



Energy in the Building Life Cycle



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Demographical Context



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Planet population reached recently 7 Bn. people. About 2 Bn. live in countries with a high standard of living, and high consumption of energy, products and energy.

About 5 Bn. people aim to achieve sooner or later similar living standard.

All human beings wish a car, wish to work and live in a built environment with modern HVAC, wish to have plenty of food, access to education, a developed infrastructure.

We are already struggling with scarcity of the resources. How can we cope with this accelerated growth?

This demographic pressure is amplified by unprecedented changes in technology, science, communication. We are facing a huge shift in our lives and we have to change our behavior regarding the use of the resources as is no way back to pre-industrial era.

Population – 2 Bl.
Weekly food expenditure
500 \$



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Population – 5 Bl.
1.23 – 5 weekly food expenditure



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The gap between living standards and consumption is really large. As we expect that many people will achieve the desired increase of their living standards the pressure on limited resources of the planet will increase.

It is obvious that a strong focus on reducing waste of resources and focus on sustainability is the only way forward .

40% of total Energy consumption is generated by Buildings.

Until 2020 **CO₂** emissions generated by the energy consumption of the buildings can be reduced by **29%** at zero net cost.

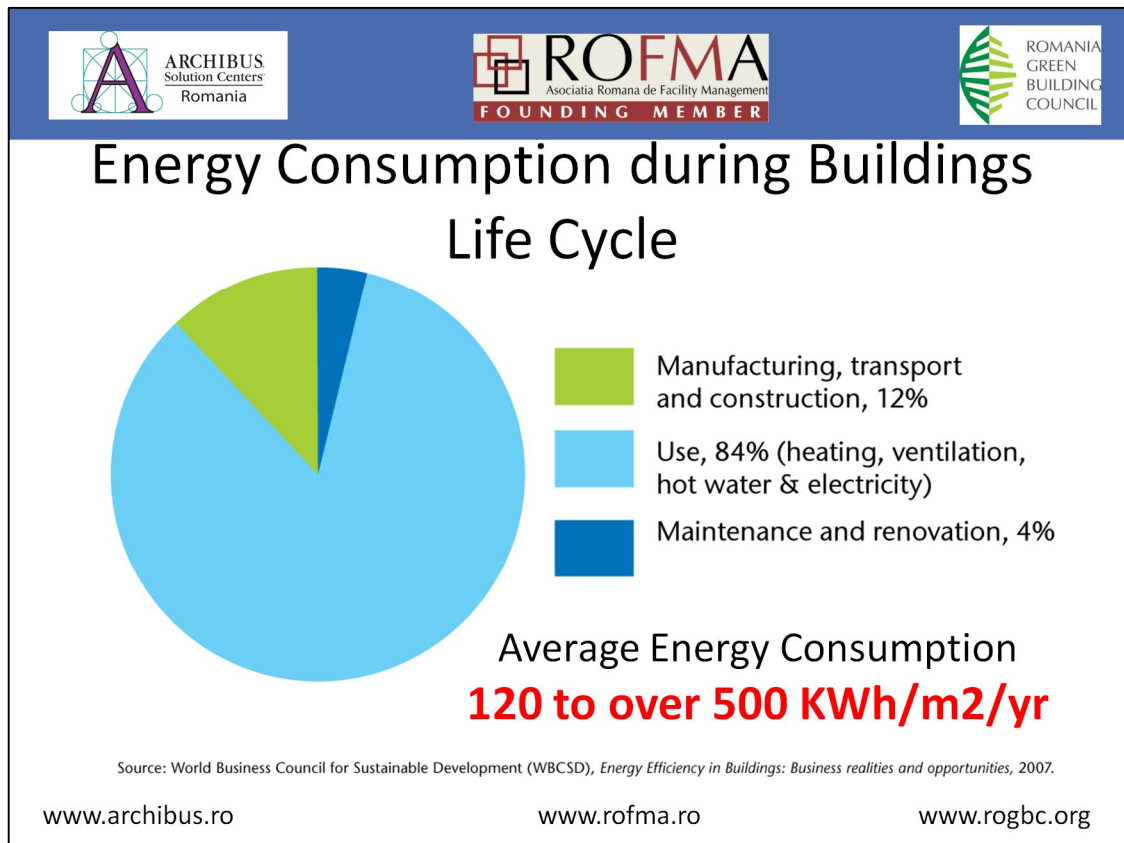
(WBCSD - World Business Council for Sustainable Development – Energy Efficiency in Buildings)

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The Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report estimates that by 2020 CO₂ emissions from building energy use can be reduced by 29% at no net cost. (World Business Council for Sustainable Development WBCSD – Energy Efficiency in Buildings)
As built environment accounts for 40% of total energy consumption, any initiative that will aim on improving energy efficiency of the buildings is highly relevant.



In average a building will consume between 120 KWh/m²/year – this being the standard for Passive House to over 500 KWh/m²/year depending on type, climate and use of the building.

A study of World Business Council for Sustainable Development (WBCSD) shows that about 16% of energy is used for design, build and disposal of the buildings.

In average 84% of energy is consumed while the building is in use.

Any effort to design efficient buildings, as well as actions and programs to renovate, modernize and change behavior of the users of the buildings will have a long term impact on energy consumption level and green gas emissions.

Green Building

- It is a building certified from Design, Build and Operation perspective, according to a specific methodology.
- Most used Green Certifications in Romania : **LEED, BREAM, DGNB.**
- **Alignment** at EU level of the Green Building methodologies. A common definition of the Green Building concept.
- **Alignment** between Energy Performance Certificate and Green Building Certificate.

