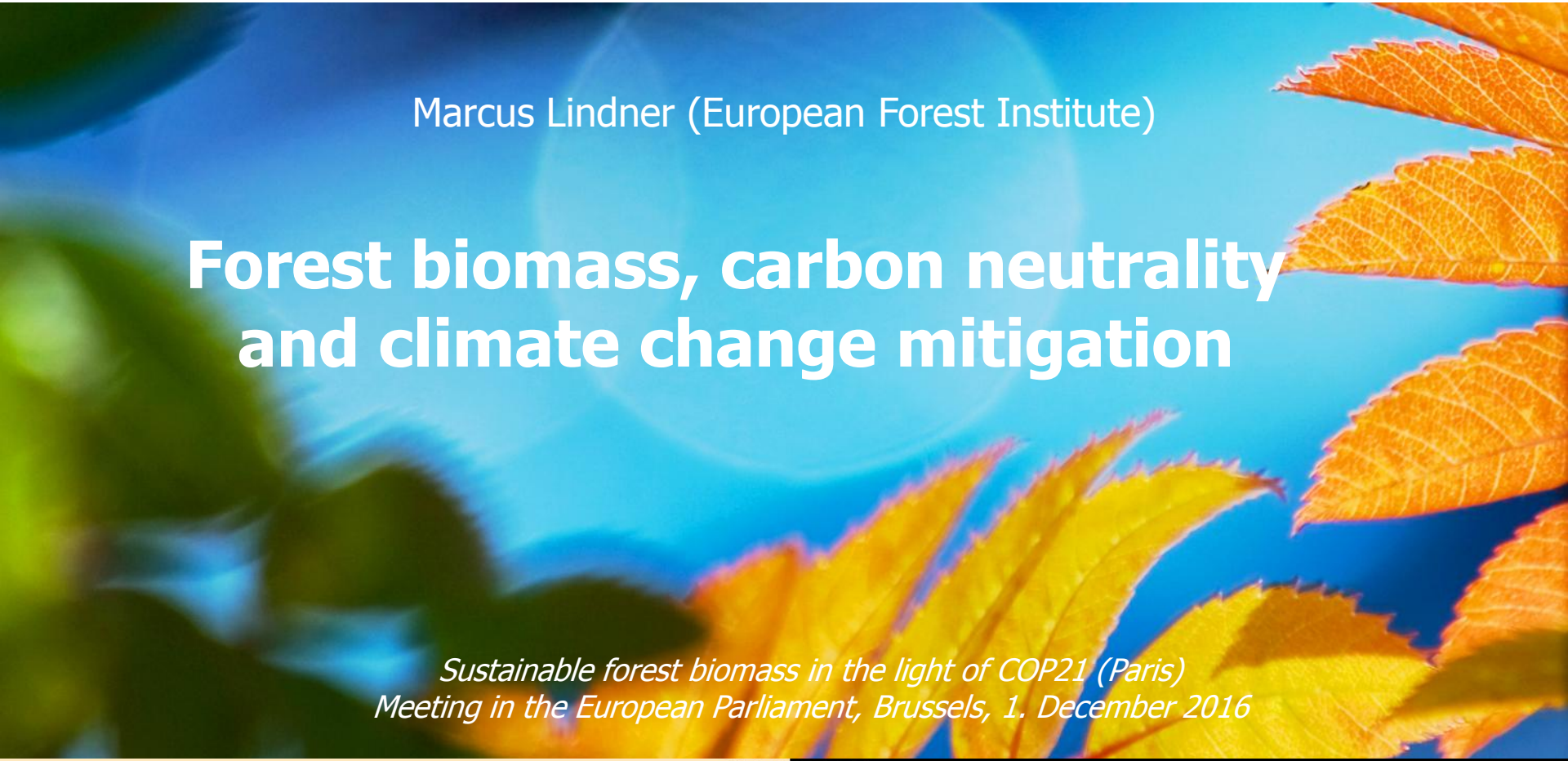
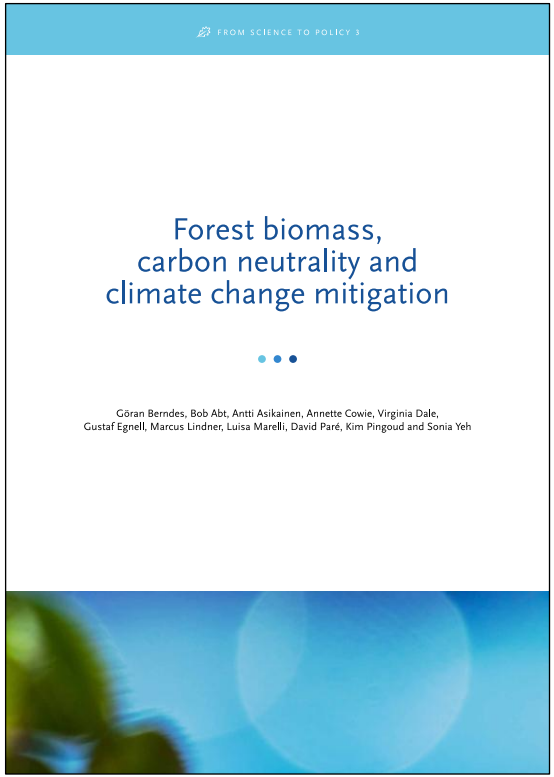
THINKFOREST



