



EUROPEAN FOREST INSTITUTE

Towards a sustainable European forest based bioeconomy ***Assessment and the way forward***

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Think Forest Seminar: Looking ahead to a circular European bioeconomy

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I. Background and introduction

Study: Towards a sustainable European forest based bioeconomy – assessment and the way forward

- Assigned by EFI's MDTF for policy support
- 48 scientists from 26 institutions in 12 countries

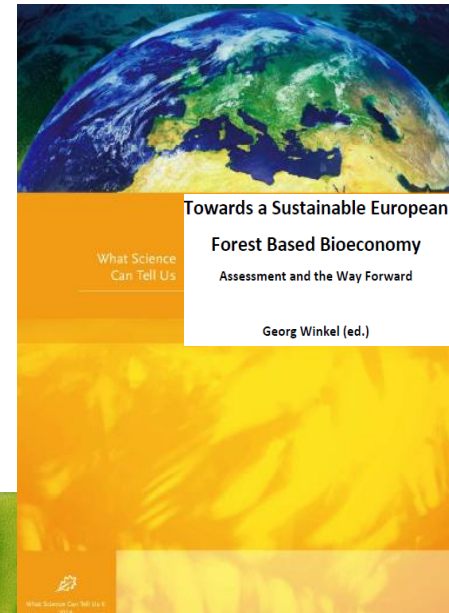
Main objectives: review scientific knowledge regarding:

- the **importance of forests** for a European bioeconomy
- economic, social and environmental **sustainability**
- **future developments** that may affect the forest-based bioeconomy

Background and introduction (2)

Main contents of the study

1. European policy framework
2. Critical issues
 - Biomass availability, biodiversity, climate change, resource efficiency, amenity values, competitiveness, employment, forest ownership, forest-product markets, non-wood forest products
3. Bioeconomy indicators
4. Policy relevant conclusions



