

National plan for increasing the number of nearly zero- energy buildings in Belgium



National plan for increasing the number of nearly zero-energy buildings in Belgium

By: **Sven Schimschar, Michelle Bosquet, Nesen Surmeli, Andreas Hermelink**

Date: **15 May 2013**

Project number: **BUIDE13616**

© Ecofys 2013 by order of: European Commission

Table of contents

1	Starting point	4
2	Application of the definition of nearly zero-energy buildings	6
3	Intermediate targets for improving the energy performance of new buildings in order to ensure that by 31 December 2020 all new buildings are nearly zero-energy buildings	9
4	Intermediate targets for improving the energy performance of new buildings in order to ensure that by 31 December 2018, new buildings occupied and owned by public authorities are nearly zero-energy buildings	12
5	Policies and measures for the promotion of all new buildings being nearly zero-energy buildings after 31 December 2020	13
6	Policies and measures for the promotion of all new buildings occupied and owned by public authorities being nearly zero-energy buildings after 31 December 2018	19
7	Policies and measures for the promotion of existing buildings undergoing major renovation being transformed to nearly zero-energy buildings	21
8	Additional Information	23
9	Possible improvements	24
	Annex- Definition of nZEB	27

1 Starting point

Please give a short overview of your national building stock. Describe the most important characteristics and emerging needs. Additionally, illustrate the chronological development of national requirements on the energy performance of buildings (for an example, see guidance document)

Various constitutional reforms have made Belgium a federal State, as a result of which competences have been distributed among the Federal State and the 3 Regions (Flanders, Wallonia and Brussels-Capital).

The Nearly Zero Energy Buildings policy falls mainly within the competence of the Regions.

The Federal State implements some additional measures aimed at realizing nearly zero energy buildings within its competences.

- **Inventory of Brussels-capital residential housing stock**

Between 1980 and 2003, the total built-up area increased by 13%, while the non-built-up area decreased by 17%. The surface area covered by office buildings increased by 122% (Source: IBGE, Etat de l'environnement). The total number of homes (occupied and unoccupied) located in the Brussels-Capital Region on 1st January 2009 was 544 601 units, an increase of almost 11 % compared with 1991 (+55 862 homes), but a slight drop (-0.1 %) compared with 1st January 2008 (-707 homes). In 1999, approximately 93% of the total housing stock was occupied. Out of these 545 000 homes, only 44 000 were built after 1990, i.e. 8 %. The housing is mainly comprised of blocks of flats (56%).

- **Inventory of Walloon residential housing stock**

It is a well-known fact that Belgium's housing stock is one of the oldest in Europe. And within Belgium itself, homes in Wallonia are the oldest (over 50% of homes date back to before 1945, 75% before 1980 and only 12% after 1990). Wallonia's housing stock is characterised by

- a high level of historical peri-urbanisation, added to which over the past few decades has seen a tendency towards urban sprawl (known as "rurbanisation", i.e. the urbanisation of former farming areas);
- a relatively high level (approximately 6%) of unoccupied dwellings;
- a very low level of building renewal (the replacement and renovation rates are each a little under 1% per year; (approximately 10,000 permits for each).
- extremely variable typology and condition of dwellings in Wallonia, depending on the borough, with greater density and less good condition along the ridge of the region, mainly in municipalities where the historical industrial centres are located. To the north of this ridge, as well as in the Cantons of the East, although density remains high, the buildings are more recent and of better quality. To the south of the ridge, dwellings are more dispersed.

According to ACED statistics, Wallonia has some 1 570 000 dwellings. Over 80% of these are individual houses (with more than one-third of them detached), 12% are apartment buildings and the remainder are buildings used for services and other activities. In recent years, the number of apartments has tended to develop more quickly than individual houses. The tightening of requirements in the regulations relating to the Energy Performance of Buildings as part of the transposition of the EPB Directive has brought with it a significant improvement in the level of new buildings. But in view of the low renewal rate, it is in terms of old buildings where the potential for improvement lies.

- **The policies undertaken Brussels-capital**

It has been seen that the sector that accounts for the greatest part of this final consumption is the building sector (74% of the total, mainly for heating). Therefore since 2004, the Brussels energy policy was developed mainly around this building sector. Thanks to the numerous initiatives of the Brussels-Capital Region (energy subsidies, strengthening of the regional regulations on energy performance of buildings, etc.), the final energy consumption per inhabitant decreased by 18% between 2004 and 2010.

Based on this results, the Brussels-Capital Region has paved the way for greater restraint in energy use without compromising its economic viability, while at the same time granting special attention to the most disadvantaged sectors of the Brussels population. This energy policy is furthermore coordinated with the global regional economic development. It is indeed one of the thematic plans of the Regional Sustainable Development Plan, currently being elaborated. This latest plan defines the general policy orientations for the legislative session underway (2009-2014) and announces the transition from separate initiatives to a new sustainable city project.

- **The policies undertaken Walloon**

Achieving a sharp reduction in the energy consumption of buildings has been one of the main policies pursued by the Walloon Government for many years. Approved just recently, the First Employment-Environment Alliance (EEA) of the "Plan Marshall 2.Vert", (part of section 5 of the plan, as well as part of its horizontal dynamic to promote sustainable development in all government policies), is based on the principle of making an improvement in the quality of the environment a source of economic opportunities and job creation. The EEA focuses specifically on the construction sector, with the overall aim of improving the quality of buildings in Wallonia and the enhanced energy performance that goes with it, while at the same time guiding the

construction sector towards taking a more sustainable approach and boosting its level of employment. To achieve that aim, the EEA includes a series of measures that act simultaneously on:

- stimulating demand for building renovation and sustainable construction, for both private and public buildings,
- strengthening the sector's capabilities in offering sustainable construction and renovation.

- **Specificities Energy Policy Flemish Region**

The coalition agreement states: We will gradually tighten regulations for the energy performance of buildings. Considerations will include the investment costs and the resulting savings in energy. If the on-going research demonstrates the feasibility of attaining the E60 level, we will make the E60 level a requirement by 2012 for all new homes built.

The Pact 2020 states: By 2020, all new home construction will meet the top energy performance standard.'

An E-level requirement has applied to both new homes and new offices/schools since January 2006. This requirement was tightened from E100 to E80 for all homes for which a building permit was applied in January 2010 or later. Beginning January 2012, the maximum E-level requirement of E70 applies to homes, offices and schools. For permit applications which are made on or after 1 January 2014, this requirement will be tightened to E60 (resolution of the Government of Flanders of 20 May 2011). The insulation level of Flemish new home constructions has improved considerably since the implementation of energy performance regulations.

The number of new and renovated buildings is minimal compared to the volume of existing buildings, but they will determine the long-term energy performance of the building stock to a great extent. Buildings in Belgium have a long life span (30 years until the first major renovation; the overall life span can reach as much as 100 years).

2 Application of the definition of nearly zero-energy buildings

Please indicate how a nearly zero-energy building is defined within national context and explain underlying assumptions and factors that provide the rationale for the chosen definition.

For reporting the detailed application in practice of the definition of nearly zero-energy buildings, the table presented in the Annex is to be used.

If a national definition of nearly zero-energy buildings does not exist yet in your country, please indicate here whether precise plans are already under development and if so, please describe these plans. Please also describe if any currently used non-governmental definitions will be considered in these plans and/or a future directive.

- **Definition NZEB Brussels-Capital Region**

In the Brussels-Capital Region, the Brussels Air, Climate and Energy Code (COBRACE) that will make the nearly zero energy buildings (NZEB) obligatory by 2021 (by 2019 for public buildings) passed second reading in July 2012 and is scheduled to come into force by the beginning of 2013.

