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Introduction

The following report is an investigation on the plans and measures on Energy Efficiency (EE) in the public building stock for each partner country of the project ENERJ. The countries involved in this activity are Albania, Croatia, Cyprus, Greece, Italy, Malta, Portugal, Slovenia and Spain. The report assesses the EU Directives that are relevant to the EE of public buildings and how they are Nationally implemented in each of the partner Countries, along with the other specific laws that are related to EE of buildings in each partner Country. More specifically, it analyses all the laws and regulations, on a European, National, Regional and Local level that affect the building and retrofitting practices for public buildings. Furthermore, any provisions on regulations regarding energy efficiency of buildings in specific areas are also addressed, as well as regional plans for the EE of the public building stock, which are implemented, how they are implemented and what kind of data is available. Additionally, some good practices from the countries involved in the project are presented.

Each country has transposed the EU directives into National Laws/Decrees and Acts, but the implementation of measures differs and especially for larger countries, regional and local approaches have to be considered. SEAPs are key to most of the local authorities in implementing measures, where good practices can also be implemented by other local authorities. In general, different approaches arise from the transposition of the EU Directives, with the speed of implementation of measures also varying for each country.

1 Relevant EU Directives

The EU Directive 2010/31/EU on the Energy Performance of Buildings (EPBD) introduces the concept of nearly zero-energy buildings (nZEB) as the EU considers the energy efficiency of the building sector one of the key sectors into a more sustainable future. It requires member states public authorities to purchase or rent nZEB after the 31st December 2018 but also to draw up National plans for the energy refurbishment of buildings. The efficient use of energy is underlined in the Energy Efficiency Directive (EED) 2012/27/EU where measures are to be promoted into Member States for reaching the 2020 targets of 20% energy efficiency.

1.1 Directive 2010/31/EU

On 2010 a revision of the Energy Performance of Buildings Directive (EPBD) was adopted from the European Parliament. The directive 2010/31/EU introduced the concept of nearly Zero Energy Buildings (nZEB). It was stressed that the influence of the building sector in Europe's total energy consumption is urgently underlined as it is written that "reduction of energy consumption and the use of energy from renewable sources in the building sector constitute important measures needed to reduce the Union's energy dependency and greenhouse gas emissions".

The Article 9 of the Directive requires that "Member States shall ensure that by 31 December 2018, new buildings occupied and owned by public authorities are nearly zero-energy buildings". Furthermore, Member States shall "draw up national plans for increasing the number of nearly zero-energy buildings" and "following the leading example of the public sector, develop policies and take measures such as the setting of targets in order to stimulate the transformation of buildings that are refurbished into nearly zero-energy buildings". Due to the diversity of the EU building sector, the EPBD requires Member States to define specifically national approaches to the design aspects of a nZEB and plans that reflect their national, regional and local conditions. A nZEB is defined as a building with very low energy demands and a very high energy performance, where the energy supplied is to a significant extent by on-site and nearby renewable energy sources.

Moreover, the EPBD underlines the importance of existing building stock in the total energy balance, therefore the EU Member States should also prepare plans for implementation that take into account measures to refurbish the existing building stock towards nZEB levels.

1.2 Directive 2012/27/EU

The 2012 Energy Efficiency Directive (EED) was put in place, in order to facilitate the EU targets of reaching to 20% energy efficiency by 2020. All Member States are required to use energy more efficiently from production to final consumption.

The EED was published in the Official Journal on the 14 November 2012 and was put into force on 4 December 2012. The Member States had to transpose it by 5 June 2014. It puts forward legally binding measures to step up Member States efforts to use energy more efficiently at all stages of the energy chain.

Some of the measures that are transferred to national policies include:

- Energy distributor or retail energy sales companies have to achieve 1.5% energy savings per year through the implementation of energy efficiency measures.
- EU countries can opt to achieve the same level of savings through other means, such as improving the efficiency of heating systems, installing double-glazed windows or thermally insulating roofs.
- Every year, governments in EU Member States must carry on energy renovations on at least 3% (floor area) of the buildings that they use (owned or rented).

