



The global forest sector model of the European Forest Institute (EFI-GTM) and its applications.

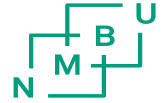
Alexander Moiseyev, Birger Solberg & Maarit Kallio
Streamlining the next round of Forest Sector Outlook Studies
in the UNECE region

Pushkino, Moscow Region, Russian Federation, 2016.



What is the EFI-GTM model?

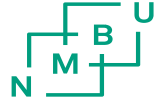
- – A multi-regional, multi-periodic global market model for the forest sector that integrates forestry, forest industries and final forest product demand.
- – Finds periodical competitive market equilibrium quantities, prices and investments for all the markets and regions.
- –EFI-GTM is not a forecasting tool! It is a tool for "WHAT IF scenario" analysis or a tool facilitating selection between alternative policy options.



What makes the EFI-GTM different from other forest sector models ?

- High and more realistic disaggregation of forest industry products: Covers 6 wood categories, 7 mechanical forest industry products, 6 pulp grades, 4 waste paper grades and 13 paper grades;
- High number of regions (61) covering the whole world: –emphasis on Europe with 31 regions;
- 3 or more technological vintages included for each product in European regions;
- Trade included for each product and each pair of regions

The EFI-GTM has been used to address a wide array of questions



- Forest conservation policies and increased forest growth due to climate change
- Increased investments in forest plantations in Asia and South America
- Impact of EU FLEGT on the trade of wood and wood based products
- Impact of the Russian roundwood export tariffs
- Increased demand for bioenergy and impact of the various carbon emission and fossil fuel prices on the use of wood biomass for energy
- Impact of subsidies on the use of the wood biomass for energy

EU FLEGT (INDUFOR, 2008, Moiseyev et al., 2010)



- Several policy options including VPAs and FLEGT trade instruments have been modeled with EFI-GTM
- It was found that an option, which requires a licensing scheme for all wood and wood products placed on the EU market by all sellers would lead to the lowest negative consequences, including leakage of forest sector value added in favor of the high risk regions.
- This option was chosen by EC as a basis for its EU timber regulation (EUTR)

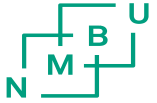
Impact of the increased Russian logs export tariffs (Solberg et al., 2010)

- As expected a very high roundwood export tariffs were found to decrease Russian logs exports and harvest and lower roundwood prices
- The decreasing roundwood prices could give some help to the development of the Russian sawnwood and pulp industry
- However, it was found that for the Russian forest industry development the improvements in the investment climate would be far more important

EFI-GTM was used as a part of integrated modeling framework for studying the potential impacts of the increased use of sawnwood and plywood for construction in Europe (Eriksson et al., 2011)



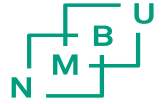
- Increasing the share of apartment flats built of wood instead of non-wood materials gradually so that most new flats in Europe would be built of wood by 2030 was found to have surprisingly small effect on the wood market and consequently on forest management.
- A case where the sawnwood consumption per capita would increase in European countries to 1 m³/capita, i.e., to the level of sawnwood consumption in Finland. This development would have drastic effect on the wood market and possibly on forestry.



EFI-GTM applications on the increased use of wood for energy

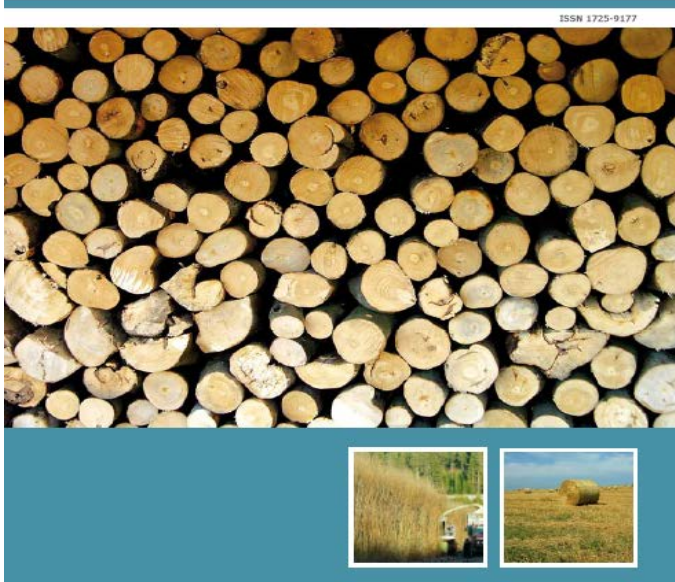
- EEA study on the sustainable biomass potential supply for energy – energy wood demand is price driven (Moiseyev et al., 2011)
- EFSOS II study (energy scenario) – energy wood demand is policy driven
- CENBIO project – impact of carbon emission, fossil fuel prices and subsidies on the use of wood biomass for energy (Moiseyev et al. 2013, 2014)

How much biomass could technically be available for energy production without increasing pressures on the environment?



