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# Climate-Smart Forestry: quantification of mitigation impacts in three case regions in Europe

Gert-Jan Nabuurs, Hans Verkerk, Mart-Jan Schelhaas, Jose Ramon Gonzalez, Antoni Trasobares, Emil Cienciala

*EFI ThinkForest Roundtable Discussion, 30 May 2017, Brussels*

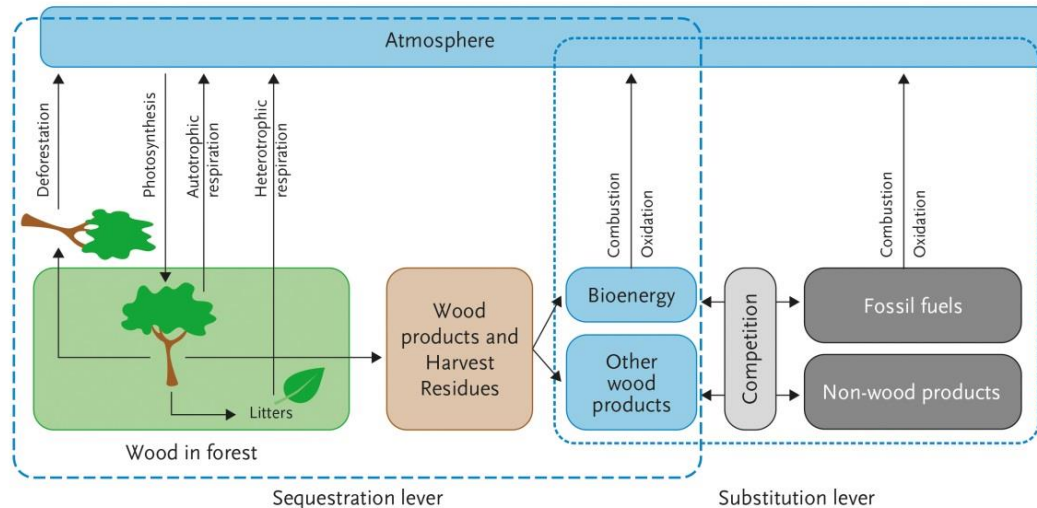
# Outline

- Concept of Climate-Smart Forestry
- Three cases
- Results & Implications

*All results are draft results and may be subject to change*

# Current role of European forests in mitigation

- Sink of 450 Mt CO<sub>2</sub>, or **10%** of total EU emissions
- Harvested wood products: sink of 44 Mt CO<sub>2</sub>
- Biomass for bioenergy producing 3% of total EU energy need
- Some signs of possible saturation

