



**BIOMASS UNDER ATTACK:
WHEN IS CARBON NEUTRAL?**

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The use of biomass from forests, grasslands and other organic material to produce electricity has been expected to be a major contributor to meeting clean energy goals in the United States and around the world. Yet recently, the combustion of biomass for electricity has caused some scientists and environmental advocates to raise concerns about its long-term impact on forests and climate change. In at least one state, these questions have led regulators to temporarily suspend consideration of applications for renewable energy incentives for biomass power projects. Developers of several biomass power plants cannot proceed with financing until they receive clarification on what new requirements will apply to their plants. Those requirements, when they are finally known, will not only determine the ability of biomass plants to contribute to meeting that state's renewable energy goals, but may well set important precedents for state and federal clean energy policies in the future.

Biomass burning power plants have been expected to play a large role in meeting renewable energy goals across the United States because wood, grass and other organic matter are both renewable and plentiful. The increasing concentration of populations in urban areas, not to mention increasingly efficient farming techniques, are causing a substantial transformation of previously developed land to forests or grasslands. In addition, power plants that combust organic matter can operate whenever they are needed and therefore have very high productive capacity. In many cases, these plants operate more than 90 percent of the time. Power generating facilities that use other renewable fuels can only operate intermittently, for example, when the wind blows or the sun shines, and therefore have much lower productive capacity. Windmills generally produce electricity between 24 and 36 percent of the time while solar photovoltaic panels operate between 12 and 16 percent of the time. In the competition to meet renewable energy goals, the advantage that investments in wind or solar generating capacity gain by avoiding the need to purchase fuel, which biomass must purchase, is more than offset by the much greater productive efficiency of capital invested in biomass generating capacity.

On the other hand, electricity production from biomass requires combustion, and that releases carbon dioxide from the stack to the atmosphere. Advocates for, and developers of, biomass plants have long argued that since all or most of the wood and grass harvested for biomass grows back, it eventually sequesters an amount of carbon dioxide equal to that released in the combustion process. Recently, some scientists have questioned the accounting methods by which biomass is automatically considered to be carbon neutral.^{1/} They point to instances where biomass use for power generation (or, in some cases, for production of bio-fuels) resulted in land-use changes or wood harvesting methods that are not likely to achieve full re-growth of the biomass material. In that case, biomass re-growth would sequester less carbon than was released in the original combustion process. They argue that "carbon neutrality" can only be determined on a case-by-case basis using sound metrics for measuring carbon emitted and carbon sequestered. These considerations have caused renewable energy advocates and government regulators to seek to limit carbon emissions on a lifecycle basis from biomass in order for it to qualify for renewable energy incentives that are given for the use of other, non-carbon emitting, renewable fuels.

^{1/} For example, see Searchinger, Timothy, et al; "Use of U.S. Croplands For Biofuels Increases Greenhouse Gases Through Emissions From Land Use Change;" Science Magazine, 29 February, 2008, Vol. 319. no. 5867, pp. 1238 – 1240.

Recent developments in Massachusetts provide a case in point. Since 2003, power generation using biomass has been contributing a substantial portion of the power supply that qualifies for compliance with the state's renewable energy portfolio standards (RPS). In one notable example, the owners of a 50 MW power plant in New Hampshire converted its coal-fired boilers to wood in order to qualify for RPS incentives. In the last two years, several biomass-fueled power plants have been proposed to be built in the heavily forested areas of western Massachusetts. Some of these would use exclusively "clean waste wood," of which the majority would come from stumps and branches now left behind after logging activity to obtain wood for furniture, cabinets, paper, and other high value products.^{2/} Notably, these forms of wood waste currently have no economic value and are left on the forest floor to decompose and release their carbon content into the atmosphere over many years. Another proposed plant would combust "recycled wood," which is obtained from construction and demolition activities and sorted to exclude non-wood material and contaminants.^{3/} This material would otherwise be buried in landfills, where it too would decompose and release its carbon content into the atmosphere over many years in the form of methane, a more potent greenhouse gas than carbon dioxide.

