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Forest Bioenergy in Europe:

Reassessment needed

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Davide Pettenella (editors).

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what_science_can_tell_us/](http://www.efi.int/portal/virtual_library/publications/what_science_can_tell_us/)



FOREST BIOENERGY: A THOUSAND DIFFERENT THINGS

Forest biomass production helps society to respond to an increasing demand for renewable energy sources, meet EU climate policy and renewable energy targets, and comply with international agreements on tackling climate change. It also supports regional policies in enhancing the rural economy and employment opportunities.

Forest biomass-based bioenergy can be a thousand different things. The forest biomass source and its management, the end products (heat, power, transport fuel), the conversion technology, the logistics, the environmental impacts, and the markets and opportunities to use bioenergy may vary significantly across the EU and across regions within countries. As a result, *one size fits all* policies are not optimal for enhancing forest biomass-based bioenergy development in a sustainable way. New policies are needed. Markets do not take care of the externalities (including *public good and bads*), and there are already policy failures and a lack of policy coordination, distorting market incentives. **Renewed assessments and policies, and better policy coordination are needed.**

POLICY RECOMMENDATIONS

Reassess EU forest biomass demand

Recent studies (EUwood, 2010) have suggested that the EU's forest biomass *supply* would increase by 11% from 2010 to 2030. However, assuming the EU's 2020 climate and energy targets, and the continuation of forest products markets along past trends, this study also estimated that the *demand* for forest biomass would increase by 73%. This would mean a shortage or a "gap" of 316 million m³ of forest biomass in 2030. This "gap" has aroused concerns that scarcity of wood could lead to fierce competition over woody biomass, and that there could also be a significant loss of forest biodiversity due to increasing forest biomass usage.

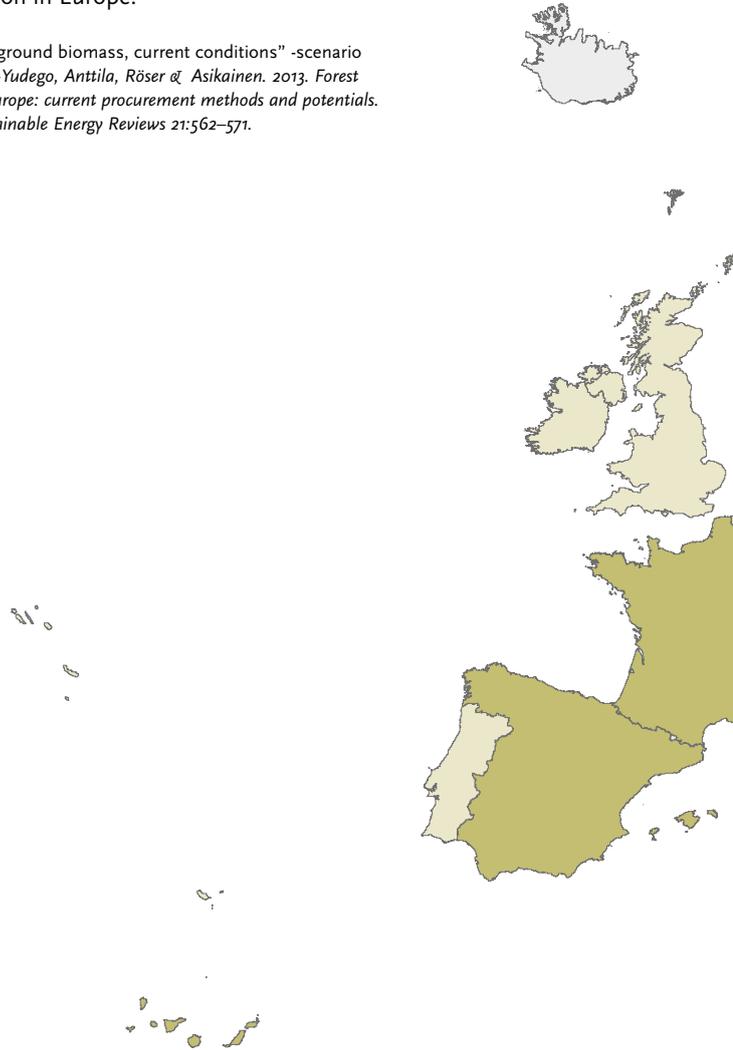
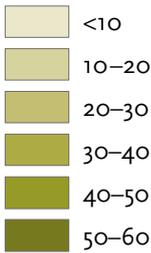
However, there are three main factors not included in the EUwood study:

1. The ongoing structural changes in global and EU forest products markets are likely to result in a lower demand for and production of forest products in the EU. The forest biomass demand for industrial purposes is therefore likely to be lower.
2. The EUwood study does not consider the impacts of international trade in forest biomass. Imports already exist, and are likely to increase in future, given that markets and policies in the EU provide incentives for this.
3. Forest biomass, forest products and bioenergy production react to market incentives, such as the prices of raw material and end products. These market adjustments may be significant and help to clear the "gaps" between supply and demand for forest biomass.

