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European Forest Week

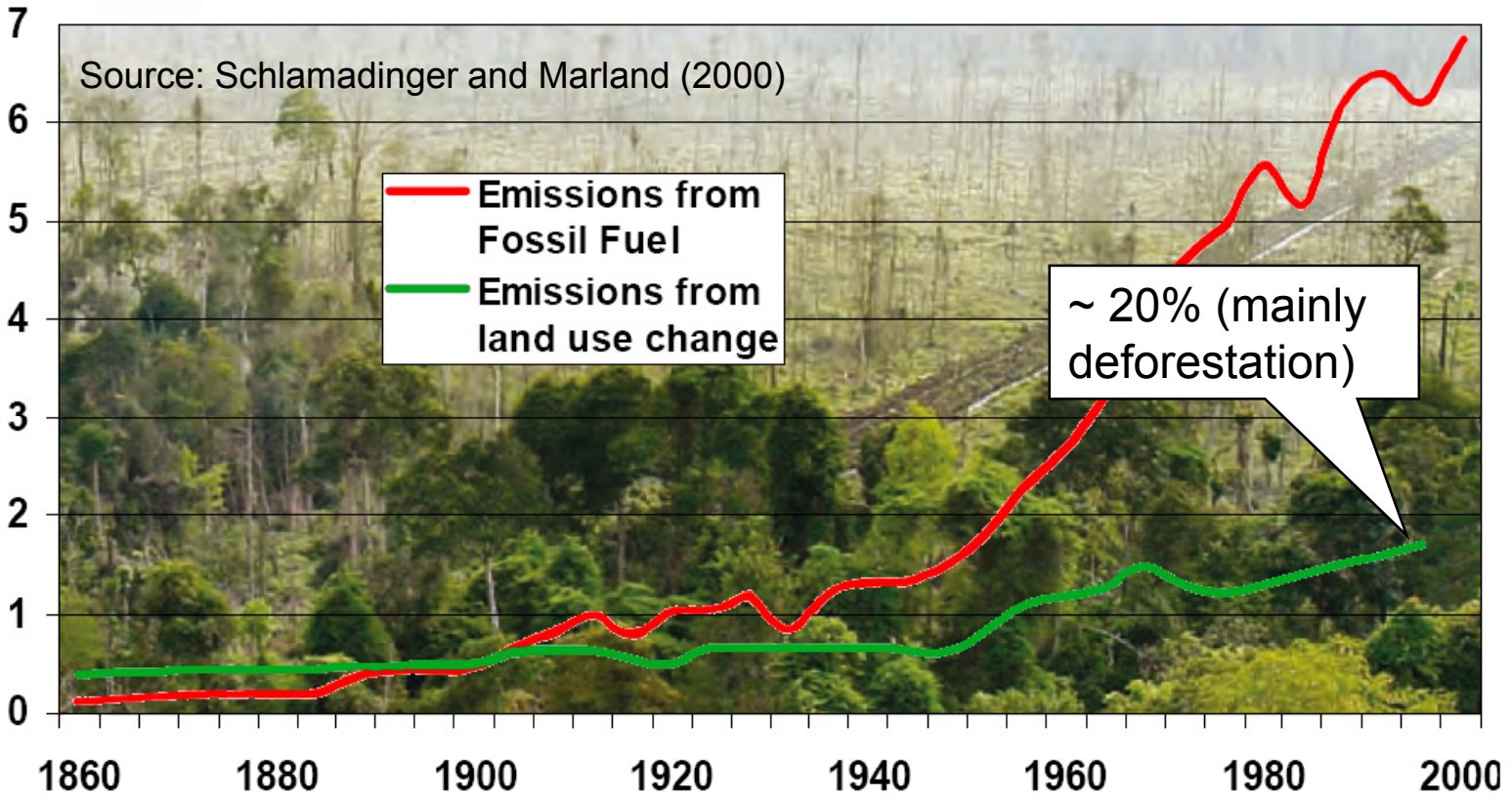
Partner Event "The Role of HWP in Climate Change Mitigation"

Estimating HWP contribution to Climate Change Mitigation

21 October 2008, Rome

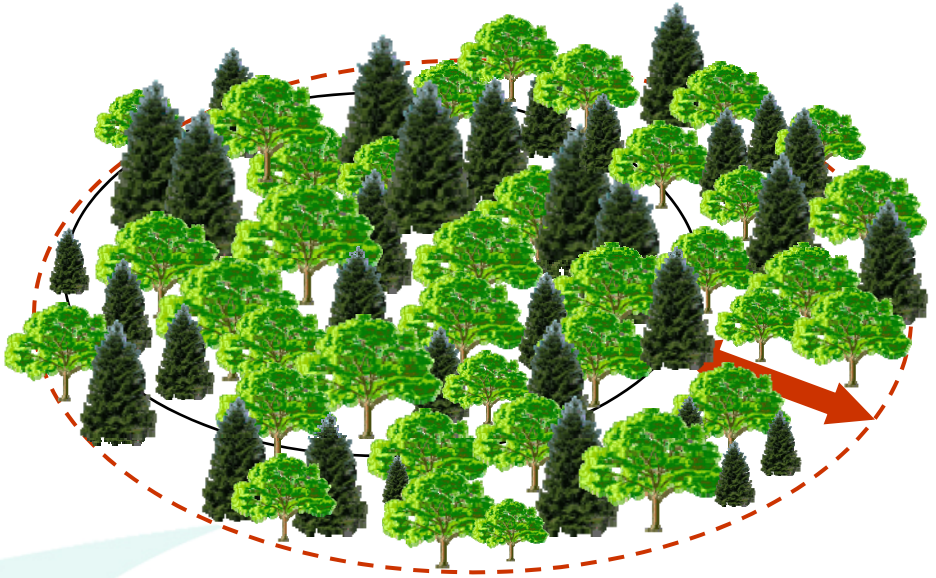
- background
- carbon storage effect
- substitution effect
- resume

