

3rd International Conference on Life Cycle Management


Lightweight boards – A resource and greenhouse gas saving innovation in the wood industry?

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Introduction



“Life Cycle Management (LCM) is an integrated concept to assist in businesses managing the total life cycle of products and services towards more sustainable consumption and production patterns”

EPA, Victoria, Australia [www.epa.vic.gov.au]

 LCM shall induce environmental friendly innovations

Source of graphic: www.netzwerk-lebenszyklusdaten.de

Environmental friendly innovations

... are innovations reducing the environmental impact of products and services (...)

But,

environmental impacts: where to begin and where to end?

- emissions into the air vs. emissions into soil vs. resource use?
 - only direct impacts
plus upstream impacts
plus downstream impacts
plus impacts on competing products and their environmental performance?
- } Life cycle approach

Objective

Discussion on the

- effects of a “green” innovation
- on resources and carbon dioxide emissions
- in the context of interdependent processes/sectors

Example: Lightweight boards

Method: economic wide material flow model

Standard wood-based boards

Standard wood-based panels consist of

- outer ply made of finest chipped wooden material and
- central ply made of larger chipped wooden material
- both made of fresh wood as well as recycled material

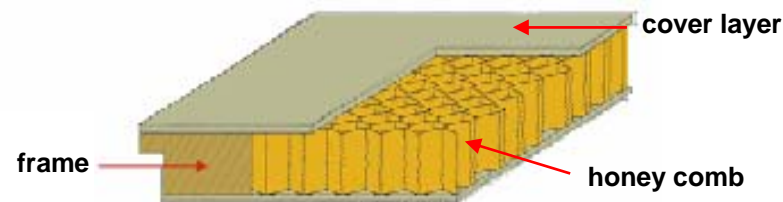


Source: www.glunz.de

Lightweight boards

Lightweight boards consist of

- thin cover layers (standard wood-based panels) and
- core layers made of paper (expanded hexagon or octagon honey combs or corrugated card board) and
- frames, where required due to construction



Standard boards vs. Lightweight boards

Example: 25mm thickness

Selected items	Standard board	Lightweight board	Change
Solid wood	0.343m ³ /m ³	0.110m ³ /m ³	-68.0%
Waste paper	0kg/m ³	54.8kg/m ³	n.a.
Energy	1,530MJ/m ³	666MJ/m ³	-56.5%
Board	1.00 kg	0.43 kg	-57.0%

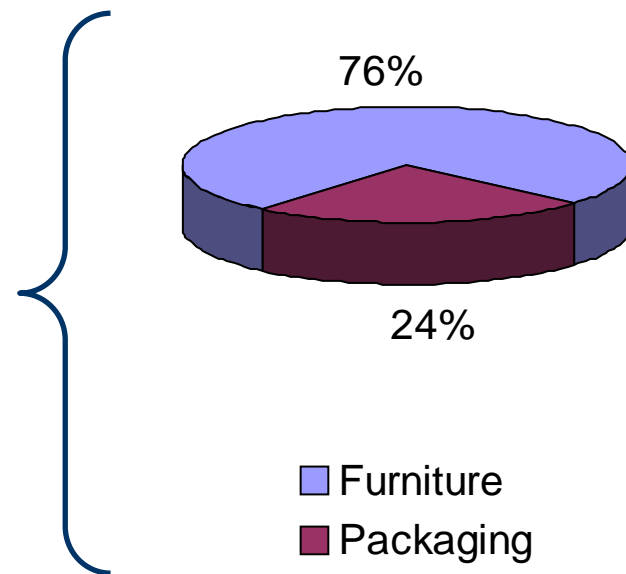
Lightweight boards

- Advantages
 - reduced demand for solid wood by replacing the core by wetted paper, which bases on recycled paper
 - reduced demand for energy
 - both should reduce GHG emissions as well as resource use
- Disadvantages
 - crowding out of traditional demander of recycled paper (i.e. paper and print industry)
 - increased demand for solid wood to substitute recycled paper by the paper industry

