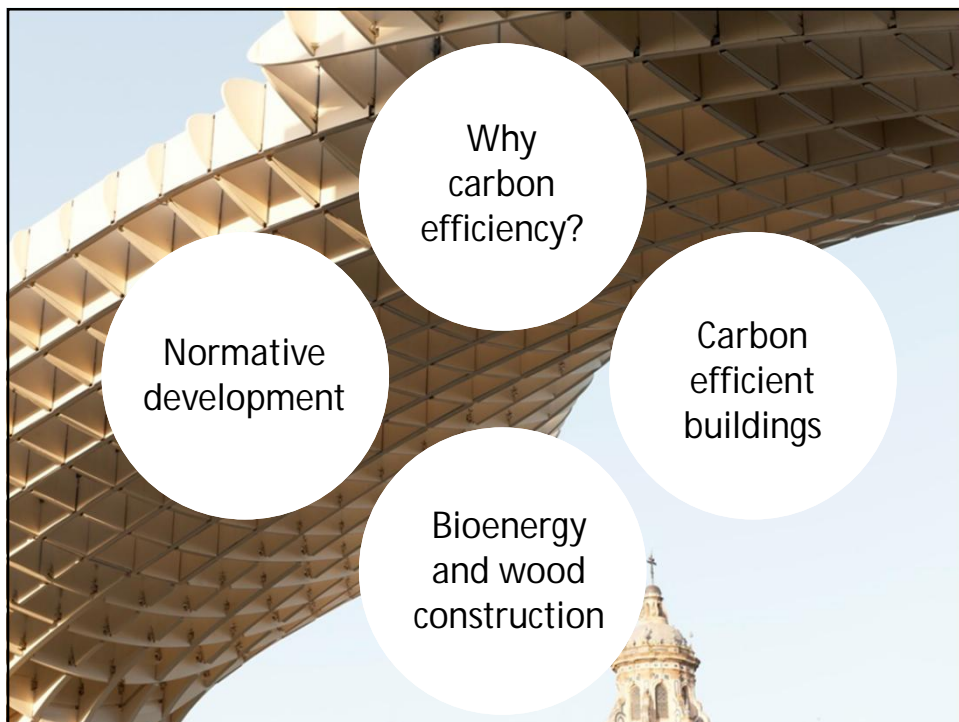


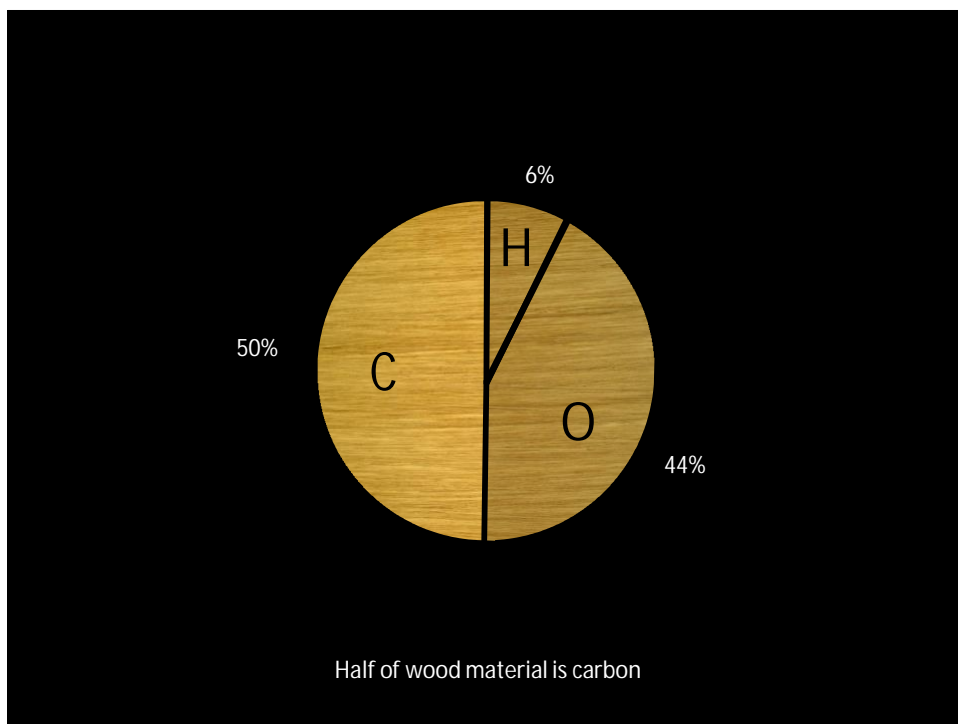
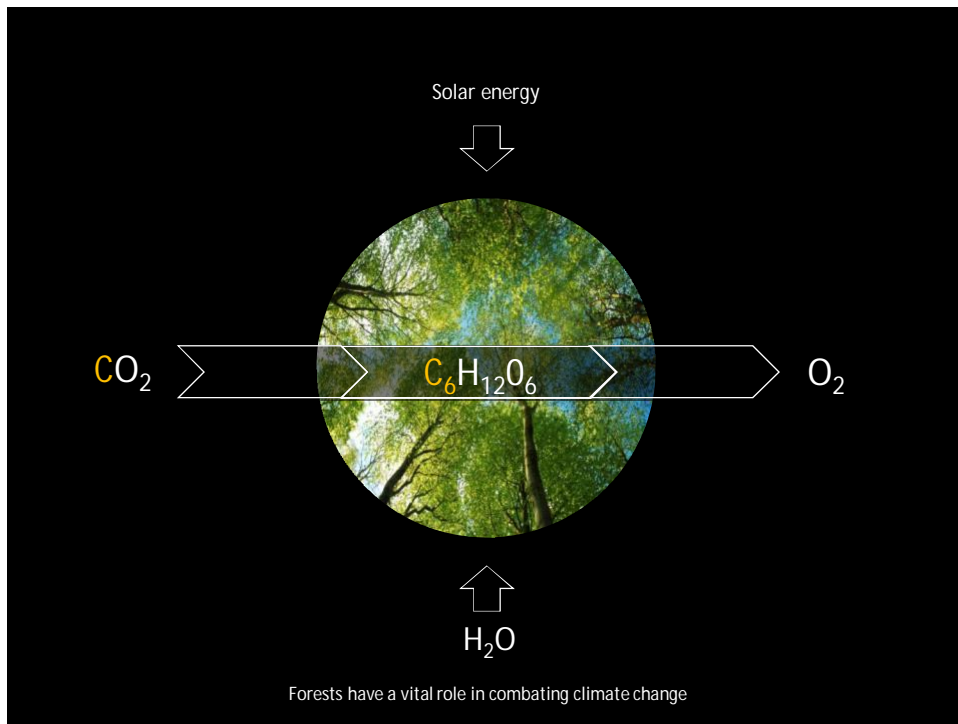


