



EUROPEAN FOREST
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Forests in climate change mitigation and sustainable bioeconomy

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Presentation outline

1. EFI
2. Forests and climate
3. Bio-based products (including wood construction)



EFI Headquarters, Joensuu

- Bioeconomy Programme
- Policy Support Facility

EFI Bonn

- Resilience Programme

EFI Brussels

- Liaison Office

EFI Bordeaux

- Planted Forests Facility

EFI Barcelona

- Mediterranean Facility
- FLEGT & REDD Facilities

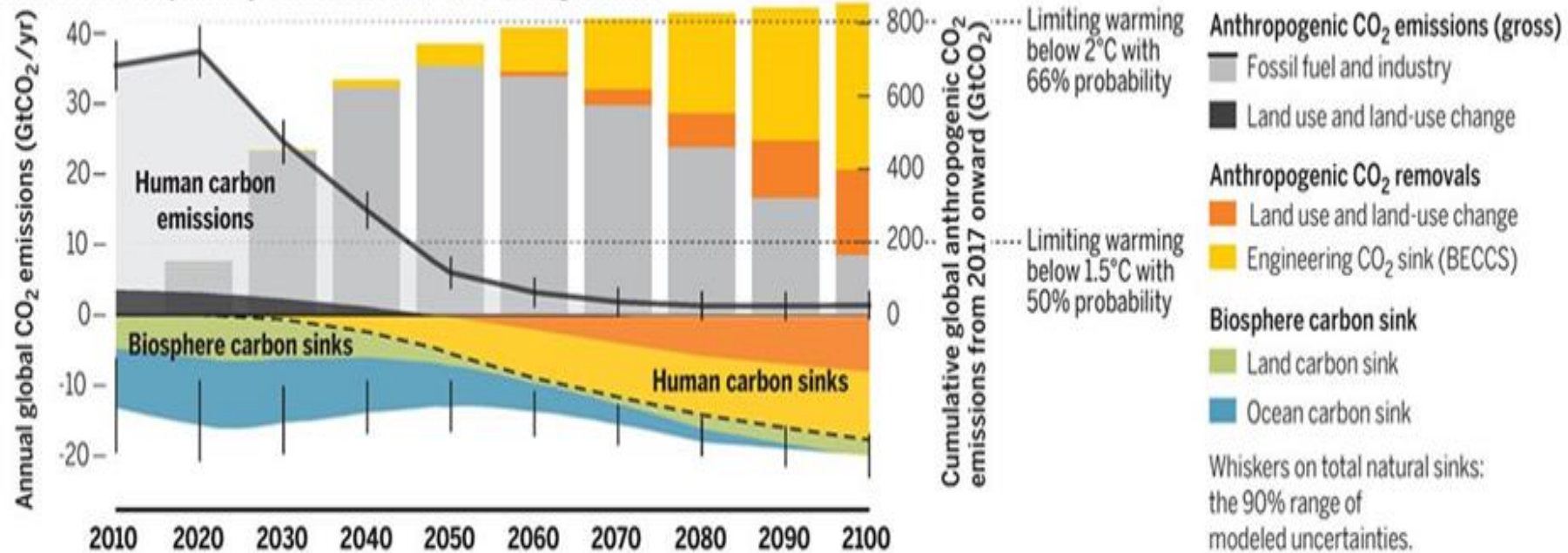
Strategic bioeconomy topics at EFI

- Building a better understanding of future **markets** of forest products
- Assessing the **sustainability** of value chains for forest products and services
- Linking smart **forest management** to products and services under climate change
- Promoting **science-policy dialogue** on sustainable bioeconomy development

