

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



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Table of contents

1	Starting point	4
2	Application of the definition of nearly zero-energy buildings	7
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	8
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	10
5	Policies and measures for the promotion of all new buildings being nearly zero-energy buildings after 31 December 2020	11
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	13
7	Policies and measures for the promotion of existing buildings undergoing major renovation being transformed to nearly zero-energy buildings	14
8	Additional Information	15
9	Possible improvements	16

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)

Since 2008 Luxembourg prioritized the implementation of energy efficiency requirements in buildings and was able to increase energy performance standards in residential buildings in 2008 ("règlement grand-ducal modifié du 30 novembre 2007 concernant la performance énergétique des bâtiments d'habitation" (afterwards "RGD 2007")) and in non-residential buildings in 2011 ("règlement grand-ducal modifié du 31 août 2010 concernant la performance énergétique des bâtiments fonctionnels" (afterwards "RGD 2010")).

With regard to energy efficiency in buildings, Luxembourg has strengthened its building codes, effective compliance systems and is committed to foster the implementation of Energy Performance Certificates (hereafter "EPC"). Since 2012, through a modification of the RGD 2007, Luxembourg has increased the energy performance requirements of residential buildings (primary energy needs of the building) and the thermal insulation requirements (heating energy needs of the building) through a timetable up to 2017. For non-residential buildings, a regulation is in legal procedure (it has been approved by the Government in 2014) to strengthen their energy performance from 1st July 2015 from D (primary energy needs) – D (heating energy needs) to C-C.

The RGD 2007 and RDG 2010, amended through a regulation of 26th May 2014 which was published in June in the Memorial, the Official Journal in Luxembourg ("Règlement grand-ducal du 26 mai 2014 modifiant 1. le règlement grand-ducal modifié du 30 novembre 2007 concernant la performance énergétique des bâtiments d'habitation; 2. le règlement grand-ducal modifié du 31 août 2010 concernant la performance énergétique des bâtiments fonctionnels; et 3. le règlement grand-ducal du 27 février 2010 concernant les installations à gaz") foresee in their definitions the concept of the nearly zero energy building to become mandatory for all new buildings from 1st January 2019.

For new and existing residential buildings the calculation of the energy performance is based on energy needs and includes heating, hot water, ventilation and auxiliary needs. The results of the calculation are expressed in terms of absolute levels of primary energy need, final energy need and CO₂ emissions.

In case of non-residential buildings the energy performance calculation is based on energy needs for new buildings and energy consumption for existing buildings. The calculation methodology for both (new and existing buildings) includes, in addition to the calculation of needs for residential buildings (heating, hot water, ventilation and auxiliary needs) the calculation of energy needs (consumption) for refrigeration, lighting and for humidification and dehumidification. The results are expressed as a ratio to a reference building of the same type. The 100% mark represents the requirement for new non-residential buildings, this means that no building permit is granted for new buildings situated above this mark. For existing non-residential buildings, the scale of classification ranges from 0% to 400%; 100% represents a typical existing building of the same type.

Since 1996, the energy performance requirements have increased over time, in principle for all building components for all types of buildings (a few exceptions exist). The table below illustrates the minimum required U-values applicable from 1996 to 2008 and those currently in force (Table 1). The new minimum performance standards for residential (2008) and non-residential buildings (2011) are shown in Table 2. The government expects the new rules to reduce the energy consumption in the building sector between 30% and 50% compared to the previous regulation. Table 2 shows the different stages and sorts of requirements for residential and non-residential buildings from 1st January 2008 on up to today.

The government has implemented significant incentives for the improvement of existing buildings and the construction of new low energy and passive buildings. In December 2012, a new regulation was adopted for the period 2013-16 which links the level of subsidies to energy efficiency improvements and the use of renewable energies in the residential sector to energy performance improvements. A bonus will be granted if a certain class in the EPC is achieved through the improvement. Depending on the refurbishment impact, the support can range from EUR 10 to EUR 52 per square meter. Renewable technologies eligible for support include wood-fueled boilers and geothermal heat pumps.