Last December, motivated by concerns being raised by both scientists and environmentalists, the Massachusetts Department of Energy Resources announced that it was suspending its review of applications from biomass plant developers for eligibility under the state's RPS.^{4/} The agency wanted to better understand the impacts of expanded biomass power generation on the emission and sequestration of carbon dioxide and on the ecology of the state's forests. The state has made clear that, to qualify for renewable energy financial incentives, biomass plants in the future will have to meet new standards for both forestry management and carbon emissions, though these will not be determined until the end of 2010, at the earliest.^{5/}

To help determine what these new standards will be, the state has commissioned a report from a consortium of independent consulting firms that will review and analyze the most recent scientific studies and analytic reports from around the world on these issues.^{6/} Expected to be completed in the spring of 2010, this "meta-study" is likely to provide a compilation of all readily available information, analyses and protocols in the areas of forest management and lifecycle carbon accounting. The state will then face the difficult challenge of translating this

^{2/} For example, see Pioneer Renewable Energy plant proposed for Greenfield, MA described at www.pioneerrenewableenergy.com; See also, Russell Biomass proposed for Russell, MA described at www.russellbiomass.com.

^{3/} See Palmer Renewable Energy proposed for Palmer, MA described at www.calettarenewable.com/companies.html.

^{4/} See letter from Massachusetts Department of Energy Resources Commissioner Philip Giudice to "Massachusetts Biomass Energy Stakeholders" dated December 3, 2009 at www.mass.gov/Eoeea/docs/doer/rps/Mass%20Biomass%20Energy%20Stakeholders.pdf

^{5/} Ibid. The Giudice letter states, "... In recognition of scientific questions about the sustainability of biomass energy, both from a forest management and greenhouse gas perspective, Secretary of Energy and Environmental Affairs Ian Bowles directed DOER in June 2009 to revise our regulations to include 'sustainability' requirements for eligible biomass fuel."

^{6/} See November, 2009 press release at: www.mass.gov/?pageID=eoeepressrelease&L=1&L0=Home&sid=Eoeea&b=pressrelease&f=091105_pr_biomass&csid=Eoeea

information into enforceable performance standards for biomass plant operators and their fuel suppliers.

Meanwhile, citizen activists, concerned about the impact on climate change of carbon emissions from biomass, and not content to rely on actions that may be taken by the State's renewable regulators, have taken matters into their own hands. They prepared an initiative petition last summer that seeks the enactment of a new state law that would require biomass or waste-to-energy plants that seek RPS financial incentives to limit the emissions from their stack to 250 lbs of carbon dioxide per megawatt hour. During the fall of 2009, they secured a sufficient number of signatures to have the Secretary of State file with the legislature a bill that would implement their petition.^{7/}

The emissions limit set forth in this proposed law would give no credit for the sequestration of carbon through replenishment of the wood supply. At the same time, there is no technology currently available that can remove carbon emissions from smoke stack gases. Thus, the standard would effectively exclude biomass and waste-to-energy plants from qualifying for financial incentives previously available to them under the state's RPS program. If this standard were to be enacted into law, it is unlikely that any new biomass plants would be built in Massachusetts (or in nearby states that supply renewable power for its RPS). Existing plants around the region would likely lose the incentives they have relied upon to recover their costs for converting to biomass.

The current situation in Massachusetts raises several difficult questions. Will biomass plants be allowed to measure their carbon impacts on a lifecycle basis? If so, what will be the metrics and protocols for measuring that impact? To insure that a plant's lifecycle carbon impact is acceptable, what actions will be required to ensure the wood resources will be sustainably harvested? Will existing renewable energy incentives be sufficient to enable these plants to meet what will inevitably be increased fuel and operating costs? If not, how much will the loss of this "base load" resource increase the cost to consumers for complying with renewable portfolio standards, since the fuels that remain eligible would mainly be the pristine, but intermittent, fuels like wind and solar? What impact will such state action have on the treatment of biomass in emerging federal climate change legislation, which would otherwise be likely to rely heavily on the expanded use of biomass to achieve broad political support for ambitious clean energy goals? It is too soon to know the answers to these important questions, but the process in Massachusetts bears close watching. The results of the state's report on the issues of concern, and its new biomass eligibility requirements, are not yet known. The outcome of the legislative process on the proposed new law and the potential reaction of voters to an initiative petition that would eliminate biomass from the portfolio of renewable resources are likewise not yet known.

What is known is that the way in which Massachusetts acts to address these questions will break new ground in the evolution of renewable energy and carbon management policy at the state level. Its actions could secure a significant role for biomass in meeting both renewable energy and carbon emission goals in Massachusetts. Alternatively, its actions could preclude

^{7/} This Initiative Petition is currently under consideration in the Massachusetts legislature as a proposed law (H 4458). If it is not enacted into law during the current legislative session, it would very likely end up as a ballot question to be decided by voters in the state-wide election in November, 2010.

contributions from biomass to these same goals and thereby make reaching them considerably difficult and more expensive. Whatever the state does, it is likely to set an important precedent that will materially influence the role that biomass will play in reaching similar goals throughout the United States.