



EUROPEAN FOREST INSTITUTE

European Forest-Based Bioeconomy

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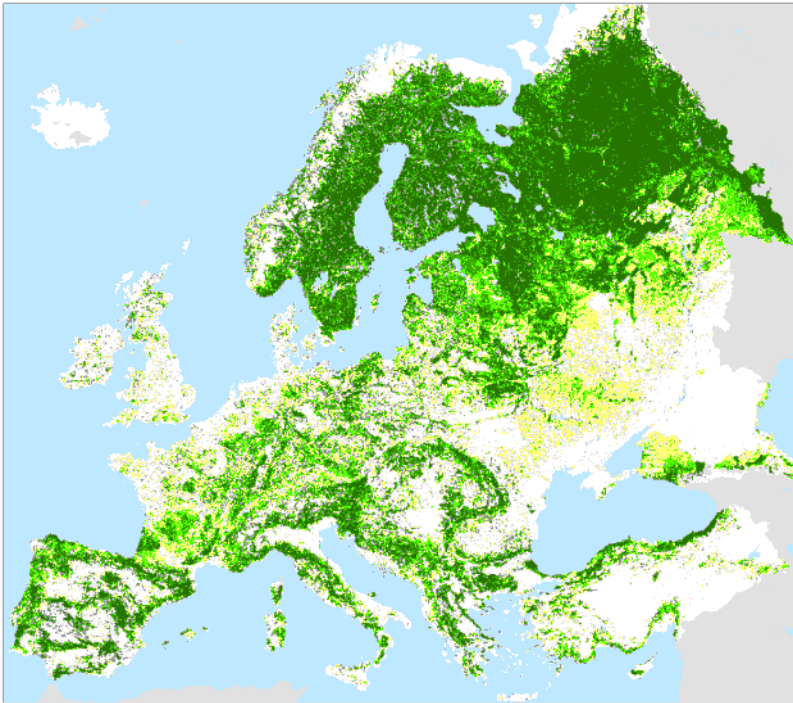


Presentation outline

1. Relevance of European forest bioeconomy
2. New bioeconomy products
3. Bioeconomy services
4. Conclusions



European forests: key for Europe's circular bioeconomy



- Covering **37% of EU land**
- Capturing **13% of CO₂ emissions**
- Renewable resources for
 - **25% of EU Bioeconomy**
 - **44% of renewable energy**
- Key for the sustainability of:
biodiversity, water and soil

Relevance of *traditional* EU forest products industry

- Turnover equal to sum of French company giants *GDF Suez + EDF + Airbus*
- Employment 3 x bigger than the three above companies
- Including further forest-based processing industries + forestry + logistics + services could easily double the numbers

EU forest products industries turnover & employment

<i>Data source: EUROSTAT</i>	Paper and Paperboard	Wood Products	Total
Turnover value <i>(2014, in billion euros)</i>	179	123	302
Employment <i>(2013, number of workers)</i>	621 700	823 000	1.45 million

Changes in forest-based bioeconomy will have major impacts to *climate, economy, employment and forests*



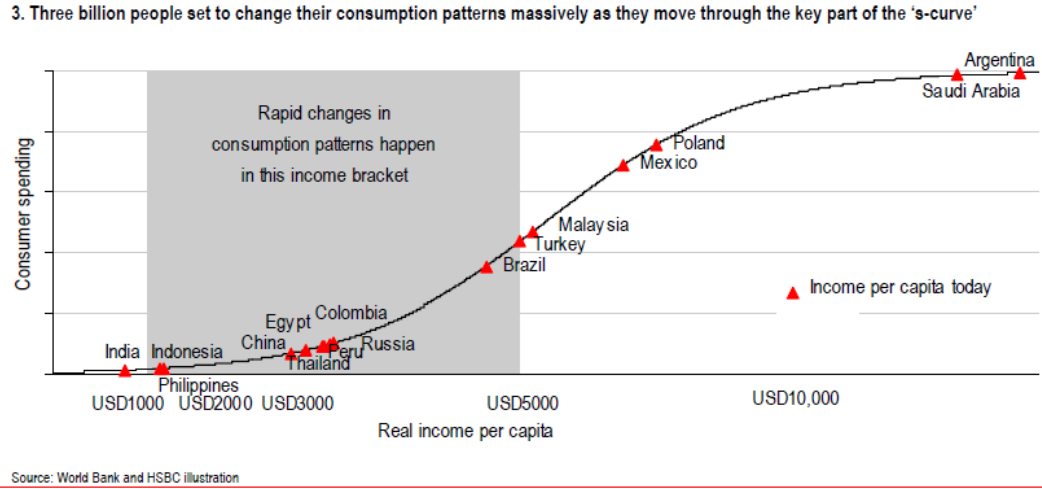
Many definitions of “**bioeconomy**”. Often it has been understood to mean using renewable biomass for materials and products, which can replace fossil raw materials and products. But should not forget that forest sector *services* are also part of bioeconomy