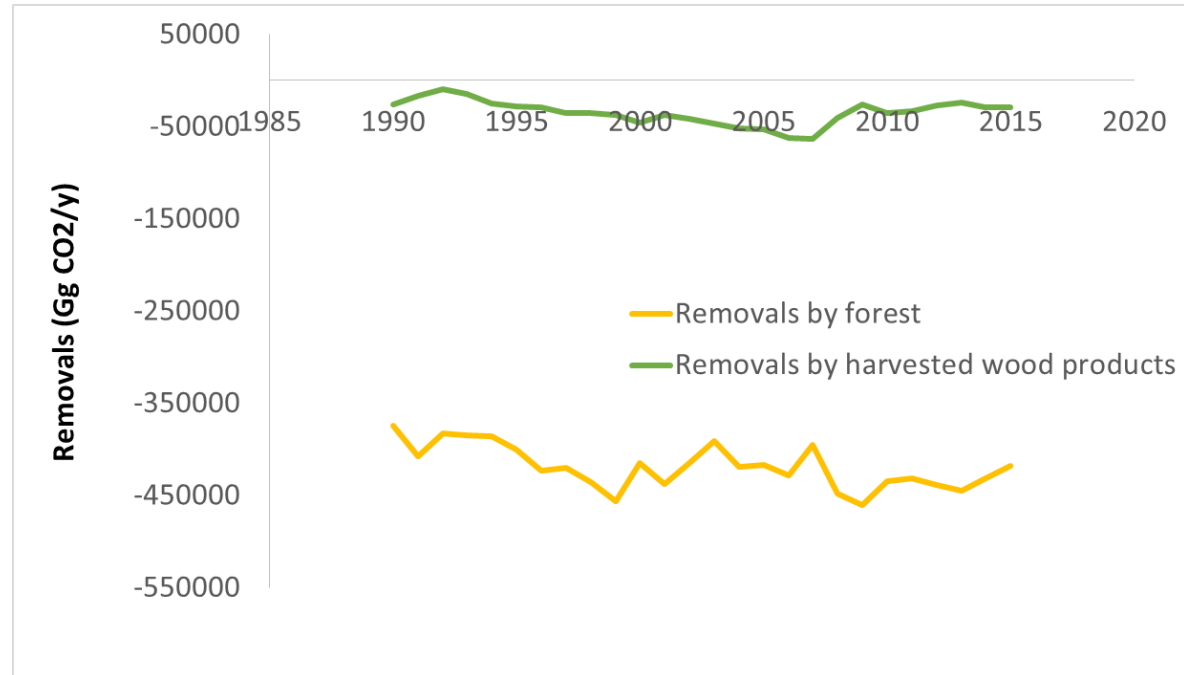


*Uncertain sector ? 'you may lose the carbon', ..'trees burn', etc.*

The only sector that has made a consistent and significant contribution, every year since 1990!

*..ask Volkswagen what they achieved in 25 yrs..*

Forest management and HWP  
sink as reported by MS to  
UNFCCC



# Climate-Smart Forestry

- whole forest and wood products chain, including material and energy substitution effects.
- includes adaptation to climate change and strives to achieve synergies
- CSF's 3 pillars: 1) reducing and/or removing greenhouse gas emissions, 2) adapting and building forest resilience, and 3) sustainably increasing forest productivity and incomes

# In 2015 we introduced 'Climate-Smart Forestry'

An earlier study found that the mitigation role of EU forests and forest sector could increase to 20% of emissions.

Can we make this more specific ?



A new role for forests and  
the forest sector in the EU  
post-2020 climate targets



Gert-Jan Nabuurs, Philippe Delacote, David Ellison, Marc Hanewinkel,  
Marcus Lindner, Martin Nesbit, Markku Ollikainen and Annalisa Savaresi