Deforestation as one of the biggest sources of CO_2 on global level [in Bt CO_2 y^{-1}]



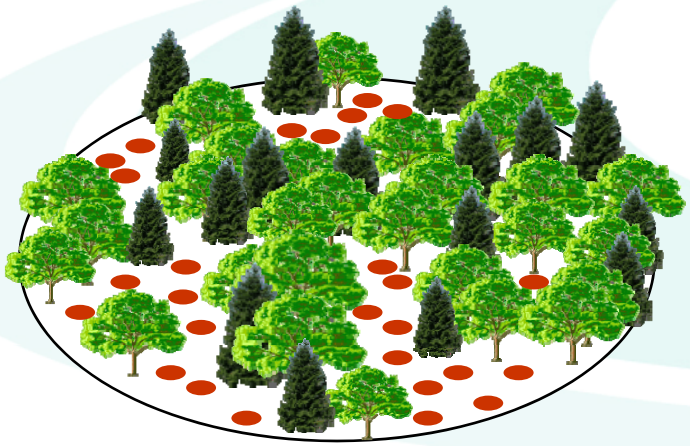
Article 3.3 KP ARD

- Afforestation
- Reforestation
- Deforestation



Article 3.4 KP FM

- Forest management



➡ Forests are considered in GHG Inventories and in the emission reduction targets (Annex I)

➡ Estimation of emissions/removals from annual carbon pool/stock changes (source/sink) on national level (5 pools for 3.4 KP FM)

Kyoto-Protocol

- Wood products currently excluded from accounting
- Possible consideration under post-2012 climate regime (Copenhagen)

National GHG-Inventories (UNFCCC)

- Suggestion of default assumption “that all carbon removed in wood […] from forests is oxidised in the year of removal”
  (IPCC Guidelines 1996 Vol. 3 p 5.17)
- However, guidelines recommend the inclusion of HWPs in case stocks are increasing and sufficient data are available

  →*Australia, Canada, Great Britain and USA*
- Methodology provided in Good Practice Guidance 2003

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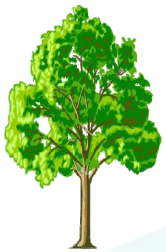
Carbon storage along wood products life cycle

CO_2 = *removal*

process chain

= *store/pool*

CO_2 = *emission*



forest

roundwood

sawnwood

building

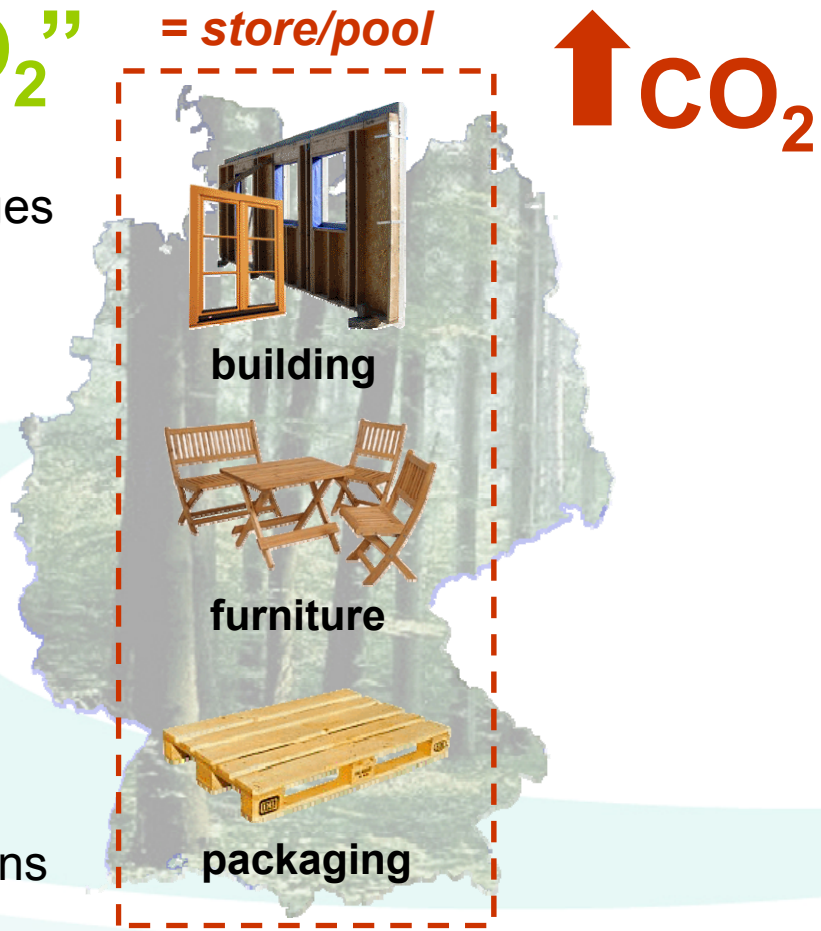
post-consumer wood

- Only trees remove carbon from the atmosphere, thus being able to serve as a carbon sink. Wood products only constitute a pool for carbon.