# Wood in carbon efficient construction


Environmental Committee of the Estonian Parliament  
26 March 2014




















Matti Kuittinen  
Architect, researcher  
Aalto University






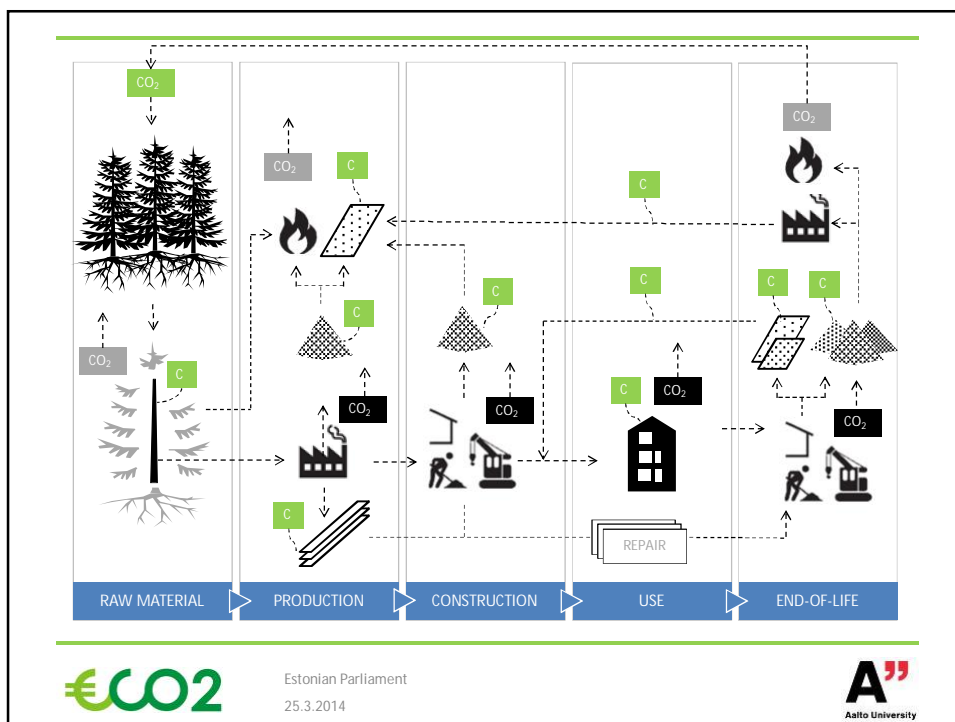


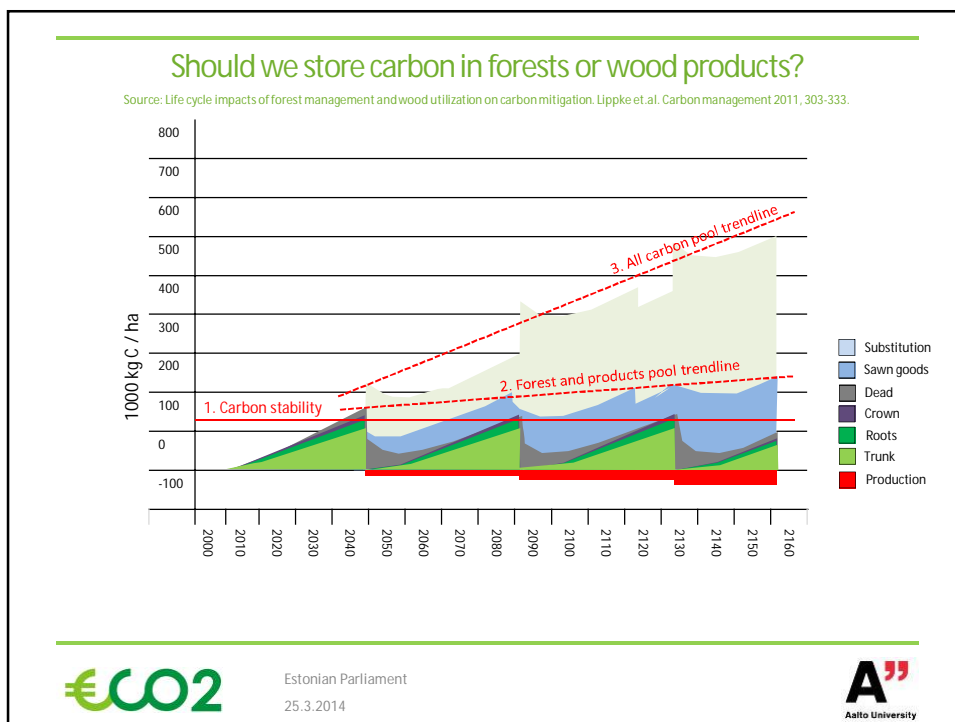
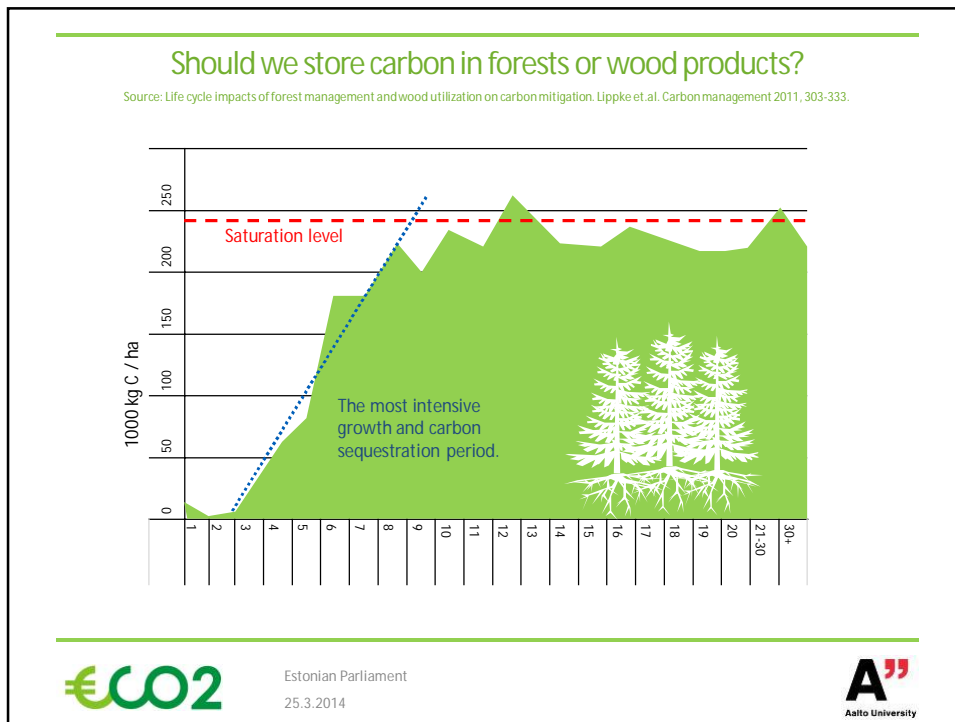
**€CO<sub>2</sub>** WoodWisdom-Net research project 2010 - 2013

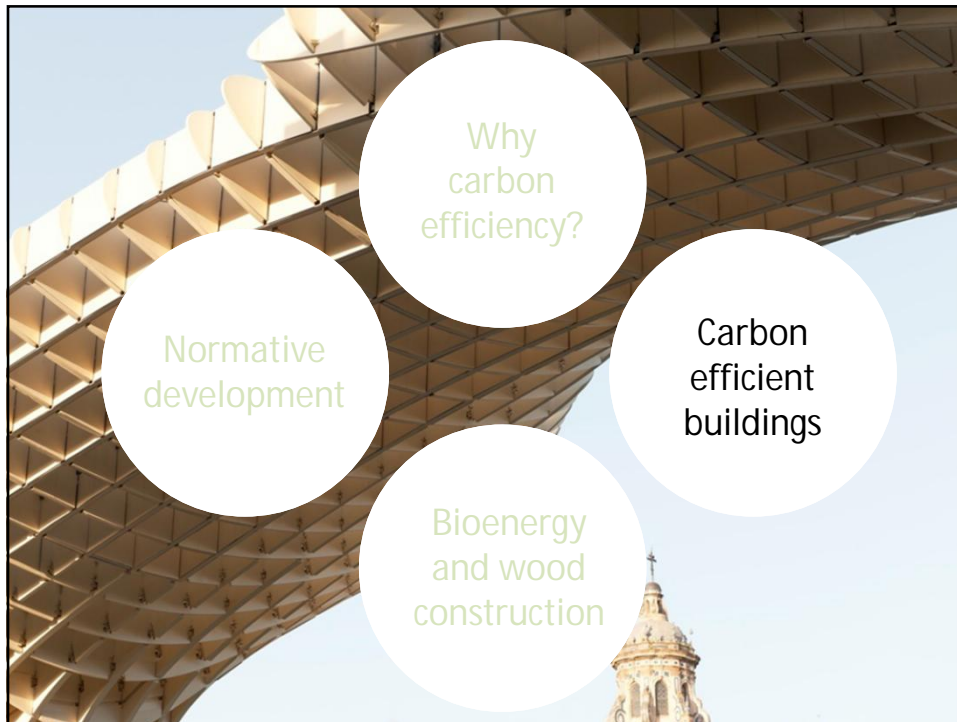


Austria	Finland	Germany	Sweden
			
			
			
			
			
			