Major drivers for global & European forest bioeconomy ...

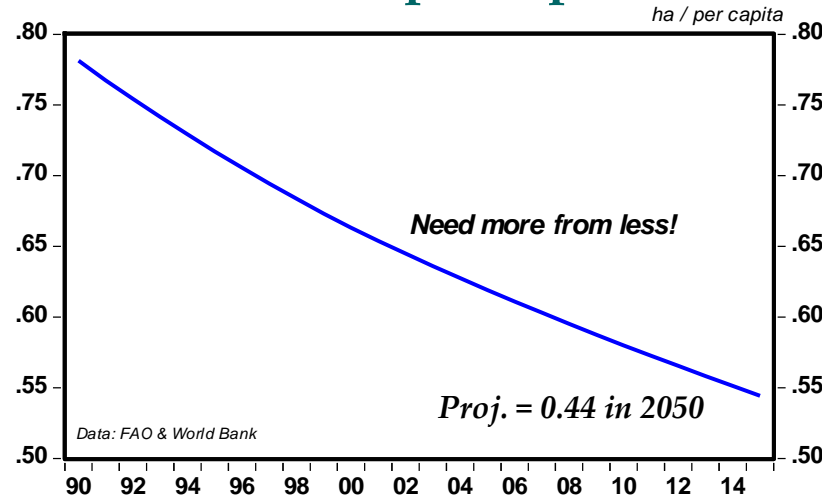
1. Population and income growth
2. Climate change
3. Challenges with current forest products markets in Europe
4. New forest-based products (*bioenergy, biomaterials, nanopulp, etc.*)
5. Services - the big megatrend of the 21st Century

Income growth > more demand for using forests



Balancing demand and supply
will require
increasing resource-efficiency &
better forest management

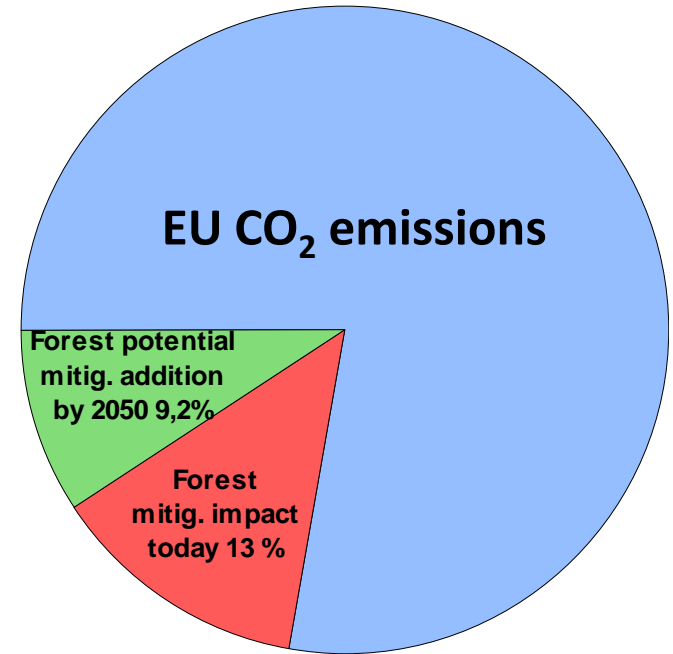
World forest area per capita 1990-2015



EU forests & bioeconomy could do much more for climate mitigation

Climate Smart Forestry*

- Uses *sink, substitution* and *storage*
- Incentives & tailoring policies in regions – *one size does not fit all*
- Finding synergies between climate and other benefits (*e.g., bioeconomy, biodiversity*)
- Strive to conciliate mitigation with adaptation

