

POLICY WATCH:

A bioeconomy to fight climate change

The use of biomass for energy generation is helping European Union countries meet their renewable energy and emissions targets, but demand from other sectors means policy needs to be developed for maximum climate benefits, reports [Sonja van Renssen](#).

The world's leader in renewable energies — the EU — gets about two-thirds of its renewable energy from biomass, or plant-based material¹. It has a 20% renewable energy target for 2020 and a 10% renewables in transport sub-target. These have driven a massive bioenergy industry that is only set to grow. At the same time, the EU has launched its vision for a bioeconomy², in which biomass replaces fossil fuels in everything from plastics to coal plants to airplanes.

Policymakers see an opportunity here to reindustrialize Europe, drive local jobs and growth, and tackle climate change. But all the different stakeholders that are supposed to fit so neatly together in this vision are clamouring for policymaker attention, on top of which, the climate effects of biomass use remain far from clear.

“As long as 90% of fossil fuels go to the energy sector, it's most urgent to replace fossil fuels in the energy sector. We can afford to go on with fossil fuels in the materials sector for decades,” says Heinz Kopetz, President of the Board of the World Bioenergy Association. “Europeans are getting lost in minor issues such as cascading [a hierarchy of use], ILUC [indirect land-use change] and opposition to first generation biofuels, when the most urgent problem is climate change.”

The bioenergy sector sees itself as on a par with other renewables, although, like fossil fuels, it can offer a steady — not variable — supply of power and comes with an operational fuel cost rather than only upfront investment. “The biggest problem is securing long-term [fuel] supply contracts,” says Michael John White, Founding Partner at EnerCap Capital Partners, a private equity firm focused on renewables and efficiency investments in Central and Eastern Europe. “Without them, you can't get bank financing [for power and heat plants].”

Biomass suppliers are often small and local. The average forest holding is less than five hectares, says Bernard de Galember, Innovation and Bioeconomy Director at the Confederation of European Paper Industries. The paper industry is fighting for its share of an increasingly sought after resource — wood makes up three-quarters of the biomass Europe burns for energy³.

