

Buildings in the key role in the EU Energy Efficiency Action Plan



Zoltan Magyar
University of Pecs, Hungary
REHVA vice-president
zmagyar@invitel.hu

Energy efficiency is at the heart of the EU's Europe 2020 Strategy for smart, sustainable and inclusive growth and of the transition to a resource efficient economy. Energy efficiency is one of the most cost effective ways to enhance security of energy supply, and to reduce emissions of greenhouse gases and other pollutants. In many ways, energy efficiency can be seen as Europe's biggest energy resource. This is why the European Union has set itself a target for 2020 of saving 20% of its primary energy consumption compared to projections, and why this objective was identified in the Commission's Communication on Energy 2020 as a key step towards achieving our long-term energy and climate goals.

Substantial steps have been taken towards this objective – notably in the appliances and buildings markets. Commission estimates suggest that the EU is on course to achieve only half of the 20% objective. The EU needs to act now to get on track to achieve its target. Responding to the call of the European Council of 4 February 2011 to take determined action to tap

the considerable potential for higher energy savings of buildings, transport and products and processes, the Commission has therefore developed this comprehensive new Energy Efficiency Plan 2011 [1].

The Energy Efficiency Action Plan 2006 [7] defined ten priority actions covering the main energy-using sectors and key horizontal issues (**Table 1**).

Energy efficiency measures in the building sector provide enormous potentials to reduce CO₂ emissions in Europe. The energy use of the building segment accounts for 40% of the total energy use in the EU and represents Europe's largest source of emissions (nearly 36% of EU CO₂ emissions). This high amount of emissions could be reduced up to 80% through integrated design solutions, e.g. better insulation of the different components of the existing building stock, of already refurbished dwellings, as well as for new buildings (EURIMA, ECOFYS 2005a,b, Wuppertal Institut 2005). Energy performance of buildings is key to achieve the EU Climate & Energy objectives.

The **Figure 1** illustrates that for the final energy sectors, even though some of the potential is currently being used, the cost-effective savings potential in each sector would not be fully utilized in 2020. Further savings are possible but not cost-effective.

Energy used in residential, commercial and public buildings for space and water heating, cooling, ventilation, lighting, etc. makes up 40% of the EU's final energy consumption. The major Community legislation addressing the energy performance of buildings is the Energy Performance of Buildings Directive (EPBD) of 2002 [11]. The Action Plan tackles energy efficiency in buildings by pushing for the full implementation of the EPBD and by putting forward its revision - as the second priority action.

The recast of the EPBD [12] suggests that all EU Member States endorse national plans and targets

Table 1. Structure of the Energy Efficiency Action Plan 2006. [7]

85 (sub-) measures	6 priority areas	10 priority actions
	SECTORS	
<ul style="list-style-type: none"> Regulatory instruments Economic & market-based instruments Information & support programs 	Energy-using products Energy services	(1) Appliance & equipment & minimum energy performance standards
	Residential, commercial & public buildings	(2) Building performance requirements and very low energy buildings
	Energy transformation	(3) Making power generation and distribution more efficient
	Transport	(4) Achieving fuel efficiency of cars
<ul style="list-style-type: none"> Voluntary actions 	HORIZONTAL ISSUES	
	Financing	(5) Facilitating financing of energy efficiency investments for SME and Energy Services Companies
	Economic incentives	(6) Spurring energy efficiency in the new MS
	Energy pricing	(7) Coherent use of taxation
	Energy behaviour	(8) Raising energy efficiency awareness
	International partnerships	(9) Energy efficiency in cities (10) Foster energy efficiency worldwide

in order to promote the uptake of nearly zero energy buildings. So far, around 20 000 low energy houses have been built in Europe. The plan focuses on instruments to trigger the renovation process in public and private buildings as well, to improve the energy performance of the appliances used in them and to foster energy efficiency in households and the industry.

The Action Plan promotes the exemplary role of the public sector and proposes a binding target to accelerate the refurbishment rate of the public sector building stock. Public authorities should be required to refurbish at least 3% of their buildings each year. This is roughly double of the actual renovation rate. It also introduces energy efficiency criteria in public procurement. Each refurbishment should bring the building up to the level of the best 10% of the national building stock. When public bodies rent or buy existing buildings, these should always be in the best available energy performance class. The public sector can create new markets for energy efficient technologies, services and business models. Member States need to reform subsidies promoting energy use, for example by reorienting them to improve energy efficiency and address energy poverty.