Production and demand of standard wood-based boards, Germany 2000

Production: 4.1m t

Demand: 4.1m t



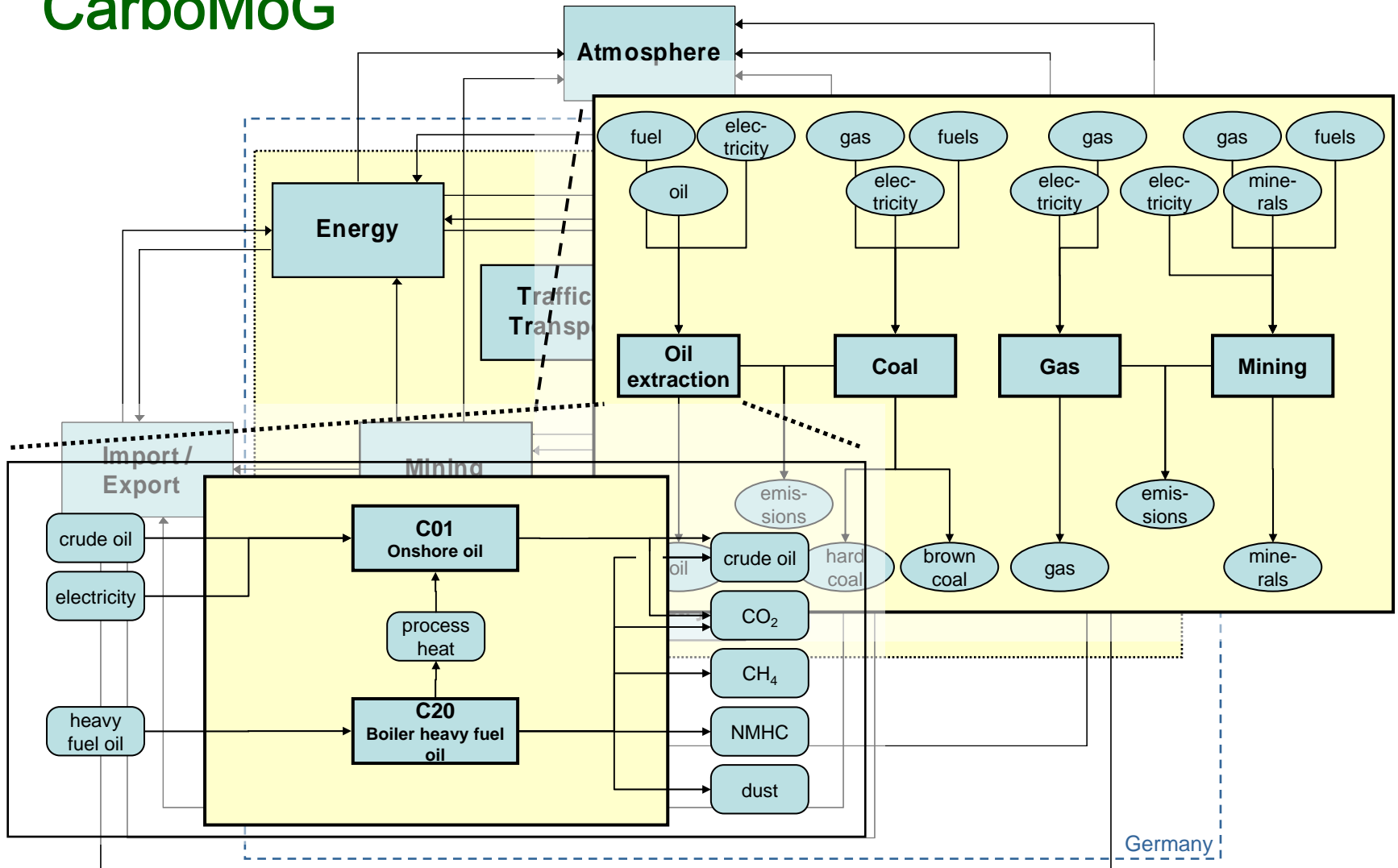
Source: CarboMoG Database

Model – CarboMoG

CarboMoG ~ Carbon Flow Model of Germany

- is a material flow model,
- focussing on the German carbon system,
- contains 215 single material and energy flows and 175 processes
- base year 2000

Model – CarboMoG



Model – CarboMoG

Category	Subcategory	Material flow
	Oil	Crude oil
	Hard coal	Hard coal, raw Hard coal briquette Hard coal coke
	Brown coal	Brown coal, raw Brown coal coke Brown coal briquette Fluidised bed and pulverised coal
	Gas	Natural gas and oil gas Mine gas and sewage gas Refinery gas Liquefied gas
	Fuels	Gasoline Diesel fuel Kerosene
	Heat	Space heat Process heat District heat
Vegetable raw material and products		
Animal raw material and products		
Manufactured products		
Energy carriers		
Wastes and residues		
Mineral raw materials		
Emissions and assimilation (of gases)		
Total		