# **A view on the 3 cases**

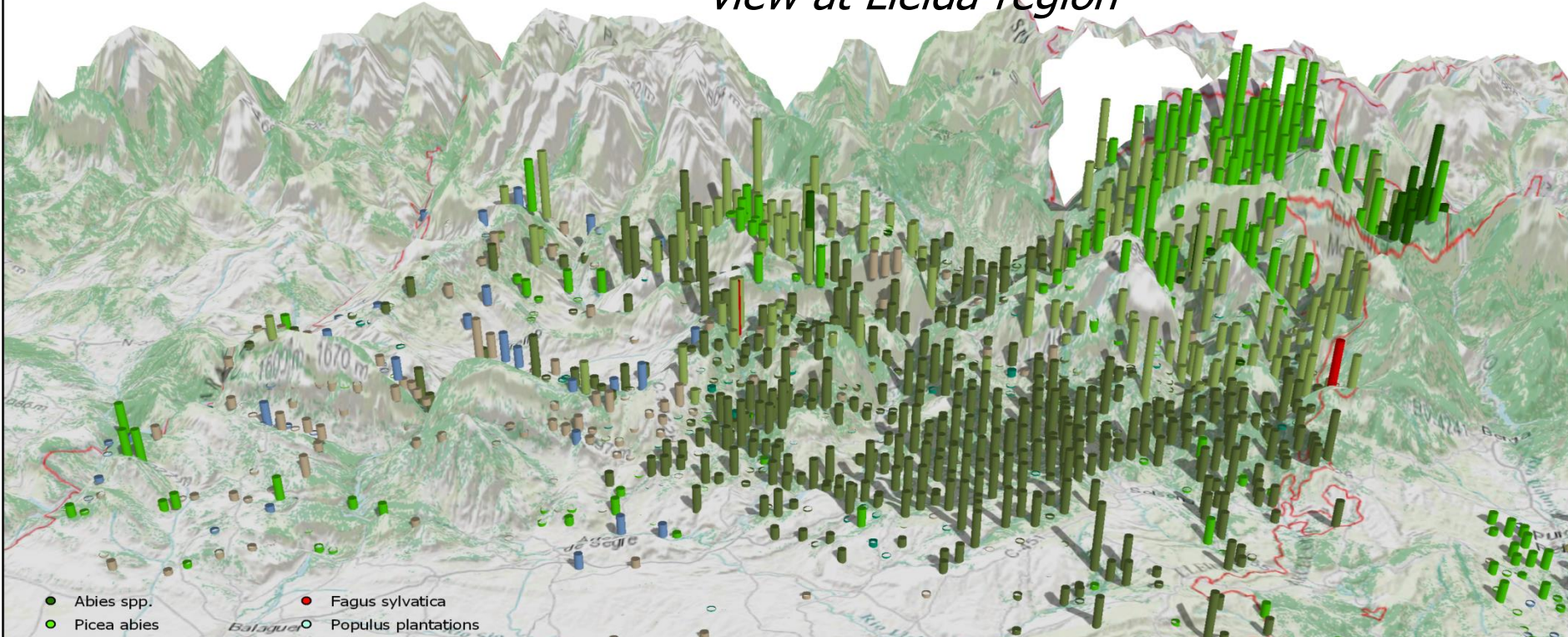
- 50 yrs simulations





# Spain, the Mediterranean region of Catalonia

## *view at Lleida-region*



- Abies spp.
- Picea abies
- Pinus halepensis
- Pinus nigra en mugo
- Pinus sylvestris
- Other conifers
- Betula spp
- Castanea sativa
- Eucalyptus spp.
- Fagus sylvatica
- Populus plantations
- Quercus ilex
- Quercus robur+petraea
- Other Quercus
- Robinia pseudoacacia
- Pseudotsuga menziesii
- long-lived broadleaves
- short-lived broadleaves

0.67 Mha included in runs. Dry forests with fire risk.  
Only 28% managed. 77% in private ownership (200  
000 owners). Monte growth models

Raw data: Spanish NEI



# Czech Republic

2.67 Mha included. 59% in public hands. 51% spruce with high stocking. Health problems: in 2015, 50% of fellings was a sanitary felling /*EFISCEN simulation model used*

Photo: Cienciala



# Ireland

0.76 Mha included. 52% sitka spruce.  
Storm prone. Large afforestations. Much  
in private grant aided form / *EFISCEN*  
*simulation model used*



Photo: veon.ie

## CSF Scenarios

- Spain, Med region of Catalonia: doubling of managed area compared to baseline. Reduction of mortality and reduction of fire risk. Higher share of raw material allocated to sawlogs
- Czech Republic: same total felling level as in baseline, but fast conversion of unstable spruce to oak, beech and fir
- Ireland: afforestation picks up again to 15kha/y. Fast increase of roundwood production to 9.4 Mm<sup>3</sup>/y. 54% of spruce clearcut regenerated with same spruce. 16% with better provenance. 30% with mixed spp.

