

## Opinion of the EEA Scientific Committee on Greenhouse Gas Accounting in Relation to Bioenergy

Important international and European efforts are under way to account for and reduce greenhouse gas (GHG) emissions and to increase the use of renewable energy. Several European Union energy directives encourage a switch from fossil fuels to renewable energy derived from plant biomass based on the premise that biomass combustion, regardless of the source of the biomass, would not result in carbon accumulation in the atmosphere. This mistaken assumption results in a serious accounting error.

Producing energy from biomass is meant to reduce GHG emissions. But burning biomass increases the amount of carbon in the air (just like burning coal, oil and gas) if harvesting the biomass decreases the amount of carbon stored in plants and soils, or reduces ongoing carbon sequestration. Two important factors that determine whether bioenergy reduces carbon in the atmosphere compared to fossil fuels are (i) where and (ii) how the biomass is produced and harvested. Hence, legislation that encourages substitution of fossil fuels by bioenergy, irrespective of the biomass source, may even result in increased carbon emissions – thereby accelerating global warming.

It is widely assumed that biomass combustion would be inherently ‘carbon neutral’ because it only releases carbon taken from the atmosphere during plant growth. However, this assumption is not correct and results in a form of double-counting, as it ignores the fact that using land to produce plants for energy typically means that this land *is not producing plants for other purposes*, including carbon otherwise sequestered. If bioenergy production replaces forests, reduces forest stocks or reduces forest growth, which would otherwise sequester more carbon, it can increase the atmospheric carbon concentration. If bioenergy crops displace food crops, this may lead to more hunger if crops are not replaced and lead to emissions from land-use change if they are. To reduce carbon in the air without sacrificing other human needs, bioenergy production must increase the total amount of plant growth, making more plants available for energy use while preserving other benefits, or it must be derived from biomass wastes that would decompose and neither be used by people nor contribute to carbon sequestration.

The potential consequences of this bioenergy accounting error are immense. Based on the assumption that all burning of biomass would not add carbon to the air, several reports have suggested that bioenergy could or should provide 20% to 50% of the world’s energy needs in coming decades. Doing so would require doubling or tripling the total amount of plant material currently harvested from the planet’s land. Such an increase in harvested material would compete with other needs, such as providing food for a growing population, and would place enormous pressures on the Earth’s land-based ecosystems. Indeed, current harvests, while immensely valuable for human well-being, have already caused enormous loss of habitat by affecting perhaps 75% of the world’s ice- and desert-free land, depleting water supplies, and releasing large quantities of carbon into the air.

Building on the bioenergy opinion of 2008, the Scientific Committee of the EEA recommends that:

- European Union regulations and policy targets should be revised to encourage bioenergy use only from *additional* biomass that reduces greenhouse gas emissions, without displacing other ecosystems services such as the provision of food and the production of fibre.

- Accounting standards for GHGs should fully account for changes in the fluxes and pools of carbon in ecosystems resulting from the production and use of bioenergy.
- Bioenergy policies should encourage energy production from biomass by-products, wastes and residues (except if those are needed to sustain soil fertility). Bioenergy policies should also promote the integrated production of biomass that adds to, rather than displaces, food production.
- Decision makers and stakeholders worldwide should adjust global expectations of bioenergy use to levels based on the planet's capacity to generate additional biomass, without jeopardizing natural ecosystems.