Carbon storage of HWPs in post-2012 climate regime

Carbon storage of HWPs in post-2012 climate regime

- Estimation of CO_2-emissions in LULUCF sector on basis of annual stock changes
  → wood products as well?
- Estimation of wood products contribution to LULUCF on the basis of service life data or by means of decay functions (*IPCC HWP Model, tier 1*)
- Use in the market determines the duration of carbon storage
- Need to calculate CO_2-emissions from HWPs recursively



C-HWP-MODEL DE

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Hamburg, 20 October 2008

Data prior to 1949: logarithmisch

Calculation of carbon pool: Spec. service life (market-based)

Scenario: Eigene Parametrisierung

Base year: 2007

- Show

Amounts: 0%

Service life: 0%

Market share: 0% Building Packaging

C-Pool | Scenario (C)

Tier und source of data: IPCC HWP Model using FAOSTAT data (tier 1)

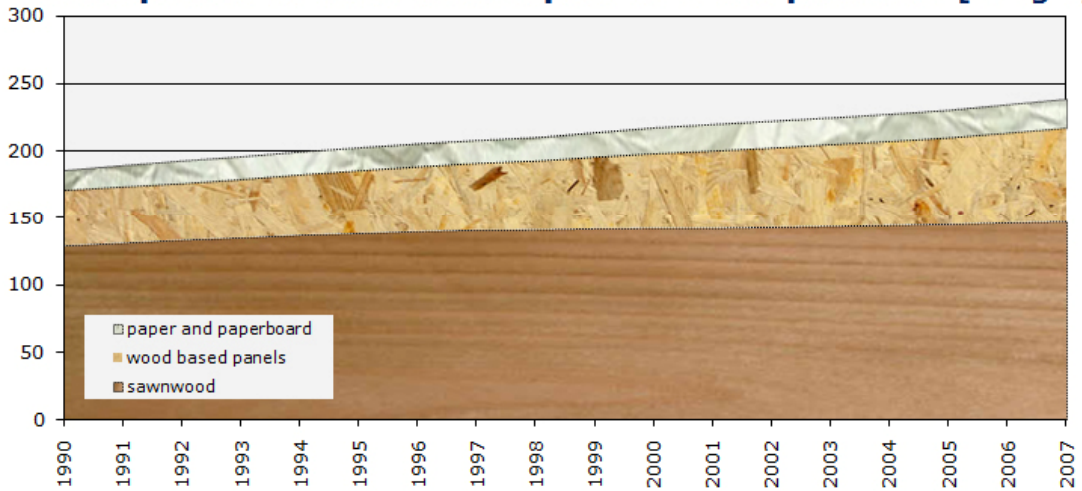
Accounting: Stock-change approach (SCA)

Base year: 1990 Base period: 1990 bis 1995

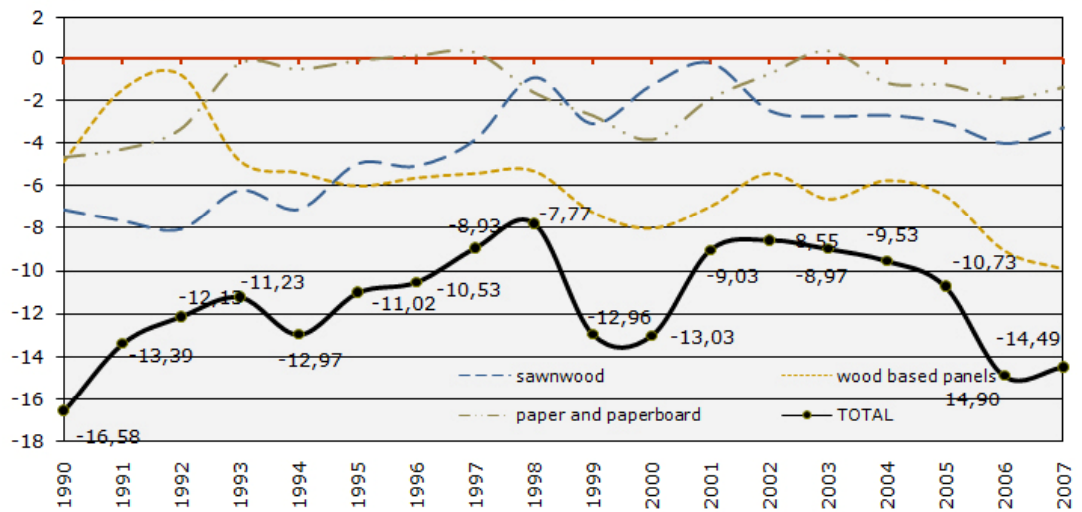
Accounting | Scenario (CO_2)

Steuerung | Marktentwicklung

Development of total carbon pool in wood products [in Tg C]



Annual emissions from pool/stock change [in Tg CO_2 yr^{-1}]



Approaches for accounting currently being discussed

- Stock Change
- Production
- Atmospheric Flow

→ Who (consumer/producer) accounts for what?

→ On which basis (data)?

