Clearing the air about biomass carbon neutrality

An argument about biomass fuels is coming, but is it the right argument?

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Recently we've heard a lot about biomass fuels and their benefits for helping control greenhouse gases because they are "carbon neutral." But what is carbon neutrality?

Actually this term means different things to different people, which has not only created confusion but also encouraged a debate about the validity of the concept. This is unnecessary because it only takes a little digging to reveal that the debate—to the extent there is one—is not really about carbon neutrality but rather about how best to exploit carbon neutrality to control the buildup of atmospheric greenhouse gases without creating other environmental problems or market distortions. Let's look at the various facets of the question.

Q What is biomass carbon neutrality?

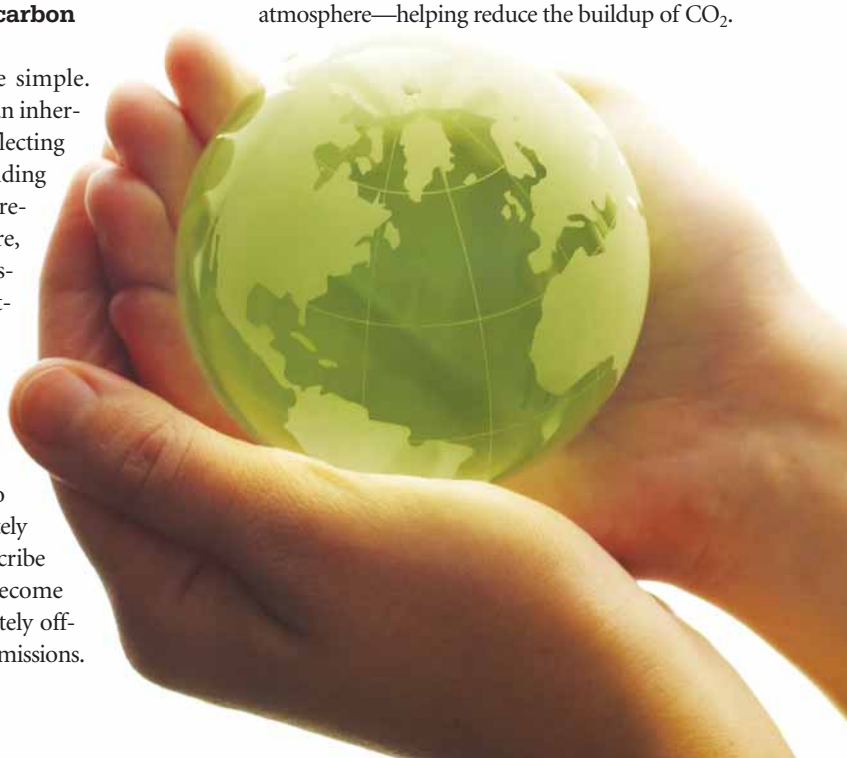
A The concept is quite simple. Carbon neutrality is an inherent property of biomass reflecting the fact that the carbon residing inside it was only recently removed from the atmosphere, so returning it to the atmosphere has no net effect on atmospheric CO_2.

There is no single "official" definition of biomass carbon neutrality. In fact, the term is usually used without definition. It is also sometimes used in a completely different context, i.e., to describe efforts by companies to become "carbon neutral" by completely offsetting their greenhouse gas emissions.

Q Why do we even need the term?

A We need the term "carbon neutral" because it contrasts the carbon in biomass, which is recycled to the atmosphere, with the carbon in fossil fuels, which undergoes a one-way transfer to the atmosphere from underground geologic reserves. This fundamental difference between biomass carbon and fossil fuel carbon is important because it allows biofuels to be used to control the buildup of atmospheric CO_2.

The levels of carbon dioxide in the atmosphere are more than one-third higher than they were in pre-industrial times. Most of the increase is the result of transferring fossil fuel carbon from geologic reserves to the atmosphere. If we substitute biomass fuels for fossil fuels, we recycle carbon to the atmosphere rather than introducing geologic carbon to the atmosphere—helping reduce the buildup of CO_2.



Q Does carbon neutrality mean that biomass fuels contribute zero greenhouse gases to the atmosphere?

A No. During combustion, both biomass fuels and fossil fuels can produce small amounts of nitrous oxide and methane, both greenhouse gases. In addition, in order to produce both biomass fuels and fossil fuels, a number of processing steps are required that may require fossil fuels and emit fossil fuel-derived CO_2. The amounts of these greenhouse gases released in the production and use of biomass fuels, however, are far smaller than for fossil fuels.

Q Does the carbon neutrality of biomass depend on replanting new trees to absorb the CO_2 released when biomass is burned?

A No. Biomass fuels contain carbon that was only recently removed from the atmosphere, and this inherent property exists whether or not trees are regrown. Therefore, all biomass is carbon neutral. We must nonetheless be wise about how we use biomass to control atmospheric CO_2.

The overall benefits of biomass fuels depend on how efficiently we use biomass to displace fossil fuels. In addition, the benefits are reduced if biomass is consumed faster than it is regrown since this shrinks future supplies of carbon-neutral fuel and can reduce the amounts of carbon sequestered in the forest.

