

EuroACE Position Paper Smart Buildings: *Energy Efficiency First!*

A **Smart Building** is a building where high energy efficiency, cost effectiveness and performance are assured, meaning that the right materials and equipment are specified, installed and maintained to deliver the highest possible intrinsic energy performance coupled with high indoor comfort and well-being. This builds on the definition of an nZEB (nearly-zero energy building) in the EPBD**.

A **Smart Building** has a functional, comfortable and healthy indoor environment and its very low energy demand allows for a wide choice of cost-effective, renewable energy sources to be used to fulfil that demand. A **Smart Building** optimises energy flows and energy usage patterns, through the integration of its design, materials and technical systems.

A **Smart Building** is also connected through the grid to its district. Thus, being fully integrated into the wider energy system, a **Smart Building** can, through demand response and energy storage, ensure increased flexibility and deliver better value to owners and occupants.

A **Smart Building**, with its advanced and connected technologies, empowers its owner or occupant to take informed decisions about energy use throughout the lifetime of the building through the provision of reliable, protected, real-time data.

*** EPBD Article 2(2) defines nZEB as a building that has a very high energy performance, as determined in accordance with Annex I. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable energy sources, including energy from renewable sources produced on-site or nearby.*

Buildings are a crucial part of the EU energy system

The Energy Union framework, adopted in February 2015, sets out the big lines for a competitive, sustainable and secure EU energy system. Its five interconnected dimensions¹ are a challenge to all levels of governance in the EU, but its implementation is a necessary step and an opportunity for the EU to reach its 2030 targets and long-term 2050 goals. Within this context, our buildings must be taken into account as they are a crucial part of the solution towards a decarbonised, competitive and sustainable economy by 2050. Strong, urgent action must be considered because, in addition to using about 40% of all energy produced in the EU, our buildings are central to the well-being and health of all occupants and users as we spend about 90% of our time inside buildings.

Smart buildings shall first be highly energy efficient so as to play their role in the future, decarbonised EU energy system

Implementation of the Energy Union framework will lead to a complete transformation of the energy system, bringing with it many positive outcomes, especially for job creation, GDP growth and improvements to energy security. Central to this transformation will be energy efficient buildings, which will play an active role in the energy system.

This means that buildings, whether new or undergoing renovation, must be made as energy efficient as possible, reducing their energy demand and decreasing the time needed to heat or cool them, thus making them comfortable, healthy and responsive to a changed energy system. Integrating intelligent and well-performing automation and control systems that manage energy flows and usage patterns offers the opportunity to integrate all of the buildings technical systems, further boosting overall efficiency and system stability.

¹ The five dimensions are (1) Energy security, solidarity and trust; (2) A fully-integrated internal energy market; (3) Energy efficiency as a contribution to the moderation of energy demand; (4) Decarbonisation of the economy and (5) An Energy Union for Research, Innovation and Competitiveness.

A highly energy efficient building is the starting point for a decarbonised building stock, which will be an essential cornerstone for a decarbonised energy system. It is fundamental to the emergence of smart districts and cities, and a pre-requisite for smart development in the EU. As **Smart Buildings** keep warm and comfortable for longer with less energy input, they can play a more active role in demand response, in load shifting and in energy storage as outlined below. In short, the starting point for **Smart Buildings** is to take account of energy performance and efficiency whilst delivering increased indoor comfort and well-being. *A fortiori*, 'smartness' aspects deliver more in buildings that are highly energy efficient.



Smart buildings are enablers of demand response, energy generation and energy storage

With the emergence of a greater level of de-centralised, de-carbonised energy production in the EU, increased use of building automation, controls and energy management systems, the installation of smart meters and the incorporation of smart chips in appliances and equipment, buildings will occupy a central position in the overall energy system.



As a result, buildings are increasingly contributing to demand response by permitting automatic deferral of demand, thus helping to manage energy. A **Smart Building** is a building where all systems are connected and where contractors of different technologies work together to achieve overall, improved energy performance, avoiding data silos. This enables citizens and businesses to be more flexible in their energy consumption patterns.

Moreover, through the judicious use of renewable energy sources at building level, **Smart Buildings** can produce energy and, by virtue of the incorporation of energy storage,² buildings can become grid stabilisation resources, absorbing excess production for later use - a factor that will have a greater impact on the energy system in the future. In short, **Smart Buildings** can be energy consumers, energy producers and energy managers and thus play a crucial role in the future of the energy system. In fact, they must be made to play this new role so that the EU can prosper in a de-carbonised future.

Smart buildings must enjoy full interconnectivity within the energy system

Once a building has been brought to its optimum level of energy performance and energy efficiency, it can be connected through smart grids to its neighbourhood and to service providers. Buildings are already integrated elements of the energy system, but through optimised, full interconnectivity they can play their full role in ensuring a stable, competitive, sustainable, resilient and secure energy system in the EU.³

An energy efficient building stock enables the energy system, notably electricity and heat supply, to be more flexible in case of peak loads⁴. This is thanks to the ability of **Smart Buildings** to shift

DID YOU KNOW?

In France, in the winter 2016-2017, there were some risks of power shortages on the electricity system because of peak loads. A more efficient building stock would avoid the need to resort to expensive solutions such as electricity imports, where 1 MWh costs almost €200 this year (normal price between €25-70).

See more information at
<http://bit.ly/2iDDnCb>

² This can be achieved, for example, through heat stores, batteries, phase change materials, etc.

³ For more information on the EuroACE Position on Energy Efficiency in Buildings as Investing in our Infrastructure, visit:
http://euroace.org/wp-content/uploads/2016/12/2016_11_03-EE-Investment-as-Infrastructure-Investment-V5.pdf

⁴ According to a study by ECOFYS (2015), an energy efficient building stock can reduce electricity demand and peak loads by 57 GW by 2050, which corresponds to savings of €89-153 billion. See more information at <http://bit.ly/1LYiaaX>

heat operations over time while maintaining thermal comfort for occupants, even when the heating system is turned off. This offers new flexibility to the energy system. Increased flexibility adds to grid stability, as it helps the energy system provider (grid operator) to ease the stress on the grid at times of peak loads or over-capacities.

A **Smart Building** also makes extensive use of available information about the operation of the building⁵ and its environment, including computerised optimisation of its systems during the hours of occupation. Thus the performance of the building and its technical building systems can be controlled and monitored in a way that is easy, informative and empowering to the owner or occupant. This means that the right, informed decision on the long-term operation and performance of the building can be taken on the basis of real data. It also opens the possibility for consumption patterns to be collected and used for the management of the building and for informing future maintenance and renovation strategies at building level. In fact, connected and interactive smart technologies add to increased comfort and reduced energy bills and allow for the adaptation of energy use to individual usage and occupation patterns.

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For further information:

Adrian Joyce
EuroACE Secretary General
+32 2 639 10 10
adrian.Joyce@euroace.org
www.euroace.org

About EuroACE

EuroACE represents Europe's leading companies involved with the manufacture, distribution and installation of energy saving products, goods and services for buildings. EuroACE members employ over 280,000 people in these activities in Europe, and have around 900 production and office facilities in the EU. The mission of EuroACE is to work together with the EU institutions to help the EU to move towards a more efficient use of energy in buildings, thereby contributing to Europe's commitments on climate change, energy security and economic growth.

EuroACE Members (February 2017):



⁵ It is here that the proposal of the European Commission to require a *smartness indicator* for buildings come in. EuroACE supports the idea and is working on a narrative that will consider how to make the concept workable