



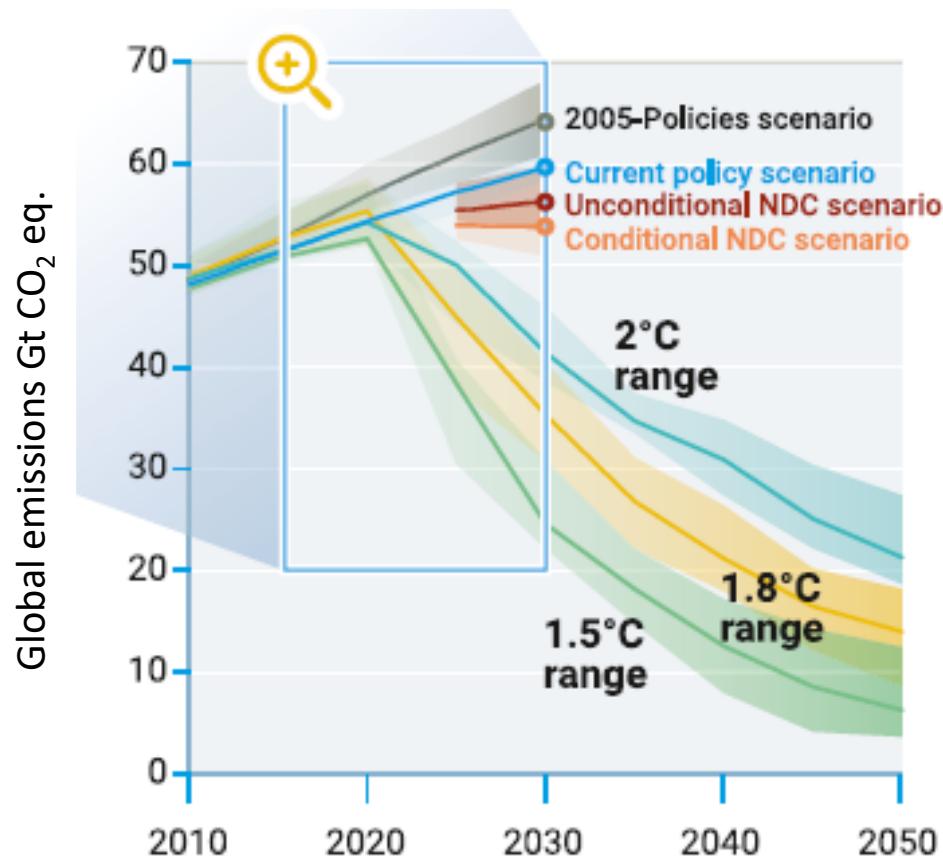
FORESIGHT

Forest renewables replacing fossil-based and GHG-intensive products

Hans Verkerk & Mariana Hassegawa
European Forest Institute



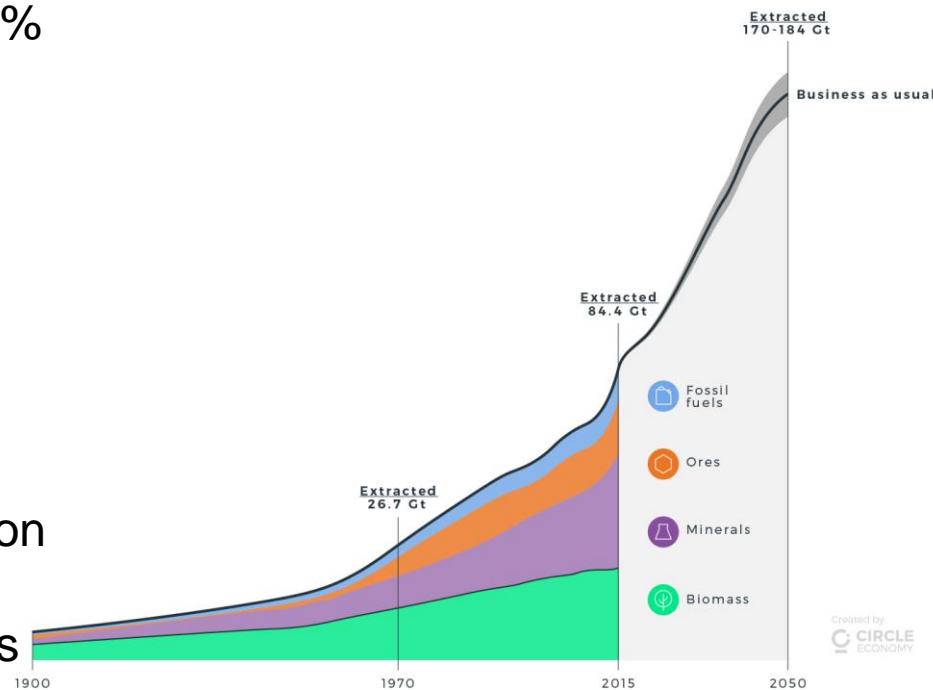
Urgent need to reduce GHG emissions and increase C storage



Source: UNEP 2019

Future wood use

- Future raw material extraction under business as usual associated with +41% in GHG emissions
- Demand for wood and forest products expected to increase due to a growing and increasingly rich global population
- Use of wood can contribute to climate mitigation by storing sequestered carbon in products and through substitution of fossil-based or GHG-intensive products



Source: Hatfield-Dodds et al. 2017

Sustainable Development Goals



Food and Agriculture
Organization of the
United Nations

ADVISORY COMMITTEE
ON SUSTAINABLE
FOREST-BASED
INDUSTRIES (ACSFI)





Project objectives

- Understand the environmental, social and economic benefits (and/or gaps in knowledge) of the substitution effects provided by forest products;
- Describe the role that forest products may play in the emerging bioeconomy;
- Provide high level insight into the supply / demand dynamics of the forest product sector and the considerations that need to occur to ensure forest products can be sustainably supplied.



Project activities and outputs

Activity	Output
1 Hold inception meeting and provide a project overview	Project kick-off and presentation at ACSFI Annual Meeting
2 Assessment of forest-based substitutes for their environmental contributions	Interim report 1: Review of environmental impacts by substitution with forest-based products
3 Forest products and the bioeconomy	Interim report 2: Forest products and the bioeconomy
4 Identify and describe a range of forest-based substitutes and provide a detailed update on emerging and potential forest-based products	Interim report 3: Analysis of the possibilities to use forest-based products to provide substitution benefits
5 Development of final report	Final report
6 Organize awareness raising event	Awareness raising event (incl. panel discussion and product exhibition)

Assessment of forest-based substitutes



Food and Agriculture
Organization of the
United Nations

ADVISORY COMMITTEE
ON SUSTAINABLE
FOREST-BASED
INDUSTRIES (ACSF)

- **Task:** conduct a review of the quantitative and qualitative understanding of the environmental impacts and benefits of substituting fossil fuel-based products with forest-based products
- Existing literature review of carbon substitution effects by Leskinen et al. (2018)

