



## Reynaers goes green



May 2011

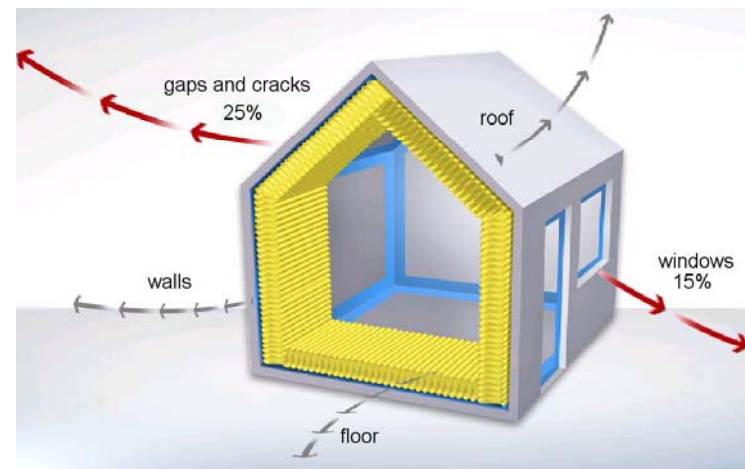
# Reynaers goes green

**Problem:** Global warming due to greenhouse gases

Greenhouse gases are emitted by burning fuels

40% of CO<sub>2</sub> production in Europe is emitted from buildings: heating and use of equipment

⇒ **Reynaers goes green** = development of **sustainable systems** which contribute to **sustainable buildings**



# Reynaers goes green

Environment and Energy



Environment  
Sustainable systems



Energy  
Contributing to sustainable buildings



# Reynaers goes green

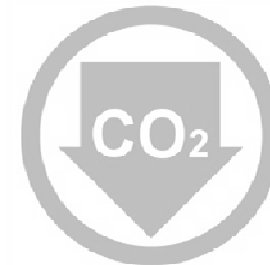
Environment and Energy



Environment  
Sustainable systems



Energy  
Contributing to sustainable buildings





# Reynaers goes green

## Environment and Energy

- evaluating environmental impact of product or building: based on used material, recyclability, energy consumption during production, general green energy consumption, ...
- promoting environmental friendly products to create a sustainable society





# Reynaers goes green

## Environment and Energy

- Aluminium = **100% recyclable**, without loss of characteristics
- Aluminium = **strong and light**: savings in CO2 for transport
- Aluminium = **very durable material**: more than 75% of the aluminium ever produced is still in use
- Recycling aluminium **saves 95% of the energy**, needed to make primary aluminium
- **Limitation**: availability of scrap  $\Rightarrow$  only 40% of market demand for aluminium