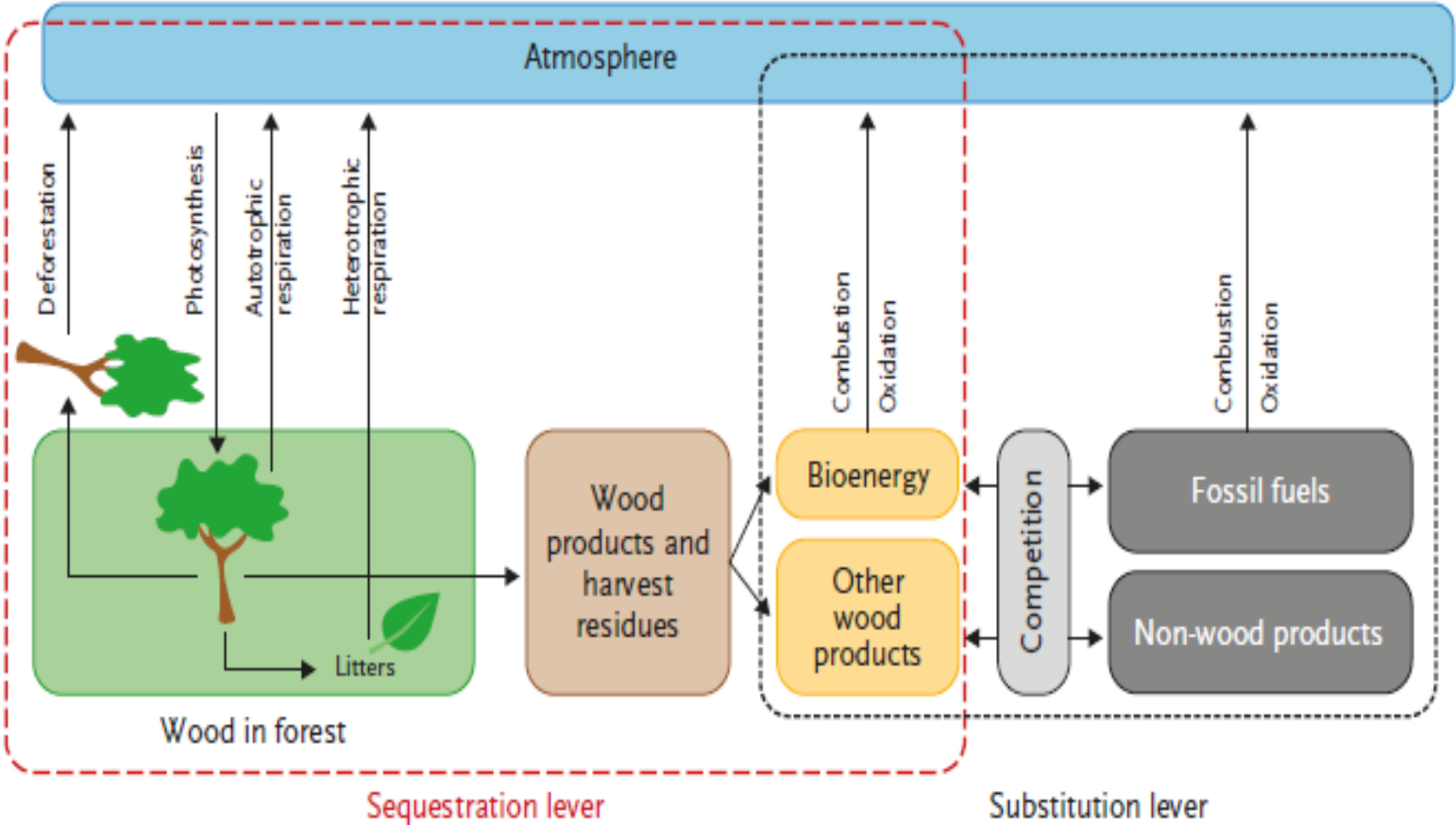
Emission pathway consistent with limiting global warming to 1.5 degrees by 2100 (Rockström et al. 2017):