Special training has been offered to qualified experts, to improve their skills in energy audits and the best economic and technologic building improvement solutions, notably by the Chamber of Handcrafts ("Energie fir d'Zukunft+").

The Ministry of Sustainable Development and Infrastructure offers technical and financial support to municipalities under the Climate Pact. In addition, the government increased the bilateral cooperation, networking and sharing of best practices on energy policy, notably on energy efficiency, with other countries e.g. Switzerland (cooperation between Myenergy and Swiss Energie-Agentur der Wirtschaft). For the implementation of the energy policy programs the Ministry is supported by Myenergy. In 2009, the government founded this national energy agency which presently has a staffing of 15 people. The agency is supporting the government in the implementation of sustainable energy policies and promotes the rational use of energy and renewable energy sources. It is financed by the Ministry and has the status of an economic interest group (EIG). An additional tool to ensure the implementation of the energy performance standards is the coupling of the energy performance standards and the investment aid for energy efficiency in buildings in the household sector.

Table 1: Minimum requirements for buildings U-values in 1996 and 2008

1996	To outdoor	To soil or unheated	
Building component	Air	Spaces	
Outdoor walls	0.4	0.4	
Windows and doors	2	0.3	
Ridget/flat roof and attic	0.3	2	
Foundation, cellar	0.4	2.5	

RGD 2007	To outdoor	To weakly heated	To soil or unheated
Building component	Air	Spaces	Spaces
Wall and floor	0.32	0.5	0.4
Roof and ceiling	0.25	0.35	0.3
Domes	2.7	2.7	2.7
Window or balcony door including frame	1.5	2	2
Door including frame	2	2.5	2.5

Table 2: Building requirements 2008-2014

The principles of legislation – requirements		
Before 1 January 2008	After 1 January 2008	After 1 January 2011
RGD 22 November 1995	RGD 2007	
U-values	1. Minimal values: <ul style="list-style-type: none"> • U-values • Tightness • Pipes • Ventilation 2. Heating energy index 3. Primary energy index	
RGD 22 November 1995	RGD 2007	RGD 2010
U-values	U-values	1. Minimal values: <ul style="list-style-type: none"> • U-values • Sun protection • Tightness • Thermal bridges • Pipes and storage • Ventilation • Regulating and measurement devices 2. Heating energy index 3. Primary energy index

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.

The RGD 2007 and the RGD 2010 define the nearly zero-energy building in conformity with the definition in the directive:

The RGD 2007 and RDG 2010, amended through a regulation of 26th May 2014 which was published in June in the Memorial, the Official Journal in Luxembourg ("Règlement grand-ducal du 26 mai 2014 modifiant 1. le règlement grand-ducal modifié du 30 novembre 2007 concernant la performance énergétique des bâtiments d'habitation; 2. le règlement grand-ducal modifié du 31 août 2010 concernant la performance énergétique des bâtiments fonctionnels; et 3. le règlement grand-ducal du 27 février 2010 concernant les installations à gaz") foresee in their definitions the concept of the nearly zero energy building to become mandatory for all new buildings from 1st January 2019.

The detailed information and application of the nearly zero-energy standard can be found in the national plan for nZEB-buildings which has been sent to the European Commission in July 2013.

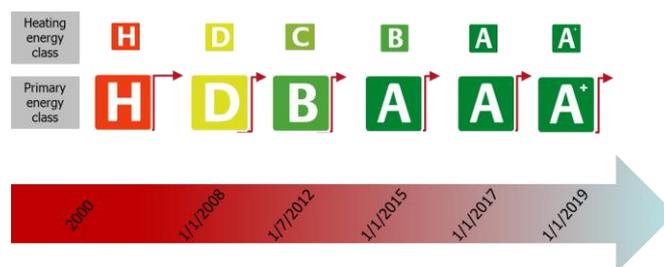
As abstract, the national energy performance calculation is based for all residential and new non-residential buildings on an asset rating for primary energy and heat demand on a monthly basis with A-class as the highest rating. The calculation of nZEB-buildings will follow the same rules. In principle the nearly zero-energy standard will be a highly energy-efficient building. Renewable electricity production (PV, CHP, ...) can be partly incorporated in the balance to reach the nZEB-standard (details can be found in chapter 2.3.2 of the national NZEB-plan). 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.