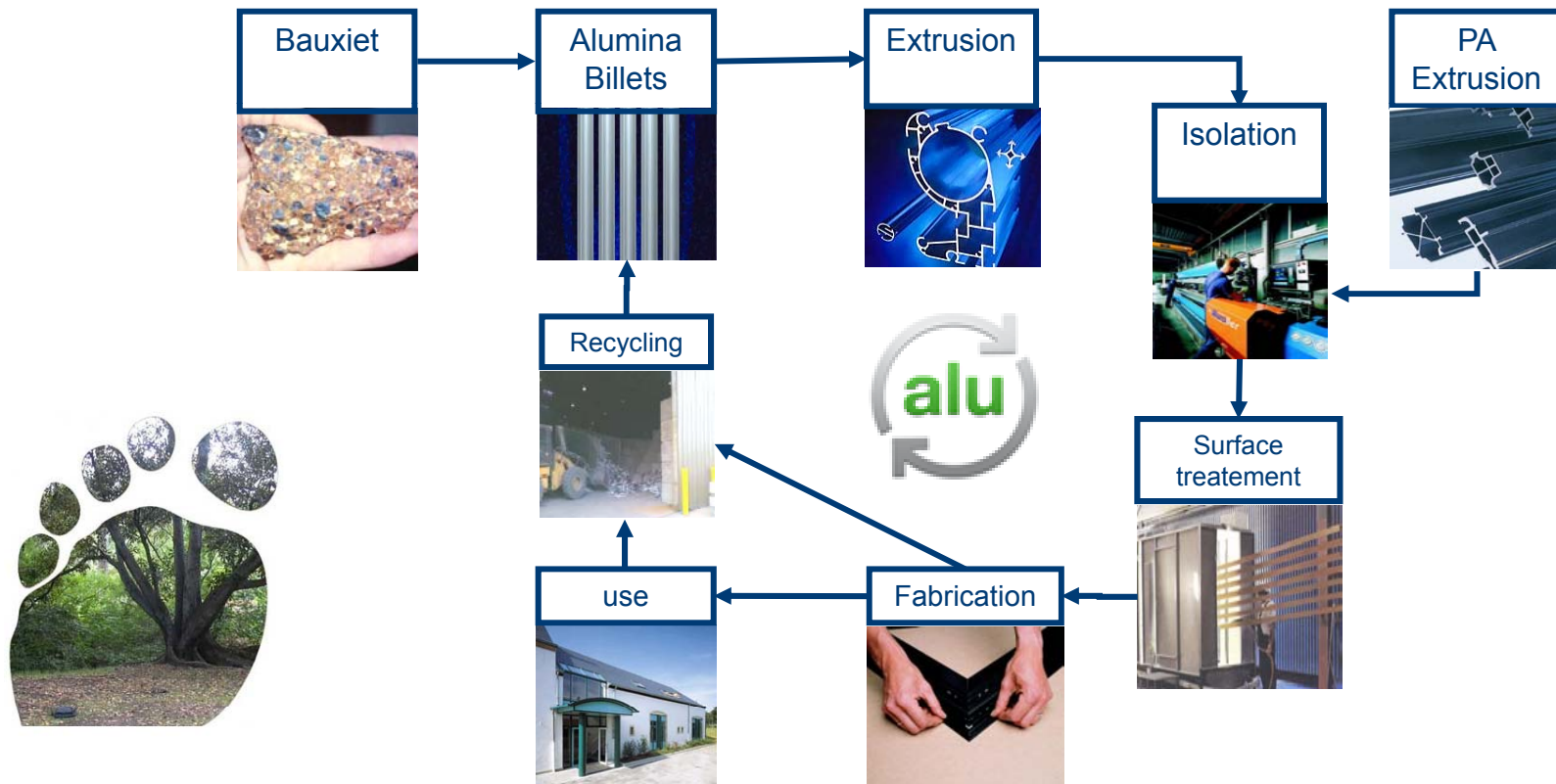




# Reynaers goes green

Environment and Energy

- Reynaers' carbon footprint: Life cycle analysis
  - ⇒ closing the cycle
  - ⇒ Recycled content of Reynaers profiles: 40 upto 60% recycled material



# Reynaers goes green

Environment and Energy



- **Building labels:**  
in Europe: based on UK label BREEAM  
in US: label LEED



## Important issues:

- Water
- Land use and ecology
- Transport
- Materials: **recycled content**
- Pollution
- Energy: **energy efficiency**
- Health & wellbeing
- Design and architecture

	BREEAM	LEED
Country	UK	US
Development and publication	1990 by Industrial Consortium (BRE)	developed in 1996 published in 2000 by United States Green Building Council (USGBC)
Rating	pass, good, very good, excellent	certified, silver, gold, platinum
Categories measuring environmentally friendly behavior	<ul style="list-style-type: none"> <li>• Management</li> <li>• Energy use</li> <li>• Health &amp; Well-being</li> <li>• Pollution</li> <li>• Transport</li> <li>• Land use</li> <li>• Ecology</li> <li>• Materials</li> <li>• Water</li> </ul>	<ul style="list-style-type: none"> <li>• Sustainable sites</li> <li>• Water efficiency</li> <li>• Energy &amp; Atmosphere</li> <li>• Materials &amp; Resources</li> <li>• Indoor environmental quality</li> <li>• Innovation and design process</li> </ul>