Main supporters





### Comparison of buildings

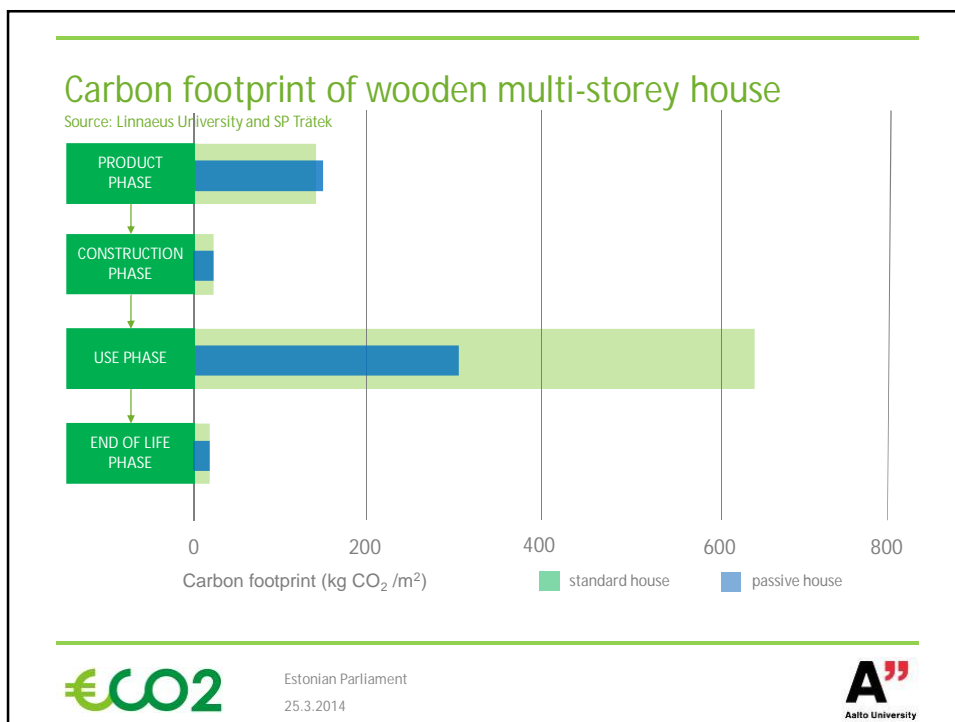
Walludden, Sweden    Mettraching, Germany    L'Aquila, Italy

Tervakukka, Finland    Joensuu Elli, Finland    Box test buildings, Finland

Muehlweg, Austria    Schoenkirchen, Austria    Steinbrechergasse, Austria

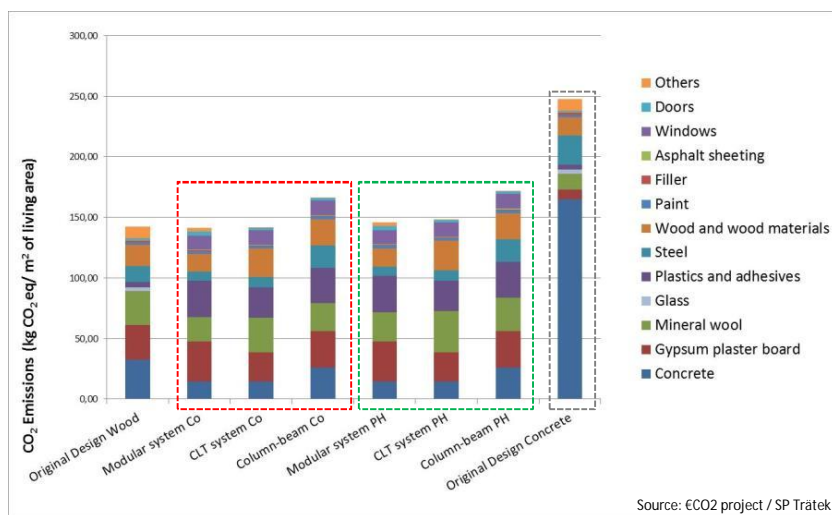
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**€CO<sub>2</sub>**    Estonian Parliament    25.3.2014    **A''**  
Aalto University

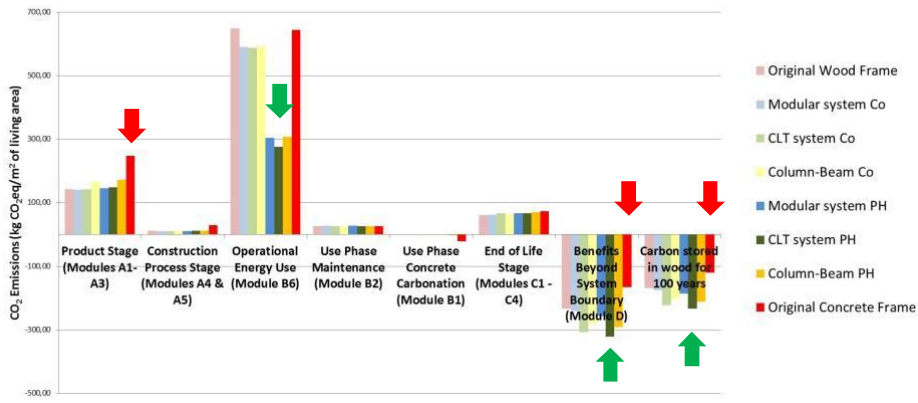




### Carbon footprint in production phase



## Carbon footprint in full life cycle



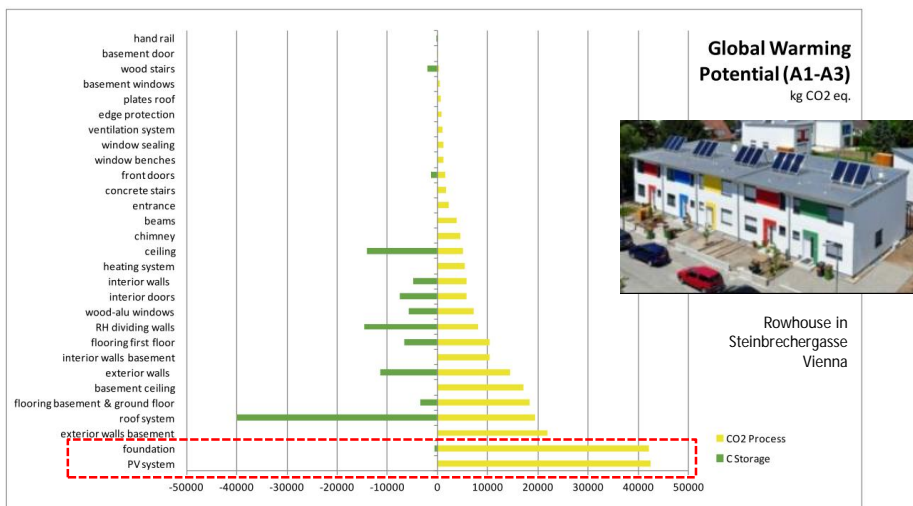
Source: eCO2 project / SP Trätek



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## Which parts of a building cause most of its GHG emissions?



Global Warming Potential (A1-A3)  
kg CO<sub>2</sub> eq.



Rowhouse in Steinbrechergasse Vienna

Source: eCO2 project / Holzforschung Austria & IBO







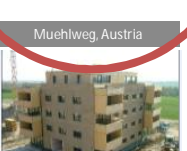





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### Comparison of buildings

 <p>Walludden, Sweden</p>	 <p>Mietraching, Germany</p>	 <p>L'Aquila, Italy</p>
 <p>Tervakukka, Finland</p>	 <p>Joensuu Elli, Finland</p>	 <p>Box test buildings, Finland</p>
 <p>Muehlweg, Austria</p>	 <p>Schoenkirchen, Austria</p>	 <p>Steinbrechergasse, Austria</p>