The definition written in the COBRACE uses the definition given by the Recast of the Energy Performance of Buildings Directive (2010/31/EU) i.e. "nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby". The results of the study "Cost Optimum" that will be launched by the end of 2012 will be used to make this definition more specific.

However, from 1st January 2015 onwards, all new buildings (housing, office or service buildings or schools) will have to be up to the Passive House standard that is to say the level of "nearly zero or very low energy consumption reached thanks to high energy performance" (NZEB definition). Its definition is the following (Government Decree of 5th May 2011 that passed first reading on 19th July 2012).

- Individual Housing EPB units
 - a primary energy consumption for heating, domestic hot water and electrical appliances below 45 kWh per m² per year;
 - a net heating need below 15 kWh per m² per year;
 - an overheating temperature that can only exceed 25°C for 5% of the time throughout the year;
 - by 2018, airtightness at 50 Pa below 0.6 per hour.

The calculation method of primary energy already includes the input of renewable energy sources like solar energy (thermal and photovoltaic), biomass heating, geothermal heating and heat pump systems as well as passive cooling techniques.

- Offices and Services EPB units and Educational EPB units

As for Offices and Services EPB units and Educational EPB units, the Decree provides for:

- a total primary energy consumption below $(95 - 2.5 \cdot C)$ kWh per m² per year, with C defined as the compactness, that is, the ratio between the volume enclosed and the loss area (maximum C is 4);
- a net heating need below 15 kWh per m² per year;
- a net cooling need below 15 kWh per m² per year;
- an overheating temperature that can only exceed 25°C for 5% of the utilisation period;
- by 2018, airtightness at 50 Pa below 0.6 renewals per hour.

A derogation can be granted on the same conditions as those applied for housing.

The calculation method of primary energy includes the input of the same renewable energy sources as described for housing.

- **Definition NZEB Walloon Region**

Tenders for a public service contract were called for by the Walloon Region at the end of 2011 to conduct a study (Co-ZEB Study) aimed at, in line with articles 4, 5 and 9 of the Directive on the Energy Performance of Buildings 2010/31/EU:

- determining requirements relative to nearly zero energy buildings;
- determining the optimum level of energy performance in relation to costs.

The contract was awarded to the association of the University of Mons (Energy Centre), The University of Liège (EnergySuD) and the study bureau, 3E. At the present time, only the first task of the study has been completed. As the second task in the study, aimed at determining the reference level in kWh/m² per year, was not able to be completed, this reference will be set based on the other results available from the study.

Research work has been conducted previously by the contract association on the status of works relative to defining "nearly zero energy building" in the various Member States. A document recording this research and presenting the various options possible for the Walloon Region has been presented.

The Co-ZEB study qualifies any NZEB by a level of energy performance of the building's envelope close or equivalent to the passive standard. However, an NZEB does not necessarily have to comply with all of the criteria set by the passive standard given the highly constraining nature of these criteria for certain types of building and/or in certain locations (in particular the criterion governing the airtightness of the building envelope, which imposes a specific level of performance that is often difficult to achieve in construction terms). Quantification of the level of performance is based on development zones and the type of buildings, as well as whether they are new or renovated. In addition to the energy performance level of the building envelope, part of the residual consumption of heat/cold and electricity may be covered by sources of production of renewable energies, with the whole characterising all NZEB.

The Co-ZEB study qualifies any NZEB by a level of energy performance of the building's envelope close or equivalent to the passive standard. However, an NZEB does not necessarily have to comply with all of the criteria set by the passive standard given the highly constraining nature of these criteria for certain types of building and/or in certain locations (in particular the criterion governing the airtightness of the building envelope, which imposes a specific level of performance that is often difficult to achieve in construction terms).

Quantification of the level of performance is based on development zones and the type of buildings, as well as whether they are new or renovated.

In addition to the energy performance level of the building envelope, part of the residual consumption of heat/cold and electricity may be covered by sources of production of renewable energies, with the whole characterising all NZEB.

This means that a Nearly Zero Energy Building is characterised at the design stage by energy performances that are close or equivalent to those of the passive standard in terms of the building envelope and by the renewable energy coverage of part of the consumption,

- **Definition NZEB Flemish Region**

The Energy Performance of Buildings Directive does not outline an unambiguous method for further specifying what constitutes an NZEB. Different articles from the Directive allow for different interpretations:

- Article 9 (Nearly zero-energy buildings) states that the only cases in which the general requirements (low energy demand with the balance to be compensated by renewable energy generation) do not have to be complied with are 'cases where the cost-benefit analysis over the economic lifecycle of the building in question is negative'. This provision can be interpreted as saying that no general system of exemption is possible and that only a system of case-by-case exceptions can be devised. The compatibility of this article with Article 4 needs to be reviewed.
- Article 4 (Establishment of minimum energy performance requirements) states that Member States are not required to set minimum requirements for energy performance which are not cost-efficient over the estimated economic lifecycle. This article actually states that it is not economically and technically prudent to impose regulatory requirements that the government must acknowledge are not cost-efficient.
- Article 5 (Calculation of cost-optimal levels of minimum energy performance requirements) stipulates that the Commission shall establish the methodology framework for calculating cost-optimal levels of minimum energy performance requirements by 30 June 2011. This methodology framework shall differentiate between new and existing buildings and between different categories of buildings. The cost of a nearly zero-energy scenario must also be calculated. However, there is still no European agreement on the methodology framework, a version of which was proposed by the European Commission in early 2012. According to this proposal, the cost-optimal level must be calculated from both a micro as well as macro perspective, though Member States do have the option to decide which of these perspectives will serve as the basis for setting energy performance requirements.
- Article 13 of the Renewable Energy Directive stipulates that, by 31 December 2014, minimum levels of energy from renewable sources be used in new buildings and existing buildings which are subject to extensive renovation.

Based on these articles, it is reasonable to assume that an NZEB must at minimum satisfy the cost-optimal level with a minimum level of renewable energy as regards energy performance requirements, and that Member States will be able to establish this cost-optimal level for the different types of buildings during the second half of 2012 at the earliest.

New constructions

According to the 2008 'economic feasibility' study, the cost-optimal level for residential buildings in the Flemish Region was E55-E60. This cost-optimal level was achieved without self-generated electricity (photovoltaic). This study will be updated in 2012, taking into account the methodology framework that was provided by the European Commission in early 2012 but for which there is still no European agreement. The contract for updating this study will begin in May 2012 and will last for 8 months. It is also being expanded to cover nonresidential buildings. In order to establish the minimum level of renewable energy, a proposal has been presented to the Government of Flanders for integrating the EPB method. **Since the study on the cost-optimal levels is still running, a detailed definition for NZEB and the intermediate targets will be added later on as an addendum.**

Existing buildings

The greatest potential for energy savings lies in existing buildings. The Energy Performance of Buildings Directive requires Member States to take measures to increase the number of NZE buildings. No provision has been made for a requirement for renovating existing buildings to the NZE level. The policy decision can therefore consist of interpreting the NZE concept in such a way that guarantees that as much energy-saving potential as possible is achieved combined with the generation of energy from renewable sources. The most appropriate option seems to be to base the definition on the index number of the EPC.

3 Intermediate targets for improving the energy performance of new buildings in order to ensure that by 31 December 2020 all new buildings are nearly zero-energy buildings

Please report the 2015 targets ensuring that by 31 December 2020 all new buildings are nearly zero-energy buildings. Also explain how they relate to and help to ensure that all new buildings are nearly zero-energy buildings by 31 December 2020.

