

Buy Smart+
Green Procurement in Europe

Building Components

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- Life Cycle Cost
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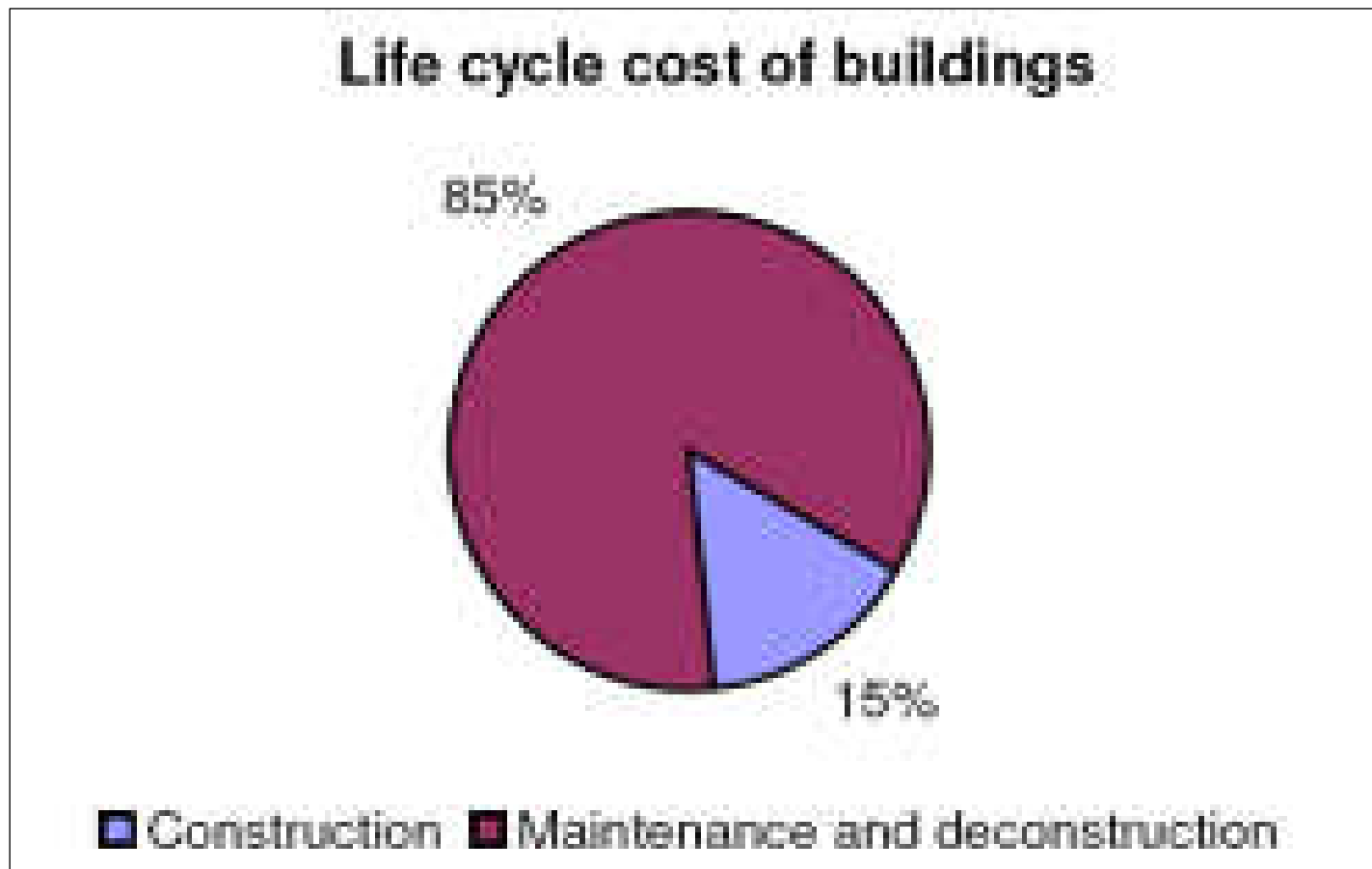
Background

Building sector and GP – particularities



- High investment costs (new build, reconstruction, major renovation).
- Long lifetime of a building as a built structure and of built-in construction products (e.g. facade, windows).
- Shorter lifetime of elements and devices, which comprise technical support building systems (e.g. boiler, a/c unit).
- Complexity – a building is a constitution of numerous components, which need to be carefully coordinated.
- Interdependence – a change in one component or its property can significantly influence performance of other components and entire building.
- Influence of users

Life cycle costs



EU Building sector in numbers



Range: 21 billion m²

Annual level of activities:

- new construction 1%
- demolition 0,5%
- renovation 1,8%

40% of final energy demand, 36% of CO₂ emissions, almost 50% of waste in Europe.

