

Forestry and Forest Products Carbon Cycle and its contribution to mitigate Climate Change.



“Working Group on Forestry and Climate Change ” 15 May 2009
ENRIQUE VALERO

Targets, strategies and one Question:

TARGETS of WG F & CC:

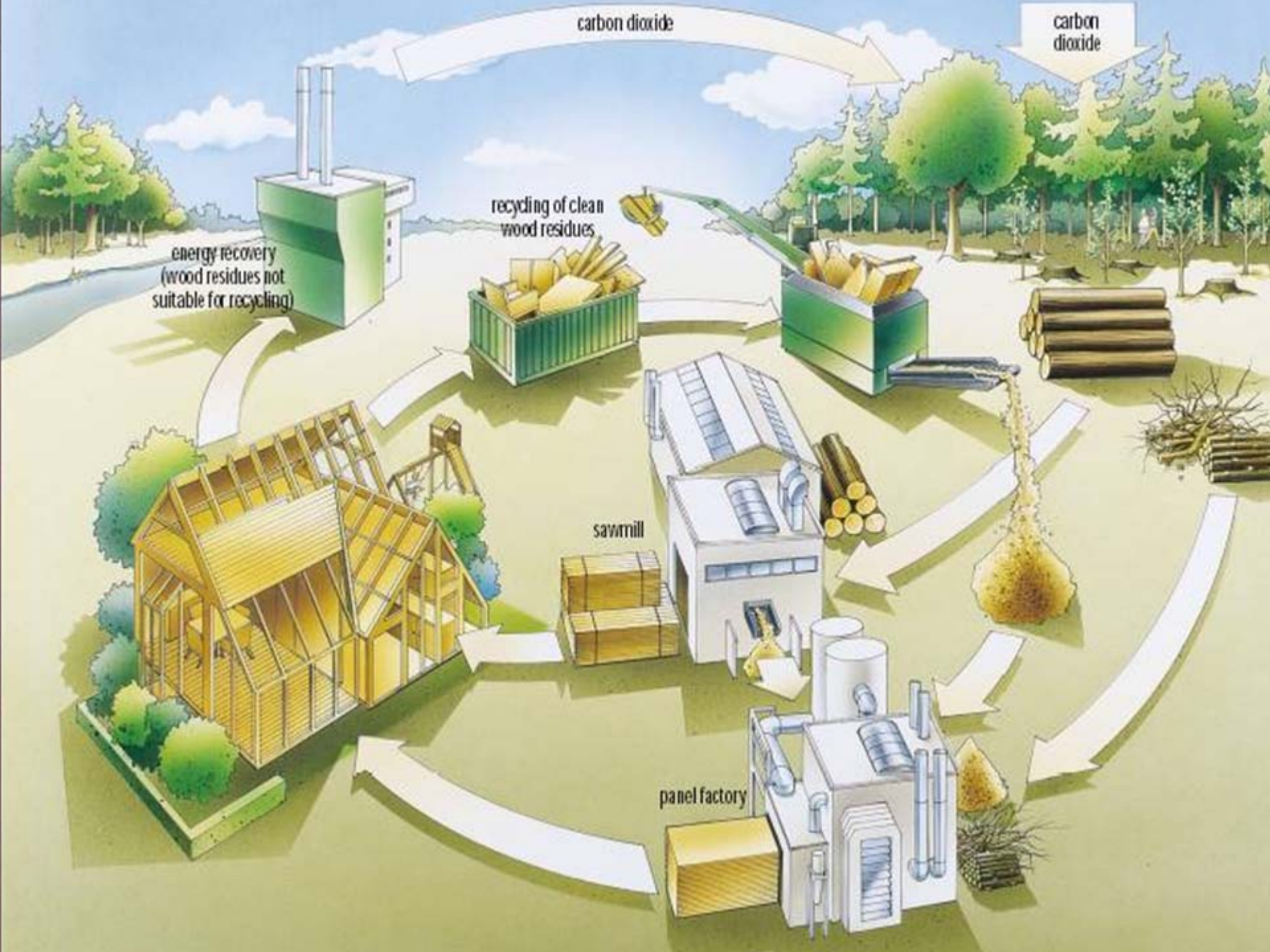
- **Improve contribution of forests to CC mitigation**
- **Adaptation of forest ecosystems to CC**
- **The role of forests in helping society adapt to CC**

MITIGATION STRATEGIES:

- 1.- Carbon reserve management**
- 2.- Carbon substitution management**

QUESTION:

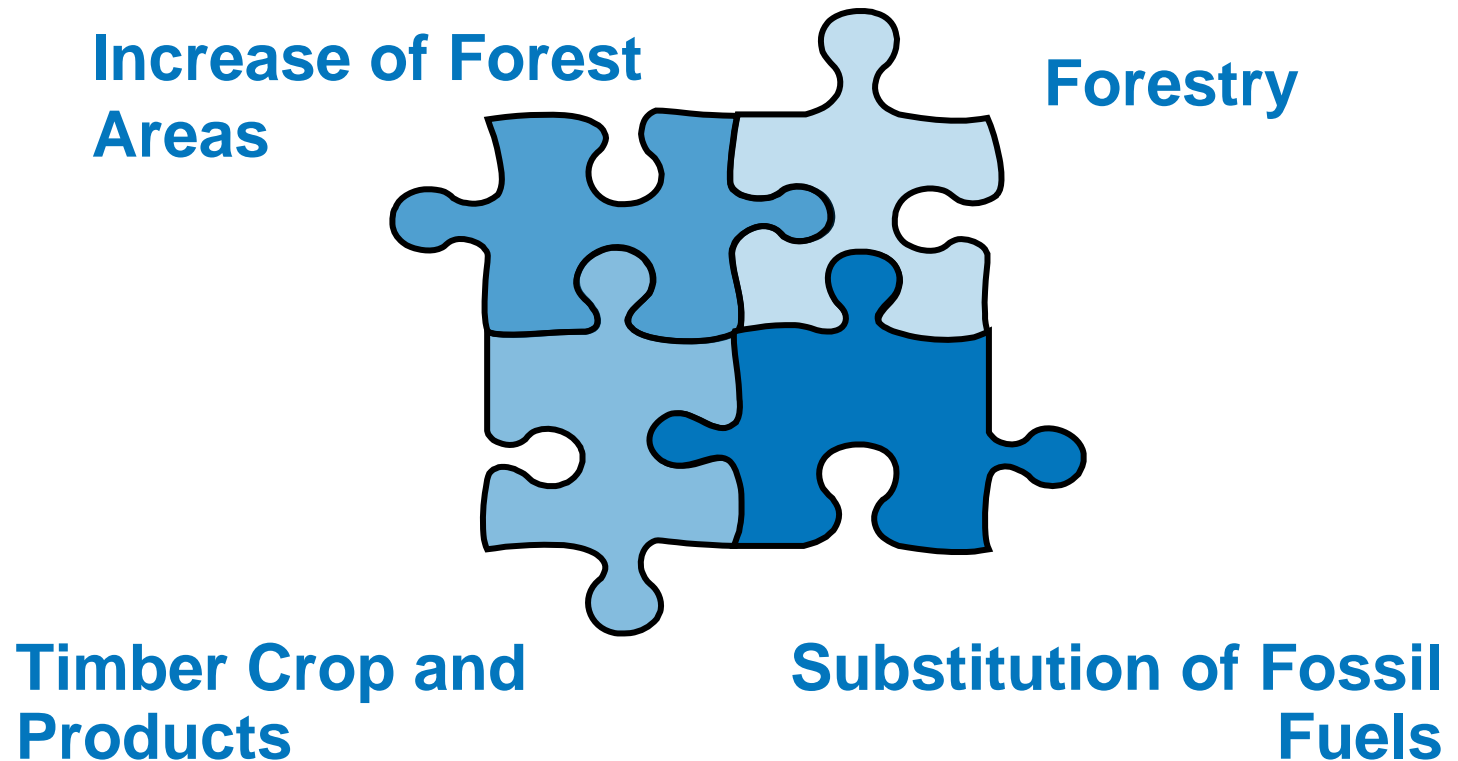
What should be the role of Forestry, Forests and Forest Products in the Europe of the future?



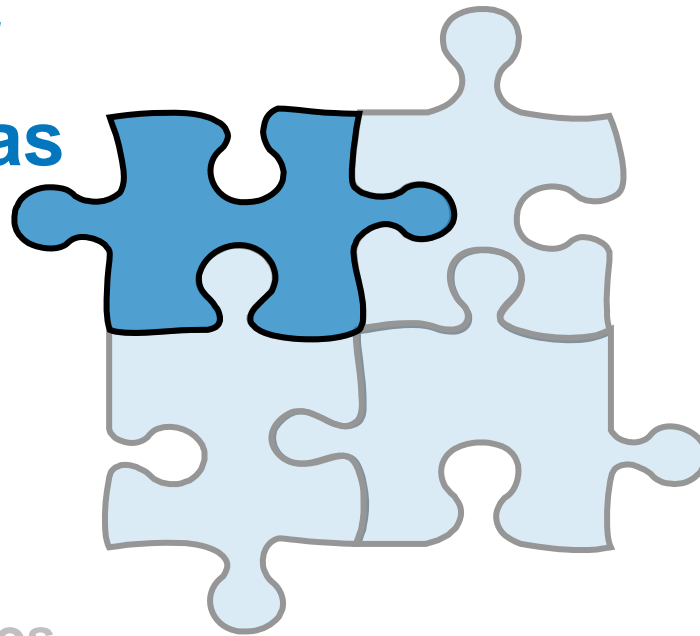
Repositories for carbon storage in terrestrial ecosystems

“Carbon Sink”	Classes	Example	Average Permanence Time
Biomass	Woody B.	Stems, branches,...	Decades to Centuries
	Non-Woody B.	Leaves, Herbs,...	Months to Years
Soil	Litter	Litter, harvest residues...	Months to Years
	O. M. Active	Partially decomposed litter,...carbon aggregates...	Years to Decades
	Stable Organic matter	Organic Matter stabilized by clay, peat...	Centuries to Millennia
Products	Wood Based Products	Building Materials, Furniture,	Decades to Centuries
	Paper, Textiles	Paper, paperboard, textile fibres,...	Months to Decades
	Waste	Wood and Paper in Landfills	Months to Decades
	BioFuel	Firewood, harvest residues, forest biomass, ...	Weeks to Months

Forestry Contribution in C Sequestration:



