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Alternative climate change mitigation strategies in forests and their relevance for certification

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The Value of FSC to Europe's Public Forests
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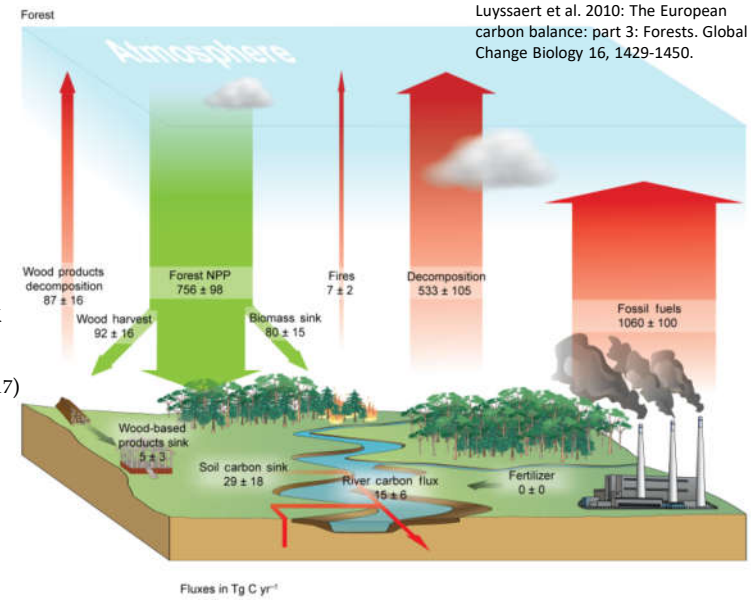
Outline

- Alternative climate change mitigation strategies
- What potentials at European level?
- Case study Lithuania – trade-offs between forest use strategies
- Implications for certification

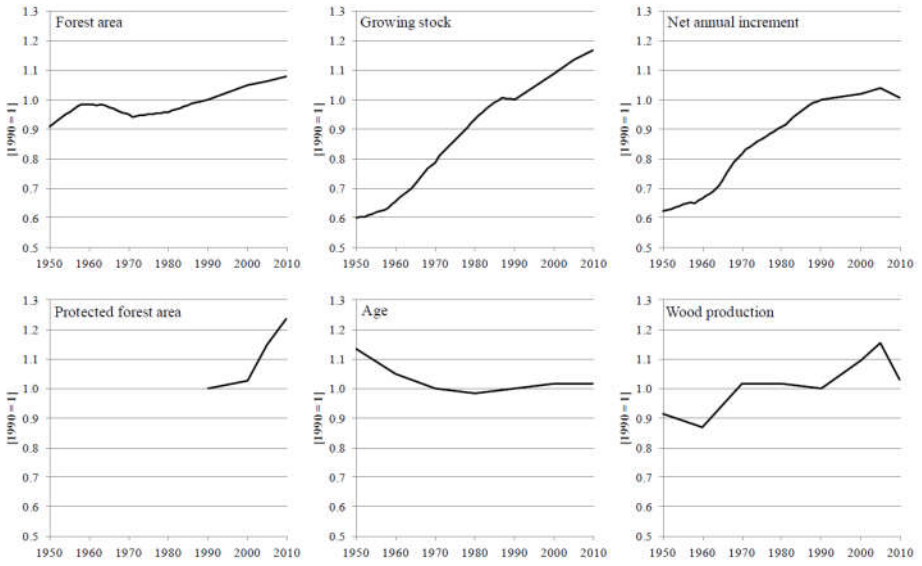
EU forests and forest-based sector

- EU forests: sink of 424 Mt CO_2 (~ **12%** of EU emissions 2015; EU GHG Submission, 2017)
- Harvested wood products: sink of 29 Mt CO_2 (~ **1 %** of EU emissions 2015; EU GHG Submission, 2017)
- Bioenergy from biomass: 7% of total EU energy need
- Substitution effects?



Luyssaert et al. 2010: The European carbon balance: part 3: Forests. Global Change Biology 16, 1429-1450.