Expenses in the public sector: 40% for products and services related to buildings.

EU Building sector - potential and trends



Estimation by International Energy Agency (IEA):

- new construction:

long-term energy saving potential 70-75%;

- renovation of existing building stock:

energy saving potential 55-80%, depending on the building type, its present condition and geographic location.

Legislation

Energy Efficiency Plan 2011



The Energy Efficiency Plan 2011 forms part of the European Union's (EU) 20 % target (aimed at reducing primary energy consumption) and the 2020 Energy strategy.

It aims at:

- promoting an economy that respects the planet's resources;
 - implementing a low carbon system;
 - improving the EU's energy independence;
 - strengthening security of energy supply.
-
- The Plan emphasises the necessity to implement the means for reducing final energy consumption in **buildings**.

EU Building sector - GP-related **legislation**




- Construction Products Directive
(“CPD”; 89/106/EEC)
- Directive on the Energy Performance of Buildings
(“EPBD”; 2002/91/EC)
- Directive on energy end-use efficiency and energy services
(“ESD”; 2006/32/EC)
- Directive on the promotion of the use of energy from renewable sources
(2009/28/EC)
- Directive establishing a framework for the setting of ecodesign requirements for energy-related products
(“Eco-Design”; 2009/125/EC)
- Recast of the EPBD (2010/31/EU)

EU Building sector - GP-related **legislation**



EPBD, EPBD Recast & G(P)P – most important points:

- Calculation of the overall energy performance
- Definition of **minimum energy efficiency criteria** for new construction and major renovation, and of mechanical systems (heating, hot water, a/c)
- Feasibility studies of alternative energy systems
- Building **energy performance certification** (mandatory displayed in public buildings); stress on recommendations for improvement 
- **Cost optimum measures** for construction and renovation – **LCC**-based planning
- Regular inspection of boilers, complete heating systems and a/c systems

EU Building sector - GP-related **legislation**



EPBD Recast & G(P)P – important issues:

As of **31 December 2020** new buildings in the EU will have to consume '**nearly zero**' energy and the energy will be 'to a very large extent' from renewable sources.

Public authorities that own or occupy a new building should set an example by building, buying or renting such '**nearly zero energy building**' as of **31 December 2018**.

A "**nearly zero energy building**" means a building that has a very high energy performance, determined in accordance with Annex I. The nearly zero or very low amount of energy required should to a very significant level be covered by **energy from renewable source**, including renewable energy produced on-site or nearby,,.

GPP in action

Building sector and **Green Procurement**



Possible and relevant in all phases and at all stages:

- Planning
- Construction
- Operation and Maintenance
- Demolition



Building sector and GP: Classification of Criteria - option 1



Qualitative; e.g.:

- references regarding planning of low-energy houses
- required transport and construction procedures
- use of certain calculation methods

Quantitative; e.g.:

- thermal characteristics of building materials
- building energy certificate class
- duration of product's technical lifetime

Building sector and GP: Classification of Criteria - option 2



On the level (at the stage) of planning and/or construction

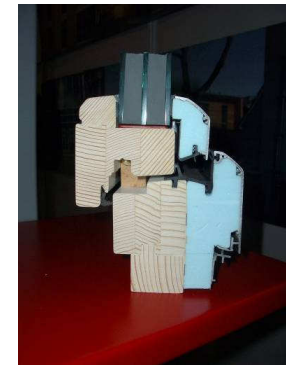
(references, procedures, methods, ...)

On the level of characteristics of materials, products and systems

(thermal conductivity, content of chemicals, operating efficiency, ...)