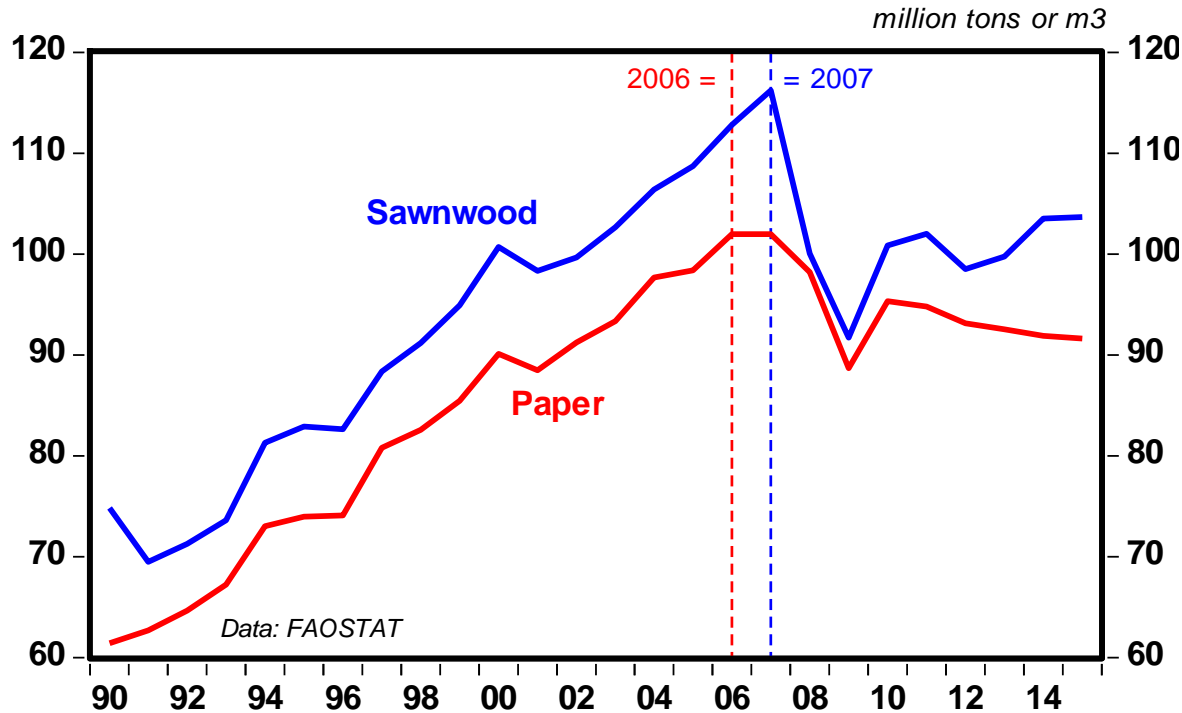


Estimated equivalent of 22 % of total EU CO₂ emissions could be potentially mitigated by forest & forest sector by 2050

*Nabuurs et al. 2015. A new role for forests and the forest sector in the EU post-2020 climate targets. From Science to Policy 2. European Forest Institute.



EU Sawnwood and Paper Production 1990-2015: “new normal?”