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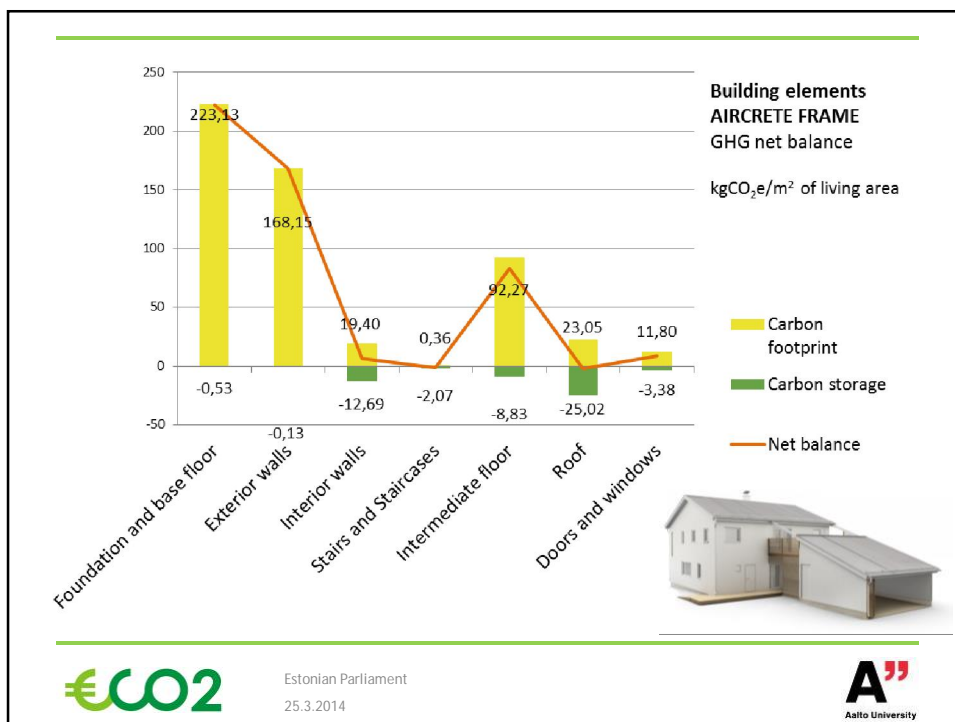
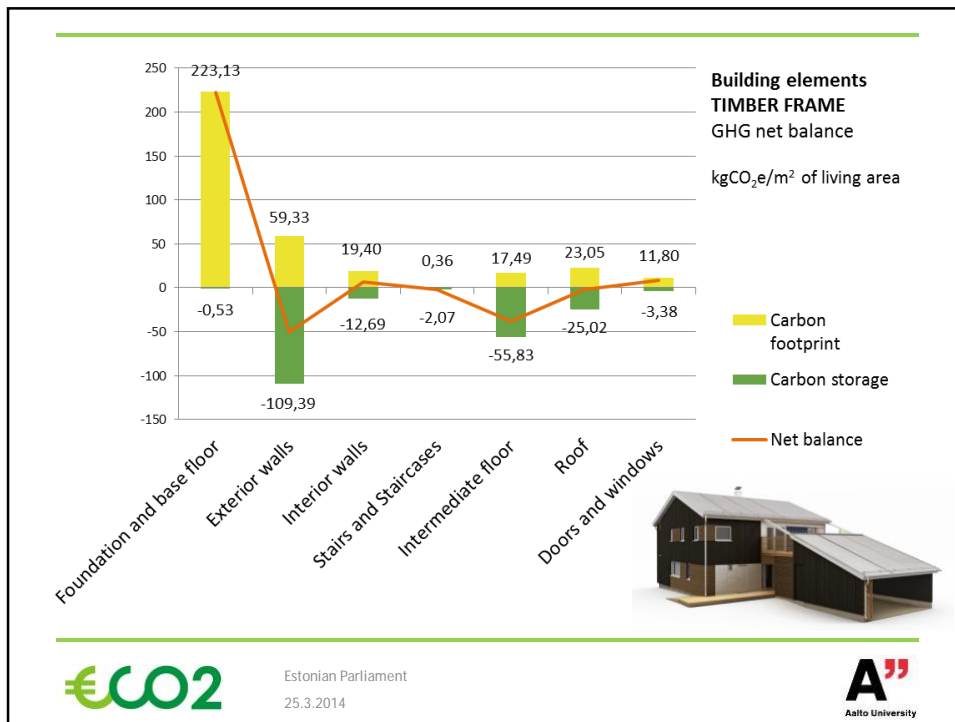
### One passive house – two frame options

Source: Aalto University

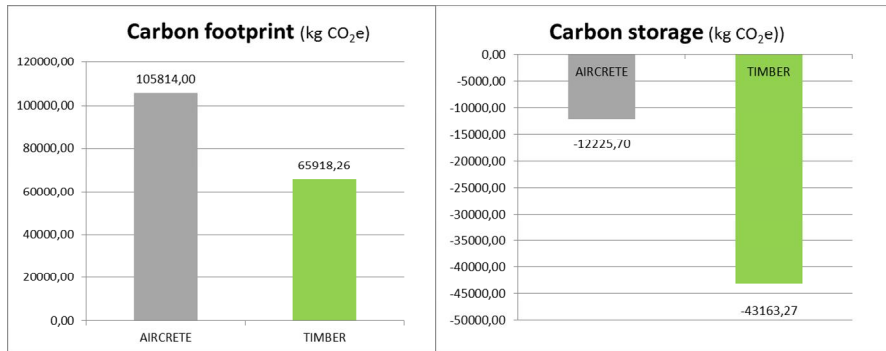
<p style="text-align: center;">Wooden frame + wood fibre insulation</p> 	<p style="text-align: center;">Concrete frame + EPS insulation</p> 
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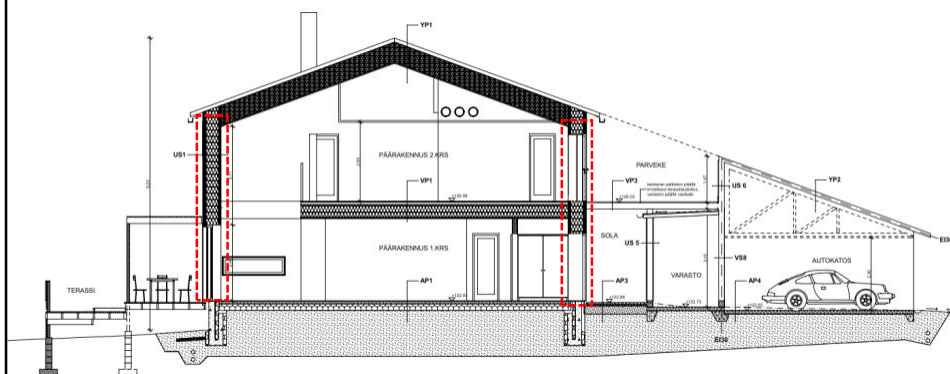
## Fossil greenhouse gas emissions and carbon storage (production phase)



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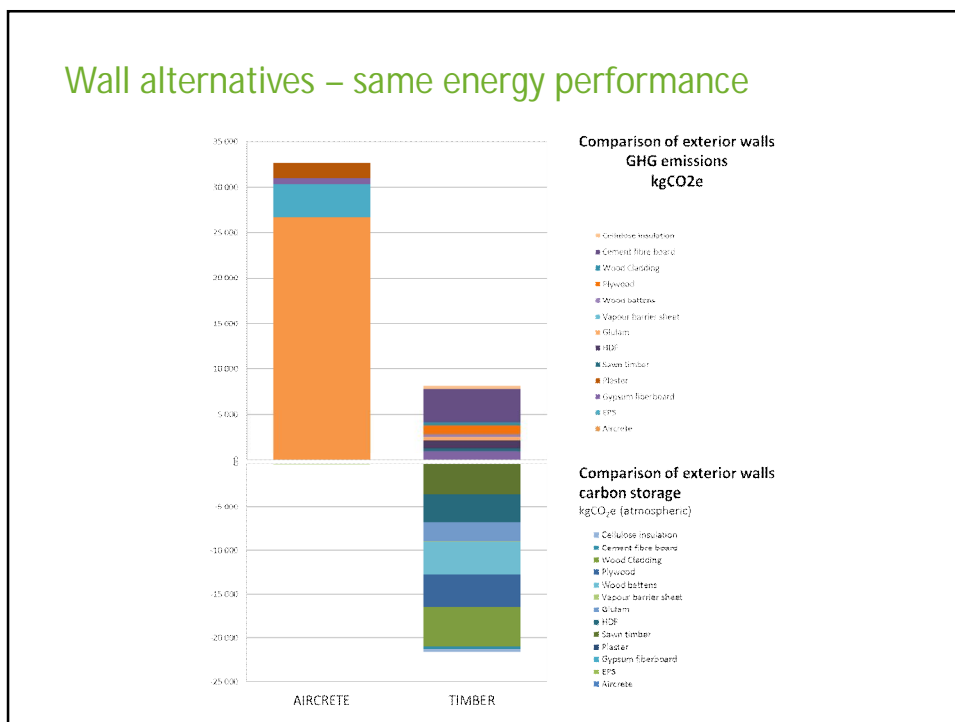
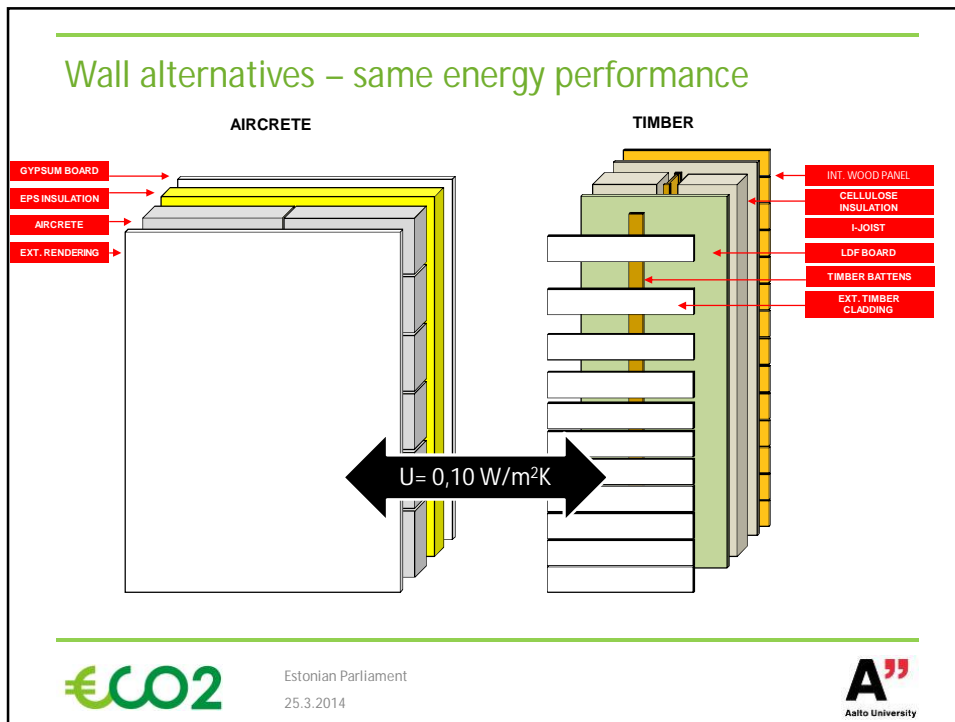