On the level of overall building energy and environmental properties

(heat demand, final energy consumption, CO2 emissions, ...)



Building sector and GP: **Indicators** for the “green scenario”



Energy efficiency class

(A, B1, B2, ...)

Use of renewable sources of energy

(type, % of demand coverage, ...)

LCC – costs in the building lifetime

Environmental and health factors (emissions, materials used, ...)

Building sector and GP: The “green scenario”



„Green” means also considering different **scenarios** and their energy and environmental outcome/impact as a basis for cost calculations (and founding award criteria on these parametres).



Product Groups

Interdependency of functions and impacts

Time order of actions

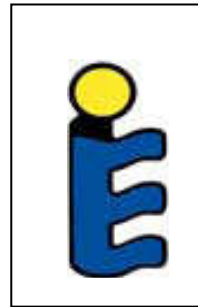
Examples:

- Procurement of thermostat valves will make no sense (the result will be poor) if the heating system is not hydraulically balanced beforehand.
- Adding thermal insulation to the facade while postponing the replacement of windows for a year or two will raise unnecessary costs, technical complications and cause structural damage to the almost-new facade.

Building sector and GP: (Indirect) use of Labels



EU Eco-Label
(ecological
materials ...)



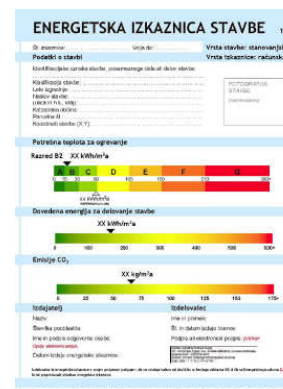
Solar Keymark
(solar thermal
systems ...)



NaturePlus
(sustainable materials ...)



Various national
labels ...



Energy certificate
(NOT a “classical”
green label!) ...

Product groups



GPP Toolkit (http://ec.europa.eu/environment/gpp/first_set_en.htm) includes criteria for:

- Construction
- Windows, Glazed Doors and Skylights
- Thermal insulation
- Hard floor-coverings
- Wall Panels
- Combined Heat and Power (CHP)

Buildings components and GP - EPDs



Environmental Product Declarations (EPDs)

- Type III ISO labels
- Prepared on the basis of Life Cycle Assessment (LCA)
- They allow detailed intercomparison of different products
- EPD databases are growing
- EPD for a product is becoming a market advantage
- www.environdec.com
- <http://bau-umwelt.de/hp421/Declarations.htm>

An **example** of possible criteria areas for a specific building component



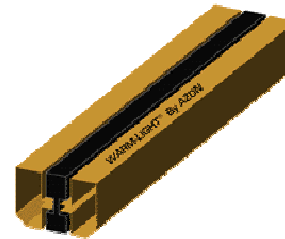
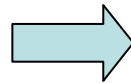
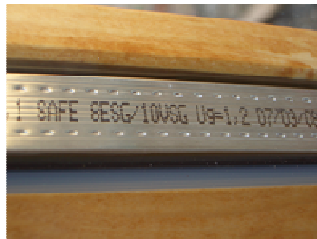
Example: WINDOWS AND GLAZING

- **U-value** of the glazing and/or of the whole window (U_g , U_w)
- Overall **energy transmittance** of the glazing (G-value)
- Visible **light transmittance** of the glazing (T_v)

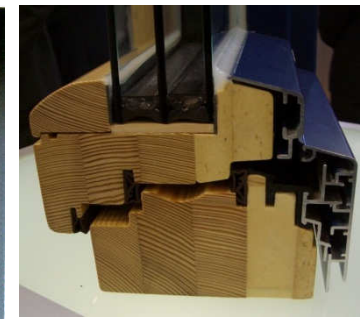
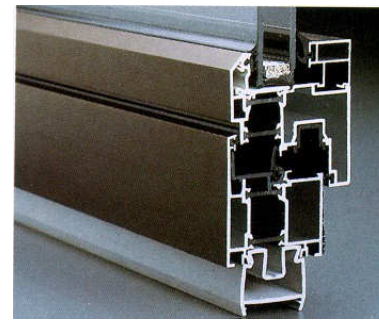
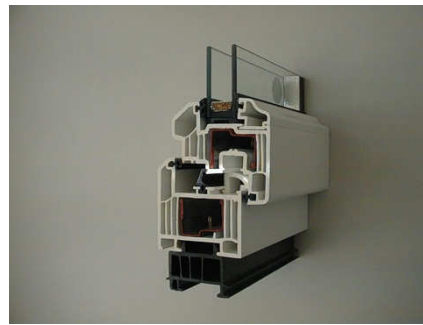


