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Overview of Member States information on NZEBs

Working version of the progress report - final report

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1 Introduction

Buildings are central to the EU's energy efficiency policy, as nearly 40%[1] of final energy consumption and 36% of greenhouse gas emissions is in houses, offices, shops and other buildings. The 2030 Communication published by the European Commission in July 2014 underpins the key role of the building sector[2], stating that "the majority of the energy-saving potential is in the building sector."[3] Improving the energy performance of Europe's building stock is crucial, not only to achieve the EU's 2020 targets but also to meet the longer term objectives of our climate strategy as laid down in the low carbon economy roadmap 2050[4].

Directive 2010/31/EU on the energy performance of buildings[5] (hereafter called the 'EPBD') is the main legislative instrument at EU level for improving the energy efficiency of European buildings. A key element of the EPBD, especially for achieving these longer term objectives, is its requirements regarding nearly zero-energy buildings (hereafter called 'NZEBs').

Article 9(1) of the EPBD requires Member States to "ensure that:

(a) by 31 December 2020, all new buildings are nearly zero-energy buildings; and

(b) after 31 December 2018, new buildings occupied and owned by public authorities are nearly zero-energy buildings."

Member States must draw up national plans for increasing the number of NZEBs, which may include targets differentiated according to the category of building.

Article 9(2) furthermore provides that Member States must develop policies and take measures such as the setting of targets in order to stimulate the transformation of buildings that are refurbished into NZEBs, and inform the Commission thereof in their national plans.

Article 9(3) states that "The national plans shall include, inter alia, the following elements:

(a) 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/m^{2}per year….

(b) intermediate targets for improving the energy performance of new buildings, by 2015…;

[1] In 2010. See "Energy, transport and environment indicators, 2012 edition", European Commission. For the purpose of this estimate the final energy consumption for the household and services sectors has been combined. It has to be noted that this includes, for example, electricity consumption for appliances but excludes energy consumption in industrial buildings.
[2] COM (2014) 15
[3] COM (2014) 520
[4] COM (2011) 112
[5] OJ L153 of 18.6.2010, p.13

(c) information on the policies and financial or other measures (…..) including details of energy from renewable sources in new buildings and existing buildings undergoing major renovation in the context of Article 13(4) of Directive 2009/28/EC and Articles 6 and 7 of this Directive."

On the basis of these national plans, the Commission is required to publish a report on the progress of Member States, by December 2012 and every three years thereafter (Article 9(5)). A first progress report was published in June 2013 with a corrigendum in October 2013[6] (hereafter called 2013 Commission progress report).

This 2014 working version of the progress report updates the information presented in the 2013 Commission progress report on the basis of the information contained in the national plans and/ or consolidated information in the template for NZEBs submitted (status 18 September 2014) by 26 Member States (AT, BE, BG, CY, CZ, DE, DK, EE, FI, FR, HR, HU, IE, IT, LT, LU, LV, MT, NL, PL, PT, RO, SE, SI, SK, UK). Belgium and Austria have submitted regional reports, which were analysed separately[7]. Member States that have not sent a national plan or the consolidated templates (EL, ES) have not been taken into account.

In comparison with the 2013 Commission progress report where 9 Member States submitted national plans, this is very positive development since almost all Member States have submitted at present the national plans and/or consolidated information on NZEB.

The structure of the report follows the reporting template and gives an overview of differences across the EU, especially regarding the application of the NZEB definition in practice, the intermediate targets, policies and measures for the promotion of NZEBs, policies and measures for stimulating refurbishment into NZEB. Whenever possible the actual progress report compares the figures with the previous report to illustrate the development in terms of quantity but also quality.

At the end of the report conclusions are made and next steps are suggested.

[6] COM(2013) 483 final/2 Communication from the Commission to the European Parliament and the Council - Progress by Member States towards Nearly Zero-Energy Buildings

[7] If regional results differ among each other this is indicated.

2 Overview of differences across the EU

2.1 Application of the NZEB definition in practice

According to Article 2(2) of the EPBD a NZEB "means 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 sources, including energy from renewable sources produced on-site or nearby;"

So while the EPBD sets the framework definition of NZEBs, Member States have the responsibility to report on the detailed application in practice of that definition (i.e. reflecting their national, regional or local conditions).

An analysis of the available information (see annex 1 for a detailed overview) shows that more than a half of the Member States (AT[8], BE (Brussels and Flanders), CZ, HR, DK, EE, FR, IE, LU, LV, LT, NL and SK) already implemented a definition in some form and some are under approval (BG, HU, IT, PL, SI). Several Member States (BE (Brussels and Flanders), DK, FR, IE, LV, LT, NL and SK) provided a definition that comprises both[9] a numerical target for primary energy use (or end energy/ useful energy demand) and considering the share of renewables in a quantitative or qualitative way. Other Member States have a definition under development. Figure 1 gives an overview (and Figure 2 a detailed overview) of the state of play and informs regarding what criteria are included by the Member States and illustrates the development from the previous progress report.

Compared to the 2013 Commission progress report there is a clear positive development. Whereas previously only 5 Member States had NZEB definitions in place, now the majority of the Member States have a NZEB application in practice of the definition developed, some of them at approval stage[10] (see Figure 2 for a detailed overview). The development shows that there has been quite some activity from the Member States in the development and implementation of the NZEB definition.

[8] Adopted by all provinces, for the illustrative purpose (figure) this and any other regional differences are only counted once considering that it corresponds to a single Member State.
[9] Only considered if definition is in place
[10] The figures should be taken with care, since in some cases it is not fully clear at what stage a given definition is in terms of implementation in legal documents.

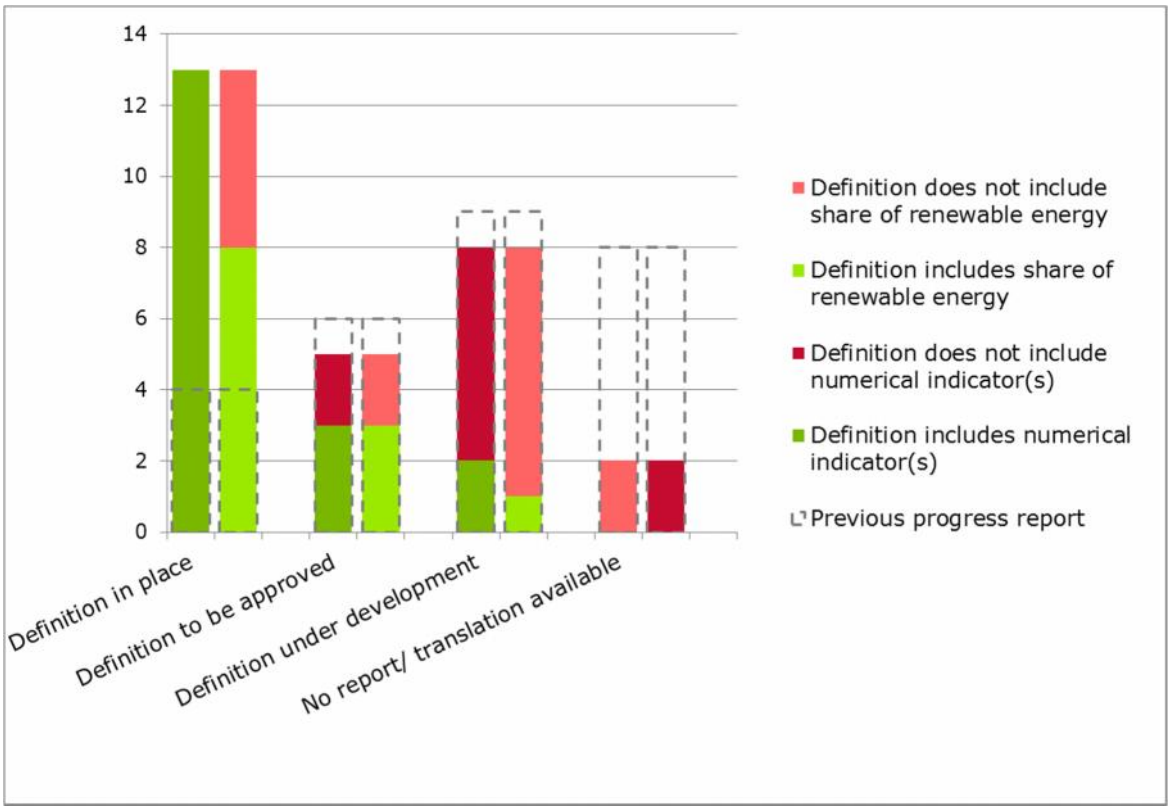

Figure 1: Status of development of the NZEB definition in Member States[11]

A few Member States mentioned objectives that go beyond NZEB requirements, including zero energy buildings in the Netherlands, positive energy buildings in Denmark and France, climate neutral new buildings in Germany and the zero carbon standard in the UK.