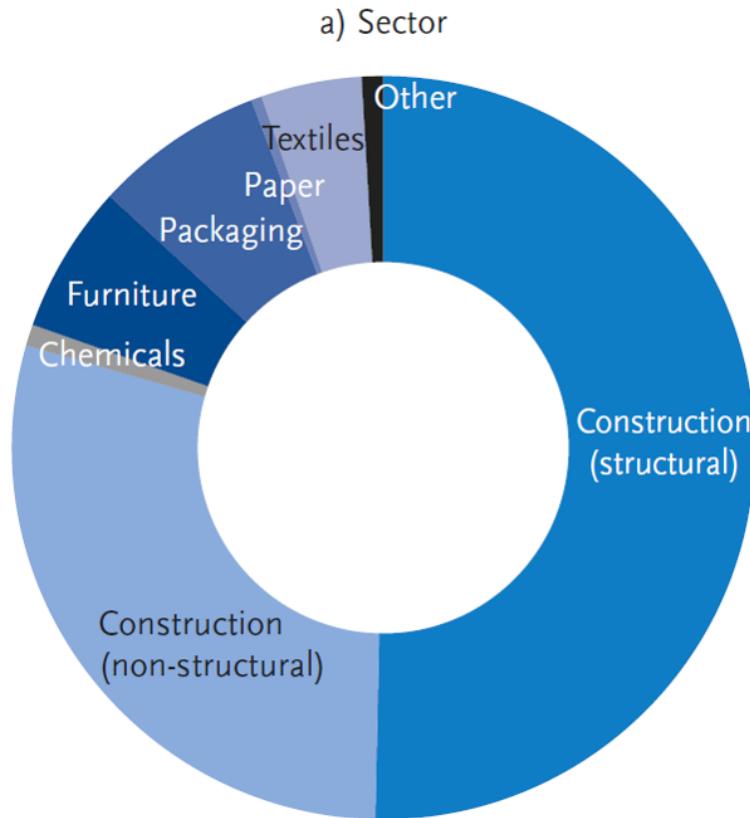
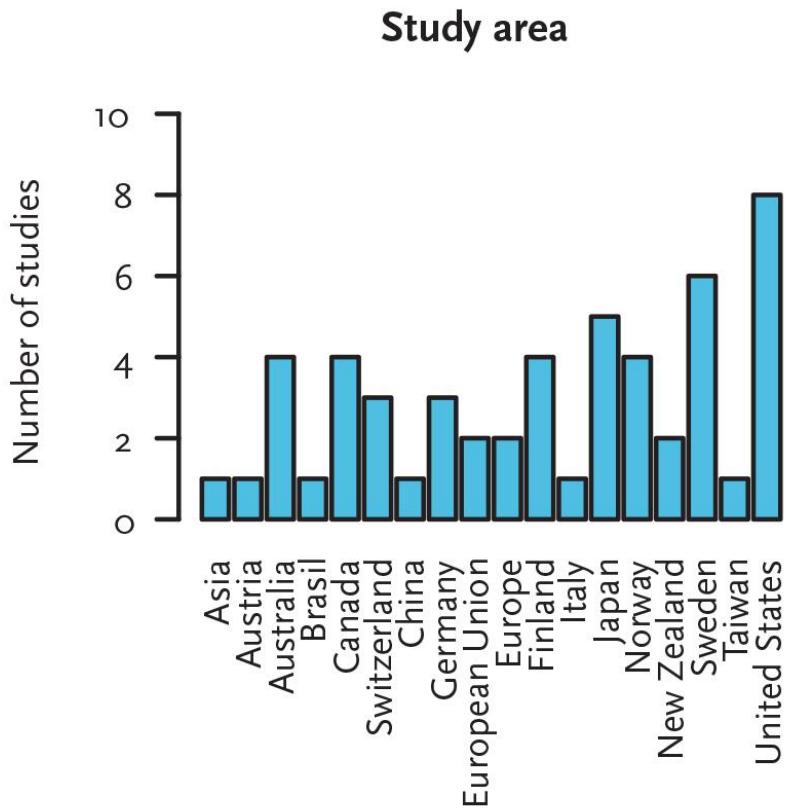
FROM SCIENCE TO POLICY 7

Substitution effects of
wood-based products in
climate change mitigation

• • •

Pekka Leskinen, Giuseppe Cardellini, Sara González-García, Elias Hurmekoski,
Roger Sathre, Jyri Seppälä, Carolyn Smyth, Tobias Stern and Pieter Johannes Verkerk

Assessment of forest-based substitutes





Assessment of forest-based substitutes

- Majority of studies show wood products provide substitution benefits
- Large variability between studies