Prerequisites for accounting

- Climate effects should be given priority
- Creation of positive incentives
  - → avoidance of leakage and perverse incentives (deforestation)
  - → sustainable forest management and cascade use
- Methodological consistency with LULUCF/AFOLU
  - → calculation of emissions on basis of Δ wood products pool (consumption = production + import – export)

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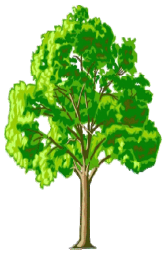
Substitution effect due to wood utilization

CO_2 = *removal*

CO_2

CO_2 = *emission*

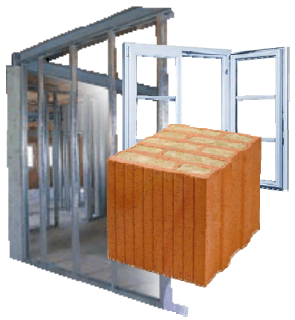


forest

roundwood

sawnwood

building



material

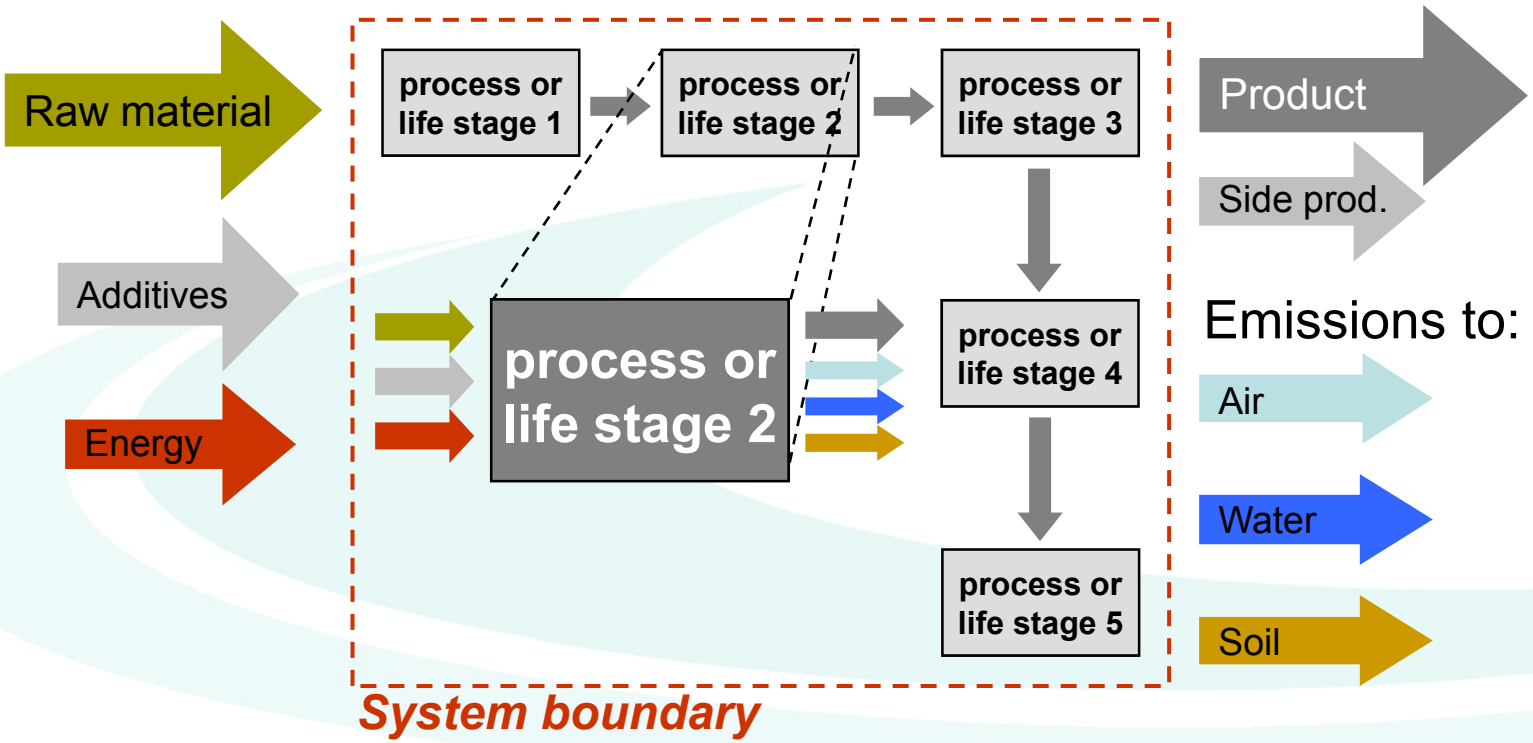
post-consumer wood

energy

- Balance for C pool results in zero sum game over products life cycle
- Emissions from e.g. processing assessed by means of Life Cycle Assessment (LCA)
- Impact categories Global Warming Potential (GWP 100) and energy consumption

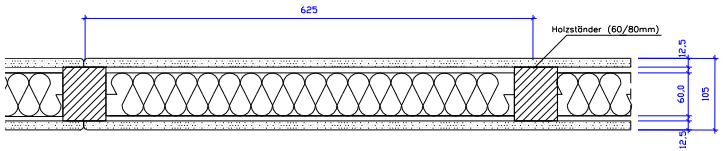
Methodology

- LCA summarizes and evaluates all environmentally relevant material and energy flows, as well as all environmentally relevant effects of a product system (ISO EN 14040 and 14044)