What are the qualitative and quantitative 2015 targets for all new buildings?

3.1.1 Qualitative 2015 targets: Interim energy related requirements for new residential and non-residential buildings

Requirements on fraction of renewable energies: N/A

Requirements on useful energy demand: N/A

Requirements on primary energy demand: N/A (45 kWh per m² per year)

3.1.2 Quantitative 2015 targets: Share of nZEB according to official nZEB definition on all newly constructed buildings (define reference parameter e.g. number of buildings, floor area, volume etc.):

Brussels-Capital Region

However, from 1st January 2015 onwards, all new buildings (housing, office or service buildings or schools) will have to be up to the Passive House standard that is to say the level of "nearly zero or very low energy consumption reached thanks to high energy performance" (NZEB definition). Its definition is the following (Government Decree of 5th May 2011 that passed first reading on 19th July 2012).

Miscellaneous:

Brussels-Capital Region

- Individual Housing EPB units
 - a primary energy consumption for heating, domestic hot water and electrical appliances below 45 kWh per m² per year;
 - a net heating need below 15 kWh per m² per year;
 - an overheating temperature that can only exceed 25°C for 5% of the time throughout the year;
 - by 2018, airtightness at 50 Pa below 0.6 per hour.

A derogation can be granted in case of housing to be built in an unfavourable location (that is to say an overshadowed or badly oriented location, weak compactness, etc.). It has to be up to a new energy need calculated using default parameters for insulation efficiency (0.12 W/m².K for opaque walls and 0.85 W/m².K for windows and doors), airtightness (1 volume per hour in 2015 to 0.6 volume per hour in 2018), and the efficiency of the ventilation system (75%).

The calculation method of primary energy already includes the input of renewable energy sources like solar energy (thermal and photovoltaic), biomass heating, geothermal heating and heat pump systems as well as passive cooling techniques.

- Offices and Services EPB units and Educational EPB units

As for Offices and Services EPB units and Educational EPB units, the Decree provides for:

- a total primary energy consumption below (95-2.5°C) kWh per m² per year, with C defined as the compactness, that is, the ratio between the volume enclosed and the loss area (maximum C is 4);
- a net heating need below 15 kWh per m² per year;
- a net cooling need below 15 kWh per m² per year;
- an overheating temperature that can only exceed 25°C for 5% of the utilisation period;

- by 2018, airtightness at 50 Pa below 0.6 renewals per hour.
- A derogation can be granted on the same conditions as those applied for housing.

Walloon Region:

- The targets set in the Regional Policy Statement (RPS) and included in the EEA:

“With regard to new buildings, all construction will comply with the ‘very low energy’ standard from 2014 onwards. Construction will also comply with the ‘passive’ standard or equivalent from 2017. From 2019 onwards, all new buildings – in addition to the passive standard – will be required to comply as a minimum with the ‘net zero’ standard and tend towards positive-energy buildings (i.e. buildings where the production of renewable energy is equal to or greater than the consumption of non-renewable primary energy on an annual basis). (...) In order to set an example, from 2012 onwards the Walloon Region will apply these standards for all public buildings, as well as for granting subsidies, making donations or any other form of aid for property investments that the Region grants to other public or associated bodies.” In the spirit of the RPS, any new building will tend towards the ‘very low energy’ standard from 2014 onwards, while complying as a minimum with requirements $E_w \leq 60$ and $K \leq 35$.
- On 1st January 2014, in order to set an example:
 - level Ew60 will be used as the benchmark in funding decrees and specifications:
 - for public buildings (office and services buildings and buildings intended for education)
 - for public housing (single-family homes and apartment buildings) from the 2012 -2013 programme
 - level K35 will be used as the benchmark in specifications and funding decrees for all types of public buildings, i.e. residential buildings, including collective accommodation buildings, office and services buildings and buildings intended for education, as well as all other non-residential buildings, such as hospitals, retail, hospitality, sports infrastructure, etc. (with the exception of industrial buildings and exceptions provided for under CWATUPE regulations).
- The energy requirements provided in the RPS, from 1st January 2015 for large-scale renovation works, are to comply with “very low energy” requirements. As a reminder, large-scale renovation works, according to the government decree dated 17th April 2008, apply to buildings subject to approval, where the total usable floor area is greater than 1000 m², that are the subject of major renovation works, i.e.: - either if it involves works encompassing at least one-quarter of the building envelope; - or if the total cost of the renovation works relating to the envelope of the building or to its energy systems is greater than twenty-five per cent of the value of the building; the value of the building does not include the value of the land on which the building is situated.

Flemish Region:

- E-level

For residential and office buildings, the E70 level requirement is still higher than the economic optimum. To be able to implement an E-level of E60 on a large scale, building practices and the equipment that is used need to be adapted. On 20 May 2011, the Government of Flanders gave final approval to the proposal to tighten the E-level requirement for residential, office and school buildings to E70 in 2012 and E60 in 2014.
- K-level, U- and R-values

For buildings subject to EPB regulations, the maximum required U-values and the minimum required R-values for all types of building envelope sections will be tightened to levels approximating those of neighbouring countries - levels which correspond closely to the cost-optimal values. Beginning in 2012, the K-level requirement was tightened to K40.
- Net energy demand

In order to achieve a good building envelope and to limit transmission and ventilation loss, an additional criterion was enforced regarding the net energy demand for space heating. This is why the net energy demand for heating residential buildings was capped at 70 kWh/m² starting in 2012. This is an additional step aimed at reducing the energy demand of buildings.
- Minimum level renewable energy in buildings

In implementation of the European Directive on Renewable Energy, the Energy 2009-2014 policy memorandum proposes a study into how we will effectively introduce a required minimum level of energy from renewable sources, while focusing on the relationship between renewable energy generation in a building and that building’s E-level.

The VEA commissioned a study which sought to determine the most appropriate method for incorporating a requirement for a minimum share of renewable energy sources into the building regulations for new buildings.

This study focuses primarily on buildings for which the E-level must be calculated. In early 2012, a concrete proposal was presented to the Government of Flanders. Definitive approval is foreseen by the end of 2012, and it is foreseen that legislation will be in force for public new buildings and major renovations from January 2013. From January 2014 legislation will be in force for new residential buildings, offices and schools and major renovations.

For singular residential buildings are 6 possibilities foreseen:

- 1. Thermal solar energy systems
- 2. Photovoltaic solar energy systems
- 3. Biomass (boiler, stove or qualitative CHP)
- 4. Heat pumps
- 5. Connection with district heating or cooling
- 6. Participation in a RE project

For residential buildings with more than one housing units are the same 6 possibilities foreseen with the additional possibility ≥ 10 kWh renewable energy per m² total useful floor area (combination one or more systems).

The same regulation counts for schools and offices.

The possibility for combining leads to more possibilities in design. If not complied with the minimum RE requirements, the energy performance requirement (E-level) is set 10% more strict. The implementation is integrated in the existing E-level calculations for buildings, no new methods are required.

From your point of view, how close is your country at the moment in achieving this target? In case there is no target defined yet, please indicate when it is expected to have such a target.

4 Intermediate targets for improving the energy performance of new buildings in order to ensure that by 31 December 2018, new buildings occupied and owned by public authorities are nearly zero-energy buildings

Please report here the 2015 targets ensuring that by 31 December 2018 all new public buildings are nearly zero-energy buildings. Also explain how they relate to and help to achieve that by 31 December 2018, all new public buildings are nearly zero-energy buildings

What are the qualitative and quantitative 2015 targets for all new buildings occupied and owned by public authorities?