Figure showing a scenario estimate of forest wood biomass potentials in Europe. The highest potentials are in Germany, Sweden, Finland and France. The figure does not show the potential from industrial wood residues (e.g. sawdust and chips) and post consumer wood (e.g. packaging materials, demolition wood), which is also a significant source for wood energy production in Europe.

Source: "(a) Above ground biomass, current conditions" -scenario in Diaz-Yanez, Mola-Yudego, Anttila, Röser & Asikainen. 2013. *Forest chips for energy in Europe: current procurement methods and potentials. Renewable and Sustainable Energy Reviews* 21:562–571.

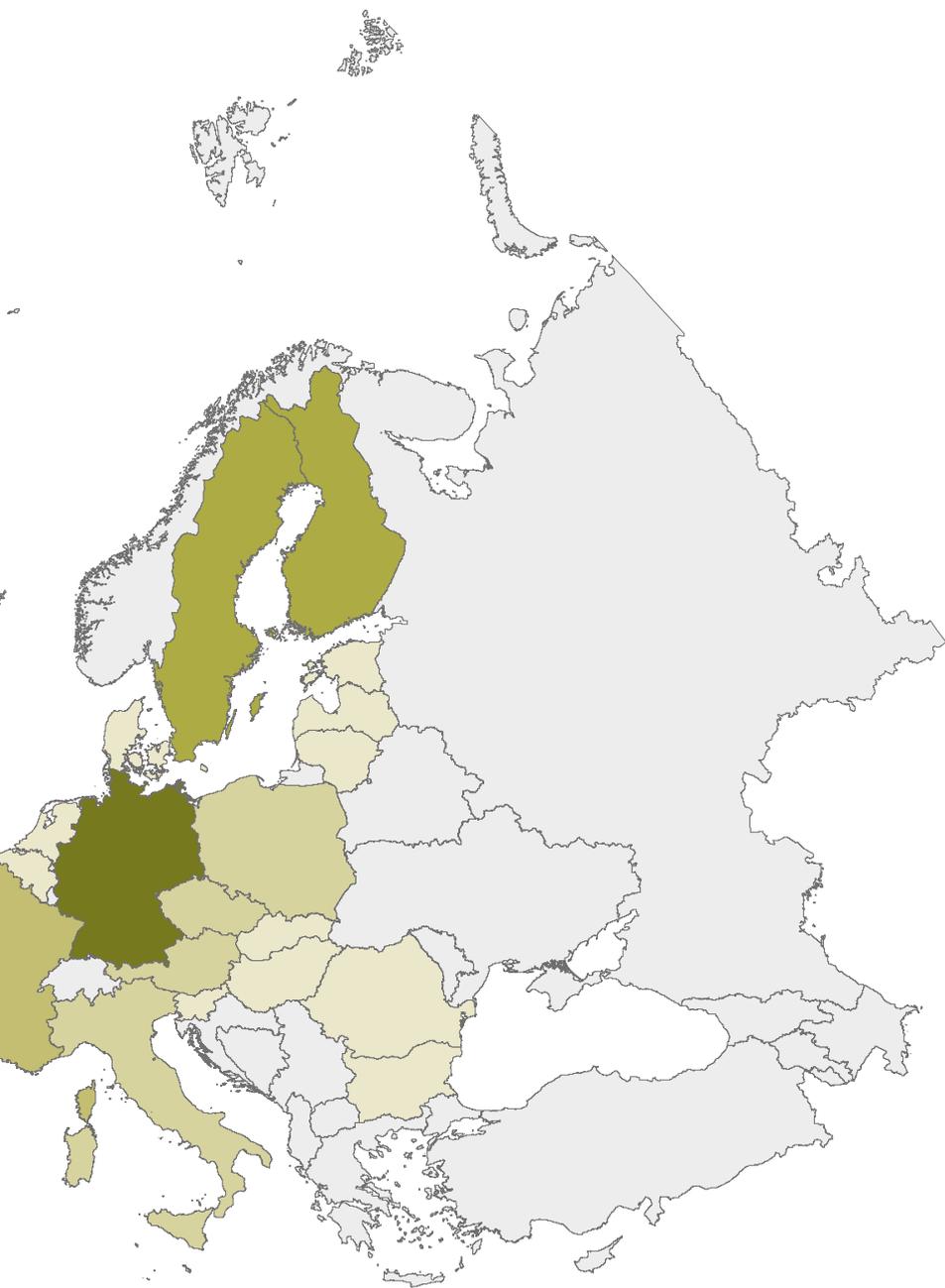
la
(10⁶ m³)



These factors suggest that the future usage of forest biomass in the EU may not be as large as is often thought. We need to reassess future EU forest biomass demand to also take into account these factors. New EU climate and renewable energy targets and policies for 2030, to be decided in 2014, will increase the need for reassessment.