Fortunately, it is widely understood that using biomass faster than it is renewed is neither sustainable nor environmentally responsible. Sustainable forest management programs, which are strongly supported by the industry, not only ensure the regrowth of fiber supplies to meet future needs, they also ensure attention to environmental and biodiversity objectives for the long-term health of the ecosystems in which we operate.

Q Although all biomass is carbon neutral, shouldn't we only use biomass that can be shown to be sustainably produced?

A We certainly want to ensure that the use of biomass (for all purposes) does not deplete forest biomass, but the details are very important. Over what time and area should the release of CO_2 from burning biomass be matched by regrowth of new biomass? A loss of forest biomass in one location is unimportant to the atmosphere if it is balanced by a gain at a different location, so it is best to look at the changes in forest biomass across multiple ownerships, large areas and multiyear periods. Requiring each acre of forest to maintain constant long-term carbon stocks in order for the harvest to "qualify" for biomass carbon neutrality is unnecessary, impractical and inconsistent with the inherent characteristic of biomass carbon neutrality.

Q How, then, do we ensure that the demand for forest biomass does not deplete forests?

A In most cases, existing forest management policies and practices will do the job, and they can be enhanced as needed to address specific circumstances. In considering what is needed, however, it is important to understand that across the developed world, forest biomass stocks are stable or growing, *even though most of the global harvest comes from these same countries.* In some of the world's emerging economies, additional policies and practices may be needed to ensure the wise use of forest resources, but in all circumstances it is clear that concerns about the overuse (or misuse) of forests are better addressed through policies that focus on the forest rather than on the definition of carbon neutrality.

Q Isn't biomass carbon neutrality simply an artifact of international carbon accounting rules?

A No. In national greenhouse gas reports, countries estimate the amounts of biomass-derived CO_2 added to, or removed from, the atmosphere. These estimates are often developed using "stock change" accounting, an approach that does not require information on the CO_2 released when biomass fuels are burned (equivalent to using a zero emission factor for CO_2 from biomass). This feature of stock change accounting clearly differentiates biomass carbon from fossil fuel carbon, so it is well-aligned with biomass carbon neutrality.

An alternative approach called "flow accounting" requires information on emissions of biomass CO_2 and, in this respect, it treats biomass-derived CO_2 the same as fossil fuel-derived CO_2. Biomass carbon neutrality, therefore, is better aligned with stock change accounting than flow accounting. Biomass carbon neutrality, however, does not depend on stock change accounting because, as explained

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earlier, carbon neutrality is an inherent property of biomass—a property that can be used to help control the buildup of atmospheric CO_2 regardless of the carbon accounting approach used by national governments.

Q Why are some environmental groups challenging the concept of biomass carbon neutrality?

A The debate is not really about biomass carbon neutrality. It is about how best to use forest biomass and the property of biomass carbon neutrality to control the growth in atmospheric CO_2 without causing other environmental problems. These are legitimate concerns but they are not new to the forest products industry, nor are they unique to forests used to produce biomass fuels. They are concerns that are best addressed by focusing on forest conservation and management practices rather than the definition of carbon neutrality.

Q Why have some groups in the forest products industry started to question biomass carbon neutrality?

A In some places, public policies have created such large incentives to use biomass as fuel that they have distorted the wood market and made it difficult for the forest products industry to compete for limited wood supplies. Some in the industry have decided that the problem is biomass carbon neutrality.

While one can sympathize with the plight of companies struggling with distorted wood markets, treating biomass carbon as equal to fossil fuel carbon is, simply put, a terrible idea. It would eliminate one of the most effective tools available to policymakers to address the buildup of atmospheric CO_2. In fact, it would create an incentive to switch from biomass fuels to fossil fuels because fossil fuels generally burn more efficiently. This would cause a corresponding increase in the one-way transfers of geologic carbon to the atmosphere, ultimately increasing CO_2 levels. For these reasons, it is hard to imagine why policymakers would be interested in treating biomass carbon as equal to fossil fuel carbon.

In addition, such a policy could more than double the CO_2 emissions liability of the forest products industry for no good environmental reason. While the industry could lessen this liability by reducing the consumption of biomass, it is important to consider that most of the biomass used in the pulp and paper industry is contained in black liquor, which must be processed to recover pulping chemicals.

Q So the bottom line is...?

A Carbon neutrality is a fundamental property of biomass, reflecting the fact that the carbon in biomass was only recently removed from the atmosphere so returning it to the atmosphere has no net effect on atmospheric CO_2. This fundamental property differentiates biomass fuels from fossil fuels and can be used to assist in efforts to control the buildup of CO_2 in the atmosphere. Nonetheless, with the rapidly growing interest in biomass fuels, it is not unreasonable to be concerned about the potential impacts on forests, the environment and the competition for wood. These concerns require responses that are focused on the specific problems that surface as demand for biomass increases. Attempts to address these issues by tinkering with the definition of carbon neutrality are inappropriate, likely to be ineffective and could ultimately result in higher levels of CO_2 in the atmosphere.

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