



Assistant Building's addition to Retrofit, Adopt, Cure And Develop the Actual Buildings up to zeRo energy, Activating a market for deep renovation

DELIVERABLE 2.3

TOOLKIT REGULATORY – PRELIMINARY REPORT

PARTICIPANT ORGANIZATION NAME

(Coordinator) University of Bologna (**UNIBO**)

D'APPOLONIA (**DAPP**)

National and Kapodistrian University of Athens (**UOA**)

Foundation for Development, Innovation and Technology (**KIM**)

Housing Europe (**HOUSING EUROPE**)

Architects' Council of Europe (**ACE**)

ICLEI European Secretariat (**ICLEI**)

Ecuba S.r.l. (**ECUBA**)

International Union of Property Owners (**UIPI**)

RENESCO (**RENESCO**)

Banca Monte Paschi Belgio (**MPB**)

EnergyPro Ltd (**ENERGYPRO**)

Municipality of Brasov (**BRASOV**)

TU Delft Onderzoek voor de gebouwde omgeving (**OTB**)

Norwegian Institute of Wood Technology (**TRETEKNISK**)

Partenaires Europeens puor l'environnement (**EPE**)

Sociedad Aragonesa de Gestión Medioambiental (**SARGA**)

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Co-Author(s)		
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CONTACTS:

Project Coordinator Email: annarita.ferrante@unibo.it

Project managers: a.zamboni@unibo.it; claudia.pacciolla@unibo.it

Website: www.ABRACADABRA-project.eu





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ABRACADABRA

REGULATORY TOOLKIT

Background

The ABRACADABRA project is developing a toolkit, targeting policy makers, with a focus on regulatory challenges and opportunities for boosting energy retrofitting of buildings. For this purpose, the project will investigate regulatory issues, as well as available good practices, in the project's target countries (Bulgaria, Greece, Italy, Latvia, Norway, Romania, Spain, and the Netherlands).

The aim is to support Public Administrations in charge of territorial and building regulation in estimating the right type and amount of possible Add-ons, in order to achieve a sustainable and cost-efficient business model for tenants, developers and owners, and avoiding over-estimation of proposed add-ons.

Major regulatory obstacles in relation to add-ons, notably linked to property rights, tenancy and condominium law as well as local and urban planning rules will be addressed. Different configurations of Add-ons will be considered in order to support the selection of the best option on a case-based approach to overcome legal planning and urban rules at local level, condominium decision-making rules, and tenancy contractual arrangements. Environmental as well social sustainability criteria will be investigated and will represent key elements of the recommendations provided.

The Toolkit will include:

1. Background on the problem and barriers.
2. Available experiences in understanding and tackling the problem and overcoming the barriers.
3. Background information for understanding the topic from the different angles.
4. The proposed solution, with pro and cons (maybe a SWOT analysis).

The toolkit has been developed through a combination of desk research and interviews to specific stakeholders. The aim of these interview is to assess the regulatory framework in the national, local and EU context, identify key regulatory and non-regulatory challenges and seek appropriate response recommendations, and highlight best practices with high replication potential, and what makes them work.



Bulgaria

The EPBD - National implementation report

In Bulgaria, the implementation of the Energy Performance of Buildings Directive (EPBD) falls under the joint responsibility of:

- The Minister of Energy that is responsible for the implementation of all directives on energy efficiency (including Directive 2010/31/EC).
- The Ministry of Regional Development and Public Work which develops and implements Energy technical rules and regulations and implements projects
- The Sustainable Energy Development Agency (SEDA) responsible of the implementation of the national policy on EE of energy use and energy services
- The National Action Plan for Energy Efficiency (NEEAP) covers all plans and programmes that are related to the building sector

Some principles of Directive 2002/91/EC in Bulgarian legislation have been introduced in 2005. Subsequently the legislation has been upgraded with Energy Efficiency Act (No. 98/14.11.2008, and amendments 35/03.05.2011, No. 38/18.05.2012, No. 66/26.07.2013, No. 22/03.11.2014 and No. 33/11.04.2014.

Directive 2010/31/EC has been transposed into national legislation with the Law on Energy Efficiency (11.04.2014) and the Energy Efficiency Act (35/05.15.2015), the latest transposing also Directive 2012/27/EC.

A success story in implementing the EPBD: in 2007 the Bulgarian Demonstration Project for the Renovation of Multi- family Buildings, a joint initiative of the United Nations Development Programme and the Ministry of Regional Development and Public Works developed a model for an integrated energy audit of buildings in which the use of Renewable Energy Sources (RES) had been introduced was tested. The project, aiming at renovating 50 pilot multi- family residential buildings in 13 cities in Bulgaria made it possible to confirm that the renovated buildings after the first two heating seasons confirmed the planned savings of 40- 60%. (source www.epbd-ca.eu)



Type of Envelope Structures and Elements	U, W/m ² .K	
	Internal T ⁰ θ _i ≥ 15 °C	Internal T ⁰ θ _i < 15 °C
External walls in contact with the external air	0.28	0.35
Walls adjacent to unheated spaces, when the difference of average temperatures between heated and unheated spaces are equal or more than 5° C	0.50	0.63
External walls of heated basement adjacent to the ground	0.6	0.75
Floor slab over an unheated basement	0.50	0.63
Heated floor area directly bordering the ground in a building without basement	0.40	0.50
Floor of a heated basement	0.45	0.56
Floor of a heated space in contact with external air	0.25	0.32
Wall, ceiling or floor in contact with the external air or the ground with in-built area	0.40	0.50
Flat or sloped roof with heated underroof space designed for habitation	0.25	0.32
Ceiling slab of an unheated flat roof with an air layer with thickness δ > 0.30 m	0.30	0.38
External door, solid, adjacent to the external air	2.2	2.75
External door, solid, adjacent to an unheated space	3.5	4.38

Reference values of the heat transfer coefficient, effective from 15 July 2015

ENERGY PERFORMANCE REQUIREMENTS

Bulgarian legislation differentiates between two main categories of buildings: new and existing buildings, and imposes specific requirements according to their use as residential, non-residential and public.

The Energy Efficiency Act sets out the type of buildings which are to be certified within a certain period. All public buildings in operation with a total built-up area of 500 m², and from 9 July 2015 with a total built-up area of over 250 m², are subject to mandatory certification.

Minimum requirements for the energy performance of buildings or are specified in the Law on Spatial Planning (see Table).

Ordinance No. 7 for energy efficiency in buildings, promulgated in State Gazette No. 5/14.01.2005 (and amendments) defines the methodology for calculating the indicators of energy consumption and the energy performance of buildings. Main indicators for the energy performance of buildings are:

- EP_{max,r} is kWh/m².year of the building calculated with the in charge U- values norms
- EP_{max,s} is kWh/m².year of the building calculated with the U- values norms active in the moment of building commissioning.

The calculation methodology takes into consideration: the climatic zone the building is located in, the average volume of indoor air temperature, the size and characteristics of the envelope structures and elements, the availability of different thermal zones, the net volume of conditioned space, quality indicators of indoor air, thermal bridges, shading devices.

A national software for modelling and simulation of the annual energy consumption in buildings was first developed in 2005 by the Technical University of Sofia and is regularly upgraded.

Ordinance No. RD-16-869/02.08.2011 sets rules for calculating the overall share of energy from renewable sources in the gross final consumption of energy.

Towards Nearly ZeroEnergy Buildings (NZEBs)

The Action plan for the progression towards Nearly ZeroEnergy Buildings (NZEBs) in Bulgaria sets sails with the Energy Efficiency Act of 15 May 2015.

In Point 28 of additional provisions the statement is done that "a Nearly Zero- Energy Building is a building that meets the following conditions:

- a) energy consumption of the building (primary energy), corresponds to class A of the scale of energy classes for the type of building;
- b) no less than 55% of the delivered energy necessary for heating, cooling, ventilation, domestic hot water and lighting must come from renewable sources produced on- site at the level of a building or near the building.

The first building with close- to- zero- energy consumption was built in 2012. The total primary energy use is 47.94 kWh/m².year.

Building type	Minimum requirements	Year		
		2015/2016	2019	2020
Single family buildings	Primary energy [kWh/m ² /yr]	60-70		30-50
	Renewable share [%]	>20		>40
	CO ₂ emissions [kgCO ₂ /m ² /yr] ¹⁴	<8		<3-5
Multi-family buildings	Primary energy [kWh/m ² /yr]	60-70		30-50
	Renewable share [%]	>20		>40
	CO ₂ emissions [kgCO ₂ /m ² /yr] ¹⁵	<8		<3-5
Office buildings	Primary energy [kWh/m ² /yr]	100		60-80
	Renewable share [%]	>20		>40
	CO ₂ emissions [kgCO ₂ /m ² /yr] ¹⁶	<15		<8-10
Public office buildings (exemplary role)	Primary energy [kWh/m ² /yr]	100	40-60	
	Renewable share [%]	>20	>50	
	CO ₂ emissions [kgCO ₂ /m ² /yr] ¹⁷	<12	<5-8	

Potential nZEB definitions in Bulgaria - Source: www.bpie.eu

Bulgaria: University Research Centre at the Technical University of Sofia as case study

Very low energy consumption has been achieved with moderate renovation measures at the building envelope level (insulation of the walls to reach a U-value of 0,35 W/m²K, 10 cm mineral wool insulation between the ceiling and the unheated space under the roof to reach 0,26 W/m²K,



and new double-glazed windows), combined with a comprehensive improvement of the building service systems.

The heating and cooling of the research centre is now with a heat pump in connection with the ventilation. Hot water is provided by local electrical heaters and the building uses low-energy lighting system.

The total final energy use includes heating, domestic hot water generation, cooling, ventilation, and lighting amounts to 48 kWh/m²/year (78% improvement compared to the national requirements in Bulgaria). 63% of the final energy is provided by RES.

Implementation of the Energy Efficiency Directive (EED) regarding building renovation

The implementation of the Energy Efficiency Directive (EED) regarding building renovation and the exemplary role of public buildings - via the interdepartmental working group to develop drafts of ordinances stipulated by the Energy Efficiency Act until 15 November 2015 - includes the following elements, translated into ordinances:

- energy consumption and buildings' energy performance for different categories of buildings;
- conditions and procedures for energy audits and certification of buildings;
- minimum energy performance requirements for buildings and indicators for EE and methods/ standards for determining the annual energy consumption in buildings.
- cost-optimal levels of minimum energy performance requirements for buildings as well as the method/standards for determining annual energy expenditure in buildings, including of nearly zero-energy buildings,
- qualification of energy auditors and auditors' the public register,
- indicators of energy expenditure, energy performance of enterprises, industrial systems and outdoor lighting systems,

Engaging the consumers

National strategies and legislation foresee awareness on energy performance of buildings, but often there is no financial support and the information activities are not properly implemented.

To date there is no strategic approach to communication and information activities concerning energy efficiency and renewable energy in buildings.

The main sources of information concerning energy efficiency and renewable energy are professional chambers and associations.

With the actual situation a framework improvement is necessary to further elaborate and implement a communication and dissemination plan at national level for building energy efficiency.

Articles 12 and 17 of EED are linked to the following initiatives: Consumer Council and Consumer Day, and various campaigns in regional and municipal centres where customers learn about how to save energy.

Consumer Council is an independent body with the focus of improving the quality of services offered by energy companies and promoting the understanding of the priorities of energy end users. The energy suppliers publish on their website energy saving advises. Some examples of information campaigns made by energy suppliers are:

- "Energy Saver" (by electricity supplier company);
- "The energy and the children" Campaign (by electricity supplier company);
- Information video clips "Advices for the households" (by natural gas supplier company);
- "Energy efficiency projects - funding sources" Brochure (by natural gas supplier company).



Within Build-Up Skills, a Roadmap for Trainings to Develop Skills and Knowledge on Intelligent Energy Solutions in Buildings for Bulgaria until 2020 had been already developed. (http://www.buildupskillsbg.com/uploads/9/8/8/4/9884716/bus_bg_report-small.pdf).

Expected results of the roadmap:

- deliver a higher number of trained installers also for new and renewable heating technology such as heat pumps, biomass boilers, solar thermal installations
- training activities to facilitate the transition to an integrated and holistic approach for building design and renovation in Bulgaria

Besides energy savings, model facilitating the voluntary association of condominium owners and new mechanism for technical and financial support have to be tested. The Bulgarian Demonstration Project for the Renovation of Multi- family Buildings was awarded first prize by the European Union "Sustainable Energy for Europe" in 2011. Following the completion of the pilot project, the Bulgarian Ministry of Regional Development launched a programme to improve the energy efficiency of multi- family residential buildings by developing financial mechanisms for the implementation of the "National Programme for Renovation of Bulgarian Homes". All the buildings involved in this programme must have an EPC issued after renovation. (source www.epbd-ca.eu)

Subsidies and incentives

The National EE targets include energy-saving effects achieved by optimising the national budget's contribution through EU programmes and funds, maximising the involvement of local financial sources in the use of financial resources from EU programmes and funds.

In particular EU Structural Funds play a key role:

- The Operational Program "Innovations and Competitiveness" 2014-2020 (OPIC), the basic program document on national level outlining the aid envisaged for the Bulgarian business from the European structural and investment funds for the period 2014-2020
- The Operational Programme "Regions in Growth" 2014-2020 is a continuation of the program "Regional Development" 2007-2013. Specific goals are the increase of the quality of life, social inclusion and improving the ecological environment by upgrading the physical environment in cities improvement of economic activity in cities
- The Rural Development Programme 2014-2020

The main programme in Bulgaria for EE measures in households is the National programme for Energy Efficiency of Residential Buildings that deploys 1 billion leva invested by the Government in the form of bank guarantee, to attract the resources and secure the financing for the programme's activities. Within the programme all municipalities can access to it getting a State grant for all buildings which meet the requirements. Eligibility is given to residential buildings, constructed by industrial means, with more than 36 apartments.

Programme BG04 "Energy Efficiency and Renewable Energy", financed by the Financial Mechanism of the European Economic Area based on the signed MoU between the Republic of Bulgaria and Kingdom of Norway, Iceland and Principality of Liechtenstein, includes the two program areas EE and RES.





Greece

The EPBD - national implementation report

In Greece, the implementation of the Energy Performance of Buildings Directive (EPBD) - through the NATIONAL ENERGY EFFICIENCY ACTION PLAN (NEEAP) is developed with the cooperation of:

- the Ministry of the Interior and Kingdom Relations;
- CENTRE FOR RENEWABLE ENERGY SOURCES (CRESthe Directorate for Energy Policy and Energy Efficiency
- the Secretariat-General for Energy and Mineral Raw Materials
- the Ministry of the Environment, Energy and Climate Change (YPEKA)
- the Directorate for Energy Policy and Planning of the Centre for Renewable Energy Sources and Saving (CRES).

Law 3661/2008 'Measures to reduce energy consumption in buildings and other provisions' (Government Gazette, Series I, No 89, 19-05-2008) harmonizes Greek legislation with Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings (OJ L1, 4.1.2003). It incorporates all the provisions of the Directive, provides for the adoption of a Regulation on the Energy Performance of Buildings and distinguishes five main themes: definition of minimum energy performance requirements and the method for calculating energy performance (Article 3) of new and existing buildings (Articles 4 and 5), issue of energy performance certificate (Article 6), inspections to boilers and air-conditioning systems (Articles 7 and 8), provision of qualified and accredited energy inspectors (Article 9).

The new 'Regulation on the Energy Performance of Buildings' KENAK, in view of the requirements of the Directive 2010/31/EU, amended in June 2010, remove the 1,000 m² limits.