A global carbon law and roadmap to make Paris goals a reality

Decarbonization pathway consistent with the Paris agreement

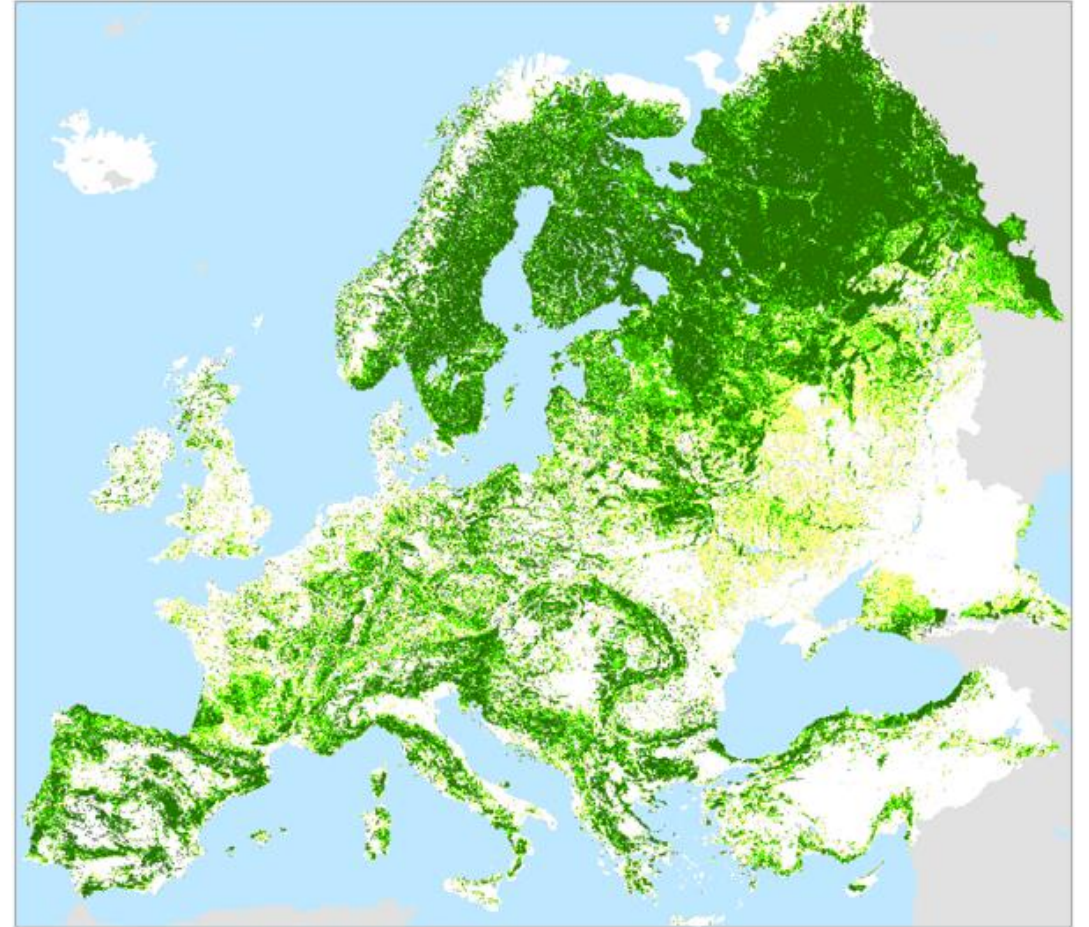


Carbon stocks and flows (Nabuurs et al.)



Forests, our most important biological infrastructure

- Covering **43% of EU land**
- Key for **biodiversity, water and soil**
- Climate change mitigation effect equivalent to **13% of CO₂ emissions**
- **Main source** of non-food, non-feed renewable biological resources



Climate Smart Forestry (CSF)

- Use triple S impacts – sink, substitution and storage.
- Country differences: tailoring policies and incentives at the regional level – one size does not fit all.
- Finding synergies between climate and other benefits (e.g., bioeconomy, biodiversity, recreation).

What CSF could contribute

- Current annual mitigation effect from EU forests via contributions to the forest sink, **material substitution and energy substitution** is estimated to be 569 Mt CO₂/yr (i.e. 13% of total EU emissions).
- According to Nabuurs et al., it would be possible to achieve an additional mitigation impact through CSF of 442 Mt CO₂/yr by 2050.