**Increase of
Forest Areas**



Selvicultura

Aprovechamientos
y Productos de madera

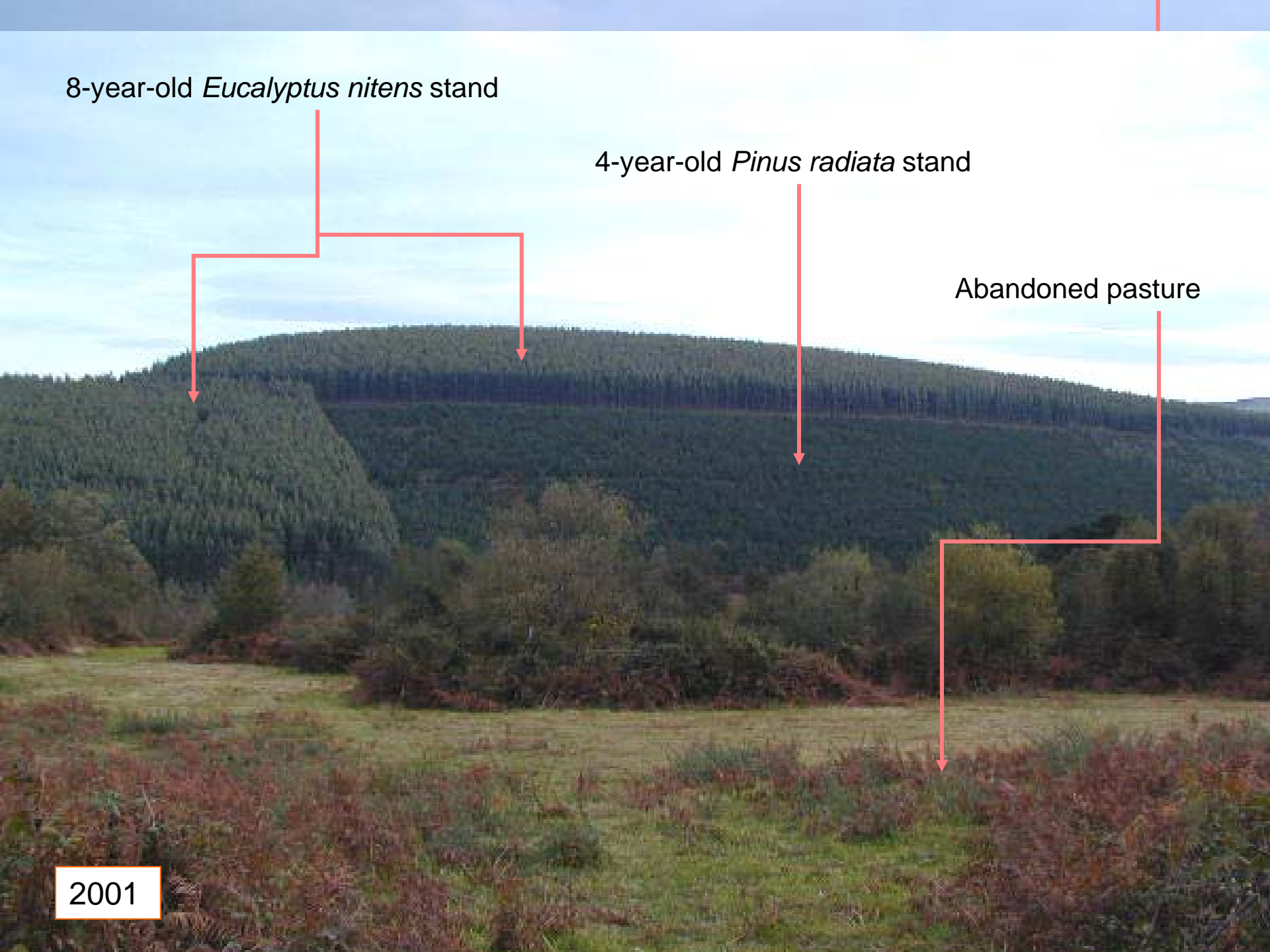
Sustitución de
Combustibles Fósiles

8-year-old *Eucalyptus nitens* stand

4-year-old *Pinus radiata* stand

Abandoned pasture

2001



Increase forest areas (Reforestation, afforestation)

Estimation of CO₂ balance in a Forest Management Unit through existing simulation models.

(simulating by CO₂Fix)

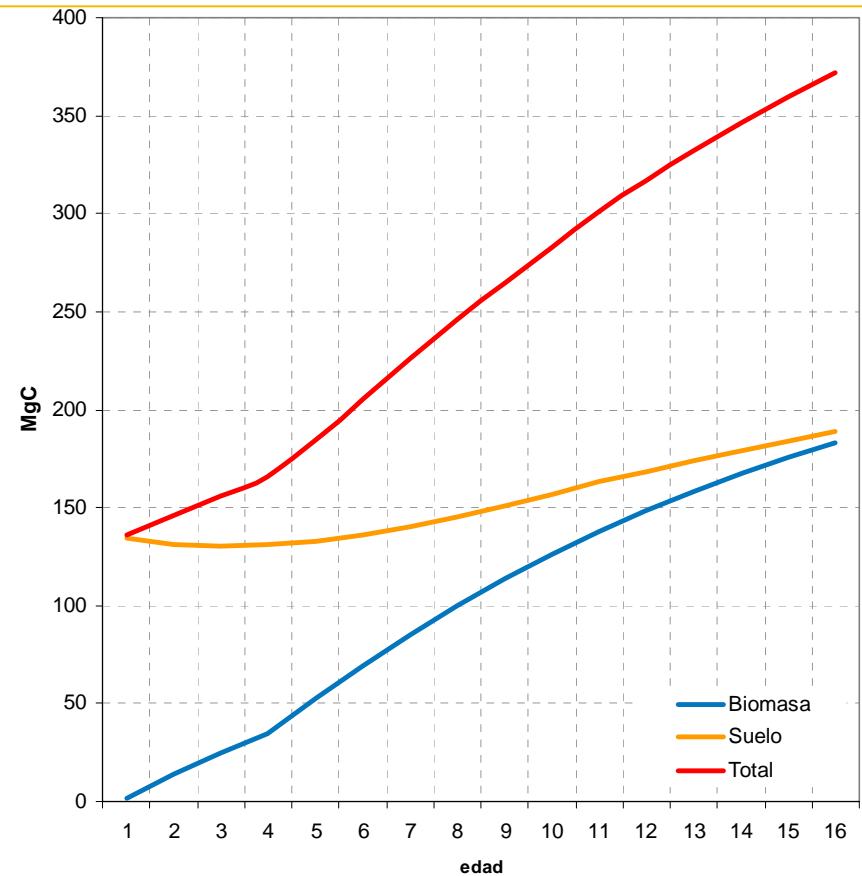
Collecting C is faster in biomass but sequestration in soil is more stable.

It's necessary to take into account:

- Preexisting Vegetation
- Previous work in soil

Example: Avoid

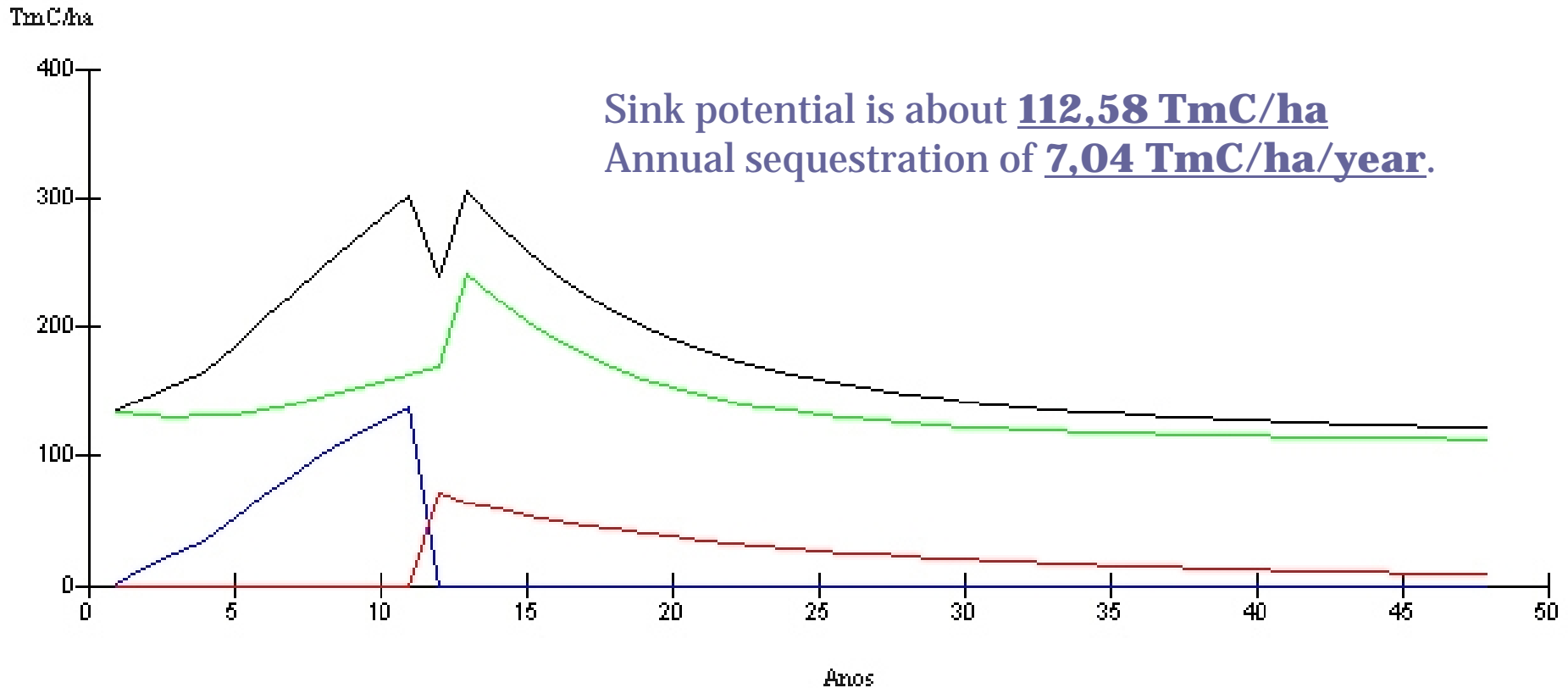
- Deep or intense preparation of soil (loss of fixed carbon)
- Bury vegetable debris (methane)



Source: Valero (2002)
CO₂Fix Model developed by CASFOR project
(ALTERRA, UNAM, CATIE and EFI)

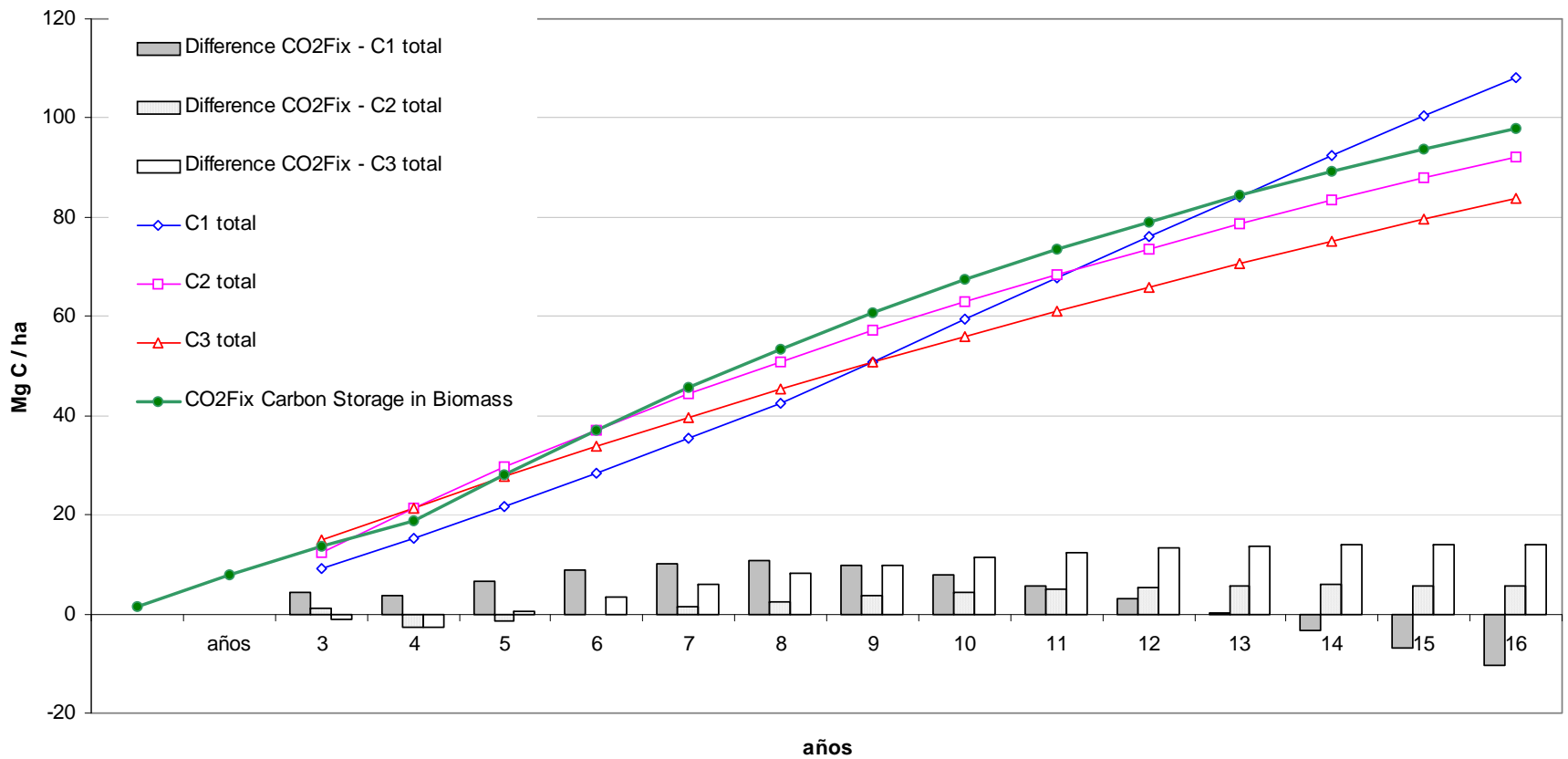
C-Stocking in a Eucalyptus Stand

Case of a single rotation of 16 years and no reforestation after harvesting



— Biomass — Soil — Products — Total

Comparación de la Estimación del Carbono en la Biomasa entre los datos de campo y la simulación de CO₂Fix



THE GREAT PARADOX

IMPORTANCE OF PLANTED FOREST:

- UN, AGENDA 21, UNCCD, UNFCCC, CBD, FAO, ITTO, IUCN, CIFOR, MCPFE, EU, FAP, EESC, etc.