European forest resources

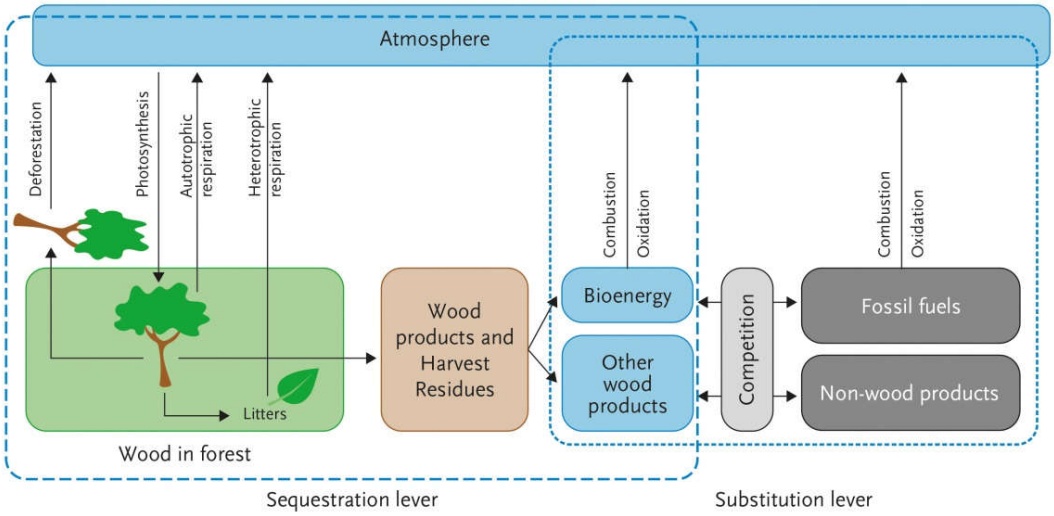


Verkerk 2015

Forest(ry) and climate change mitigation – complementary and partly conflicting strategies

1. Conservation management: Stop or slow down deforestation (REDD+ policy)
2. Sequestration management with focus on forests: **increase C sink in forest biomass and/or forest soils** (forest protection OR increased productivity)
3. Sequestration management with focus on wood products: **increase C sink in HWP** (increased share of wood in construction, new bio-materials, cascade use of wood products)
4. Substitution management: **substitute fossil fuels and fossil fuel intensive materials** (bioenergy, wood instead of concrete or steel)

CO_2 exchange with the atmosphere: forests and forest-based products offer complementary climate change mitigation levers



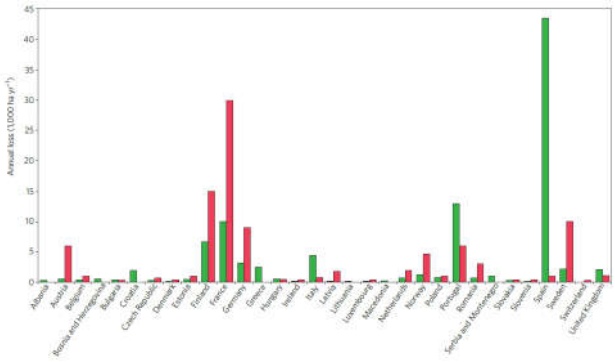
Nabuurs et al. 2015: A new role for the forests and the forest sector in the EU post-2020 climate targets. EFI. From Science to Policy **2**, 30 p.

1. Conservation management

- Halting deforestation - a crucial topic outside of Europe

Deforestation rates in Europe are hidden in the statistics (balanced by reforestation), but urban expansion continuously leads to gross deforestation

➢ Limiting urban land use change could mitigate emissions



Average yearly gross deforestation in 1990–2010. Green: CORINE land cover data; Red: UNFCCC country reports (Nabuurs et al. 2013. Nature Climate Change 3, 792–796.)

2. Sequestration management - C sinks in forest biomass and/or forest soils

Afforestation area relative to total forest area in 2010

	Afforestation 1950-2010 [1000 ha]	Total forest area [1000 ha]	Afforestation from tot forest area [%]
AT	931	3 836	24
BE	180	677	27
BG	1 048	3 361	31
CH	232	1 219	19
CZ	410	2 634	16
DE	3 213	11 075	29
DK	225	488	46
EE	849	2 247	38
FI	2 285	22 388	10
FR	5 373	15 366	35
HU	922	1 902	48
IE	679	636	107
IT	3 643	8 388	43
LT	306	2 023	15
LU	15	89	17
LV	1 637	3 248	50
NL	247	363	68
PL	2 588	9 018	29
PT	1 346	3 424	39
RO	878	6 355	14
SE	5 486	27 467	20
SI	473	1 229	38
SK	45	1 910	2
UK	1 837	2 776	66
total	34 848	132 118	26

Vilen & Lindner 2014. ResearchGate.