4.1.1 Qualitative 2015 targets: Interim energy related requirements for new public buildings

Requirements on fraction of renewable energies: N/A

Requirements on useful energy demand: N/A

Requirements on primary energy demand:

4.1.2 Quantitative 2015 targets: Share of public nZEB according to official nZEB definition on all newly constructed public buildings (define reference parameter e.g. number of buildings, floor area, volume etc.):

However, from 1st January 2015 onwards, all new buildings (housing, office or service buildings or schools) will have to be up to the Passive House standard that is to say the level of "nearly zero or very low energy consumption reached thanks to high energy performance" (NZEB definition). Its definition is the following (Government Decree of 5th May 2011 that passed first reading on 19th July 2012).

Miscellaneous:

Flemish Region

- Offices and Services EPB units and Educational EPB units
 - As for Offices and Services EPB units and Educational EPB units, the Decree provides for:
 - a total primary energy consumption below $(95-2.5 \cdot C)$ kWh per m² per year, with C defined as the compactness, that is, the ratio between the volume enclosed and the loss area (maximum C is 4);
 - a net heating need below 15 kWh per m² per year;
 - a net cooling need below 15 kWh per m² per year;
 - an overheating temperature that can only exceed 25°C for 5% of the utilisation period;
 - by 2018, airtightness at 50 Pa below 0.6 renewals per hour.

A derogation can be granted on the same conditions as those applied for housing.

From your point of view, how close is your country at the moment in achieving this target? In case there is no target defined yet, please indicate when it is expected to have such a target.

5 Policies and measures for the promotion of all new buildings being nearly zero-energy buildings after 31 December 2020

5.1 Residential buildings

5.1.1 Relevant regulations

Brussels-Capital Region

- Action 1 : As of 2015, apply PEB requirements comparable to the passive concept for all new constructions, and at the very low energy level for all major renovations

Walloon Region

- Action 1 : Regulations on the Energy Performance of Buildings ()

Flemish Region

- Action 19: defining and communicating the long-term trajectory of energy performance regulations
 - Establishing the timeline for tightening energy performance regulations for new buildings
 - Establishment of a two-track policy including long-term trajectory for trendsetters (shadow trajectory)
 - Required minimum level of renewable energy in housing
 - Communicating information on E-level long-term trajectory

5.1.2 Relevant economic incentives and financing instruments

Brussels-Capital Region

- Action 19 : Pursue and improve support for the investment "energy subsidies"
- Action 20 : Continuation and general implementation of the financial help "loan with a reduced rate"
- Action 21 : Pursuing and reinforcing aid for "green certificate" production
- Action 22 : Provide special guidance and financing for at-risk populations
- Action 23 : Improve support to the non-residential sectors via the financial incentive policy
- Action 24 : Encouraging the private sector (tertiary and industrial) to make the most of ESCO
- Action 17 : Support market development toward construction of buildings with nearly zero-energy consumption thanks to "Exemplary Buildings"

Walloon Region

- Action 6 : Energy Bonuses for private individuals ()
- Action 7 : 0% loan - Ecopack
- Action 8 : Subsidies for RUE investments in public buildings (RUEPB)
- Action 9 : Grant for Public Service Housing Companies
- Action 10: Green certificates for the production of electricity from renewable sources and from high-yield cogeneration, and the payment mechanism for transfer/supply to the power grid ()

Flemish Region

- Action 15: adjusting the conditions for incentives
- Action 16: linking support to an overall improvement in energy performance
- Action 17: recognition of energy performance by the financial sector

Action 18: third-party financing for extensive energy renovations

5.1.3 Energy performance certificates' use and layout in relation to nZEB standard

Brussels-Capital Region

- Action 2 : Continue implementation of the energy certificate for buildings built, rented or sold
- Action 18 : Award a "Sustainable Building" label and certificate

Walloon Region

- Action 5 : Quality labels/certification :
 - Passive building certification
 - Reference system for sustainable building

Flemish Region

5.1.4 Supervision (energy advice and audits)

Brussels-Capital Region

- Action 4 : Establish an efficient, high-quality system of energy audits
- Action 5 : Control energy management by large owners through establishment of Local Action Plans for

Energy Management ("PLAGEs")

- Action 6 : Implement mandatory energy audits during renewal of environmental permits²¹ for large buildings
- Action 37 : Monitoring thanks to the Brussels-Capital Region's energy balance
- Action 39 : Establish a collection of data on the quality of the building stock
- Action 40 : Monitor proper implementation of the regulatory and incentive actions and, if necessary, sanction

Walloon Region

- Action 14 : EAP energy audit
- Action 38 : Monitoring of EPB regulations + energy certification
- Action 39 : PAEE monitoring, monitoring of bonuses, etc.
- Action 40 : Monitoring the proper implementation of the EEA

Flemish Region

- Action 7: creation of a quality framework for the building sector
 - Developing a vision for an integrated quality framework in the building sector
 - Individual certification of installers
 - Energy efficiency & renewable energy quality label for companies

Promoting construction teams with an energy consultant

5.1.5 Information (tools)

Brussels-Capital Region

- Action 25 : Establish a technical, financial and administrative support service involving Rational Use of Energy (RUE) and eco-construction for households
- Action 26 : Communicate on and raise awareness of housing with nearly zero-energy consumption through actions and events on a Region-wide scale
- Action 27 : Supporting households to reduce energy consumption (use) in nearly zero-energy homes
- Action 38 : Every second year, publish a report on the sustainable management of the buildings of the Brussels public authorities

Walloon Region

- Action 15 : RUE information in public buildings
- Action 16 : Communication campaigns conducted by the Department of Energy and Sustainable Building in the context of EPB
- Action 17 : Energy Service Counters
- Action 18 : Single service counters
- Action 19 : Creation of the Sustainable Living Home

Flemish Region

- Action 8: 'NZE' trademark branding
- Action 9: establishment of knowledge platforms
- Action 10: awareness & information campaigns directed at trendsetters
- Action 12: advice for NZE projects
 - Advice for residential buildings
 - Advice for non-residential buildings
- Action 13: manual for NZE buildings

Action 14: manual for extensive energy renovations

5.1.6 Demonstration

Brussels-Capital Region

Walloon Region

- Action 11 : Project tenders "Exemplary Buildings Wallonia" ()
- Action 12 : Project tenders – large solar thermal systems
- Action 13 : Project tenders "Sustainable Home"
- Action 36 : Aid for energy research and development
 - - Calls for tenders for energy research projects ()
 - - Participation of research teams and design offices in certain International Energy Agency projects ()

Flemish Region

- Action 11: development of demonstration projects
 - Residential demonstration projects

Non-residential demonstration projects

5.1.7 Education and training

Brussels-Capital Region

- Action 30 : Guarantee the quality of the procedure via an accreditation and recognition system for sustainable building professionals
- Action 31 : Ensure an adequate training offering for professionals in sustainable building from design to implementation
- Action 32 : Employment-Environment Alliance: collaborate with the competent authorities to improve teaching in construction
- Action 33 : Develop and consolidate the technical reference and the tools available to professionals in sustainable building
- Action 35 : Finance applied research in the area of sustainable buildings, in particular with regard to the flexibility and adaptability of the buildings and the reuse of construction materials
- Action 36 : Allow the concrete application of research results in sustainable building

Walloon Region

- Action 21 : Organising EPB training courses ()
- Action 26 : Build Up Skills ()
- Action 30 : Teaching Tools and Practical Guides ()