Where a numerical indicator is set, the requirements range rather widely from 0 kWh/m²/y to 270 kWh/m²/y and are mainly given as primary energy use in kWh/m²/y. The higher values are mainly from hospitals or other special non-residential buildings. For residential buildings the maximal primary energy consumptions ranges between 33 kWh/m²/y in Croatia (Littoral) and 95 kWh/m²/y in Latvia with a majority of the countries (BE (Brussels), EE, FR, IE) aiming at 45 or 50 kWh/m²/y. Other Member States (BE, LT, NL) use non-dimensional value (e.g. BE (Walloon) were an E-level of 60 is set at the moment) or an energy performance class (e.g. LT where NZEB have to comply with building class A++) as indicator. In some cases, Member States (e.g. CZ) did not define NZEBs for all building categories of the regulations, but in that specific example only for single family houses while definitions for other buildings are under development.

As regards the share of renewable energy the reporting is quite diverse, with only a few countries defining a specific minimum percentage and the majority making qualitative statements (BE (Brussels, Flanders), BG, CZ, DE, DK, FR, IE, IT, LV, LT, NL, RO, SE, SK and UK).

[11] In the case of BE: If more than one region have communicated specific intermediate targets, for the illustrative purposes (figure) this is only counted once considering that it relates to a single Member State.

No Member State has yet reported any legislative regime for not applying the NZEB requirements in specific and justifiable cases where the cost benefit analysis over the economic life cycle of the building in question is negative, as permitted under Article 9(6) of the EPBD.

Member State	Full Definition in Place	Numerical Indicator	Share of Renewable Energy
Austria			
Belgium - BXL			
Belgium - Walloon			
Belgium - Flemish			
Bulgaria			
Croatia			
Cyprus			
Czech Republic			
Denmark			
Estonia			
Finland			
France			
Germany			
Greece			
Hungary			
Ireland			
Italy			
Latvia			
Lithuania			
Luxembourg			
Malta			
Netherlands			
Portugal			
Poland			
Romania			
Slovenia			
Slovakia			
Spain			
Sweden			
United Kingdom			

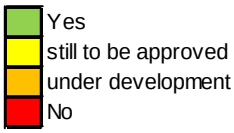

Figure 2: Status of development of the applied NZEB definition in the different Member States

2.2 Intermediate targets

Article 9(3) (b) states that the national plans are to include, inter alia, "intermediate targets for improving the energy performance of new buildings, by 2015".

Most of the Member States (AT[12], BE (Brussels, Flanders, Walloon), BG, HR, DK, EE, FI, FR, DE, HU, IE, IT, LU, LT, MT, NL, PL, PT, SK, SI and UK) have set such intermediate targets. Member States have taken different approaches to setting intermediate targets (see annex 4 for details). A majority of countries define these targets as minimum energy performance requirements (e.g. 50 kWh/m²/y in 2015) or as a required Energy Performance Certificate level by a certain year (e.g. level B in 2015) (s. below Figure 3). Other Member States define the intermediate targets by stating that "all new buildings" or "all new public buildings" will be NZEBs by 2015.

Few Member States (BE, MT, NL) have set actual numbers for new buildings or new public buildings to be constructed by the year 2015. The Netherlands aim to build 60.000 new NZEB dwellings by 2015. In Malta a minimum of 5% of the new buildings occupied and owned by the public authorities will be built according to NZEB.

The exemplary role of the public sector has been emphasised by several Member States (BE (Brussels, Walloon), BG, DE, DK, EE, FI, FR, IE, IT, LT, LU, MT and UK) through the establishment of specific intermediate targets for public buildings.

Additionally few Member States set other targets, i.e. for the refurbishment of existing buildings into NZEBs (BE (Walloon), DK, DE, IE, SK and SI). Other targets such as a minimum share of NZEB are also set as an intermediate target for improving the performance of new buildings by 2015.

The overall development is considered positive, since compared to the 2013 Commission progress report 21 Member States, i.e. six more countries, set intermediate targets.[13]

[12] Adopted by all provinces, for the illustrative purpose (figure) this is only counted once to not disturb the picture on EU level.

[13] If a MS has more than one target it is counted only once. The 2013 Commission progress report noted that fifteen of the 27 Member States (BE, CZ, DK, EE, FI, DE, EL, HU, IE, LV, LT, SI, SE, NL and the UK) have set such intermediate targets. A majority of the countries defined these targets as minimum energy performance requirements (e.g. 50 kWh/m²/y in 2015) or as a required Energy Performance Certificate level by a certain year (e.g. level B by 2015). Other Member States defined the intermediate targets by stating that "all new buildings" or "all new public buildings" will be NZEBs by 2015. A few Member States (CZ, EE and NL) had set actual numbers for new buildings or new public buildings to be constructed by the year 2015. The exemplary role of the public sector had been emphasised by several Member States (BE, CZ, DE, DK, EE, IE, NL and UK) through the establishment of specific intermediate targets for public buildings. Intermediate targets for refurbishment of existing buildings into NZEBs had been set by only a few Member States (BE, DK and IE).

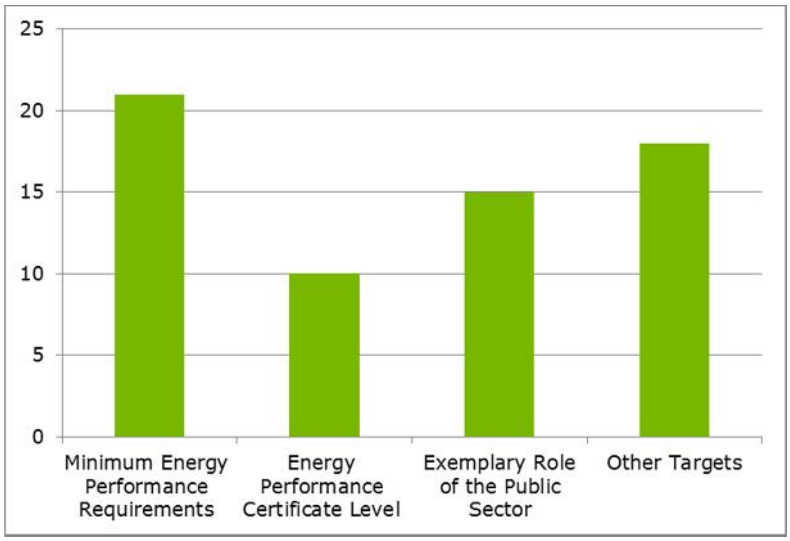

Figure 3: Different kinds of intermediate targets in different Member States (Member States may have chosen one or several kinds of targets)[14]

2.3 Policies and measures for the promotion of NZEBs

Article 9(3c) of the EPBD requires the national plans to include: "information on policies and financial or other measures adopted in the context of paragraphs 1 and 2 for the promotion of nearly zero-energy buildings, including details of national requirements and measures concerning the use of energy from renewable sources in new buildings and existing buildings undergoing major renovations in the context of Article 13(4) of Directive 2009/28/EC and Articles 6 and 7 of this Directive."

Member States reported a wide range of policies and measures in support of the NZEB objectives in their national plans and NEEAPs (National energy efficiency action plans), although it is often not clear to what extent these measures specifically target NZEBs. Compared to the 2013 Commission progress report, the number of policies and measures reported from the Member States increased see Figure 4 and for a detailed overview see Figure 5.

More than two third of the MS have polices and measures in the categories awareness raising and education, strengthening building regulation and energy performance certificates measures in place. In the 2013 Commission progress report less than half of the Member States had policies or measures addressing these topics in place[15]. The following Member States use at least one of the above mentioned measures or policies: AT, BE (Brussels, Walloon, Flanders), BG, CZ, HR, CY, DK, EE, FI, FR, DE, HU, IE, IT, LV, LT, MT, PL, PT, SE, SI and UK.

[14] In the case of BE: If more than one region have communicated specific intermediate targets, for the illustrative purpose (figure) this is only counted once to not disturb the picture on EU level.
[15] In the 2013 Commission progress report the category "Awareness raising and Information" and "Education and Training" have been reported as one category. Thus in figure 4 the data referring to the 2013 Commission progress report.