KENAK is the regulation describing the methodology of calculating the energy performance of buildings in Greece -through the Ministerial Decision Δ6/Β/οικ.5825/30-03-2010 ΦΕΚ Β' 407. The Regulation is based on EN ISO 13790 and sets out the methodology for the calculations. A number of "Technical Guidelines" were issued from the Technical Chamber setting out in detail the methodology, national parameters, climatic data etc.

It introduces the definition of Nearly Zero- Energy Buildings (NZEB) and to require a minimum of 60% of Domestic Hot Water (DHW) demand to be covered by Renewable Energy Sources (RES) in new buildings.



The two snapshots below indicate the main energy requirements:

Minimum requirements according to the new regulation		U-value (W/m ² .K)			
		Climatic zone			
		A	B	C	D
Heating degree days (18 °C)		800 - 900	1,100 - 1,400	1,700 - 2,100	> 2,200
Roofs	U _{V_D}	0.50	0.45	0.40	0.35
External walls *	U _{V-W}	0.60	0.50	0.45	0.40
External floors	U _{V_DL}	0.50	0.45	0.40	0.35
Floor over ground	U _{V_G}	1.20	0.90	0.75	0.70
External walls in contact with the ground	U _{V_WE}	1.50	1.00	0.80	0.70
Openings *	U _{V_F}	3.20	3.00	2.80	2.60
Glass façades	U _{V_GF}	2.20	2.00	1.80	1.80
Minimum requirements according to the previous regulation		U-value (W/m ² .K)			
		Climatic zone			
		A	B	C	
Roofs	U _{V_D}	0.50	0.50	0.50	
External walls	U _{V-W}	0.70	0.70	0.70	
Floor over ground	U _{V_G}	3.00	1.90	0.70	
External walls in contact with the ground	U _{V_WE}	3.00	1.90	0.70	

* Not applied to passive systems such as Trombe walls. The requirements apply to windows (direct gain passive systems) only.

Minimum requirements Before and After the new regulation

F/V (m ⁻¹)	Max Um (W/m ² .K)			
	Climatic zone			
	A	B	C	D
≤ 0.2	1.26	1.14	1.05	0.96
0.3	1.20	1.09	1.00	0.92
0.4	1.15	1.03	0.95	0.87
0.5	1.09	0.98	0.90	0.83
0.6	1.03	0.93	0.86	0.78
0.7	0.98	0.88	0.81	0.73
0.8	0.92	0.83	0.76	0.69
0.9	0.86	0.78	0.71	0.64
≥ 1.0	0.81	0.73	0.66	0.60

F: Surrounding Area

V: Volume of the building

Minimum energy performance requirements for the building envelope.

The Energy Performance Certificate (EPC) in case of building rental was put into force in January 2011, and was extended to individual apartments in January 2012.



The type and level of requirements are subject to variation in relation to the type of building (residential, or non- residential buildings including public buildings) and refer to:

- the design of the building: orientation, surrounding area, solar design, daylight, natural ventilation...;
- maximum U- value for walls, windows, roofs etc., for each one of the 4 climatic zones, with the main parameter used for the definition of the climatic zones being the annual heating degree- days;
- maximum average U- value for the whole building;
- at least 50% heat recovery in the central air- conditioning (AC) units;
- minimum levels of insulation of the heating and cooling distribution networks;
- at least 60% DHW production from solar panels;
- minimum requirements for lighting installations for buildings in the tertiary sector (55 lm/W);
- minimum efficiency for heating generators.

One of the most past successful programmes indirectly related to the EPBD implementation is the 'Eksikonomisi kat' Oikon' (Energy Savings at Home). The programme utilizes the body of energy auditors and the 'Regulation of Energy Performance of Buildings' (KENAK). Its main goals are to determine the energy demand of buildings and the interventions leading to energy savings. The programme has officially started on 1 February 2011 and provides subsidies of up to 70%, while the remaining amount is in the form of no interest loans, and the total budget for each case should not exceed 15,000 €. The initial budget of the programme outlined by the state was 396 M€ coming from structural and national funds, where 241 M€ are revolving funds. At a second stage, another 152 M€ have been added as direct subsidies. The programme is based on the collaboration between the major banks and the MEECC. Banks are providing another 800 M€, leading to a total budget of almost 1.2 b€.

Lack of funds and limited capacity at the municipal level hinders the level of enforcement of the regulation in case of renovation.

Towards Nearly ZeroEnergy Buildings (NZEBs)

MEASURES ON THE ENERGY EFFICIENCY OF BUILDINGS

The methodology for identifying the optimal level in terms of costs to meet minimum energy efficiency criteria as defined in the Greek Regulation on the Energy Performance of Buildings (KENAK).

Target group: all new buildings with a total surface area of more than 50 m² and existing buildings undergoing major renovation.

In Greece, transposition of the European Directive 2009/28/EC took effect in June 2010 by the national law N.3851/2010 on RES (FEK 85/A/4.6.2010). All public buildings by 2015 and all new buildings by 2020 should cover their primary energy consumption from RES, combined heat and power, district heating or cooling, and energy efficient heat pumps.

In addition, N.3851/2010 sets some very ambitious national targets by 2020: reach a contribution of 20% from RES in the national gross final energy consumption (from 5% in 2007), 40% in gross electricity generation (from 4.6% in 2007), and 20% in final energy consumption for heating and



cooling. By 2050, the goal is to reduce primary energy consumption by 50% compared to 2008 levels, while there are several scenarios for the RES share, including a 100% scenario.

The NZEB definition was introduced to national legislation by amendment of the Law 3661 in June 2010 and is identical to the EPBD definition. This definition is also included in Law 4122/2013, which specifies that, after 1 January 2019, every new building of the public sector should be a NZEB. This obligation applies also to all new buildings constructed after 1 January 2021. However, the national NZEB definition has not yet been applied.

Due to the lack of the national application of the NZEB definition, it is not possible to identify NZEB buildings. Some new buildings with very low energy consumption have been constructed, but it is not possible to label them as NZEBs.

In the residential sector, significant use was made of structural fund for the renovation of buildings in the past years. More than 100.000 houses have been renovated.

Implementation of the Energy Efficiency Directive (EED) regarding building renovation

The energy efficiency target was notified firstly by the 3rd Energy Efficiency Action Plan, which was submitted to EU in December 2014, while according to the requirements of Article 4 of the Law 4342/2015 the Ministerial Decision ΔΕΠΕΑ/Γ/οικ. 185496 (Official Government Gazette: no. 3023 of issue B') has imposed officially the obligation to achieve 18.4 Mtoe of final energy consumption in 2020.

Article 3 " Energy efficiency targets": An indicative national energy efficiency target was established based on final energy consumption taking into account the requirements of the paragraph 1 of Article 3 of the EED.

Article 4 " Building renovation": The long-term strategy for mobilising investments in the renovation of the national stock of residential and commercial buildings was prepared and submitted to the EU in the beginning of 2015 according to the requirements of the of the paragraph 1 of Article 4 of the EED. According to the requirements of Article 6 of the Law 4342/2015, the official approval of the long-term strategy was performed through the adoption of the Ministerial Decision ΔΕΠΕΑ/Γ/οικ. 185497 (Official Government Gazette: no. 3004 of issue B').

The measures foreseen for the implementation of Article 4 of the EED regarding the strategy for the renovation of residential and commercial buildings include the following:

- a. the 'Eksikonomisi Kat' Oikon' (Energy Savings at Home) project, which offers financial incentives for the refurbishment of heating and cooling systems, as well as building envelopes and DHW systems in the residential sector;
- b. the pilot 'Green Neighbourhood' project for the energy upgrade of social housing;
- c. financial incentives to SMEs in the tourism, commerce and services sectors to upgrade their energy consumption profile.

In all these measures, in order to receive the financing it is required to issue an EPC first during the application for funding, then again after the implementation of the measures, in order to verify the results.

The list of public buildings falling under Article 5 of the EED was published on 31 December 2013 and includes central government buildings that have an area greater than 500 m². The list includes 82 buildings with a total area of 309,712 m². The refurbishment of these buildings is included in the national structural funds programmes.



Furthermore, the following measures that focus on the exemplary role of the public sector also apply to local government buildings:

- a. the financing of energy refurbishment in central government buildings that appear in the published list;
- b. the promotion of the Covenant of Mayors for integral energy planning of municipalities;
- c. the financing of refurbishments in existing school buildings and higher efficiency designs in new school buildings;
- d. the programme 'Green roofs on public buildings' for financing investments in green roofs;
- e. compulsory installation of DHW using solar energy in all public sector buildings that have hot water demand;
- f. compulsory replacement of all lighting systems with energy- efficient lighting systems in public buildings;
- g. 'Energy Smart Museums', a programme for financing the energy upgrade of public museum buildings.

For all the measures mentioned above, applying for funding goes hand in hand with the issuance of an EPC. The evaluation of the funding applications is based on the energy savings calculated in the EPC. A second EPC must be issued after the completion of the interventions in order to verify these results.

Article 5 " Exemplary role of public bodies' buildings": Article 7 of the Law 4342/2015 introduces the obligation to renovate from 1st of January 2014 3% of the total floor area of heated and/or cooled buildings owned and occupied by the central government annually in order to meet at least the minimum energy performance requirements as foreseen in Article 4 of Directive Article 5 Article 7 of the Law 4342/2015 introduces the obligation to renovate from 1st of January 2014 3% of the total floor area of heated and/or cooled buildings owned and occupied by the central government annually in order to meet at least the minimum energy performance requirements as foreseen in Article 4 of Directive

Article 6 " Purchasing by public bodies": According to Article 8 of the Law 4342/2015 the central governments should purchase only products, services and buildings with high energy-efficiency performance taking into consideration various criteria, such as the cost-effectiveness, the economic feasibility, the wider sustainability, the technical suitability, as well as the sufficient competition in the market. Moreover, the public bodies, including authorities at regional and local levels, are encouraged to purchase only products, services and buildings with high energy-efficiency performance. In paragraph 6 of Article 8 of the Law 4342/2015 it is foreseen that only buildings that are classified at least in the Energy Performance Class C according to the existing Energy Efficiency Regulation in Buildings can be rented or purchased by public authorities. The identical obligation exists also in the case of the potential renewal of the existing contracts.

Article 7 " Energy efficiency obligation schemes": In December 2013 it was notified to the EU that the Article 7's target will be achieved through the introduction of alternative measures. The initially proposed alternative measures were updated during the submission of the 3rd Energy Efficiency Action proposing 18 policy measures finally. Nevertheless, the observed deviations from the established target in the annual reports both of 2015 and 2016 led to the reconsideration of the Article 7's implementation. According to Article 9 of the Law 4342/2015 the introduction of an energy obligation scheme to the energy distributors and/or retail energy sales companies is foreseen since 1st of January 2017. Therefore, the fulfillment of Article 7's target will be performed through a combination of alternative policy measures and an energy obligation scheme. A ministerial decision is expected in order to specify the required details about the obligated parties, the allocated target for each obligated party separately, the monitoring and verification scheme, the reporting obligations and other provisions of the scheme. Moreover, according to paragraph 10 of Article 9 of the Law 4342/2015 it will be given the option to the obligated party to pay equivalently the required investments to the Energy Efficiency Fund. Finally, the current design of the existing



alternative measures will be reviewed taking into account the effectiveness of the existing measures, the introduction of the obligation scheme and the current deviations for the intermediate targets.

Article 8 " Energy audits and energy management systems": Article 10 of the Law 4342/2015 introduces the provision of high quality energy audits, which have to be cost-effective for all final customers. Moreover, the enterprises that are not SMEs have the obligation to carry out an energy audit in an independent and cost-effective manner by qualified and/or accredited experts or by independent authorities under the national legislation until 9 November 2016 and at least every four years from the date of the previous energy audit. In the case that the obligated enterprises have already developed an energy or environmental management system, which is certified by an independent body according to the relevant European or International Standards, will be exempted from the obligation to conduct an energy audit.

Nevertheless, all the details regarding the quality criteria of the energy audits, the energy auditors and the implemented procedure will be determined through the adoption of a ministerial decision. Finally, specific incentives will be introduced in order to encourage SMEs to conduct an energy audit and specific initiatives will be organised in order to enhance the existing level of awareness and knowledge considering energy audits.

Article 16 " Availability of qualification, accreditation and certification schemes": Currently, there is no qualification, certification and accreditation scheme for the providers of energy services, the energy auditors, the energy managers and the installers of energy-related building elements. Moreover, there are no suitable training programmes developed for these professional categories. Article 17 of the Law 4342/2015 foresees the establishment of certification and/or accreditation schemes and/or equivalent qualification schemes, including suitable training programmes potentially, for the energy auditors and for the related professions with the building elements as defined in Directive 2010/31/EU. Finally, information about the established certification and/or accreditation schemes and/or equivalent qualification schemes should be provided to all the consumers.

Article 20 " Information and training": Article 20 of the Law 4342/2015 promotes either the adoption of new financing measures or the exploitation of the existing financing mechanisms for the implementation of energy efficiency measures in order to maximise the derived benefits by the multiple streams of financing. Furthermore, according to Article 21 of the Law 4342/2015 the establishment of an Energy Efficiency National Fund is foreseen. Nevertheless, the responsibilities of the Energy Efficiency National Fund may be exercised by the existing Green Fund until the official establishment according to its operational characteristics as outlined in Article 9(5) of the Law 3855/2010.

No non-legislative provisions have been introduced yet.

A total of 516,272 certificates were issued until 15 July 2014. This number includes the second EPC, issued after the energy refurbishment, of buildings and flats that were included in the various incentive schemes. It is difficult to calculate the percentage of the existing building stock having an EPC because, as was mentioned previously, certificates are issued for either individual apartments or buildings- but a first estimation is between 5% and 10% of the total building stock, which corresponds to 3,821,175 buildings (according to 2001 statistics). In general, the majority of EPCs are issued for apartments, since each owner decides to have the EPC issued whenever it is required. In 2013 alone, 226,077 EPCs were issued.





Engaging the consumers

Implementation body: Regions

Supervisory Authority: Ministry of Development and Competitiveness, Ministry of Finance, Ministry of the Interior

The Regulatory Authority for Energy (RAE) implemented a national campaign programme with the slogan 'actively engaged' to raise awareness of savings and energy savings issues.

Declaration by the Ministry of Development of the years 2005-2010 as energy savings years. Under this initiative, two information campaigns were organized involving the distribution of: A. three leaflets entitled:

1. 'Saving energy for a better quality of life and a clean environment.'
 2. 'Drive economically: Seven golden rules for fuel economy.'
 3. 'Heating-Cooling: Saving energy without compromising comfort.'
- B. leaflets entitled: 'Energy saving. He who knows, gains.'

Euronet 50/50 - In Greece promoted by the Regional Energy Agency of Crete - max is a European project that encourages energy efficiency in schools and public buildings through the application of best practices in the use and management of energy.

The Project is developed in 500 schools and 48 public buildings in 13 European countries. The methodology of the 50/50 is to introduce financial incentives to energy savings. The city council and the building sign a commitment where the first agrees to return 50% of the cost savings achieved, and the building is committed to a set of best practices and lead the project.

Euronet 50/50 Max encourages energy efficiency by introducing a financial incentive scheme for energy savings, leading to better use and management of energy in schools and public buildings.

Under the project, the city council and the building user sign a commitment where the council agrees to return 50% of the cost savings from energy consumption reduction, and in turn the building user commits to implement a set of best practices for energy efficient behaviour and no/low-cost measures. The other 50% is a net savings for the public authority that pays the bills.

As a result, the school gains additional financial resources, the managers of school buildings enjoy lower energy costs, the school population (students, teachers and caretakers) is trained in practical energy efficiency solutions and energy efficient schools contribute to local energy and climate change policy targets.