- Large companies will undergo energy audits in order to identify ways to reduce their energy consumption and also increase RES
- Energy consumers should be able to manage better their energy consumption. This includes easy and free access to consumption data through individual metering
- National incentives to SMEs to undergo energy audits

Further to the 2020 targets, on 30 November 2016 the Commission proposed an update to the EED, with a 30% energy efficiency target for 2030. Therefore, measures in the present Directive will be updated to facilitate the EU targets set for 2030.

2 National implementation of EU directives and other relevant national regulations

The EU directives are Nationally transposed in the Member States in National Laws/Decrees and Acts, as well as Ministerial orders. All 9 countries that take part in the ENERJ project have transposed the EU Directives in different stages and formats. Some countries already had Laws regarding the energy efficiency and some strategic plans were already in place. Most of the countries have transposed the EU Directives into Laws within 2-4 years after the Directives were introduced, but countries like Albania who are not a Member State introduced some guidelines and key provisions, but on a later stage than the member States. Furthermore, some countries like Greece, even though they have transposed the Directives, are not taking enough actions for implementation and as a result are fined by the EU. On a later stage, countries have started to introduce the energy audits and energy auditors and most of them have already identified the nZEB for the different climatic areas.

2.1 Albania

The status of the alignment of the Albanian Energy efficiency with the EU directives is summarized as follows:

Law No.10113, date 09.04.2009 "On the indication by labeling and standard product information of the consumption of energy and other resources by household appliances" (Directive 2010/30/EU on energy labelling)

The Albanian legal framework for energy labelling is transposed. Framework directive 1992/75/EEC is transposed through Law No.10113, date 09.04.2009 "On the indication by labelling and standard product information of the consumption of energy and other resources by household appliances", providing the same obligations of suppliers regarding the information to consumers through the fiche and specified label on the consumption of energy for the household.

Law No.124/2015 "on energy efficiency" (Directive 2006/32/EC and several key provisions of Directive 2012/27/EU)

Albania adopted the Law on Energy Efficiency in November 2015, replacing the outdated Law on Energy Efficiency of 2005 and transposing the provisions of Directive 2006/32/EC. The law is in line with the requirements of Directive 2006/32/EC and some key provisions of Directive 2012/27/EU, including setting of the 2020 indicative energy savings target, EEAP and its monitoring, the exemplary role of the public sector, energy audits and promotion of the market for energy services. It also envisages institutional and financial reinforcement, i.e. the establishment of an energy efficiency agency and an energy efficiency fund. The law provides the basis for transposing the requirements of Articles 3 (targets), 6 (purchasing by public bodies), 8 (energy audit and management), 9-11 (metering and billing), 12 & 17 (information and training) and 18 (energy services). Furthermore Article 24 which details programs that

may be financed by the Energy Efficiency Fund would allow for transposition of Article 7 using the Alternative measures route.

Law No. 116/2016 “on performance energy building” (Directive 2010/31/EU on the energy performance of buildings)

With regard to energy efficiency in buildings, the Law on the Energy Performance of Buildings, is done in compliance with Directive 2010/31/EU. The law sets the guidelines for the application of the minimum requirements for the energy performance of new buildings and existing buildings, which are subject to major renovation.

The Energy Performance of Buildings (“EPB”) Law has been approved by the Albanian Parliament on 10 November 2016. The objective of the Law will be to reduce energy consumption and to reduce the consequential emissions from the buildings sector. Ministry of Energy and Industry is in the process of harmonizing and transposing legislation on energy efficiency and energy performance of buildings, which will set standards for new buildings and for the retrofitting of existing buildings. MEI is working closely with the Ministry of Urban Development (“MUD”), which has under its mandate the developing of affordable housing policies, including policies for housing retrofitting.

2.2 Croatia

EU Directives 2010/31/EU and 2012/27/EU are being implemented in Croatia through Act on Energy Efficiency (Official Gazette nr. 127/14). Act regulates the area of efficient energy use, adoption of plans at the local, regional and national level for the improvement of the energy efficiency and their implementation, energy efficiency measures, energy efficiency obligations, obligations of the regulatory body for energy, transmission system operators, distribution system operators and market operator in connection with the transfer or transport and distribution of energy, obligations of the energy distributor, supplier of energy and / or water, and in particular energy service, determines the energy savings and consumer rights in the implementation of energy efficiency measures.