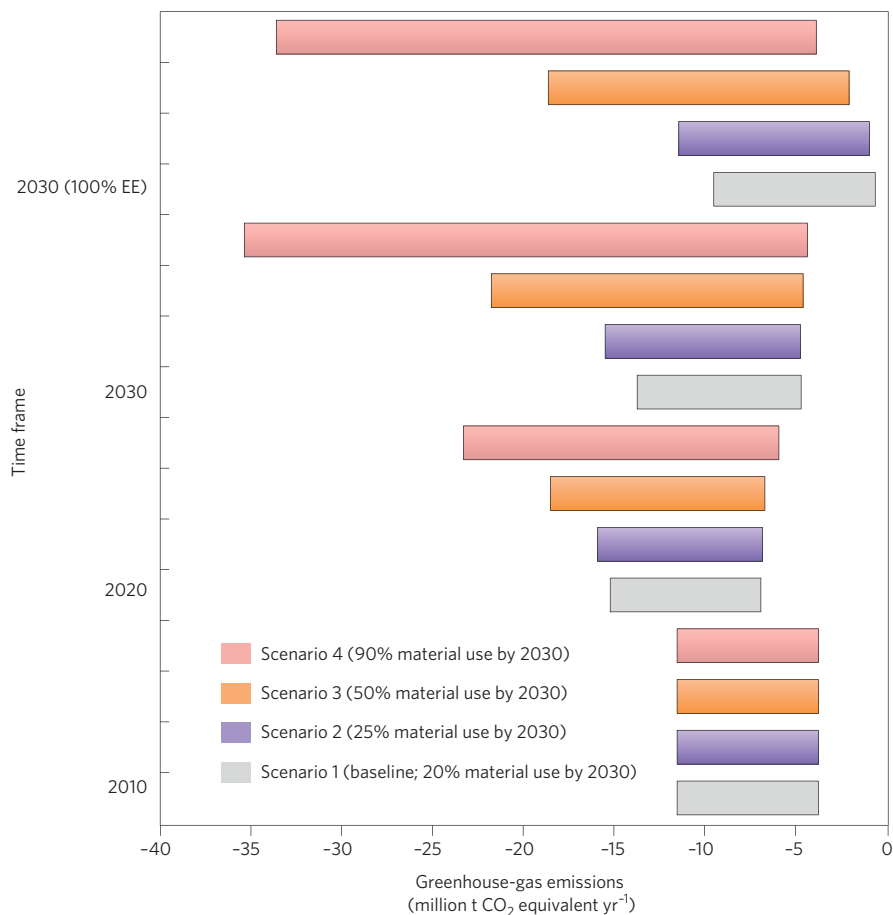


Figure 1 | Emissions change from increasing use of biomass for materials. Change in emissions is considered for 2010 to 2030, with the assumption of the availability of 2.5 million hectares in Germany for biomass resources (this reflects the initial situation in 2012). Percentages are the land area for biomass destined for materials, rather than energy. Scenario 4 is an extreme scenario that demonstrates the potential benefits if biomass allocation between energy and material use were virtually inverted from what it is today. In the 2030 (100% EE) scenario, electricity is 100% renewable, mainly from solar, wind and water. Reproduced with permission from ref. 9, © 2014 nova-Institute.

Innovation and Bioeconomy Director at the Confederation of European Paper Industries. The paper industry is fighting for its share of an increasingly sought after resource — wood makes up three-quarters of the biomass Europe burns for energy³.

There has been no supply crunch so far, de Galember says, because of (1) the economic crisis and (2) cheap pellet imports from North America.

Some say there is still plenty of new wood to be mobilized. Annual harvests amount

to just 60% of annual forest growth in Europe, points out Fanny-Pomme Langué, Policy Director at the European Biomass Association (AEBIOM). Others disagree. Two studies, commissioned by non-governmental organizations (NGOs) Birdlife Europe, the European Environmental Bureau and Transport & Environment, show that demand is set to outstrip supply and warn that without new policy safeguards “the benefits of bioenergy in the fight against climate change are highly uncertain”⁴.

The two big climate uncertainties, neither of which are factored into policy so far, are ILUC and ‘carbon debt’. ILUC is the indirect displacement of forest by crops used for energy production. A legislative proposal⁵ to curb ILUC for biofuels, that is biomass turned into liquid fuel for transport, is still subject to heated debate by EU lawmakers and will probably not be agreed until the middle of 2015.

The second problem of ‘carbon debt’ is a newer one and specific to forests. It is the notion that when trees are chopped down to create wood, it can take many years for new trees to re-grow to the point where they ‘cancel out’ the carbon released from their felled predecessors. The delay can be anything from decades to centuries, depending also on assumptions over what may have happened in the absence of felling.

As a result, forest residues may deliver only three-quarters of the estimated savings and standing wood less than half, over 100 years, of what would be expected if biomass were truly ‘carbon neutral’. The obvious question is: can greater use of forest biomass deliver carbon savings on the timescale needed for climate mitigation? The Institute for European Environmental Policy in Brussels says that “many options do not achieve this”⁶. Carbon debt is a problem utilities are waking up to, as the discrediting of biomass would deprive them of a welcome substitute for coal in power and heat generation.

For the Confederation of European Paper Industries and the NGOs, the priority going forward is resource efficiency. “It’s a question of how we use what we use in a more resource-efficient way,” says Sini Eräjää, in charge of biomass policy for both Birdlife Europe and the European Environmental Bureau. This means introducing a hierarchy of use that recognizes that bio-based products keep carbon emissions locked up for longer; burning biomass for energy should be last on the list.

So far the EU has no dedicated biomass policy. There is an EU forest strategy⁷, but this leaves it to individual member states to develop ‘sustainable forest management’. The NGOs say it is

insufficient. In addition, there are EU sustainability criteria for biofuels — albeit without ILUC, implemented through certification schemes — but no equivalent for solid biomass. On the demand side, there are subsidies for bioenergy, but not for bioproducts.

Nevertheless, in its 2030 climate and energy proposals⁸, the European Commission acknowledged the need for ‘an improved biomass policy’ to maximize its resource-efficient use, deliver real greenhouse-gas emissions savings, and allow for ‘fair competition’ between energy and non-energy uses.