How to further increase forest carbon sinks?

- Forest protection:
  - Protected forest area in Europe increased by 7.5 mio ha (from 2000 to 2015) (Forest Europe 2015)
  - Example Germany: share of strictly protected forests should increase to 5%
- Increased forest productivity:
- Improved forest genetic resources
- Optimized management

  => + 10 - 25 % yield possible

  (Iqbal et al. 2016. Maximising the yield of biomass… Ecofys, Berlin, 352. p.)

Ebrach, Germany. Foto M.L.

Ruotsalainen and Persson 2013. Scots pine. Best practice for tree breeding in Europe, Skogforsk, Sweden.

3. Sequestration management - C sinks in harvested wood products

Bioeconomy development – an opportunity for forest-based carbon mitigation

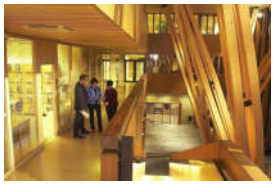
- The biggest consumer of wood in Europe is the construction sector.
  - Expanding the use of wood in construction could create larger HWP carbon sinks!

Foto: M.Lindner

Metla House, Joensuu

One of the largest wooden office buildings in Finland

Fotos: Metla/Luke website



Projected harvested wood product mitigation potential

- HWP carbon sink may decline from current levels and almost saturates by 2030 (Pilli et al. 2015. Carbon Balance and Management 10: 6)
- ClimWood2030 estimated 11-16 Mt annual CO_2 sink until 2030 in a *Reference* scenario and 18-30 Mt CO_2 sink in a *Strongly increased use of wood* scenario (Rüter et al. 2016. Thünen report 42: 142 p.)

4. Substitution management - substitute fossil fuels and fossil fuel intensive materials

Projected mitigation potential through substitution

- The ClimWood2030 calculated the substitution effects of the *Strongly increased use of wood* scenario with 6-13 Mt CO_2 eq. $year^{-1}$ until 2030.
- EFI review study on "Substitution effects of wood-based products in climate change mitigation" (Leskinen et al. 2018. From Science to Policy 7):
  - Use of wood and wood-based products is associated with **lower fossil and process-based emissions** when compared to non-wood products
  - Average substitution effect of **2.2 kg CO_2 / kg wood product**
  - Substitution factor is not sufficient to guide policy making – a more holistic approach is needed

Case study: wood use scenarios in Lithuania

- How to optimize wood utilization in Lithuania with enhanced climate change mitigation and support for bioeconomy developments?

Jasinevičius et al. 2017. Forests 8, 133.

Some facts on the Lithuanian forest-based sector (around 2015)	
Annual fellings	7-8 mill m^3 or 60-70 % of increment on forest area available for wood supply
Growing stock	529 mill m^3, since 1991 increased by 65 %
Age	26 % of growing stock in mature or over-mature forests
Protection	30% of forests are under protection status
Trade	30% of domestic industrial roundwood is exported

Case study: wood use scenarios in Lithuania (2)

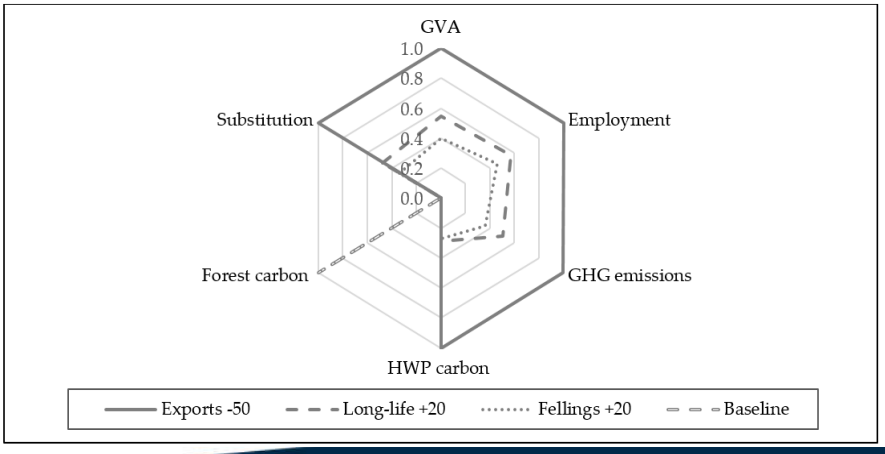
- Objectives: to asses the impacts of increased **domestic** wood utilisation **on climate change and bioeconomy**
- Indicators: employment; the economic performance of the sector; carbon in forest biomass and soil; and carbon in harvested wood products
- Scenario projections until 2100: increasing industrial wood supply for **local industry** and changes in product value chains.