MK3 Berlin: LEED



Airport Plaza Diegem: BREEAM



Sofia Airport Bulgaria: LEED





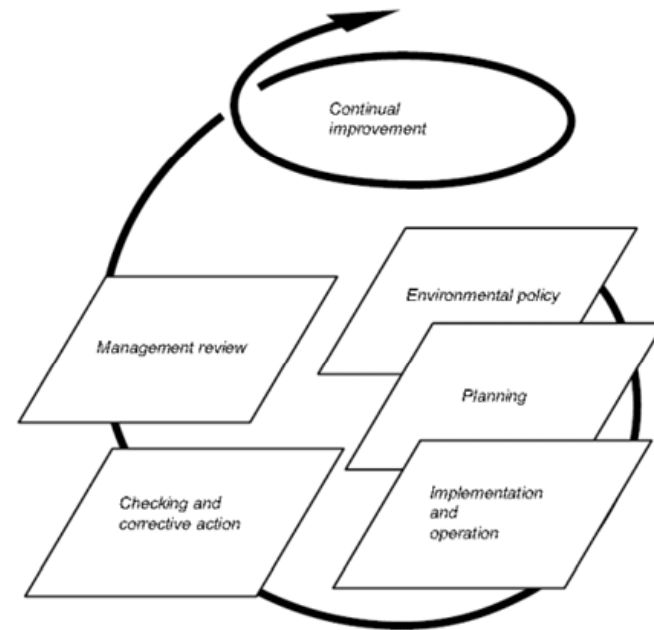
# Reynaers goes green

**Environment** and Energy

- **ISO 14001:**  
ISO 14001 is the **international standard for environmental management**

Environmental impacts of ISO 14001 includes:

- air pollution;
- water pollution;
- soil pollution;
- waste;
- use of resources (including water);
- energy;
- Local issues such as safety, noise and odor



ISO 14001 certification Reynaers Duffel: in process for Q4/2011

ISO 14001 certification **Reynaers UK**: granted May 2011

# Reynaers goes green

Environment and **Energy**



Environment  
Sustainable systems



Energy  
Contributing to sustainable buildings





# Reynaers goes green

Environment and **Energy**

- evaluating energy consumption: based on requirements in specifications
- promoting energy efficient products to reduce greenhouse gas emissions





# Reynaers goes green

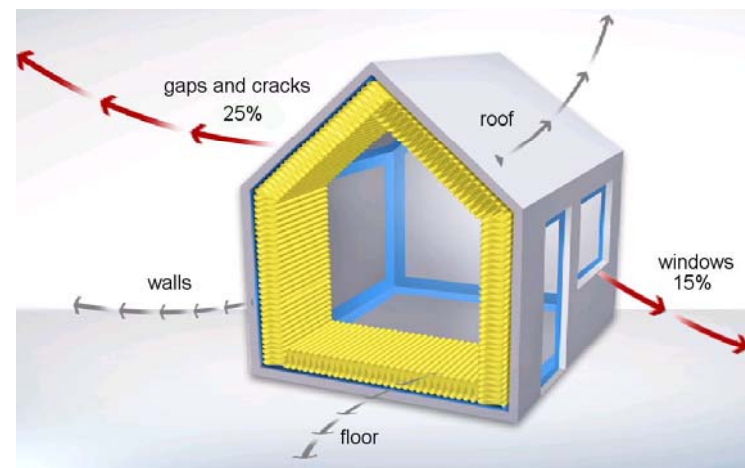
Environment and **Energy**

## EPBD Energy Performance of Buildings Directive in Europe

⇒ European commitment to reduce greenhouse gases regarding targets Kyoto protocol.

- Aspects of energy transmission through building envelope
- Aspects of energy use inside the building

⇒ Regulations for new buildings and important renovations





# Reynaers goes green

Environment and **Energy**

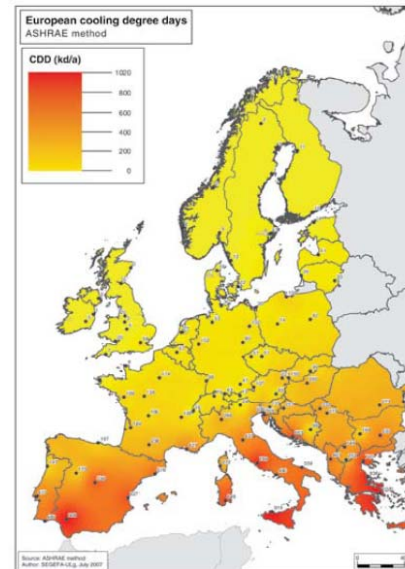
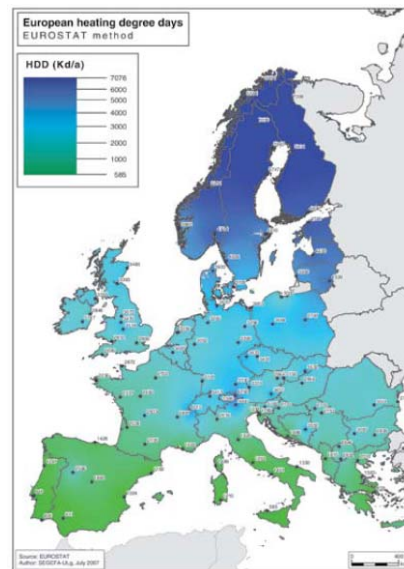
EPBD Energy Performance of Buildings Directive (2002)

