Viewpoint: Biomass Energy Requires Seeing the Forest Through the Trees

A response to the New York Times *editorial board*

The concept of biomass energy, the use of organic materials for energy, is easy to misunderstand. We as a society have a strong inclination to protect our trees, and have done an excellent job of doing so—almost too good.

Biomass power as "burning trees," as the *New York Times* referred to it in its April 20 editorial "An Energy Bill in Need of Fixes," is a common but inaccurate description of biomass power. A true assessment of the science and reality of the carbon impacts of biomass energy requires much more nuance.

The article states, "The underlying assumption is that the carbon emissions caused by power plants that burn wood are canceled out by the carbon absorbed by new and growing trees. But this is a dangerous misconception. Burning wood releases carbon almost instantly, whereas it will take years, if not decades, for new trees to absorb an equivalent amount of carbon."

Let's take a hypothetical example where a tree is cut down to be used for energy. Sure, it may take 20, 30, 40, or even 100 years for another tree of equivalent size to grow in its place and sequester the carbon released by burning that tree. However, as you increase the scale of your analysis from a simple, single tree to a plot of timber and further to the landscape level, the time it takes for the forest to re-sequester the carbon released decreases dramatically. At the landscape scale, provided you have the important prerequisite of sustainable forest management, where the total volume of tree growth exceeds the total harvest, the carbon released from burning that wood is essentially sequestered instantaneously.

Some opponents of biomass energy, and of forest harvest in general, have argued that if a tree, such as the one in our previous example, was never harvested in the first place, the surrounding forest would still be growing and therefore that sequestration shouldn't count. The reality is that forest carbon cycles are much more complex than that and require a more nuanced look that involves both forestry science and economics. After all, some family or investor likely owns that tree.

In fact, the premise of a tree being cut down for biomass energy is, in itself, a misrepresentation of the type of material that is used at biomass power plants. The majority of the material being burned at biomass power plants consists of tops, limbs, broken trees and other feedstocks that are essentially byproducts of timber harvest that if left on the forest floor to decompose would lead to the same amount of carbon emissions as if they were burnt. There is indeed some additional harvest for biomass energy (smaller and lower quality timber); however, no rational landowner would allow trees that have a higher value as feedstock for other uses to be used for electricity production. Most private forests are managed for a myriad of uses, including recreation as well as the production of sawlogs and other higher value timber used for wood products.

To put this in perspective, in Virginia and North Carolina, where wood-based energy production has increased significantly over the past several years, according to RISI's *Timber Transaction Price Service*, the average price of stumpage (the revenue from a timber sale earned by the landowner) for biomass feedstocks averaged $1.57/ton in 2015, whereas the price of pine and hardwood sawlogs (for lumber production) averaged $24.71/ton and $20.10/ton, respectively.

Forest landowners are not managing their forests so they can harvest the $1.57/ton biomass. They are much more interested in the $20+/ton sawlogs. Understanding the economic motivations of private landowners is crucial to evaluating the true impacts of various policies on forest carbon stocks. This is because 77% of all forests east of the Rocky Mountains are on private land. These private lands account for 92% of the total timber harvested. Even when including the western part of the country, where 70% of the forested acres are on public land, much of it Federal, 89% of timber harvested in the United States comes from private land.

Healthy markets for forest products lead to both more and healthier forested acres and increased forest productivity. In 2012 there were 23% more forested acres in the United States than in 1920. The actual volume of trees on managed timberland increased 227% between 1953, the first year the forest service started collecting this data, and 2012. These increases can be attributed to two factors: (1) a shift away from an agrarian economy and (2) the development of efficient forest products markets (and income to pay for forest management and land taxes) that created incentives for landowners to plant trees on former agricultural land and think twice before selling their forests for development.

To properly account for emissions from biomass energy, it is necessary to consider much more than just the instantly released carbon. Also at stake are carbon cycles, the state of our nation's forests, where biomass fits into the forest products value chain and the incentives that drive forest management. Biomass energy could play a significant and important role in reducing fossil fuel emissions, keeping forests healthy and transitioning the United States energy sector away from fossil fuels.

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