FOREST ROLE AS:

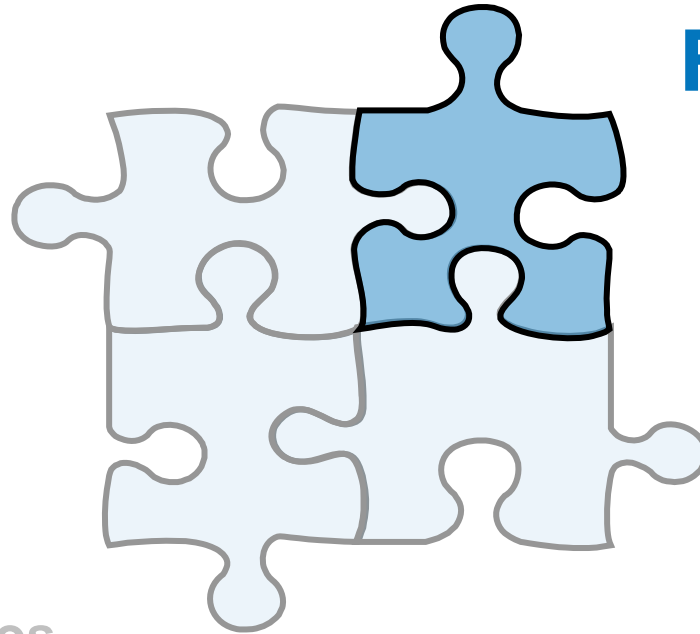
- Capacity of C sequestration (in 2005, 315 Mt CO₂, 8 % GHG EU)
- Welfare of adjacent communities
- Provision of environmental services
- Soil erosion protection and well structured watersheds
- Organic Matter and Nutrient balances
- Restore degraded landscapes
- Take the pressure for raw materials away from native forests

THE DATA, PF ARE LESS 2% OF GLOBAL LAND USE (FAO, 2008):

- 271 MHas of PF sequestered 1,5 Gtons of C per year
 - Additionally 0,5 GTons of C are stored long-term in products / year.
-

Aumento del
Área Arbolada

Forestry



Aprovechamientos
y Productos de madera

Sustitución de
Combustibles Fósiles

Forestry and Sustainable Forest Management

1.- Increment of productivity

[Thinning, Fertilisation, mixing species ...]

2.- Consciencious soil management

3.- Prevention of Forest Fires

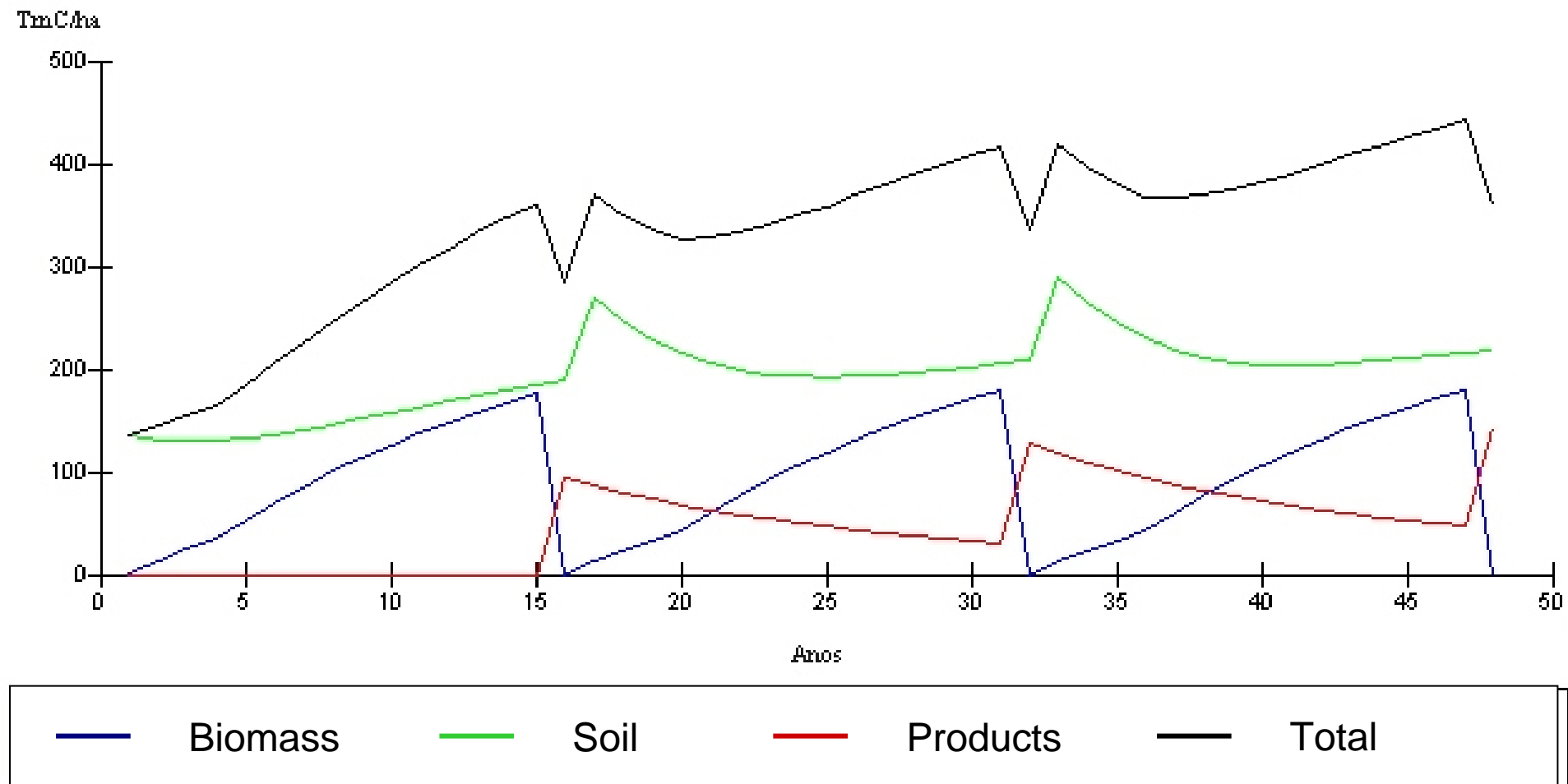
4.- Sustainable Forest Management (MCPFE)

5.- Careful rotation selection

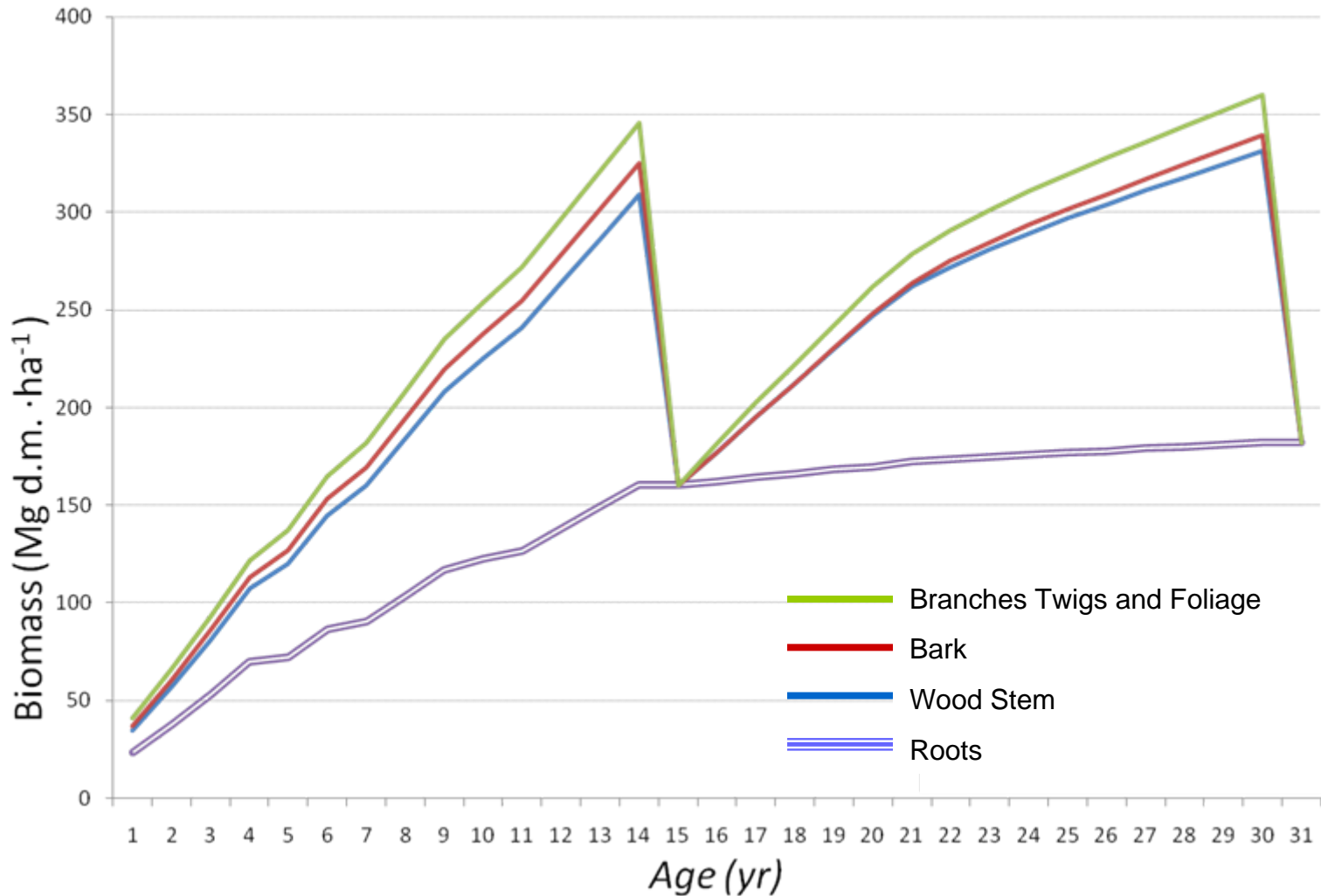
6.- Adaptation measures to CC



C-Stocking in a Eucalyptus Stand Case of a 3 rotations of 16 years



Belowground Biomass: a key factor (especially in coppice silviculture)



Source: Valero et al. 2009 - in preparation Allometric equations for Above and belowground biomass for first and second rotation of *Eucalyptus globulus* coppice silvicultural system in Spain and Uruguay – in preparation - Provisional