⇒ translated into national regulations

Energy consumption for heating / cooling demand: dependent on geographical location

Important issues:

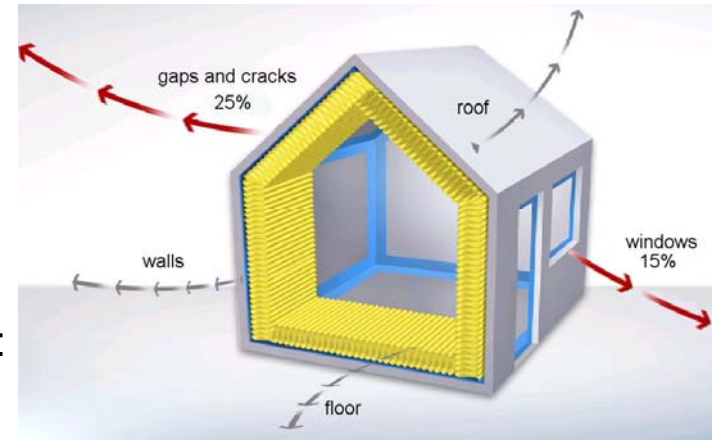
- *Increasing insulation*: national regulations with maximum U-values (min. performance level)
- Using *energy efficient systems*



# Reynaers goes green

Environment and **Energy**

⇒ recommendations for windows and doors:  
part of building envelope



- Reducing heat loss by **insulation**

- **U-value** (overall heat transfer coefficient) of the building elements
- additional **heat loss through junctions** of building elements per meter length of that detail:  $\Psi$  Psi linear thermal transmittance

- Reducing heat loss **by air tightness** of building

- Air tightness of the window or door
- Air tightness of the connection between the building and the window/door
- n50-value: 50Pa pressure difference between inside and outside is created and the air leakage is measured (blower door test)

⇒ ventilation required

- Heat gain by use of passive solar energy

⇒ **General overall tendency for  $U_w < 1.5 \text{ W/m}^2\text{K}$**





# Reynaers goes green

Environment and **Energy**

- **Reynaers' high insulation systems**

- CS 86 HI: av.  $U_f$  1.5 W/m<sup>2</sup>K



- CS 104: av.  $U_f$  1.0 W/m<sup>2</sup>K



- CP 155 HI-Minergie: av.  $U_f$  2 W/m<sup>2</sup>K



- CW 50 HI: av.  $U_f$  0.9W/m<sup>2</sup>K



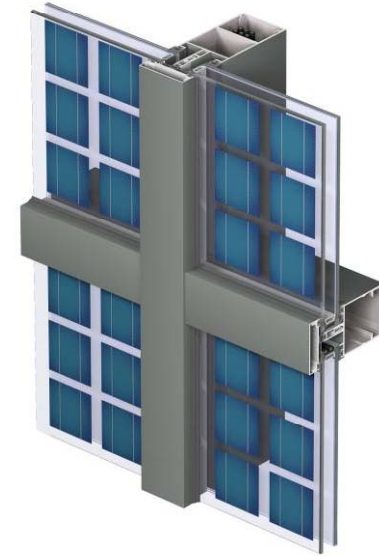
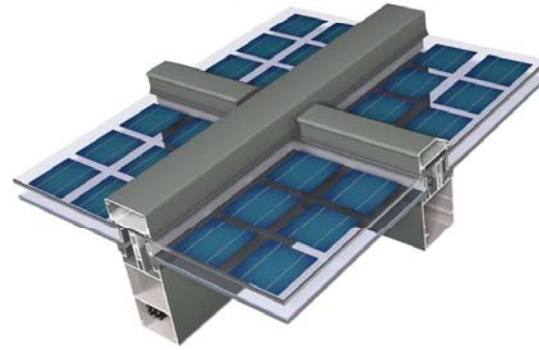


# Reynaers goes green

Environment and Energy

- **Reynaers' green energy systems**

- CW 60 solar: BIPV



- BS solar



- BS 100: sun shading





# Reynaers goes green

Environment and **Energy**

- **Reynaers' green energy systems**
  - Integration of all different types of PV panels possible:
    - Crystalline
    - Semitransparent crystalline
    - Amorphous
    - Translucent amorphous