II. Core findings and policy relevant conclusions

1. The scope of the forest-based bioeconomy
2. Regional diversity
3. Sustainability
4. Bioeconomy and society

II.1 The scope of a forest-based bioeconomy

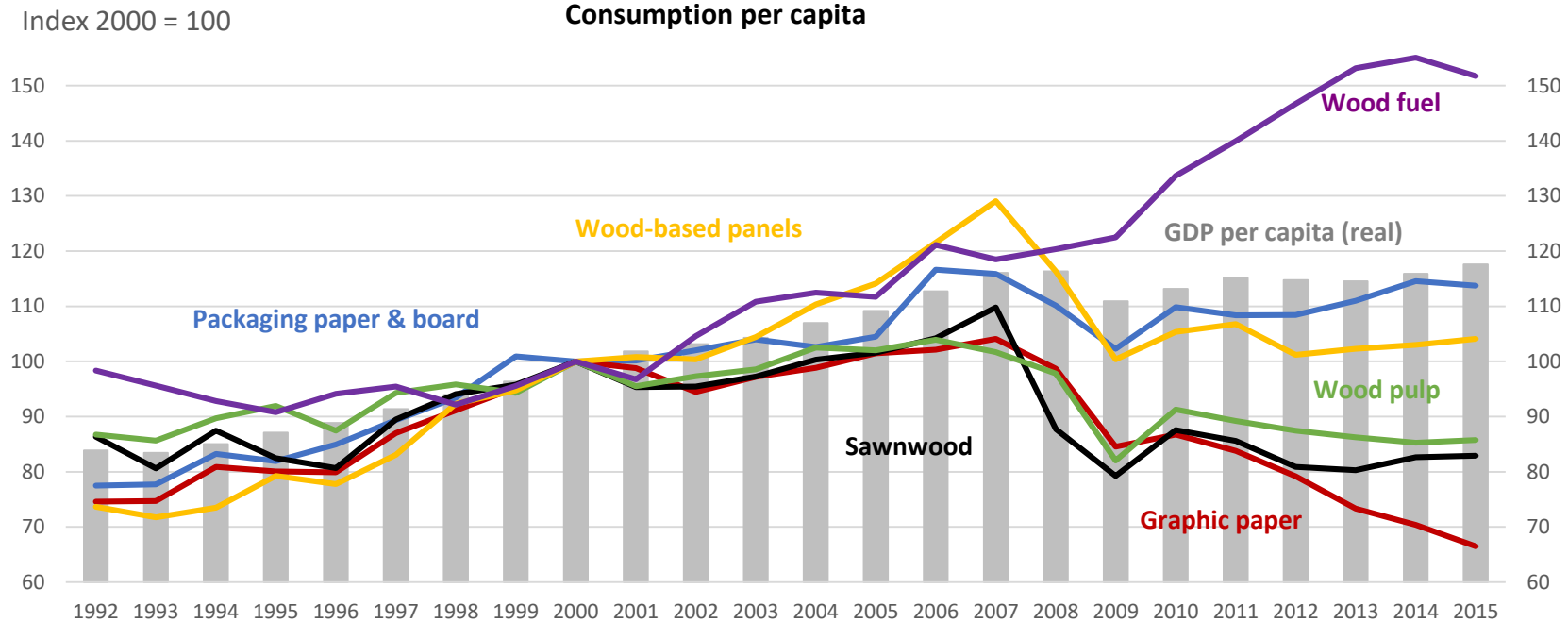
Key findings

- Current bioeconomy strategies and their implementation focus on forest biomass (Sec. 2.2: Pülzl, Giurca, Kleinschmit, Arts, Mustalahti, Sergent, Secco, Pettenella, Brukas)
- Non-wood forest products and other forest ecosystem services have substantial





The scope of a forest-based bioeconomy (2)



Consumption per capita of forest-biomass-based products and GDP growth in Europe
(Data: FAOSTAT, World Bank, here Sec. 3.9: Jonsson, Hurmekoski, Hetemäki, Prestemon)

The scope of a forest-based bioeconomy (3)

- Medical, environmental, and industrial sensors
- Water and air filtration
- Cosmetics
- Organic LEDs
- Flexible electronics
- Photovoltaics
- Recyclable electronics
- Battery membranes

HIGH VALUE

Possible end uses of new wood-based products (Cowie et al, 2014; Pöyry, 2016; here Sec. 3.9: Jonsson, Hurmekoski, Hetemäki, Prestemon)

- Insulation
- Aerospace structure & interiors
- Aerogels
- Food & feed additives
- Paints and coatings

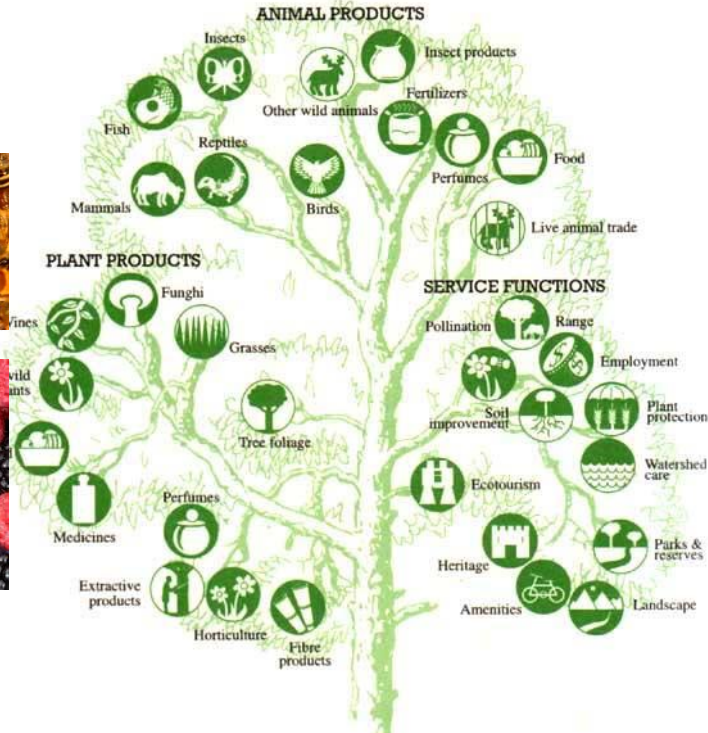
- Textiles
- Biofuels (crude oil, diesel, ethanol, jet fuel)
- Construction elements
- Cement additives or reinforcement fibers
- Automotive body & interior
- Packaging & paper coatings
- Paper & packaging filler
- Plastic packaging
- Intelligent packaging
- Hygiene and absorbent products