An example of possible criteria areas for a specific building component

- **Spacer type** – e.g. an insulating spacer instead of a conventional (aluminium) one to minimize the linear thermal bridge effect

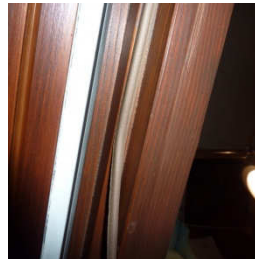


- Specifications about the **frame material** (wood, PVC, metal; combinations; insulating fillings), its origin and treatment (chemical composition)

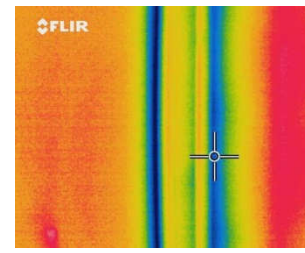
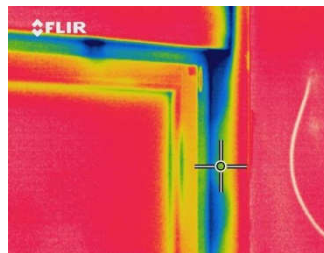


An example of possible criteria areas for a specific building component

- **Airtightness of the window frame/wing joint** (number and type of sealing stripes) – to be proven in the framework of a Blower door test or with an appropriate anemometer device after installation

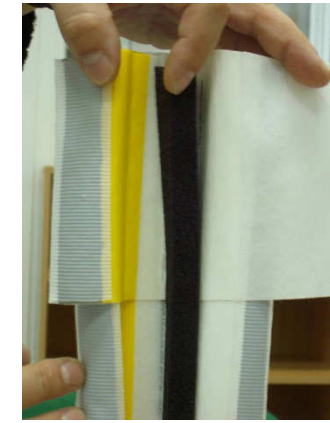


- **Airtightness of the window/wall joint** (related to the installation type) – to be proven in the framework of a Blower door or with an appropriate anemometer device test after installation



An example of possible criteria areas for a specific building component

- Official **proofs of window characteristics** (certificates, technical reports, etc.)
- **Type of the installation** (e.g. three-level sealing („RAL installation“) instead of a standard one)



- Official **proofs of installation material characteristics** (certificates, technical reports, etc.)

An example of possible criteria areas for a specific building component

- Transport means and waste management on site
- Warranty period by the manufacturer(s)
- Free maintenance schedules, other special offers, ...
- Etc.



Tipps for usage

Building sector and GP: What next?



- With the purchase of energy-efficient building materials, components and systems (or even when new construction or an integral renovation of buildings is in question) only one part of saving potentials can be opened up.
- To a large extent real practical results lie in the hands of **building users and building managers**. This includes **regular maintenance and suitable patterns of use** (behavioral aspects).
- Even technically most advanced building components can not provide expected (and pre-calculated) results if not used and maintained in an appropriate manner.

Sources of information



- EU: GPP Toolkit
http://ec.europa.eu/environment/gpp/first_set_en.htm
- Build up
www.buildup.eu/
- Buy Smart
www.buy-smart.info
- Information from the city of Frankfurt, Germany
www.energiemanagement.stadt-frankfurt.de/

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| 6 | Ekodoma | Latvia |
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| 8 | Energiaklub | Hungary |
| 9 | ESS | Sweden |
| 10 | ESV | Austria |
| 11 | Icemenerg | Romania |
| 12 | KREA | Lithuania |
| 13 | RAEE | France |
| 14 | REACM | Greece |
| 15 | REGEA | Croatia |
| 16 | SEC | Bulgaria |
| 17 | SEVEEn | Czech Republic |
| 18 | ZRMK | Slovenia |