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.

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.

For new residential buildings, the Government decided a timeline of the improvement of energy performance. This timeline is defined in the RGD 2007 and can be resumed as follows:



with

A - A being the passivehouse-standard

A⁺ - A⁺ being the 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%.

Details can be found in chapter 3.6 of the national nZEB-plan.

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

Requirements on fraction of renewable energies: see chapter 2.3.4 of the national nZEB-plan

Requirements on useful energy demand: see chapter 2.3.4 of the national nZEB-plan

Requirements on primary energy demand: see chapter 2.3.4 of the national nZEB-plan

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.):

As from 2017 on, all new residential buildings have to fulfil the passivehouse-standard (A-A standard), the share of residential buildings which meet the nZEB will rise the forthcoming years. The rate of new building is very high in Luxembourg which is an additional factor for a high market penetration rate of nZEB-buildings.

Miscellaneous:

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.

As the government has prioritised the energy performance of buildings and decided to require nZEB-buildings being the standard for new buildings from 1st January 2019 on for public and private buildings, being earlier than the deadlines foreseen by the directive, it can be assumed that the market penetration will steadily rise in the coming years.

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?

In addition to the explanations in chapter 3 of the present document, the governmental declaration of 2013 already foresees that all new public buildings should be at minimum at passive house level which will increase the share of highly energy efficient buildings in Luxembourg. In general the public authorities assume their role of precursor by this way.

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

Requirements on fraction of renewable energies: see chapter 3.1.1 of the present document
Requirements on useful energy demand: see chapter 3.1.1 of the present document
Requirements on primary energy demand: see chapter 3.1.1 of the present document

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.):

see chapter 3.1.2 of the present document

Miscellaneous:

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.

see chapter 3.1.2 of the present document

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

5.1 Residential buildings
<p>5.1.1 Relevant regulations RGD 2007</p>
<p>5.1.2 Relevant economic incentives and financing instruments "Règlement grand-ducal du 12 décembre 2012 instituant un régime d'aides pour la promotion de l'utilisation rationnelle de l'énergie et la mise en valeur des énergies renouvelables dans le domaine du logement". For additional information please see chapter 3 of the national nZEB-plan.</p>
<p>5.1.3 Energy performance certificates' use and layout in relation to nZEB standard EPCs have to be issued in case of the demand of a building permit, a refurbishment (renovation), change of owner or tenant. In addition, advertisements of buildings have to be completed by energy indicators of the building. Subsidy scheme is also linked to EPC. A layout for nZEB-buildings labelling has not yet been developed, but it will be based on the actual layout of the EPC.</p>
<p>5.1.4 Supervision (energy advice and audits) EPCs can only be issued by accredited experts or members of the OAI ("Ordre des architectes et ingénieurs-conseils"). A voluntary label called "myenergy certified" has been created which ensures quality of the experts. The Ministry of the Economy supervises experts and organises controls of experts. The EPC register is being developed which will help to better organise the control. For additional information please see chapter 3 of the national nZEB-plan.</p>
<p>5.1.5 Information (tools) The Ministry of the Economy developed a calculation tool which is available for free to the experts. Another commercial calculation tool is on the market.</p>
<p>5.1.6 Demonstration /</p>
<p>5.1.7 Education and training Education and training courses are organised by the Ministry of the Economy, the Chamber of Handcrafts and different private actors. A wide range of information and/or training courses exist covering all aspects of energy efficient buildings (in relation to passive house planning, energy performance regulations, subsidies, ...). For additional information please see chapter 3 of the national nZEB-plan.</p>