Researchers at the nova-Institute in Germany are calling on policymakers to turn the EU’s renewable energy directive into a renewable energy and materials directive. Bio-based materials would count towards member states’ renewable energy targets — and qualify for bioenergy subsidies. Redirecting biomass to material use could deliver “significantly greater [emissions] reductions” as well as 4–10 times the added value and jobs, say Michael Carus and his team (Fig. 1; ref. 9). The idea is getting some interest from policymakers, but is a long way from becoming reality.

Yet, the first policy limits to using biomass for energy are starting to appear. In the case of biofuels, they are the ILUC proposal plus a pledge to end subsidies for food-based biofuels and discontinue specific decarbonization targets for transport fuels from 2020 (ref. 10). “We are moving away from a discussion around targets to incentives,” believes Transport & Environment campaigner Nuša Urbančič. In other words, rules around biofuels support will determine their future. Eräjää says she will push for limits on biomass for heat and power, where EU rules on member-state subsidies play a critical role.

A stakeholder panel set up to think through the European bioeconomy unveiled its recommendations on supply and demand at a conference in Turin, Italy, on 8 October (see <http://bioeconomy.miur.it/> and http://ec.europa.eu/research/bioeconomy/policy/panel_en.htm; recommendations still to be published at the time of writing). Dorette Corbey, a former Member of the European Parliament and present Chairman of an Advisory Committee on Sustainable Biomass in the Netherlands, who worked on the supply side, highlights in particular the novel idea of a regional approach to sustainability — to cover all biomass, regardless of its final use.

In a nutshell, the EU would set basic criteria, such as minimum greenhouse-gas emissions savings, which would be complemented at the regional level by rules

around water use, for example. “Instead of complex certification procedures, a certificate of origin from a sustainable biomass region would be enough to prove sustainability,” she argues.

The panel acknowledges that the system may not be suitable for all types of biomass — not forestry, perhaps — and it advocates other sustainability initiatives too, such as flexible bioenergy quotas of the kind used in Brazil or Thailand. It introduces ‘conservation biomass’, a concept from the United States that combines land restoration with biomass production by the removal of woody brush on historical grasslands, for example. This could be a way of further greening rising imports from North America.

On the demand side, the Bioeconomy Panel recommends an EU-wide public procurement programme for bio-based products — à la the US BioPreferred Program. Existing legislation such as the Construction Products Directive could also promote them. Standards for bioproducts currently under development will help support these initiatives. In other policy realms, waste law could define the thresholds for energy recovery.

At the end of the day, everyone agrees that bioenergy is needed for the EU to meet its renewable energy and climate objectives. This is especially true for the heating sector, which makes up nearly half of EU final energy consumption. For the European Commission, “the vast majority of the biomass used today in the EU for heat and power are considered to provide significant [greenhouse-gas] savings compared to fossil fuels”⁹. An emissions saving of “at least 70%” can be considered good practice, it adds — although this is without accounting for ILUC or carbon debt, of course.

More research is underway into both issues, as well as biomass pathways that seem to lead to negligible savings or even increase emissions. The European Commission is leading the establishment of a new bioeconomy observatory — the first of its kind worldwide — that will look for science-driven answers to questions such as the real climate implications of the bioeconomy. It should be fully up and running by spring 2016.

Policymakers will need to incentivize the right kinds of biomass. More wood will be burnt, but the use of agricultural residues and waste is also on the rise. The International Renewable Energy Agency says the technology is there to double bioenergy use by 2030 and 40% of it could come from residues and waste¹¹.

At the same time, initiatives such as a €3.7 billion public-private partnership

between the EU and bio-based industries are working to lift the bioeconomy beyond research and into policymaking. Already some pulp mills are calling themselves biorefineries and producing lignin for road-building, solvents and even vanillin, as well as bioenergy and pulp. The energy and material uses of biomass will find themselves increasingly rubbing shoulders. It's time for policymakers to design a holistic biomass policy that also does more for climate change. □

Sonja van Renssen is a freelance journalist based in Brussels, Belgium.

e-mail: svr.envi@gmail.com

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