## Comparison of structures





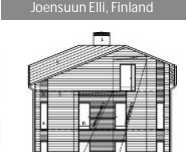







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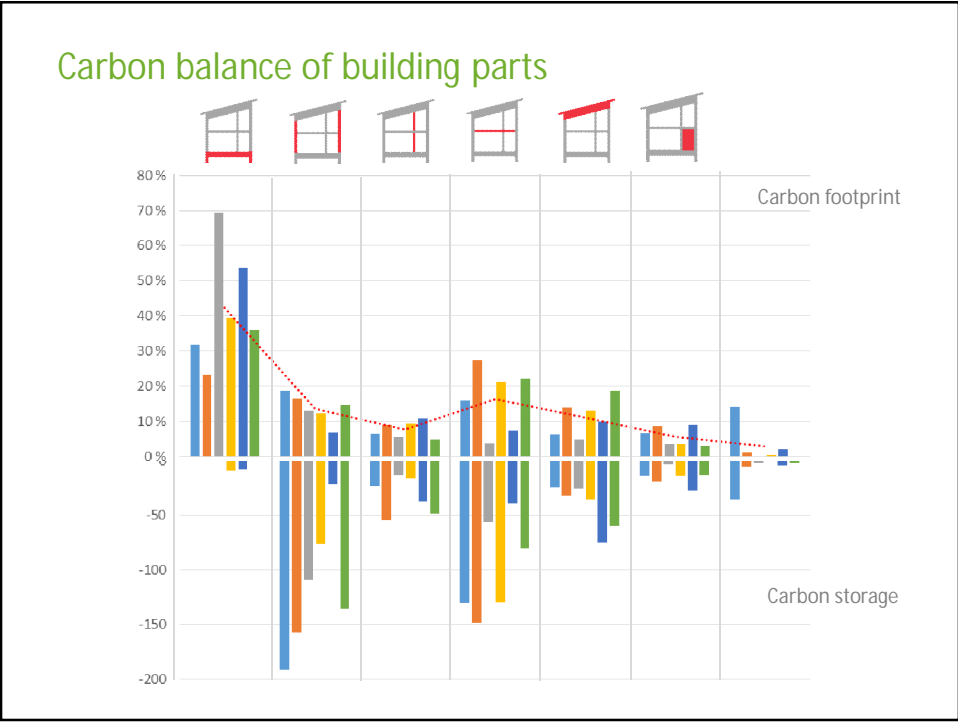
### Comparison of buildings

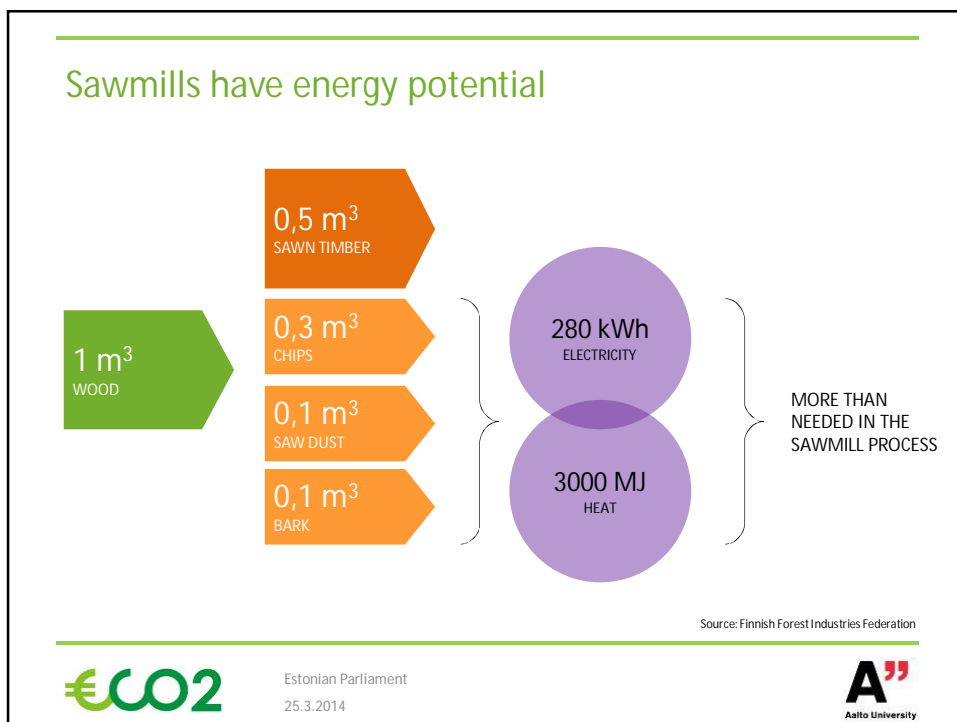
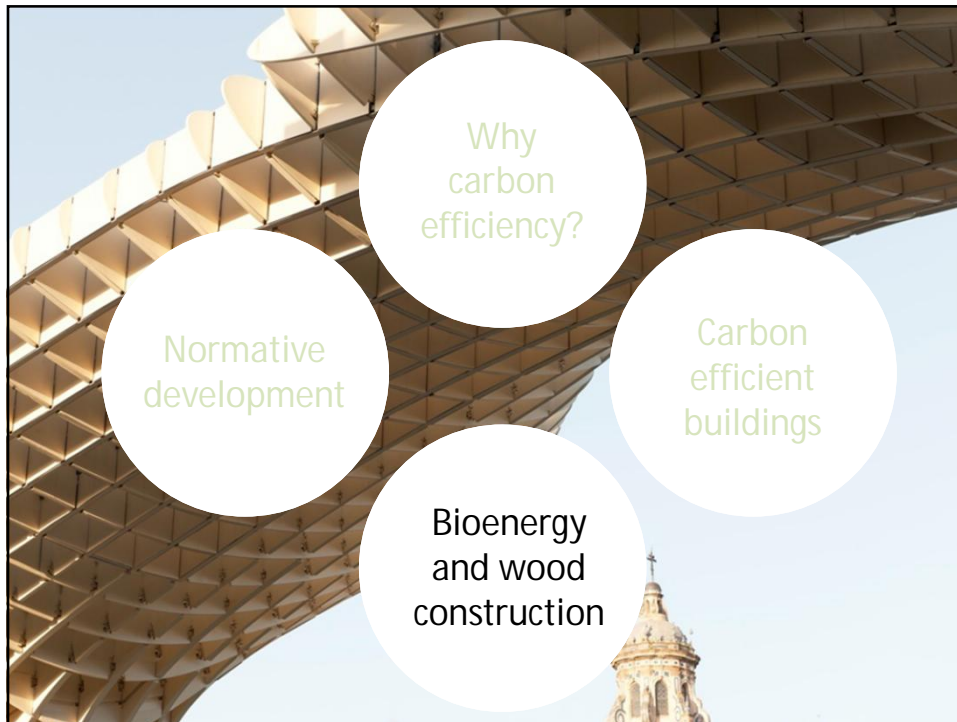
 <p>Walludden, Sweden</p>	 <p>Mietrachig, Germany</p>	 <p>L'Aquila, Italy</p>
 <p>Tervakukka, Finland</p>	 <p>Joensuu Elii, Finland</p>	 <p>Box test buildings, Finland</p>
 <p>Muehlweg, Austria</p>	 <p>Schoenkirchen, Austria</p>	 <p>Steinbrechergasse, Austria</p>