HIGH VOLUME

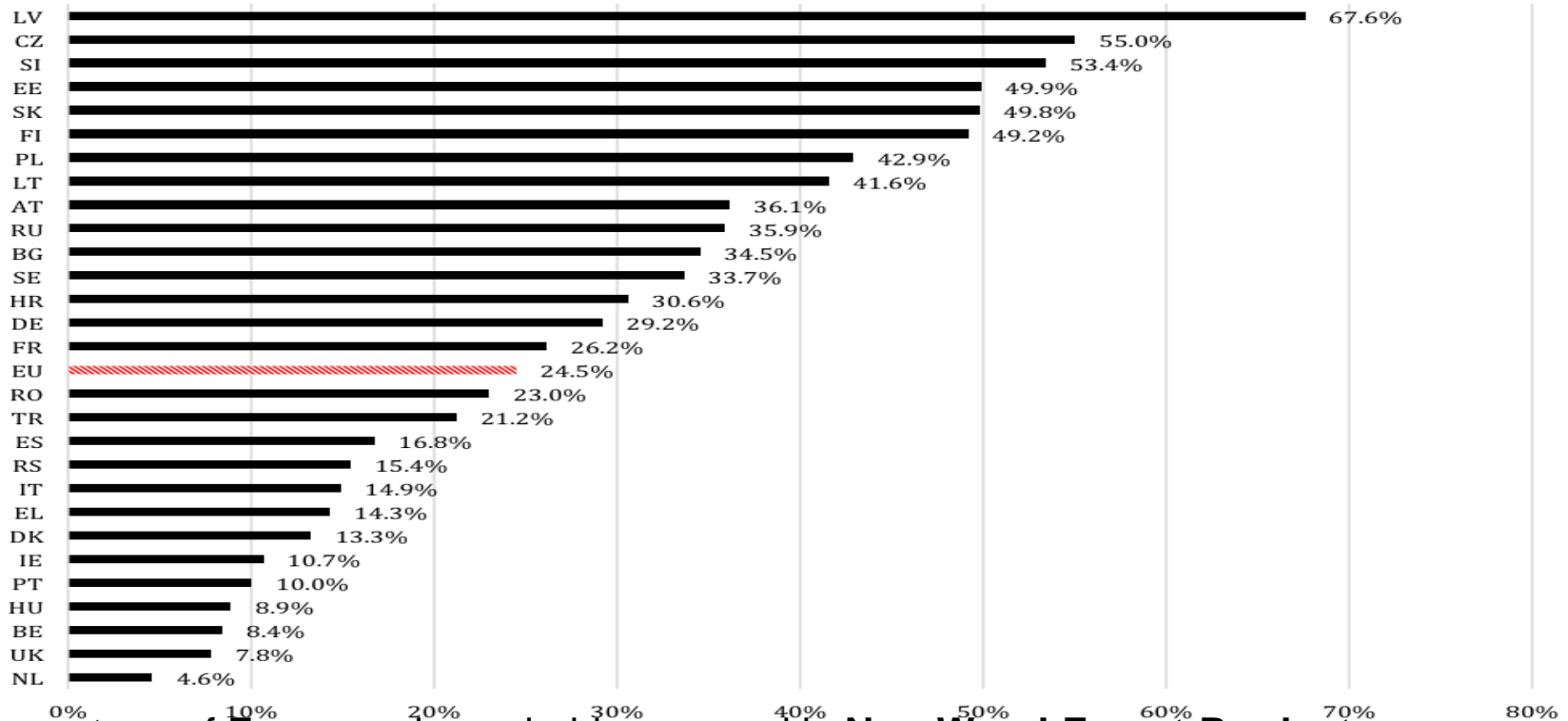
The scope of a forest-based bioeconomy (4)

Non-Wood-Forest-Products

- Estimated value €2.2 billion, representing around 10% of the value of round wood (Forest Europe, 2015)
- New research indicates significantly higher economic importance in Europe



The scope of a forest-based bioeconomy (5)



Percentage of European households engaged in **Non-Wood-Forest-Product harvesting** in 2015 (Vidale et al, 2015; here Sec 3.10: Prokofieva, Lovrić, Pettenella, Weiß, Wolfslehner, Wong).

The scope of a forest-based bioeconomy (6)

Cultural ecosystem services (Sec 3.5: Tyrväinen, Plieninger, Sanesi)

- Nature based tourism, recreation & health
- Education
- Spiritual values



The scope of a forest-based bioeconomy (7)

Conclusions and recommendations

- Economic activities relating to forests are diverse *and* diversifying
- Define the forest-based bioeconomy as encompassing economic activities relating to the entire spectrum of forest ecosystem services