Disasters

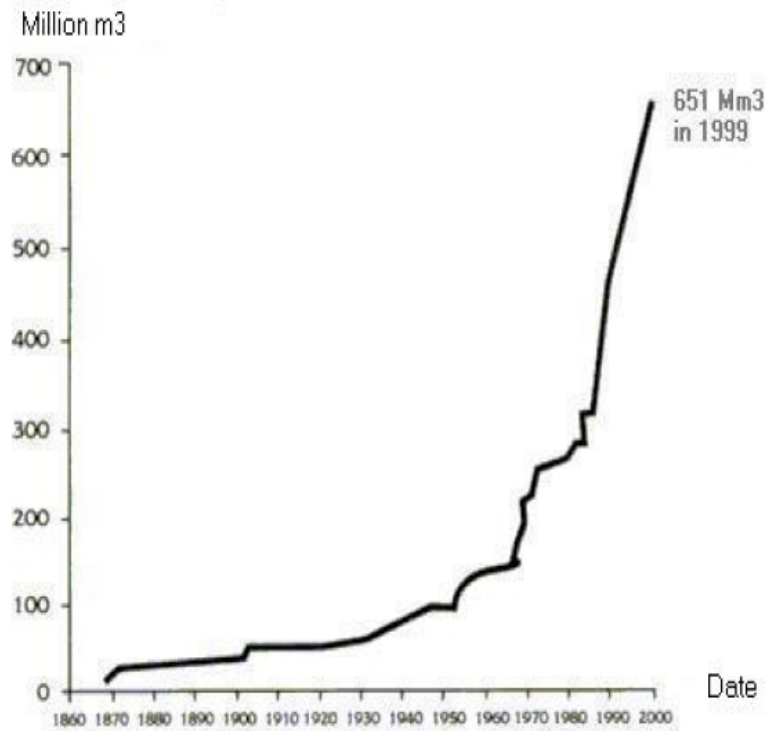
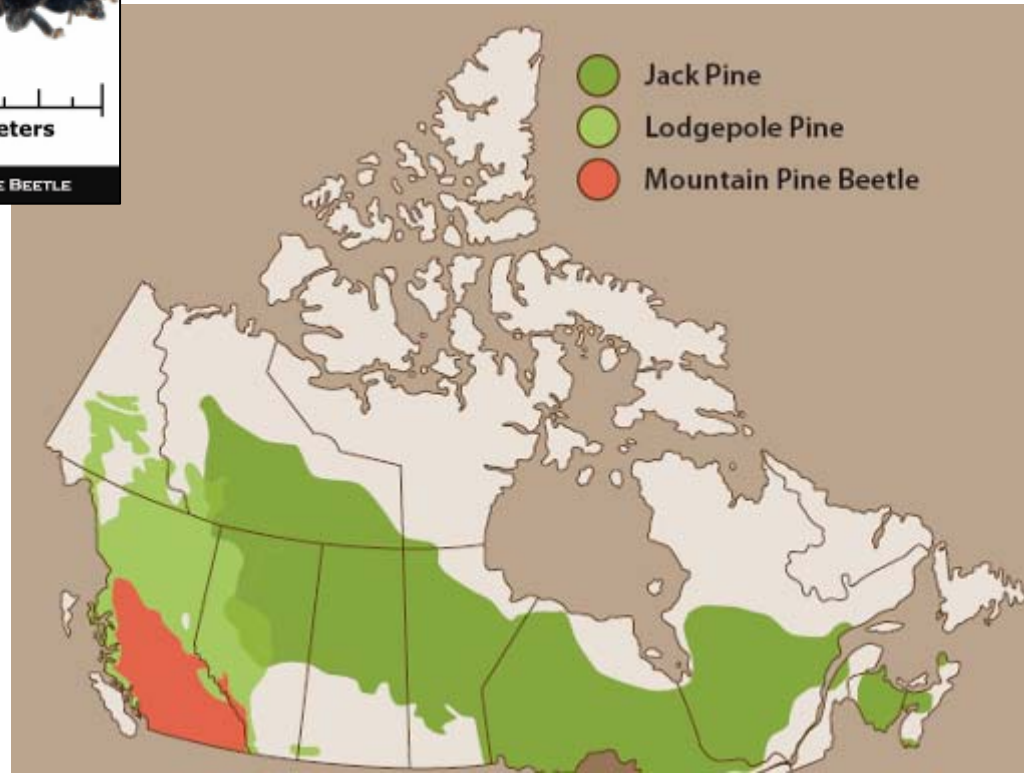
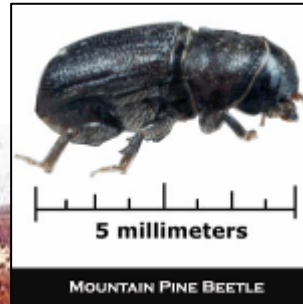


Figure 2: Cumulated wind storm damage (million m³) from 1865 to 2000
(after Doll, 1991 and updated [3])

Forest Adaptation Problems to CC

– BIOTIC PATHOLOGY AGENTS

- Mountain Pine Beetle:
8 million hectares (400 millions m³) affected in Canada



1.747.272,65 T CO₂

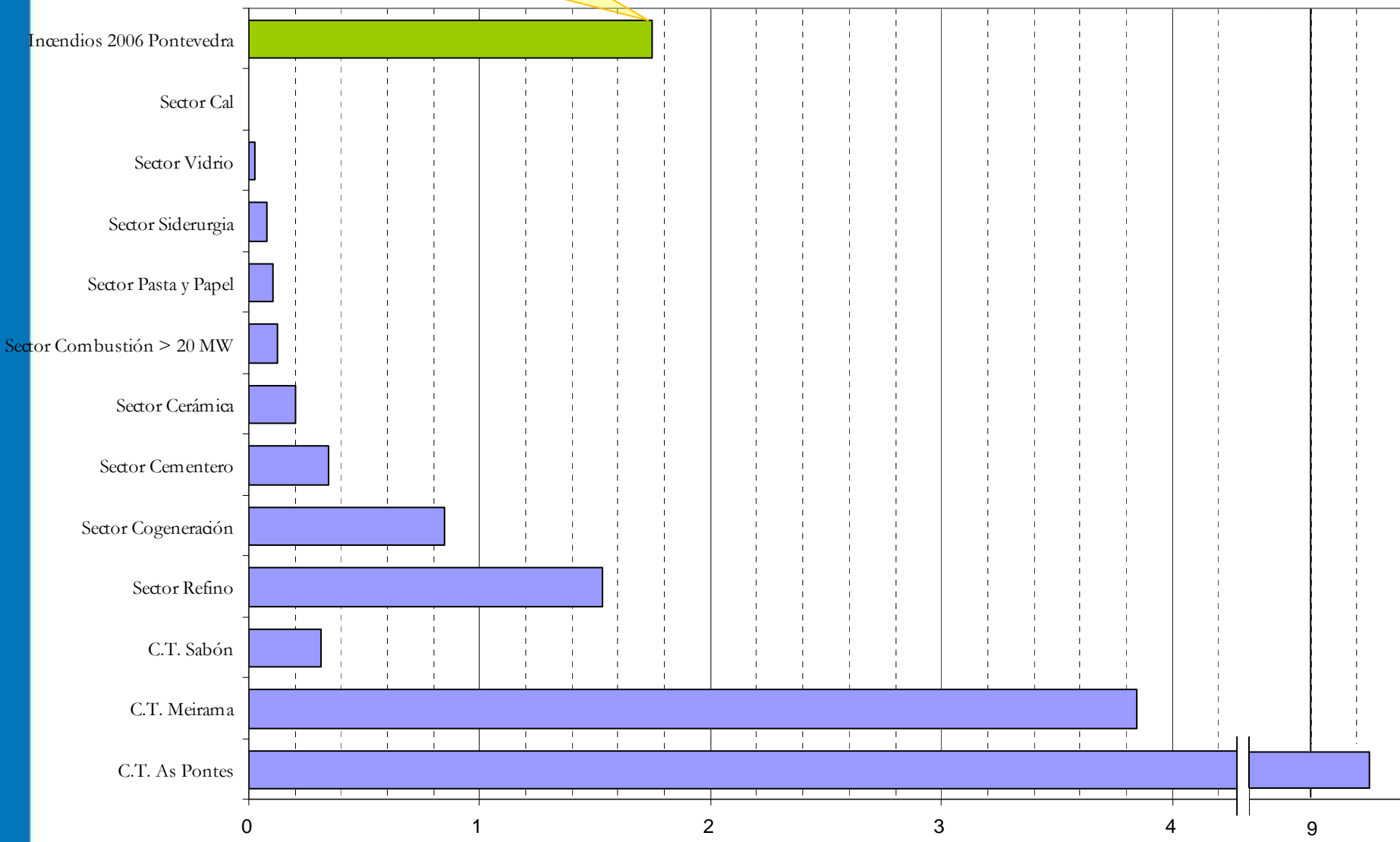


*From EFFIS (JRC) data and applying
2006 IPCC Guidelines for National
Greenhouse Gas Inventories
methodology*



Comparing CO₂ forest fires emissions with certified industrial sectors in Galicia.

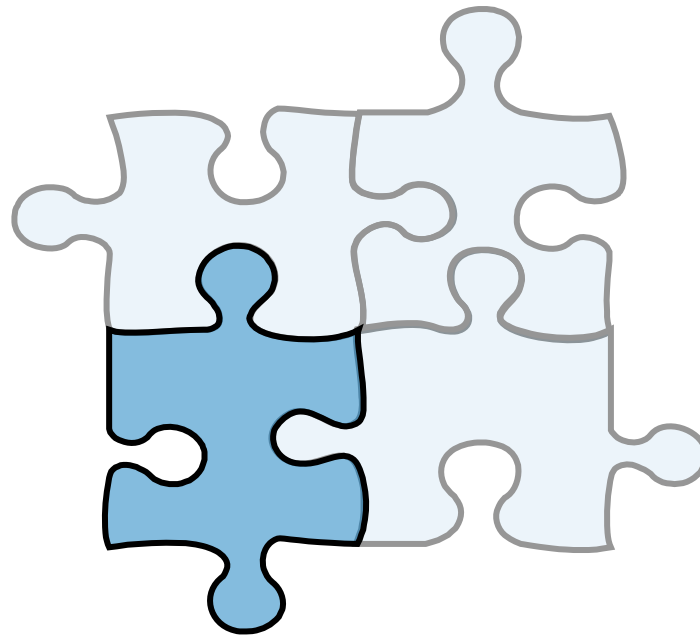
1.747.272,65 Mg CO₂



Millones Toneladas de CO₂

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Área Arbolada

Selvicultura



**Timber Crop and
Products**

Sustitución de
Combustibles Fósiles

From a carbon sink...



... to a source ?



Must wood harvesting and manufacturing be outside of a C Strategy ?

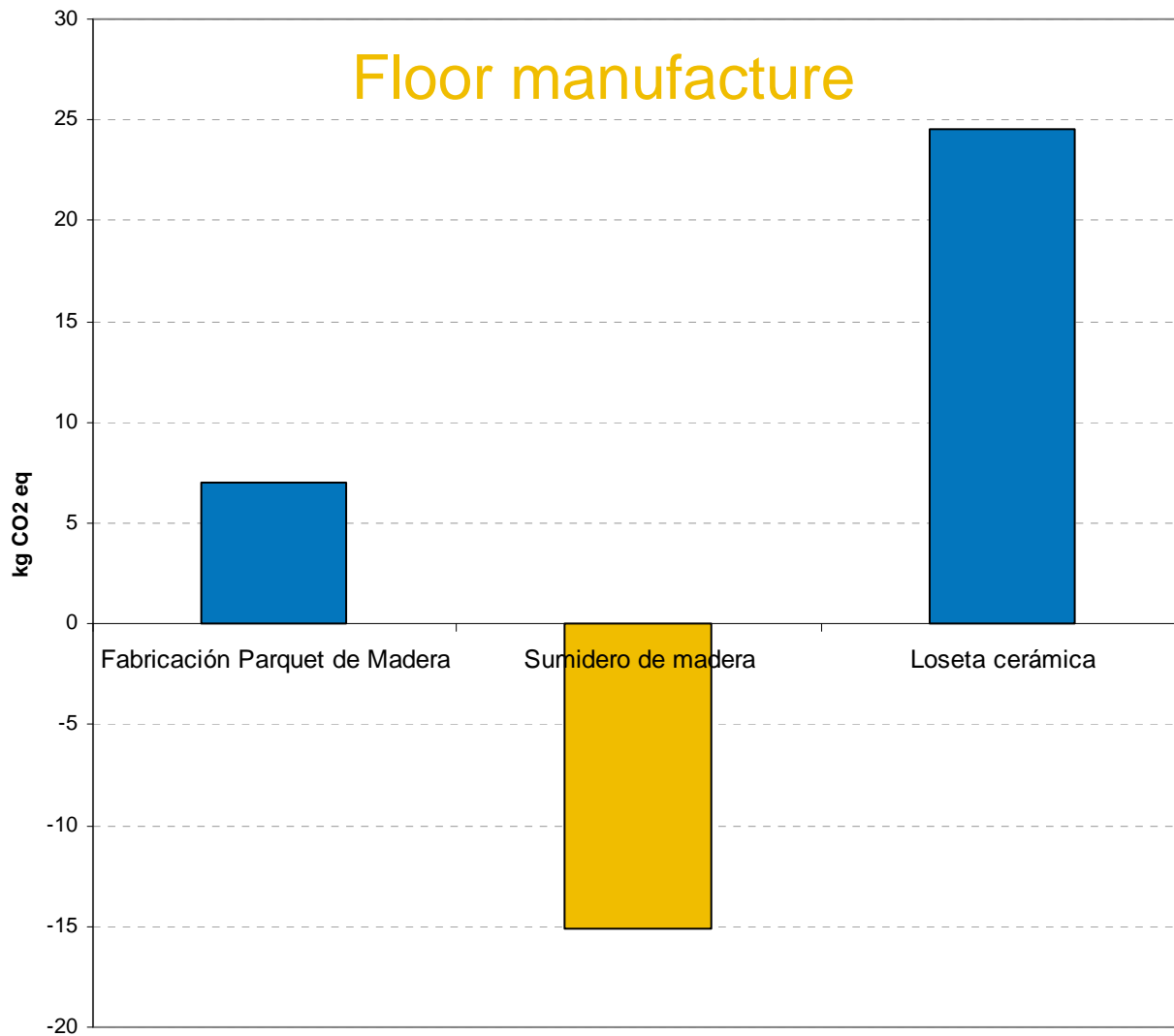
No

- 1.- Important Volume in long life wood products
- 2.- Powerful Substitution Effect
- 3.- Rural Development and other social and economic implications
- 4.- Enhancement possibilities