Financial instruments and support measures, including e.g. incentive policies, energy bonuses for private individuals, grant scheme for installation of RES, provide special guidance and financing for at-risk populations and subsidised mortgage interest rates for energy efficient homes, are another focus to promote NZEB (AT, BE (Brussels, Walloon, Flanders), CZ, BG, HR, DK, FI, FR, DE, IT, LU, NL, PL, PT, SI and UK).

Various Member States have policies and measures for strengthening building regulations which include tightening energy minimum standards for buildings or the minimum level of renewable energy in housing in place. Other measures which are often used by the Member States are energy performance certification (e.g. certificate provides information about opportunities to improve building energy efficiency or scaled energy certificates), demonstration and pilot projects (e.g. project tenders with the topic "Sustainable home" or pilot projects "Existing nearly zero-energy buildings") and supervision (e.g. establish an efficient, high-quality system of energy audits or rollout of smart meters). Research and development policy measures are used less (DK, FI, FR, DE, IT, NL, SI).

Most of the policies and measures reported by the Member States also apply for public buildings. The scope of measures for public buildings varies substantially between Member States ranging from central government buildings only to all publicly-owned buildings or all buildings used for public purposes. Some Member States have also specific measures for public buildings. Those are mainly monitoring campaigns (e.g. "NRClick" is an energy accounting system for the comparison of different municipalities in Belgium) and demonstration projects (e.g. in Germany the Zero-energy building for the Federal Environmental Agency (Umweltbundesamt)).

Compared to the 2013 Commission progress report the increase in the number of policies and measures to promote NZEB can be considered very positive (see in the Figure 4).

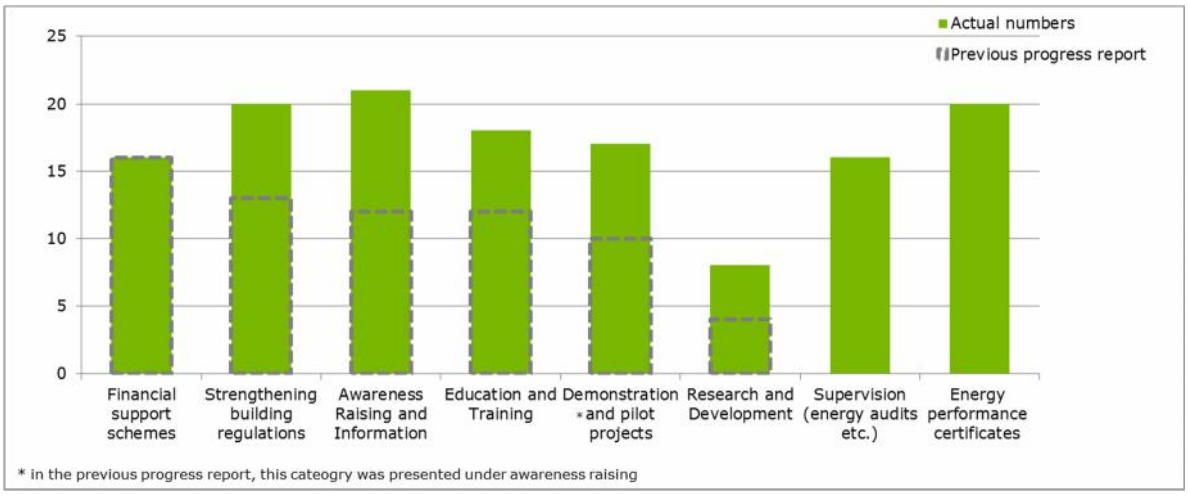

Figure 4: Main policies and measures in support of new NZEBs in Member States[16]

[16] If more than one region have communicated policy measures (per category) in BE and AT for the illustrative purpose (figure) this is only counted once to not disturb the picture on EU level. In AT all provinces have communicated policy measures in all categories.

Memberstate	Awareness raising / Information	Strengthening building regulations	Energy performance certificates	Education and Training	Demonstration and pilot projects	Financial support schemes	Supervision (energy audits etc.)	R&D
Austria								
Belgium - BXL								
Belgium - Flemish								
Belgium - Walloon								
Bulgaria								
Croatia								
Cyprus								
Czech Republic								
Denmark								
Estonia								
Finland								
France								
Germany								
Greece								
Hungary								
Ireland								
Italy								
Latvia								
Lithuania								
Luxembourg								
Malta								
Netherlands								
Portugal								
Poland								
Romania								
Slovakia								
Slovenia								
Spain								
Sweden								
United Kingdom								

Existent
not existent

Figure 5: Main policies and measures in support of new NZEBs in the different Member States

2.4 Reporting on Article 13(4) of Directive 2009/28/EC

Article 9(3c) of the EPBD requires Member States to also inform the Commission in their national plans about the "...details of national requirements and measures concerning the use of energy from renewable sources in new buildings and existing buildings undergoing major renovations in the context of Article 13(4) of Directive 2009/28/EC...".

Article 13(4) of Directive 2009/28/EC on the promotion of the use of energy from renewable sources (hereafter called RES Directive) states that:

"Member States shall introduce in their building regulations and codes appropriate measures in order to increase the share of all kinds of energy from renewable sources in the building.

In establishing such measures or in their regional support schemes, Member States may take into account national measures relating to substantial increases in energy efficiency and relating to cogeneration and to passive, low or zero-energy buildings.

In the 2013 Commission progress report the category "Awareness raising and Information" and "Education and Training" have been reported as one category. 12 Member States had policies and measures in this category in place. Polices and measures in the category "Supervision" and "Energy Performance Certificates" have not been reported separately in the 2013 Commission progress report.

By December 2014, Member States shall, in their building regulations and codes … require the use of minimum levels of energy from renewable sources in new buildings and in existing building that are subject to major renovation."

Only a few Member States reported on this requirement in their national plan. Some Member States reported on the share of renewable energy in buildings e.g. IE, LT, NL and SK.

2.5 Policies and measures for stimulating refurbishment into NZEB

Article 9(2) of the EPBD requires Member States to, "following the leading example of the public sector, develop policies and take measures such as the setting of targets in order to stimulate the transformation of buildings that are refurbished into NZEBs, and inform the Commission thereof in their national plans…".

About two thirds of the Member States indicate specific measures for refurbishing existing buildings into NZEBs (AT, BE (Walloon), BG, CZ, HR, CY, DK, EE, FI, FR, DE, HU, IE, IT, LV, LT, MT, NL, PL, SK, SE and UK), see Figure 6, for a detailed overview see Figure 7.

The most prevalent measure for stimulating refurbishment into NZEB is the implementation of financial support schemes. Other policy measures for promoting refurbishments into NZEB are awareness raising and education by setting up for example different campaigns (e.g. IE), training (e.g. LV) or using media, news releases of the ministries and agencies to spread the information.

Other measures which are frequently used by the Member States are energy performance certificates (e.g. scaled energy labelling with specific class for NZEB), demonstration and pilots (e.g. in the public sector such as hospitals) and strengthening building regulations (e.g. technical regulation, tighten energy minimum standards for buildings). Measure in the field of research and development are used less.

In the 2013 Commission progress report, only 7 Member States reported specific measures for the refurbishing of existing buildings. This development is very positive and indicates that Member States focus more on the refurbishment of the existing building stock than before.

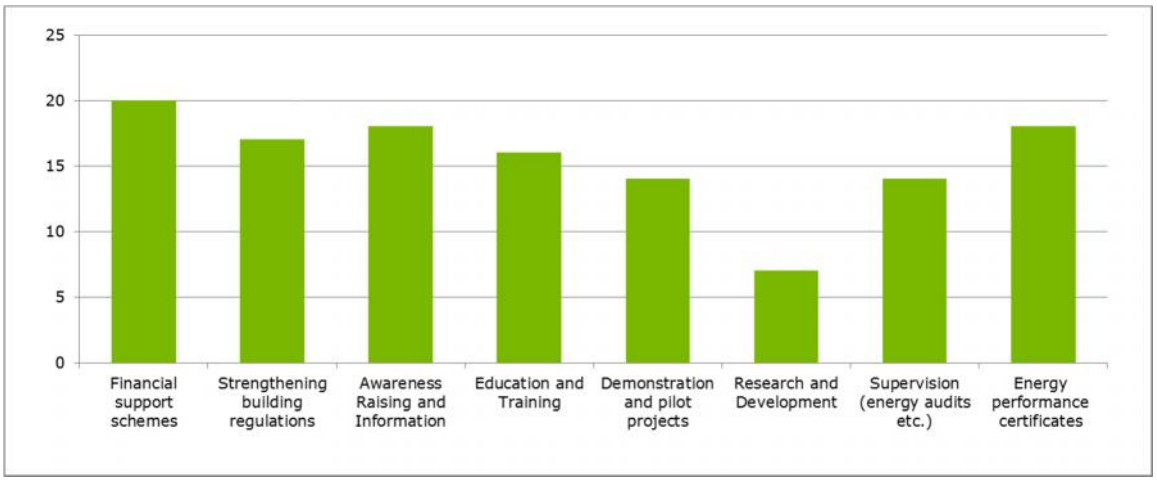

Figure 6: Main policies and measures in support of mayor renovations to NZEBs in Member States