II.2 Regional diversity

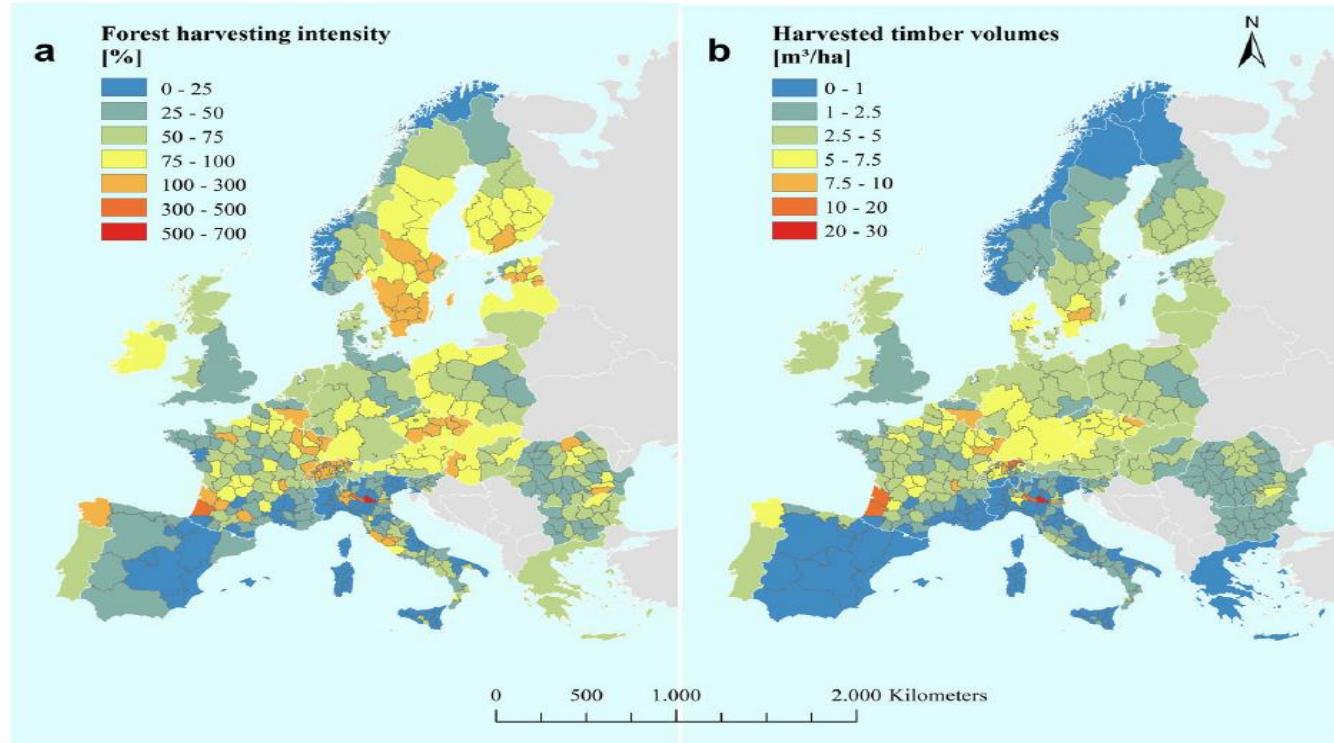
Key findings

The forest based bioeconomy is regionally diverse

- **Biophysical** conditions
- **Socio-economic** factors & **institutional setting**