Subsidies and incentives

RES

Law. 4296/2014- Ministerial decision for self-consumption of solar energy with rooftop and ground-mounted PV systems. Among other provisions, the decision also allows governmental and non-governmental not-for-profit organizations (e.g. hospitals and universities) to install up to 500 kWp of PV capacity, in order to cover their electricity needs. This will essentially make these organisations self-reliant and autonomous in their energy production and consumption cutting down significant expenses.

The Greek government has also initiated the Energy Efficiency at Household Buildings Program, offering financial incentives for homeowners depending on economic status and the property's location. Interventions include replacing outdated windows/doors, upgrading heating and hot water supply systems, installing shading systems and heat insulation on exterior walls, terraces and roofs.



EE

Eight funding programmes were identified supporting energy efficiency activities in Greece .

The overall amount of public funding for energy efficiency was around €150 million in 2012, peaked at €324 million in 2013 and decreased again to only € 41 million in 2014. The programme Saving Energy at Home accounts for the largest share of funds available.

The increase and subsequent drop in the overall funding level in the country over the period 2012-2014 follows the level of funding for this programme.

Energy efficiency funding in Greece is directed mainly at the buildings sector.

Smaller amounts went to the energy supply sector –for the installation of CHP systems (about €18 million per year from 2012 to 2014) and a round €5 million to the industrial sector (only in 2013).

Funding for energy efficiency in Greece is channeled through grants and soft loans.

The programme Saving Energy at Home provides both grants and soft loans. It is estimated that an average of 44% of the available funding for this programme are loans channeled by participating banks, whereas the rest of the funds are distributed as grants

THE EUROPEAN BANK FOR RECONSTRUCTION AND DEVELOPMENT STRATEGY FOR GREECE, approved by the Board of Directors at its meeting on 22 June 2016, in its STRATEGIC ORIENTATIONS Priority 3 underlines the "Support of private sector participation and commercialization in the energy and infrastructure sectors to enhance regional integration and improve quality of utility services"



Latvia

The EPBD - national implementation report

In Latvia, the implementation of the Energy Performance of Buildings Directive (EPBD) falls under the responsibility of the Ministry of Economics which develops and implements the national energy efficiency policy and as a consequence transposes the EPBD.

The laws and regulations that transpose Directive 2010/31/EC which were adopted and are in force:

- Cabinet Regulation Number 907 of 28 September 2010 "Regulations Regarding the Survey, Technical Servicing, Current Repairs and Minimal Requirements for Energy Efficiency of the Residential House".
- Law on the Energy Performance of Buildings (LEPB) - adopted in the Latvian Parliament Saeima, 9 January 2013;
- Cabinet Regulation No. 348 of 25 June 2013 "Building energy performance calculation method". sets energy performance methodology requirements
- Cabinet Regulation Number 907 of 28 September 2010 "Regulations Regarding the Survey, Technical Servicing, Current Repairs and Minimal Requirements for Energy Efficiency of the Residential House". Cabinet Regulation No. 382 of 9 July 2013 "Regulations Regarding Independent Experts of Energy Performance of Buildings", defines requirements for independent experts
- Cabinet Regulation No. 383 of 9 July 2013 "Regulations regarding Energy certification of Buildings".
- amendments to the Latvian Building Norm LBN 00201 "Thermal requirements of the buildings envelopes" (LBN 002- 01), with new minimal requirements for energy performance of buildings, 22 April 2014;
- Energy performance requirements for external building envelope structures have been set since 2003, through the LBN 002- 01 that was then replaced in 2015 by LBN (Latvian Building Norm) 002- 15.
- Cabinet Regulation No. 338 of 30 June 2015 "Regulations regarding the Latvian Building Norm LBN 003- 15 - Construction Climatology" (LBN 003- 15) describes Climate conditions
- Regulation No. 382 which includes requirements for independent expert activities.

Cost-optimal calculation results show the cost-effective measures for different typologies of buildings:

- in multi-apartment buildings: facade insulation, attic insulation and window replacement
- in existing single family houses: the insulation of the attic and roof are refundable
- in existing school buildings: the insulation of external walls, the insulation of the attic and plinth and the replacement of windows and doors
- in existing kindergarten buildings: thermal insulation, insulation of the plinth, and replacement of windows
- in existing office buildings: insulation of exterior walls, and the insulation of the loft and the plinth
- in multiapartment buildings cost optimal measures are insulation of the outer walls of the buildings, additional insulation of the plinth, replacement of windows and insulation of basement ceiling

Minimum energy performance requirements of LBN 002- 15 are set for three types of buildings:

- > residential buildings, hospitals, kindergarten;
- > public buildings;
- > industrial buildings.

The minimum requirements apply for newly built, reconstructed and renovated heated buildings, as well as for new heated spaces added to existing buildings when their temperature during the heating season is maintained at 8 degrees C, or more.

LBN 002- 01, amended in April 2014 establishes minimum requirements for the external envelope structures of buildings closer to the cost- optimal level (see tables).

Regulation No. 907 dictates the minimum energy performance requirements for existing residential buildings, through the uptake of energy performance improvement measures: residential building administrator or owners shall plan measures for improving energy efficiency, including renovation, if the average thermal energy consumption of the house, during the last three calendar years, has exceeded 200 kWh/m².year or 150 kWh/m².year, if the heat is only used for house heating.

Envelope element	W/m ² .K	1980	1992	2003	2014 (values after cost-optimal study)
Roof		0.90	0.33	0.20k	0.15k
Floor		1.10	0.50	0.25k	0.15k
Wall		1.10	0.42	0.30k	0.18k
Window		2.40	2.20	1.80k	1.30k
Door		2.40	2.20	1.80k	1.80k
Thermal bridges	W/m.K	0.90	0.60	0.20k	0.10k
Energy consumption for heating	kWh/m ² .year	150 - 200	100 - 130	70 - 90	60 - 80

Change of requirements for the building envelope of residential buildings and approximate energy consumption for heating.

Type of building	Residential, homes for elderly, hospitals and kindergartens	Public, excluding pensions, hospitals and kindergartens	Industrial
Heat Transmission coefficients			
Envelope U _{RN} / U _{RM}	W/m ² .K		
Roofs	0.15k/0.20k	0.20k/0.25k	0.25k/0.35k
Floors	0.15k/0.20k	0.20k/0.25k	0.30k/0.40k
Walls	0.18k/0.23k	0.20k/0.25k	0.25k/0.30k
Windows	1.30k/1.80k	1.40k/1.80k	1.60k/1.80k
Doors	1.80k/2.30k	2.00k/2.50k	2.20k/2.70k
Thermal bridges	W/m.K		
	0.10k/0.15k	0.15k/0.20k	0.30k/0.35k

k - temperature factor $k = 19/(\Theta_i - \Theta_e)$, depends on the indoor and outdoor air normative temperature values.

Note: The actual value for separate building elements may not meet the normative value, but the entire building must meet the total normative value.

Requirements (normative/maximum) for the building envelope after the costoptimal study.

The energy performance calculation methodology - as described in Regulation No. 348 (2013) is applicable for new and reconstructed buildings: it is based on the corresponding CEN/TR 15615:2009, on standard EN ISO 13790:2008 conditions, and it also includes references to the 16

other standards. It includes primary energy factors of non- renewable energy, using the values specified in DIN V 185991: 2011-12, which have been customised in accordance with the Institute of Physical Energetics experts' calculations according to Latvian conditions.

Towards Nearly ZeroEnergy Buildings (NZEBs)

the Law on the Energy Performance of Buildings (LEPB) is the national application of the NZEB: in the LEPB, a NZEB is defined as a building with a very high energy performance, using high efficiency systems for its energy supply.

Requirements for NZEBs are set out in Regulation No. 383, that dictates the following requirements for new and renovated class A rated buildings:

- final energy demand for heating must not exceed 30 kWh/m².year;
- the total primary energy consumption for heating, hot water supply, mechanical ventilation, cooling and lighting shall not exceed 95 kWh/m².year;
- high-performance systems are used in the building, enabling to:
 - provide at least 75% of ventilation heat recovery during the heating period;
 - provide at least partial use of renewable energy;
- there must be no low- efficiency fossil fuel heating system installed in the building.

The mentioned requirements, set in 2013, are not attainable in an economically reasonable way according to the cost- optimal study: this: makes it necessary to develop another study to produce new NZEB definition and values.

Country	Residential Buildings		Non-Residential Buildings	
	(kWh/m ² /y or Energy Class)		(kWh/m ² /y or Energy Class)	
	New	Existing	New	Existing
Latvia	95	95	95	95

Energy requirements defined by EU Member States for NZEB levels and Latvian figures

Experience in the low energy buildings construction in Latvia began in 2012, with the Low energy buildings" (LEB) project activated by the of Environmental Protection and Regional Development in the context of the Latvian governmental programme "Climate Change Financial Instrument (CCFI). LEB supported the construction an reconstruction of buildings: 14 different projects were realised for different building types by 2013

Implementation of the Energy Efficiency Directive (EED) regarding building renovation

1. Legal context

The requirements of the EED still are not fully transposed into national legislation but the main legal document "Energy Efficiency Law" has entered into force from March 29, 2016.

Issues covered by the laws:

- Energy Efficiency Obligation Scheme
- EE Funds
- Voluntary agreements on EE improvements
- Energy auditing. Energy audits in companies
- Energy management system in entities – large electricity consumers. Energy Efficiency Duty



- EE Services
- EE Monitoring
- Provision of Final Consumers with Information

Since 2012, Latvia annually collects information about the energy performance of central government buildings: to meet the 3% renovation rate of the total floor area as mentioned in Article 5 of the EED, Latvia has since 2012 renovated 232,635.36 m² of central government buildings, which fulfils the Latvian 3% target rate until 2017. After 2017, Latvia is planning a programme for central government building renovation to be started in 2016.

The level of competence, objectivity and reliability of energy auditors (art. 16), energy managers and installers in Latvia is sufficient, and is secured by different articles of laws, some of which are here under indicated:

- Regulations of Cabinet of Ministers No 445 "Regulations on National Accreditation Institution"
- Regulations of Cabinet of Ministers No1059 "Terms of Conformity Assessment, Accreditation and Supervision of Assessment Bodies"16;
- Regulations of Cabinet of Ministers No 138 "Regulations on Energy Audits in Industry"17

The EPC register was completed in 2015, but certain legislative improvements are still necessary. The EPC registration software system was planned to begin running on 15 January 2016.

Engaging the consumers

The requirements of the Article 15 of EED regarding the role of regulatory bodies in promoting EE are transposed into the National legislation by the following articles of:

- Law on Regulators of Public Utilities;
- Public Utilities Commission Council decision "Electricity transmission system service tariff calculation methodology", "Electricity distribution system service tariff calculation methodology", "Thermal energy supply service tariff calculation methodology", "Electricity Network Code"

Electricity distribution company "Sadales tīkls" Development Plan for the next 10 years includes smart grid development in two main directions: distribution grid automation and smart grid elements (sensors, active emergency power supply control equipment) gradual implementation; and smart electricity metering implementation, replacing the old counters.

The purpose of the Plan is to provide customers and electricity traders with information on current electricity consumption; Providing new service opportunities; Carry out power supply quality monitoring for each connection; Reduce electricity consumption monitoring and control loss costs. Smart electricity metering priority is to install smart meters for users with electricity consumption over 2500 kWh/year of distribution transformer substation networks with highest energy consumption. "Sadales tīkls" plan provides up to year 2023 fully replace old meters with smart meters. In year 2014 it was planned to install 50 000 smart meters and in the following years 100 000 smart meters in a year. (Source "Smart meters and consumer engagement" 3.03.2015)

The requirements of the Article 12 (and 17) of the EED regarding promotion of efficient energy use by small energy customers, including domestic customers are transposed into the National legislation by Article 4 part 6 of the Energy Efficiency Law.



The appointed ministry shall establish measures to facilitate the efficient use of energy by households and other consumers, and its website has to provide information on energy efficiency improvement measures aimed to change their behaviour to improve energy efficiency and support programs and other fiscal incentives to improve energy efficiency.

Since 2010 the Ministry of Economic affairs together organizes the communication campaign "Lets Live Warmer!" to promote energy efficiency of buildings in Latvia with key objectives of: - raising awareness about energy efficiency among the general public and decision makers;
- activating apartment owners into renovation using the aid from EU funds;
- informing and advising building managers, apartment owner associations and trustees on EU funding programmes, conditions, and benefits;
- encouraging construction companies, construction material manufacturers and investors to take the initiative of housing renovation.

Subsidies and incentives

The "Energy Efficiency Law" on 2016 sets a National Energy Efficiency Fund (NEEF) that have the following characteristics:

- sources are coming by payments done by the participants to the Efficiency Obligation Scheme
- min. 90% of EE duties are to be paid by non-compliant with the law large electricity consumers
- the resources of NEEF will be spent to support programmes aiming to achieve the mandatory targets of end-use energy savings and for
- public information and education programmes on EE

The "Energy Efficiency Law" on 2016 sets a Municipality Energy Efficiency Fund (MEEF) that have the following characteristics:

- sources are coming by payments done by the participants to the Efficiency Obligation Scheme AND municipal budget
- the resources of NEEF will be spent to support programmes aiming to achieve the mandatory targets of end-use energy savings and for
- supporting the implementation of EE measures planned by the municipalities and to
- implement and maintain the energy management system(s) of municipalities

The Latvian government promotes the generation of electricity from renewable sources through a feed-in tariff, which also includes elements of a quota system and tenders. The support scheme is being revised since 2011 and is closed for new submissions until 01.01.2020.

Latvia 2nd National Energy Efficiency Action Plan (NEEAP 2007-2013) provided the following EE measures:

- 1) Household sector, financial measures (co-financed by EU ERDF) under the National Operational Programme "Infrastructure and Services 2007-2013":
 - a) "Improving thermal stability of apartment blocks"
 - b) "Improving thermal stability of social housing",
- 2) Tertiary sector, financial measures (co-financed by CCFI):
 - a) "Improving EE in local authority buildings,
 - b) "Improving EE in buildings housing higher education institutions",
 - c) "Complex solutions to reduce GHG emissions in buildings housing State and local authority vocational education institutions"
- 3) Horizontal Measures –



- a) Improving minimum EE requirements in new buildings or in reconstructions,
- b) improving EE, by developing and implementing local authority EE action plans,
- c) GPP,
- d) exemplary measures and leading role of the public sector

EU Funds financing is still the main source of funding of energy performance of building projects for the 2014-2020 programming period supplemented with State, local governments and private funds. The following measures for the 2014-2020 programming period are foreseen:

- improving the energy performance of residential buildings,
- improving the energy performance of central government buildings,
- improving energy performance of municipal buildings

A total of EU Funds co-financing for these measures is c.a.280 MEUR (150 MEUR, 97.86 MEUR and 31.4 MEUR respectively). The EE in buildings measures is complementary with the measures aimed to increase EE and use of local RES in DH sector for which 53.19 MEUR EU Funds co-financing is assigned.





The Netherlands

Regulatory framework

Renovation

The partial renovation or change or extension of a building

- Article 5.6 paragraph 1 (Bb)
 - For Thermal insulation obtained the legal level applies as lower $R_c = 1,3 \text{ m}^2 \text{ K} / \text{W}$
 - For The air flow applies the law resulting level

Renovation or replacing insulation layers

- Article 5.6, paragraph 2 (flat) - Thermal insulation (R 2.5 minimum floor / wall 1.3 / $2 \text{ m}^2 \text{ K} / \text{W}$ roof / U up to $2.2 \text{ W} / \text{m}^2 \text{ K}$ for average of windows, doors, etc. ., or legally obtained level if it has a better energy performance.