<p>5.2 Non-residential buildings</p>
<p>5.2.1 Relevant regulations RGD 2010</p>
<p>5.2.2 Relevant economic incentives and financing instruments "Loi du 18 février 2010 relative à un régime d'aides à la protection de l'environnement et à l'utilisation rationnelle des ressources naturelles". For additional information please see chapter 3 of the national nZEB-plan.</p>
<p>5.2.3 Energy performance certificates' use and layout in relation to nZEB standard EPCs have to be issued in case of the demand of a building permit, a refurbishment (renovation), change of owner or tenant. In addition, advertisements of buildings have to be completed by energy indicators of the building. Subsidy scheme is also linked to EPC. A layout for nZEB-buildings labelling has not yet been developed, but it will be based on the actual layout of the EPC.</p>
<p>5.2.4 Supervision (energy advice and audits) EPC's for new buildings can only be issued by members of the OAI ("Ordre des architectes et ingénieurs-conseils"). For existing buildings, accredited experts can also issue EPCs.</p>
<p>5.2.5 Information (tools) The Ministry of the Economy developed a calculation tool which is used by the experts.</p>
<p>5.2.6 Demonstration /</p>
<p>5.2.7 Education and training Education and training courses are organised by the Ministry of the Economy, the Chamber of Handcrafts and different private actors. A wide range of information and/or training courses exist covering all aspects of energy efficient buildings (in relation to passive house planning, energy performance regulations, subsidies, ...). For additional information please see chapter 3 of the national nZEB-plan.</p>
<p>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?</p>
<p>See chapter 3.1.2 of the present document</p>

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
<p>6.1.1 Relevant regulations See chapter 5 of the present document</p>
<p>6.1.2 Relevant economic incentives and financing instruments For municipality buildings, a special aid scheme exists. The Ministry of Sustainable Development and Infrastructure offers technical and financial support to municipalities under the Climate Pact. For further information, please visit www.myenergy.lu.</p>
<p>6.1.3 Energy performance certificates' use and layout in relation to nZEB standard See chapter 5 of the present document</p>
<p>6.1.4 Supervision (energy advice and audits) See chapter 5 of the present document</p>
<p>6.1.5 Information (tools) See chapter 5 of the present document</p>
<p>6.1.6 Demonstration See chapter 5 of the present document</p>
<p>6.1.7 Education and training See chapter 5 of the present document</p>
<p>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?</p>
See chapter 3.1.2 of the national nZEB-plan

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 "Règlement grand-ducal du 12 décembre 2012 instituant un régime d'aides pour la promotion de l'utilisation rationnelle de l'énergie et la mise en valeur des énergies renouvelables dans le domaine du logement." For additional information please see chapter 3 of the national nZEB-plan.</p>
<p>7.1.2 Relevant economic incentives and financing instruments See chapter 7.1.1 of the present document</p>
<p>7.1.3 Energy performance certificates' use and layout in relation to nZEB standard See chapter 5 of the present document</p>
<p>7.1.4 Supervision (energy advice and audits) See chapter 5 of the present document</p>
<p>7.1.5 Information (tools) See chapter 5 of the present document</p>
<p>7.1.6 Demonstration See chapter 5 of the present document</p>
<p>7.1.7 Education and training See chapter 5 of the present document</p>
7.2 Non-residential buildings
<p>7.2.1 Relevant regulations "Loi du 18 février 2010 relative à un régime d'aides à la protection de l'environnement et à l'utilisation rationnelle des ressources naturelles." For additional information please see chapter 3 of the national nZEB-plan.</p>
<p>7.2.2 Relevant economic incentives and financing instruments See chapter 7.2.1 of the present document</p>
<p>7.2.3 Energy performance certificates' use and layout in relation to nZEB standard See chapter 5 of the present document</p>
<p>7.2.4 Supervision (energy advice and audits) See chapter 5 of the present document</p>
<p>7.2.5 Information (tools) See chapter 5 of the present document</p>
<p>7.2.6 Demonstration See chapter 5 of the present document</p>
<p>7.2.7 Education and training See chapter 5 of the present document</p>
<p>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?</p>
<p>See chapter 3.1.2 of the present document</p>

8 Additional Information

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

See chapter 3 of the national nZEB-plan.

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.