THE MANOMET STUDY: BIOMASS CONFUSION

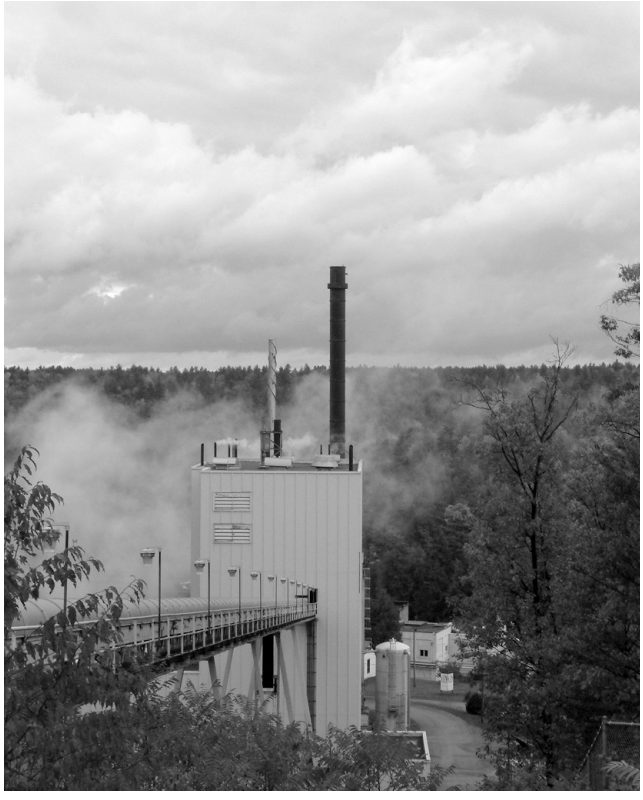
WHEN THEY WEREN'T COMPLETELY WRONG, HEADLINES DISTORTED FACTS

BY ERIC KINGSLEY

"Report shows that electricity from biomass compares unfavorably with coal…" So led the press release from the Massachusetts Division of Energy Resources (DOER), summarizing a just-released report prepared for them by a team assembled by the Manomet Center for Conservation Sciences.

To understand this report, it helps to take a step back. A few years ago, Massachusetts was viewed as a state with public policy that strongly encouraged biomass electricity generation, and had a mandate for renewable electricity that was encouraging new and re-powered biomass throughout New England. Several developers proposed new biomass power plants in the forest-rich western part of Massachusetts, bringing promise of a stable, consistent market for low-grade wood. At one point, there were up to six "proposed" new facilities in the region, ranging as large as 50 MW (about 600,000 green tons of wood use annually).

While it is common knowledge in the forest products industry that the vast majority of proposed biomass plants never make it to groundbreaking, this knowledge didn't make it into most conversations about new biomass plants in Massachusetts. (The Manomet report notes that more than 200 plants have been proposed in New England alone over the last decade; only one has been constructed.) Residents of Massachusetts began expressing concerns about over-harvesting, truck traffic, pollution, climate change, habitat impact, and many other issues. It didn't seem to matter that New Hampshire, the neighbor to the north, has more than two decades of experience with a half-dozen biomass plants and a timber inventory that continues to grow.



Massachusetts is surrounded by states with healthy biomas energy projects, like this chip-burning power plant in northern New York State.

Following public outcry, an anti-biomass referendum campaign, and some very heated permitting battles on specific biomass projects, in 2009 the Massachusetts DOER called a halt to all new biomass plant permitting, and asked for a study of biomass harvesting and biomass electricity generation, particularly its impact on greenhouse gas emissions. Six months later, the Manomet team released its findings, titled "Biomass Sustainability and Carbon Policy Study."

The report tackles a number of issues, including international and domestic biomass energy policy, forest biomass supply, sustainability and harvesting issues in Massachusetts, forest carbon modeling, and carbon accounting for biomass energy. While each subject has found some controversy, it is the carbon accounting piece

that has proven to be the lighting rod, and the section with the most significant regional policy implications.

Following the release of the report, newspaper headlines blared "Wood power worse than coal" and "Bay State rethinking wood power: Worse for climate than coal, study says." Those in the biomass industry—long assessed as "carbon neutral" by federal, state and international protocols—were shocked and began trying to understand the study and its implications.

The Biomass Power Association, a trade association representing biomass electric plants around the country, almost immediately demanded an apology and highlighted some questions it had with the study. Chief among those was that the Manomet team assessed the carbon impacts on the forest stand-level, assuming that biomass fuel would come from stems specifically harvested for biomass and through a "typical" harvest scenario. Those in the industry recognize that much of the fuel for biomass plants comes from culls and "forest residue" the portion of a harvest—tops, branches, etc. that are left in the woods in non-biomass harvests. These materials naturally give off carbon dioxide as they decay on site. The exact mix of residues and low-grade roundwood depends on many factors—including local markets, harvest type, and contractor capabilities—but roundwood is not the primary feedstock for any biomass electric facilities in operation today. The Manomet team—anticipating a supply mix in Massachusetts heavy to roundwood—assumed this as the baseline. On page 110 of the report, the authors do acknowledge that the use of residues ("wastewood") has a very positive carbon profile, and generation of electricity using residues compares favorably to all competing electricity generation sources.

