

# **QUESTIONS AND ANSWERS FOR FIXING A CRITICAL CLIMATE ACCOUNTING ERROR**

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## ***What is the accounting error?***

The accounting error results from the combination of (1) exempting all carbon dioxide emissions from the use of bioenergy (2) in a legal system that limits emissions from energy use but not land use activities. The combined effects means bioenergy is always carbon neutral from a legal perspective regardless of the source of the plant material (the biomass) used for the energy. In fact, the net greenhouse gas effects of bioenergy depend on the source of the biomass, and in particular, on land use affects.

## ***Why is land management critical for the greenhouse gas effects of bioenergy?***

When factories, power plants or cars use bioenergy, they emit roughly the same quantity of carbon dioxide as when they use fossil energy, i.e., coal, oil or natural gas. In other words, what goes out tailpipes and smokestacks does not change. Put another way, total energy emissions do not change.

Bioenergy can reduce greenhouse gas emissions if it results in land management changes that increase the amount of carbon taken out of the atmosphere by increasing plant growth to offset the emissions from burning bioenergy. Similarly, bioenergy can use some wood wastes left after timber removal or some crop residues left after harvest that would decompose anyway. Doing so reduces the amount of carbon emitted from these lands. In both cases, bioenergy uses carbon that would not otherwise be stored in plants and soils. When it does so, it reduces emissions of carbon from fossil fuel use without decreasing the amount of carbon stored in plants and soils and therefore reduces greenhouse gas emissions overall. The key is whether the biomass used for energy is what the authors call “additional carbon.”

If all bioenergy is treated as free of carbon, the implicit assumption is that all bioenergy results from these beneficial changes in land management. In fact, bioenergy can also result from harvesting the carbon that would otherwise be stored in trees, including new tree growth that would occur anyway. Using this carbon adds carbon to the atmosphere in the same way as “harvesting” carbon stored in the ground as coal, oil or natural gas and burning it for energy.

## ***Why isn't all bioenergy carbon neutral merely because it comes from plants?***

If the earth had no plants already, and all plants were grown for bioenergy, all bioenergy would be carbon neutral because the carbon absorbed from the atmosphere by the plants would equal the

carbon released by burning the plants or the fuels they make. But the earth has abundant plants already, and these plants continue to grow. Simply burning fuels from plants that would already remain in place and store carbon transfers carbon to the atmosphere in the same way as using coal or oil that would otherwise store carbon underground?

Bioenergy can also result from new plants, but if those plants are grown on otherwise productive forest, that means clearing the forest first with large losses of carbon. If bioenergy uses cropland, the carbon in crops, which feeds us, has to be replaced and may cause forest clearing and other land use change as farmers replace the crops elsewhere. To reduce greenhouse gases, bioenergy production has to make available “additional carbon” above and beyond what the earth would store anyway.

### ***How did the error come into existence?***

The Intergovernmental Panel on Climate Change is the international scientific body that advises governments on technical issues related to global warming. It advised countries on how to count emissions generally for the first time in the mid-1990s. When it discussed bioenergy, it recognized, for example, that if trees are cut down and burned in boilers for electricity, carbon is emitted up smokestacks, but the carbon only needs to be counted once. Either it should be counted as energy emissions from smokestacks or as emissions from land use change when the trees are felled (a separate accounting category), but it should not be counted twice. The panel recommended putting the emissions in the land use category and omitting them from the energy accounts. That worked at that time because the accounting applied to a treaty in which all countries reported both energy and land use emissions (the original UN Framework Convention on Climate Change). In other words, under this treaty, if trees are felled in Asia to make bioenergy used in Europe, Europe does not count the smokestack emissions, but Asia counts the loss of trees as land use emissions.

However, the Kyoto Protocol placed real limits on emissions on energy use but not land use emissions. Under the Protocol, if emissions are not counted from smokestacks, even when they result from burning trees, the carbon is never counted because land use emissions do not count. In other words, if Europe still excludes emissions from the use of bioenergy generated in Asia, the emissions from clearing land in Asia do not count toward carbon limits. (For special reasons, even clearing land in Europe mostly does not count.) The accounting rules should have been changed, but were not, and this erroneous accounting rule has passed into other laws.

### ***Who is responsible for the error?***

In effect, many share responsibility for the error. Government officials should have better understood the guidance of the IPCC, the IPCC could have been clearer about the need for different accounting rules for the Kyoto Protocol, and the scientific community should have clarified the error sooner.

### ***Which laws contain the error?***

The Kyoto Protocol, Europe's Emissions Trading System, and the climate bill passed in July by the U.S. House of Representatives.

### ***What are the likely consequences and why?***

This error means that countries, power plants, oil companies, and factories that must reduce their greenhouse gas emissions can receive credit for a 100% reduction in carbon dioxide emissions to the extent they replace fossil fuels with any source of bioenergy. What they do in fact will depend on the cost of reducing emissions in different ways, for example, through solar power, nuclear power or carbon capture and storage. However, a number of studies have estimated that on a global basis, it is cheap enough to use biomass grown on productive lands that bioenergy production will expand to replace more than half of the world's natural forests to achieve a 50% "cut" in greenhouse gas emissions. The basic reason is that it takes a lot of land to make a meaningful amount of energy and the cheapest place to produce biomass is in forests, particularly those in the tropics where land is cheap and productive.

### ***What are the consequences for greenhouse gases?***

The loss of these forests releases large quantities of carbon dioxide. One study estimates the annual potential release of carbon dioxide will equal to roughly one quarter of total human carbon dioxide emissions today. Another study estimates that peak emissions in the worst year could equal 100% of annual human emissions today.

### ***Can efforts to protect forests help?***

A number of proposals exist to provide funds to countries to preserve their forests. However, the perverse incentive created by this proposal is very powerful and likely to exceed the incentive to protect forests provided by financial assistance. At a minimum, it drives up the cost of forest protection dramatically. In addition, even if forests could be fully protected worldwide, there are roughly 500 million hectares of savannahs and sparse woodlots that are not considered forests that would be converted. That would also release carbon, although less carbon, and have large impacts on biodiversity.

### ***How can the error be fixed?***

The solution is to count the carbon dioxide that is released by smokestacks and tailpipes whatever the source of the energy. In other words, if the carbon dioxide is real, count it. However, bioenergy should receive a credit that allows countries or companies to offset their emissions to the extent bioenergy results from sources of biomass that do reduce greenhouse gas emissions because they stem from land management changes that make available "additional" carbon.

***Are there other effects of this error?***

In addition to adverse impacts on biodiversity, this large-scale competition for land would drive up crop prices, place pressures on water resources, and affect indigenous forest users.

***How should awareness of this error affect Copenhagen?***

According to our understanding, the discussion at Copenhagen is unlikely to get into the details of carbon accounting. However, the world's countries should agree on a process for correcting this accounting error.