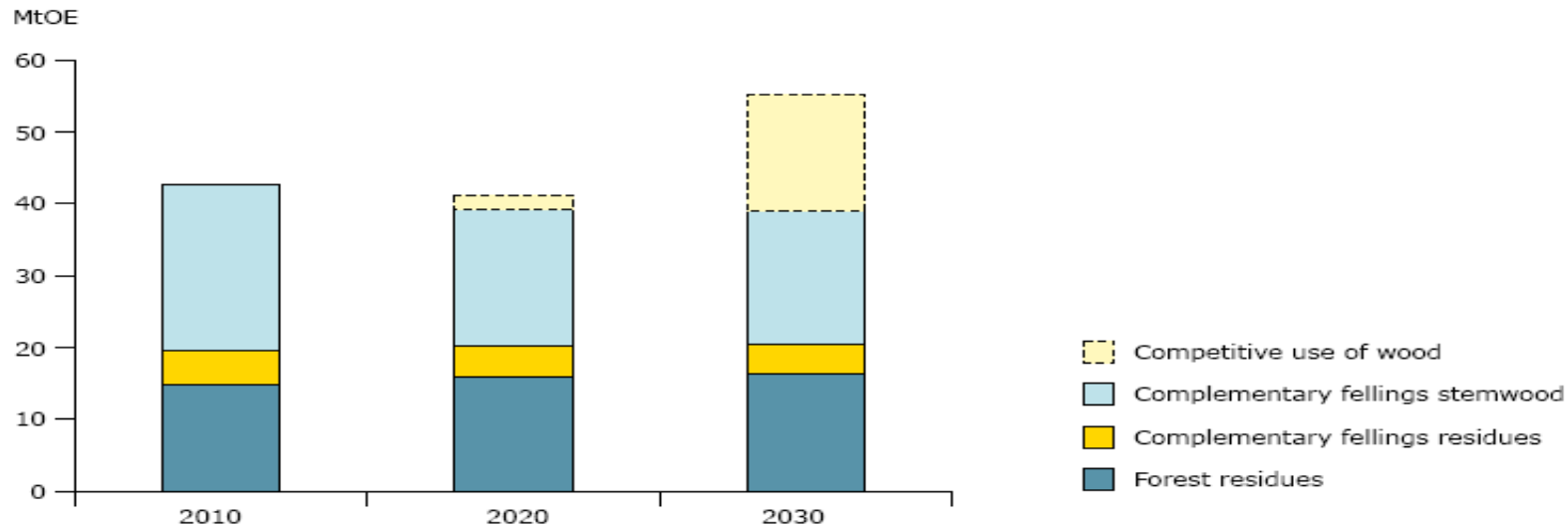
EEA Report | No 7/2006

How much bioenergy can Europe produce without harming the environment?



- Outlook for biomass supply for 2010-2020-2030
- The environmentally-compatible primary biomass potential is estimated around 190 million t of oil equivalent (MtOE) in 2010
- Biomass potential increases to around 295 MtOE by 2030 (compared to 69 MtOE in 2003)

Environmentally-compatible bioenergy potential from forests



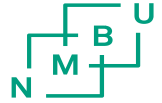
Note: Calculations cover EU-25 Member States without Cyprus, Greece, Luxembourg and Malta

(²⁹) The energy value of wood chips was assumed to be 64 EUR/m³ in 2020 and 94 EUR/m³ in 2030 (see Annex 3). If a higher oil price of EUR 50 per barrel was assumed, the potential being redirected from competing industries would increase to 6 and 33 MtOE in 2020 and 2030, respectively.

Projected change of the use of wood biomass for energy by source in 2030 relative to the Low 10 €/tCO₂ scenario, MM m³

	Additional industrial wood for energy from				Logging Residues	Total logging residues + industrial wood for energy
	Wood products	Imports	Harvest	Total wood		
No subsidy CO ₂ -100	11.5	10.3	8.5	30.2	224.0	254.2
Subsidy 30 UK-NL-DK-DE e/MWh	34.5	101.8	21.5	157.8	230.9	388.7
Subsidy 30 UK-NL-DK e/MWh	27.1	72.7	17.3	117.1	228.3	345.4
EFSOS II	21.9	31.6	16.1	69.6	271.9	341.5

Conclusions from EFI-GTM bioenergy applications:



- There is sufficient technical availability of biomass for energy to fulfill the EU target on RES;
- However, high volumes of biomass for energy can be supplied at rather high energy and CO2 permit (taxes) prices **and especially with subsidies**;
- High energy and CO2 prices are likely to cause **some moderate** distortion on forest products markets (wood pulp and wood based panels), **subsidies will cause significant distortion on forest products markets** ;
- More efficient policies can be based on direct economic incentives in agriculture (including subsidies) for growing energy crops (including short rotation forestry) and subsidies for pre-commercial thinning in forestry in order to increase actual biomass supply instead of overheating competition for already existing resources.

EFI-GTM work in progress and future applications



- Market impacts of the increased forest conservation in Europe and associated harvest & carbon leakage (FORMIT project)
- Research and Innovation perspective of the mid- and long-term Potential for Advanced Biofuels in Europe (EU Consultancy project) – EFI-GTM & EFISCEN to be used in connection with EU PRIMES energy and EU agriculture CAPRI model)



EFI-GTM use conclusions:

- Forest sector model is a tool for “What If Scenario” analysis
- EFI-GTM is a tool which helps to better understand likely consequences of different policy options
- Model results are helping to provide a better insight for policy decision, but these decisions are not based solely on model results
- Selection of scenarios is a crucial part of the analysis

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