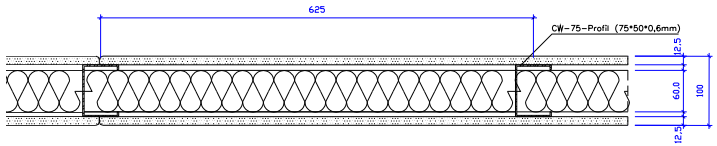


Example interior wall systems

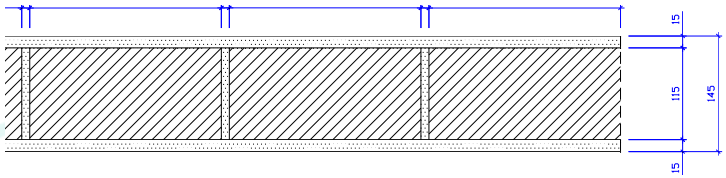
Timber frame wall



Metal frame wall

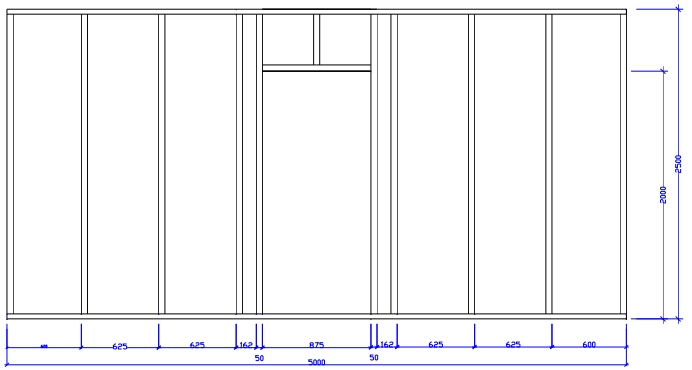


Brick wall



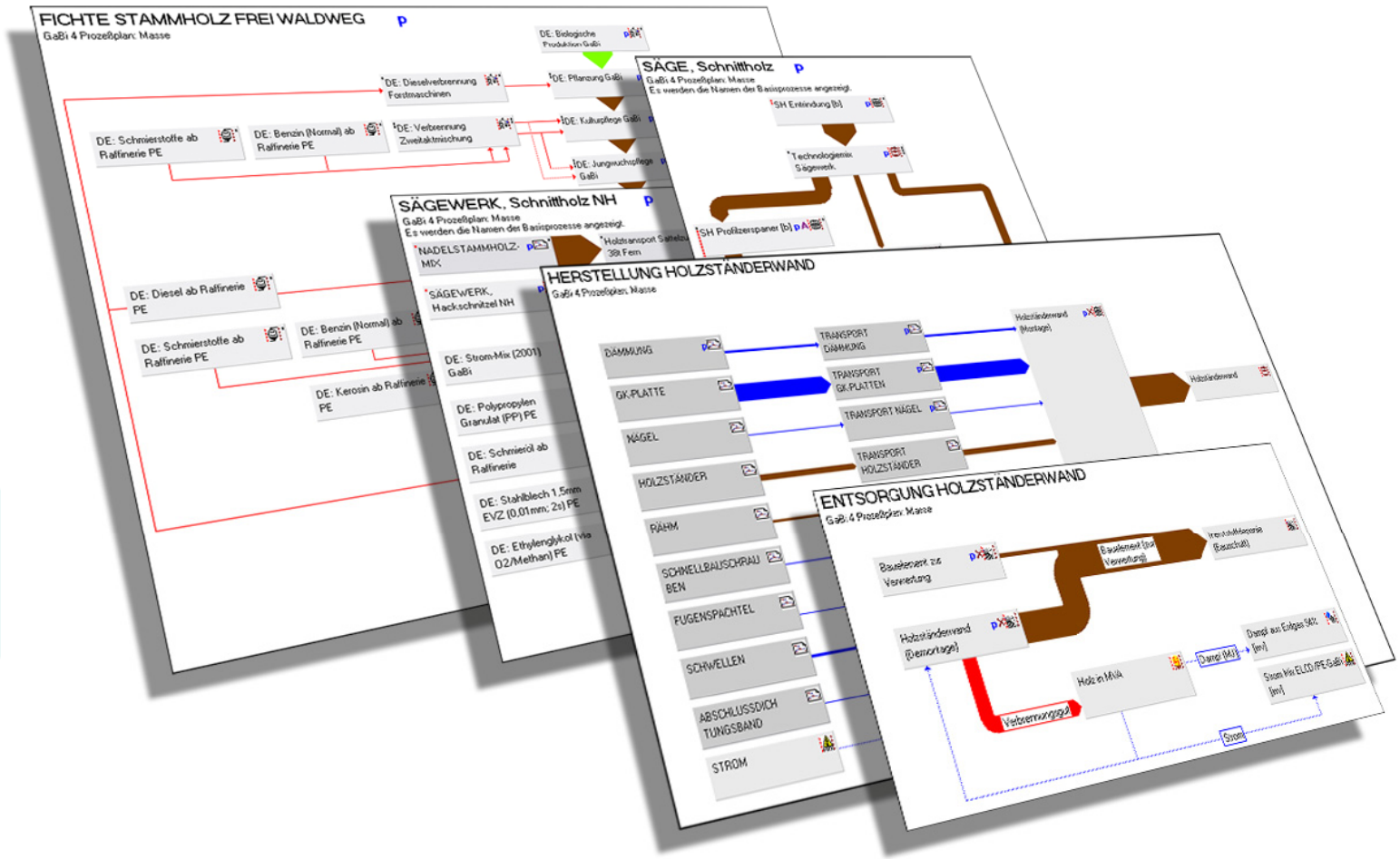
➡ Calculation of substitution effect of a product only on the basis of functional equivalent:

- Dimensions 5000 x 2500 mm
- Door way 875 x 2000 mm
- Sound reduction index R_w, R = 38 dB

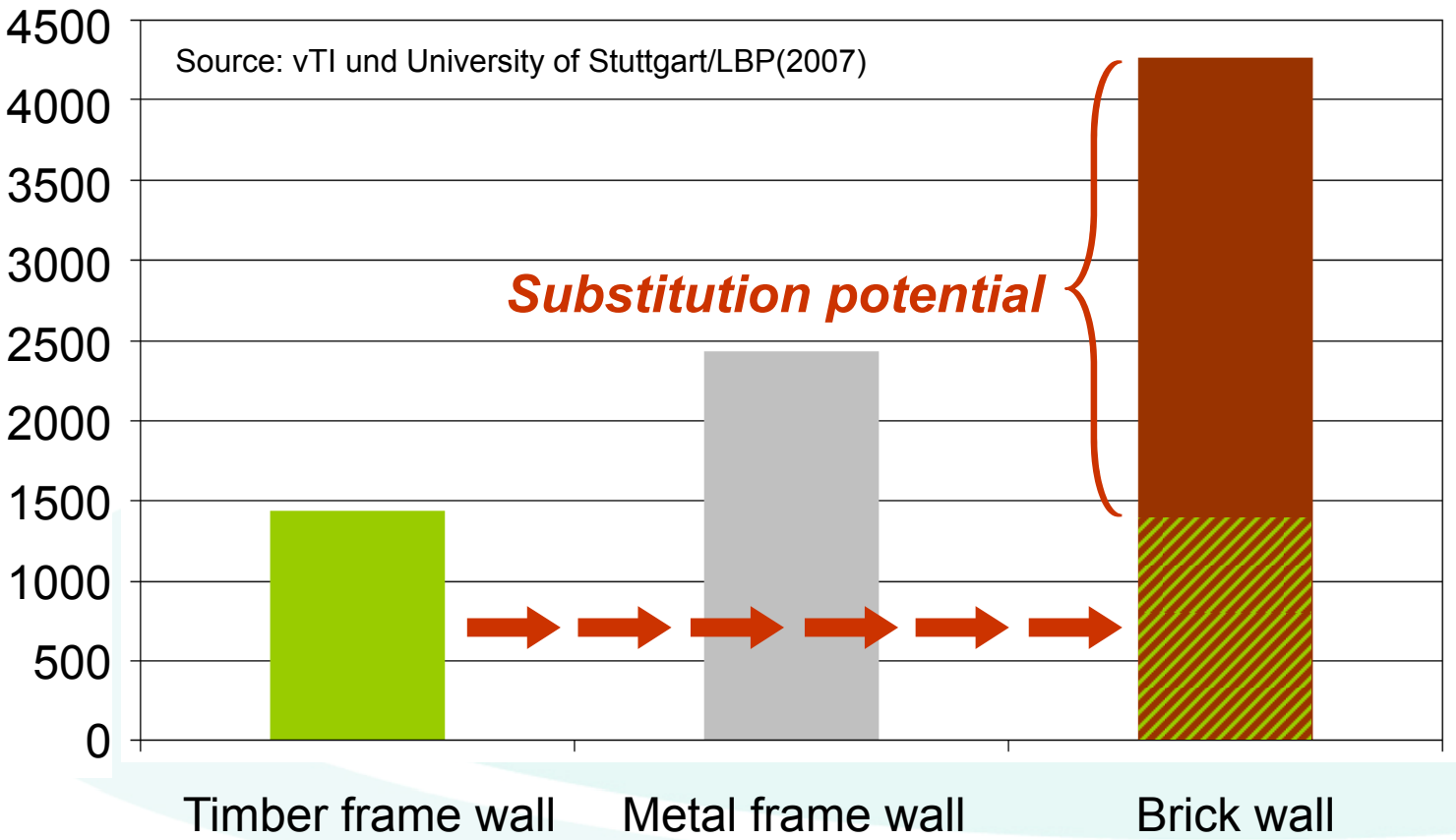


Modeling in LCA software

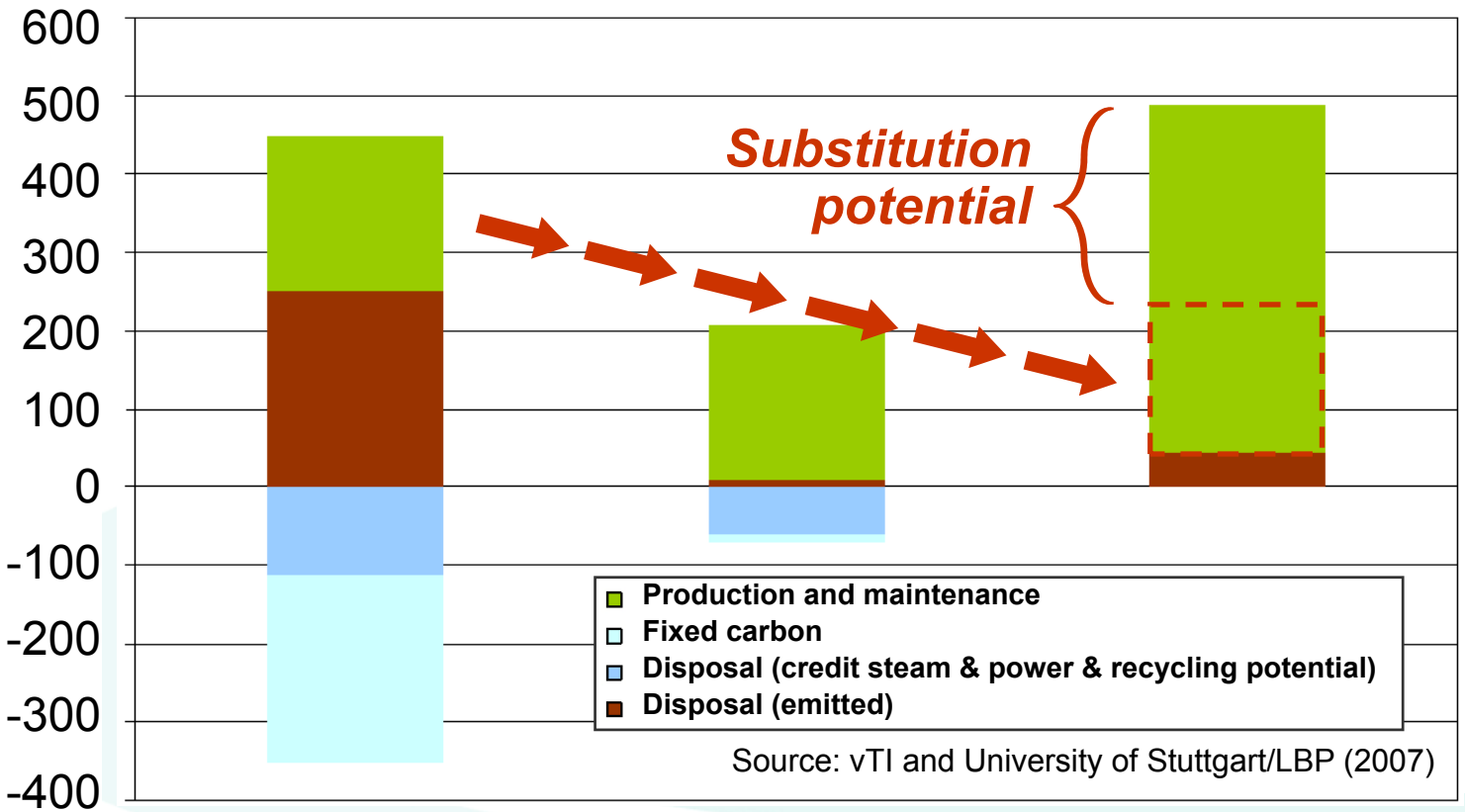