Address the hidden impacts of policies and trade-offs

Given the uncertainty of future carbon and energy prices, renewable energy sources (RES) policies help to promote new investments. However, they can also cause new problems. Subsidies directed to one sector may harm other sectors, and can also increase the costs of mitigating climate change. For example, research has found



that if subsidies are given for biodiesel production, this tends to increase the forest biomass price, which in turn may decrease the production of wood-based heat and power. In some cases, it could also decrease pulp and panel production.

Policy makers need to be better informed about the many impacts that policies may have. They need to have clear priorities guiding them to accept trade-offs between sometimes conflicting policy goals.

Tailor sustainability policies

Environmental, economic and social sustainability is a key condition for successful business development in the forest biomass sector. But securing these objectives is a challenge for policy makers.

For instance, if a RES policy triggers woody biomass imports to the EU, these should meet the same sustainability standards as forest biomass from within the EU. The EU Timber Regulation ensures the legality of wood placed on the EU market, but this does not guarantee all dimensions of sustainability.

Another important issue is the carbon neutrality of forest biomass as fuel. Because of the many different ways that bioenergy can be produced, the energy efficiencies and climate (carbon) impacts of forest biomass-based energy production may vary greatly. Consequently, RES policies can have different sustainability impacts. We need further studies to synthesise the best scientific knowledge about carbon neutrality, and point out the interlinkages between bioenergy and climate policies, and the implications for policy. **There are no silver bullets. Simple solutions and widely applicable generalizations are not easily found for sustainability questions.**

Focus on energy efficiency, minimizing emissions and promoting new businesses

The potential annual harvest of biomass from forests for energy in the EU is about 200 million m³. There is also still plenty of potential and need to strengthen the utilization of industrial wood residues (e.g. sawdust and chips) and post consumer wood (e.g. packaging materials, demolition wood, timber from building sites). It is estimated that the EU would need around 40,000 person-years in labour input to mobilize the full potential of harvested forest biomass for energy – eight-times the number who work in forest energy supply today. To meet this likely shortfall in labour, novel technologies are needed to improve efficiency in energy biomass harvesting, logging, processing and transport.

Long lasting competitive advantages can only be reached by developing biomass production, harvesting technology and supply logistics to reduce the cost of biomass. It is also essential to improve the energy efficiency of the production processes. The product portfolio based on forest biomass must be developed towards high value materials and fuels to enable a higher ability to pay for the feedstock. But to operate these more efficient technologies and processes, we need agents, enterprises and businesses willing to take over responsibility for sourcing materials, transporting and converting them ready for use, and producing the products.

Policies which create incentives to help facilitate economic, technological and environmental efficiency developments and business opportunities for the whole forest biomass-based energy supply chain are needed. **Policies should direct support to the most energy efficient and least emission-generating production processes.**

Design a stress test for sustainability

Forest biomass-based bioenergy production may result in significant environmental and economic sustainability gains for the EU. However, this is not guaranteed, and will not happen automatically. The market mechanism by itself will not guarantee that all environmental and economic objectives are met. Energy from forest biomass is not a single entity, but hides a large variety of sources and qualities, conversion technologies, end products and markets. Some processes do make economic and environmental sense, others not. Therefore, bioenergy-related policies should be designed in a way that enhances technological and economic efficiency, and environmental sustainability.

A stress test needs to be designed and implemented to guarantee that forest biomass-based bioenergy production supported by subsidies or other policy means in the EU has an environmentally and economically sustainable basis. The stress test would determine the ability of a given forest biomass-based bioenergy process to guarantee certain environmental and economic sustainability criteria. For example, the following *stresses* could be analyzed:

- What is the carbon balance of the process?
- What are the biodiversity impacts of the process?
- What are the potential trade-offs (opportunity costs) in terms of forgone alternative forest uses?
- What is the energy efficiency of the process?
- What is the socio-economic viability of the process (to what extent it needs policy support, and for how long?)

Reference

Mantau, U., Saal, U., Prins, K., Steierer, F., Lindner, M., Verkerk, H., Eggers, J., Leek, N., Oldenburg, J., Asikainen, A. and Anttila, P. 2010. EUwood – Real potential for changes in growth and use of EU forests. Final report. Hamburg/Germany, June 2010. 160 p

There is a growing need to strengthen communication between the science community and key policy makers in the EU. For this reason, the European Forest Institute (EFI), after consultation with leading experts on forest policy in Europe, is supporting and facilitating a high-level discussion and information-sharing forum, “ThinkForest”.

ThinkForest provides an active and efficient science-policy interface and fosters an inspiring and dynamic science-policy dialogue on strategic forest-related issues.



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