Forest bioeconomy

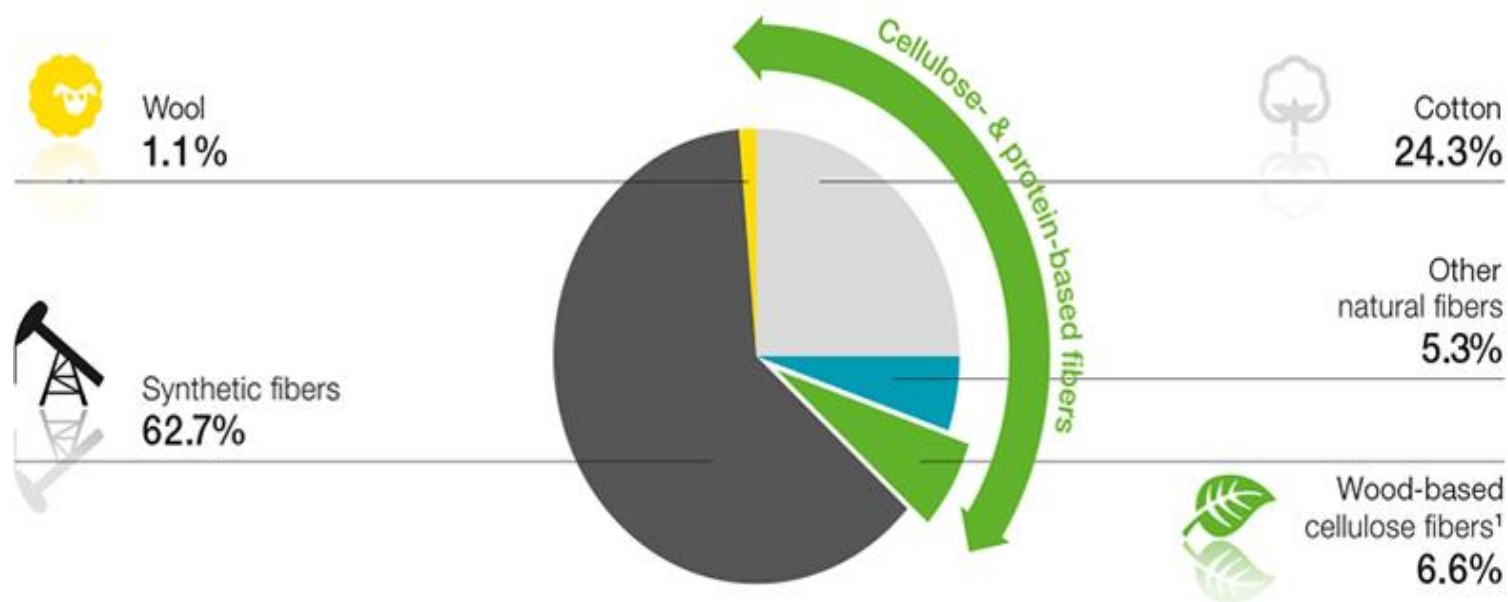
Wood construction

- For each ton of wood products used instead concrete, there could be an **emission reduction** of 2 tons of CO₂.
- When assuming 100% market share of all buildings in Europe with 50% share of wood of building mass, this implies a **3.5% reduction** of total EU CO₂ emissions.



Wood-based fibres for a sustainable textile industry

- Global production of textile fibres:
 - 93 Mt (2016)
 - 250 Mt (2050)
- Carbon footprint from wood-based textile fibres can be significantly lower than synthetic ones



The plastics economy: an inconvenient truth?