The Action Plan aims to trigger the renovation process in private buildings and to improve the energy performance of appliances. In residential buildings, retrofitted wall and roof insulation offer the greatest opportunities, while in commercial buildings, improved energy management systems are very important. Improved appliances and other energy-using equipment still offer enormous energy savings opportunities. Member States are called upon to introduce measures – in line with national property law - to address the problem of split incentives. This means how the costs of renovation are split between the tenant and the landlord in case of rented buildings and apartments. At the same time, Member States are called on to support the uptake of Energy Service Companies as catalysts for renovation. Energy Service Companies renovate private houses and apartment at their own costs and make profits by receiving the difference between the energy costs before and after the renovation over a defined period of time. The Action Plan also focuses on the roll-out of smart grids and smart meters providing consumers with the information and services necessary to optimise their energy consumption and calculate their energy savings.

Large companies have to do regular and independent energy audits. They have to organize these themselves. Member States are encouraged to develop incentives for companies that introduce an energy management sys-

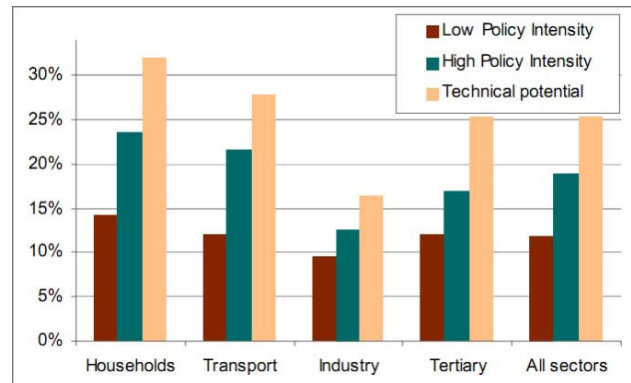


Figure 1.

Final energy savings potential in EU 27 in 2020. [6]

tem as a systematic framework for the rational use of energy. Exchange of best practices in energy efficiency and projects aimed at building capacity on energy management are proposed for micro and small companies.

The Plan also includes a reference to the launch of a new initiative – Smart Cities and Smart Communities – to develop a European framework for excellence in innovative low-carbon and energy efficient solutions at the municipal level. A great challenge is the refurbishment of the existing building stock, and in particular how to finance the necessary investments. The final actors (e.g. EU citizens, public authorities and service companies) in both sectors face similar market and regulatory failures that limit the uptake of energy savings measures, namely: high initial costs, incomplete markets (lack of trained staff, infrastructure, information), lack of information/ knowledge/ motivation, split incentives (landlord-tenant problem), poor enforcement of legislation, and rebound effect. Some Member States are already pro-actively using structural funds.

Energy efficient building solutions are often technically demanding. There is a lack of appropriate training for architects, engineers, auditors, craftsmen, technicians and installers, notably for those involved in refurbishment. Today, about 1.1 million qualified workers are available, while it is estimated that 2.5 million will be needed by 2015. The Commission is therefore launching the 'BUILD UP Skills: Sustainable Building Workforce Initiative' to support Member States in assessing training needs for the construction sector, developing strategies to meet them, and fostering effective training schemes. This may lead to recommendations for the certification, qualification or training of craftsmen. Investments in energy efficiency enhance competitiveness and support security of energy supply and sustainability at low cost.

The combined effects of full implementation of the existing and new measures has the potential to generate financial savings of up to €1 000 per household each year; improve Europe's industrial competitiveness; create up to 2 million jobs. The EPBD recast [12] is expected to have a major impact on the future final process of the existing building stock as well as the construction of nearly zero-energy houses will have significant quantitative and qualitative impacts on employment. The higher level of qualifications of the workforce as well as the acquired knowledge on state-of-the-art low energy buildings will bring an additional competitive edge to the European building industry.

In Hungary a study [13] investigated the depth of retrofits and the speed of renovation assumed. For an overview of the scenario description shows the **Table 2**.

The focus was on existing residential and public sector buildings, and emphasised scenarios that support "deep" retrofits, which bring the buildings as close to passive house standards as realistically and economically feasible. The research has demonstrated that up to 85% of Hungarian heating energy use, and the corresponding CO₂ emissions, can be avoided by a consistent and wide-spread deep retrofit programme in the country (**Figure 2**). The investigation has also highlighted the important risk related to less ambitious renovation programmes. As can be see in **Figure 2**, this sub-optimal renovation scenario saves only 40% of final heating energy use, locking 45% of 2010 building heating-related emissions at the end of the programme. This means

Table 2. Scenario of depth and speed of the renovation. [13]