Product categories	Average substitution effect kg CO ₂ eq. / kg wood product
Structural construction	2.4
Non-structural construction	2.9
Textiles	5.1
Other product categories	1.8 – 2.7
Average across all product categories	2.2*

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

Forest products and the bioeconomy

- **Task:** review the role and opportunity for the forest sector in the global bioeconomy
- Global focus / geographical spread
- Focus on products that are already on the market:
 - Graphical paper and newsprint
 - Traditional packaging (cardboard)
 - New packaging materials
 - Engineered construction materials
 - Novel products (e.g. man-made fibres)
 - Non-wood forest products (e.g. cork)
- Potential risk factors:
 - Carbon footprint (incl. forest carbon balances)
 - Not solving current problems related to circularity, toxicity, biodiversity
 - Implications for SFM
- *Discussion question: what are potential risk factors associated with the use of forest products in a bioeconomy that can provide reasons for caution or new insights?*



Forest-based substitutes and emerging and potential forest-based products

- **Task:** produce factsheets and an overview on emerging forest-based products that could displace fossil-based and GHG-intensive products in the future
- Content of factsheets
 - Current global demand and production
 - Feedstock required
 - Fossil-based or GHG-intensive products that can be substituted
 - Knowledge and gaps on products' environmental impact
 - Policy and other incentives that enabled the forest-based product's development
 - Relevant research and innovation related to the product
- *Discussion question: What would be novel forest-products providing substitution benefits that could be explored in the project?*

Product Factsheet

 **Wood-based textiles**
Here there will be some information about new wood-based textiles.

 **Feedstock**
What are the main raw materials used?
Here we can add some information about the feedstock used to manufacture these products.

 **Current global demand and production**
How much is consumed and produced?
In this section we can present the current global demand and production of textiles in general and wood-based textiles. The demand and production can be divided into man-made textiles and bio-based textiles, including cotton.

 **Knowledge and gaps regarding the environmental impact**
What are the knowledge and gaps regarding the environmental impacts of wood-based textiles?
Here it will be described what it is known about the environmental impacts related to the production of wood-based textiles. Some production processes use harsh chemicals, others technologies are closed-loop. The gaps in knowledge regarding the environmental impact will also be described here.

 **Substitution**
What are the products that can be substituted?
In this section we can list the fossil-based and GHG-intensive products that could be substituted by wood-based textiles. We can discuss about how newer technologies can substitute traditional ones, such as for the production of viscose.

 **Policy and other incentives**
What are the policy and other incentives that enable the development of the wood-based textile industry?
Here we can describe the policies and other incentives that can enable the development of the wood-based textile industry.

 **Relevant research and innovation initiatives**
What are the relevant and innovation initiatives?
Here relevant research related to the development of technologies and improvement of processes can be described. The most relevant innovation initiatives can also be discussed here.



Project outcomes

- Comprehensive report by end of 2020
 - Synthesis of all tasks
 - Recommendations on how best to account and demonstrate substituting forest products' contribution to SDGs 15,12 and 13 and Global Forest Goal 2
 - Recommendations for enabling conditions for sustainable substitution in a range of jurisdictions
- Awareness raising event at FAO Headquarters on innovative and commercially viable wood-based products that could provide substitution benefits



Food and Agriculture
Organization of the
United Nations

ADVISORY COMMITTEE
ON SUSTAINABLE
FOREST-BASED
INDUSTRIES (ACFSI)

THANK YOU!

We welcome your feedback!

Hans Verkerk (hans.verkerk@efi.int)

Mariana Hassegawa (mariana.hassegawa@efi.int)



- What are the forest industries' strategies to warrant forest product sustainability and ensure circularity of novel forest products?
- What are potential risk factors associated with the use of forest products in a bioeconomy that can provide reasons for caution or new insights?
- What would be novel forest products providing substitution benefits that could be explored in the project?