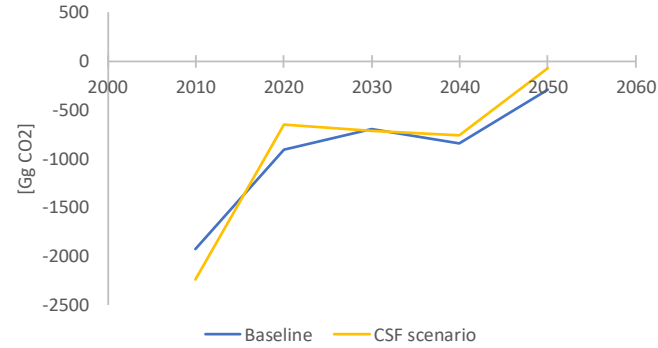
# Scenarios

- CSF scenario intends to demonstrate what could happen if certain measures are implemented
- CSF scenario should not be considered as a prediction or reference to assess the impacts of currently (intended) national or international policies

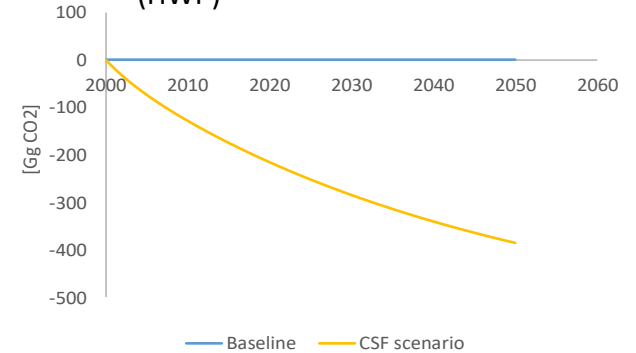
# Results: Spain, Med region of Catalonia