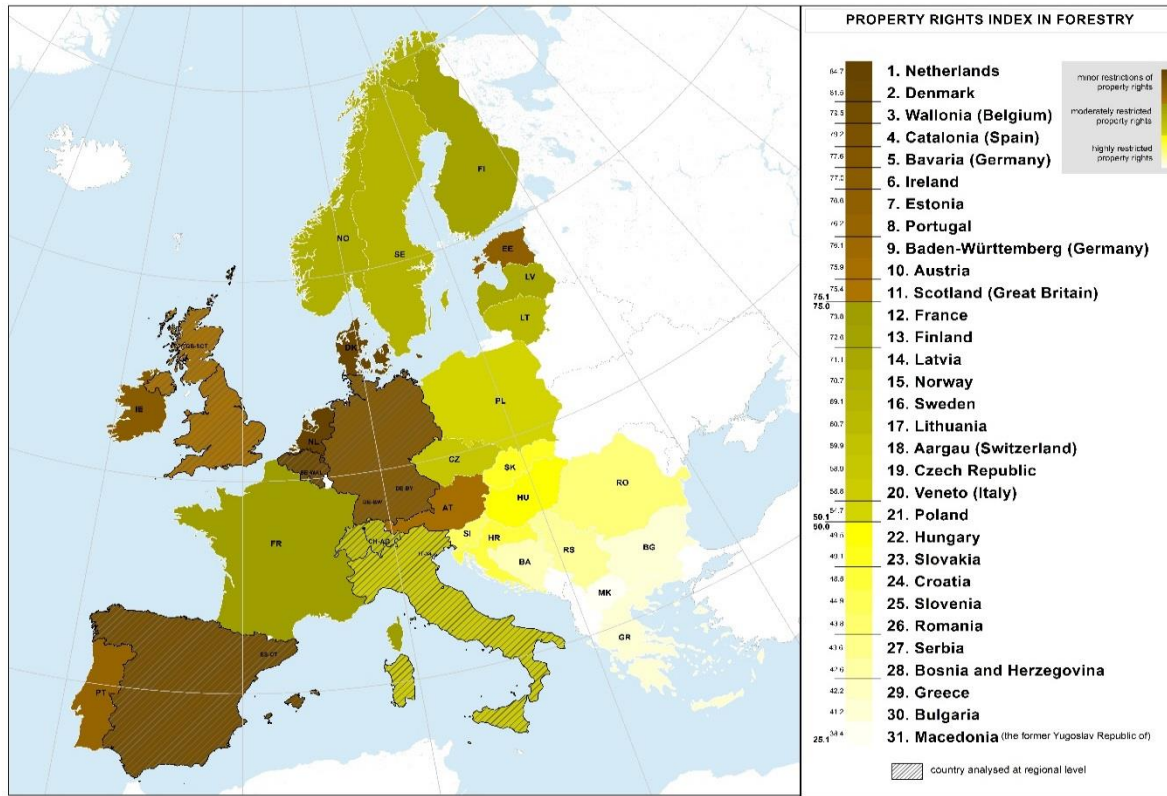


Regional diversity (2)



Average **harvesting intensity** (a; %) and **harvested timber volumes** (b; m³/ha) for the period 2000–2010 (Source: Levers et al, 2014, here Sec 3.1: Kraxner, Fuss, Verkerk)

Regional diversity (3)

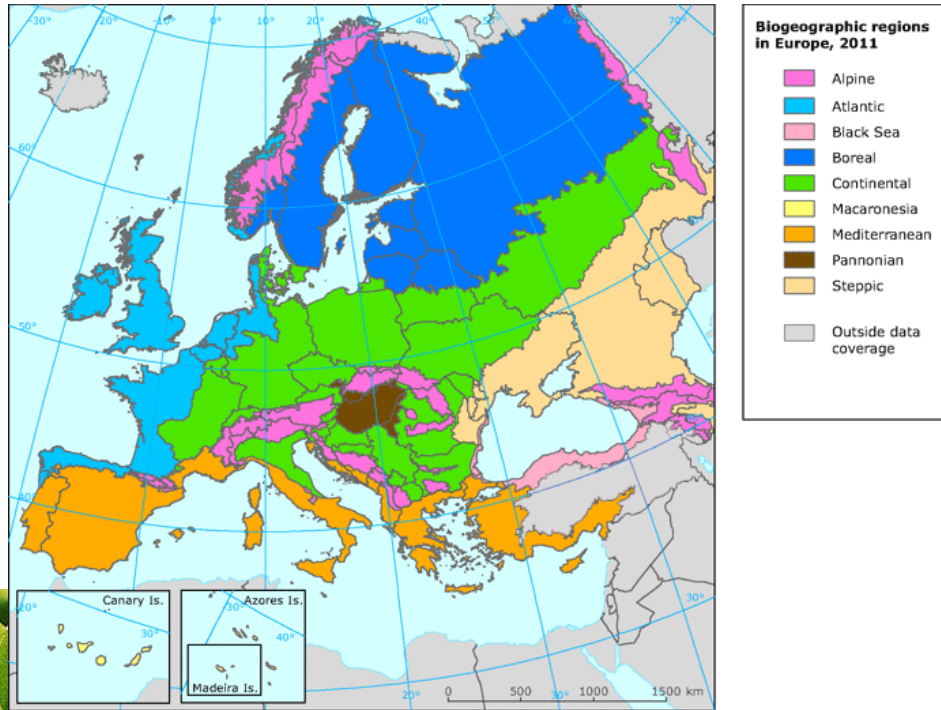


Level of restrictions in private forest management identified across Europe (calculated based on 37 indicators assessing owner's rights (Nichiforel et al, forthcoming, here Sec 3.8: Weiss, Lawrence, Nichiforel)

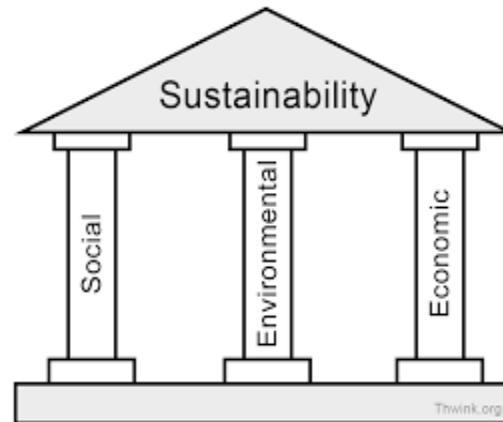
Regional diversity (4)