Name	Scenario	Type of energy-efficiency intervention	Renovation rate, per year
S-BASE	Baseline scenario	No intervention	"Business-as-usual" (1.3% of the total floor area)
S-DEEP1	Deep retrofit, fast implementation rate	Deep retrofit	Around 20 million sqm (eq. to 250,000 dwellings, 5.7% of the total floor area)
S-DEEP2	Deep retrofit, medium implementation rate	Deep retrofit	Around 12 million sqm (eq. to 150,000 dwellings, 3.4% of the total floor area)
S-DEEP3	Deep retrofit, slow implementation rate	Deep retrofit	Around 8 million sqm (eq. to 100,000 dwellings, 2.3% of the total floor area)
S-SUB	Suboptimal retrofit, medium implementation rate	Suboptimal retrofit	Around 12 million sqm (eq. to 150,000 dwellings, 3.4% of the total floor area)

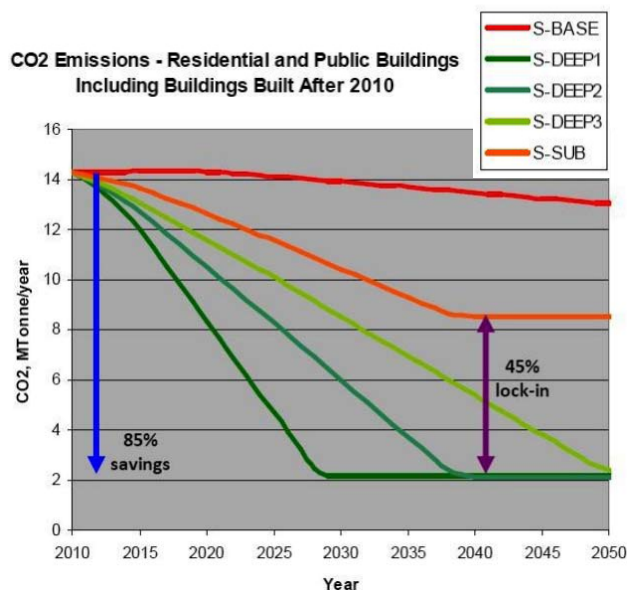


Figure 2. CO₂ emission reductions of the Hungarian building stock for all scenarios considered in the study. [13]

that reaching ambitious mid-term climate target, such as often quoted 75 – 85% reductions that are needed by 2050, will become extremely difficult, and expensive, to achieve.

References

- [1] Energy Efficiency Plan 2011 http://ec.europa.eu/energy/efficiency/action_plan/action_plan_en.htm.
- [2] Energy Efficiency in Buildings http://ec.europa.eu/energy/efficiency/buildings/buildings_en.htm.
- [3] Study on the Energy Savings Potentials in EU Member States, Candidate Countries and EEA Countries. http://ec.europa.eu/energy/efficiency/studies/doc/2009_03_15_esd_efficiency_potentials_final_report.pdf.
- [4] Low energy buildings in Europe: Current state of play, definitions and best practice http://ec.europa.eu/energy/efficiency/doc/buildings/info_note.pdf.
- [5] European Energy Efficiency Plan <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/11/271&format=HTML&aged=0&language=en&guiLanguage=en>.
- [6] Impact Assessment Energy Efficiency Plan 2011 http://ec.europa.eu/energy/efficiency/action_plan/doc/20110308_efficiency_plan_impact_assessment_en.pdf.
- [7] Progress report of the Energy Efficiency Action Plan 2006 http://ec.europa.eu/energy/efficiency/action_plan/doc/20110308_efficiency_plan_progress_report.pdf.
- [8] European council 4 February 2011 Conclusions <http://europa.eu/rapid/pressReleasesAction.do?reference=DOC/11/1&format=HTML&aged=0&language=EN&guiLanguage=en>.
- [9] A Roadmap for moving to a competitive low carbon economy in 2050 http://ec.europa.eu/clima/documentation/roadmap/docs/com_2011_112_en.pdf.
- [10] Action Plan for Energy Efficiency: Realising the potential <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2006:0545:FIN:EN:PDF>.
- [11] Directive 2002/91/EC of the European Parliament and the Council of 16 December 2002 on the energy performance of buildings, Official Journal of the European Communities, Brussels, 2003.
- [12] Directive 2010/31/EU of the European Parliament and the Council of 19 May 2010 on the energy performance of buildings (recast), Official Journal of the European Communities, Brussels, 2010.
- [13] Employment Impacts of a Large-Scale Deep Building Energy Retrofit Programme in Hungary, Central European University, Budapest (on behalf of the European Climate Foundation), 2010. **3E**