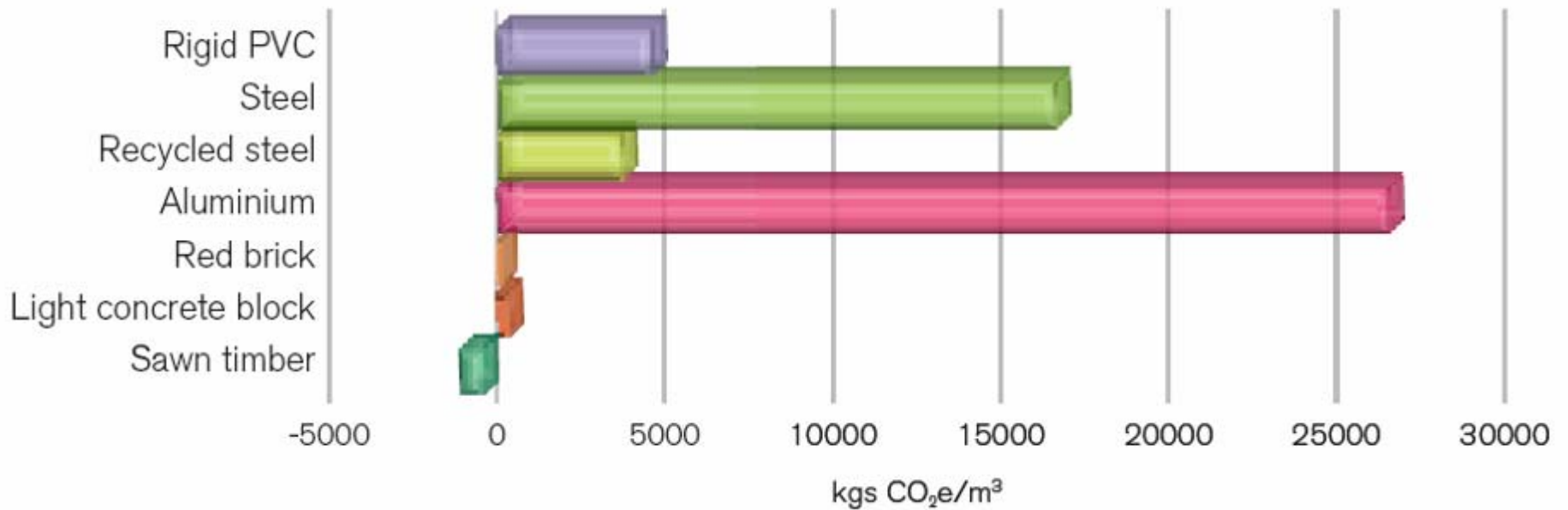
The substitution effect is a permanent effect substituting fossil-based energy and fossil-based raw materials by forest based products

Fruehwald et al. (1994) made a statistical approach to estimate the mass of carbon in wood products. In Germany the volume of wood products in use equals to 335 Mill. tons carbon (33 % of carbon stored in above ground biomass in German forests).