Conclusions and recommendations

- Multi-level approach: European framework *and* regional profiles
- Consider transnational "bioeconomic regions"

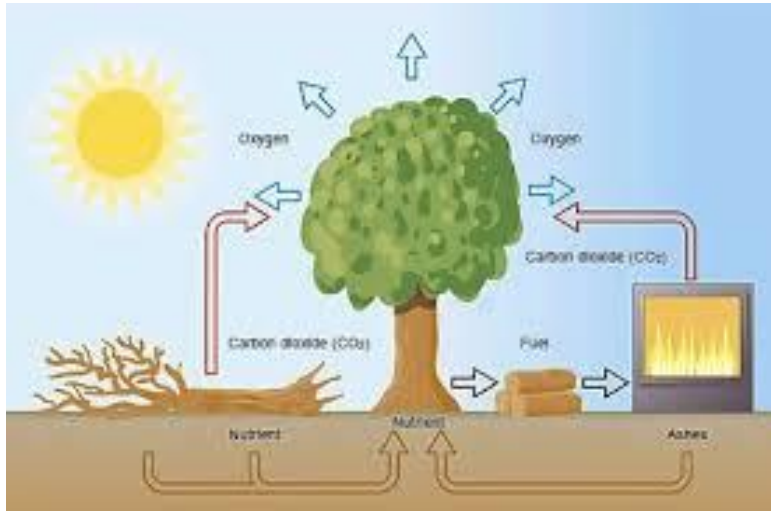


II.3 Sustainability



Sustainability – environmental dimension

- **Climate change mitigation:** forests and wood products sequester ca. 13% of the anthropogenic greenhouse gas emissions in the EU (Sec. 3.3: Lindner, Hanewinkel, Nabuurs)
- **Biodiversity:** significant trade offs relating to intense forest biomass production, but also significant potentials to better use existing synergies (Sec. 3.2: Bauhus, Kouki, Paillet, Asbeck, Marchetti)



Sustainability – environmental dimension (2)

Biodiversity smart forestry (Sec 3.2: Bauhus, Kouki, Paillet, Asbeck, Marchetti)

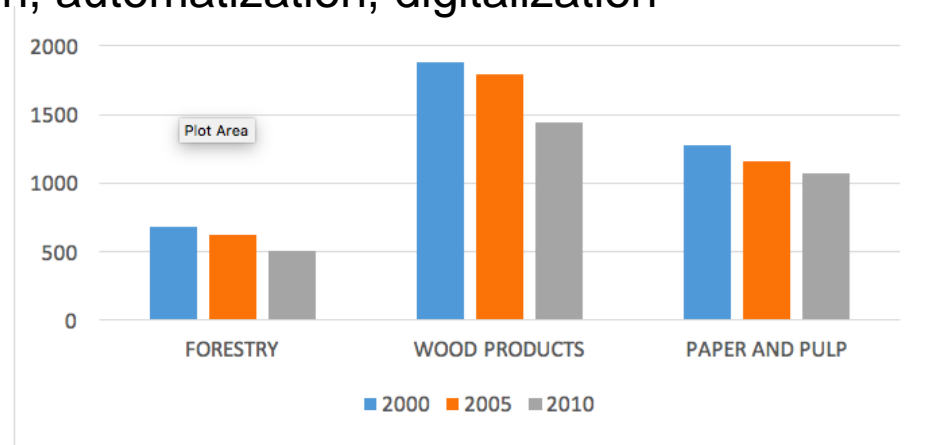
- Science based landscape approach with retention
- Intensification where biodiversity impacts are minimal or positive
- Diversified forest bioeconomy creates synergies



Sustainability – social dimension

Example: employment

- Very little information available
- Significant enlarged employment portfolio: green jobs
- Liberalisation, diversification, automatization, digitalization