Major renovation

A major renovation affects more than 25% of the surface of the building envelope (definition in Building Regulations Article 3.2.):

- Article 5.6, paragraph 3 (Bb) - Thermal insulation (see table 5.1 Bb: RC floor at least 3.5 / 4.5 facade
- Article 5.6, paragraph 4 (Bb) - / $6 \text{ m}^2 \text{ K} / \text{W}$ roof / U up to $1.65 \text{ W} / \text{m}^2 \text{ K}$ for average of windows, doors, etc.
- For the air flow applies the law resulting level

Enlargement with adaptation of the technical building system (installation)

(partial) renovation, alteration or enlargement of the technical building system (installation) system yields (Article 6:55 Bb Table 6:55)

- Heating system for residential purposes, not local - 0.71
- Heating other functions, not local - 0.65
- Local verwarmingssyst - 0.63
- Hot water system - 0.29
- Cooling System - 0.75
- Ventilation with fan capacity $> 5000 \text{ m}^3 / \text{h}$, expressed in $2,50 \text{ W} / (\text{dm}^3 / \text{s})$

The EPBD - national implementation report

In The Netherlands, the implementation of the Energy Performance of Buildings Directive (EPBD) falls under the joint responsibility of:

- the Ministry of the Interior and Kingdom Relations;
- the Netherlands Enterprise Agency (RVO.nl), which implements the national EPBD legislation in The Netherlands and is also in charge of managing the certification schemes, the training and accreditation of experts and compliance checking, as well as a central register to stock all certificates;
- the National Governmental Inspection Authority IL&T ("Inspectie Leefomgeving & Transport"), in charge of control and enforcement, and along with others, of policing the quality of accredited experts and checking the presence of valid Energy Performance



Certificates (EPC) for sale and rental, as well as of obtaining the permits of use for new residences;

- certification institutions, in charge of policing the quality of independent experts active in the labelling of nonresidential buildings.

In September 2013, a national Energy Agreement ("Energie Akkoord") was signed by more than 40 market participants and other stakeholders. The targets for energy efficiency and use of renewable energy in buildings in this agreement are in line with the requirements of the EPBD. Until 2020, the EPC of 300,000 existing residences will be improved by two energy grades in the energy performance scale. The stock of the social housing sector will be renovated to the level of energy class B on average. In the private rental sector, 80% of the existing houses will be improved to a minimum of energy class C. After 2020, newly built residences have to reach the Nearly Zero- Energy Building (NZEB) standard. The Agreement should provide support for the market uptake of an energy efficient and energy- neutral building environment in the future of The Netherlands.

Energy performance requirements have been in place for new buildings in The Netherlands since 1995. They are updated on a regular basis, moving towards NZEB targets for 2020.

The change towards more demanding requirements took place as a result of so called 'tightening studies'. These studies included an analysis of the market penetration of energy efficiency measures, renewable energy applications and energy- efficient heating and cooling generators. They also took into account the cost- effectiveness of these measures and their impact on indoor climate and occupant satisfaction.

In 2011 and 2012, a study was performed by a consulting company supervised by the RVO on behalf of the Ministry of the Interior, to establish cost- optimal minimum requirements for existing buildings. These requirements came into effect in 2013- 2014. The main requirement for the energy performance of new buildings is the energy performance coefficient.

The energy performance coefficient calculation is part of the building permit application.

New buildings and major renovations that are required to have a building permit also have to meet minimum requirements for building components, e.g., the R- value of walls, roof and floor, and the U- value of windows and doors. A major renovation is any building in which more than 25% of the envelope will be renovated.

For minor renovations, there are only minimum requirements for the R- value of walls, roof and floor, and U- value of windows and doors. In such cases, no energy performance calculation or building permit is required.

A project developer has to demonstrate full compliance with the energy performance requirements to receive a building permit for a new building or a major renovation. Permits are checked and issued by local municipalities before construction.

Monitoring and enforcement is carried out by the regional environmental services.

Municipalities are also responsible for compliance checking during construction.

In case of non- compliance, they issue a 'cease- work' order that remains valid until the requirements are met. As such, there are no financial penalties. Buildings that do not comply do not get built and if builders deviate, construction is ceased until it is in line with the permit.

Every year, a sample is drawn by the RVO to check if all permits are in line with the legal requirements. If the permits are not in line with the legal requirements, the RVO will report this to the municipalities who will take legal action.

Lack of funds and limited capacity at the municipal level hinders the level of enforcement of the regulation in case of renovation.



Towards Nearly ZeroEnergy Buildings (NZEBs)

The energy performance coefficient has been tightened on 1 January 2015, as an intermediate step to reach the NZEB level. The next step will be to place demands on primary energy consumption and the share of renewable energy up to the NZEB level.

The study on the cost optimality in accordance with Article 5 of the EPBD is planned for 2018.

The Dutch government supports a programme from intermediary organisations, aimed at repairing the market players for increased demands to reach the NZEB level for new buildings with 300 K€/year.

In 2016, the organisations will start a new programme under the name 'ZEN' (i.e., 'very energy efficient new buildings') to prepare the market players for tightening NZEB requirements in 2020. This will also be supported by the Dutch government.

The Dutch government supports the "Energiesprong" and the "Stroomversnelling". The "Energiesprong" (energy jump) is an initiative that aims to reach very energy efficient renovations in both the private and social housing sector. They are supported with 45 M€. From the yearly report "Energiesprong" 2014, nearly 130 zero-energy-bill houses have been realised. The "Stroomversnelling" (white water) aims to renovate 111,000 social housing buildings and 50,000 privately owned houses to the level of the net zeroenergy bill.

Laws and legislation are adapted to enable owners to get a refund ("Energiepresetatievergoeding") in case of renters for this reduced energy bill. This solves the problem of the split incentive, in which the costs of energy efficiency measures are the responsibility of the building investor or owner, whereas the benefits of a lower energy bill go exclusively to the tenants. Unless these costs are recouped from the tenants, the owner should not be liable for investing in energy efficiency measures.

Implementation of the Energy Efficiency Directive (EED) regarding building renovation

The targets for energy efficiency and use of renewable energy in buildings in the Energy Agreement are in line with Article 4 of the Energy Efficiency Directive (EED).

Until 2020, the energy label of 300,000 existing residences will be improved by 2 classes. The stock of the social housing sector will be renovated to energy label class B on average. In the private rental sector, 80% of the existing houses will be improved to a minimum energy label class C. After 2020, newly built residences have to reach NZEB standards.

For Article 5 of the EED, the Dutch government has chosen the 'default' approach to ensure that 3% of the total floor area of heated and/or cooled buildings owned and occupied by its central government is renovated each year, and 2% of energy savings per year is reached.

This will be realised through sustainable procurement, optimising and tuning of energy installations and deep renovation once every 20 years. The total savings during the period of 2014 – 2020 will be 700 TJ (100 TJ/year) for the buildings owned by the Government Buildings Agency. In the period of 2009 – 2019 an additional savings of 600 TJ (60 TJ/year) will be reached for the real estate owned by the Department of Defence. The total savings are estimated at 160 TJ/year.

Concerning Article 5.7, 'Encouraging other bodies to follow central government's exemplary role in building renovations', the Netherlands has placed this responsibility within the umbrella organization of municipalities, as confirmed in the national Energy Agreement.



Engaging the consumers

There are 7,587,028 residential buildings in The Netherlands. At the end of 2014, 33% of these residential buildings had an EPC (2,499,336 units).

In 2014, a total of 1,429 EPCs were checked by 4 certification institutes. Of these, 6% of residential buildings did not comply with the quality criteria. For nonresidential buildings the non-compliance rate was 11.1%.

The Dutch parliament agreed in 2014 to introduce a smart gas and electricity meter to all homes and small businesses by 2020. The distribution systems operator is responsible for offering smart meters, grants access for the metering data to the energy supplier, and is the responsible party for collecting and validating the metering data for other third parties upon customer request. The highest benefits associated with the smart meter rollout appear to go to the customer, as the advantages of energy savings and efficiency improvements in the market largely benefit the customer. Therefore, part of the rollout strategy is to encourage the consumer to opt for a smart meter with detailed meter readings and to use it as efficiently as possible. Furthermore, the smart meters are considered a significant contributor to a future smart grid system.

Before 2015, several activities to promote the EPC were undertaken via a specific website, television and/or media campaigns.

In the period between January and March 2015, 4.5 million residence owners that did not have an EPC received a letter with a temporary energy label for their residences. The intention of this initiative was to make them aware of the energy performance of their property and the opportunities to improve it, as well as of their obligation to have a definitive EPC when selling or renting their house. The obligation related to the labels was also communicated through social media and other national and regional public channels. A call centre was set up with a staff of over 40 employees to answer questions.

Municipalities developed additional awareness campaigns and organised local information desks.

The introduction of a new simplified EPC in the Netherlands has empowered citizens to directly influence their energy use. The practical advice has given building owners concrete steps for improvement. The new EPC has become a marketing tool instead of a technical process. It is motivating for owners to improve the energy level of their houses and get a new EPC. A good level is perceived as an indicator for good quality and an added value. This is also recognised by banks and other financial institutions and has influenced mortgaging. Banks are investigating if they can offer lower interest rates for better EPCs from 2016 onwards. The EPC has supported builders and installers in their pursuit of energy efficiency as a new or renewed market. New market offers have sprung up from different companies that offer integral solutions for homeowners and buildings to upgrade their EPC. The long-term experience of Dutch professionals with integral solutions contributes to an increased demand. The voluntary agreement of the partners in the 'Energy Accord' gives a central place to improvements of the EPC as a vehicle to reach the 2020 objectives. This broad support has contributed to higher investments in energy efficiency and renewable energy.

In addition a series of soft measures to build capacity of relevant stakeholders:

- 'Smart Energy': campaign to inform facility managers about energy saving and use of RES in their buildings
- "Energy subsidy guide": internet tool; overview of financial instruments (subsidies, loans)
- "Energy Scout": interactive internet tool; insight into energy saving measures in existing houses and the financial consequences



- demo projects of several offices and schools, which were renovated and transformed into nearly zero-energy buildings

Subsidies and incentives

Energy performance (EPC) requirement for new building tightened up in 2015, and the energy Performance Standard (EPN) sets requirements for EE of new and major renovations of existing buildings. The most effective instruments to boost renovation have so far been incentives and subsidies.

Measures carried out included:

- 'SDE+': subsidy scheme for investments in renewable energy systems such as geothermal systems and bio- based installations;
- Sustainable heat subsidy scheme for solar boilers, heat pumps and micro -CHP systems in existing homes
- Grants for innovation of techniques and for supporting process to building nearly zero-energy building (pilots)
- Energy Savings Credit Guarantee / Green Projects Scheme /National Mortgage Guarantee
- Energy efficiency funds under programme "Energy Leap" (2011-2014): tax rebate, co-financing Energy efficiency funds, and "More With Less": energy saving programme for existing buildings, with the goal to create a substantial market for energy savings; offer educational training of building workforce and provide information on how to save energy, and apply for grant
- "Energy subsidy guide": for energy performance advice, improving energy performance - subsidies include a grant of 200 € for a detailed Energy Performance Advice, and subsidy of 350€ or 750 € when improving EP of dwelling and a higher mortgage when achieving class A, as well as lower VAT rate for insulation of roof, wall and floor and further incentives
- 'Energy Investment Allowance' (EIA): tax reduction for investments in innovative sustainable energy systems based on an EPC indicator;
- 'National Energy saving Fund' (NEF): cheap loans for energy saving measures for private owners (300 M€);
- 'STEP': subsidy for social housing corporations for investment in energy efficiency (400 M€) based on EPC improvements;
- 'Funds for the Energy Saving Rental Sector' (FEH): cheap loans for extreme energy efficient renovations (75 M€);
- 'Energie Prestatie Vergoeding': social housing corporations that rent houses or apartments with a 'zero energy bill' can oblige the occupants to pay a contribution to the energy investments. This overcomes the barrier of the split incentive.
- Energy Savings Credit Guarantee / Green Projects Scheme /National Mortgage Guarantee loans targeted at home owners.





Norway

The Planning and Buildings Act (2016-)

Energy requirements in the technical requirements for building works chapter 14, Technical Building Works Regulations. Latest amendments adopted November 12, 2015.

The latest tightening of the energy efficiency requirements for new buildings was adopted November 2015, entered into force 1. January 2016, with a transition period until 1. January 2017.

Detailed title: Amendments to the technical requirements for building works chapter 14 (Energy), Technical Building Works Regulations of 26 March 2010 No. 489. Planning and Building Act of 27 June 2008 no 71.

<https://lovdata.no/dokument/LTI/forskrift/2015-11-12-1290> (amending regulation, in Norwegian)
<https://lovdata.no/dokument/SF/forskrift/2010-03-26-489> (regulation, in Norwegian)

Applicable Building Type(s): Existing non-residential, Existing residential, New non-residential, New residential

Policy Requirement Level: Mandatory

Governance:

Development Authority: Norwegian Building Authority, Ministry of Local Government and Modernisation

Implementation Authority: Local Government (municipalities)

Verification Authority: Local Government (municipalities)

Enforcement Authority: Local Government (municipalities)

Prescriptive Compliance path

Prescriptive - Energy Requirements for Buildings: Heated usable floor area

Energy Requirements:

Insulation

U-Values (W/m².K) Walls Floor Roof

Minimum requirements $\leq 0.22 \leq 0.18 \leq 0.18$

Basic/standard requirements $\leq 0.18 \leq 0.10 \leq 0.13$

Windows

U-Values (W/m².K) Windows

Minimum requirements ≤ 1.2

Basic/standard requirements ≤ 0.8

Proportion of window and door areas $\leq 25\%$ of heated usable floor space.

Air Leakage

The energy budget in the requirements assume an air leakage of max. 0.6 l/(s.m²) at 50 Pa.

Renewable Energy



Section 14-4 Energy supply requirements

- 1) The installation of fossil fuel heating installations is not permitted.
- 2) Buildings with heated usable floor space (BRA) of more than 1,000 m² shall
 - a) have energy flexible heating systems,
 - b) adapted for the use of low temperature heating systems.
- 3) The requirements in the second paragraph does not apply to small houses.
- 4) Small houses must be constructed with chimneys. The requirement does not apply if
 - a) the house is constructed with a central heating system, or
 - b) yearly net energy need for heating does not exceed the requirements for passive houses, calculated in accordance with Norwegian standard NS 3700:2013 Criteria for passive houses and low energy houses.

Compliance Softwares:

Various software can be used if in line with national calculation methods

End-uses considered

Space heating, Appliances, Water heating, Lighting interior, Ventilation

The EPBD - national implementation report

In 2012, a broad agreement in the Parliament stated that all new buildings should be at "Passive House" level in 2015, and Near Zero- Energy Buildings (NZEB) by 2020.

Directive 2002/91/EC, the first version of the Energy Performance of Buildings Directive (EPBD), has been fully implemented in Norway since 2010. By the end of 2015, approximately 570,000 Energy Performance Certificates (EPCs), had been issued. The majority of these concern houses and apartments, while 22,000 concern non- residential buildings.

Directive 2010/31/EU has not been formally included in the Agreement on the European Economic Area (EEA), and is thus not implemented in Norway. The content of this directive is, however, actively pursued in the planning of future regulations. A control scheme was established in 2013 and samples are controlled for the existence of certificates.

Norway has two for passive houses and low- energy buildings: NS 3700 for residential buildings (Kriterier for passivhus og lavenergibygninger), and NS 3701 for non- residential buildings (Norsk passivhusstandard for yrkesbygninger).