Marcus Lindner (European Forest Institute)

Forest biomass, carbon neutrality and climate change mitigation

Sustainable forest biomass in the light of COP21 (Paris)
Meeting in the European Parliament, Brussels, 1. December 2016



From Science to Policy 3,
European Forest Institute, October 2016.
The publication can be downloaded here:
http://www.efi.int/portal/policy_advice/publications/from_science_to_policy/

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Outline

1. Background: discussion on bioenergy carbon neutrality
2. How is forest bioenergy produced?
3. Assessing bioenergy climate impacts
4. A synthesis of science knowledge
5. Policy implications

Discussion on bioenergy carbon neutrality

- Climate impact of bioenergy critical for EU
- Carbon neutrality debated topic
- No clear consensus among scientists
- Different points of view concerning policy objectives
- Different methodological approaches -> different conclusions
- Report: balanced and policy-relevant synthesis on the issue

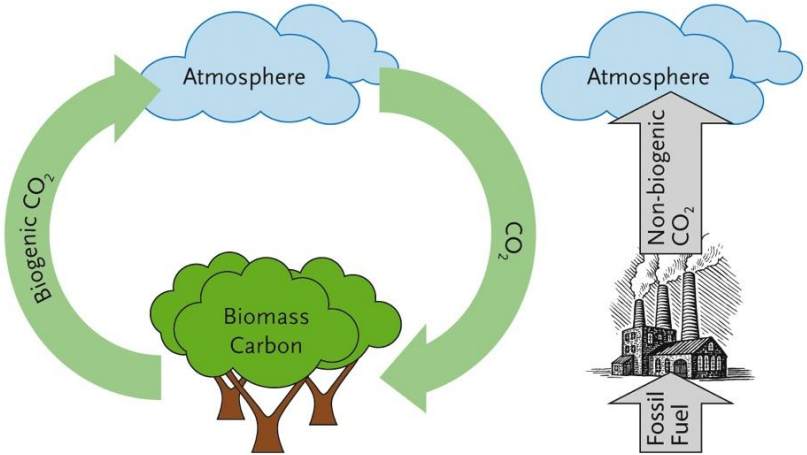


Illustration of distinction between bioenergy *(cyclic carbon flow)* **and fossil-based energy** *(linear carbon flow)*

Figure: National Council for Air and Stream Improvement

How is forest bioenergy produced? (1)

- Integrated systems that deliver bioenergy and other forest products
- Process by-flows, residues and low grade / small diameter stems from forest operations
- Process energy in forest industry, fuels and electricity for other markets
- Low fossil fuel inputs in common supply chains