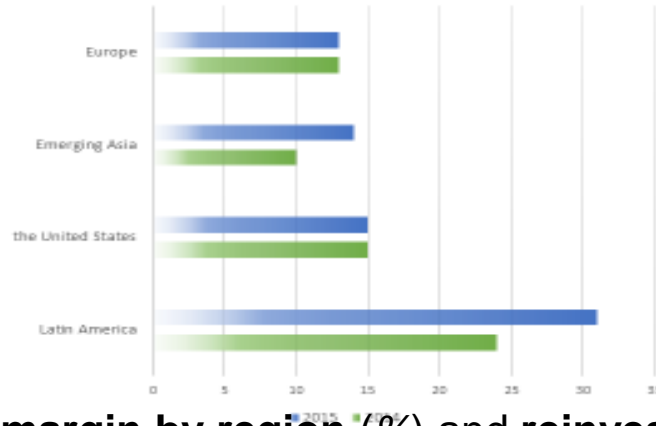
Change in reported **totals employed in the forest sector** in Europe. (Source: Original analysis based on UNECE Statistical Database >> [Forestry \(FOREST EUROPE/UNECE/FAO\)](#) >> [Socio-Economic Functions](#) [accessed October 2016], here Sec. 3.7: Lawrence, Spinelli, Toppinen, Salo)

Sustainability – economic dimension

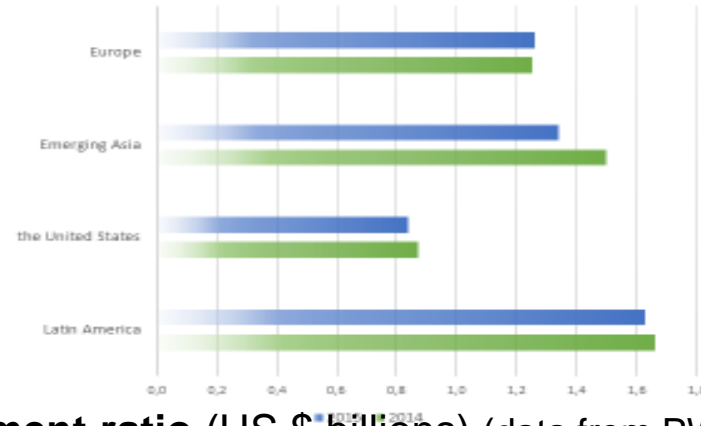
Competitiveness

- European based forest companies still amongst the leading globally, but strong pressure relating to costs and innovations
- Sustainability as a long term asset for European companies

EBITDA margin (%)



Reinvestment ratio (US \$ billions)



EBITDA margin by region (%) and reinvestment ratio (US \$ billions) (data from PWC, 2016, here Sec 3.6: Toppinen, Korhonen, Hurmekoski, Hansen).

Sustainability – recommendations

Conclusions and recommendations

- Forest based bioeconomy – **sustainability promise**, but not sustainable per se – need to **invest in sustainability!**
- Policy needs to create a level playing field: **internalize social and environmental sustainability** (standards and economic instruments) (see also Sec 3.4: Olsson, Asikainen, Junginger)
- Explore **synergies**
- **Monitor** sustainability (Sec 4: Wolfslehner, Linser, Pülzl, Bastrup-Birk, Camia, Marchetti; advised by: Wolf-Crowther)
- Form **cross-sectoral alliances**
- Explore **new sustainability markets**