Crystalline PV



Semitransparent Crystalline PV



Amorphous PV

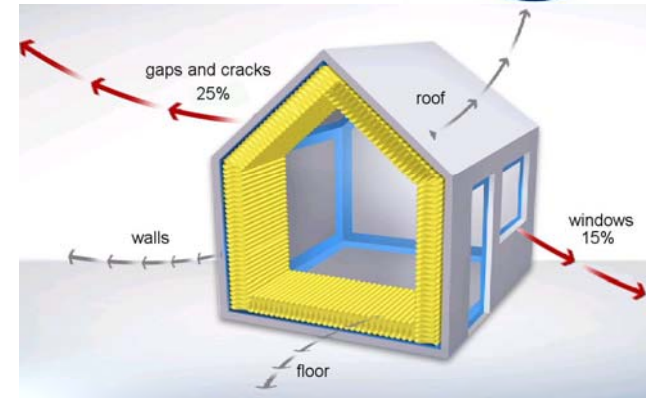


Translucent Amorphous PV

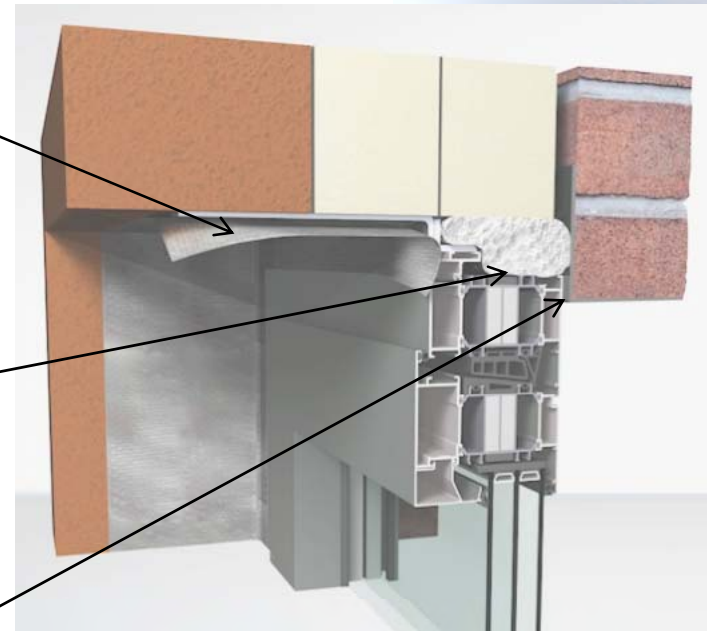
# Reynaers goes green

Environment and **Energy**

- **Reynaconnect**: solution for building connections



<p><b>Airtight</b></p> <p><b>Simple Installation</b></p>	A roll of white airtight tape and a tube of white sealant.
<p><b>Acoustic insulation</b></p> <p><b>Thermal insulation</b></p>	A tube of acoustic insulation and a tube of thermal insulation.
<p><b>Damp regulation</b></p> <p><b>Watertight</b></p>	A roll of black damp regulation tape and a roll of black watertight tape.

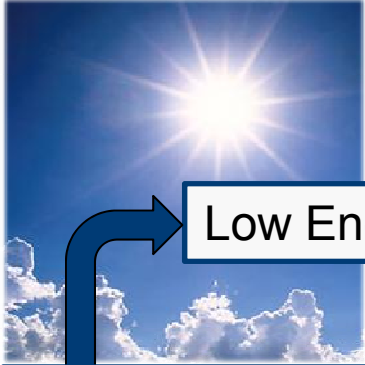


# Reynaers goes green

Environment and **Energy**



Environment  
Sustainable systems



Low Energy Building

Energy  
Contributing to sustainable buildings





# Reynaers goes green

Environment and **Energy**

EPBD Recast : directive is significantly strengthened for 2015 -2020

Important issues:

- Requirements for all major renovations
- The overall target is to make all new buildings **nearly zero energy** by end of 2020
- Minimum energy requirements for technical building systems (airco's, boilers)
- Use of smart metering,...
- Financial measures to encourage energy efficiency by the member states
- The public sector is to be used as an exemplar: display of EPCs,...