Scenario	Changes
Baseline	No changes
Fellings +20	Increase in fellings by 20%, but no changes in wood flows for long-life HWP
Long-life HWP	Wood from increased felling used for long-life HWP
Exports −50	Decreased roundwood exports by 50 % and increased long-life HWP

Jasinevičius et al. 2017. Forests 8, 133.

Results – impacts of alternative scenarios

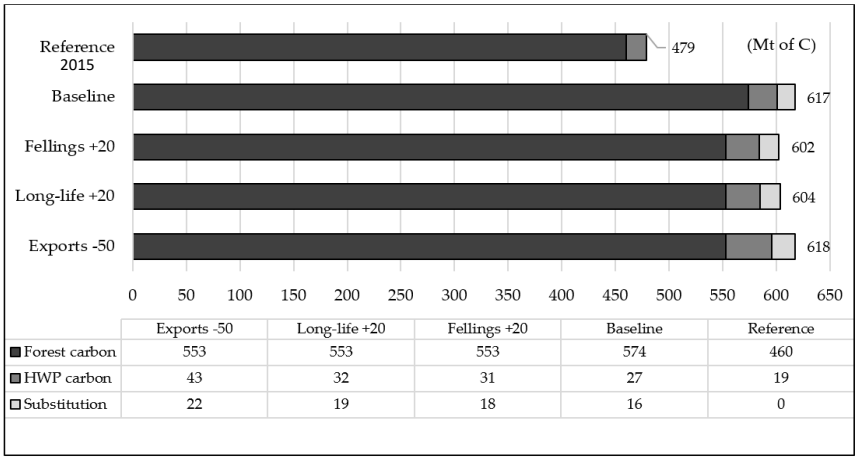
- Gross value added of the sector, employment, **carbon stock in HWP and substitution effects increased significantly** in all scenarios compared to the baseline.
- **Forest carbon stock decreased** and GHG emissions increased



Jasinevičius et al. 2017.

Overall impacts of Lithuanian forest sector scenarios on climate change mitigation

- Only in the Export -50 scenario decreased forest carbon stocks were compensated by increased carbon stock in HWP and substitution effects.



	Exports -50	Long-life +20	Fellings +20	Baseline	Reference
Forest carbon	553	553	553	574	460
HWP carbon	43	32	31	27	19
Substitution	22	19	18	16	0

Jasinevičius et al. 2017.

Importance of system boundaries and accounting practices

- Looking only at forest balances without HWP pools and substitution, (no management or) a baseline scenario is always the best option
- Including HWP carbon pools is not sufficient to balance the forest carbon loss
- Additional substitution effects of the studied increased wood use scenarios were small within Lithuania
- Only with consideration of substitution effects and decreased exports, the national climate change mitigation effect can compensate the forest carbon losses
- GHG reporting to UNFCCC typically ignores exports. Lithuania as wood exporting country does not ”see” all impacts of wood product use

Case study conclusions

- Increased wood utilisation might support Lithuania's bioeconomy through increased socio-economic benefits.
- Positive climate change mitigation effects from the national perspectives could be gained only if substantial actions are taken to utilise more domestic wood for long-life HWP
- Wide system boundaries are needed to give policy advice that sees the full impact of decisions

- Methodological choices are affecting strongly the results of scenario assessments
- We need improved estimates of substitution effects with comparable assumptions

Climate change mitigation and forest certification

- FSC certified products (should) guarantee "deforestation-free" wood products
- Certification could be used to monitor and document forest carbon balances (biomass and soil?)
- FSC verified supply chains that cross country borders could help track carbon flows across accounting boundaries (enrich national accounts with information on value chain impacts of exported timber)
- FSC certified wood products could be attached with exemplified substitution factors (e.g. FSC certified pre-fabricated CLT construction element vs national non-wood construction materials; FSC certified textiles vs. cotton textiles…)

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Thank you!

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