Example of the substitutive effect in products

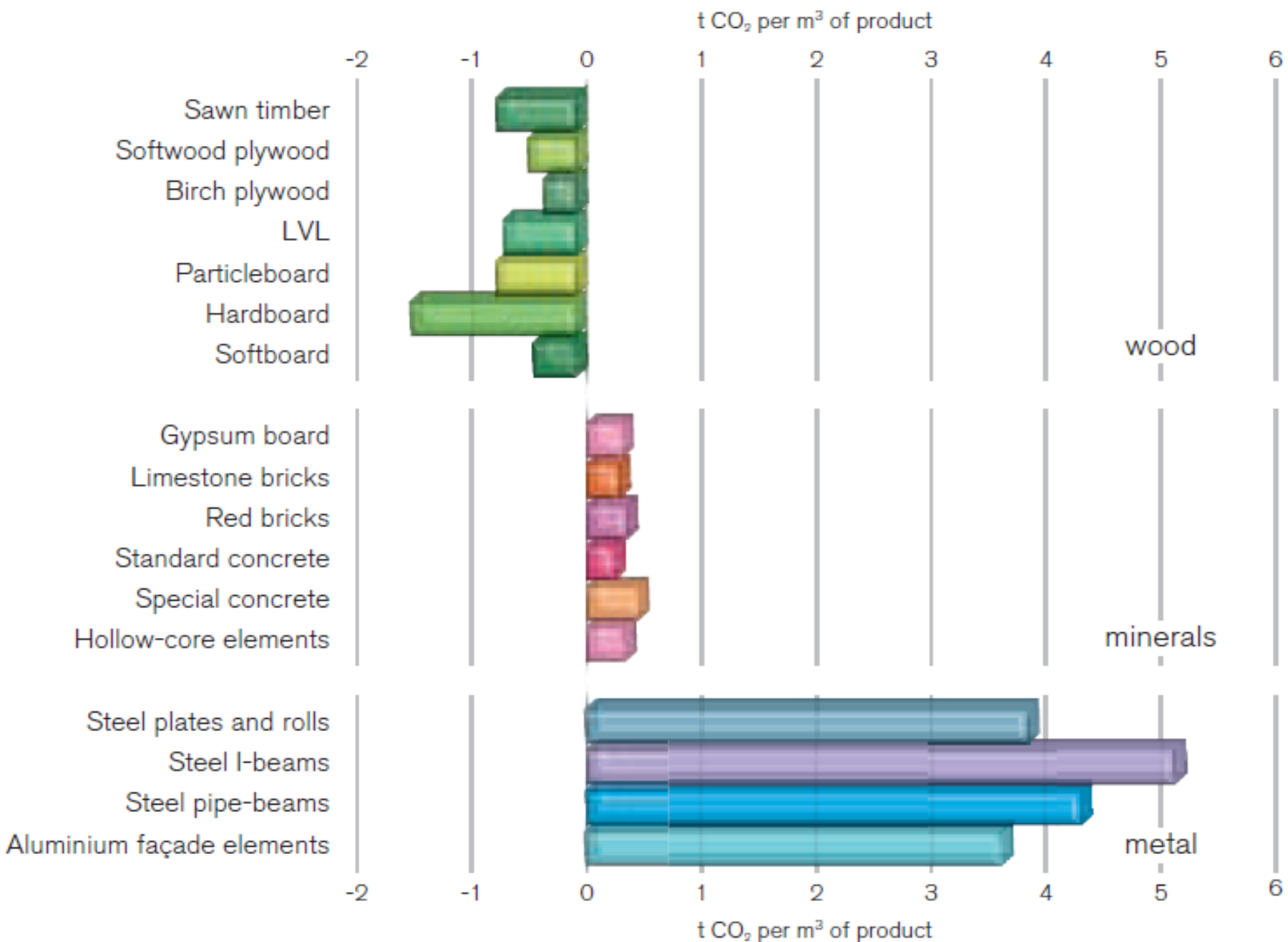


Net emissions of CO₂ including carbon sink effect

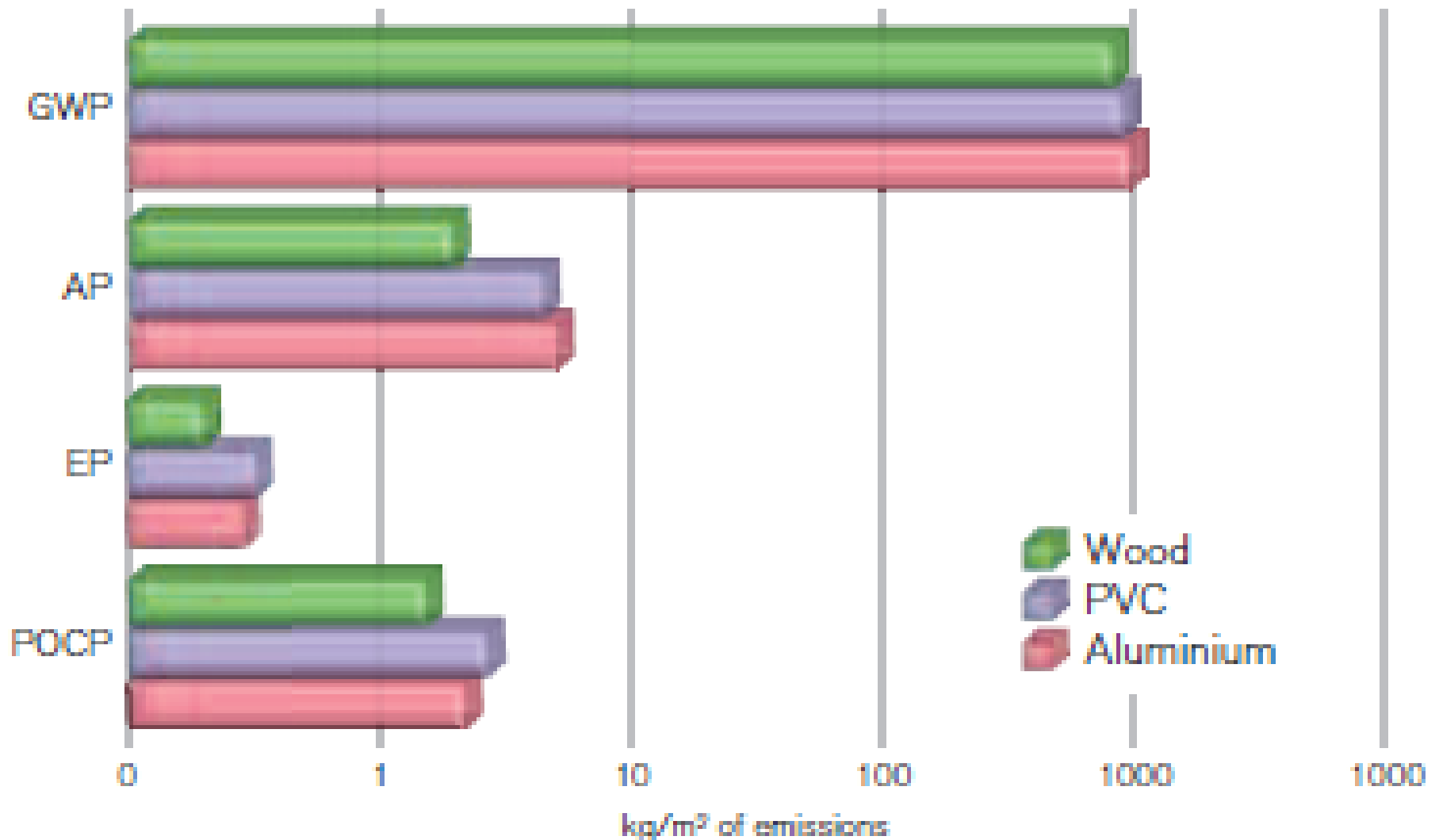


CEI-BOIS citing RTS, Environmental Reporting for Building Materials, 1998-2001

Net CO₂ lifecycle emissions



Window frames: the environmental impact



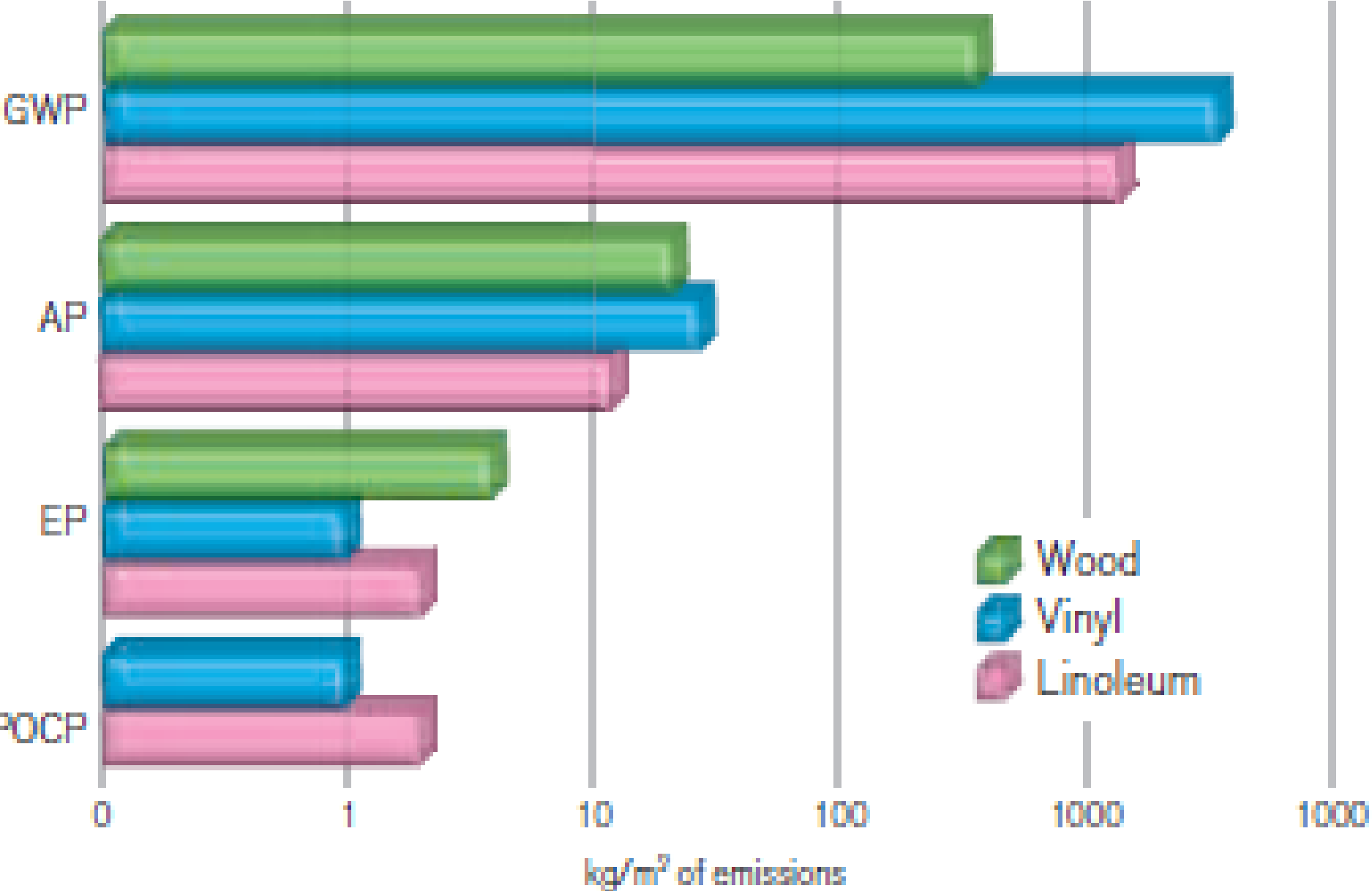
GWP: Global Warming Potential (CO₂ eq.)

AP: Acidification Potential (SO₂ eq.)

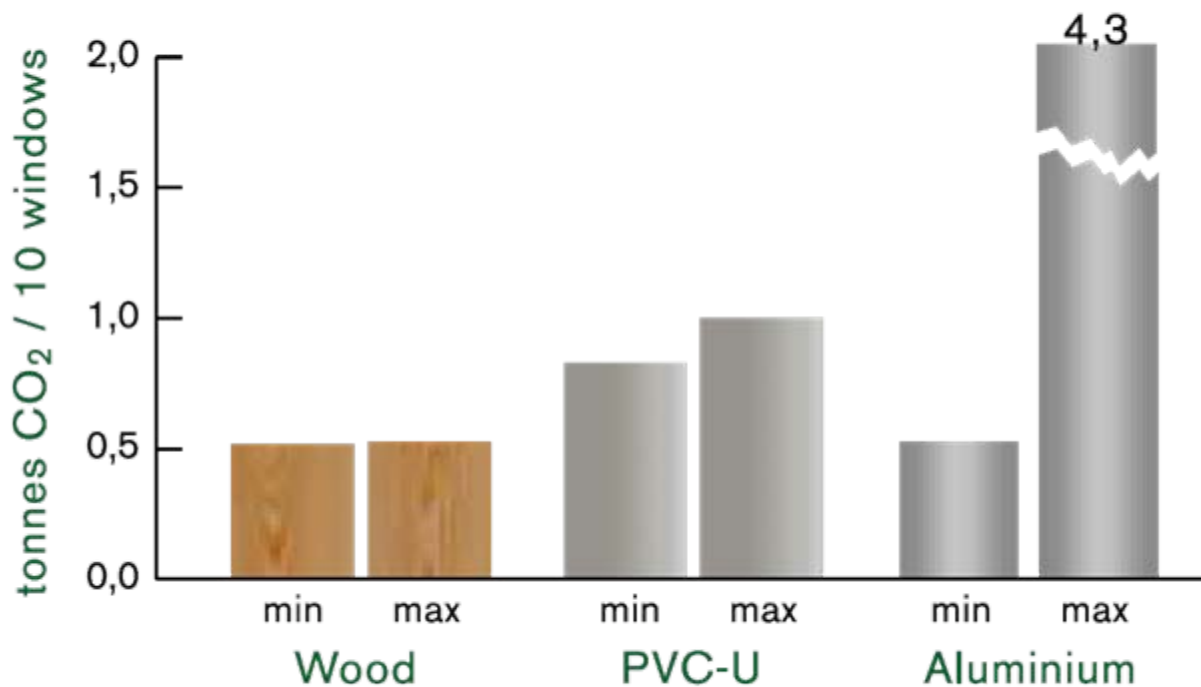
EP: Eutrophication Potential (PO₂ eq.)

POCP: Photochemical Ozone Creation Potential (C₂H₄ eq.)

Flooring: the environmental impact



Comparison of CO₂ emissions in the production of different window materials



Carbon Mitigation in Forestry and Wood, Industry workshop, 1998 – Lifecycle Assessment of Wood Products, K Richter

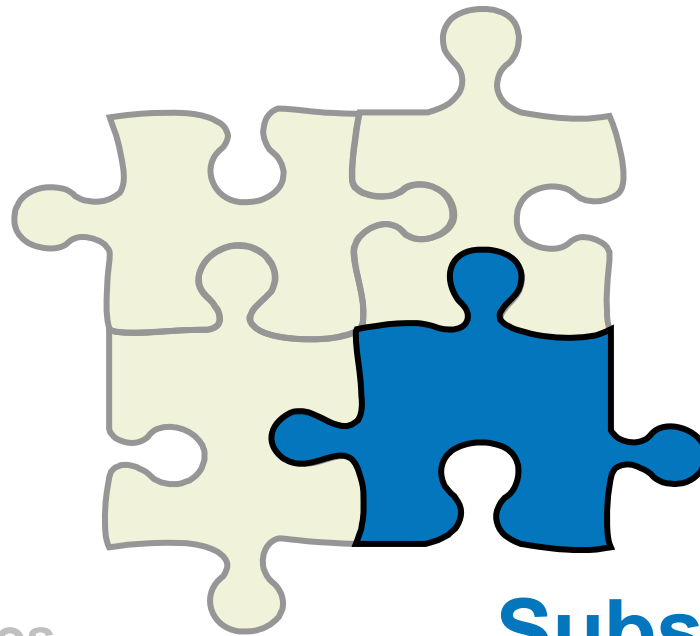
Each 10 Windows

- By substituting wood for PVC up to 0,5 t CO₂ can be saved
- By substituting wood for Aluminium to 4,0 t CO₂ can be saved