The definition of "Passive House" level is in the building regulations since 2015: since January 2017 the requirement is be mandatory, although the requirement per-se do not fully meet the "Passive House" standards

Options given to meet the requirements (being the 1st the only one available for non- residential buildings):

- Specific energy limits for different building types, set in kWh/m²/yr. considering heat recovery from ventilation systems but not considering system losses and energy export (see 1st table)
- The 2nd option addresses different components of the building envelope, as well as technical installations and solutions: the requirements are fulfilled if 9 specific energy measures are applied. In addition to requirements concerning insulation and envelope airtightness, there are specific requirements for the heat recovery of ventilation air in the

ventilation apparatus (yearly mean heat recovery rate), and the Specific Fan Power (SFP) factor.

To ensure flexibility in heating systems, and systems being based on renewable energy, all buildings larger than 1,000 m² shall have flexible heating systems. Detached dwellings need to have a chimney, unless flexible heat distribution is installed and the installation of heating systems meant for fossil fuels is prohibited.

Primary energy factors are not used in the regulations because electricity production is almost exclusively based on renewable energy and fossil fuels are to be phased out from buildings.

Since 1 January 2013, all new buildings are required to be controlled by an independent expert at the end of the construction process (larger residential buildings and non-residential buildings require a more extensive than for single-family houses).

Air leakage testing is mandatory for all building types and must be documented according to the current standard.

The Norwegian standard for the calculation of the energy performance of buildings is called NS 3031. This standard is built on the EN 15603. The regulation of 2015 is based on the 2014 version of NS 3031.

Requirement	2010 (after EPBD Directive 2002/91/EC)	2015
Net energy demand kWh/m ² .year	Single-family house: 120 + 1,600/m ² heated floor area Apartment: 115 Commercial building: 150	Single-family house: 100 + 1,600/m ² heated floor area Apartment: 95 Commercial building: 115
Maximum area of glass plus doors	20% of heated floor area	25% of heated floor area
Max U-value: exterior wall W/m ² .K	0.18	0.18
Max U-value: roof W/m ² .K	0.13	0.13
Max U-value: exposed floors W/m ² .K	0.15	0.1
Max U-value: glass/doors W/m ² .K	1.2	0.8
Thermal bridges (normalised U-value) W/m ² .K	Single-family house: 0.03 Other buildings: 0.06	Single-family house: 0.05 Other buildings: not defined
Minimum efficiency of heat recovery in ventilation air	Dwellings: 70% Commercial building: 80%	80%
Minimum airtightness (Max air changes/hour at 50 Pa pressure difference)	Single-family house: 2.5 Other buildings (with more than two floors): 1.5	1.5
Max SFP factor kW/(m ³ /s)	Dwellings: 2.5 Commercial building: 2.0	Dwellings: 1.5
Max screening factor for glass/window (gt)	0.15 (all buildings)	

Minimum energy requirements for buildings in Norway.

U-value exterior wall W/m ² .K	U-value roof W/m ² .K	U-value exposed floors W/m ² .K	U-value glass/doors W/m ² .K	Airtightness (air changes/hour at 50 Pa pressure difference)
≤ 0.22	≤ 0.18	≤ 0.18	≤ 1.2	≤ 1.5



Minimum requirements under the “specific energy limits” option: absolute minimum requirements that must be fulfilled if using the option of net energy demand limit.

The Government announced in 2013 that new requirements, to be decided in 2015, would be close to the now-established Passive House level. The new requirements were decided in November 2015, although less ambitious than the level defined by the Passive House standards. Norwegian window producers continue to develop cutting edge technology, and are now developing windows to meet the NZEB requirements 2020), including windows with integrated solar collectors. In 2013, more than 1M m² of passive houses and 400,000 m² of low energy buildings were built with support from the national programme for passive and low energy buildings, making up for more than 10% of the new building stock.

Towards Nearly ZeroEnergy Buildings (NZEBs)

2020 goals aim to comply with NZEB, but still have to be formalised

The Norwegian Parliament stated that the building requirements in 2020 will correspond to NZEB level, however, the concept of NZEB in a Norwegian context has not yet been fully defined, as Norway has no NZEB definition

Norway's first NZEB, a single family house, was completed in 2012. The table shows the calculated energy needs. After the first full calendar year in use, the actual used energy for the operation of the house (excluding consumption not related to the building operation) was about 6,500 kWh, and the produced electricity from the solar panels was 7,126 kWh.

Heating	12,9 kWh/m ² /yr
Hot water	29,8 kWh/m ² /yr
Ventilation fans	4,4 kWh/m ² /yr
Cooling	0 kWh/m ² /yr
Technical equipment	17,5 kWh/m ² /yr
Pumps	0,8 kWh/m ² /yr
Lighting	11,4 kWh/m ² /yr
Others	0,8 kWh/m ² /yr
Total	76,8 kWh/m ² /yr

Implementation of the Energy Efficiency Directive (EED) regarding building renovation

The EED is not yet implemented in Norway.

Requirements for technical building systems (TBS)



The regulation have a special requirement for energy supply to stimulate energy flexibility: a building with more than 1,000 m² floor area shall be designed and constructed with a flexible heating system, prepared for low temperature heat.

An obligation to connect to a district heating system, buildings shall be equipped with a heating system allowing for the use of district heating for heating rooms, ventilation heating and hot water.

The Regulation of system performance is distinct from the product or whole building performance

It is required that pipes and other elements of the heating system be insulated according to cost efficiency and Norwegian standards.

There are no requirements specifically for installation, dimensioning, adjustment, and controls.

At the moment there is no encouragement of intelligent metering

Encouragement of active energy saving control (automation, control and monitoring): to get economic support for the installation of heat pumps, a specific energy and heat monitoring system must be installed. To be able to apply for economic support to upgrade existing commercial buildings, an energy monitoring system must be in place before the upgrade.

Energy performance certificates (EPCs) requirements

The scheme for the certification of buildings is under the responsibility of the Ministry of Petroleum and Energy and the Norwegian Water Resources and Energy Directorate (NVE) is the managing body for certification and inspection schemes.

The regulation does not distinguish between public and private buildings: the EPC both for residential and non- residential buildings is valid for 10 years, or until the building undergoes major changes.

EPC has to be shown to potential buyers and renters as a part of the marketing.

The regulation requires that every residence has an EPC (both apartments and single- family houses)

EPC in figures: more than 570,000 EPCs have been issued in 2010-2015, implying that more than 400,000 unique buildings/ apartments have been certified.

More than 90% of the EPCs are issued for residences.

Typical EPC costs: the certificate for existing residences can be obtained free of charge by anyone self-registering data on the internet. A hired certification costs above 200 €.

Engaging the consumers

In the public information campaigns of 2010- 2011, the core messages were on energy certification and less on inspection of technical systems.

The reduction rate of certification over the years 2014-2015, in particular for nonresidential buildings, creates a clear challenge to implement a new information strategy capable of addressing this challenge.

Subsidies and incentives

1. Investment aid for new technology for the future's buildings, started in 2014: Enova offers aid to project regarding new technology for the future's buildings with Grants and subsidies





2. Investment aid for existing buildings Norway, started in 2012: Investment aid to implement energy efficiency measures in existing commercial and public buildings, including building cooperations with Direct investment. Managed by Enova

3. Incentives for Low-energy Housing, started in 2002. The Norwegian State Housing Bank (husbanken) assists with achieving Norway's national environmental targets by encouraging the construction of more environment-friendly housing, for example by stimulating low energy consumption. The Housing Bank supports projects that contribute to capacity building; those with a high level of ambition and a high transfer value. The basis for the Housing Banks environmental work is the environmental action plan for 2009 - 2012, issued by the Ministry of Local Government and Regional Development. Almost half of all new homes with a loan through the Housing Bank have specific environmental qualities. Projects focusing on low-energy housing, "passive" houses and environmentally friendly renovations and modernizations are prioritized, and nearly half of these have implemented energy saving measures. In new buildings, the energy saving is 40 percent or more, and for renovated buildings 20 - 40 percent.

Romania

The EPBD - national implementation report

In Romania, the implementation of the Energy Performance of Buildings Directive (EPBD) falls under the responsibility of:

- the Ministry of Regional Development and Public Administration (MDRAP);

The National Authority for Regulation in the Energy Sector (ANRE) is a key Stakeholder as well as the Romanian agency for energy conservation (ARCE)

Law 159/2013, in force since 19 July 2013, which amends Law 372/2005. Law 372/2005 on the energy performance of buildings (recast 2013) was published in the Official Gazette of Romania, No. 451/23.07.2013 and is the transposition of the Directive 2010/31/EU into national law (approved by the Parliament).

The national act of transposition embeds the following elements:

- a general framework for the methodology for calculating energy performance of buildings and building units;
- the application of minimum energy performance requirements for new buildings and building units;
- the application of minimum energy performance requirements for existing buildings, building units and building elements that form part of the building envelope, which are subject to major renovations, or the installation/replacement/upgrading of Technical Building Systems (TBS);
- the energy performance certification for buildings and building units;
- the inspection of heating and Air- Conditioning (AC) systems in buildings;
- the control of Energy Performance Certificates (EPCs), energy audits and inspection reports for TBS installed in buildings.

For the design of new buildings, the technical regulation in force is the Code for thermal calculation of building elements (C 107- 2005), published in the Official Gazette of Romania, No. 1124 bis/13.12.2005 (subsequently amended in 2010 and 2013).

Envelope building elements	Minimum corrected thermal resistances R_{min} ($m^2 \cdot K/W$)	Maximum corrected thermal transmittances U_{max} ($W/m^2 \cdot K$)
External walls	1.80	0.56
External windows	0.77	1.30
Terraces	5.00	0.20
Floors above unheated basement	2.90	0.35
Ground floors (no basements)	4.50	0.22
Floors of heated basements	4.80	0.21
External walls of heated basements	2.90	0.35

(technical regulation C 107-2005 with further amendments)

Reference R and U values (corrected by taking thermal bridges into account) required for residential buildings

In terms of minimum energy performance requirements, the code does not include a global indicator that gathers the consumption from individual elements such as heating, Domestic Hot



Water (DHW), ventilation, or lighting, where applicable. It includes, however, prescriptive element-based criteria for insulation and the total thermal coefficient (G- value). The global heat transfer coefficient, G (W/m³.K), of the heated volume, is an overall minimum requirement and varies as a function of the number of floors of a building and the surface- to- volume ratio (A/V).

Residential buildings

The annual maximum heating demand is 15 to 37,5 kWh/m³.year depending on the climatic zone and the surface- to- volume ratio.

The maximum heat demand does not take the efficiency of the TBS into account.

Technical regulations contain assessment criteria for each building element, and calculation rules of the global coefficient for thermal insulation (G- value) that allow energy performance evaluation.

The level of energy requirements for new buildings depends on building type (housing, office buildings, schools, etc.) and building envelope elements, and it refers to:

- the minimum thermal resistance corrected by taking thermal bridges into account (the R value);
- the maximum thermal transfer corrected by taking thermal bridges into account (the U value);
- the global coefficient for thermal insulation (the G value).

Non- residential buildings

No explicit minimum thermal resistance values are given: reference is given to the value of the global coefficient G_{max} (total heat transfer coefficient) i.e. the values of thermal resistance for external walls, roof, floor (slab and floor laying) above an unheated basement, outer building perimeter of the floor in contact with the soil and windows (W/m².K).

Existing buildings

New technical regulations require:

- design code for façades with ventilated structures, NP 135- 2013 (technical regulation published in the Official Gazette of Romania, No. 807 bis/19.12.2013);
- guidelines for the design and execution of thermal rehabilitation of housing, GP 123- 2013 (technical regulation published in the Official Gazette of Romania, No. 538 bis/26.08.2013);
- framework solutions for the hydrothermal rehabilitation of the existing building envelope, SC 007- 2013 (technical regulation published in the Official Gazette of Romania, No. 540 bis/27.08.2013);
- guidelines for the design and execution of green roofs for new and existing buildings, GP 120- 2013 (technical regulation published in the Official Gazette of Romania, No. 803 bis/19.12.2013).

These regulations do not cover any potential energy savings due to improved efficiency in TBS, nor do they consider the real behavior of the occupants.

Non-residential buildings with full-time occupancy or part-time occupancy and high thermal inertia						
Building Type	Climatic zone	a (W/m ² .K)	b (W/m ² .K)	c (W/m ² .K)	d (W/m ² .K)	e (W/m ² .K)
Hospitals, kindergartens and clinics	I	0.59	0.25	0.48	0.71	1.45
	II	0.57	0.22	0.40	0.71	1.45
	III, IV	0.56	0.20	0.34	0.71	1.45
Educational and sports	I	0.59	0.25	0.48	0.71	2.00
	II	0.57	0.22	0.40	0.71	2.00
	III, IV	0.56	0.20	0.34	0.71	2.00
Offices, commercial and hotels	I	0.63	0.29	0.48	0.71	2.00
	II	0.59	0.25	0.40	0.71	2.00
	III, IV	0.56	0.22	0.34	0.71	2.00
Other types (normal conditions)	I	0.91	0.33	0.91	0.71	2.50
	II	0.91	0.33	0.83	0.71	2.50
	III, IV	0.91	0.33	0.77	0.71	2.50

(technical regulation C 107-2005 with further amendments)

Maximum thermal transmittance for non residential buildings with fulltime occupancy or parttime occupancy and high thermal inertia.

Non-residential buildings with part-time occupancy but without high thermal inertia						
Building Type	Climatic zone	a (W/m ² .K)	b (W/m ² .K)	c (W/m ² .K)	d (W/m ² .K)	e (W/m ² .K)
Hospitals, kindergartens and clinics	I	0.67	0.25	0.50	0.71	1.45
	II	0.63	0.22	0.43	0.71	1.45
	III, IV	0.59	0.20	0.38	0.71	1.45
Educational and sports	I	0.67	0.25	0.50	0.71	2.00
	II	0.63	0.22	0.43	0.71	2.00
	III, IV	0.59	0.20	0.38	0.71	2.00
Offices, commercial and hotels	I	0.67	0.29	0.50	0.71	2.00
	II	0.63	0.25	0.43	0.71	2.00
	III, IV	0.59	0.22	0.38	0.71	2.00
Other types (normal conditions)	I	1.00	0.34	1.00	0.71	2.50
	II	1.00	0.34	0.91	0.71	2.50
	III, IV	1.00	0.34	0.83	0.71	2.50

(technical regulation C 107-2005 with further amendments)

Maximum thermal transmittance for nonresidential buildings with part time occupancy but without high thermal inertia.

Proof of compliance with technical regulations of new buildings is carried out in two separate moments:

- when the building permit is request;
- after the building construction works have ended.

The efficiency of TBS is based on the minimum energy performance requirements set in the appropriate technical regulations listed in section 2.II.i.

In order to improve the energy performance of residential buildings, national programmes were promoted using various funding mechanisms in compliance with:

- Government Emergency Ordinance 18/2009, for increasing the energy efficiency in residential buildings, approved by Law 158/2011, with further amendments;
- Government Emergency Ordinance 69/2010 regarding the thermal rehabilitation of residential buildings, with bank funding based on a governmental pledge, approved by



Law 76/2011;

- European funding mechanism provided by the Structural and Cohesion Funds for programmes implementing the thermal rehabilitation of apartment buildings.

For the efficient use of public funding in implementing various thermal rehabilitation measures to increase the energy performance of buildings, the standard for costs of housing thermal rehabilitation was developed and approved by Government Decision 363/2010, with further amendments.