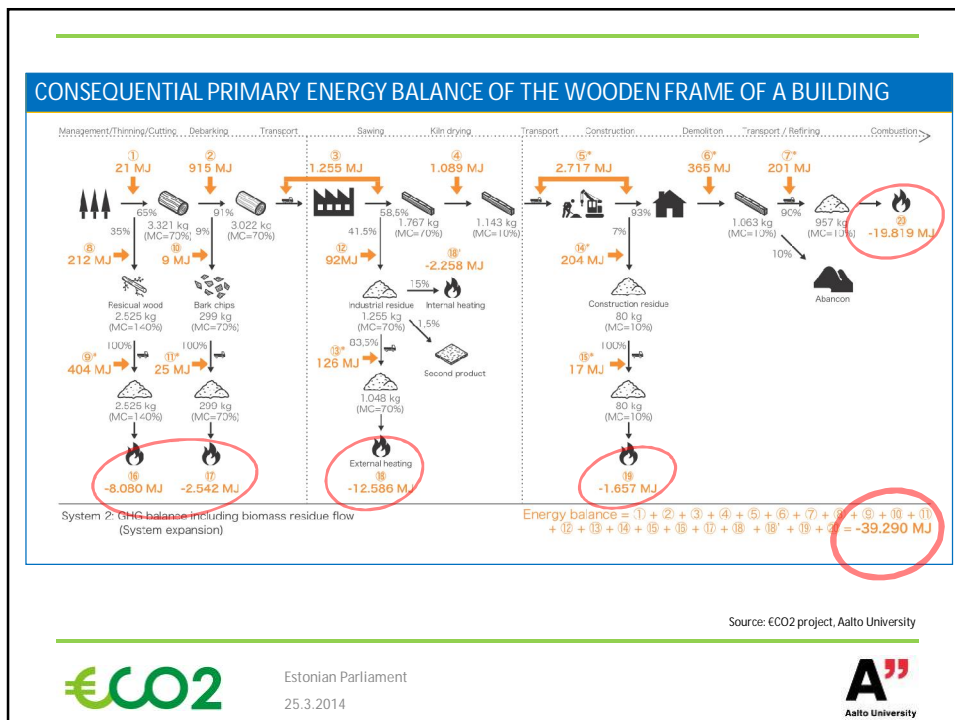
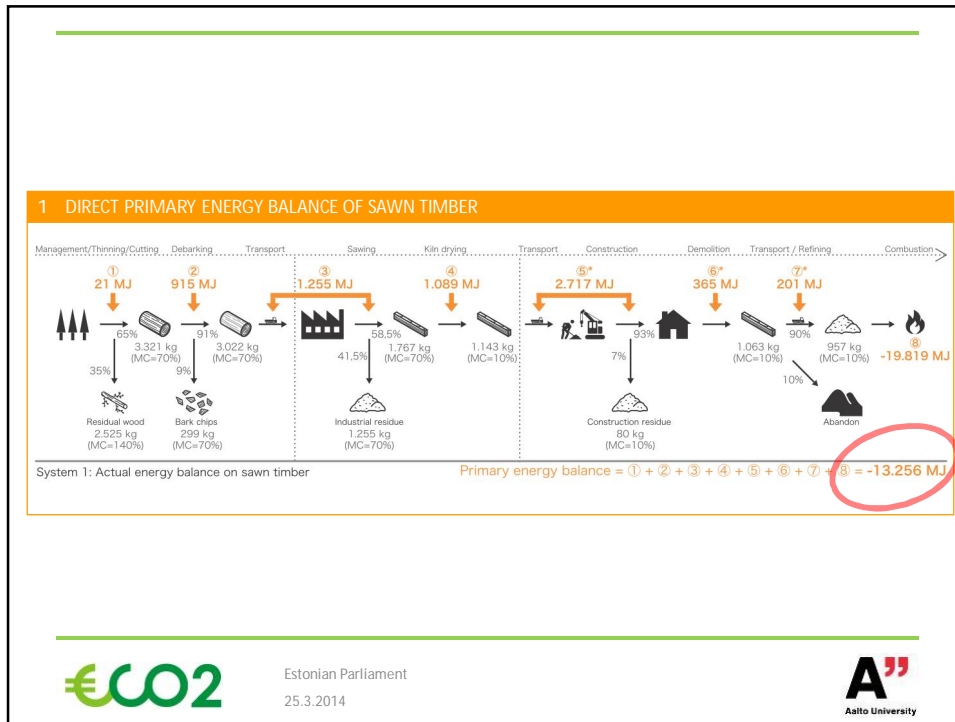


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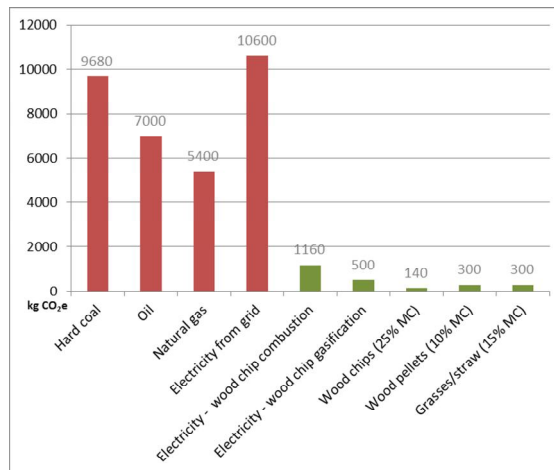