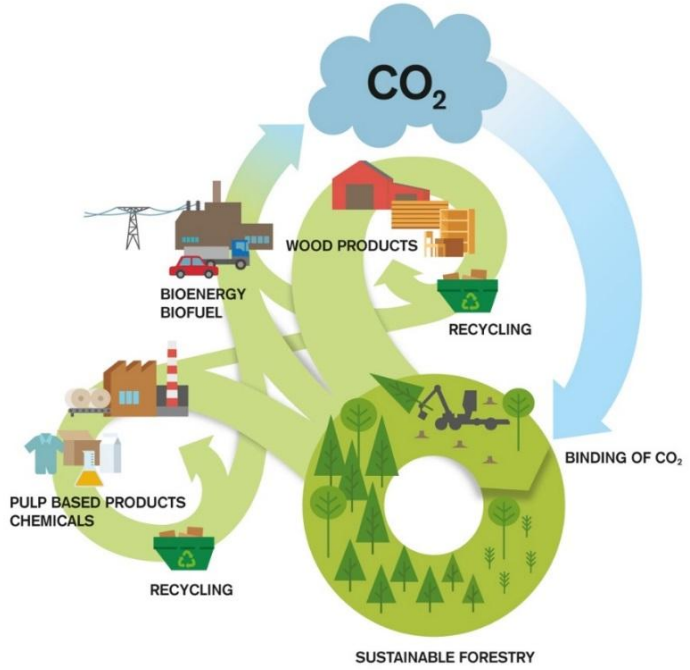


Figure: Sveaskog

How is forest bioenergy produced? (2)

- Forest area, biome, ownership, forest industry structure, and the objectives and culture related to forests differ significantly between MS
- There is a diversity of forest types and management systems across Europe
- Bioenergy implementation will consequently look differently in different locations

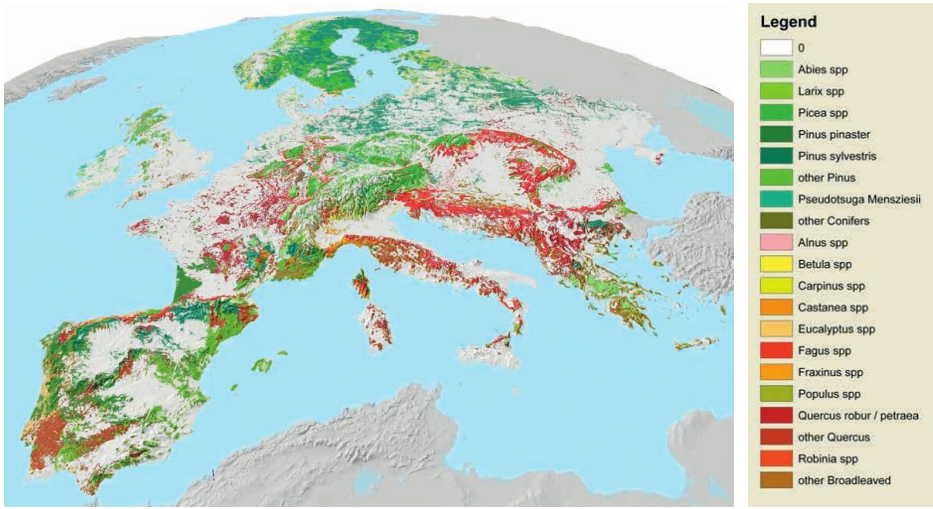


Figure: Nabuurs et al, 2015. A new role for forests and the forest sector in the EU post-2020 climate targets.

Assessing bioenergy climate impacts (1)

Methodological choices affect outcome:

- Definition of counterfactual (ref) ”no bioenergy” scenario
- Time frame: short-term or long-term evaluation period
- Spatial scale: forest stand level or landscape level
- Scope: economic aspects, actors and markets included?
- Metric choice, e.g., GHG balance or warming contribution

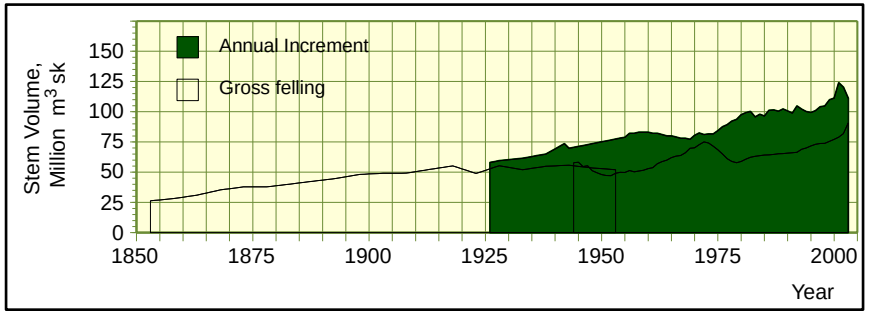


Photo: Dan Neary, USDA-FS

Figure: Eliasson et al, 2011. Forest carbon balances at the landscape scale and responses to intensified harvest investigated with the Q and COUP models.

