purposes of making this demonstration to the Department, the AAR may take into account forest lands that are not specifically included in the harvest of the biomass, provided such lands meet the Certification Criterion; or
(b) **100 years**, with no additional demonstration to the Department.”(emphasis added).

Maryland - legislation requiring 65% efficiency for RPS-qualified bioenergy

Legislation currently being considered in the Maryland statehouse would restrict eligibility of Class I biomass to facilities with 65% efficiency or higher, in order to reduce greenhouse gas emissions per unit useful energy generated. The governor supports the measure.

EPA’s Science Advisory Panel

At the Environmental Protection Agency, a panel commissioned by the agency to examine the greenhouse gas impacts of biomass energy has concluded that biomass energy “can not *a priori* be considered carbon neutral”, but depends on a number of factors, including whether forest wood is used as fuel.¹¹

Emission standards for biopower air pollutant emissions in Bill 1138 are inadequate

The report from the DEEP¹² stating that bioenergy purchased from old biomass plants in Maine and New Hampshire is the least “clean” form of energy is a major understatement. While we do not think that low-efficiency biopower should be included in Connecticut’s RPS at all, we believe that if it is included, rigorous standards for conventional pollutant emissions are essential. Why should ratepayers subsidize renewable energy that emits as much pollution as a coal plant? If Connecticut is determined to move away from purchasing “dirty” biopower produced out of state and to promote biopower generation in-state, shouldn’t the new rules avoid importing the pollution problems associated with those out-of-state plants?

Unfortunately, the proposed standards do not really meet that goal. The previous Connecticut RPS standard required biopower facilities to meet an emissions standard of 0.075 lb/MMBtu for the ozone precursor NO_x; Bill 1138 would leave this in place and add a particulate matter (PM) emissions standard of 0.02 lb/MMBtu. However, neither of these standards is rigorous enough to protect air quality and health. Connecticut might instead look to Massachusetts, which despite having generally better air quality than Connecticut and fewer areas in nonattainment with EPA’s National Ambient Air Quality Standards (NAAQS) for PM and ozone, has adopted reasonably rigorous biopower emissions standards for the RPS. Massachusetts requires that RPS-qualified biopower facilities over 10 MW achieve emission rates of 0.065 lb/MMBtu for NO_x and 0.012 lb/MMBtu for PM, significantly lower than the Connecticut standards.

The difference between the two PM standards is significant. For instance, a 15 MW plant (250 MMBtu/hr boiler) operating at the proposed PM standard of 0.02 lb/MMBtu would emit almost 21

¹¹ [http://yosemite.epa.gov/sab/sabproduct.nsf/0/57B7A4F1987D7F7385257A87007977F6/\\$File/EPA-SAB-12-011-unsigned.pdf](http://yosemite.epa.gov/sab/sabproduct.nsf/0/57B7A4F1987D7F7385257A87007977F6/$File/EPA-SAB-12-011-unsigned.pdf)

¹² Connecticut Department of Energy and Environmental Protection, March 18, 2013. Restructuring Connecticut’s Renewable Portfolio Standard (executive summary).

tons of particulate matter per year, whereas it would emit about 13 tons per year at the 0.012 lb/MMBtu standard. The relationship between particulate matter concentration in the air and health effects is linear and extends even below EPA's health standard, thus this difference in PM emissions can produce quantifiable changes in the rate of asthma attacks, other heart and respiratory problems, and even deaths. Any new biomass plant being built today will be able to meet an emission standard of 0.065 lb/MMBtu for NO_x and 0.012 lb/MMBtu for PM, because all modern plants use similar technologies to reduce emissions of these pollutants. Differences in emissions standards in large part come down to the plant operator's willingness to ensure that standards are consistently met, and the degree of care brought to running the facility.

We have worked extensively on air pollution issues in the Springfield, Massachusetts region, as well as assessing emissions standards and technologies in more than 70 biomass power plant air permits nationally. As residents to the north of Connecticut and recipients of air pollution from Connecticut, we hope Connecticut will adopt the Massachusetts standards, especially given that EPA's recent lowering of the NAAQS for PM may make achieving attainment with the standard even more difficult. Both emissions standards are achievable at biomass and even coal plants.

The Plainfield gasification plant will be a source of heavy metals and PM

Bill 1138 appears determined to carve out exceptions for gasification, but what legislators may not realize is that gasification plants emit a great deal of conventional air pollution. Gasification produces a material known as "char", in which all the toxic materials not volatilized in the gasification process are concentrated. Char is typically burned in a conventional burner at the facility, with typical emissions. The Plainfield Renewable Energy plant will be gasifying construction and demolition waste (C&D), which contains significant amounts of heavy metals even after "sorting".¹³ The EPA treats particulate matter as a "proxy" for heavy metals under the part of the Clean Air Act that regulates emissions of hazardous air pollutants, thus better PM control translates to better heavy metals control. Given the extreme toxicity of metals and other contaminants conveyed with particulate matter, we encourage Connecticut to adopt the most rigorous PM emissions standards possible.

Thank you for your consideration of these comments.

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¹³ See our review of the fuel supply study for a C&D burner proposed in Springfield, MA, at <http://www.pfpi.net/wp-content/uploads/2011/03/MEEA-comments-on-Palmer-BUD-11-18-09.pdf>. While the plant changed its fuel supply to non-C&D wood, our assessment of the actual metals emissions in this fuel supply was one factor that induced the State of Massachusetts to promise a health study of the effects of burning construction and demolition waste as fuel, should it be proposed again.