HWP

## Living Biomass

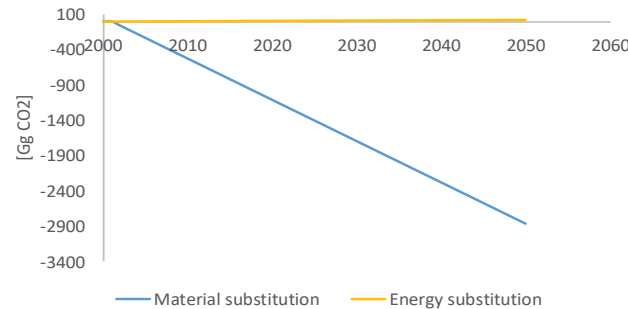


## Harvested wood products pool (HWP)

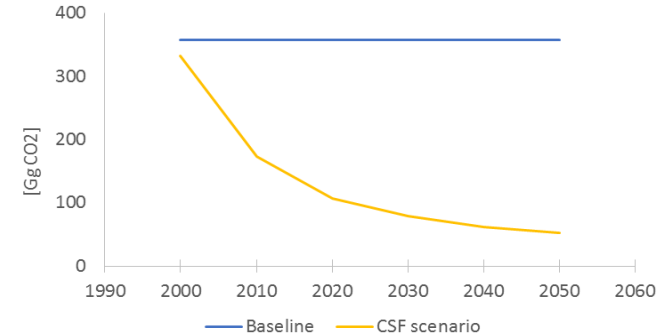


*Emissions: positive*  
*Removals: negative*

## Substitution of products

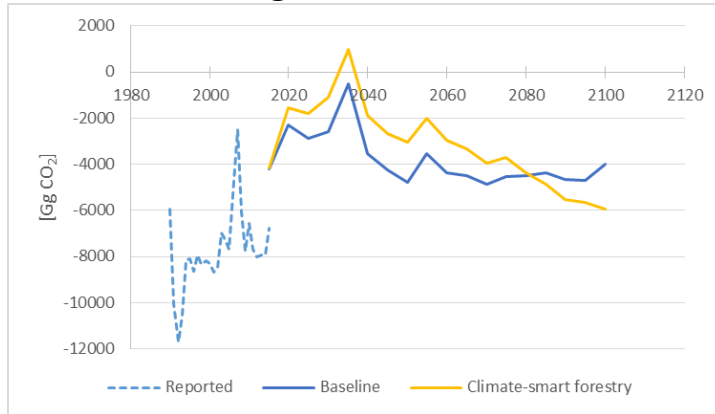