Assessing bioenergy climate impacts (2)

- Landscape level appropriate for informing policy
- Stand level too narrow and potentially misleading
- Economic and biophysical dynamics are important
- Integrated ”total system” modelling provides important insights

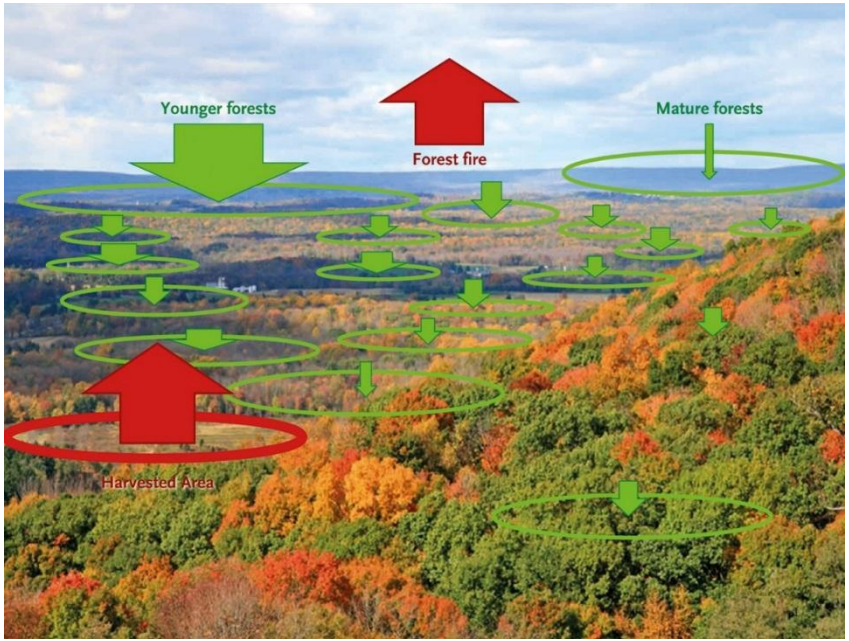
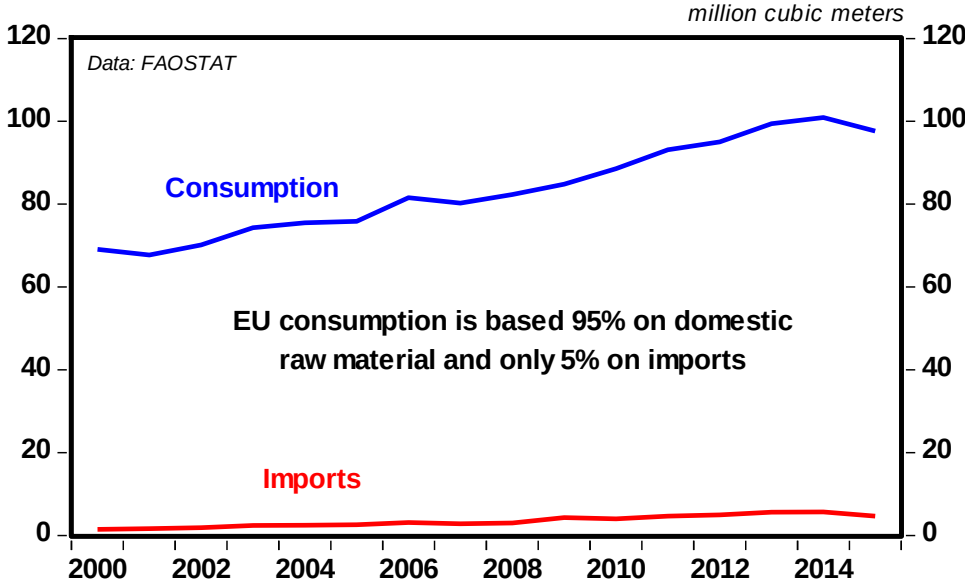


Figure: National Council for Air and Stream Improvement

Impacts outside EU?