Flemish Region

- Action 1: optimisation of research and development into innovation
- Action 2: conduct analysis of trendsetter target group
 - Supply-side trendsetters
 - Demand-side trendsetters
- Action 3: EPB framework for valorisation of innovative systems or technologies
- Action 4, promote airtightness and ventilation
 - Promoting the airtightness of the building envelope
 - Study of minimum airtightness requirements
 - Promoting the top-quality installation and optimal use of ventilation systems
- Action 6: knowledge enhancement in the building sector
 - Overview and roadmap of professional training in the building sector
 - From energy-conscious to NZE architect
 - Energy-conscious contractor
 - Specific info/training sessions for building professionals
 - Educating the real estate sector & property owner associations
 - Training builders
 - Training the builder of the future

Train the trainer

5.2 Non-residential buildings

5.2.1 Relevant regulations

Brussels-Capital Region

Walloon Region

Integrated with regulations on residential buildings (see 5.1.1)

Flemish Region

5.2.2 Relevant economic incentives and financing instruments

Brussels-Capital Region

Walloon Region

Integrated with regulations on residential buildings (see 5.1.2)

Flemish Region

5.2.3 Energy performance certificates' use and layout in relation to nZEB standard

Brussels-Capital Region

Walloon Region

Integrated with regulations on residential buildings (see 5.1.3)

Flemish Region

5.2.4 Supervision (energy advice and audits)

Brussels-Capital Region

Walloon Region

Integrated with regulations on residential buildings (see 5.1.4)

Flemish Region

5.2.5 Information (tools)

Brussels-Capital Region

- Action 28 : Develop a proactive support service for non-residential buildings
- Action 29 : Communicate on and raise awareness of non-residential buildings with nearly zero-energy consumption

Walloon Region

Integrated with regulations on residential buildings (see 5.1.5)

Flemish Region

5.2.6 Demonstration

Brussels-Capital Region

Walloon Region

Integrated with regulations on residential buildings (see 5.1.6)

Flemish Region

5.2.7 Education and training

Brussels-Capital Region

- Action 34 : Facilitate the creation of - or the transition toward - businesses active in sustainable construction and offer them support structures

Walloon Region

Integrated with regulations on residential buildings (see 5.1.7)

Flemish Region

5.3 From your point of view, how would you evaluate the current measures that are in force? Please also try to describe the existing gap between what is in force and what should be in force in order to ensure that after 31 December 2020, all new buildings are nearly zero-energy buildings. Are there precise measures planned for the future?

6 Policies and measures for the promotion of all new buildings occupied and owned by public authorities being nearly zero-energy buildings after 31 December 2018

6.1 All new buildings occupied and owned by public authorities

6.1.1 Relevant regulations

Brussels-Capital Region

- Action 10 : Continue implementation of strict energy performance requirements for public buildings

Walloon Region

Integrated with regulations on residential buildings (see 5.1.1)

Flemish Region

6.1.2 Relevant economic incentives and financing instruments

Brussels-Capital Region

- Action 13 : Establish an energy services company that acts in financing the third-party investor system for buildings of the municipalities and other regional authorities
- Action 14 : Revise the investment rationale for public housing ("SDRB", "SLRB", Housing Fund, etc.) by incorporating occupation cost rationales

Walloon Region

Integrated with regulations on residential buildings (see 5.1.2)

Flemish Region

6.1.3 Energy performance certificates' use and layout in relation to nZEB standard

Brussels-Capital Region

- Action 9 : Continue implementation of the energy certificate for public buildings
- Action 12 : Use the "Sustainable Building" quality labelling framework as a tool to promote sustainable construction and renovation of buildings of the public authorities

Walloon Region

Integrated with regulations on residential buildings (see 5.1.3)

Flemish Region

6.1.4 Supervision (energy advice and audits)

Brussels-Capital Region

- Action 11 : Control energy management of owning or occupying public authorities through establishment of Local Action Plans for Energy Management ("PLAGEs")

Walloon Region

Integrated with regulations on residential buildings (see 5.1.4)

Flemish Region

6.1.5 Information (tools)

Brussels-Capital Region

Walloon Region

Integrated with regulations on residential buildings (see 5.1.5)

Flemish Region

- Action 22: raising awareness among and providing information to governments
 - Awareness
 - Best practices
 - Knowledge development projects for government personnel (with technical responsibilities)

NZE tendering standard for public buildings

6.1.6 Demonstration

Brussels-Capital Region

- Action 15 : Integrating part of green energy production into the consumption of newly built public buildings
- Action 16 : Energy accounting service available to municipalities via "NRClick"

Walloon Region

Integrated with regulations on residential buildings (see 5.1.6)

Flemish Region

- Action 23: NZE public buildings
 - Local authorities
 - Building NZE buildings prior to 2019
 - Extensive energy renovations

Leasing of NZE buildings

6.1.7 Education and training

Brussels-Capital Region

Walloon Region

Integrated with regulations on residential buildings (see 5.1.7)

Flemish Region

6.2 From your point of view, how would you evaluate the current measures that are in force? Please also describe the existing gap between what is in force and what should be in force in order to ensure that after 31 December 2018, all new public buildings are nearly zero-energy buildings. Are there precise measures planned for the future?

7 Policies and measures for the promotion of existing buildings undergoing major renovation being transformed to nearly zero-energy buildings

7.1 Residential buildings
<p>7.1.1 Relevant regulations</p> <p>Walloon Region No NZEB obligations for major regulation foreseen, but cost-optimal additional measures.</p>
<p>7.1.2 Relevant economic incentives and financing instruments</p> <p>Walloon Region Integrated with regulations on residential buildings (see 5.1.2)</p>
<p>7.1.3 Energy performance certificates' use and layout in relation to nZEB standard</p> <p>Walloon Region Integrated with regulations on residential buildings (see 5.1.3)</p>
<p>7.1.4 Supervision (energy advice and audits)</p> <p>Walloon Region Integrated with regulations on residential buildings (see 5.1.4)</p>
<p>7.1.5 Information (tools)</p> <p>Walloon Region Integrated with regulations on residential buildings (see 5.1.5)</p>
<p>7.1.6 Demonstration</p> <p>Walloon Region Integrated with regulations on residential buildings (see 5.1.6)</p>
<p>7.1.7 Education and training</p> <p>Walloon Region Integrated with regulations on residential buildings (see 5.1.7)</p>
7.2 Non-residential buildings
<p>7.2.1 Relevant regulations</p> <p>Walloon Region: No NZEB obligations for major regulation foreseen, but cost-optimal additional measures.</p>
<p>7.2.2 Relevant economic incentives and financing instruments</p> <p>Walloon Region Integrated with regulations on residential buildings (see 5.1.2)</p>
<p>7.2.3 Energy performance certificates' use and layout in relation to nZEB standard</p> <p>Walloon Region Integrated with regulations on residential buildings (see 5.1.3)</p>
<p>7.2.4 Supervision (energy advice and audits)</p> <p>Walloon Region</p>

Integrated with regulations on residential buildings (see 5.1.4)

7.2.5 Information (tools)

Walloon Region

Integrated with regulations on residential buildings (see 5.1.5)

7.2.6 Demonstration

Walloon Region

Integrated with regulations on residential buildings (see 5.1.6)

7.2.7 Education and training

Walloon Region

Integrated with regulations on residential buildings (see 5.1.7)

7.3 From your point of view, how would you evaluate the current measures that are in force? Please also try to describe the existing gap between what is in force and what should be in force in order to stimulate the transformation of buildings that are refurbished into nZEB. Are there precise measures planned for the future?