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Selvicultura

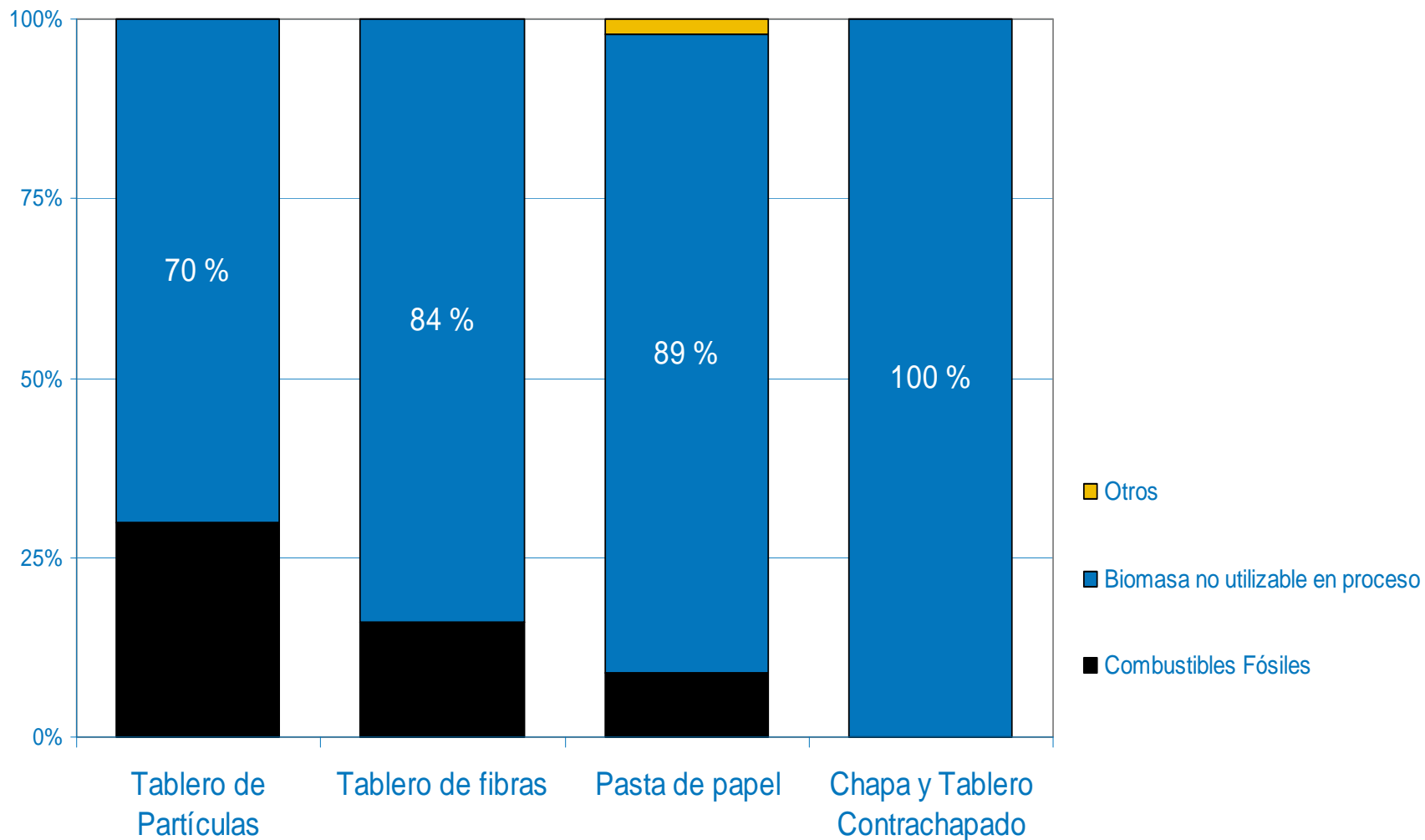


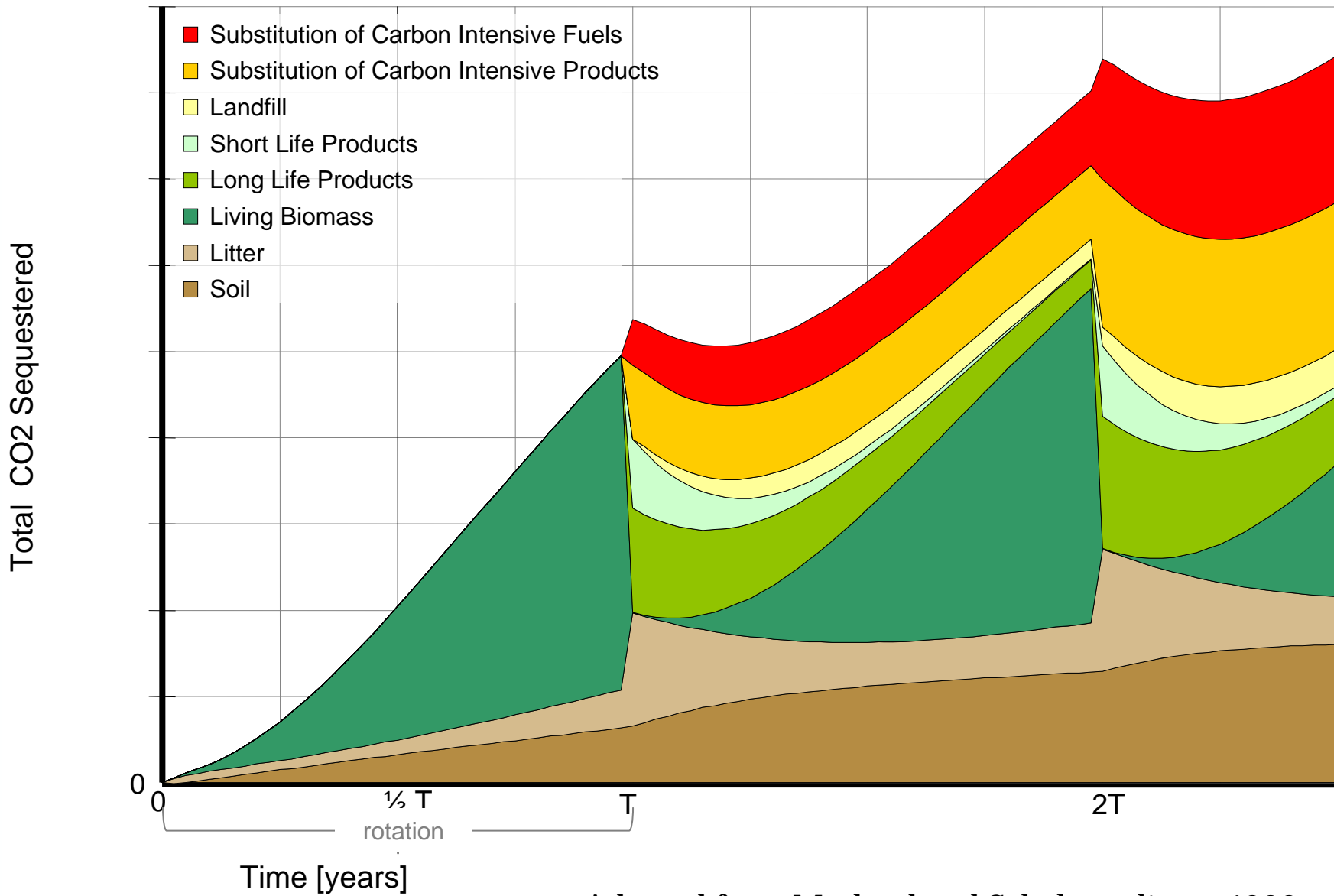
Aprovechamientos
y Productos de madera

**Substitution Of
Fossil Fuels**

Substitutive effect fossil fuels (permanent)

Fuentes de Energía en la industria forestal gallega





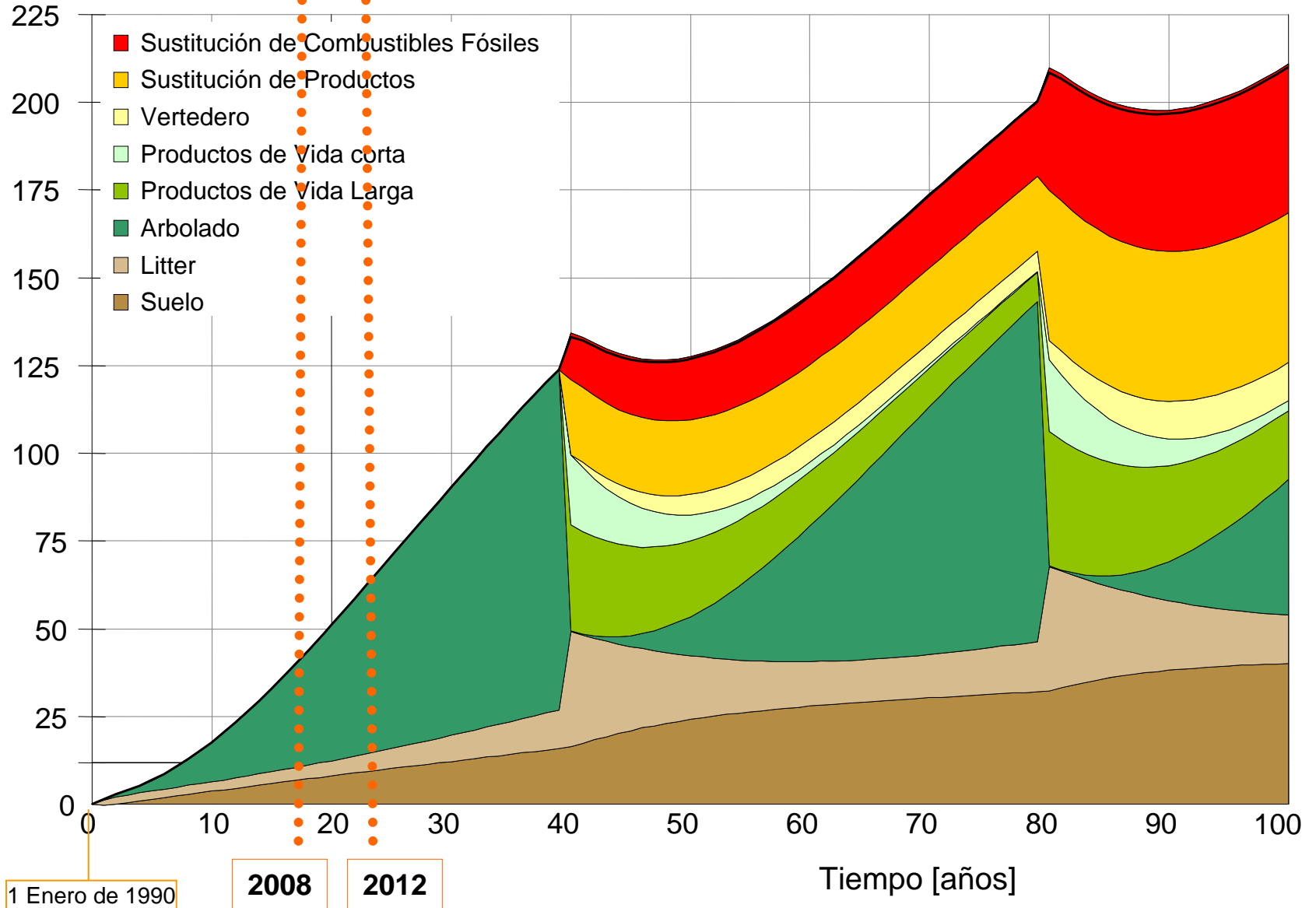
Adapted from Marland and Schalamadinger 1999

Example: of a generic species with 40 year rotation

First Kyoto period



Equivalente Carbono Fijado [tC/ha]



1 Enero de 1990

2008

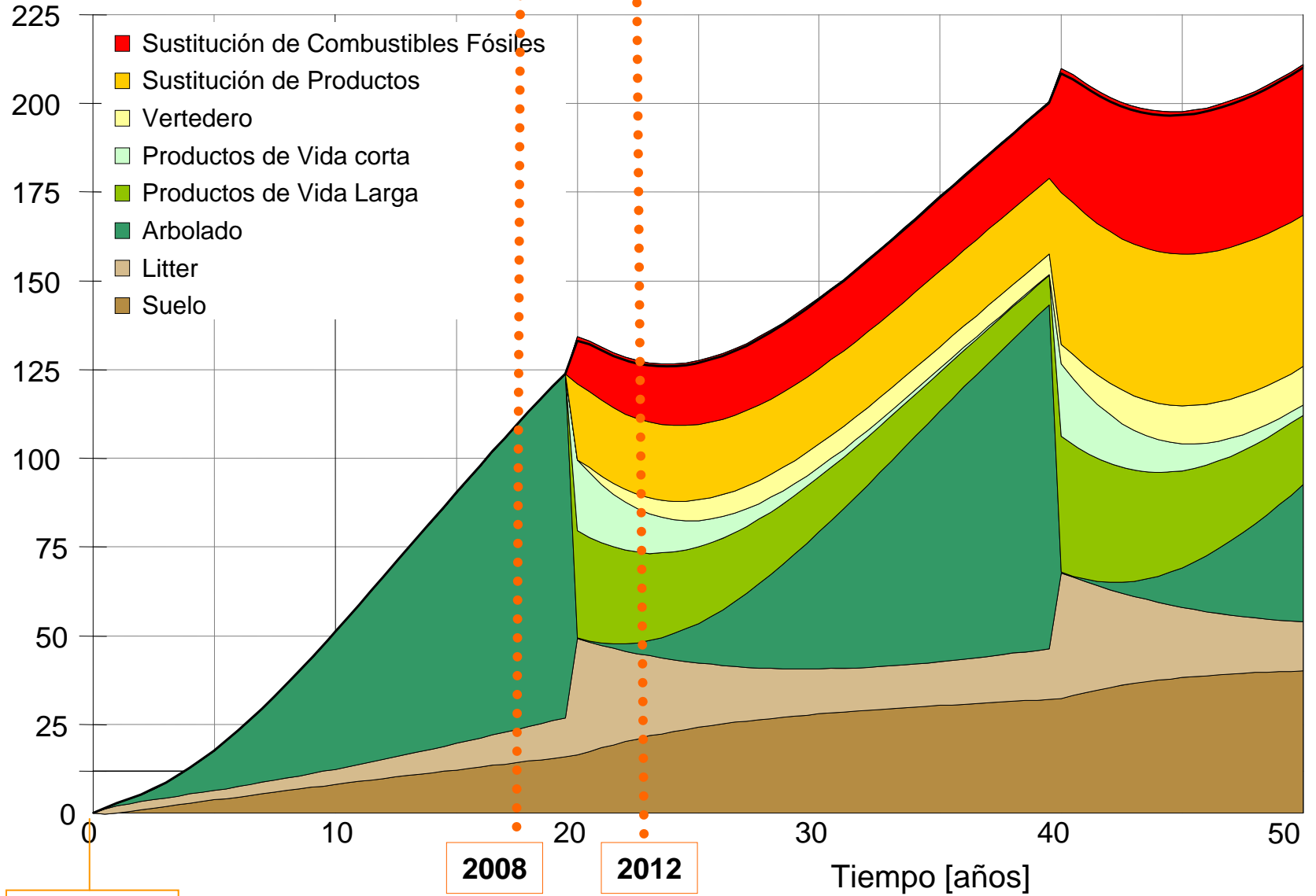
2012

Tiempo [años]

Generic species with 20 year rotation

First Kyoto period

Equivalente Carbono Fijado [tC/ha]