## Fire emissions

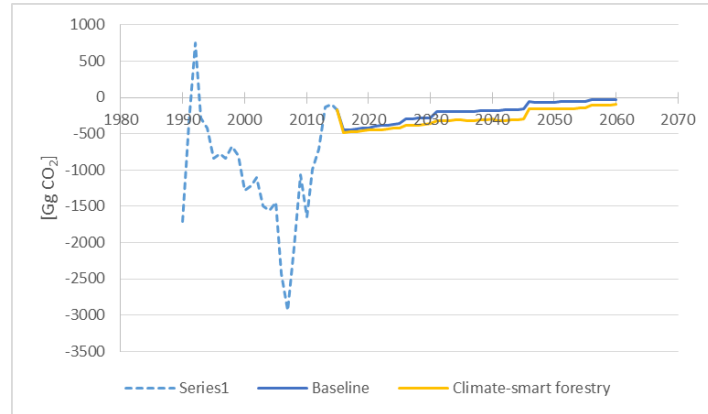


# Results: Czech Republic

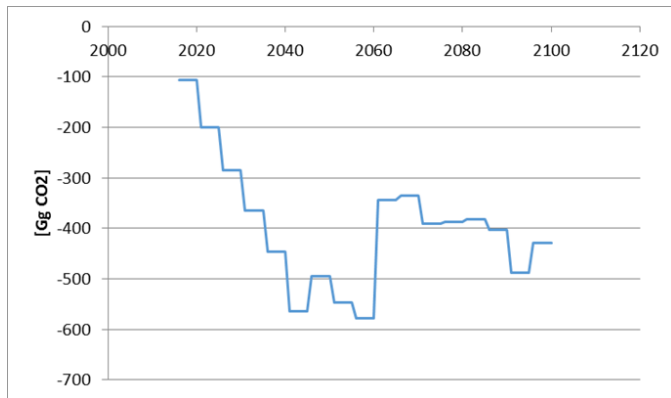
## Living biomass



## HWP

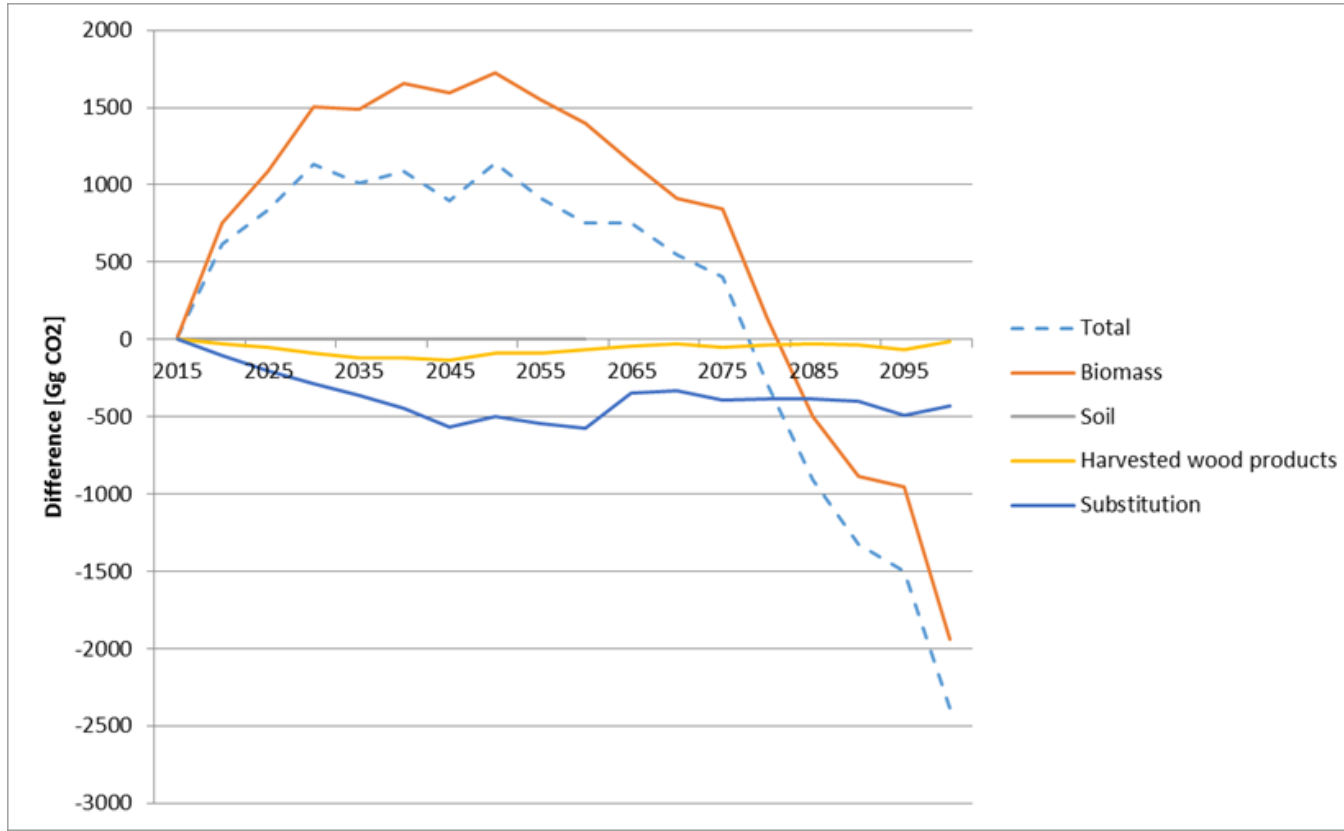


## Material substitution

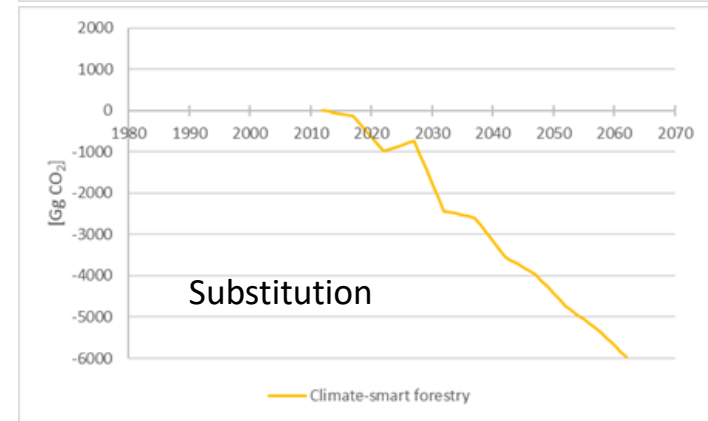