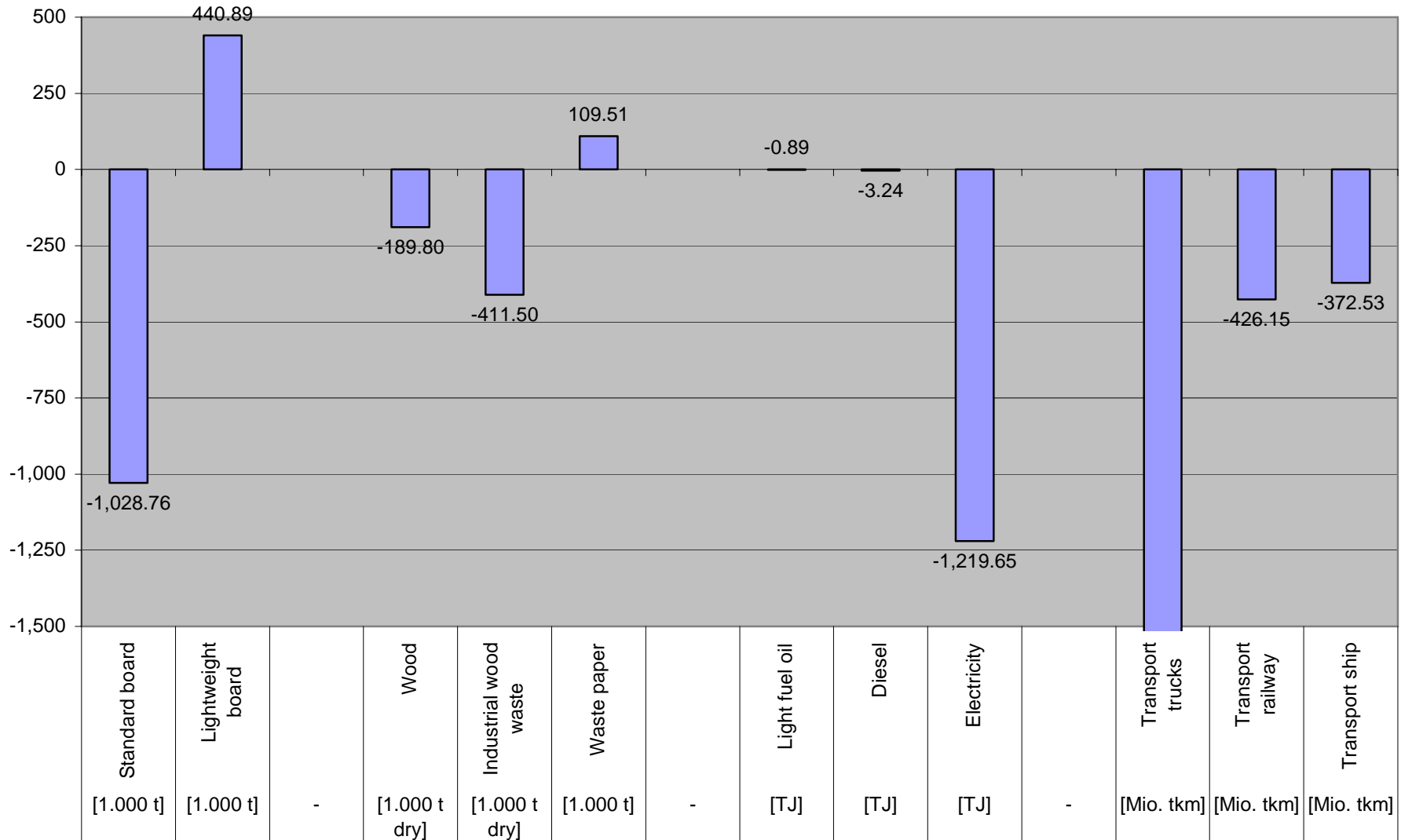
Scenario

- Switch from standard board to a lightweight board, 25mm thickness

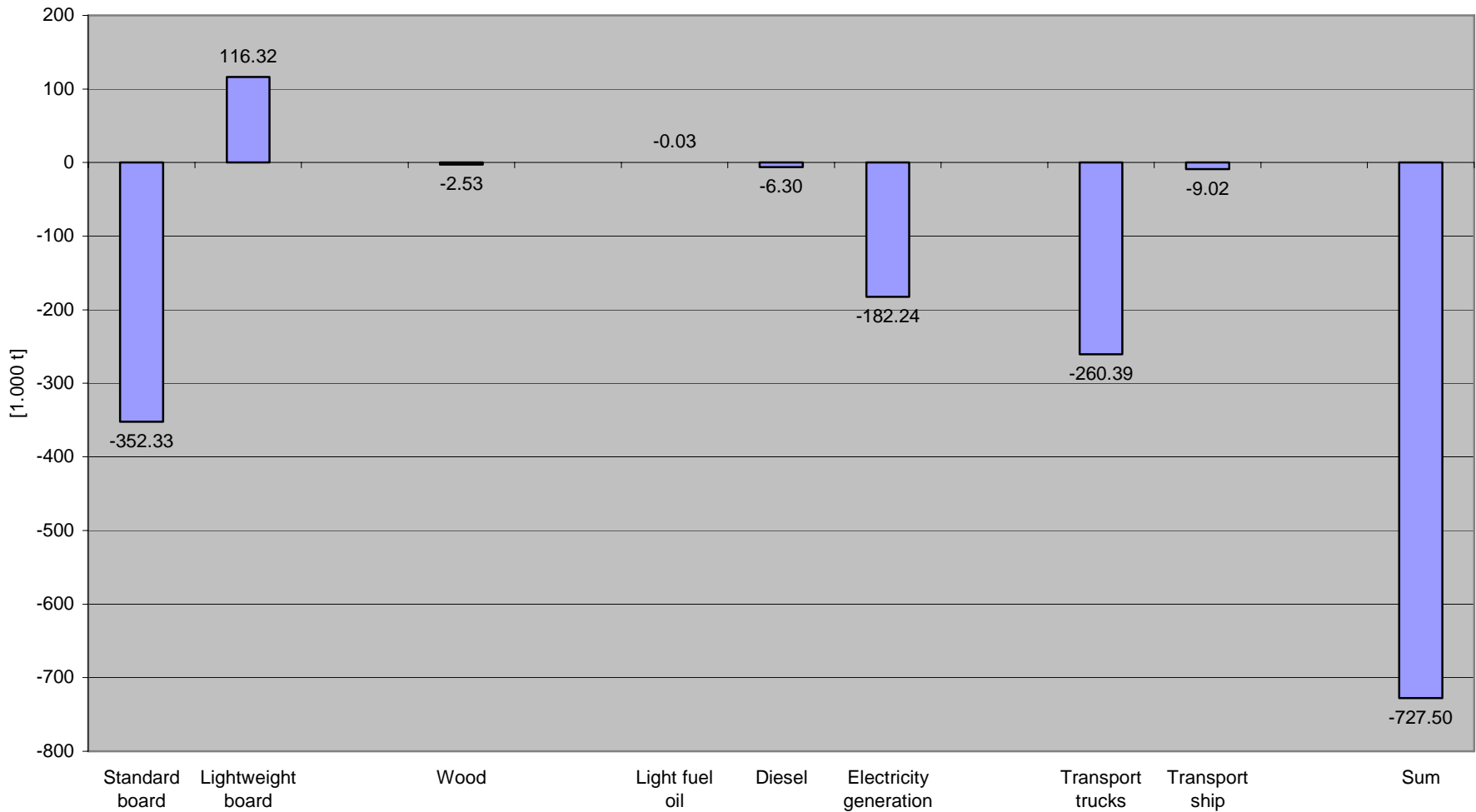
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- Market penetration of lightweight boards: 25% market share

Material and energy flows and transport

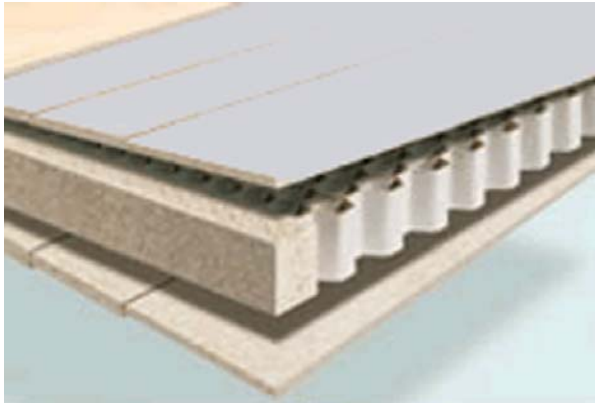


Carbon dioxide emissions



Conclusions

- Lightweight board could reduce
 - the demand for resources
 - the emissions of greenhouse gases
in Germanybut, the overall impacts are small: e.g. CO₂: - 0.07%
- A crowding out of demand of waste paper will happen, but – in our example – not in Germany



Source: www.egger.com



Source: www.glunz.de

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