Romania has a Large Infrastructure Operational Programme for 2014-2020, a regional Operational Programme and a Strategy for mobilizing investment in the renovation of buildings. An Energy Efficiency Investment Fund manages financing from varied origin (Structural Funds, EU ETS revenues) and supports investment.

Towards Nearly ZeroEnergy Buildings (NZEBs)

The NZEB requirements will be introduced gradually, with a first update in 2015, an intermediate value in 2018 and the final values in 2020.

Based on Law 372/2005 (amended 2013) provisions, all new buildings should be NZEB buildings starting 1 January 2019 for public buildings and 1 January 2021 for all others

The nZEB plan background policies are here summarised:

- Energy roadmap for Romania (GD 890/2003) aiming at a final electricity consumption of 57.59 TWh in 2015;
- The national programme "Heating 2006–2015 heat and comfort" (GD 462/2006) for rehabilitation of the district heating systems and thermal rehabilitation of buildings;
- Romania's national energy strategy 2007–2020 (GD 1069/2007) aiming to reach a primary energy intensity of 0.32 in 2015 and 0.26 in 2020;
- The national strategy on the sustainable development of Romania – Horizon 2013-2020-2030 (GD 1460/2008).
- Continuation of "Heating 2006–2015 heat and comfort" programme;
- Continuation of the Programme for the improvement of energy efficiency of blocks of flats;
- Compulsory issuing of EP Certificates since 2010, for residential buildings sold or leased;
- Regulations or voluntary agreements;
- Supporting the development of ESCOs and ESCOs market

As of 2015, there are no newly constructed or existing NZEBs in Romania and no relevant data is available on this topic.

Several ongoing projects have acted and are still acting to provide technical support the increase in energy performance of buildings in Romania:

- BUILD UP Skills QualiShell" National Qualification Scheme for Construction Workers to Ensure High Performance Building Envelopes
- Cluster PRO-nZEB Cluster for promoting nearly zero energy buildings in Romania
Calificăte! Da-ți o șansă la o viață mai bună!"
- PROEFICIEN - Professional Qualifications for Energy Efficiency
- NeZeR - Promotion of smart and integrated NZEB renovation measures in the European Renovation market
- RePublic_ZEB - Refurbishment of the Public Building Stock Towards nZEB



Implementation of the Energy Efficiency Directive (EED) regarding building renovation

The national EE, that implements the EED, is included in the National Energy Efficiency Action Plan (NEEAP), approved and published in 2015. Main goals are:

- an overview of the national building stock based on statistical sampling;
- the identification of cost- effective approaches to renovations relevant to the building type and climatic zone;
- policies and measures to stimulate cost- effective deep renovations
- an estimate of expected energy savings and wider benefits
- job creation and improvement of the living conditions in buildings and workspaces perspective

Annex 1 of the NEEAP reports specific policies order to achieve the general objective of reducing energy consumption in buildings

The 3% yearly renovation of Governmental floors goal is incorporated in the MDRAP (Ministry of Regional Development and Public Administration) Order 3466/2013, making the inventory of buildings with a total useful

Low taxation rates for energy in the Country are at or near the EU minimum: this can hinder the momentum and efficiency of the EED Goals.

Engaging the consumers

Information campaigns that encourage energy performance of buildings for owners and tenants to are indicated in Law 372/2005 (and amendments of 2013). Main elements are:

- education programmes fro building owners/managers of buildings
- media dissemination of good practices implementation and highlighting high efficiency
- promotion of financial instruments
- promotion of policies and programmes to increase the number of NZEBs using energy from conventional sources by 2020;
- promotion of programmes for installing and operating alternative energy supply systems in buildings.
-

The MDRAP website. is the main reference.

The liberalization of energy markets will increase energy price for final consumers: this requires significant efforts at all levels, especially at community level to reduce negative effects to vulnerable consumers by reducing energy poverty. One solution is to reduce the energy consumption by increasing energy efficiency of households, also through community initiatives.

Subsidies and incentives

The national and local programmes established by Government Emergency Ordinance 18/2009, amended by Ordinance 63/2012, establish several financing mechanisms for rehabilitation works - for vulnerable categories - on building envelopes to increase the energy performance of residential





buildings and achieve the annual target on specific energy for heating consumption of 100 kWh/m²:

1) EU Structural and Cohesion Funds:

- 60% of funds from European funds and state budget allocations (approved annually in the MDRAP budget);
- 40% of funds approved annually in local budgets and/or other sources (as well as from the owner association's building repair fund and/or other sources).

2) the national funding programme, provides:

- 50% of funds from state budget allocations (approved annually in the MDRAP budget);
- 30% of funds approved annually local budgets and/or other sources;
- 20% of funds from the owner association's building repair fund and/or other sources (owner contribution);

3) local programme funding.



Assistant Buildings' addition to Retrofit, Adopt, Cure And Develop the Actual Buildings up to zeRo energy, Activating a market for deep renovation ABRACADABRA

Italy

(Development ongoing – see survey responses and training materials for more results)



This project has received funding from the European Union's Horizon 2020 Research and innovation programme under grant agreement No 696126

The EU Framework Programme for Research and Innovation

The communication reflects only the author's view and the Research Executive Agency for SMEs is not responsible for any use that may be made of the information it contains



Assistant Buildings' addition to Retrofit, Adopt, Cure And Develop the Actual Buildings up to zeRo energy, Activating a market for deep renovation ABRACADABRA

Spain

(Development ongoing)



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The Survey

National, Regional and Local Stakeholders were surveyed to develop the Toolkit: information was gathered through the following questions and merged to found bibliography.

Interview Questions

1. What is your country's approach to developing, adopting, administering and enforcing regulations enabling retrofitting?
2. Which Region in your country has the most advanced regulation? Please provide a few examples.
3. Are there any best practices, in terms of energy efficiency retrofit of regulation in your national context? Please provide examples.
4. What kind of minimum requirements are included in your national building code, in the different sectors?
 - a. Public and Institutional
 - b. Private Commercial
 - c. Private Industrial
5. What types of actors are involved in the definition of the building codes?
 - a. Public and Institutional
 - b. Private Commercial
 - c. Private Industrial
6. Is there any protocol or mechanism foreseen for monitoring, review, and assessment?
7. Is there any external verification process foreseen?
 - a. Public and Institutional (a. Local, b. Regional, c. National)
 - b. Private Commercial (a. Local, b. Regional, c. National)
 - c. Private Industrial (a. Local, b. Regional, c. National)
8. Is there any enforcement or incentive mechanisms to facilitate the success of regulatory tools? - Y/N - Which type (tax rebates/fiscal incentives, extra cubic meters....)?
9. Is there any type of standard used (such as LEED certification, ClimateHouse...)?
10. What are the main challenges in terms of regulation in your opinion?
11. What regulatory changes/ improvements do you think are necessary to speed up the renovation process of the existing building stock? What do you think the benefits would be?



Responses

Greece

Interviewee: Evi Tzanakaki, Project Manager, Center for Renewable Energy Sources (CRES)

1. What is your country's approach to developing, adopting, administering and enforcing regulations enabling retrofitting?

Save @ home ö paid by national gov through structural funds, it ays off up o 70% of the retrofit , according to income levels. Eg. For high incomes only bank loans are available for high incomes.

Ministry of energy in charge to energy in buildings, but a different ministry is in charge of regulation, and there is lack of coherence among regulations (e.,g regulations on materials and energy might be not coherent)

Local governments can act only in terms of public procurement of specification through tender.

Tax rebates and fiscal incentives might also be difficult

2. Which Region in your country has the most advanced regulation? Please provide a few examples.

Very centralized all same regulations

3. Are there any best practices, in terms of energy efficiency retrofit of regulation in your national context? Please provide examples.

Exceeding buildable are only for adding External insulation but up 30 cm

Increasing the height for solar systems on the allowable volume of the building (1.5 meters ?)

Bad practices of extension of allowable area, because they were closing down open air spaces, then it was sort of taken care of (through pay a fee)

Very strict building regulation – densification Is not possible

4. What kind of minimum requirements are included in your national building code, in the different sectors?

I don't know

5. What types of actors are involved in the definition of the building codes?

Only national governments. Only in the implementation of the regulation local municipal planning departments can be included in the process. But quite passive role.

Key is always to not have exceeded the building coefficient – which is set a national level, according to zones

Regional department do the zoning , municipalities can decide in usage, but not coefficient which are developed by regional organization supervised at the ministerial level

6. Is there any protocol or mechanism foreseen for monitoring, review, and assessment?

I don't know

7. Is there any external verification process foreseen?

I don't know



8. *Is there any enforcement or incentive mechanisms to facilitate the success of regulatory tools? -Y/N - Which type (tax rebates/fiscal incentives, extra cubic meters....)?*

Very low energy efficiency building you can a small increase in building. This is included in a different regulation than the energy one,

It has not been implemented because it is not clear criteria Building construction regulation

Practitioners would go to the planning department, who should know but does not, and this because the regulation was developed before the energy regulation and by a different ministry.

9. *Is there any type of standard used (such as LEED certification, ClimateHouse...)?*

National energy performance certificate

10. *What are the main challenges in terms of regulation in your opinion?*

- Lack of cooperation among ministries
- Different regulations not aligned
- Very strong centralization
- Incentives existing but not promoted/implemented

11. *What regulatory changes/ improvements do you think are necessary to speed up the renovation process of the existing building stock? What do you think the benefits would be?*

- Having ministries talking to each other
- Extensive discussion with respect to extending the legislation in order to use building volumes for real energy efficiency measures, with real monitoring of the performance
- Pilot studies for exploring the real potential
- Strong misuse the past



Italy

Interviewee: Danaïela Luise, Coordinamento AgendeLocali 21, Italia

1. What is your country's approach to developing, adopting, administering and enforcing regulations enabling retrofitting?

In Italia non esiste una normativa specifica e dettagliata per favorire la riqualificazione energetica degli edifici. Tuttavia nel luglio 2015 sono stati approvati i decreti ministeriali relativi ai requisiti minimi di prestazione energetica degli edifici ed alla certificazione energetica degli edifici dando così attuazione alla Direttiva 2010/31/UE. La normativa nazionale si applica solo alle Regioni che non provvedono autonomamente al recepimento della Direttiva UE.

Esistono fondamentalmente due diversi strumenti:

- 1) Piano Casa: una legge nazionale che prevede facilitazioni in aumento di cubatura nel caso in cui si realizzino piccoli interventi di riqualificazione energetica e almeno 1 kw di produzione di energia rinnovabile.
- 2) Detrazioni fiscali per interventi di : riqualificazione energetica come cappotti e sostituzione infissi, per installazione di pannelli fotovoltaici e termico solare per la produzione di acqua calda.

2. Which Region in your country has the most advanced regulation? Please provide a few examples.

Regione Emilia Romagna con delibera di Giunta Regionale n. 967 del 20 luglio 2015 ha approvato un atto di coordinamento tecnico regionale per definire i requisiti minimi di prestazione energetica degli edifici.

L'atto prevede un forte impulso verso edifici ad energia quasi zero, a partire dal 2019 i nuovi edifici e quelli sottoposti a ristrutturazione importante dovranno essere realizzati in modo da ridurre al minimo i consumi energetici incrementando l'uso di energia rinnovabile.

Per gli edifici pubblici la scadenza è anticipata al gennaio 2017.

Il progettista dovrà evidenziare i risultati della valutazione della fattibilità tecnica, ambientale ed economica per l'utilizzo di sistemi alternativi ad alta efficienza: cogenerazione, teleriscaldamento, teleraffrescamento, pompe di calore.

3. Are there any best practices, in terms of energy efficiency retrofit of regulation in your national context? Please provide examples.

Il progetto IEE – MLEI – PadovaFit – progetto che prevede l'individuazione di una ESCO per effettuare interventi di riqualificazione energetica di condomini – capofila Comune di Padova –

www.padovafit.it – padovafit@comune.padova.it

I progetti Cityinvest e Infinite Solutions che vedono coinvolte alcune altre città italiane.

4. What kind of minimum requirements are included in your national building code, in the different sectors?

- 4.1 - Public and Institutional
- 4.2 - Private Commercial
- 4.3 - Private Industrial



Al momento non c'è differenza tra i diversi settori. Sono previste norme per energia rinnovabile, efficientamento edifici nel decreto che è stato pubblicato sulla Gazzetta Ufficiale n. 162 del 15 luglio 2015, Supplemento Ordinario n. 39, il decreto ministeriale 26 giugno 2015 "Applicazione delle metodologie di calcolo delle prestazioni energetiche e definizione delle prescrizioni e dei requisiti minimi degli edifici".

5. What types of actors are involved in the definition of the building codes?

5.1 - Public and Institutional

5.2 - Private Commercial

5.3 - Private Industrial

A livello nazionale sono stati coinvolti vari attori nazionali:

Ministero Ambiente, Ministero Sviluppo Economico, ENEA, Ispra, Associazioni di categoria, Albo Costruttori, Albi professionali.

6. Is there any protocol or mechanism foreseen for monitoring, review, and assessment?

No, tranne qualche città che nel regolamento edilizio ha previsto l'applicazione di alcune certificazioni: LEEDS e Casa Clima

7. Is there any external verification process foreseen?

7.1 - Public and Institutional (a. Local, b. Regional, c. National)

7.2 - Private Commercial (a. Local, b. Regional, c. National)

7.3 - Private Industrial (a. Local, b. Regional, c. National)

No

8. Is there any enforcement or incentive mechanisms to facilitate the success of regulatory tools?

Y/N - Which type (tax rebates/fiscal incentives, extra cubic meters....)?

Si

- detrazioni fiscali diversificate per interventi di recupero del patrimonio edilizio 36 – 41 – 50 – 65% a seconda della tipologia dell'intervento e interventi di risparmio energetico 55 e 65%
- nel piano casa la concessione di cubatura ulteriore (regolamentata in modo diverso nelle varie regioni)

9. Is there any type of standard used (such as LEED certification, ClimateHouse...)?

Sì, anche qui regolamentata a livello regionale o locale (città) in modo diverso

10. What are the main challenges in terms of regulation in your opinion?

Bisognerebbe usare tutti lo stesso metodo di certificazione energetica, bisognerebbe effettuare dei controlli puntuali sugli interventi e non basarsi solo sui documenti presentati dal progettista

11. What regulatory changes/ improvements do you think are necessary to speed up the renovation process of the existing building stock? What do you think the benefits would be?

Bisognerebbe agire molto sulla formazione dei progettisti che ancora non sanno progettare utilizzando i giusti materiali per ottenere i migliori risultati.

In Italia per superare il problema legato alla stagnazione del mercato edilizio bisognerebbe costruire una politica di concertazione con tutti gli stakeholders principi per rilanciare il mercato attraverso interventi di riqualificazione energetica degli edifici privati. Si darebbe anche un forte input ai risultati dei PAES.



Italy

Interviewee: Luigi Acquaviva, Energy expert, Municipality of S. Giuseppe Vesuviano, Italy

1. What is your country's approach to developing, adopting, administering and enforcing regulations enabling retrofitting?

L'attuale approccio normativo italiano non richiede titoli abilitativi per attività di manutenzione ordinaria e straordinaria su impianti esistenti e finiture degli edifici. E' invece richiesto un titolo abilitativo per quanto riguarda gli interventi sulle strutture o gli aumenti di superficie utile/volumetria.

2. Which Region in your country has the most advanced regulation? Please provide a few examples.

Trentino Alto Adige, Emilia Romagna

3. Are there any best practices, in terms of energy efficiency retrofit of regulation in your national context? Please provide examples.