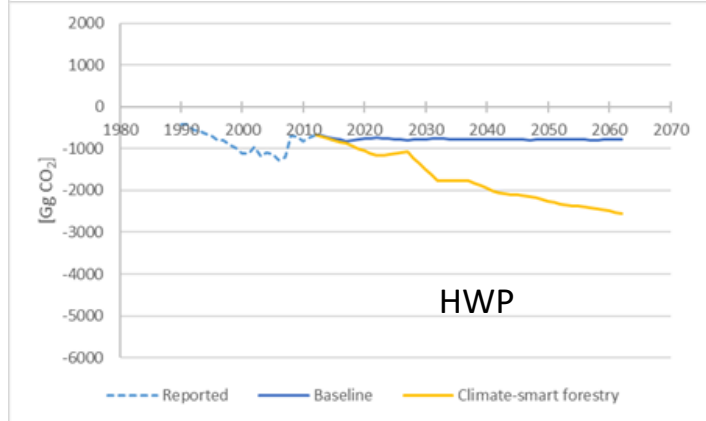
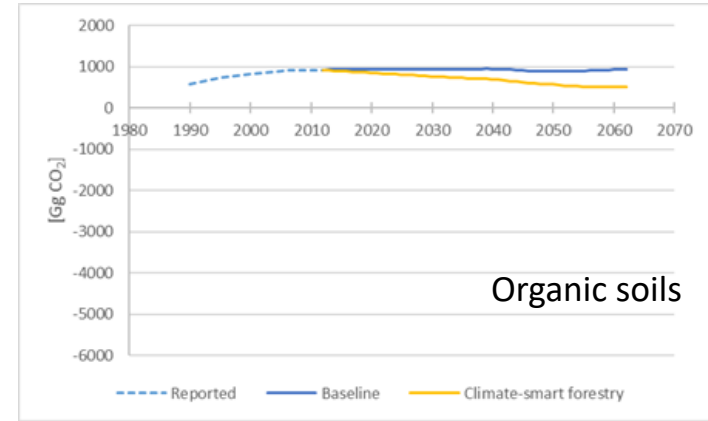
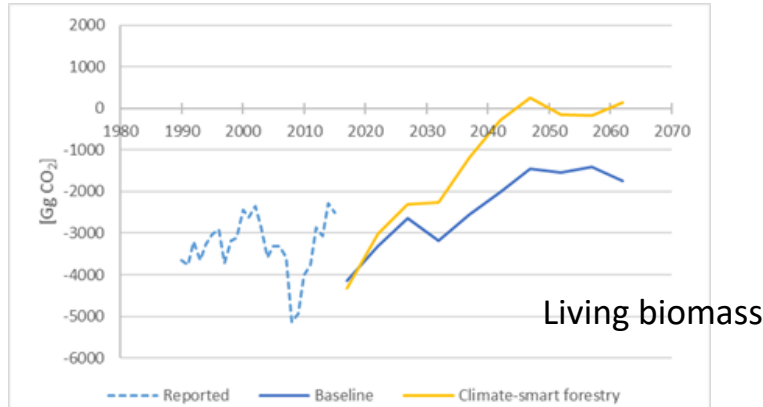




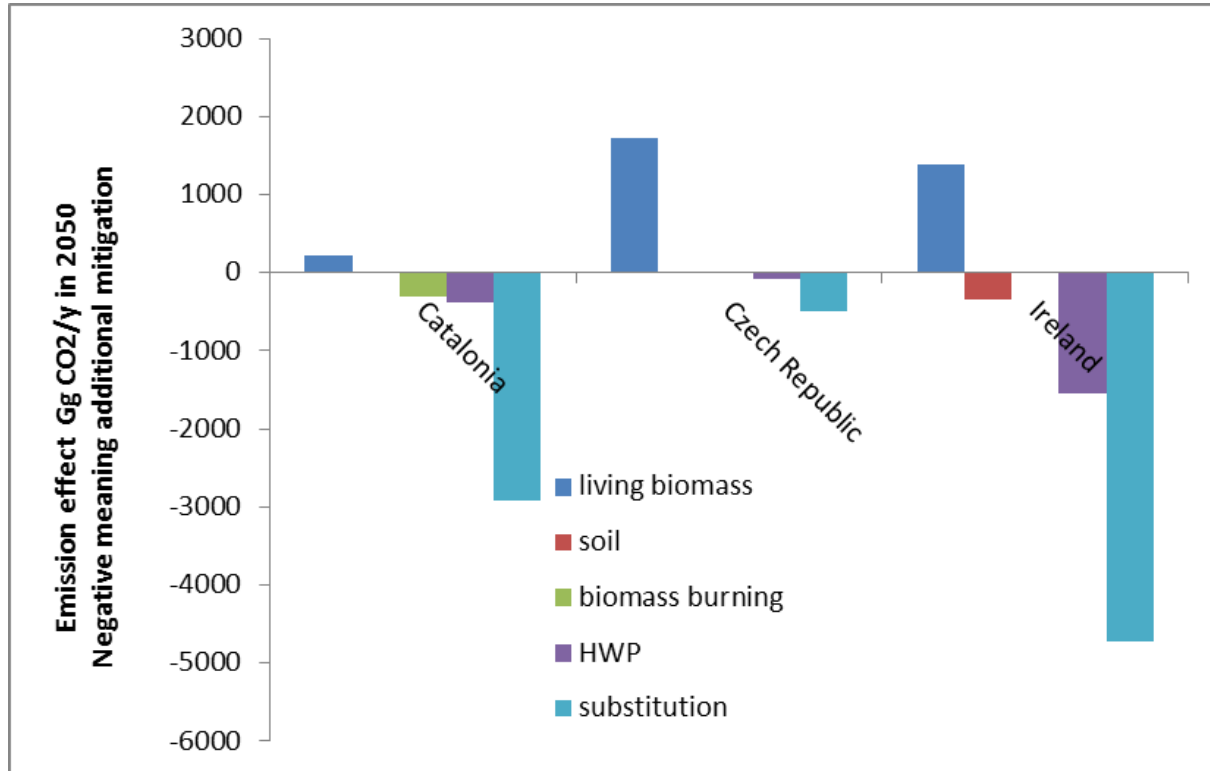
# Results: Czech Republic total mitigation effect