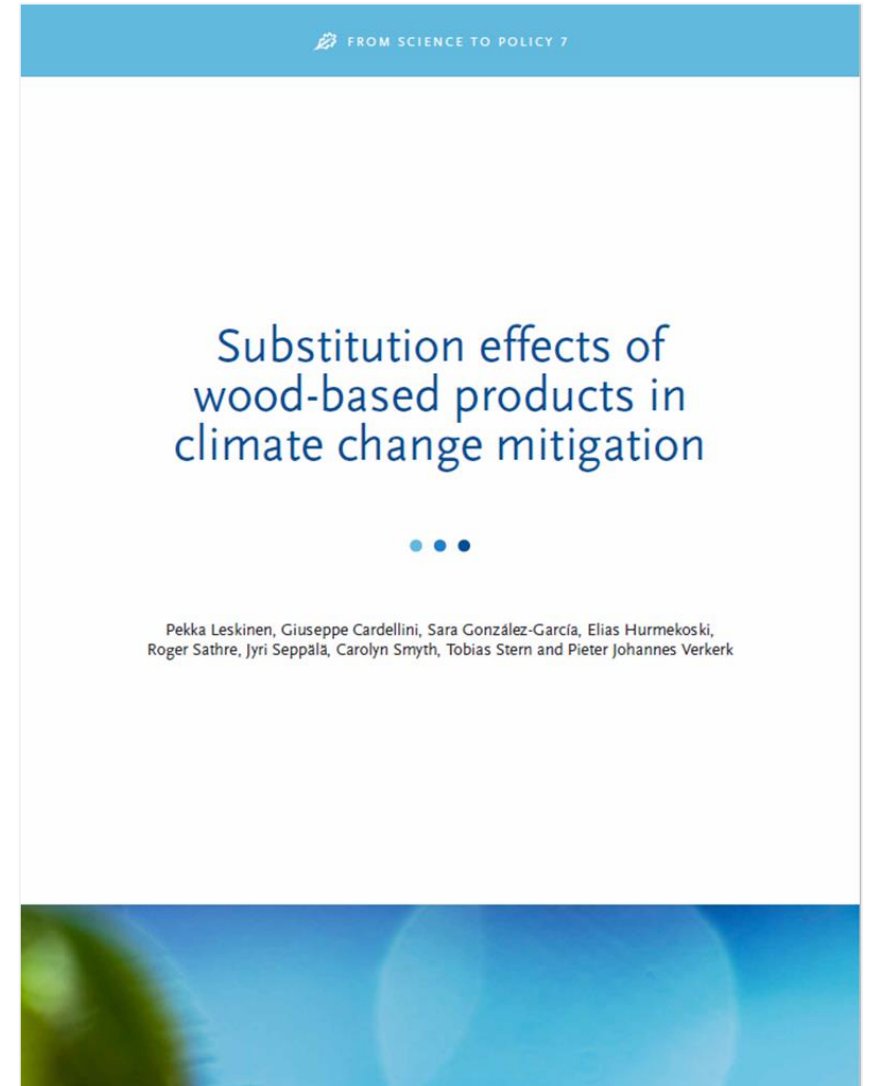


- Global production of plastics: **311 Mt**
 - Resulting in **390 Mt CO2** and **8 Mt** of plastics **to the ocean** every year
- By **2050**, demand for plastics **400% higher**:
 - **20%** of oil consumption
 - **15%** of CO2 emissions
 - **More plastic than fish in oceans**



Why this study?

- Many roles: forest carbon sinks, wood products as carbon storage, **substituting greenhouse gas intensive materials**
- Contribution of wood products to mitigation **not well understood**
- Lack of up-to-date knowledge
- Need to understand impacts to develop **optimal strategies for forests/forest sector to contribute to climate change mitigation**