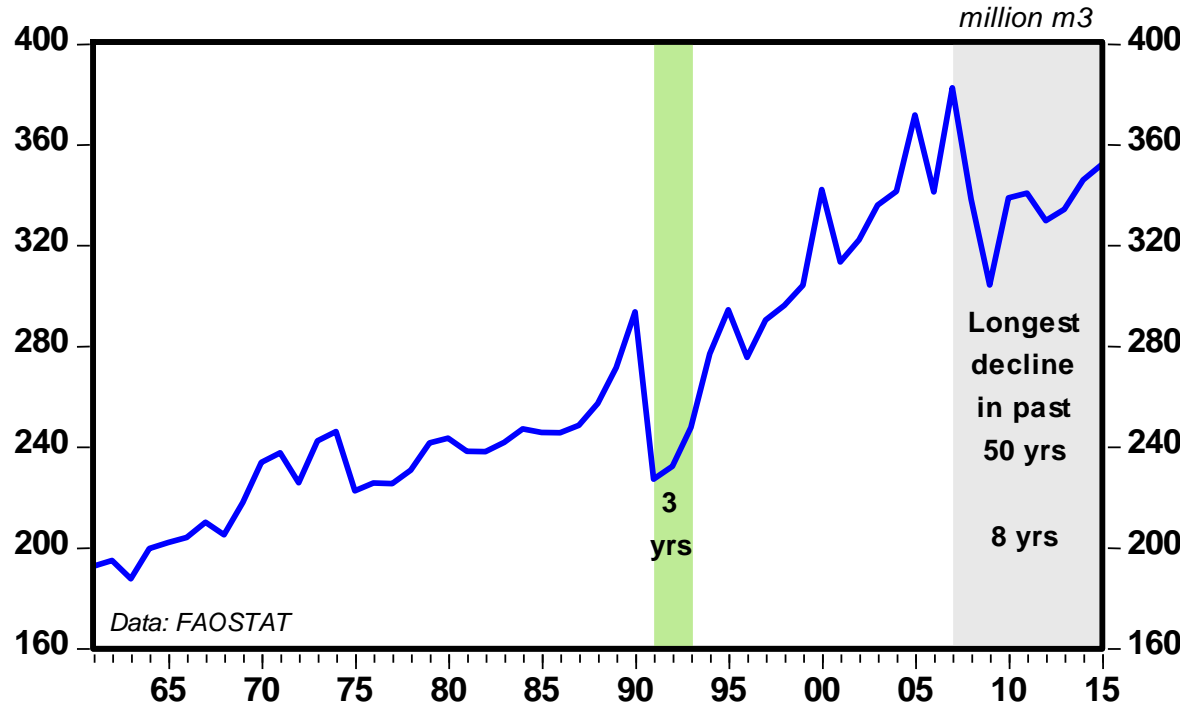


1. Structural reasons
2. Long economic slump

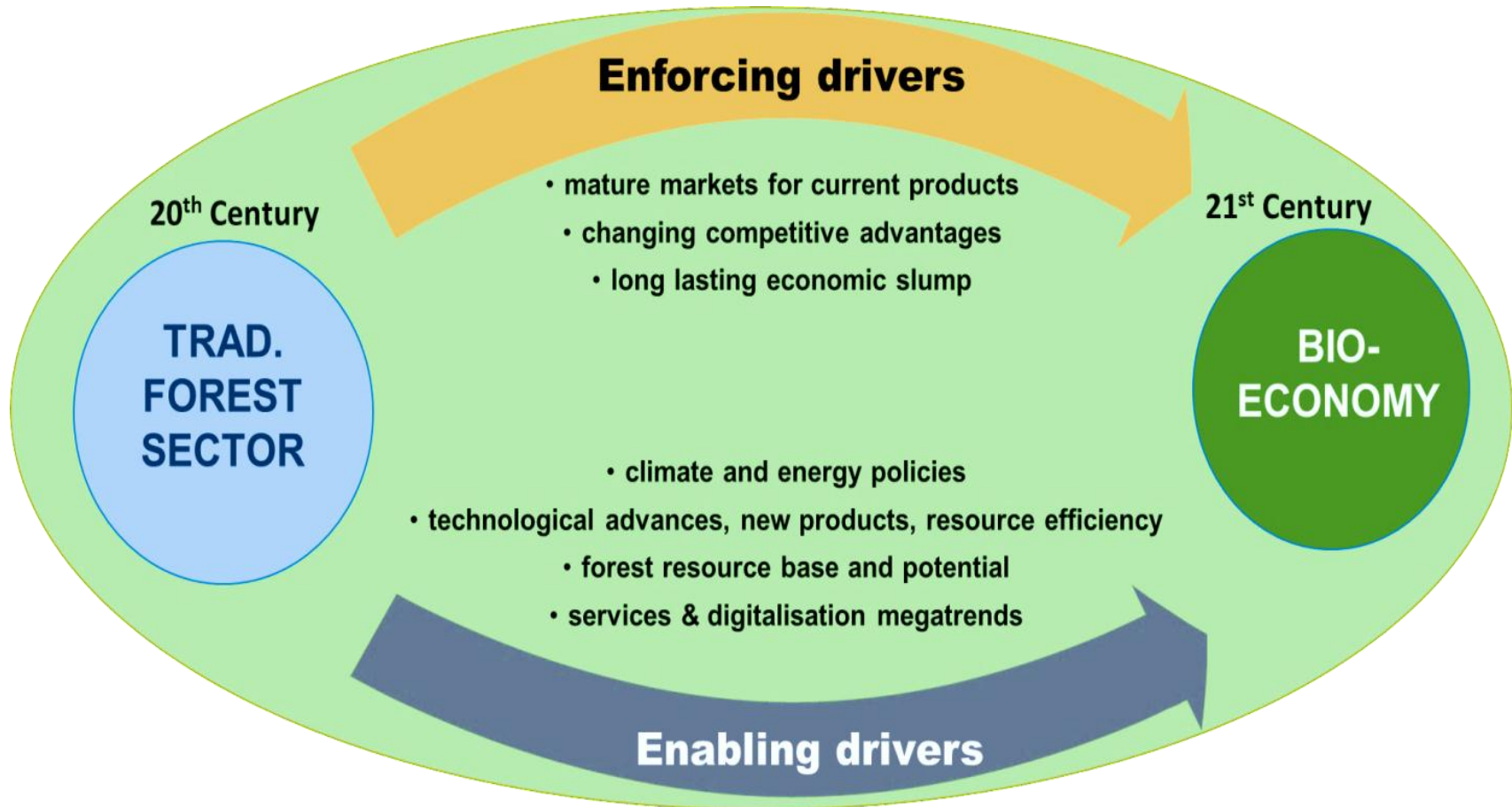
EU Industrial Roundwood Production: Room to increase

*Average production 2008-2015 vs. 2007 was 46 Mm³ lower
> equal to Germany's annual production*

EU Industrial Roundwood Production 1961-2015



Traditional European forest sector is moving to innovative bioeconomy





New forest based bioproducts: some examples

Example wood construction: key part of urban bioeconomy

Prefabricated wood modules & elements, *e.g. cross laminated timber (CLT)*

- rapid construction
- less primary energy
- less carbon emissions

- For a **1 ton of wood products** replacing Portland cement, estimated average of **2 tons of CO₂ avoided**



Image: Keskustakirjasto arkkitehtuurikilpailu



Photo: © Blumer-Lehmann AG

Possible in tomorrow's Paris: low carbon buildings

“Our goal is that through innovation, youthful social contact and overall community building, we have created a design that becomes uniquely important to Paris,” said Michael Green, Principal of MGA. “Just as Gustave Eiffel shattered our conception of what was possible a century and a half ago, this project can push the envelope of wood innovation with France in the forefront.”



Michael Green Architecture Proposes World's Tallest Wood Building in Paris

<http://www.archdaily.com/637885/mga-proposes-world-s-tallest-wood-building-in-paris>