Memberstate	Financial support schemes	Awareness raising / Information	Energy performance certificates	Strengthening building regulations	Education and Training	Demonstration and pilot projects	Supervision (energy audits etc.)	R&D
Austria								
Belgium - BXL								
Belgium - Flemish								
Belgium - Walloon								
Bulgaria								
Croatia								
Cyprus								
Czech Republic								
Denmark								
Estonia								
Finland								
France								
Germany								
Greece								
Hungary								
Ireland								
Italy								
Latvia								
Lithuania								
Luxembourg								
Malta								
Netherlands								
Portugal								
Poland								
Romania								
Slovakia								
Slovenia								
Spain								
Sweden								
United Kingdom								

Existent
not existent

Figure 7: Main policies and measures in support of mayor renovations to NZEBs in the different Member States

3 Conclusions and next steps

3.1 Conclusions

The current working update of the 2013 Commission progress report is based on the information contained in the national plans and/or consolidated information in the template for NZEBs submitted (18 September 2014) by 26 Member States (AT, BE, BG, CY, CZ, DE, DK, EE, FI, FR, HR, HU, IE, IT, LT, LU, LV, MT, NL, PL, PT, RO, SE, SI, SK, UK). Member States that have not sent a national plan or a consolidated template (EL, ES) have not been taken into account for this working version of the progress report.

Compared to 2013 Commission progress report, there are clear positive signals in quantity and quality of the information submitted to the Commission. To date, with exception of Greece and Spain, all Member States submitted the national plans and almost all Member States submitted the consolidated information. The templates for the consolidated information obviously helped to structure the information and make it assessable. At the same time, it helped the Member States to fill in the required information. However, in many national plans, still parts of the information are missing or vague, which hampers a consistent and detailed evaluation and comparison of all national plans on NZEBs at this stage.

As regards the detailed practical definition of NZEBs, 13 Member States (AT, BE (Brussels, Flanders), CZ, HR, DK, EE, FR, IE, LU, LV, LT, NL and SK) presented a applied definition for NZEBs in practice which includes a numerical target of primary energy use. The reports of 8 Member States (BE (Brussels, Flanders), DK, FR, IE, LV, LT, NL and SK) contain both a numerical target of primary energy use and the share of renewable energy sources[17]. Compared to the 2013 Commission progress report, where only 5 Member States had a definition in place, there is progress regarding the practical definition of NZEB which include both the numerical target of primary energy use and the share of renewable energy sources (increased from 5 Member States to 8 Member States). Sometimes the description stays vague whereas in other cases Member States have very precise descriptions. Furthermore it is not always clear from the reports to what extent the definitions are legally binding and conform to the requirements of the EPBD.

The ranges of numerical values differ widely across the various Member States and are not automatically comparable. The range of values goes from targets that are beyond NZEB requirements (such as zero or positive energy buildings) up to 270 kWh/m²/y and are mainly given as primary energy use in kWh/m²/y. The higher values are mainly target values for hospitals or other special non-residential buildings. For residential buildings the maximal primary energy consumptions ranges between 33 kWh/m²/y and 95 kWh/m²/y. The majority of the countries with numerical targets aim at 45 or 50 kWh/m²/y. As regards the share of renewable energy the reporting is quite diverse, with only a few countries defining a specific minimum percentage and the majority making qualitative statements.

[17] Only considered if definition is in place

The study Towards nearly zero-energy buildings: Definition of common principles under the EPBD[18] (hereafter called "Towards NZEB study") concluded that the Member States had a variety of definitions and schemes related to nearly zero-energy buildings. Most of them had (and still have) in common the objective to achieve a more or less equalised annual energy balance. Since calculation procedures at country level differ there are limits to the exact cross-comparison of the energy performance. Consequently there is specific concern about the comparability of ambition target expressed as a "numeric indicator of primary energy use" as required by Annex 1 of the EPBD.

Member States are not obliged to use CEN standards for determining such a numeric indicator and even the application of CEN standard leaves quite some flexibility, for example as to the time step used in calculations - not to mention political considerations that may lead to different primary energy factors. Thus a major conclusion is (similar to the conclusion in the Towards NZEB study) that it seems to be inappropriate to take primary energy as the only basis for creating benchmarks for nearly zero-energy buildings. We reinforce the recommendation of the study to strongly recommend always adding the energy need for heating, cooling and hot water as well as the energy use for lighting. Later other performance indicators, e.g. for ventilation, auxiliaries and plug loads, may be added as 'bring to life' the energy performance indicator required by Annex I of the EPBD.

The energy need is the starting point for calculating primary energy via the additional steps of energy use and delivered energy. In each step additional parameters are included which make the result of the calculation more dependent on the chosen factors. Therefore the energy need seems to be well-suited as a (supplementary) benchmark for the energy performance of nearly zero-energy buildings.

Regarding the intermediate targets the situation improved with the common templates. The information now is collected in one document and not spread over NEEAPs and NREAPs and facilitates the comparison the ambition and measures taken for increasing the number of nearly zero-energy buildings between the different Member States). The depth and scope of actual reporting by the Member States does not differ as significantly as in the time before the Member States used the common templates.

Suggestion for improvement may be to structure the submitted information in a better way. Some Member States set energy performance targets, some set targets in number or share of NZEB buildings and some set both. Some Member States set qualitative, some quantitative targets, some set both. Most of the Member States presented intermediate targets for improving the energy performance of new buildings by 2015, with most focusing on strengthening the building regulations and/or the energy performance certificate level.

Regarding the policies and measures section in the report, the Member States name a wide range of policies; however they often are not very precise to what extend the policy focuses on achieving the targets and the do not seem tailor-made but rather more general policy for all buildings. Thus the exact support effect the policy has for reaching the targets is not very clear. The following section describes the uncertainties in a more detailed way and gives examples. Most Member States reported a variety of support measures to promote NZEBs, including financial incentives, strengthening their

[18] http://ec.europa.eu/energy/efficiency/buildings/implementation_en.htm

building regulations, awareness raising activities and demonstration and pilot projects, however it is not always clear to what extent these measures specifically target NZEBs.

In summary, compared to the 2013 Commission progress report, the situation clearly improved, there are more practical applications of the NZEB definition implemented at national level, more intermediate targets are set and more policies and measures are in place both for new NZEB and for refurbishment to NZEB levels. There is still space for improvement; however for communication purposes it might be recommendable to mention the positive development compared to the last progress report.

3.2 The link between nearly zero-energy performance of buildings and cost-optimal levels

While cost optimality is the current framework regarding the ambition level for both renovation of existing buildings and new buildings, the principle of nearly zero-energy buildings will be guiding for new buildings as from 2021 (for new public buildings as from 2019) onwards. A smooth and consistent transition of policies and markets from cost optimality to nearly zero-energy buildings is needed. In the Towards NZEB study[19] in Europe the estimated gap between the principles of cost optimality and nearly zero-energy buildings was assessed in terms of a) availability/technical feasibility of technologies needed and b) differences in life cycle (global) cost.

It was concluded that current technologies related to energy savings, energy efficiency and renewable energies are sufficient to reach, in combination, a suitable target for nearly zero-energy buildings. A real technology gap to be bridged until 2021 was not perceived. The study found out that investment cost reductions, improved performance of components and systems or energy storage solutions can positively influence the viability and introduction of nearly zero-energy buildings and that limitations may arise for renewable systems due to disparities in time or place, especially if one technology would be significantly favoured by the market or by policies.

The analysis showed that in various cases and depending on the exact national nearly zero-energy building definition, nearly zero-energy buildings are located beyond cost optimality, see virtual example in Figure 8.