Life cycle of building component



Primary energy consumption (non-renewable / 100 y.) [in MJ]



GHG Potential (100 y.) [in kg CO_2-eq.]

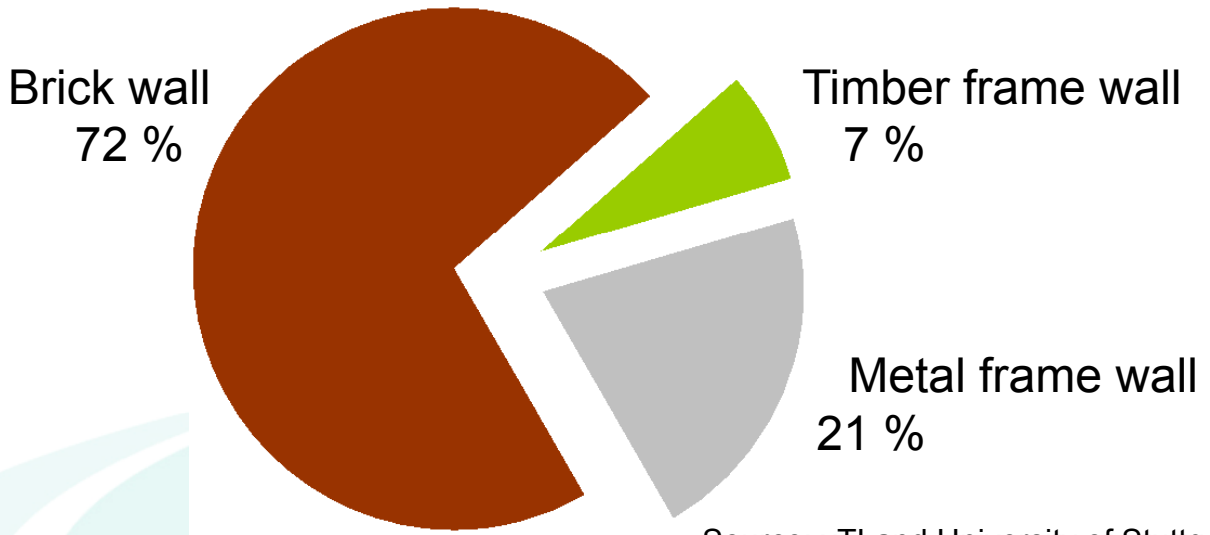


97 kg CO_2-eq. (netto)