Réinventer Paris competition

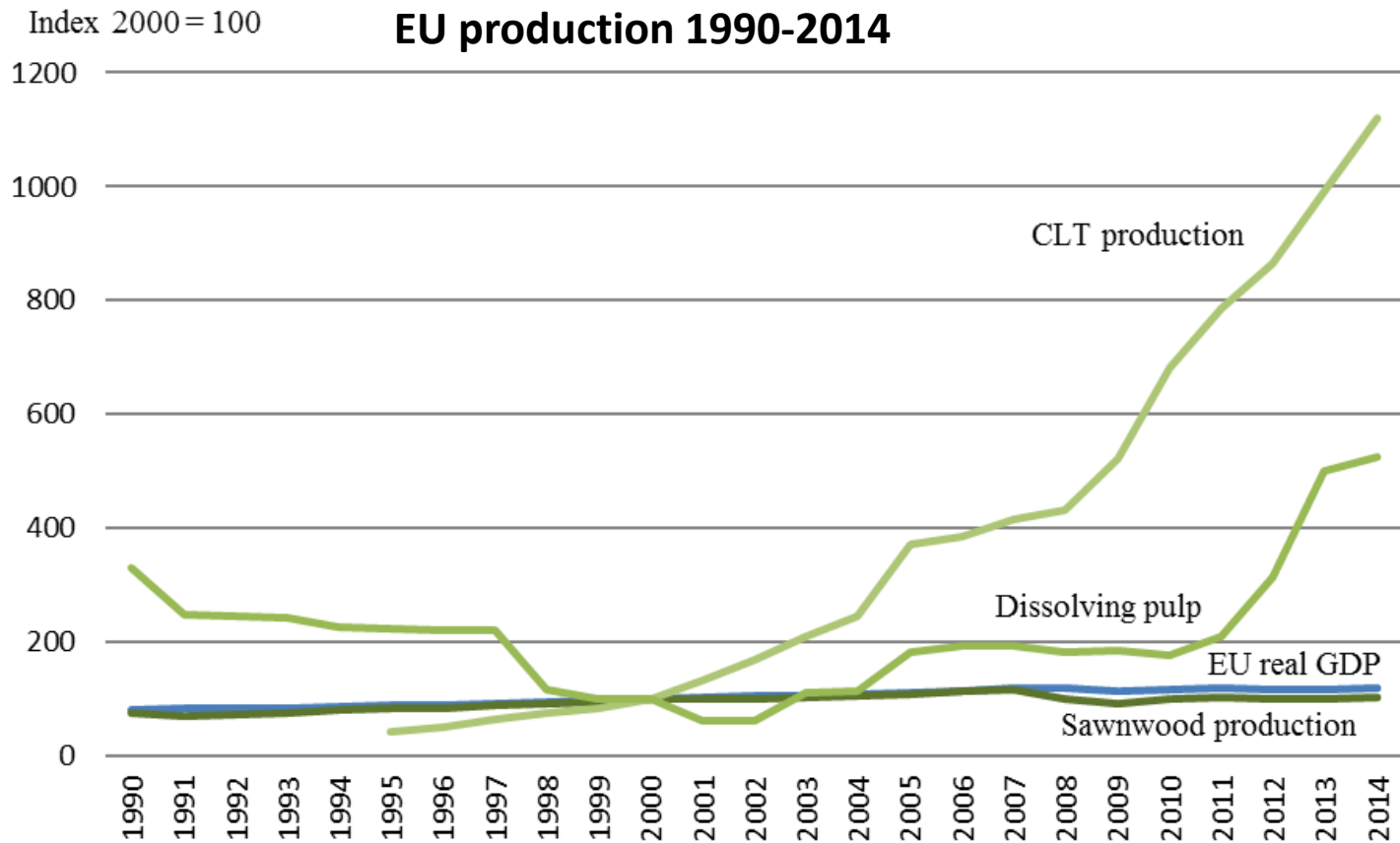
Wood-based textile fibres for growing population

- The textile market to triple by 2050: **from 80 Mt to 250 Mt.**
China & India key markets
- Only 5% of world textiles are wood-based (viscose etc.), but expected to grow 10% /year
- Polyester (60%) and cotton (30%) are less environmentally friendly than viscose (*dissolving pulp based*)