# Reynaers goes green

Environment and **Energy**

targets for national regulations towards Low Energy Building

Country/year	2008	2009	2010	2012	2013	2015	2016	2017	2020
Austria						social housing subsidies only for PH buildings			
DK			-25%			-50%			-75%
France				"low consumption standard" (Effinergie)					Energy positive buildings
Germany	-30%			-49%					Buildings to operate without fossil fuels
Hungary				0-emission buildings for "large investment buildings"					0-emission buildings
NL			-25%			-50% (PH level)			Energy neutral buildings
Norway		-30%						PH level	
UK			-25%		-44% (PH level)		0-CO <sub>2</sub> , (Heating & lighting)		

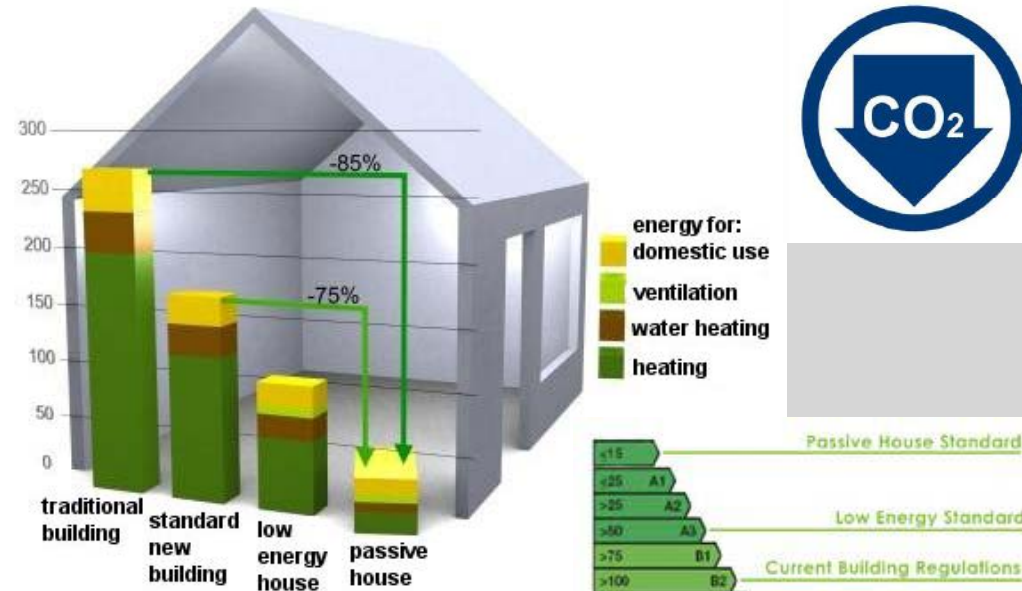
Table 1 Overview of announced /planned development in energy requirement in national Building Regulations compared to current requirements.

# Reynaers goes green

Environment and Energy

## Low Energy labels

⇒ labels for buildings



**Difficult comparison:** different calculation methods, norms and scope

**MINERGIE®**

**effinergie**  
Qualité de vie et économie d'énergie

**Passiv Haus**

Primary energy

### Switzerland

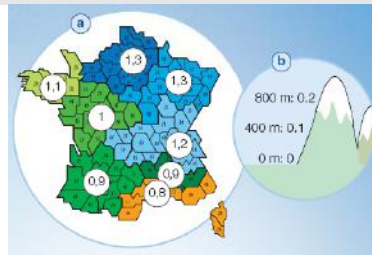
< 42 kWh/m<sup>2</sup>.yr  
= energy consumption for heating, cooling, ventilation and hot water

### France

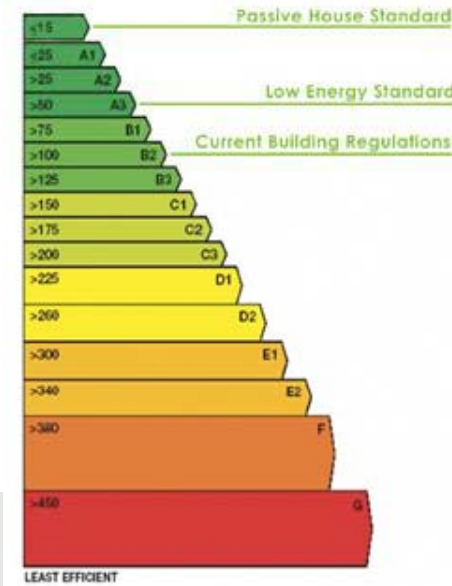
40-75 kWh/m<sup>2</sup>.yr  
= energy consumption for heating, cooling, ventilation and hot water + lighting

### Germany

< 120 kWh/m<sup>2</sup>.yr  
= energy consumption for heating, cooling, ventilation and hot water + lighting + electrical domestic appliances



< 15 kWh/m<sup>2</sup>.yr  
= energy need for heating (due to ventilation and transmission losses)





# Reynaers goes green

Environment and **Energy**

## Low Energy labels

⇒ labels for components



- **Passiv haus:** Germany Passiv Haus Institut (Darmstadt)
  - Also recognised in Belgium, the Netherlands, ...

