Smart-e buildings GLOSSARY

Smart energy building[1]:

A building that has optimized cost-efficient solutions to reduce heating, cooling and electricity demand as well as maximizing the use of renewable energy sources on-site to cover the remaining energy needs.

Energy performance of a building[2]

Means the calculated or measured amount of energy needed to meet the energy demand associated with a typical use of the building, which includes inter alia, energy used for heating, cooling, ventilation, hot water and lighting

Passive house:

The *Passivhaus* standard was developed for heating load dominated climates of Central and Northern Europe and indeed most existing Passive Houses are in Austria, Germany, northern France, Sweden and Switzerland[3].

The term "Passive House" is not defined by a legally binding norm, but there is a definition by the Passivhaus Institute Darmstadt, which is accepted by a large part of the scientific community and the main stakeholders in the "scene". Passive houses reduce annual demand for space heating to 15kWh/m^2.y which means that they roughly use 85% less overall energy with the limit for total primary energy use being 120kWh/m^2.y

- Max. 15 kWh/m2.a heating demand
- Max. 42 kWh/m2.a final energy demand (includes heating, cooling, hot water and electricity on the household)
- Max. 120 kWh/m².a primary energy demand (considers the amount of energy, which is need to produce the final energy. E.g. to produce 1 kWh electricity in Europe (EU-15 average) about 2.7 kWh of primary energy is necessary in the power plants)

[1] Definition by the project consortium Smart-e buildings, EREC (European Renewable Energy Council), ADEME (French Environment and Energy Management Agency) Euro ACE (European Allicance of Companies for Energy Efficiency in Buildings), CEETB (European Energy Efficiency Installers Committee for the Construction Industry), FEDARENE (European Federation of Regional Energy and Environment Agencies), Energy-Cities (Association of European local authorities inventing their energy future), Climate Allicance (Association of European local authorities committed to climate protection), Eclareon, Ketchum Pleon)

[2] Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (recast), http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:153:0013:0035:EN:PDF

[3] Low energy buildings in Europe : current state of play, definitions and best practice, Brussels, 25 September 2009, http://ec.europa.eu/energy/efficiency/doc/buildings/info_note.pdf, accessed on 13/10/2010

- The criteria of a max. Heat load of 10 W/m2 is not obligatory for a PH in general, it is only necessary if a PH should be heated only by the ventilation system

The Passive-On project[4] has based a more general definition on the above mentioned standards and indicates that a passive house or equivalent requires combined heating and cooling demand between 15-20 kWh/m2.y. The Design Guidelines developed within the Passive-On Project indicate how the design solutions of the Passivhaus standard can be successfully adopted to the requirements of warmer southern Europe.

Zero energy building[5]

The specificity of a zero energy building is that the remaining energy needs are entirely covered by renewable sources. A building with zero net energy consumption annually can be autonomous from the energy grid supply, but in practice that means that in some periods power is gained from the grid and in other periods power is returned to grid (renewable energy sources are often seasonal). In the US, various definitions of zero energy buildings are used.[6]

Zero net primary energy building[7]

A zero net primary energy building means a building in which the overall annual primary energy consumption equals its on-site energy production from renewable energy sources.

Primary energy[8]

Means energy from renewable and non-renewable sources which has not undergone any conversion or transformation process

'Nearly zero-energy' buildings[9]

A 'nearly zero-energy building' means a building that has a very high energy performance, as determined in accordance with Annex I of the EPBD Recast[10]. The nearly zero or very low

[4] http://www.passive-on.org/en/index.php

[5] Low energy buildings in Europe : current state of play, definitions and best practice, Brussels, 25 september 2009, http://ec.europa.eu/energy/efficiency/doc/buildings/info_note.pdf, accessed on 13/10/2010

[6] For more information on net zero site energy (site ZEB) – net zero source energy buildings (source ZEB) – net zero energy costs (cost ZEB) – net zero energy emissions: "Zero energy buildings: A critical look at the definition", National Renewable Energy Laboratory, P.Torcellini, S.Pless, M.Deru and U.S. Department of Energy, D.Crawley. To be found on: www.nrel.gov/docs/fy06osti/39833.pdf

[7] Amendment to the EPBD Recast proposed by the European Parliament, 2010

[8 - 9] "Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (recast)", http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:153:0013:0035:EN:PDF

[10] "Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (recast)", ANNEX I Common general framework for the calculation of energy performance of buildings (referred to in Article 3 – Adoption of a methodology for calculating the energy performance of buildings**),** http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:153:0013:0035:EN:PDF

amount of energy required is covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby

Energy positive house

An energy positive house (also: plus energy house) is a house that on average over the year produces more energy from its combined efficiency actions and renewable energy sources than it consumes.