# Results: Ireland



# Results: aggregate on 3 cases



On the 4.1 Mha simulated:

- An additional mitigation of 7.4 Mt CO<sub>2</sub>/y is achieved in 2050 against a baseline
- Losses in biomass because of conversion and increased harvest
- More than compensated in HWP and substitution

## Additional benefits

- Better adapted forest ecosystem in Czech Republic, with higher biodiversity values and stability of production
- More woody material produced: additional 3 Mm<sup>3</sup>/y in Ireland compared to baseline and additional ~260 000 m<sup>3</sup>/y in Spanish region *Catalonia* (=more jobs)
- A more stable forest ecosystem in Ireland
- More material for energy coming available
- Reduced fire emissions in Spanish region of Catalonia

# Discussion

- We don't follow accounting rules; but simply look at how the atmosphere sees the whole impact of the sector
- Cases were chosen for a diversity in conditions: e.g. unstable spruce with high stocking, drought prone region of Catalonia, young afforestation in Ireland
- Scenarios stayed close to ongoing policies & practices. More ambitious incentives would have had a bigger impact. E.g. we could have assumed more regeneration with better provenances for a more optimal mitigation effect.

# Discussion

- Energy substitution not even included. Nor an increasing disturbance risk under climate change
- Still an overall large additional mitigation was found mostly in substitution of products, because of conversion or increased harvest
- Had the simulations been extended beyond 50 yrs period, the CSF mitigation benefits would most likely have been much bigger.



Thank you !

Thanks to country correspondents and to EFI MDTF

Gert-jan.nabuurs@wur.nl

[www.toerklub.nl](http://www.toerklub.nl)



# Methods

		Catalonia	Czech Republic	Ireland
Pools	Living biomass	Empirical growth models [15-17]	EFISCEN [41-43] using data from forest management plans	EFISCEN [41-43] using data from NFI 2012 [28]
	Soil	-	-	Emission factor for organic soils [32, 33]
	Biomass burning	Empirical fire models [13, 14]	-	-
	Harvested wood products	IPCC Tier 2 approach [40, 44]	IPCC Tier 2 approach [40, 44]	IPCC Tier 2 approach [33, 44]
Substitution	Materials	Material displacement factor [20]	Materials displacement factor [20]	Materials displacement factor [20]
	Energy	Energy displacement factor	-	-