[19] Source: Towards nearly zero-energy buildings: Definition of common principles under the EPBD, see http://ec.europa.eu/energy/efficiency/buildings/implementation_en.htm

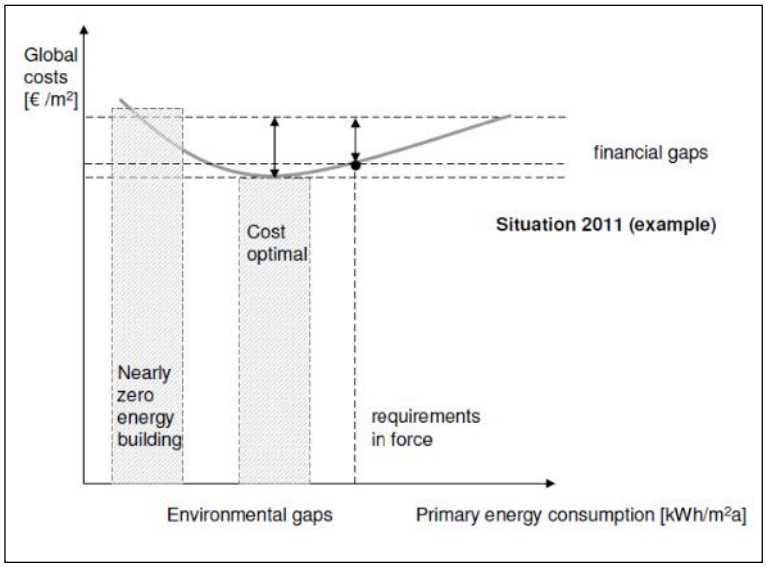

Figure 8: Example: Financial and environmental gaps between nearly zero-energy building, cost optimality and current requirements in 2011

It is important to keep in mind, that for the bulk of new buildings the nearly zero-energy buildings concept will apply as from 2021 onwards (for new public buildings from 2019 onwards). Thus the actual gap that might need to be bridged will result from the framework conditions in 2021 (2019). Factors that are likely to be subject to changes are e.g. technology costs as reaction to more mature markets and larger volumes, energy prices (presumably being higher in 2021 – 2050 compared to 2011-2040) and primary energy factors for electricity, gas, district heating, etc. (presumably being lower in 2021 – 2050 than in 2011-2040). This is currently assumed by many experts to lead to a reduction/closure of the gap in relation to the situation in 2011.

Based on examples calculated in Task 3 of the above mentioned study, possible changes regarding the input parameters have been assessed between now and 2021. This concerns 3 areas, i.e. system costs, energy prices and primary energy factors (here only assessed for electricity, although of course possible for other energy carriers as well):

- The annual changes in costs for building envelope components and systems can be found in the appendix of task 4 of the above mentioned study.
- The average primary energy factor for electricity was reduced by 20% (for the time frame 2021 – 2050 versus 2011-2040).

In a second step, the study calculated the impact of these changes on the position of the cost optimum and its relation to the “nearly zero-energy buildings area”. Two examples of the calculations under Western European conditions and conservative assumptions about available technologies for both new and existing office buildings are shown below:

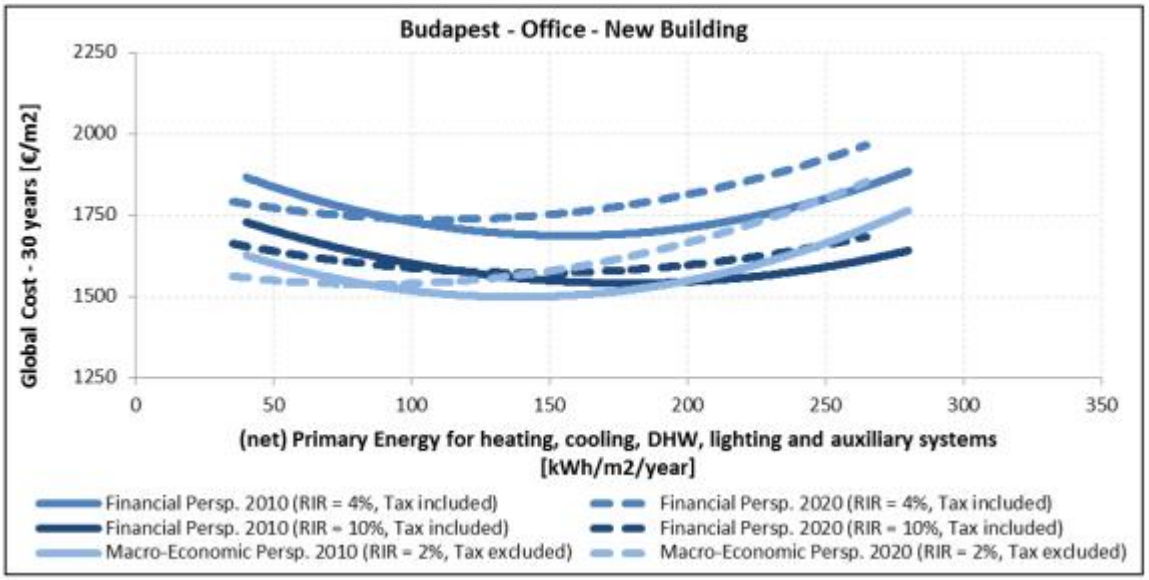

Figure 9: Impact of assumed changes between 2010 and 2020 on crucial input parameters – Budapest – Office - New building

A number of uncertainties regarding input parameters (e.g. cost of building materials and installation work, etc.) affect the location of the points in the graphs. Thus the study suggested talking about an optimum zone (range) rather than an optimum point. In the example of Figure 9, the cost optimal zone for the situation in 2010 (for RIR=4%) could be located around 170 kWh/m²a, moving to a zone around 100 kWh/m²a in 2020. In spite of uncertainties about absolute future values the optimum zone clearly and significantly moved towards zero, supporting the view that a smooth transition between cost optimality and nearly zero-energy buildings is achievable.

Considering the findings of the study, it is recommended that the Member States actively use the cost-optimal methodology in order to locate the potential areas for NZEB buildings and to assess the position for a situation in 2020 for various packages of measures to develop deeper insights in possible solutions for NZEBs.

3.3 Next steps

As described in the Towards NZEB study, reporting significantly improves if the MS are obliged to use a template. Considering this, it may be worth to prescribe the use of the template for the reporting. However, most of the MS have used the template for the reporting and it was the quality (and sometimes the quantity) that was lacking.

Therefore, we propose the following additional steps to improve the reporting on national plans:

a) Providing a template that is 100% filled in as required as a best practice example. This could be developed by compiling best available information on the different sections from different MSs, completed by further additions and fine tuning.

b) Realising a workshop on NZEBs reporting in which such best practice report is presented and explained, accompanied by Q&As. Workshop and Q&A could be designed similar to the approach and process around the implementation of the cost optimal methodology.
c) Providing a guidance document for Member States (issued by the EC) that condenses the experience of the process in a guideline on how to develop and report on national plans for increasing the number of nearly zero-energy buildings.

4 Annex 1: Overview of the national definitions of NZEBs[20]

The following progress reports have been evaluated: BE, BG, CY, CZ, DE, DK, EE, FI, FR, HR, HU, IE, IT, LU, LT, LV, MT, NL, PL, PT, RO, SE, SK, UK.
The following progress reports have not been handed in by date of submission of the report: EL, ES.

Country	Description of the application in practice Article 9(3a)	Numerical indicator for energy demand Article 9(3a)	Intermediate targets Article 9(3b)	Share of renewable energy sources Article 9(3c)
Austria (AT)	The definitions set out in the document 'OIB Guidelines — Definitions' apply for NZEB (Niedrigstenergiehäuser). This is part of the draft national plan for whole Austria.	The definition includes inter alia four numerical indicators: - heat demand (HWB) - primary energy need (PEN) - CO2 -emission - Energy performance factor For new residential buildings from 2020: PEN = 160 kWh/m²/y Major renovations from 2020: PEN = 200 kWh/m²/y	Intermediate targets for improving the energy performance of new buildings are set for 2014 (to enter into force on 01.01.2015), 2016 (01.01.2017), 2018 (01.01.2019) and 2020 (01.01.2021) for new buildings and major renovations.	
Belgium (BE) Brussels-Capital Region	The definition in the Brussels Air, Climate and Energy Code (COBRACE) uses the EPBD definition of Article 2(2). The definition will be made more specific	Individual Housing: total primary energy consumption below 45 kWh/m²/y	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	No explicit share of RES. The calculation method of primary energy already includes the input of renewable energy

[20] The energy performance levels in the table represent energy requirements as presented by the different Member States. Since building regulations and calculation methods differ between countries the numerical targets cannot be compared without taking this into account