8 Additional Information

Please fill in any additional information on actions taken to increase the number of nearly zero-energy buildings in your country.

9 Possible improvements

Where do you see most room for improvement in order to increase the number of nearly zero-energy buildings in your country? Please also try to give examples for appropriate measures.

Brussels-Capital Region

The construction sector is dominant in the Brussels-Capital Region: buildings are responsible for no less than 70% of energy consumption. This data is hardly surprising since we know that the built heritage covers a surface area of almost 64 million m². Furthermore, the buildings are extremely energy-guzzling because they were mainly built before 1970, at a time when the apparent abundance of low-cost energy made insulation measures redundant. The oil crisis seemingly didn't cause sufficient concern to encourage energy savings. In fact, energy consumption per inhabitant followed an upward trend of +12% between 1990 and 2004 owing to the lack of an ambitious policy in terms of energy efficiency in the Brussels-Capital Region. It was in 2004, just after the regional elections, that awareness and the desire to act took root in the Brussels- Capital Region.

At the same time, numerous mechanisms were set up to reduce the energy bill of Brussels' inhabitants (citizens, companies and public authorities). Considering the vast potential to reduce energy consumption, the political choice was to target the "consumption" component of the energy bill rather than the "unit price". A choice that proved to pay off: energy consumption per inhabitant fell by 18% between 2004 and 2010.

One of the Region's flagship projects – the "Exemplary Buildings" project call for the construction and renovation of buildings meeting high energy standards – saw the light of day in 2007. The extent of the Region's ambition was partially revealed: Brussels wanted to abandon its European position as last in class and catch up with the leaders in energy efficiency. This plan explains how such a huge step forward was possible; as much in construction and building renovation as in energy management within the building industry, as well as in terms of training, jobs and innovation.

The Region's ambitious policy is completely coherent with the requirement imposed through directive 2010/31 regarding the "nearly zero-energy buildings" standard for all new constructions, as of 31 December 2018 for public buildings and 31 December 2020 for all constructions. By imposing requirements comparable to the passive standard on all new buildings as of 2015, the Region will already meet the first part of the European definition of NZEB: a building with very high energy performance. According to the experience acquired in Brussels, the passive standard seems to be the ultimate limit in terms of insulation. Demanding more would not be "cost optimum". With the amount of energy required thus determined, it is then necessary to cover "the majority" of these needs with renewable energy produced on site or within the vicinity.

In organising its approach, the Region is developing, in parallel with its objectives, the expertise and resources necessary to respond to the many demands that such objectives will necessarily generate. In other terms, and to use a familiar terminology, the "sustainable building" supply and demand must be balanced. In order to explicitly reveal the way one responds to the other, this plan has been developed along two major themes: one devoted to demand, and one devoted to the market supply for buildings with nearly zero-energy consumption.

With regard to demand, the measures rely on various complementary aspects:

- regulation;
- the exemplary role of the public authorities;
- non-financial incentives: strong stimulus for construction and renovation of high-performance buildings;
- financial incentives;
- support and communication.

While regulations remain a significant instrument in the evolution of the building sector toward "sustainable building", a certain number of important steps have nevertheless already been taken, with, in particular, the adoption of a decree that imposes observance of "passive construction requirements" on new buildings from 2015. Independently of what is imposed on the public authorities, regulatory action nonetheless remains necessary with a view to, among other examples, removing the various hindrances and obstacles to activities that would allow the energy and environmental impact of buildings to be reduced. The leading role of the public authorities with regard to sustainable construction will be strengthened; they should in particular occupy very high-performance buildings.

Along with the regulatory framework, voluntary initiatives have contributed a great deal to the development of sustainable construction. These initiatives must be supported and promoted through various fundamental approaches:

- financial support for the projects and activities that participate in the objectives pursued by the Region with regard to very high energy efficiency, as well as easier access to assistance;
- raising the awareness of the public, and if necessary supporting them in activities they propose with a view to improving the energy performance of a property or rationalising energy use.

As for the supply, it should be ensured through support, guidance and development of the economic sectors providing employment, including those related to sustainable construction. This principle is concretely expressed in particular through the Employment-Environment Alliance and its "sustainable construction" sectorial focus. This is based on two imperatives:

- businesses in the building sector must be able to fulfil this demand for high energy and environmental performance;
- workers, especially those who are unskilled, and the unemployed must have access to the new skills required by implementation of sustainable construction.

These objectives are apparent in the proposed measures. They centre around the following aspects:

- regulations;
- training;
- the guarantee of quality;
- support for business development in sustainable construction;
- innovation.

The regulatory aspect thus emphasises the guarantees of professionalism that must be fulfilled by those involved in sustainable construction, guarantees embodied in accreditation or official recognition.

Along with such requirements, the various professionals must of course have access to complete and relevant training, ensuring in this way that unskilled workers acquire new skills.

In an even more fundamental way, the construction sector should be helped to evolve toward sustainable construction. On the one hand, the boom in businesses active in this area and of energy service companies should be promoted; on the other hand, it seems necessary to facilitate access to the labour market for workers trained in the techniques of sustainable construction.

Finally, the concept of sustainable construction will continue to develop as new technologies or innovative solutions appear; energy and environmental performance may constantly improve still more. The measures proposed here should thus be accompanied by action to support applied research.

A third aspect confirms the necessity of monitoring the policies underway and possible sanction of deviations, but also of the importance of communicating the results achieved.

Flemish Region

In Flanders, a considerable number of nearly zero energy buildings need to be built in the medium term. A Flemish action plan was developed (and integrated in this national plan), based on the barriers to realise NZEB's. The main purpose of the 'Flemish Action Plan NZEB' is to realise a transition to a broad societal acceptance of NZEB's by 2020. It is the action plan's approach to adopt measures and actions to stimulate the construction of NZEB's on large scale, this with a specific policy focus on trendsetters. In order to achieve this objective, the actions presented in the Flemish action plan are categorised into five pillars:

1. Innovation
2. Quality framework
3. Communication
4. Financial initiatives
5. Energy policy

During the so-called introductory phase, trendsetters must receive support in the development and application of these systems, technologies and services so that they are followed by the early adopters, ushering in a growth phase. Only then - once the 'early majority' has adopted the systems, technologies and services - can a volume market be achieved. The goal of the trendsetter policy is therefore to support a transition from demonstration projects to a volume market by way of a growth phase.

All stakeholders like (local) governments, building federations, knowledge institutions, environmental organisations and so on, are actively involved.

Imposing a roadmap with clear and transparent requirements for energy performance will lead to the realisation of new NZEB's. However, the challenge as well as the opportunities for energy retrofit for existing buildings are large.

Stimulating measures and actions for these buildings have an even more important role in realising this transition. The actions in this document are aimed at encouraging both the new construction and the renovation markets to attain the NZEB requirements. In terms of the Flemish building sector and the techniques it employs, only minimal distinction is made between these two markets. There is made very little distinction between residential and non-residential

buildings. The actions are thus being further developed for all types of buildings. The exemplary role which is reserved for the government during this transition process is extremely important. In addition, the attainment targets which are enforced for public buildings must be implemented more rapidly.

According to the EPB directive, the national plans shall include the Member State's detailed application in practice of the definition of nearly zero energy buildings, reflecting their national, regional or local conditions, and including a numerical indicator of primary energy use expressed in kWh/m² per year. Based on the comparative methodology framework for calculating cost-optimal levels of minimum energy performance requirements established by the European Commission, the Flemish Energy Agency (VEA) has set up a tender to determine the cost-optimal levels for Flanders. The outcome of this study will be used as input for the detailed application in practice of the Flemish definition on nearly zero energy buildings. Since the study on the cost-optimal levels is still running, a detailed definition for NZEB and the intermediate targets will be added later on as an addendum.