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Energy consumption is only one of the components of a green building certification process.

There are many other aspects taken into consideration such as :

- good access to public transportation to reduce traffic, pollution, and fossil fuel use
- building sites selected and managed to minimize damage to local ecology
- materials choices that minimize or eliminate toxicity and minimize the energy required to manufacture and transport.
- reuses existing materials or selects materials with a large amount of recycled content
- provides natural day lighting and healthful indoor air quality
- flexibility in the use of space to reduce necessary resource-intensive interventions when reconfiguring the space.
- waste management

Given the importance of the Green Buildings in the sustainability of the built environment and the fact that there are already in use many national certifications for Green Building it might make sense to align those certifications methodologies and standards in an unitary European concept.

Further on it makes sense to align this Green Building standard with the existing EN 15217 – the standard for Energy Performance of the buildings.

Thus creating an unitary concept of the sustainable buildings that will be an trustworthy framework for investors, developers, landlords and buildings users.

Based on such coherent standards broader policies could be implemented with long term results regarding sustainability of the built environment in all European countries.

Trends

- Smart Grid / Smart Consumer – Reducing **cost / KWh** / RE portfolio.
- **ROI** – on energy efficiency investments
- Zero Energy Buildings – **producing own energy**
- **CO2 reduction goals** – orientation toward green energy sources

While maintaining the **Comfort** and keeping the **Capital** expenditures to minimum

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There are a number of trends generated by the fast changing economic environment and the implementation of sustainability initiatives :

- As the energy grid becomes smarter so are the consumers who aim to negotiate better rate according to energy consumption profile in order to reduce cost/KWh/m² of their buildings.

-In the same time landlords, due to scarcity of the available capital, looks very carefully to the Return On Investment regarding any investments that aim to improve energy efficiency of the buildings. From this perspective any legislative initiatives that will reduce the taxation on green or highly energy efficient buildings will have a major impact.

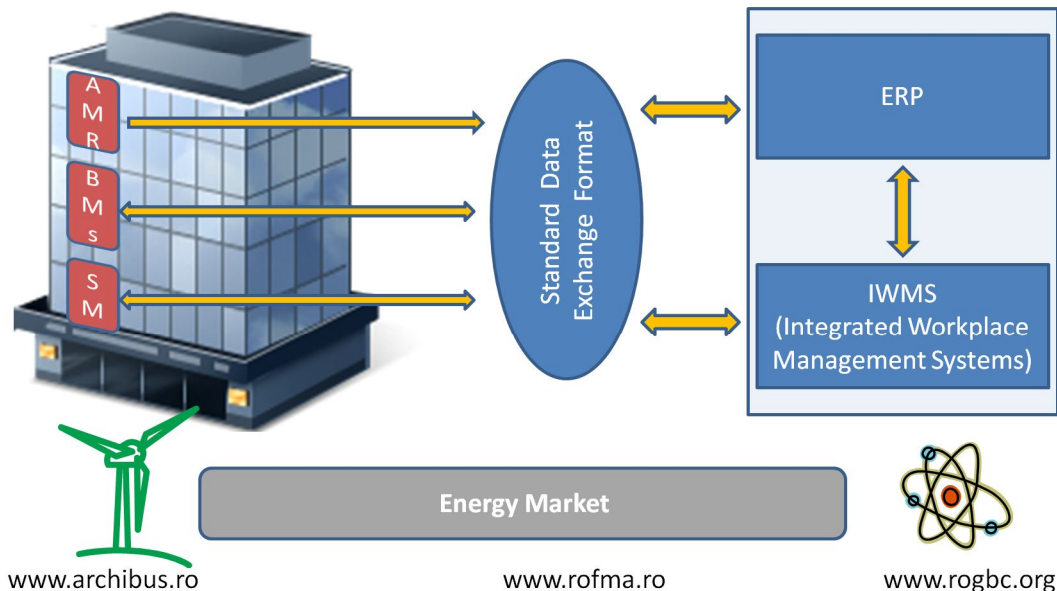
ROGBC supported successfully such legislative initiative in Cluj where the property tax reduction was implemented for sustainable certified buildings.

-As the concept of Zero Energy Building is becoming reality, new challenges emerge as such buildings drift outside the pattern of the “passive” energy consumer, producing their own energy and need to be integrated in the energy grid.

-On top of energy reduction, more organizations and individuals will prefer to consume green energy against traditional sources.

One important element is that the comfort level of the buildings should remain constant or growing while keeping capital expenditures for energy efficiency at minimum level.

Systems Integration



As consumer behavior change from “passive consumer” to “proactively manage consumption and environmental impact” more holistic integration is required between internal building measurement and management systems, distribution grid and software systems that control the building and measure the effect in terms of expenses and energy use.

In order to implement energy efficiency initiatives at organization level, data about energy consumption has to be :

- more detailed – it is not enough to measure the energy consumption at building level but more often to floor and even room or equipment level.
- More frequent – it is not enough to measure monthly consumption, but to measure hourly or even 15 minutes

-All this data has to be sent to decision system of the organization represented by the ERP (Enterprise Resource Planning) or the IWMS (Integrated Workplace Management System) in order to provide decision makers defendable data to take action and implement changes.

Therefore a Standard Data Exchange Format is really needed in order to allow fast data collection and integration between a broad range of devices (AMR –Automatic Meter Readers, BMS - Building Management Systems, or SM - Smart Meters) delivered by a large number of suppliers.

Currently such integration has to be customized based on each particular system thus increasing the time and cost.