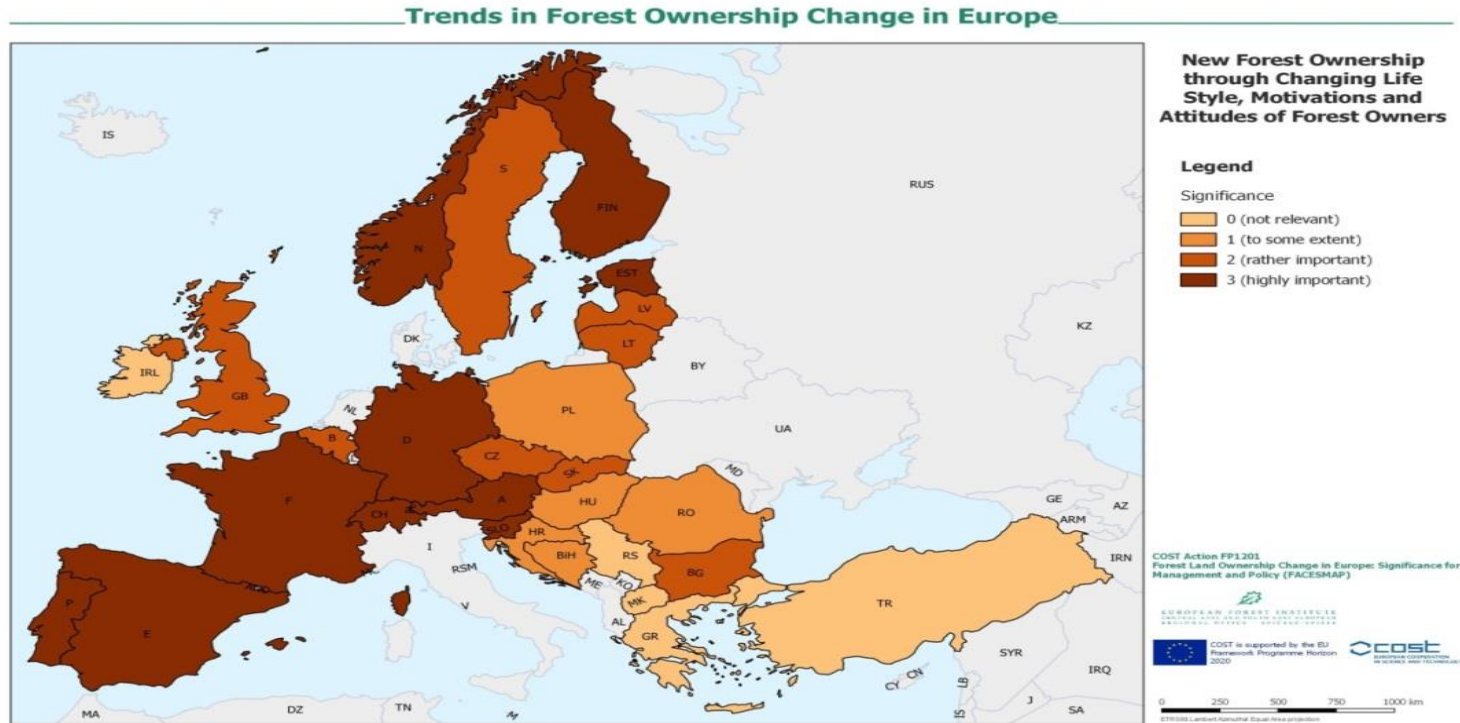
II.4 Bioeconomy and Society

Key findings

- Human agency is in the center of the forest-based bioeconomy
- Changing lifestyles, attitudes and perceptions impact the entire value chain



Bioeconomy and Society (2)



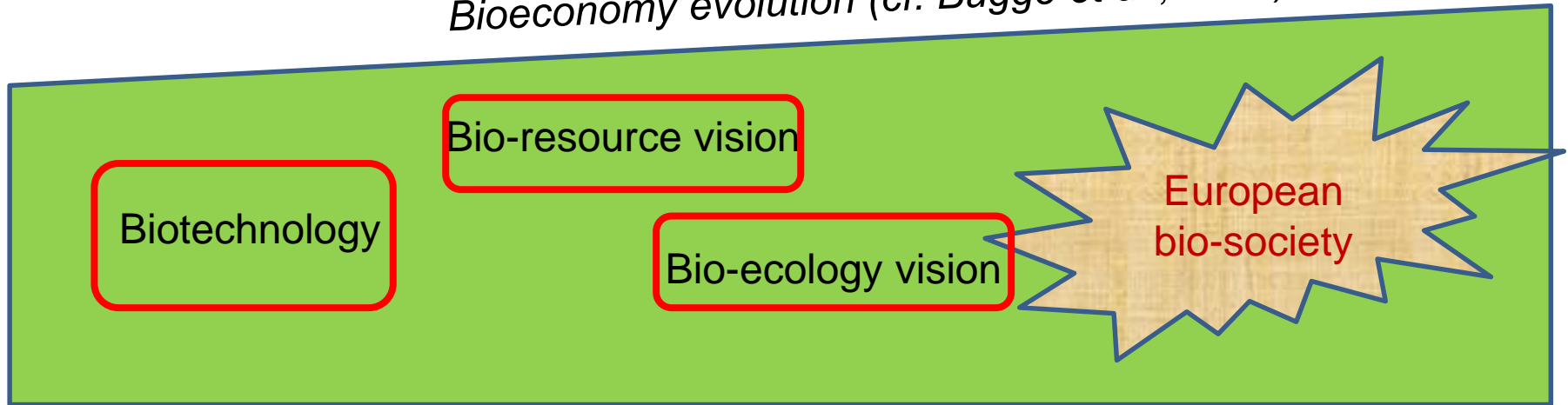
Significance of **changed lifestyle, motivations and attitudes of forest owners** in Europe (data source: FACESMAP Country Reports; published in: FACESMAP Policy Paper, Weiss et al, 2017, Here Sec. 3.8: Weiss, Lawrence, Nichiforel).

Bioeconomy and Society (3)

Conclusions and recommendations

- An (societally) inclusive forest-based bioeconomy is imperative in Europe
- Sustainability *and* bioeconomy diversification are key to access urban milleus

Bioeconomy evolution (cf. Bugge et al., 2016)



Thank you!

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