- Forest feedstock imports to EU for bioenergy do not play a big role *(see Figure)*
- Pellets production for the EU => a few percent of harvested wood products in Canada and SE US
- Pellet demand has some influence, but higher value markets are more important for land management planning

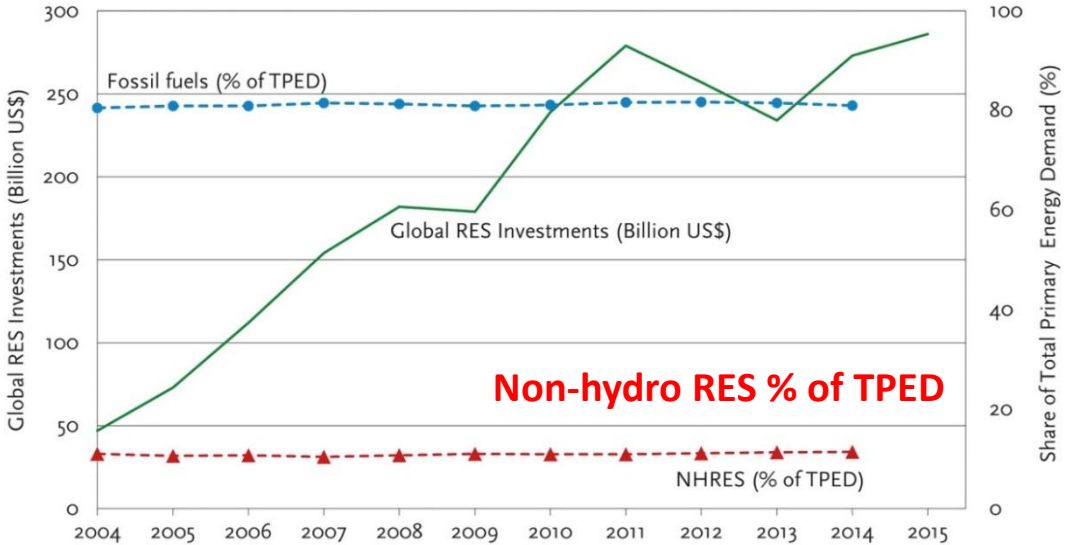
EU energy wood* consumption & imports 2000-20015



*Energy wood = FAOSTAT wood fuel = e.g. pellets, firewood, chips, sawdust for purposes such as heating or power production

A synthesis of science knowledge (1)

- Difficult to meet long-term climate target without bioenergy
- Fossil fuel displacement efficiency critical
- Feedstocks more or less debated (residues vs stems)



Global investments in renewable energy sources (RES) and total primary energy demand (TPED)

Figure: Filip Johnsson, Jan Kjaerstad and Johan Rootzén, Chalmers University of Technology, Sweden.

A synthesis of science knowledge (2)

- Impact of bioenergy on net GHG emission savings is context- and feedstock-specific due to that many important factors vary across regions and time
- There can be trade-offs between carbon sequestration, storage, and biomass production – and between short term and long term climate objectives
- Variation in results calls for stronger efforts to ensure that results are carefully explained and interpreted correctly

Trees killed by spruce budworm, Quebec

Photo: Evelyne Thiffault, Laval University, Canada.

Policy Implications (1)

- European forests and associated industries play important role in GHG balance => **sequester** and **store** carbon and **displace** fossil fuels
- Critical that policies create a situation where promotion of bioenergy and other non-fossil energy options lead to **fossil fuel displacement,** rather than competition among non-fossil options

Photo: FreeBigPictures.com

Policy Implications (2)

- Consider policies in **context** of the regional forest and energy sector.
- ***One-size-fits-all policies*** **are unlikely to be optimal**
- **Generic classification system** *(eligible/non-eligible)* for different forest biomass types may **prevent effective management** of forest resources to economically meet multiple objectives, including climate change mitigation

Photo: FreeBigPictures.com

Policy Implications (3)

- Knowledge and experiences of forest bioenergy should be shared and discussed, to facilitate development of **regionally tailored management guidelines**

Photo: FreeBigPictures.com

Overall conclusion (1)

The use of forest biomass for energy is likely to make economic and environmental sense, if accompanied by a package of measures to promote best practices in forest management for climate change mitigation

Photo: Brent Perry

Overall conclusion (2)

Involving policymakers and stakeholders in defining policy-relevant research questions increases the likelihood that results are relevant, interpreted correctly, and useful in the policy development process

Photo: Brent Perry

Thank you!

Byholma airport: storage of about 1.3% of trees felled by storm Gudrun

Photo: www.goranssonsakeri.se