Source: ECO2 project, Aalto University

## Carbon emissions from heating a typical house with alternative fuel types

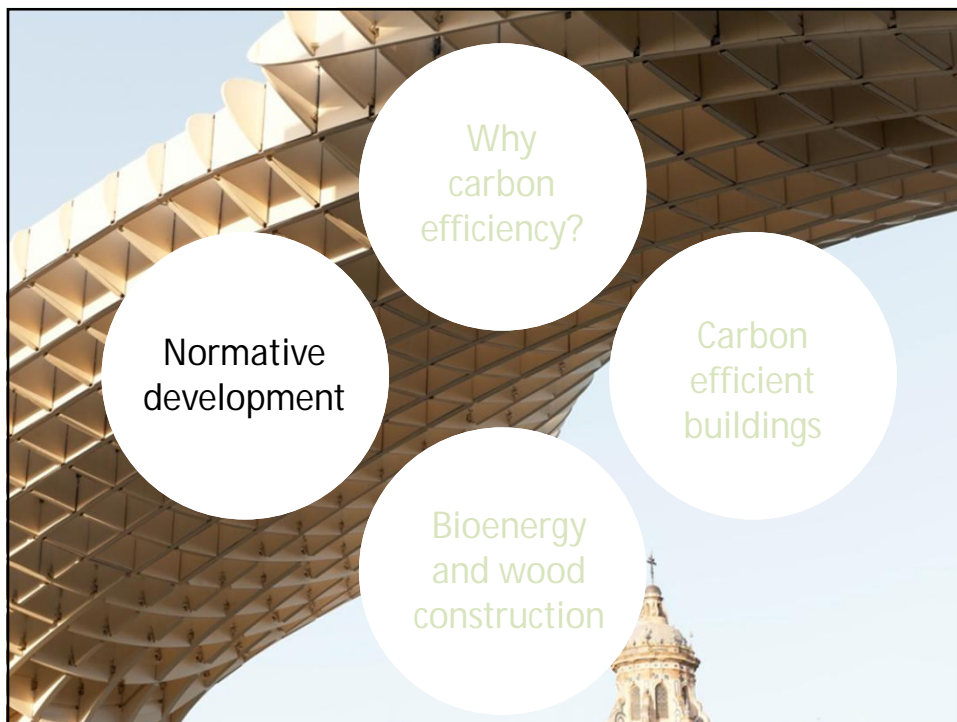


Energy demand:  
20 000 kWh/year

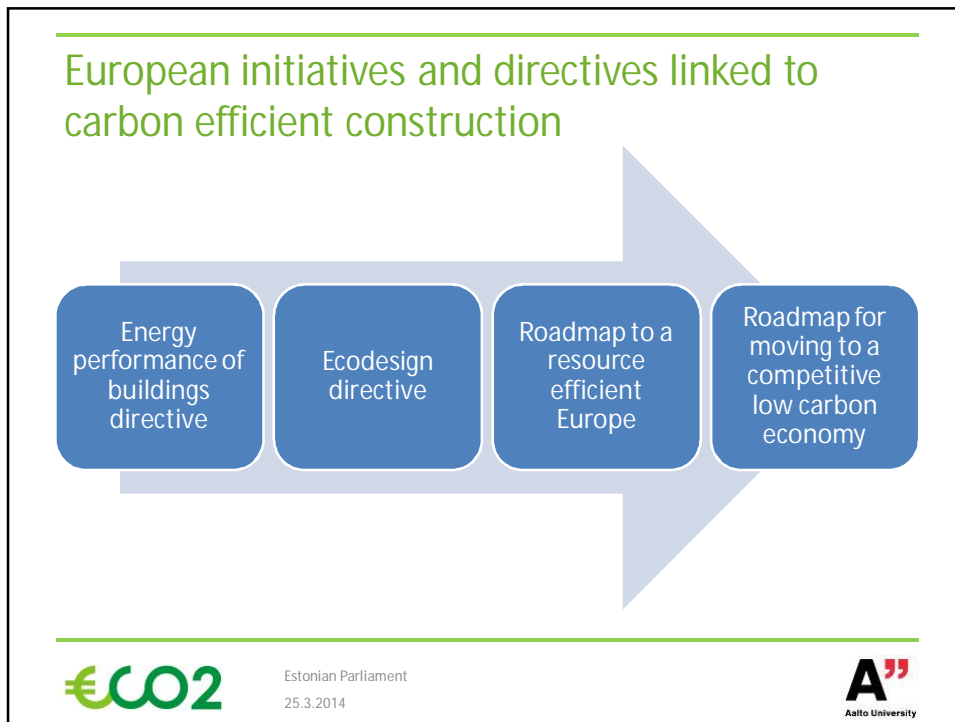
Data source:  
Biomass Energy Centre, UK



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EPBD	Ecodesign	Resource efficiency	Low carbon economy
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L 285/10    EN    Official Journal of the European Union    31.10.2009

**DIRECTIVES**

**DIRECTIVE 2009/125/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL**  
**of 22 September 2009**  
**on the**  
**requirements for energy-related products**



(12) In order to maximise the environmental benefits from improved design, it may be necessary to inform consumers about the environmental characteristics and performance of energy-related products and to advise them on how to use products in a manner which is environmentally friendly.



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EPBD	Ecodesign	Resource efficiency	Low carbon economy
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2.3.2. *Specific Barriers*

There is significant lock-in to existing ways of using materials, for example in construction, where the introduction of more resource-efficient building elements may require new knowledge by architects and builders.

EUROPEAN COMMISSION

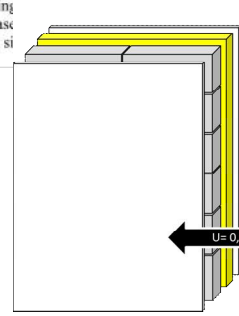
**COMMISSION STAFF WORKING PAPER**  
**Analysis associated with the Roadmap to a Resource Efficient Europe**  
**Part II**

*Accompanying the document*

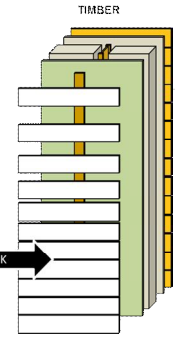
**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF REGIONS**  
**Roadmap to a Resource Efficient Europe**

{COM(2011) 571 final}  
{SEC(2011) 1068 final}


AIRCRETE




TIMBER




← U= 0,10 W/m²K →



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25.3.2014



EPBD	Ecodesign	Resource efficiency	Low carbon economy
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EUROPEAN COMMISSION

COMMUNICATION FROM THE COMMISSION  
TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

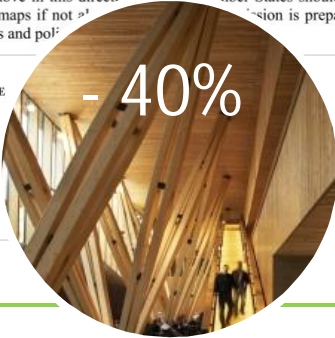
A Roadmap for moving to a competitive low carbon economy in 2050


(SEC(2011) 287 final)  
(SEC(2011) 288 final)  
(SEC(2011) 289 final)

### 6. CONCLUSIONS


The Commission's detailed analysis of cost-effective ways of reducing greenhouse gas emissions by 2050 has produced a number of important findings.

In order to be in line with the 80 to 95% overall GHG reduction objective by 2050, the Roadmap indicates that a cost effective and gradual transition would require a 40% domestic reduction of greenhouse gas emissions compared to 1990 as a milestone for 2030, and 80% for 2050. Building on what has already been achieved, the EU needs to start working now on appropriate strategies to move in this direction. Member States should soon develop national low carbon Roadmaps if not already done. The Commission is prepared to provide some of the necessary tools and policies.






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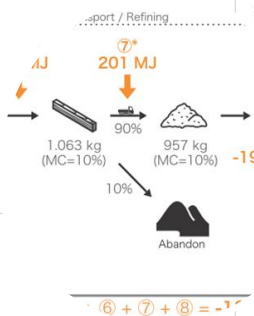


EPBD	Ecodesign	Resource efficiency	Low carbon economy
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EUROPEAN COMMISSION


In 2050, the EU's total primary energy consumption could be about 30% below 2005 levels. More domestic energy resources would be used, in particular renewables. Imports of oil and gas would decline by half compared to today, reducing the negative impacts of potential oil and gas price shocks significantly. Without action the oil and gas import bill could instead double compared to today, a difference of € 400 billion or more per annum by 2050, the equivalent of 3% of today's GDP<sup>16</sup>.




Consider the reduction potential in the agricultural and forestry sectors, the global action takes into account the following requirements:

- need to ensure food security to feed the global population.
- EU stated objective of reducing deforestation as part of a co-ordinated global n, in particular within developing countries.
- orts to reduce agricultural emissions, or rather limit the increase of these
- increased biomass use for energy as a result of global action on climate change

Dietary habits remain the same as in the baseline (i.e. changes towards more carbon intensive food linked to welfare increases).



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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**DRAFT**  
**prEN 16485**

September 2012

ICS 91.010.99; 91.080.20

English Version

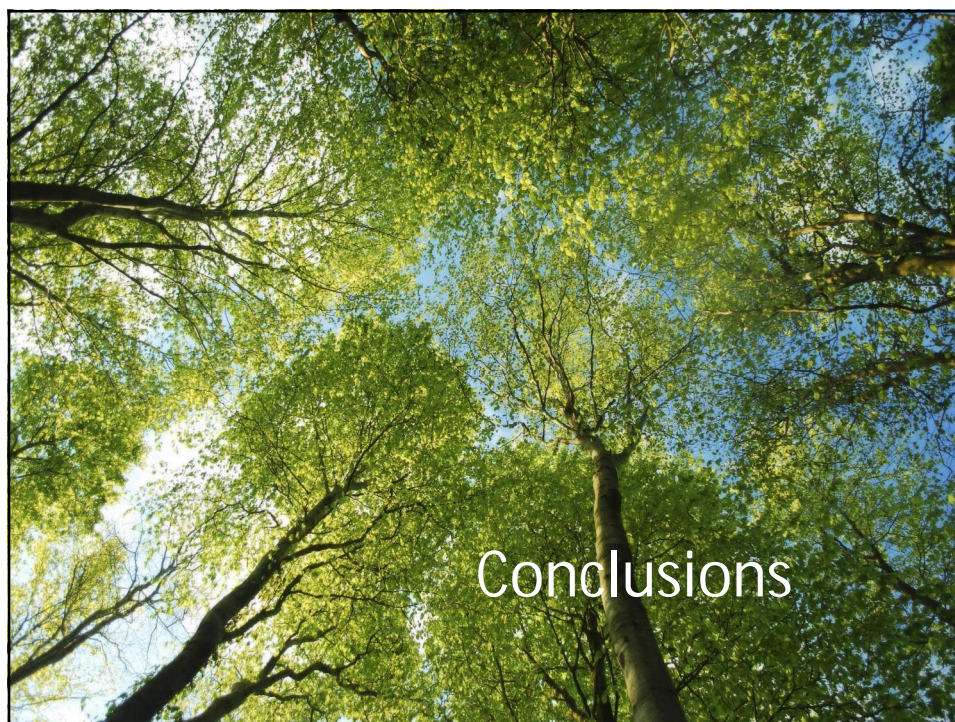
Round and sawn timber - **Environmental Product Declarations** -  
Product category rules for wood and wood-based products for  
use in construction