**MINERGIE**<sup>®</sup>

- **Minergie:** Switzerland
  - Different labels

**MINERGIE**<sup>®</sup>  
**MINERGIE-P**<sup>®</sup>  
**MINERGIE-ECO**<sup>®</sup>  
**MINERGIE-P-ECO**<sup>®</sup>



# Reynaers goes green

Environment and **Energy**

## Low Energy labels: NGO labels

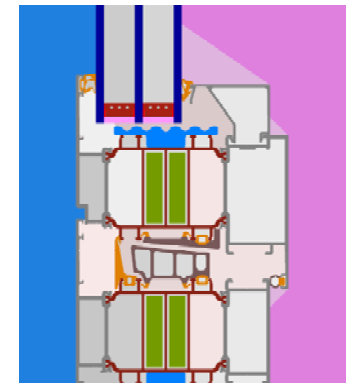
⇒ Passiv haus



- certification of a **Passive House building**  
⇒ **CS 104 window** with glass of **Ug < 0.6**  
(U<sub>w</sub> installed < 0.85 W/m<sup>2</sup>K)

Ug-value	0,5	0,6	0,7
U <sub>w</sub>	0,751	0,811	0,873
U <sub>w</sub> installed	0,764	0,824	0,886

- certification of a **Passive House component:**  
⇒ **CS 104 door:** certification pending (Q4/2011)  
(U<sub>w</sub> installed < 0.80 W/m<sup>2</sup>K)



Passive house action Poland

# Reynaers goes green

Environment and **Energy**

**Low Energy labels: NGO labels**

⇒ Minergie

**MINERGIE®**

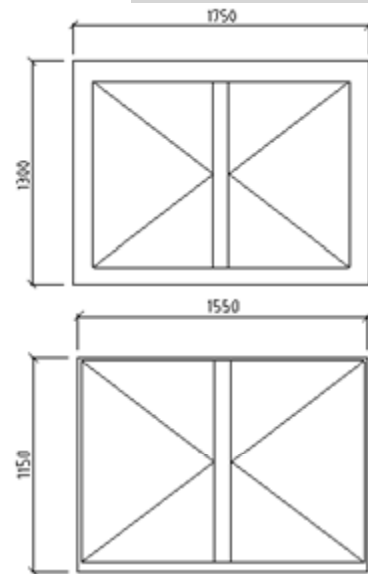
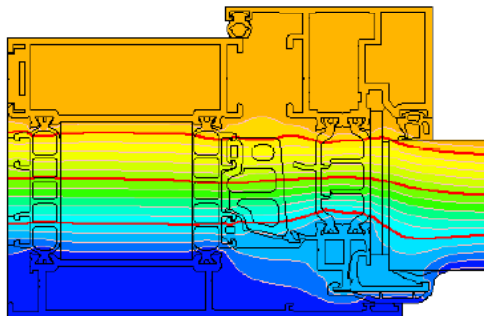
- Minergie: **CS 77**  
 **$U_w \leq 1.0 \text{ W/m}^2\text{K}$ : label granted**

- Minergie: **CS 86-HV**  
 **$U_w \leq 1.0 \text{ W/m}^2\text{K}$ : label granted**

- Minergie: **CP 155 monorail**  
 **$U_w \leq 1.0 \text{ W/m}^2\text{K}$ : label granted**

**MINERGIE-P®**

- Minergie-P: **CS 86 in study**





# Reynaers goes green

Environment and **Energy**

## Participation Solar Decathlon: team Belgium

⇒ University of Ghent  
Use of CS 104



Ecube

The U.S. Department of Energy Solar Decathlon challenges 20 collegiate teams from all over the world to **design, build and operate solar-powered houses** that are **cost-effective, energy-efficient, and attractive**.

Competition in Washington US: September 2011





[www.reynaers.com](http://www.reynaers.com)