L. 10/91 introduce all'uso razionale dell'energia e al risparmio energetico anche mediante impiego di fonti rinnovabili e l'uso di risorse specializzate come l'energy manager; DPR 412/93 regola il funzionamento degli impianti termici degli edifici al fine di contenere i consumi energetici; D. Lgs. 192/2005 certificazione energetica e controlli sugli impianti di climatizzazione; DPR 59/09 riferimenti per il calcolo delle prestazioni energetiche degli edifici; DL 63/2013 Attestato Prestazione Energetica; altre normative che recepiscono direttive europee.

4. What kind of minimum requirements are included in your national building code, in the different sectors?

AESS Modena

5. What types of actors are involved in the definition of the building codes?

Obbligo per gli edifici pubblici di ricorrere a fonti di energia rinnovabili (salvo impedimenti tecnici/economici!!); limiti di trasmittanza termica degli elementi costruttivi (pareti, infissi, solai ecc.) di nuova realizzazione o in caso di interventi su elementi esistenti; impiego di valvole termostatiche sui corpi scaldanti.

6. Is there any protocol or mechanism foreseen for monitoring, review, and assessment?

Ordini professionali, Associazioni di categoria (ANCE, ANIEM ecc.), Enti normativi (UNI, CEI, CEN ecc.), Comitati tecnici

7. Is there any external verification process foreseen?

Non credo ce ne siano se non per i casi in cui sono previsti incentivi

8. Is there any enforcement or incentive mechanisms to facilitate the success of regulatory tools?

Obbligo di dotazione e trasmissione APE per locazioni, vendite, ecc.; Libretti di impianto; Dichiarazioni di conformità impianti; Controllo fumi sui generatori di calore degli impianti termici

9. Is there any type of standard used (such as LEED certification, ClimateHouse...)?

Incentivi fiscali per ristrutturazioni edilizie al 50% che arrivano al 65% per interventi su zone ad elevata sismicità; incentivi per il risparmio energetico al 65%. Entrambi gli incentivi sono accessibili con l'esecuzione di una varietà di interventi che va dalla semplice manutenzione ordinaria alla riqualificazione energetica complessiva degli edifici ma sono fruibili ratealmente in 10 anni.



9. CasaClima, Protocollo Itaca, SB100, GBC Italia, Leed Italia (Troppi?)

10. What are the main challenges in terms of regulation in your opinion?

Incentivare l'impiego di materiali naturali e tecniche proprie della bioedilizia. Relativamente al contesto locale superare i vincoli imposti da normative di tutela che limitano l'impiego di tecnologie impiantistiche rinnovabili le quali, confrontate con interventi di altro tipo ben più diffusi, risultano molto meno impattanti sotto l'aspetto paesaggistico. C'è uno sviluppo minimo delle ESCO, che sono rappresentate al momento principalmente dai grandi fornitori di servizi.

11. What regulatory changes/ improvements do you think are necessary to speed up the renovation process of the existing building stock? What do you think the benefits would be?

Prevedere il raggiungimento di standard minimi per tutti gli edifici, inclusi quelli esistenti; incentivare il recupero edilizio con contributi per l'efficientemente energetico degli edifici privati; investire prioritariamente fondi pubblici sugli edifici caratterizzati da uso continuativo e grande dispendio di energia (es. ospedali, caserme, edilizia scolastica ecc.). Facilitare la nascita di strumenti assicurativi che supportino le ESCO minori per garantire investimenti per deep renovation che superano il decennio. Ampliare l'uso di strumenti come gli EPC (energy performance contracts) che servirebbero a garantire tutti i soggetti coinvolti (istituzioni pubbliche, finanziatori, tecnici) sull'opportunità e qualità dell'investimento.



Latvia

Interviewee: Marika Rosa, project manager, EKODOMA

1. What is your country's approach to developing, adopting, administering and enforcing regulations enabling retrofitting?

In general the approach is based to fulfill requirements set by different EU directives. Main requirements from the directives are harmonized with national legislation.

2. Which Region in your country has the most advanced regulation? Please provide a few examples.

In Latvia there are five planning regions. However, none of them have any own regulations as the administrations of the regions have no legal instruments. All the regulations are made and approved at national level. Municipalities can introduce at local level any more specific regulations.

3. Are there any best practices, in terms of energy efficiency retrofit of regulation in your national context? Please provide examples.

Introduction of the new building codes were finalized in 2015 as required by the Directive of Building Energy Efficiency.

There is a report available on best case studies on deeply renovated multifamily buildings <http://sharex.lv/lv/renoveto-maju-analize>

4. What kind of minimum requirements are included in your national building code, in the different sectors?

There are many different requirements for three main sectors: housing; public and industrial

4.1 - Public and Institutional

4.2 - Private Commercial

4.3 - Private Industrial

5. What types of actors are involved in the definition of the building codes?

I will not be able to say for sure but to my knowledge Ministry of Economics consulted associations of civil engineers and Association of Energy Auditors

5.1 - Public and Institutional

5.2 - Private Commercial

5.3 - Private Industrial

6. Is there any protocol or mechanism foreseen for monitoring, review, and assessment?

As far as I know Monitoring / assessment is required for those renovation projects of multifamily buildings for which EU structural funds have been used.

Also in case of municipal buildings, if they attracted funding from Climate Change Financial instrument they have to report for five years their energy savings and CO2 emissions.



7. Is there any external verification process foreseen?

If verification of energy savings – there is no real external verification ensured. In the SUNSHINE we are working on the platform and Latvian Baltic Energy Efficiency Fund (LABEEF) who will ensure for EPC projects to be verified.

7.1 - Public and Institutional (a. Local, b. Regional, c. National)

7.2 - Private Commercial (a. Local, b. Regional, c. National)

7.3 - Private Industrial (a. Local, b. Regional, c. National)

8. Is there any enforcement or incentive mechanisms to facilitate the success of regulatory tools?

At local (municipal) level there are incentives for tax reduction for those buildings that have undergone renovation

Y/N - Which type (tax rebates/fiscal incentives, extra cubic meters....)?

9. Is there any type of standard used (such as LEED certification, ClimateHouse...)?

no

10. What are the main challenges in terms of regulation in your opinion?

The main challenge in Latvia is to start implementation and monitoring of the results. Currently we are working on inclusion of ESCOs and promotion of the use. In the public sector it is still limited.

11. What regulatory changes/ improvements do you think are necessary to speed up the renovation process of the existing building stock? What do you think the benefits would be?

First of all, we should have a housing policy. We don't have as such and the issue is left open... we need to refurbish at least 35 thousand multifamily buildings and we need more at least 5-8 billion EUR. Where to get funding and how to attract private funding? There is need to make regulatory changes to further promote and facilitate such possibilities ...





Assistant Buildings' addition to Retrofit, Adopt, Cure And Develop the Actual Buildings up to zeRo energy, Activating a market for deep renovation ABRACADABRA

Training material

Training materials used are attached to the report.



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Activating a market for deep renovation – ABRACADABRA

National meeting n. 3
Focus on Regulatory Challenges and Opportunities
PLACE DD.MM.YYY



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AGENDA

- **Presentation of the Regulatory Tool Kit basic elements**
- **Exchange of informations and reflections on the toolkit by participants**



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ICLEI



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ICLEI – WHO WE ARE

ICLEI - Local Governments for Sustainability is the leading global network of more than 1,500 cities, towns and regions engaged in building a sustainable future.

The network ICLEI supports cities towards sustainability, decarbonisation, sustainable mobility, resilience, biodiversity, the use efficiency of resources, health and happiness, green economy and smart infrastructures, affecting over 25% of the the world's urban population



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ICLEI'S ROLE IN ABRACADABRA

- Capitalization of the knowledges acquired at the local level with preparation and implementation of training events and workshops on National and Regional Scale
- Creation of a Toolkit with the best regulatory experiences on a European scale, and in the 8 Nations of the project
- Preparation of the comm. Strategy and Communication and Dissemination materials and dissemination
- Organization of an international meeting to support Dissemination: 03/16/2017



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THE STAKEHOLDER COMMUNITY

MEETINGS ALREADY DONE

- National Meeting n. 1 Date : **xx.xx.xxxx (CITY): "TITLE"**
- National Meeting n. 2 Date : **xx.xx.xxxx (CITY): "TITLE"**

FUTURE MEETING

- Meeting on Financial Tools



THE REGULATORY TOOLKIT



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- DOCUMENT TO CAPITALIZE LOCAL KNOWLEDGES
 - EUROPEAN PART
 - NATIONAL PART: the surveyed countries are Italy, Greece, Latvia, Norway, Netherlands, Belgium, Romania, Bulgaria
 - National INTERVIEWS on three layers: National, Regional, Municipal/City



- THE TOOLKIT WILL BE A DOCUMENTS USEFUL FOR:
 - POLICY MAKERS OF EU
 - POLICY MAKERS OF ALL LEVELS OF THE INVOLVED NATIONS

The goal is to support public administrations in charge of territorial regulation to build and estimate/assess correct types and amounts of potential add-ons



STRUCTURE OF THE REGULATORY TOOLKIT



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- Context and Barriers
- Available Experiences aiming at understanding and addressing the issue
- Solutions, proposals and suggestions
- Recommendations and Lessons Learnt



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PRELIMINARY RESULTS

Part I – International Context



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EUROPEAN UNION LAWS

- Directive 2010/31/EU of the European Parliament and of the Council on the energy performance of buildings
- Directive 2012/27/UE of the European Parliament and of the Council on energy efficiency
- 2016 on guidelines for the promotion of nearly zero-energy buildings and best practices to ensure that, by 2020, all new buildings are nearly zero-energy buildings

NATIONAL VERSIONS

- The EU countries must draw-up building restructuring long-term national strategies, to be included in their National Action Plans for Energy Efficiency
- **Greece Energy Efficiency Action Plan 2014 ([en](#), [el](#)) and Annual Report ([en](#), [el](#))**



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GOOD PRACTICES/CASE STUDIES AT EUROPEAN LEVEL

- [Freiburg – Building Code with High Energy standards](#) (1992 65 kWh/m², 2011 “passive house” 15kWh/m²)
- [Barcelona – RES Regulations – Solar-Thermal Ordinance](#)
obligation to use solar energy to power the 60% of hot water in all new buildings, renovated buildings or buildings that change Operator`s destination, whether public or private.
- [Energies POSIT'IF](#) – ESCO/EPC Model with PPP steerd by a Region. GOAL: Multiproperty private residential buildings renovation (Île-de-France)

PRELIMINARI RESULTS

Part II – National Context^{*}

^{*} Based on interviews



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Q1. What is your country's approach to developing, adopting, administering and enforcing regulations enabling retrofitting?

XXXXXXXXXXXXXXXXXX



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Q2. Which Region in your country has the most advanced regulation? Please provide a few examples.

XXXXXXXXXXXXXXXXXX



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Q3. Are there any best practices, in terms of energy efficiency retrofit of regulation in your national context? Please provide examples.

XXXXXXXXXXXXXXXXXX



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Q4. What kind of minimum requirements are included in your national building code, in the different sectors?

4.1 - Public and Institutional

4.2 - Private Commercial

4.3 - Private Industrial

XXXXXXXXXXXXXXXXXX



Q5. What types of actors are involved in the definition of the building codes?

4.1 - Public and Institutional

4.2 - Private Commercial

4.3 - Private Industrial

XXXXXXXXXXXXXXXXXX



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Q6. Is there any protocol or mechanism foreseen for monitoring, review, and assessment?

XXXXXXXXXXXXXXXXXX



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Q7. Is there any external verification process foreseen?

7.1 - Public and Institutional (a. Local, b. Regional, c. National)

7.2 - Private Commercial (a. Local, b. Regional, c. National)

7.3 - Private Industrial (a. Local, b. Regional, c. National)

XXXXXXXXXXXXXXXXXX



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Q8. Is there any enforcement or incentive mechanisms to facilitate the success of regulatory tools?

Y/N - Which type (tax rebates/fiscal incentives, extra cubic meters....)?

XXXXXXXXXXXXXXXXXX



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Q9. Is there any type of standard used (such as LEED certification, ClimateHouse...)?

XXXXXXXXXXXXXXXXXX





Q10. What are the main challenges in terms of regulation in your opinion?

XXXXXXXXXXXXXXXXXX



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Q11. What regulatory changes/ improvements do you think are necessary to speed up the renovation process of the existing building stock? What do you think the benefits would be?

XXXXXXXXXXXXXXXXXX



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THANK YOU

Contacts:

Giorgia Rambelli

giorgia.rambelli@iclei.org



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Athens March 2, 2017



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- **Presentation of the Regulatory Tool Kit basic elements**
- **Exchange of informations and reflections on the toolkit by participants**





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ICLEI – WHO WE ARE

ICLEI - Local Governments for Sustainability is the leading global network of more than 1,500 cities, towns and regions engaged in building a sustainable future.

The network ICLEI supports cities towards sustainability, decarbonisation, sustainable mobility, resilience, biodiversity, the use efficiency of resources, health and happiness, green economy and smart infrastructures, affecting over 25% of the the world's urban population



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ICLEI'S ROLE IN ABRACADABRA

- Capitalization of the knowledges acquired at the local level with preparation and implementation of training events and workshops on National and Regional Scale
- Creation of a Toolkit with the best regulatory experiences on a European scale, and in the 8 Nations of the project
- Preparation of the comm. Strategy and Communication and Dissemination materials and dissemination
- Organization of an international meeting to support Dissemination: 03/16/2017



THE STAKEHOLDER COMMUNITY

MEETINGS ALREADY DONE

- National Meeting n. 1 Date : 20.05.2016 (Athens): “Challenges and Opportunities”
- National Meeting n. 2 Date : 22.09.16 (Athens): “Technical Toolkit”

FUTURE MEETING

- Meeting on Financial Tools





THE REGULATORY TOOLKIT



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- DOCUMENT TO CAPITALIZE LOCAL KNOWLEDGES
 - EUROPEAN PART
 - NATIONAL PART: the surveyed countries are Italy, Greece, Latvia, Norway, Netherlands, Belgium, Romania, Bulgaria
 - National INTERVIEWS on three layers: National, Regional, Municipal/City





- THE TOOLKIT WILL BE A DOCUMENTS USEFUL FOR:
 - POLICY MAKERS OF EU
 - POLICY MAKERS OF ALL LEVELS OF THE INVOLVED NATIONS

The goal is to support public administrations in charge of territorial regulation to build and estimate/assess correct types and amounts of potential add-ons



STRUCTURE OF THE REGULATORY TOOLKIT



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- Context and Barriers
- Available Experiences aiming at understanding and addressing the issue
- Solutions, proposals and suggestions
- Recommendations and Lessons Learnt



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PRELIMINARY RESULTS

Part I – International Context



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EUROPEAN UNION LAWS

- Directive 2010/31/EU of the European Parliament and of the Council on the energy performance of buildings
- Directive 2012/27/UE of the European Parliament and of the Council on energy efficiency
- 2016 on guidelines for the promotion of nearly zero-energy buildings and best practices to ensure that, by 2020, all new buildings are nearly zero-energy buildings

NATIONAL VERSIONS

- The EU countries must draw-up building restructuring long-term national strategies, to be included in their National Action Plans for Energy Efficiency
- Greece Energy Efficiency Action Plan 2014 ([en](#), [el](#)) and Annual Report ([en](#), [el](#))



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GOOD PRACTICES/CASE STUDIES AT EUROPEAN LEVEL

- [Freiburg – Building Code with High Energy standards](#) (1992 65 kWh/m², 2011 “passive house” 15kWh/m²)
- [Barcelona – RES Regulations – Solar-Thermal Ordinance](#)
obligation to use solar energy to power the 60% of hot water in all new buildings, renovated buildings or buildings that change Operator`s destination, whether public or private.
- [Energies POSIT'IF](#) – ESCO/EPC Model with PPP steerd by a Region. GOAL: Multiproperty private residential buildings renovation (Île-de-France)

PRELIMINARI RESULTS

Part II – National Context^{*}

^{*} Based on interviews and surveys



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Q1. What is your country's approach to developing, adopting, administering and enforcing regulations enabling retrofitting?