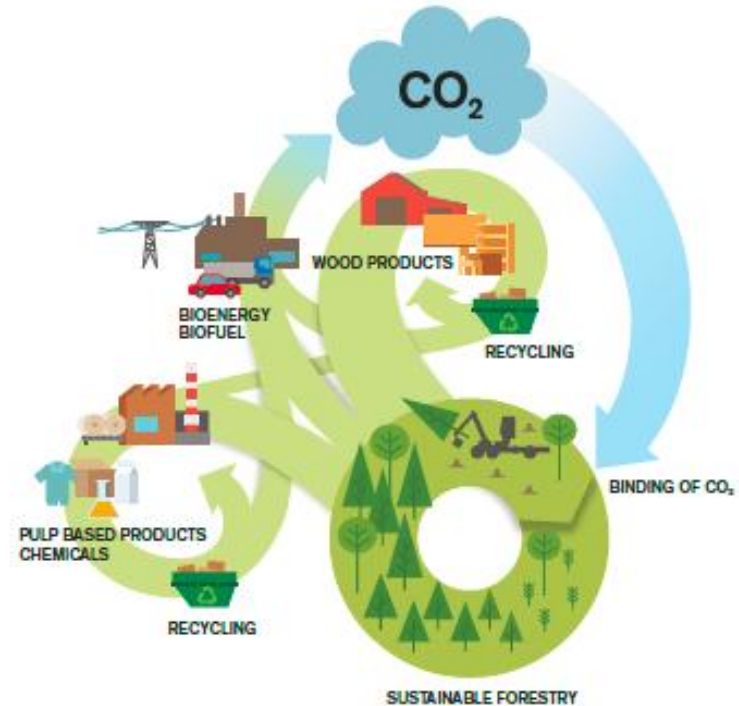
Enocell Mill in Finland produces dissolving pulp for Chinese textile industry

New products growing in EU despite economic downturn



Example: forest bioenergy

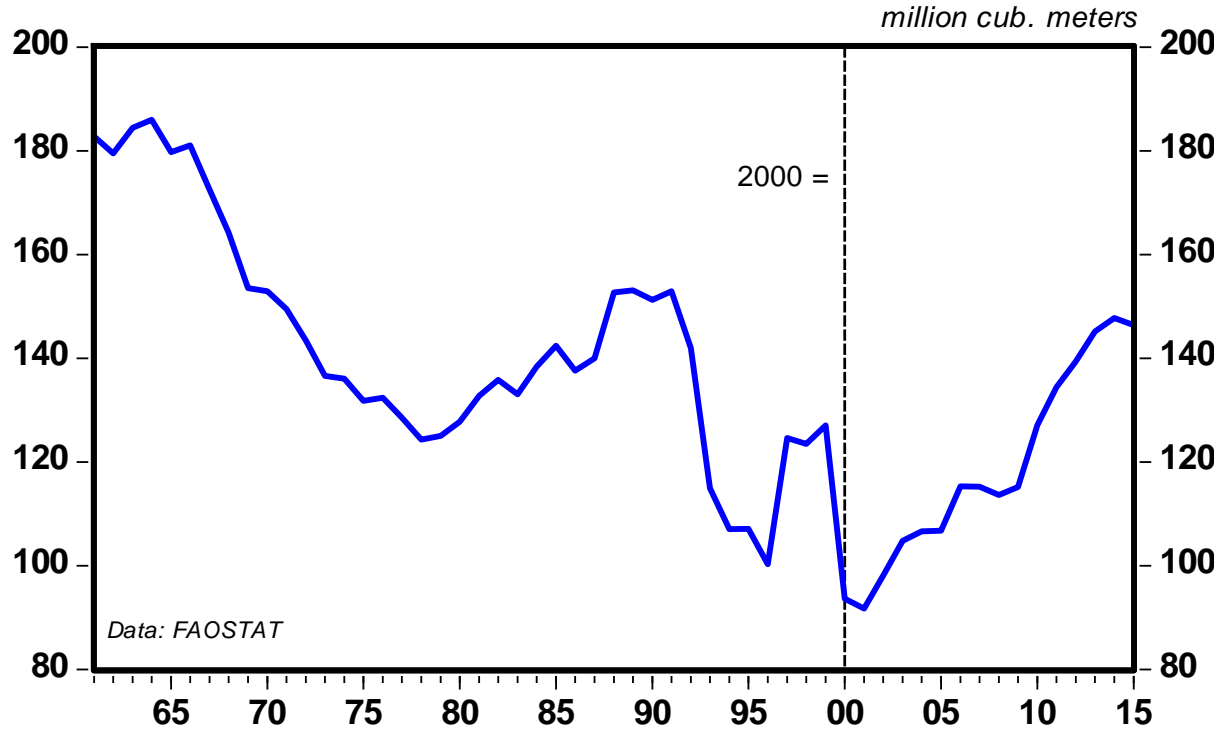
- Bioenergy largest renewable energy source in EU: 44% of renewable energy production in 2014
- Forest bioenergy integral part of forest management, forestry, forest-based products & energy-industry system > *not helpful to look at it as a separate entity*
- Bioenergy contributes significantly to energy supply in most scenarios that meet ambitious climate targets*