Life Cycle Assessment is key

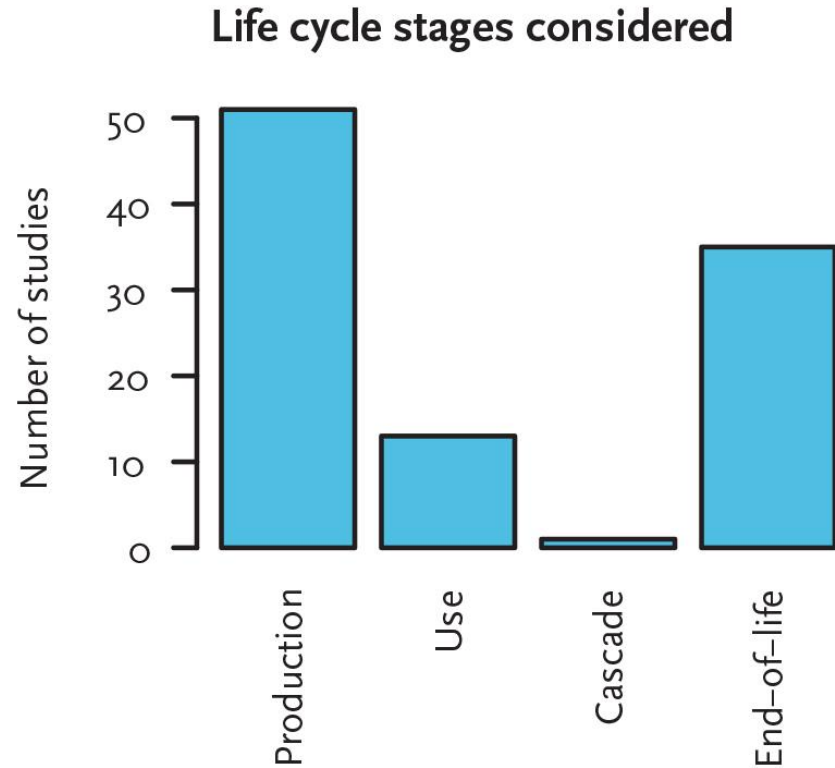
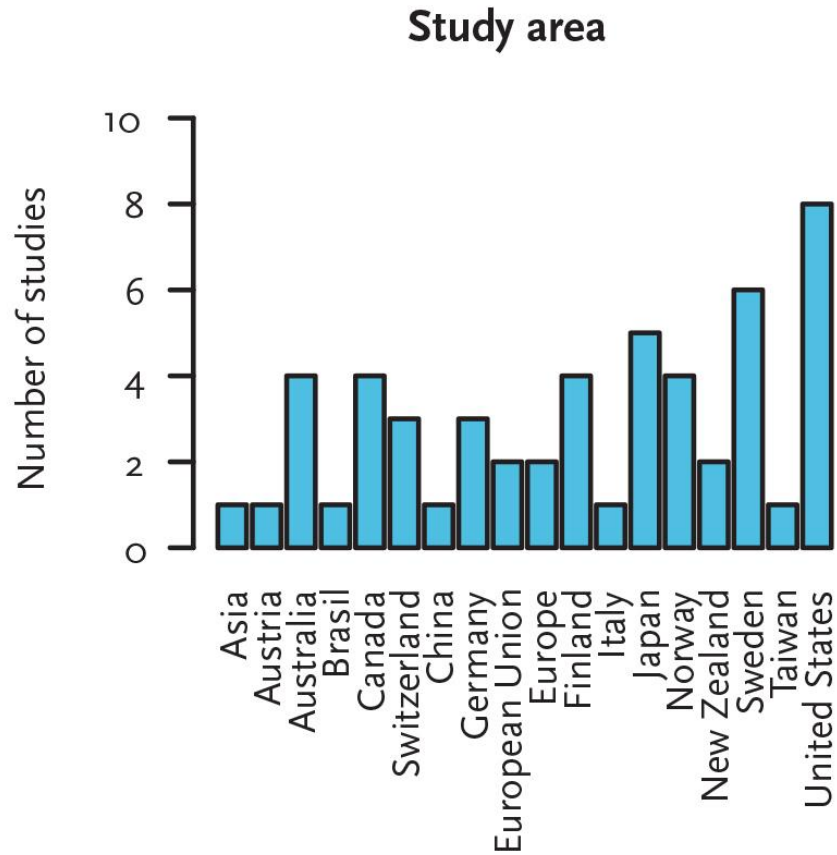
Emissions of a product depend on all life cycle stages:

- **Production**
- **Use and maintenance**
- **Cascading** effects of recovery of materials from end-of-life products
- **End-of-life**

All can be important and should be taken into account!