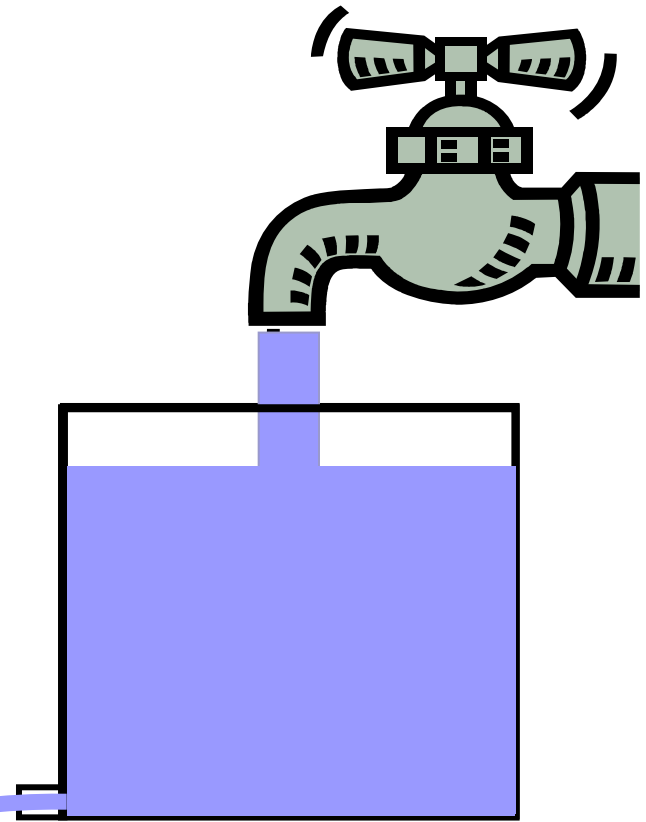
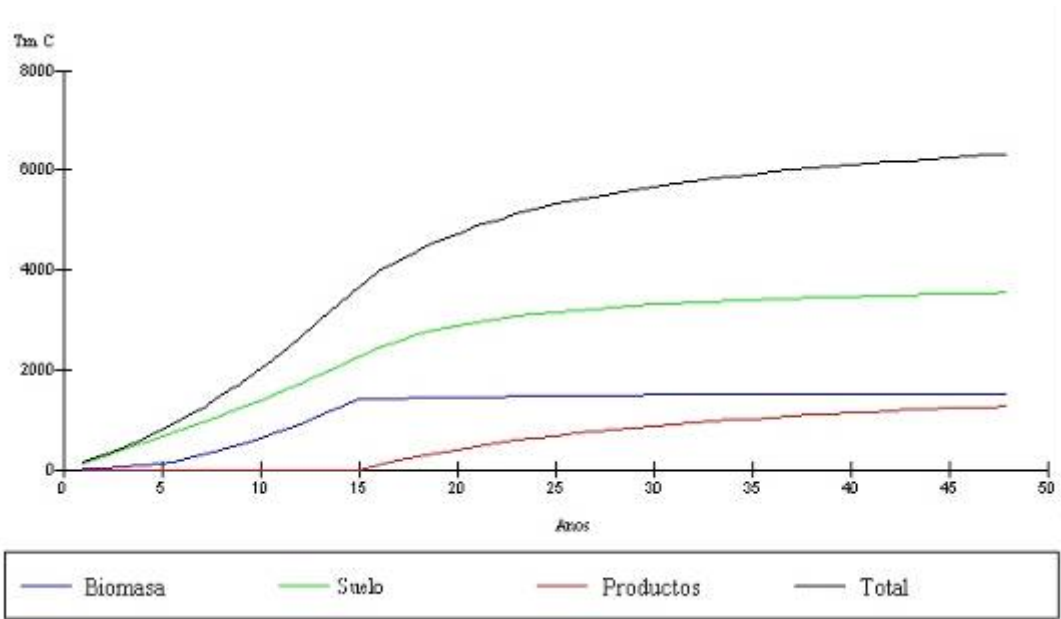


1 Enero de 1990

2008

2012

Tiempo [años]



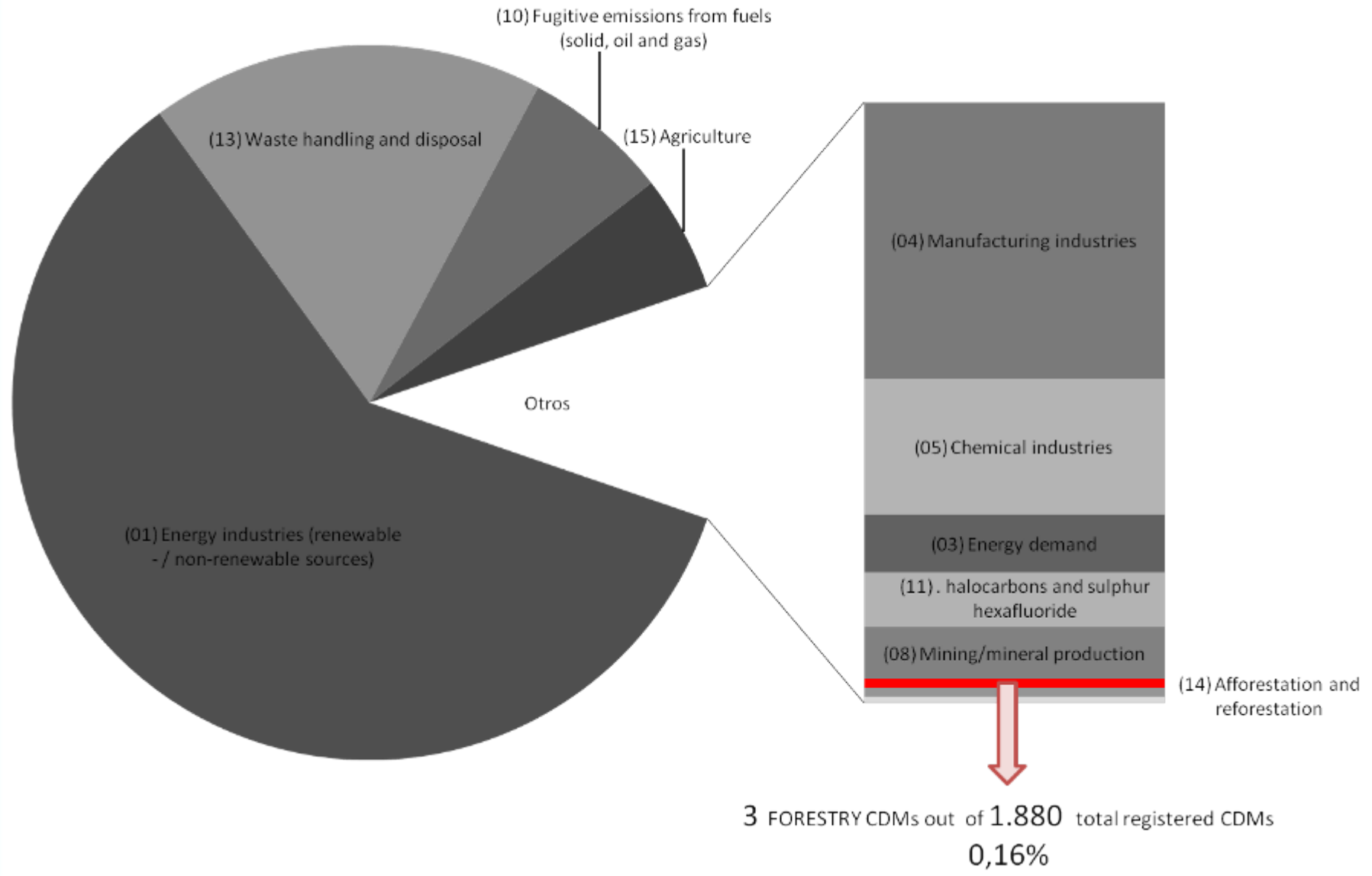
Kyoto Protocol

Article 3

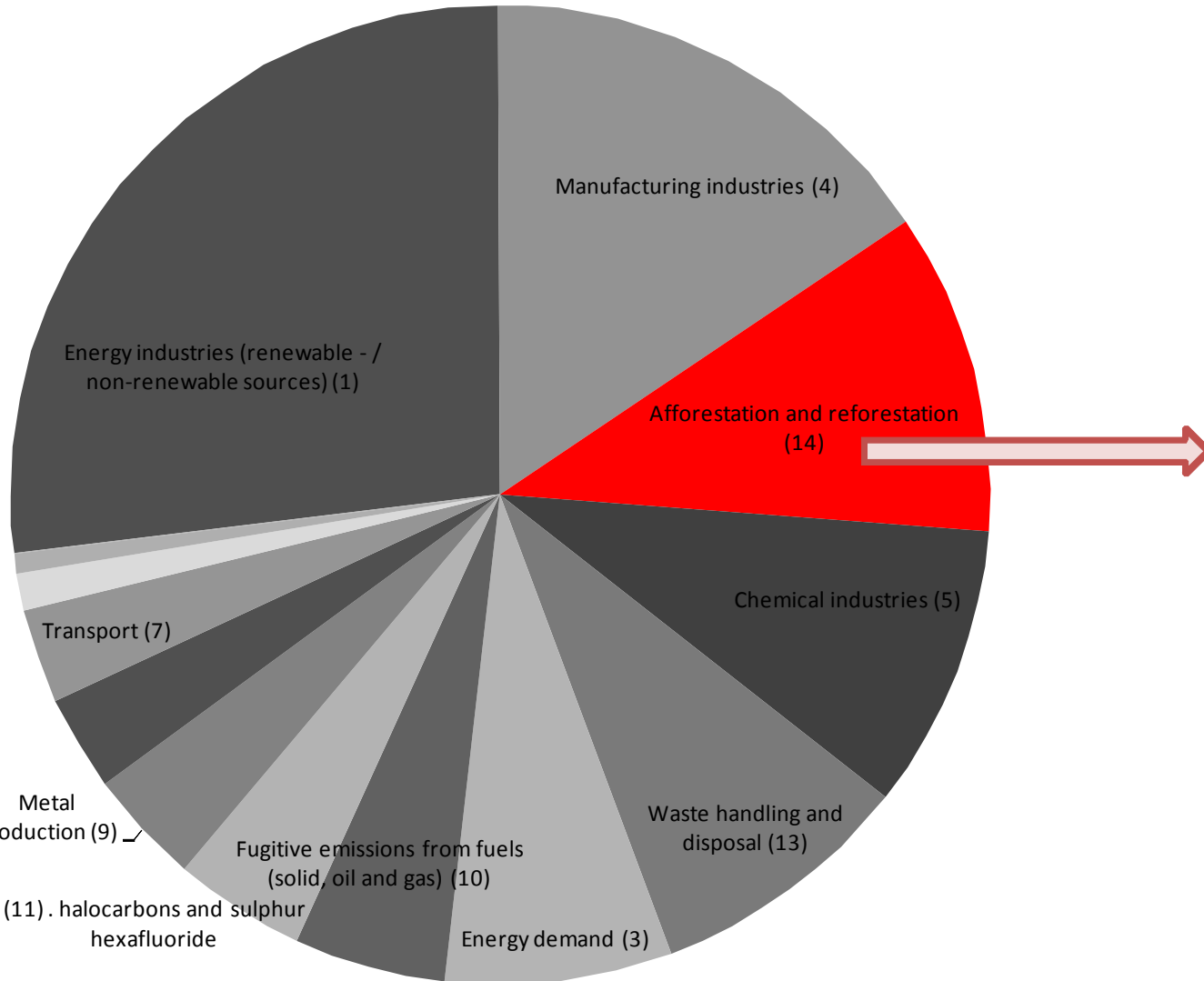
“removals by sinks resulting from direct human-induced land-use change and forestry activities, limited to afforestation, reforestation and deforestation since 1990, measured as verifiable changes in carbon stocks in each commitment period, shall be used to meet the commitments under this Article....”

Also arts. #3.3, #3.4, #6 & #1 must be considered

REGISTERED CDMs (26.03.2009)



REGISTERED METHODOLOGIES FOR CDMs (26.03.2009)



17 REGISTERED METHODOLOGIES FOR FORESTRY CDMs out of **160** total registered methodologies for CDMs **10,16%**

From 277,2 Mill T CO₂ eq CER
in Registered Projects



216,633 CERs (T eq CO₂)
Annual account of all forestry
CDL approved in the world
Equivalent to 8,5 days

83% Moldova

**37,391 CER (17%) of real
forestry CDM**
(1.5 days)





TALE ESTE MISMO.
CRED QUE TIENE EL TAMAÑO
IDEAL PARA SACAR LOS TABLONES
CON LOS QUE HACER LA MESA EN
LA QUE SE FIRMARÁ EL ACUERDO
PARA CONTROLAR EL CAMBIO
CLIMÁTICO

Boer y Jover

CONCLUSIONS: Is Forest Carbon Sequestration a Viable C Strategy?

- Recognition and enforcement of European forest, forestry and silvicultors is necessary
- Policy Instruments and measures for conscious carbon forest management are urgent (SFM)
- Forest sector needs to mobilise sustainable products in form of raw materials and biomass
- Strengthen use of forest measures in context of R D Policy and other funding mechanisms
- Review LULUCF measures into CDM
- EU could lead the real role of forest in CC in the forthcoming commitments and to D C

Thank you very much for your attention!