Annex- Definition of nZEB

1. General Information		
Country		
Name of regulation ,directive, certification scheme		
Editor of regulation, directive, certification scheme		
Year of introduction of current version	Click and choose.	
benchmark of current version (Select one)	<input type="radio"/> Energy Autonomous building <input type="radio"/> Efficient buildings <input type="radio"/> Net zero energy buildings <input type="radio"/> Plus energy buildings <input type="radio"/> Nearly zero energy buildings <input type="radio"/> Zero energy buildigns <input type="radio"/> Other	
Integration and consideration in national directive	Please add explanation/ comment/ source Click and choose.	
2. Field of Application		
2.1 Building category		
Select one and describe right is this typology included in the directive? Are special requirements or exceptions defined for this typology? If more than one definition exists, you can duplicate this appendix for each of them.		
<i>Member States shall ensure that all new buildings are nearly zero- energy buildings by 31 December 2020 respectively after 31 December 2018 (occupied and owned by public authorities). For the purpose of the calculation buildings should be adequately classified into the [...] categories. References: EPBD article 9.1a/b, EPBD Annex I.</i>		
Category	Please add explanation/ comment/ source	
<input type="radio"/> Residential <input type="radio"/> Non-residential <input type="radio"/> Residential and Non-residential		
single family houses	Click and choose.	Please add explanation/ comment/ source
apartment blocks	Click and choose.	Please add explanation/ comment/ source
Offices	Click and choose.	Please add explanation/ comment/ source
educational buildings	Click and choose.	Please add explanation/ comment/ source
hospitals	Click and choose.	Please add explanation/ comment/ source
hotels and restaurants	Click and choose.	Please add explanation/ comment/ source
sports facilities	Click and choose.	Please add explanation/ comment/ source
wholesale and retail trade service buildings	Click and choose.	Please add explanation/ comment/ source
other types of energy-consuming buildings	Click and choose.	Please add explanation/ comment/ source
2.2 New/retrofit buildings		
Select one and describe right. If more than one definition exists, you can duplicate this appendix for each of them.		
<i>New, and existing buildings that are subject to major renovation, should meet minimum energy performance requirements adapted to the local climate.</i>		
<i>Member States shall furthermore [...] stimulate the transformation of buildings that are refurbished into nearly zero-energy buildings. Reference: EPBD preamble recital 15, EPBD article 9.2.</i>		

<input type="radio"/> New buildings <input type="radio"/> Retrofit <input type="radio"/> New and retrofit	Please add explanation/ comment/ source
2.3 Private/public buildings Select one and describe right. If more than one definition exists, you can duplicate this appendix for each of them.	
<i>Member States shall ensure that by 31 December 2020, all new buildings are nearly zero- energy buildings and after 31 December 2018, new buildings occupied and owned by public authorities are nearly zero-energy buildings. Reference: EPBD article 9.1a/b</i>	
<input type="radio"/> Private <input type="radio"/> Public <input type="radio"/> Public and private	Please add explanation/ comment/ source
3. Energy Balance and calculation	
3.1 Balance Type Describe how renewable energy is calculated / included in the energy balance (e.g. renewable heat from solar thermal collectors reduces energy use for heat and DHW; renewable electricity reduces/compensates delivered electricity).	
<i>[...] The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources Energy performance of a building means the calculated or measured amount of energy needed to meet the energy demand [...]. Reference: EPBD article 2.2, EPBD article 2.4</i>	
<input type="radio"/> energy demand vs energy generation <input type="radio"/> energy import vs energy export <input type="radio"/> virtual balance between demand and generation <input type="radio"/> not specified <input type="radio"/> other	Please add explanation/ comment/ source
3.2 Physical boundary Select the widest possible boundary and describe right if/which further subdivisions are possible	
<i>This directive lays down requirements as regards the common general framework for [...] buildings and building units. [...] building' means a roofed construction having walls, for which energy is used to condition the indoor climate. Reference: EPBD article 1.2, EPBD article 2.1</i>	
<input type="radio"/> single building <input type="radio"/> building unit <input type="radio"/> building unit <input type="radio"/> building site <input type="radio"/> cluster of buildings <input type="radio"/> quarter or city <input type="radio"/> other	Please add explanation/ comment/ source
3.3 System boundary demand / energy uses included Define if this load sector is included in the energy balance calculation (other requirements like maximum consumption values can be described below under item 5, further requirements).	
<i>[...] energy performance of a building 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. Reference: EPBD article 2.4</i>	

space heating, domestic hot water	Click and choose.	Please add explanation/ comment/ source
ventilation, cooling, air conditioning	Click and choose.	Please add explanation/ comment/ source
auxiliary energy	Click and choose.	Please add explanation/ comment/ source
lighting	Click and choose.	Please add explanation/ comment/ source
plug loads, appliances, IT	Click and choose.	Please add explanation/ comment/ source
central services	Click and choose.	Please add explanation/ comment/ source
electric vehicles	Click and choose.	Please add explanation/ comment/ source
embodied energy	Click and choose.	Please add explanation/ comment/ source
3.4 System boundary generation / renewable energy sources included Select and explain right (e.g. only in building's physical footprint, on-site, on-site incl. import of off-site renewables like pellets, wood chips, rape oil etc.). How is CHP (based on non-renewable energy carriers like natural gas or oil) included? <i>[...] The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby. [...] energy from renewable sources means energy from renewable non-fossil sources, namely wind, solar, aerothermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases. [...] minimum levels of energy from renewable sources [...] to be fulfilled, inter alia, through district heating and cooling [...]. Reference: EPBD article 2.2, EPBD article 2.6, EPBD article 13.4</i>		
generation on-site	Click and choose.	Please add explanation/ comment/ source
generation near by	Click and choose.	Please add explanation/ comment/ source
generation external	Click and choose.	Please add explanation/ comment/ source
crediting	Click and choose.	Please add explanation/ comment/ source
3.5 Balance period / calculation step What is the defined period of time over which the balance is calculated? Is the calculation period divided into calculation steps (e.g. one hour, one month or one heating and/or cooling season)? <i>[...] The methodology for calculating energy performance should be based not only on the season in which heating is required, but should cover the annual energy performance of a building [...]. Reference: EPBD preamble recital 9 [...] requirements should be set with a view to [...] the cost-optimal balance between the investments involved and the energy costs saved throughout the lifecycle of the building [...] Reference: EPBD preamble recital 10.</i>		
<input type="radio"/> Life cycle balance <input type="radio"/> Yearly <input type="radio"/> Seasonal <input type="radio"/> Other	Please add explanation/ comment/ source	
3.6 Monthly accounting limitation Is a monthly accounting limit defined? Is it based on end energy (e.g. monthly electricity generation compensates monthly electricity loads) or on primary energy (any monthly generation compensates any loads)? Are surpluses transferred to an annual balance?		
<input type="radio"/> monthly source based end energy crediting <input type="radio"/> monthly primary energy crediting <input type="radio"/> nothing defined <input type="radio"/> other	Please add explanation/ comment/ source	
4. Accounting system		
4.1 Normalization <i>[...] including a numerical indicator of primary energy use expressed in kWh/m² per year. Reference: EPBD article 9.3a</i>		
	Please add explanation/ comment/ source	