Country	Description of the application in practice Article 9(3a)	Numerical indicator for energy demand Article 9(3a)	Intermediate targets Article 9(3b)	Share of renewable energy sources Article 9(3c)
	after the on-going study "Cost Optimum".	Offices, Services units and Educational units: total primary energy consumption below (95-2.5*C) kWh/m²/y with C defined as the compactness, that is, the ratio between the volume enclosed and the loss area (maximum C is 4)	is to say the level of "nearly zero or very low energy consumption reached thanks to high energy performance"	sources like solar energy (thermal and photovoltaic), biomass heating, geothermal heating and heat pump systems as well as passive cooling techniques.
Belgium (BE) Walloon region	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.	An E-level requirement defines the maximal energy consumption. Ew: expresses the primary energy consumption of the project, compared to primary energy demand of a reference building.	Any new building will tend towards the 'very low energy' standard from 2014 onwards, while complying as a minimum Ew of 60.	
Belgium (BE) Flemish region	On 29 Nov 2013, the Flemish Government imposed the requirements for as well NZE residential buildings, as schools and offices. On 28 Jan 2014, the legislation on NZEB definition was published. In order to establish the minimum level of renewable energy, a proposal has been agreed by the Government of Flanders on 28 Sept 2012 for integration in the EPB method.	The most important requirement concerns the E-level, which is the annual primary energy consumption, divided by a reference consumption.	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.	From January 2014 legislation is in force for new residential buildings, offices and schools and major renovations. For singular residential buildings are 6 options foreseen: 1. Thermal solar energy systems 2. Photovoltaic solar energy systems 3. Biomass (boiler, stove or qualitative CHP) 4. Heat pumps

Country	Description of the application in practice Article 9(3a)	Numerical indicator for energy demand Article 9(3a)	Intermediate targets Article 9(3b)	Share of renewable energy sources Article 9(3c)
				5. Connection with district heating or cooling 6. Participation in a RE project For each option quantitative and qualitative requirements are imposed. Residential buildings have the additional possibility to obtain ≥10 kWh renewable energy per m² total useful floor area (combination one or more systems).
Bulgaria (BG)	The definition, which is still to be approved, is structured around three basic requirements: • Primary energy consumption conforming with class A on the national scale • Minimum share of renewables in the building's energy balance. • Restriction of the maximum share of electricity in the building's total energy balance. This restriction applies only to buildings with a total floor space in excess of 500 m^2.	No primary energy demand set. Class A, which has to be achieved for NZEB Standards, is not defined yet.	Target for 2015, 1-1.5 % of the total floor space of new buildings occupied by central or local government departments with an energy performance corresponding to nearly zero-energy use.	At the moment the ZEVI (renewable energy requirements) specifies a fraction of renewable energies of at least 15 present for new public buildings from 2012 and other buildings form 31 Dec 2014.

Country	Description of the application in practice Article 9(3a)	Numerical indicator for energy demand Article 9(3a)	Intermediate targets Article 9(3b)	Share of renewable energy sources Article 9(3c)
Croatia (HR)	The NZEB definition for single family building is given through the useful heating energy and primary energy demand - both of which have to be fulfilled, taking into account heating and cooling energy, domestic hot water, ventilation and lighting.	New requirement (to be included with regulation changes): Continental Croatia: 41 kWh/m²/y Littoral Croatia: 33 kWh/m²/y	NZEB Requirements are given for single family building as qualitative intermediate Targets for 2015. But it is also mentioned that "Intermediate targets in the present moment are not likely to be achieved, primarily due to dramatic shrinkage of real estate market.	Fraction of renewable energy hasn't been set in definition of NZEB single family buildings.
Cyprus (CY)	The proposed NZEB in Cyprus definition is under public consultation and when it is concluded the design parameters of NZEB are to be finalized.	The maximal Primary Energy Use is not set yet. The numerical indication includes primary energy use for heating, cooling, lighting and domestic hot water.		At least 25% of the primary energy must be covered by RES.

Country	Description of the application in practice Article 9(3a)	Numerical indicator for energy demand Article 9(3a)	Intermediate targets Article 9(3b)	Share of renewable energy sources Article 9(3c)
Czech Republic (CZ)	The definition of NZEB is included in the regulation No. 78/2013 Coll. that specifies requirements of the Energy Management Act No. 406/2000 Coll. as subsequently amended when transposing requirements of recasted Energy Performance of Buildings Directive (EPBD2). "Nearly zero-energy building is a building with very low energy performance whose energy consumption is to very significant extent covered by renewable energy sources"	The definition compares evaluated building with a reference building of the same type, size, geometrics, orientation etc. but with pre-defined construction and technological specifications. The cost-optimal level of energy performance for a new building as required from 2013 and NZEB level that will be required later differ in two features: a) required average U-value of envelope (having coefficient of 0.7 for NZEB instead of 0.8 for cost-optimal level when comparing to a reference building) and b) required non-renewable primary energy (deducting 10 to 25% from reference values depending on type of building for NZEB compared to 8 to 10% for cost-optimal one)	In 2016 all public buildings larger than 1500 m² will be NZEBs. In 2017 all public buildings larger than 350 m² will be NZEBs. All new buildings larger than 1500 m² will be NZEBs in 2018. All new buildings larger than 350 m² will be NZEBs in 2019. .	
Denmark (DK)	Requirements on NZEBs are contained in the building regulations as progressive performance classes; "class 2015" and "class 2020".	A maximum demand is defined for total heating, ventilation, cooling and hot water (and lighting for non-residential buildings)	Requirements for "class 2015" are expected to be mandatory in 2015. A residential building (+hotels etc.) is classified as class 2015	The permitted energy consumption will be so low that in practice, it will be impossible for most buildings to comply with the energy requirements without using RE plants.

Country	Description of the application in practice Article 9(3a)	Numerical indicator for energy demand Article 9(3a)	Intermediate targets Article 9(3b)	Share of renewable energy sources Article 9(3c)
	A residential building can be classified as Building Class 2020 when the overall requirement for solar gain for heating, ventilation and hot water per m² heated floor area does not exceed 20 kWh annually. Other buildings can be classified as Building Class 2020 when the overall requirement for solar gain supplied for heating, ventilation, cooling, hot water and lighting per m² heated floor area does not exceed 25 kWh annually.	Residential buildings: 20 kWh/m²/y non-Residential buildings: 25 kWh/m²/y	when the collected need for energy for heating, ventilation, cooling and hot water per m² heated area does not exceed 30 kWh/m²/y plus 1000 kWh/y divided with the heated area. (30 + 1000/A) kWh/m²/y. A public building (offices, schools, institutions) is classified as a class 2015 when the collected need for energy for heating, ventilation, cooling and hot water per m² heated area does not exceed 41 kWh/m²/y plus 1000 kWh/y divided with the heated area. (41 + 1000/A) kWh/m² /y. Requirements for "class 2020" - will apply for public buildings by the end of 2018 and for all other buildings by the end of 2020.	Expected shares of renewable energy sources in the building sector are presented for 2015 and 2020. between 44 and 51% in 2015 between 51 and 56% in 2020.

Country	Description of the application in practice Article 9(3a)	Numerical indicator for energy demand Article 9(3a)	Intermediate targets Article 9(3b)	Share of renewable energy sources Article 9(3c)
Estonia (EE)	A NZEB is a building which is characterised by sound engineering solutions, which is built according to the best possible construction practice, which employs energy efficiency and renewable energy technology solutions and whose energy performance indicator is greater than 0 kWh/m²/y but does not exceed the limit values established	There are already energy performance requirements (annual energy use in kilowatt-hours per square metre of heated area of a building) in place for different building types. Between 50 kWh/m²/y for small residential buildings and 270 kWh/m²/y healthcare buildings.	The energy performance requirements that are currently in place are expected to be updated in 2016.	No specific requirement for fraction of renewable energies.
Finland (FI)	Finland has not yet reached its final definition of NZEBs. The intention is to issue technical descriptions regarding NZEBs as recommendations in 2015		New buildings in public administration built after 2015 will have "passive house" standard. In 2015, it is the intention of the Ministry of the Environment to issue the technical descriptions regarding nearly zero-energy construction as recommendations (regulation to be issued in 2017).	