**Berndes et al. 2016. Forest biomass, carbon neutrality and climate change mitigation. From Science to Policy 3, European Forest Institute, 2016*

European energy wood production again increasing

European Wood Fuel Production 1961-2015



50% of wood fuel comes from *wood residues*, and most of the rest form *logging residues, thinnings and coppice*

Growing wood residues consumption implies increasing resource-efficiency and cascading use

Wood fuels is the concept used by FAO and is basically energy wood. It is defined as all types of biofuels originating from woody biomass, e.g., firewood, log wood, wood chips, wood pellets, wood briquettes (FAO def.). These come from forests, plantations (*coppice*), urban forests, by-products (*chips, bark, etc.*), post-consumer wood.

Example: second generation forest-based diesel

- UPM 's biorefinery: 100,000 tonnes of 2nd generation biodiesel for transport from tall oil (*sidestream of pulping*)
- Decreasing transport emissions up to 80% compare to fossil fuels
- Finland's new biofuel target: 30% biofuels by 2030 of

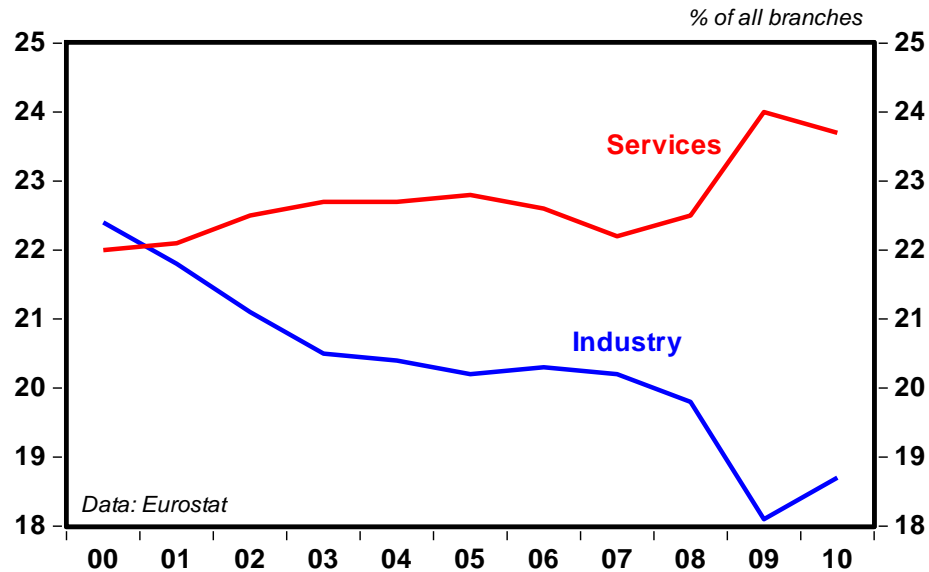


UPM Biofuels



But do not forget the bioeconomy services!

Gross Value Added of EU27 in 2000-2010



Forest bioeconomy services: all growing



Industry related: Headquarter functions, engineering and programming, servicing and maintenance, patents and licenses, R&D, consulting, etc.

Forestry related: education, R&D, inventory & planning, administration, governance, consulting, etc.



Forest services: directly attached to forests *as such*. Nature tourism and recreation, hunting, mushroom picking, carbon sequestration in forests, etc.





Conclusions

- European forest bioeconomy important for *climate change mitigation, economy, employment and forest management*
- Biggest changes for decades are taking place in European forest bioeconomy markets
- Some old products stagnating, new innovative bioeconomy products rising
- Forest bioeconomy services becoming more important
- Development in France following same patterns



Merci!



Photo: Sanit Fuangnakhon / Shutterstock