Major renovation[11]*:*

means the renovation of a building where:

(a) the total cost of the renovation relating to the building envelope or the technical building systems is higher than 25 % of the value of the building, excluding the value of the land upon which the building is situated; or

(b) more than 25 % of the surface of the building envelope undergoes renovation;

From the EPBD, Member States may choose to apply option (a) or (b).

Cost-optimal levels

- As defined by the EPBD Recast:

'cost-optimal level'[12] means the energy performance level which leads to the lowest cost during the estimated economic lifecycle, where:

(a) the lowest cost is determined taking into account energy-related investment costs, maintenance and operating costs (including energy costs and savings, the category of building concerned, earnings from energy produced), where applicable, and disposal costs, where applicable; andEN L 153/18 Official Journal of the European Union 18.6.2010

(b) the estimated economic lifecycle is determined by each Member State. It refers to the remaining estimated economic lifecycle of a building where energy performance requirements are set for the building as a whole, or to the estimated economic lifecycle of a building element where energy performance requirements are set for building elements.

The cost-optimal level shall lie within the range of performance levels where the cost benefit analysis calculated over the estimated economic lifecycle is positive

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[11] "Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (recast)", http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:153:0013:0035:EN:PDF

[12] "Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (recast)", http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:153:0013:0035:EN:PDF

- Or Short definition:

The directive defines 'cost-optimal levels' as the energy performance level which leads to the lowest cost during the life cycle of the building. It takes into account energy-related investment costs, maintenance and operating costs and disposal costs. It is up to the Member State to include the embodied carbon in materials and equipments in the buildings.

Deep energy renovation[13]

A renovation of a building at a deep level with a minimum standard of nearly zero energy, that has optimized cost-efficient solutions to reduce heating, cooling and electricity demand as well as maximizing the use of renewable energy sources on-site to cover the remaining energy needs.

LCA[14]

Life Cycle Assessment (LCA) is a technique for assessing the environmental aspects and potential impacts throughout a product's life – from raw material acquisition through production, use and disposal. The LCA method entails compiling an inventory of relevant inputs and outputs for a clearly defined system; and then evaluating the potential environmental impacts associated with those inputs and outputs. Results are interpreted in the context of the study objectives.

Trias energetic

The Trias Energetica applied to the building means that the energy demand is first minimised, renewable energy sources and cogeneration are introduced, and, if still applicable, the use of fossil fuels is done as efficiently as possible.

[13] European Smart Energy Buildings Campaign, « Forging a Common Industrial Position on Smart Energy Buildings, Smart-e buildings project consortium, 2010

[14] "Life Cycle Assessment methods for buildings, Annex31, Energy-related environmental impact of buildings», IEA, Energy Conservation in Buildings and Community Systems Programme, Annex 31, 2001 (final revisions 2004)

DIRECTIVE 2010/31/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 19 May 2010

on the energy performance of buildings

(recast)

ANNEX I

Common general framework for the calculation of energy performance of buildings

(referred to in Article 3)

1. The energy performance of a building shall be determined on the basis of the calculated or actual annual energy that is consumed in order to meet the different needs associated with its typical use and shall reflect the heating energy needs and cooling energy needs (energy needed to avoid overheating) to maintain the envisaged temperature conditions of the building, and domestic hot water needs.

2. The energy performance of a building shall be expressed in a transparent manner and shall include an energy performance indicator and a numeric indicator of primary energy use, based on primary energy factors per energy carrier, which may be based on national or regional annual weighted averages or a specific value for on- site production.

The methodology for calculating the energy performance of buildings should take into account European standards and shall be consistent with relevant Union legislation, including Directive 2009/28/EC.

3. The methodology shall be laid down taking into consideration at least the following aspects:

(a) the following actual thermal characteristics of the building including its internal partitions:

(i) thermal capacity;

(ii) insulation;

(iii) passive heating;

(iv) cooling elements; and

(v) thermal bridges;

(b) heating installation and hot water supply, including their insulation characteristics;

(c) air-conditioning installations;

(d) natural and mechanical ventilation which may include air-tightness;

(e) built-in lighting installation (mainly in the non-residential sector);

(f) the design, positioning and orientation of the building, including outdoor climate;

(g) passive solar systems and solar protection;

(h) indoor climatic conditions, including the designed indoor climate;

(i) internal loads.

4. The positive influence of the following aspects shall, where relevant in the calculation, be taken into account:

(a) local solar exposure conditions, active solar systems and other heating and electricity systems based on energy from renewable sources;

(b) electricity produced by cogeneration;

(c) district or block heating and cooling systems;

(d) natural lighting.EN 18.6.2010 Official Journal of the European Union L 153/29

5. For the purpose of the calculation buildings should be adequately classified into the following categories:

(a) single-family houses of different types;

(b) apartment blocks;

(c) offices;

(d) educational buildings;

(e) hospitals;

(f) hotels and restaurants;

(g) sports facilities;

(h) wholesale and retail trade services buildings;
(i) other types of energy-consuming buildings.