Country	Description of the application in practice Article 9(3a)	Numerical indicator for energy demand Article 9(3a)	Intermediate targets Article 9(3b)	Share of renewable energy sources Article 9(3c)
France (FR)	NZEB are called «bâtiments basse consommation» or «BBC» in France. There are different requirements set by the RT 2012 (Regulation Thermique) for new residential buildings, office buildings and renovated buildings considering the energy required for heating, cooling, the production of hot water, lighting and auxiliary systems. Consumption levels differ in the geographical regions. BBC buildings must demonstrate a use of renewable energy.	New residential buildings: less than 50 kWh ep/m²/year Office buildings: 70 kWh ep / m² / year (for non air-conditioned office buildings) or 110 kWh ep / m² / year for buildings air-conditioned offices. Energy required for heating, cooling, the production of hot water, lighting and auxiliary systems.	For collective housing, the consumption requirement will be lowered from 57.5 to 50 $kWh_{ep}/m^2/y$ in 2015. For individual housing the requirement is already 50 kWh/m²/year. All new buildings will be energy positive in 2020.	The use of renewable energies is one of the objectives of the TR 2012. First of all, regarding the buildings to use renewable energy sources by choosing one among those proposed in the order. These include: • The production of hot water by using solar thermal panels, • The connection to a network for heat supplied more than 50 % by a renewable energy recovery, or • The demonstration that the contribution of renewable energy to building EPC consumption is equal to or exceeds 5kwhep/(m².year).
Germany (DE)	The specific definition of the nearly zero-energy building standard is developed by the Federal Government with scientific support and having regard to economic considerations. In this regard, the focus is on the 'KfW efficiency houses', which are currently funded in Germany under the label of KfW Efficiency House 40, 55 and 70 (in the case of refurbishment,		The present revision of the Energy Conservation Regulation aims to take first steps on the road to a nearly zero-energy building standard. It is envisaged to tighten the energetic minimum standards for new buildings in two phases (in 2014 and 2016) by an average of 12.5 % each.	In Germany it has been made compulsory to use renewable energies for heating in new buildings according to the Renewable Energy Heat Act. The minimum amount of renewable energy generation is regulated by the Erneuerbare-Energien- Wärme-Gesetz (Renewable Energies Heat Act).

Country	Description of the application in practice Article 9(3a)	Numerical indicator for energy demand Article 9(3a)	Intermediate targets Article 9(3b)	Share of renewable energy sources Article 9(3c)
	as KfW Efficiency House 55 and 70). The number indicates the amount of annual primary energy consumption (QP) in relation (%) to a comparable new building (reference building) according to the requirements of the Energy Conservation Regulation in force (EnEV). An Efficiency House 40, for example, does not use more than 40 % of the annual primary energy consumption (QP) of the corresponding reference building.			The mandatory use may be met either by the use of solar heating (a minimum share of heating energy need of 15 %), biomass (solid and liquid: at least 50 %, gaseous: at least 30 %), geothermal energy and environmental heat (at least 50 %), but failing that, also by the use of waste heat, combined heat and power generation and energy conservation measures (15 % better than the EnEV standard). Combinations of renewable energies and with substitute measures are permitted.
Greece (EL)	No information found on a definition of NZEB			
Hungary (HU)	The requirements for energy performance of NZEB will be defined in the Decree on the energy performance of buildings which is under development.	Requirements for specific annual consumption in primary energy have been proposed depending on the types of buildings and the number of floors.	Requirements will be strengthened in 2016 together with an expected fundamental revision of the requirement system. Direct requirements regarding active solar and PV systems will be brought into being in 2016.	It is planed that buildings must use at least 25% of renewable energy.
Ireland (IE)	The definition is set with a numerical indicator for primary	By 2020 all new dwellings will have an energy load which will	The aim is by 2013 to target a 40% aggregate improvement in emissions and by 2019 a 60%	At the moment the share of renewable energy set by the Building Regulations (Part L

Country	Description of the application in practice Article 9(3a)	Numerical indicator for energy demand Article 9(3a)	Intermediate targets Article 9(3b)	Share of renewable energy sources Article 9(3c)
	energy use and a Building Energy Rating (BER) Certificate level.	not exceed 45 kWh/m²/y (including heating, ventilation, hot water and lighting) In terms of Building Energy Rating (BER) Certificates all new dwellings will be rated as A3 or higher. The same principle applies for non-residential buildings and for existing buildings but the numerical target and BER rating have not yet been formally decided. For existing buildings a target of 125 to 150 kWh/m²/y is planned.	aggregate improvement subject to cost-optimal calculations. Amending Building Regulations Part L in 2015 and 2018, to require upgraded Energy Performance Standard for existing buildings undergoing extension, renovation/alteration or change of use.	Amendment) Regulations 2011 (S.I. No.259 of 2011) can be met by • 10 kWh/m²/y contributing to energy use for domestic hot water heating, space heating or cooling; or • 4 kWh/m²/y of electrical energy; or • a combination of these which would have equivalent effect. A reasonable proportion of energy used in NZEB will be harnessed from renewable energy sources on site or nearby.
Italy (IT)	The definition of NZEB is still to be approved. A “nearly zero-energy building” is a building meeting specific technical requirements: • the energy performance index for winter conditioning • the useful thermal performance index for summer conditioning, including any humidity control • the global energy performance index, expressed in	On the basis of the definition and of the minimum energy performance requirements which, for the year 2020, will be validated on the basis of the results of the cost-optimal method, it will also be possible to establish a range for primary energy consumption expressed in kWh/m²/y, differing according to building type, location and use.	The minimum transmittance values required for building elements will be lowered by 15% compared to their current value from 01 Jan 2016 and by another 15% from 01 Jan 2021. A similar improvement will apply to the minimum performance of heating and conditioning systems. Verification of the requirements for nearly zero-energy buildings is planned to be applied starting from 2018	The obligation to include renewable energy sources in new buildings and buildings undergoing major renovations is equal to 50% of the expected consumption for hot water and to 20% of total consumption for heating, cooling and hot water. This latter share will be increased to 35% from the beginning of 2014 and to 50% from the beginning of 2017.

Country	Description of the application in practice Article 9(3a)	Numerical indicator for energy demand Article 9(3a)	Intermediate targets Article 9(3b)	Share of renewable energy sources Article 9(3c)
	non-renewable primary energy • the global energy performance index, expressed in total primary energy must be significantly lower than the value of the same indices calculated for a reference building.			As concerns electricity it is compulsory to install power from renewables which varies according to the area of the building. The obligation to include renewable energy sources in buildings applies not only to new buildings, but also to existing buildings having a useful floor area in excess of 1 000 m² undergoing full refurbishment.
Latvia (LV)	The Cabinet Regulation No. 383 paragraph 17 from 09.07.2013 sets the requirements for NZEB and Class A buildings: • The energy demand for heating does not exceed 30 kWh/m²/y • Total primary energy consumption for heating, hot water supply, mechanical ventilation, cooling and lighting does not exceed 95 kWh/m2a. • High–performance systems are used in the buildings, which provides at least 75% of ventilation heat recovery during the heating period and provides at least partial use of renewable energy.	Total primary energy consumption: 95 kWh/m²/y The energy demand for heating does not exceed 30 kWh/m²/y		At least partial use of renewable energy is required. No numerical indicator given.

Country	Description of the application in practice Article 9(3a)	Numerical indicator for energy demand Article 9(3a)	Intermediate targets Article 9(3b)	Share of renewable energy sources Article 9(3c)
	• There are no low-efficiency fossil fuel heating system installed in the building.			
Lithuania (LT)	The energy performance is defined in a way that is unrelated to a particular value of energy consumption and is defined by the respective class of energy performance of the building. Each building is assessed individually.	A NZEB is one that complies with the requirements of the Construction Technical Regulations STR 2.01.09:2012 for building class A++	Lithuania has set transitional requirements for newly constructed buildings in 2014, 2016, 2018 and 2021 under building energy performance classes: • prior to 2014 – new buildings or their parts shall comply with the requirements for class C buildings; • from 2014 – new buildings or their parts shall comply with the requirements for class B buildings; • from 2016 – new buildings or their parts shall comply with the requirements for class A buildings; • from 2018 – new buildings or their parts shall comply with the requirements for class A+ buildings; • from 2021 – new buildings or their parts shall comply with the requirements for class A++ buildings.	In buildings of class A++, energy from renewable resources must form the largest part of energy consumed (formula contained in national plan).

Country	Description of the application in practice Article 9(3a)	Numerical indicator for energy demand Article 9(3a)	Intermediate targets Article 9(3b)	Share of renewable energy sources Article 9(3c)
Luxembourg (LU)	The RGD 2007 and the RGD 2010 define the nearly zero-energy building in conformity with the definition in the directive. As abstract, the national energy performance calculation is based for all residential and new non-residential buildings on an asset rating for primary energy and heat demand on a monthly basis with A-class as the highest rating.	NZEB-standard: Heating energy class: A+ and Primary energy class: A+ Renewable electricity production (PV, CHP, …) can be partly incorporated in the balance to reach the NZEB-standard. The missing energy production by renewable electricity generation to reach a zero-energy building is highlighted for the buildings, e.g. an NZEB30 building is a building which needs 30 kWh/m2 per year to reach a zero-energy standard.	The RGD 2007 and RGD 2010 state that all new buildings (private and public) have to ensure the NZEB-standard from 1st January 2019 on. Timeline for new residential buildings: From 2015 on: Heating energy class: B and Primary energy class: A From 2017 on: Heating energy class: A and Primary energy class: A (passive house standard) From 2019 on: Heating energy class: A+ and Primary energy class: A+ (NZEB standard) For new non-residential buildings, the Government introduced in the legal procedure an improvement from classes D-D to classes C-C being the minimum standard from July 2015, representing a strengthening of the standards of 15-20%.	Renewable electricity production (PV, CHP, …) can be partly incorporated in the balance to reach the NZEB-standard. The missing energy production by renewable electricity generation to reach a zero-energy building is highlighted for the buildings, e.g. an NZEB30 building is a building which needs 30 kWh/m2 per year to reach a zero-energy standard.