Results

51 studies: 433 separate substitution factors

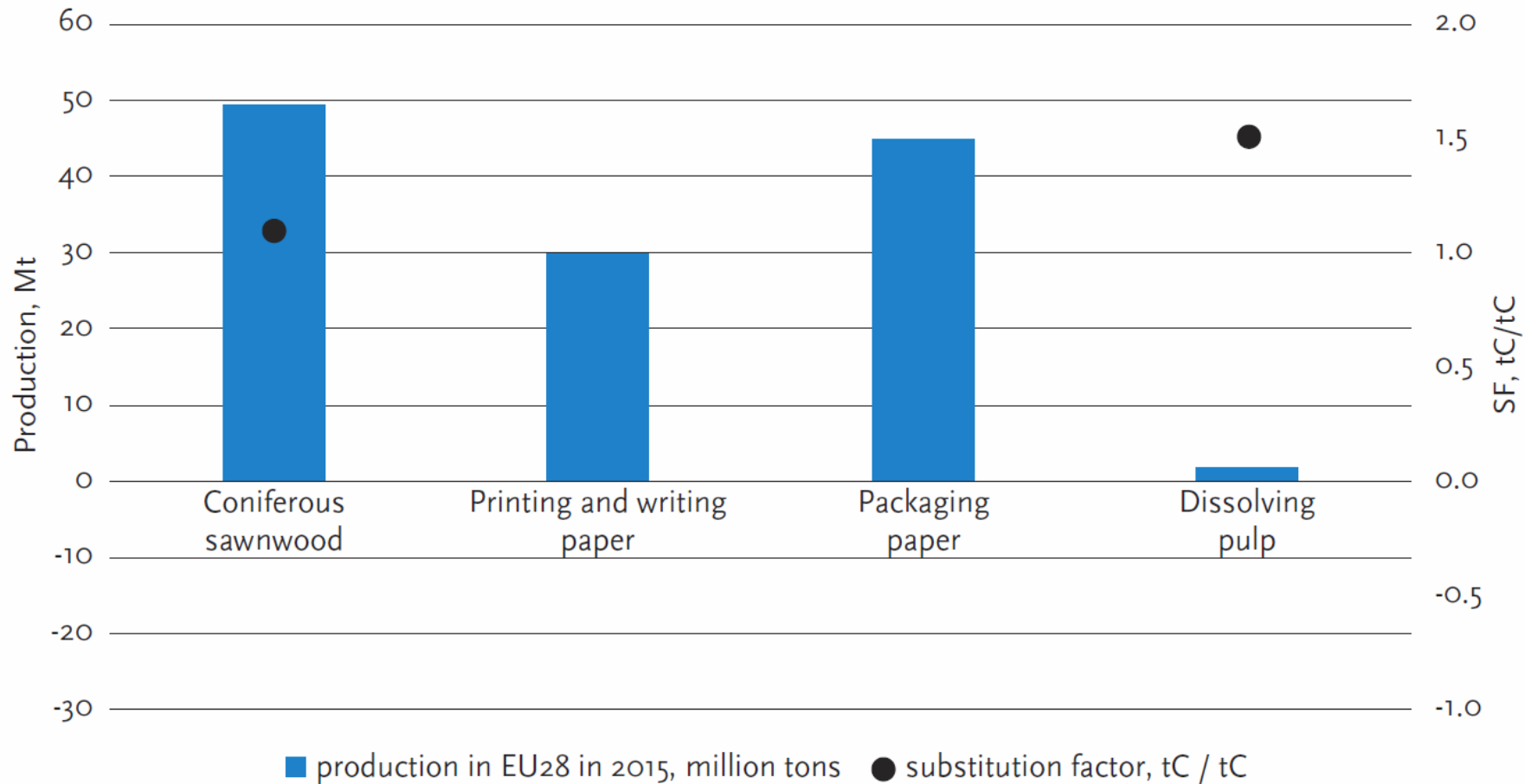


Average substitution effects

Product categories	Average substitution effect kg C / kg C wood product	Average substitution effect kg CO2 eq. / kg wood product
Structural construction	1.3	2.4
Non-structural construction	1.6	2.9
Textiles	2.8	5.1
Other product categories	1 – 1.5	1.8 – 2.7
Average across all product categories	1.2	2.2*

* 95% of the substitution factors between [-1.3, 9.3]

From products to market level



Key messages

1. Use of wood and wood-based products is associated with **lower fossil and process-based emissions** when compared to non-wood products
2. Average substitution effect of **1.2 kg C / kg C**
3. Substitution factor is not sufficient to guide policy making – needs a **holistic approach**

shock - Fotolia

Key messages

4. **Resource-efficiency and minimizing material waste** should be simultaneous policy target with climate mitigation
5. **Lack of knowledge on climate impacts of emerging forest products** – textiles, packaging, chemicals
6. Important to **consider all sustainable development goals** to find synergies and minimize trade offs





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Thank you!

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