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Q2. Which Region in your country has the most advanced regulation? Please provide a few examples.

XXXXXXXXXXXXXXXXXX



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Q3. Are there any best practices, in terms of energy efficiency retrofit of regulation in your national context? Please provide examples.

XXXXXXXXXXXXXXXXXX



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Q4. What kind of minimum requirements are included in your national building code, in the different sectors?

4.1 - Public and Institutional

4.2 - Private Commercial

4.3 - Private Industrial

XXXXXXXXXXXXXXXXXX



Q5. What types of actors are involved in the definition of the building codes?

4.1 - Public and Institutional

4.2 - Private Commercial

4.3 - Private Industrial

XXXXXXXXXXXXXXXXXX



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Q6. Is there any protocol or mechanism foreseen for monitoring, review, and assessment?

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Q7. Is there any external verification process foreseen?

7.1 - Public and Institutional (a. Local, b. Regional, c. National)

7.2 - Private Commercial (a. Local, b. Regional, c. National)

7.3 - Private Industrial (a. Local, b. Regional, c. National)

XXXXXXXXXXXXXXXXXX



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Q8. Is there any enforcement or incentive mechanisms to facilitate the success of regulatory tools?

Y/N - Which type (tax rebates/fiscal incentives, extra cubic meters....)?

XXXXXXXXXXXXXXXXXX



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Q9. Is there any type of standard used (such as LEED certification, ClimateHouse...)?

XXXXXXXXXXXXXXXXXX





Q10. What are the main challenges in terms of regulation in your opinion?

XXXXXXXXXXXXXXXXXX



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Q11. What regulatory changes/ improvements do you think are necessary to speed up the renovation process of the existing building stock? What do you think the benefits would be?

XXXXXXXXXXXXXXXXXX



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THANK YOU

Contacts:

Giorgia Rambelli

giorgia.rambelli@iclei.org



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Assistant Buildings' addition to Retrofit, Adopt,
Cure And Develop
the Actual Buildings up to zeRo energy,
Activating a market for deep renovation – ABRACADABRA

National meeting n. 3
Focus on Regulatory Challenges and Opportunities
Roma 17 Febbraio 2017



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AGENDA

- **Giro di tavolo:** breve introduzione dei partecipanti
- **Introduzione al progetto**
- **Presentazione del Regulatory Tool Kit**
- **Scambio di conoscenze e riflessioni sul toolkit**



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ICLEI



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ICLEI – CHI SIAMO

ICLEI - Local Governments for Sustainability è la rete leader globale formata da oltre 1500 città, paesi e regioni impegnate nella costruzione di un futuro sostenibile.

Il network ICLEI supporta le città verso la sostenibilità, la decarbonizzazione, la mobilità sostenibile, la resilienza, la biodiversità, l'uso efficiente delle risorse, la salute e la felicità, la green economy e le infrastrutture intelligenti, impattando oltre il 25% della popolazione urbana mondiale.



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IL RUOLO DI ICLEI NEL PROGETTO

- Capitalizzazione delle conoscenze acquisite su scala locale con preparazione e realizzazione di eventi di formazione e di workshops su scala Nazionale e Regionale
- Creazione un Toolkit con le migliori esperienze regolatorie su scala Europea e nelle 8 Nazioni di progetto
- Predisposizione della strategia e dei materiali di Comunicazione e disseminazione



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LA STAKEHOLDER COMMUNITY

INCONTRI SVOLTI

- Incontro nazionale n. 1 Data: 24.05.2016 (Bologna): "Sfide ed Opportunità"
- Incontro nazionale n. 2 Data: 12.10.2016 (Genova): "Tool Kit tecnico"

FUTURI

- Incontro su strumenti Finanziari



IL REGULATORY TOOLKIT O STRUMENTI REGOLATORI



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- DOCUMENTO PER CAPITALIZZARE LE CONOSCENZE LOCALI
- PARTE EUROPEA
- PARTE NAZIONALE: i paesi oggetto di indagine sono Italia, Grecia, Lettonia, paesi norvegesi, Paesi Bassi, Belgio, Romania, Bulgaria
- INTERVISTE nazionali su TRE LIVELLI: Statale, Regionale, Municipale

- A COMPLETAMENTO SARÁ PERCIÓ UNO STRUMENTI DI UTILITÀ.
- PER I POLICI MAKERS DELL'UNIONE EUROPEA
- PER I POLICI MAKERS DI TUTTI I LIVELLI DELLE NAZIONI COINVOLTE (CON LE VERSIONI NAZIONALI)

L'obiettivo è quello di supportare Pubbliche Amministrazioni incaricate della regolamentazione territoriale a costruire e stimare con correttezza tipologia e quantità di potenziali componenti aggiuntivi



STRUTTURA DEL REGULATORY TOOLKIT



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- Contesto e Barriere
- Esperienze disponibili volte a comprendere ed affrontare il tema
- Soluzioni e proposte



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RISULTATI PRELIMINARI

Parte I – Contesto Internazionale



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NORME EUROPEE

- Direttiva 2010/31/UE del Parlamento europeo e del Consiglio, sulla prestazione energetica nell'edilizia
- Direttiva 2012/27/UE del Parlamento europeo e del Consiglio, sull'efficienza energetica

RICADUTE NAZIONALI delle NORME EUROPEE

- I paesi dell'UE devono redigere strategie di ristrutturazione edilizia nazionale a lungo termine che possono essere inclusi nei loro Piani nazionali d'azione per l'efficienza energetica
- [Piano d'Azione Italiano per l'Efficienza Energetica](#) (Luglio 2014) e [Relazione Annuale 2016](#) (ENEA)



BUONE PRATICHE /CASI STUDIO A LIVELLO EUROPEO

- [Freiburg – Regolamento Edilizio con standard Energetici elevati](#) (1992 65 kWh/m², 2011 “passive house” 15kWh/m²)
- [Barcelona – Misure regolatorie per le RES – Ordinanza Solare-termica](#) (obbligo uso energia solare per alimentare il 60% dell’acqua calda in tutti i nuovi edifici, negli edifici ristrutturati o negli edifici che cambiano destinazione d’uso, siano essi pubblici o Privati.
- [Energies POSIT’IF](#) – Modello ESCO/EPC con PPP a trazione Regionale per riqualificare condomini



RISULTATI PRELIMINARI

Parte II – Contesto Nazionale*

* Basati sulle interviste raccolte



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D1. Qual é l'approccio nazionale nello sviluppare adottare, amministrare e rafforzare norme e regolamenti che favoriscano il retrofitting?

L'approccio nazionale è conforme e consequenziale a quello Comunitario

- Decreto Legislativo 4 luglio 2014, n. 102 di recepimento della Direttiva 2012/27/UE, che detta misure per la promozione e il miglioramento dell'efficienza energetica e stanziava 800 milioni di euro per la Riqualficazione
- L'ENEA predispone ogni 3 anni una proposta per la riqualificazione energetica degli edifici residenziali e commerciali, sia pubblici che privati, anche per aumentare il numero di Edifici a Energia Quasi Zero di cui al D.Lgs. 192/2005.
- Immobili pubblici: Entro il 2020 si dovrà procedere alla riqualificazione energetica di almeno il 3% della superficie coperta utile climatizzata degli edifici di proprietà della pubblica amministrazione centrale. L'obbligo vale per gli edifici superiori a 500 m² e dal 9 luglio 2015 per quelli superiori a 250 m². Sono esclusi alcuni immobili vincolati, gli immobili destinati alla difesa e i luoghi di culto.

D1. Qual é l'approccio nazionale nello sviluppare adottare, amministrare e rafforzare norme e regolamenti che favoriscano il retrofitting?

- Diagnosi energetiche: Le grandi aziende e le imprese 'energivore', dal 5 dicembre 2015 devono eseguire diagnosi energetiche periodiche, per individuare gli interventi più efficaci per ridurre i consumi di energia.
- Necessità di semplificare e armonizzare le procedure autorizzative per l'installazione in ambito residenziale e terziario di impianti o dispositivi tecnologici per l'efficienza energetica e per lo sfruttamento delle fonti rinnovabili.
- Bonus volumetrici: Per gli immobili di nuova costruzione che raggiungano una riduzione minima del 20% dell'indice di prestazione energetica, lo spessore di murature e solai, eccedente i 30 centimetri, fino ad un massimo di ulteriori 30 centimetri per tutte le strutture che racchiudono il volume riscaldato, e fino ad un massimo di 15 cm per quelli orizzontali intermedi, non sono considerati nei computi per la determinazione dei volumi, delle altezze, delle superfici e nei rapporti di copertura. I bonus volumetrici valgono come deroga alle distanze minime

D1. Qual é l'approccio nazionale nello sviluppare adottare, amministrare e rafforzare norme e regolamenti che favoriscano il retrofitting?

L'attuale approccio normativo italiano non richiede titoli abilitativi per attività di manutenzione ordinaria e straordinaria su impianti esistenti e finiture degli edifici. E' invece richiesto un titolo abilitativo per quanto riguarda gli interventi sulle strutture o gli aumenti di superficie utile/volumetria.

D2 Quali Regioni nella Nazione sono provviste di sistemi regolatori particolarmente avanzati?

Trentino Alto Adige, Emilia Romagna

D2. Quali sono le buone pratiche regolatorie , in tema di retrofitting, Are there any best practices, nel contesto Nazionale? Fornire esempi?

- L. 10/91 introduce all'uso razionale dell'energia e al risparmio energetico anche mediante impiego di fonti rinnovabili e l'uso di risorse specializzate come l'energy manager; DPR 412/93 regola il funzionamento degli impianti termici degli edifici al fine di contenere i consumi energetici; D. Lgs. 192/2005 certificazione energetica e controlli sugli impianti di climatizzazione; DPR 59/09 riferimenti per il calcolo delle prestazioni energetiche degli edifici; DL 63/2013 Attestato Prestazione Energetica; altre normative che recepiscono direttive europee.
- L'intero percorso della AESS di Modena
- I progetti MLEI PDA Presenti nel territorio (MARTA (Regione Marche) , PadovaFIT (Comune Padova), 2020TOGETHER (Provincia Torino), ELENA Teramo con la creazione di Capitolati Innovativi

D2. Quali sono le buone pratiche regolatorie , in tema di retrofitting, Are there any best practices, nel contesto Nazionale? Fornire esempi?

- Legge Regionale n. 10/2011, Lazio (la proroga del Piano Casa per altri 2 anni, fino al 31 gennaio 2017.)
- Regione Veneto -Incentivi urbanistici ed edilizi per la promozione dell'edilizia sostenibile, ai sensi dell'art. 3, comma 2 della L.R. 8 luglio 2009, n. 14 – Piano Casa. Proroga fino a Dicembre 2018
- Legge regionale n. 1/2011 Regione Campania, nuovo Piano casa,

D2. Quali sono le buone pratiche regolatorie , in tema di retrofitting, Are there any best practices, nel contesto Nazionale? Fornire esempi?

- Comune di Milano nel nuovo regolamento edilizio approvato il 2 ottobre 2014 - Regolamento edilizio del Comune di Milano: Bonus volumetrici fino al 15% per chi fa lavori di riqualificazione energetica degli Edifici
- Linee Guida rete Cartesio (Lombardia, Lazio, Liguria, Sardegna, Toscana, E.R.) ed applicazione agli enti Locali
- Regolamenti di sostenibilità Ambientale degli Enti locali

D3. Quali sono i requisiti minimi inclusi nei Regolamenti Edilizi cui fate riferimento?

- Obiettivo: energia quasi zero del 2019 (edifici pubblici) e del 2021 (edifici privati)
- [Decreto Interministeriale D.M. 26 giugno 2015](#) - Adeguamento linee guida nazionali per la certificazione energetica degli edifici
- Obbligo per gli edifici pubblici di ricorrere a fonti di energia rinnovabili (salvo impedimenti tecnici/economici!!); limiti di trasmittanza termica degli elementi costruttivi (pareti, infissi, solai ecc.) di nuova realizzazione o in caso di interventi su elementi esistenti
- Impiego di valvole termostatiche sui corpi scaldanti

D4. Quali attori sono da coinvolgere nella definizione di Norme e Regolamenti? (Per edifici Pubblici ed istituzionali, per edifici Privati e commerciali, per edifici Industriali)

- Ordini professionali
- Associazioni di categoria (ANCE, ANIEM ecc.)
- Enti normativi (UNI, CEI, CEN ecc.)
- Comitati tecnici



D5. Esistono protocolli o meccanismi per monitoraggio, revisione, valutazione?

- L'ENEA predisporrà ogni 3 anni una proposta per la riqualificazione energetica degli edifici residenziali e commerciali, sia pubblici che privati, anche per aumentare il numero di Edifici a Energia Quasi Zero di cui al D.Lgs. 192/2005.
- Qualcosa di più locale??????

D6. Esistono o sono previsti processi di verifica esterna?

- APE agli sportelli Edilizia dei Comuni.
- Per Piano Casa – Regioni
- ENEA



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D7. Esistono Standard in uso (such as LEED certification, ClimateHouse...)?

- Si, ma non a livello regolatorio: CasaClima, Protocollo Itaca, SB100, GBC Italia, Leed Italia



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D8. Esistono meccanismi incentivanti o di “rinforzo” per facilitare il successo degli strumenti regolatori?

- Premi volumetrici e/o Detrazioni
- Incentivi fiscali per ristrutturazioni edilizie al 50% che arrivano al 65% per interventi su zone ad elevata sismicità; incentivi per il risparmio energetico al 65%. Entrambi gli incentivi sono accessibili con l'esecuzione di una varietà di interventi che va dalla semplice manutenzione ordinaria alla riqualificazione energetica complessiva degli edifici ma sono fruibili ratealmente in 10 anni

D9. Quali sono le principali sfide nell'ambito dei regolamenti?

- Incentivare l'impiego di materiali naturali e tecniche proprie della bioedilizia.
- Relativamente al contesto locale superare i vincoli imposti da normative di tutela che limitano l'impiego di tecnologie impiantistiche rinnovabili le quali, confrontate con interventi di altro tipo ben più diffusi, risultano molto meno impattanti sotto l'aspetto paesaggistico.
- C'è uno sviluppo minimo delle ESCO, che sono rappresentate al momento principalmente dai grandi fornitori di servizi.

D10. Quali cambiamenti/miglioramenti regolatori sono necessari per accelerare il processo di riqualificazione dello stock edilizio?

- Prevedere il raggiungimento di standard minimi per tutti gli edifici, inclusi quelli esistenti;
- Incentivare il recupero edilizio con contributi per l'efficientemente energetico degli edifici privati;
- Investire prioritariamente fondi pubblici sugli edifici caratterizzati da uso continuativo e grande dispendio di energia (es. ospedali, caserme, edilizia scolastica ecc.).
- Facilitare la nascita di strumenti assicurativi che supportino le ESCO minori per garantire investimenti per deep renovation che superano il decennio
- Ampliare l'uso di strumenti come gli EPC che servirebbero a garantire tutti i soggetti coinvolti (istituzioni pubbliche, finanziatori, tecnici) sull'opportunità e qualità dell'investimento.



GRAZIE PER L'ATTENZIONE

Contatti:

Michele Zuin –
michele.zuin@iclei.org



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