Bois ronds et sciages - Déclarations environnementales de  
produits - Règles de définition des catégories de produits  
en bois et à base de bois pour l'utilisation en construction

Rund- und Schnittholz - Produkt-Kategorie-Regeln für Holz  
und Holz-Werkstoffe zur Umwelt-Produkt-Deklaration

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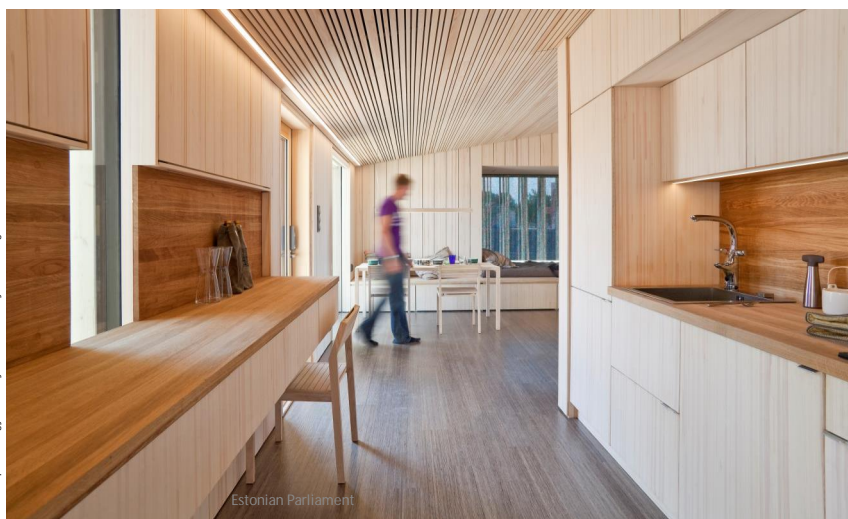
EU average: 10,9 tn CO<sub>2</sub> per capita

Sustainable level:  
1 tn CO<sub>2</sub> per capita



A large, realistic image of a human foot is shown at the top. Below it, the text reads 'EU average: 10,9 tn CO<sub>2</sub> per capita'. Underneath that, it says 'Sustainable level: 1 tn CO<sub>2</sub> per capita'. At the bottom, a small image of a shoe is shown, representing the sustainable level.

1. Because of their long service life, buildings seem to be the most suitable sector for storing carbon.



2. Focusing only on energy efficiency is not enough. The carbon footprint of construction materials should also be taken into account.



3. The full spectrum of the environmental benefits of wood construction should be utilised.

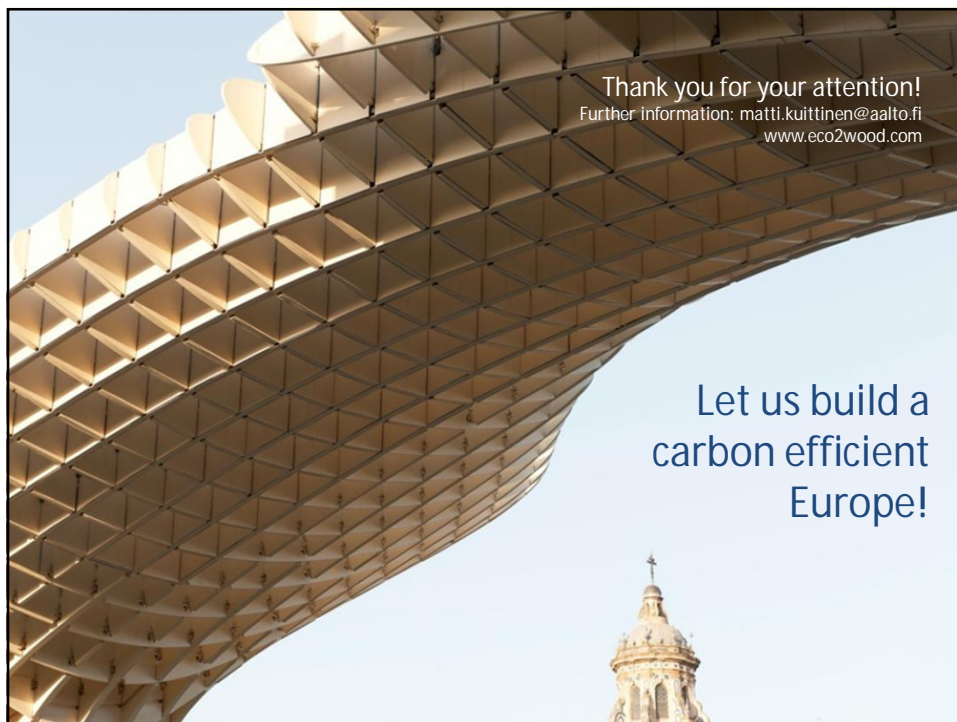


E3, Berlin, Architect: Kazian + Klingebell

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## 4. Wood-based construction materials may help to achieve several policy goals of resource efficiency, ecodesign directive and low carbon economy.

<p>consider the reduction potential in the agricultural and forestry sectors and takes into account the following requirements:</p> <p>The need to ensure food security to feed the global population.</p> <p>The EU stated objective of reducing greenhouse gas emissions, in particular within developed countries.</p> <p>Efforts to reduce agricultural emissions.</p> <p>Increased biomass use for energy.</p> <p>Dietary habits remain the same and intensive food linked to welfare is discouraged.</p>	<p><b>6. CONCLUSIONS</b></p> <p>The Commission's detailed analysis of cost-effective ways of reducing greenhouse gas emissions by 2050 has produced a number of important findings.</p> <p>In order to be in line with the 80 to 95% overall GHG reduction objective by 2050, the Roadmap indicates that a cost effective and gradual transition would require a 40% domestic reduction of greenhouse gas emissions compared to 1990 as a milestone for 2030, and 80% by 2050.</p> <p>Energy-related products account for a large proportion of the consumption of natural resources and energy in the Community. They also have a number of other important environmental impacts. For the vast majority of product categories available on the Community market, very different degrees of environmental impact can be noted though they provide similar functional performances. In the interest of sustainable development, continuous improvement in the overall environmental impact of those products should be encouraged, notably by identifying the major sources of negative environmental impacts and avoiding transfer of pollution, when this improvement does not entail excessive costs.</p> <p>In 2050, the EU's total primary energy consumption could be about 30% below 2005 levels. More domestic energy resources would be used, in particular renewables. Imports of oil and gas would decline by half compared to today, reducing the negative impacts of potential oil and gas price shocks significantly. Without action the oil and gas import bill could instead double compared to today, a difference of € 400 billion or more per annum by 2050, the equivalent of 3% of today's GDP<sup>16</sup>.</p> <p>25.3.2014</p>	<p>The Commission's detailed analysis of cost-effective ways of reducing greenhouse gas emissions by 2050 has produced a number of important findings.</p> <p>In order to be in line with the 80 to 95% overall GHG reduction objective by 2050, the Roadmap indicates that a cost effective and gradual transition would require a 40% domestic reduction of greenhouse gas emissions compared to 1990 as a milestone for 2030, and 80% by 2050.</p> <p>Energy-related products account for a large proportion of the consumption of natural resources and energy in the Community. They also have a number of other important environmental impacts. For the vast majority of product categories available on the Community market, very different degrees of environmental impact can be noted though they provide similar functional performances. In the interest of sustainable development, continuous improvement in the overall environmental impact of those products should be encouraged, notably by identifying the major sources of negative environmental impacts and avoiding transfer of pollution, when this improvement does not entail excessive costs.</p> <p>Setting minimum environmental performance standards for products as part of an integrated policy – under the Eco-Design Directive – can boost diffusion and market for more resource efficient products, by removing the least resource efficient products.</p>
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Thank you for your attention!  
 Further information: [matti.kuittinen@aalto.fi](mailto:matti.kuittinen@aalto.fi)  
[www.eco2wood.com](http://www.eco2wood.com)

Let us build a  
 carbon efficient  
 Europe!