<ul style="list-style-type: none"> <input type="radio"/> person <input type="radio"/> gross floor area <input type="radio"/> net floor area <input type="radio"/> gross volume <input type="radio"/> net volume <input type="radio"/> usable floor area <input type="radio"/> treated floor area <input type="radio"/> conditioned area <input type="radio"/> other 	
<p>4.2 Primary metric</p> <p>Indicate which metric is used for the energy performance calculation / energy balance and give input on (the source of) the conversion factors on the right. Possible sources are e.g. EN 15603 or national and regional codes.</p>	
<p><i>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. Reference: EPBD Annex 1.</i></p> <p><i>[...] including a numerical indicator of primary energy use expressed in kWh/m² per year. Reference: EPBD 9.3a</i></p> <p><i>[...] primary energy' means energy from renewable and non-renewable sources which has not undergone any conversion or transformation process. Reference : EPBD article 2.5</i></p>	
<ul style="list-style-type: none"> <input type="radio"/> energy need <input type="radio"/> energy use <input type="radio"/> delivered/site energy <input type="radio"/> primary / source energy (renewable part included) <input type="radio"/> primary / source energy (renewable part not included) <input type="radio"/> (equivalent) carbon emissions <input type="radio"/> exergy <input type="radio"/> energy costs <input type="radio"/> environmental credits <input type="radio"/> points (labeling system) <input type="radio"/> other 	<p>Please add explanation/ comment/ source</p>
<p>4.3 Secondary metric</p>	
<ul style="list-style-type: none"> <input type="radio"/> energy use <input type="radio"/> energy need <input type="radio"/> delivered/site energy <input type="radio"/> primary / source energy (renewable part included) 	<p>Please add explanation/ comment/ source</p>

<ul style="list-style-type: none"> <input type="radio"/> primary / source energy (renewable part not included) <input type="radio"/> (equivalent) carbon emissions <input type="radio"/> exergy <input type="radio"/> energy costs <input type="radio"/> environmental credits <input type="radio"/> points (labeling system) <input type="radio"/> other 	
4.4 Symmetric or asymmetric weighting	
<ul style="list-style-type: none"> <input type="radio"/> symmetrical weighting <input type="radio"/> asymmetrical weighting 	<p>Please add explanation/ comment/ source</p>
<p>4.5 Time dependent weighting Static: no time dependent weighting (annual constant weighting/factors) Quasi-static: seasonal/monthly average weighting factors Dynamic: weighting factors based on shorter time periods /hourly basis (according to energy offer and demand in the grid)</p>	
<p><i>Primary energy factors [...] may be based on national or regional yearly average values and may take into account [...] European standards. Reference: EPBD 9.3a</i></p>	
<ul style="list-style-type: none"> <input type="radio"/> static conversion factors <input type="radio"/> quasi static conversion factors <input type="radio"/> dynamic conversion factors 	<p>Please add explanation/ comment/ source</p>
5. Further requirements	
<p>5.1 Fraction of renewables Select and describe right if guidelines are given for any fraction of renewable energy and indicate how/at which level a certain fraction is calculated (e.g. solar thermal heat might be a fraction of energy use, electricity from PV a fraction of delivered energy.)</p>	
<p><i>Member States shall introduce [...] appropriate measures [...] to increase the share of all kinds of energy from renewable sources in the building sector [...]. By 31 December 2014, Member States shall [...] require the use of minimum levels of energy from renewable sources in new buildings and in existing buildings [...] Reference: RED article 13.4</i> <i>[...] The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources [...].Reference : EPBD article 2.2</i></p>	
<ul style="list-style-type: none"> <input type="radio"/> defined <input type="radio"/> not defined <input type="radio"/> defined in other regulation 	<p>Please add explanation/ comment/ source</p>
<p>5.2 Temporal performance Describe if any requirements are given for a temporal match between on-site energy load and on-site energy generation (load match) and which calculation procedures are applied.</p>	
<p><u>Load match</u></p> <ul style="list-style-type: none"> <input type="radio"/> defined 	<p>Please add explanation/ comment/ source</p>

<input type="radio"/> not defined	
Grid interaction <input type="radio"/> defined <input type="radio"/> not defined	Please add explanation/ comment/ source
5.3 Energy performance or rating requirements Are limitations given for a standard energy rating, an energy indicator or maximum demands for heating, cooling, embodied energy, demand of appliances, etc.? If yes, type the values and give explanations on the right	
<i>nearly zero-energy building means a building that has a very high energy performance [...]. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources [...]. The energy performance [...] shall [...] include an energy performance indicator and a numeric indicator of primary energy use [...]. Reference : EPBD article 2.2, EPBD Annex 1.</i>	
Performance or rating <input type="radio"/> defined <input type="radio"/> not defined <input type="radio"/> defined in other regulation	Please add explanation/ comment/ source
Energy Performance indicator Is an energy performance indicator defined? If yes, type the values and the according unit.	Give further explanation
Numeric indicator of primary energy use Is a numeric indicator of primary energy use defined? If yes, type the values and the according unit.	Give further explanation
5.4 General framework / prescriptive requirements Describe which guidelines are given for: Thermal characteristics (insulation, thermal bridges, thermal capacity, passive heating, internal loads, solar protection) Efficiency of installations (hot water supply, air-conditioning, lighting fan power)	
<i>The methodology shall [...] take into consideration: thermal characteristics (thermal capacity, insulation, passive heating, cooling elements, and thermal bridges), heating installation and hot water supply, air-conditioning installations, natural and mechanical ventilation, built-in lighting, the design, positioning and orientation of the building, outdoor climate, passive solar systems and solar protection, [...], internal loads. Reference: EPBD Annex 1</i>	
<input type="radio"/> defined <input type="radio"/> not defined <input type="radio"/> defined in other regulation	Please add explanation/ comment/ source
5.5 Definition of comfort level & IAQ requirements (for winter and summer season, beside other national directives) Describe which guidelines are given for indoor climatic conditions, minimum or maximum indoor temperature, minimum lighting levels/ daylight availability, minimum ventilation rates/ natural ventilation, indoor air quality, max. CO2 levels, etc.	

<p><i>This Directive [...] takes into account [...] indoor climate requirements [...] Reference: EPBD article 1.1</i> <i>The methodology shall [...] take into consideration: [...] indoor climatic conditions [...]Reference: EPBD Annex 1</i> <i>That includes [...] indoor air-quality, adequate natural light [...].Reference:</i> <i>EPBD preamble recital 9</i></p>	
<p><input type="radio"/> defined</p> <p><input type="radio"/> not defined</p> <p><input type="radio"/> defined in other regulation</p>	<p>Please add explanation/ comment/ source</p>
<p>5.6 Monitoring procedure Describe if and how a monitoring mandatory is formulated; calculated or measured values are used; an evaluation of the indoor environmental quality is considered; which calculation step is used.</p>	
<p><i>[...] energy performance of a building means the calculated or measured amount of energy needed [...] Reference: EPBD article 2.4</i> <i>Member States shall encourage the introduction of intelligent metering systems [...] and the installation of automation, control and monitoring systems [...]. Reference: EPBD article 8.2</i></p>	
<p><input type="radio"/> defined</p> <p><input type="radio"/> not defined</p>	<p>Please add explanation/ comment/ source</p>

ECOFYS



sustainable energy for everyone

ECOFYS

sustainable energy for everyone



ECOFYS Germany GmbH

Am Wassermann 36
50829 Köln

T: +49 (0) 221 27070-100

F: +49 (0) 221 27070-011

E: info@ecofys.com

I: www.ecofys.com