The findings of the Manomet team as it relates to the carbon neutrality of biomass are complex and controversial. While some assumptions have come into question (for example, the use of a stand-level approach or the assumption that land left unharvested in Southern New England will remain as forest), there has been widespread acknowledgement that the long-held assumption of "carbon neutrality" may need to be re-evaluated. The Manomet team reported that higher carbon emissions on a per megawatt basis from biomass cause a "carbon debt," which must then be made up to achieve "carbon neutral" and eventually "carbon positive" status. The reason this occurs is that, per unit of energy created, biomass, largely because it is consumed "green" by the biomass industry and the water must be driven off in the combustion process, is less efficient in producing energy than fossil fuels and so gives off more carbon dioxide to produce a megawatt of power than fossil fuel. Using the Manomet team's assumptions, the study finds that this "carbon debt" is paid off in five years when biomass replaces oil for thermal use (for example, heating your home), the "carbon debt" extends to 21 years when biomass replaces coal for electricity generation, and exceeds 90 years when biomass replaces natural gas for electricity generation. After the carbon debt is paid off, biomass pays a "dividend," providing an opportunity for the forest to store biomass in excess of past emissions.

While complex and full of assumptions, the underlying message is that biomass energy is carbon neutral, even carbon positive—with some important considerations. These include the source of the biomass, the technology used to convert it to energy, the carbon profile of the technology it replaced, and, probably most importantly, an understanding of the time frame.

Of course, none of this made it into the headlines. How could it? Instead, a raft of press stories led newspaper readers to think that biomass was a highly polluting technology, and grossly oversimplified a complex set of findings. The opponents of biomass power were having Christmas come early.

Following the release of the report, the Manomet Team and some of its members sought to re-focus press attention on the actual findings. The Manomet Team issued a statement detailing the findings and limitations of the study, stating:

"One commonly used press headline has been 'Wood worse than coal' for [greenhouse gas] emissions or for 'the environment.' This is an inaccurate interpretation of our findings, which paint a much more complex picture. While burning wood does emit more [greenhouse gasses] initially than fossil fuels, these emissions are removed from the atmosphere as harvested forests re-grow."

The Pinchot Institute, part of the Manomet Team, noted in a summary of the report on its web site that "Bioenergy technologies, even biomass electric power compared to natural gas electric, look favorable when biomass waste-wood is compared to fossil fuel alternatives."

The Biomass Energy Resource Center, another part of the Manomet Team, provided further guidance on its web site, noting some of the complexity regarding carbon accounting.

"It is not accurate to simply consider biomass energy "carbon neutral." The carbon implications and/or benefits of biomass energy depend entirely on several factors, including: where the wood comes from, applied forest management practices, how harvesting and management are distributed over the landscape and over time, and the types of technology used. *The study clarifies that, when biomass is sustainably harvested and forest lands are well managed over time, biomass can be a source of low carbon energy, especially when compared to fossil fuels."*

Following the release of the report, the Massachusetts DOER indicated that it would accept public comments on the report, then develop new rules regarding biomass harvesting and qualification for that state's Renewable Portfolio Standard—the program that provides necessary incentives for biomass electric generation. Two days before the close of the comment period, the state made clear its intent to pursue new harvesting and biomass supply policies, with the potential to significantly alter the industry throughout the region.

While the Manomet Team provided some interesting perspective, it is certain this report won't be the last word on the important matter of biomass energy and carbon neutrality. On the same day this report was release, the European Climate Foundation released a report on the same basic subject matter, noting in its summary that,

"The most common types of biomass energy applications reduce carbon dioxide emissions 55 to 98 percent compared to fossil fuels, even when transported long

distances, as long as the biomass production does not cause any land-use change."

In July, addressing proposed federal policy regarding biomass and carbon accounting, more than 100 scientists signed onto a letter supporting biomass as an energy source, and noting its place in the globe carbon cycle.

"The carbon released from fossil fuels has been long separated from the global carbon cycle and adds to the total amount of carbon in active circulation between the atmosphere and biosphere. In contrast, the CO2 released from burning woody biomass was absorbed as part of the "biogenic" carbon cycle where plants absorb CO2 as they grow (through photosynthesis), and release carbon dioxide as they decay or are burned. This cycle releases no new carbon dioxide into the atmosphere, which is why it is termed "carbon neutral". It is unrelated to the [greenhouse gas] emissions produced from extracting and burning fossil fuels, except insofar as it can be used to offset or avoid the introduction of new carbon dioxide into the atmosphere from fossil fuel sources. Biogenic [greenhouse gas] emissions will occur through tree mortality and decay whether or not the biomass is used as an energy source". The letter continues "Capturing the energy value of these materials thereby offsetting fossil fuel emissions generates a net effect from burning biomass that is better than carbon neutral."

Obviously, the subject of biomass and carbon neutrality is complex, and subject to significant debate. For the forest industry, the more immediate subject is probably how this complexity translates to public policy. The forest industry is only as strong as those who show up at local, state and regional hearings and meetings; the trade associations are only as strong as their member support. Participation in future policy development regarding biomass harvesting and biomass markets will be critical for those that rely upon or want to access this low-grade market.

Finally, it is important to remember that while carbon issues are important, they are far from the only reason to support biomass energy. As the Manomet team notes, "there are many other considerations besides [greenhouse gas] emissions when making energy policy—these include energy security, air quality, forest recreation values, local economics, other environmental impacts besides just [greenhouse gas] emissions, and quality of place, among others."

The Bay State's ambitious plans for biomass energy have been hampered by fears about the effects of biomass harvesting, transportation and emissions.

The entire report, as well as a clarifying statement by the authors, can be found on the Manomet Center's website: www.manomet.org

The public comments regarding the report, as well as information on rulemaking, can be found at the Massachusetts DOER website, accessed through www.mass.gov

Eric Kingsley is a Vice President in the consulting firm Innovative Natural Resource Solutions LLC, a forest industry and renewable energy consulting firm. In the interest of full disclosure, INRS has a large number of clients in all facets of the biomass energy industry, has previously conducted work for the Commonwealth of Massachusetts, and provided comments to the Massachusetts DOER regarding the Manomet report.