Country	Description of the application in practice Article 9(3a)	Numerical indicator for energy demand Article 9(3a)	Intermediate targets Article 9(3b)	Share of renewable energy sources Article 9(3c)
Malta (MT)	The definition is currently undergoing a consultation process at a national level.	Energy performance should not exceed the following values: • Dwellings: 40 kWh/m²/y; • All other buildings: 60 kWh/m²/y (not officially approved)	A minimum of 5% of the new buildings occupied and owned by the public authorities will be built according to NZEB.	
Netherlands (NL)	The definition is based on the Energy Performance Coefficient (EPC), a non-dimensional number used as an indicator of the building's energy performance depending on how the building is used. Studies will be conducted to assess how feasible and cost effective it would be to introduce a stricter EPC in the interim.	The assumption is that a completely zero-energy building has an EPC = 0	The EPC will be lowered from 0.8 to 0.6 (introduced on 01 Jan 2011) and further lowered to 0.4 as per 01 Jan 2015, with the aim to set a requirement close to EPC = 0 for other buildings than public in 2020. A comparable lowering (compared to 2007) is in effect for non-residential buildings, increasing energy efficiency in new buildings by 50% in 2015. The aim is to set a requirement close to EPC= 0 for public buildings in 2018 and to build 60.000 new NZEB dwellings by 2015.	Under the EPC system, builders are free to choose measures to reduce the demand for energy, use energy from renewable sources, and make effective use of fossil fuels, to achieve the required EPC. This principle will be maintained for NZEBs. As the requirements for the EPC become stricter and stricter, the percentage of renewable energy will automatically become increasingly important to fulfil the requirements.

Country	Description of the application in practice Article 9(3a)	Numerical indicator for energy demand Article 9(3a)	Intermediate targets Article 9(3b)	Share of renewable energy sources Article 9(3c)
Poland (PL)	The definition of the nearly zero-energy building has been the subject of governmental works. The definition shall refer to the binding technical – buildings provisions, stipulated in the Ministry of Infrastructure ordinance of 12 April 2002 on the technical requirements that shall be met by the buildings and their location. The requirements on the energy consumption for buildings, provided in the abovementioned ordinance will be the quantitative basis of the definition of the nearly zero-energy building. The detailed definition shall be indicated in the National plan for increasing the number of nearly zero-energy buildings, which now is in the preparation by the Ministry of Infrastructure and Development.	Fragmentary maximum indicator of the prime energy on the demand of heating, ventilation and domestic hot water [kWh/(m2•year)] by building type. Residential building: -single-family 70 kWh/m²/y -multi-family 65 kWh/m²/y Collective residence building: 75 kWh/m²/y Public building: -connected with health protection 190 kWh/m²/y -rest 45 kWh/m²/y Agricultural building, warehouse and production building: 70 kWh/m²/y	The maximum indicator of the prime energy will be lowered in steps 2014, 2017, 2021 (2019 for public buildings).	

Country	Description of the application in practice Article 9(3a)	Numerical indicator for energy demand Article 9(3a)	Intermediate targets Article 9(3b)	Share of renewable energy sources Article 9(3c)
Portugal (PT)	The concept of buildings with nearly zero-energy consumption (edifícios com necessidades quase nulas de energia) is provided for in Art. 16 of DL 118/2013 and refers to buildings with high energy performance and whose energy needs are largely satisfied by renewable sources. In case of new public buildings, the concept shall already be applied from January 2019 onwards.	Definition of NZEB depends on numerous variables including economic and technical viability, climate, traditional construction solutions, the architecture and the type of use. Numerical indicators are not exactly stated in the report.	Decree Law No 118/2013 of 20 August 2013 establishes that buildings undergoing renovation must, in accordance with technical viability, architectural, functional and economic criteria, seek to attain an energy performance close to that which applies to new buildings. This law establishes the goal of obtaining buildings with nearly zero-energy needs.	
Romania (RO)	Definition of NZEB under development	Various scenarios have been calculated.	No information	Considered (Various scenarios have been calculated.)

Country	Description of the application in practice Article 9(3a)	Numerical indicator for energy demand Article 9(3a)	Intermediate targets Article 9(3b)	Share of renewable energy sources Article 9(3c)
Slovakia (SK)	Act No 555/2012 provides a definition of NZEB, according to which they are buildings with very high energy performance. To achieve the NZEB parameters it is necessary to proceed from the acceptance and determination of three interrelated criteria: • Reduction of specific heat demand for heating to a minimum. • Reduction of primary energy consumption for heating, cooling, ventilation, domestic hot water and lighting • Significant coverage of the overall primary energy demands with renewable energy sources	Slovakia separates energy demands into: heating, lighting, hot water, ventilation and total. They give scales of energy classes for global indicator for different building types. Total building energy demand: between 40 and 101 kWh/m²/y Primary energy: between 32 and 96 kWh/m²/y	Intermediate targets for achievement of individual construction energy levels are set in three time phases as follows: Low-energy buildings standardised requirements required from 01 Jan 2013 ≤ 100 (class B) Ultra-low-energy buildings recommended requirements required from 31 Dec 2015 ≤ 50 (class A) Nearly zero-energy buildings recommended requirements required from 31 Dec 2018/20 ≤ 25 (class A0)	Supply of energy from RES found in the building or its proximity should provide at least a 50 % reduction of primary energy.

Country	Description of the application in practice Article 9(3a)	Numerical indicator for energy demand Article 9(3a)	Intermediate targets Article 9(3b)	Share of renewable energy sources Article 9(3c)
Slovenia (SI)	A new Energy Act is under development and this should include provisions for NZEBs. The highest permitted needs for heating, cooling, air conditioning, hot water preparation, lighting and the production of renewable energy are regarded.	New construction: Family houses: 50 kWh/m²/y Multi-dwelling buildings: 45 kWh/m²/y non-residential buildings: 70 kWh/m²/y Major renovation: Family houses: 90 kWh/m²/y Multi-dwelling buildings: 70 kWh/m²/y Non-residential buildings: 100 kWh/m²/y	Slovenia states renovation rate targets for the different sectors. New buildings and major renovations must meet the energy standard given by the national legislation (PURES 2010). For the public sector, these requirements are tightened by 10%.	Regulation PURES 2010 sets the requirement for renewable energy sources to a 25 % share of the total final energy used for the building operation.
Spain (ES)	A definition of NZEBs has not yet been formulated. In 2018 a third revision of the technical building code is planned with NZEB concepts included and a final definition is planned to be adopted in 2019.			

Country	Description of the application in practice Article 9(3a)	Numerical indicator for energy demand Article 9(3a)	Intermediate targets Article 9(3b)	Share of renewable energy sources Article 9(3c)
Sweden (SE)	The requirements on NZEB are, at present, equal to the requirements in the current building regulations. The building regulations and the definition of the NZEBs will be strengthened gradually according to the results from on-going studies and demo-projects.	Today the requirements for specific (final) energy use for dwellings are between 55-130 kWh/m²/y (55-120 kWh/m²/y for non-residential buildings). The requirements differ depending on the type of heat source and the climate zone.	Next strengthening of building regulations in 2015.	Sweden has a very high share of renewable energy in all sectors including the construction sector. The building regulations favour buildings heated with renewable sources.
United Kingdom (UK)	The UK regions have all taken steps towards improving energy efficiency measures by incrementally increasing the energy performance requirements of their Building Regulations. The government will publish a definition for 'nearly zero-energy' nearer to the 2018/2020 deadlines.	The primary energy demand is now incorporated in the UK National Calculation Methodologies. It can be found on the domestic Energy Performance Certificate (EPC) in use in all four UK administrations. But no indicator for NZEB has been set.	All homes should be zero carbon from 2016. Public sector buildings should be zero carbon by 2019.	

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