136 kg CO_2-eq. (netto)

488 kg CO_2-eq. (netto)

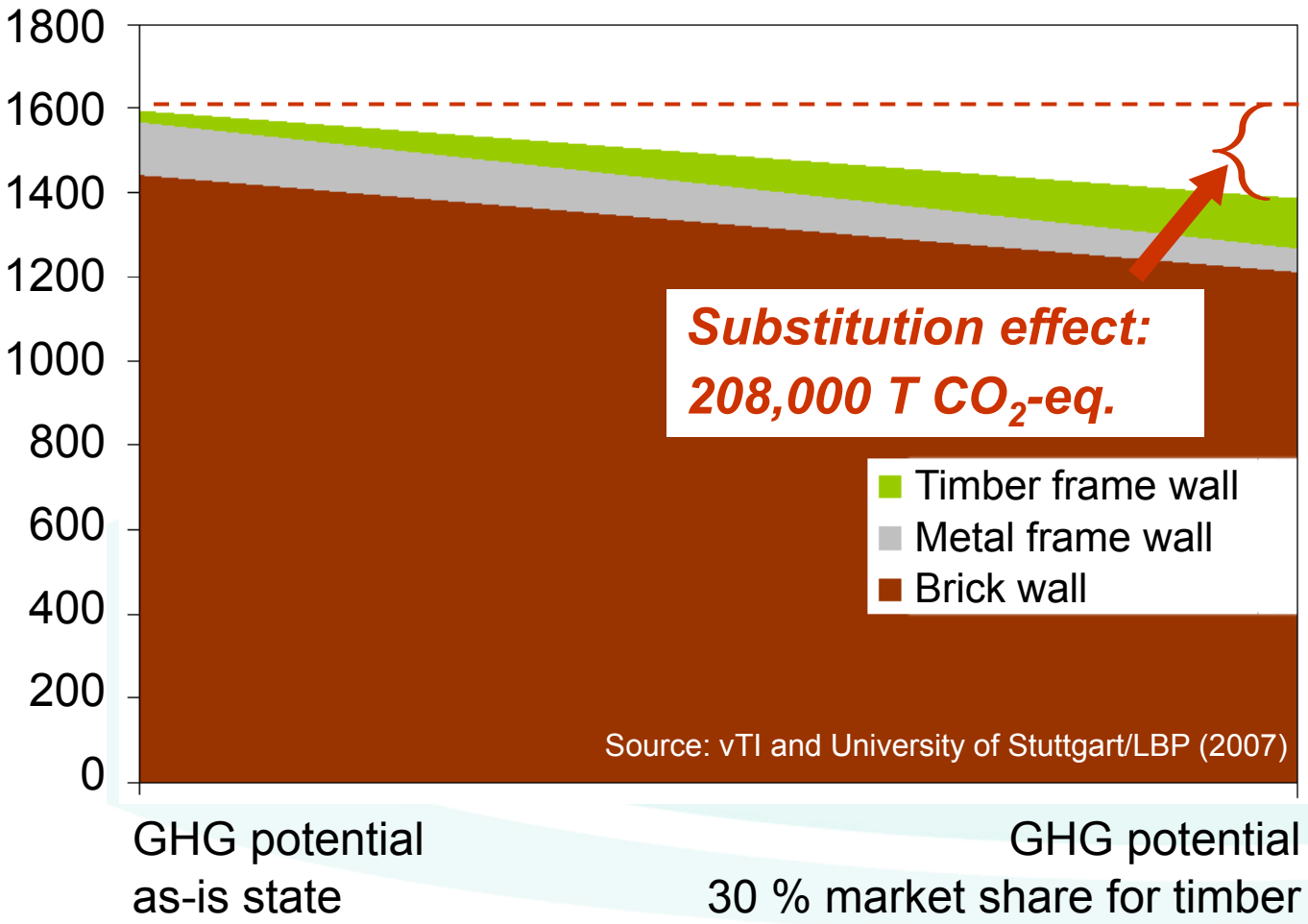
Substitution and GHG mitigation potential on national level



Source: vTI and University of Stuttgart/LBP (2007)

- Scenario: Increase of market share of timber framed interior walls from 7 % to 30 % (brick: 60,5 %, metal: 9,5 %) to estimate substitution effect in Germany

GHG potential (100 y.) [in 1000 T CO_2-eq.]



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- Deforestation as one of the biggest sources of CO_2-emissions globally
- Accounting for wood products considers storage effect, substitution effect (material/energy) indirectly considered already
- Any accounting should give priority to climate effects
- Accounting should incentivize sustainable forest management and cascade use and avoid negative impacts, e.g. deforestation
- LCA results show advantage of locally produced wood products – especially with respect to climate relevant indicators (energy consumption, CO_2-Emissions)
- Storage effect calculated for estimating emissions/"removals" from HWP on basis of pool changes on national level
- Substitution effect assessed on product level – difficult to assess on national level
- Climate relevant LCA results (energy consumption and GHG emissions) are lead indicators of sustainable building schemes
- Sustainable building schemes conceivable as policy instrument of climate policies

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Thank you for your attention

Further information

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