The national coordination body implements the policy on energy efficiency established by the provisions of this Act and other regulations. It is responsible for: ensuring systematic planning to improve energy efficiency in Croatia, approval of the Annual and Energy Efficiency Action Plan adopted by major cities and counties in Croatia, monitoring of guidance systems for monitoring, measurement and verification of energy savings and implementation of the verification of energy savings, monitoring the implementation of measures of improvement of energy efficiency, which include independent verification of a statistically significant share of measures to improve the energy efficiency of the established regulations for monitoring, measurement and verification of energy savings, and the dissemination of information on; the available contracts for energy services, financial instruments, incentives, grants and loans that support projects related to energy efficiency, the list of available energy service providers, implementation of the National energy efficiency Action plan and the implementation of the Action plan for energy efficiency, including examples of best practice.

The Law prescribes the duties of the public sector. Public authorities are obligated to: manage energy and water in an energy efficient manner, appoint a legal person responsible for monitoring energy and water consumption, regularly monitor and at least once a month upload data on energy and water consumption in buildings in the national information system for energy management and periodically (and at least once a year) analyse the energy consumption in public buildings.

The National Energy Efficiency Programme for the 2008–2016 period has been drawn up and adopted in accordance with the European Directive 2006/32/EC on energy end-use efficiency and energy services (ESD). It lays down the energy savings objectives and forms a basis for drawing up triennial national plans on energy efficiency for three triennial periods up to 2016.

Each action plan analyses the effects and, if necessary, revises current measures and establishes new sectorial measures in order to ensure that the objectives are met in 2016. This document meets the requirement referred to in Article 24 of the EED and partially meets the requirements on reporting referred to in Directive 2010/31/EU on the energy performance of buildings (EPBD II). As such, this 3rd NEEAP presents a comprehensive strategy for improvement of energy efficiency in Croatia, including improvement of energy efficiency in public buildings.

The Third National Energy Efficiency Action Plan for the 2014- 2016 period has been drawn up in accordance with the template laid down by the European Commission, with which all EU Member States must comply. This document includes the report on the status evaluation of energy efficiency policy implementation, specifies the achieved energy savings in the previous triennial period, and offers guidelines for the following period with a detailed description of the planned measures.

The adoption of this action plan is the furtherance of the continuous performance of the activities and measures laid down in the National Energy Efficiency Programme for the Period 2008–2016 and, in compliance with evaluations, in the event of an increase in the risk concerning the achievement of the planned objectives, the current measures shall be revised and new sectorial measures shall be laid down in order to ensure the objectives are met in 2016. The most important change in the 3rd NEEAP is the introduction of energy efficiency obligations in accordance with the requirements of Article 7 of the EED. Croatia has chosen to apply a combined approach which includes alternative policy measures and obligatory savings. The obligation schemes will be defined in rules based on the new Energy Efficiency Act which has not been adopted at the time of writing of this document. The national target for energy savings pursuant to Article 7 of the EED for the period from 1 January 2014 to 31 December 2020 is 1.938 PJ per year or 54.250 PJ in total, 32.094 PJ of which is planned to be achieved through 9 alternative policy measures.

The 1st NEEAP set the national indicative savings target for 2016 to 19.77 PJ. The first intermediate target was set for 2010 and it amounted to 6.59 PJ. The analysis conducted during the 2nd NEEAP established that the target was nearly reached because the 2010 savings amounted to 6.43 PJ. Energy savings targets are defined in accordance with the methodology laid down in Directive 2006/32/EC on energy end-use efficiency and energy services (ESD), and they correspond to the absolute amount of 9 %, or 10 % of final energy consumption, defined as average energy consumption in the period 2001 - 2005. Pursuant to the ESD, the achievement of objectives is monitored with calculations of achieved savings in comparison to 2007. On the other hand, the 3rd NEEAP, pursuant to the requirements of Directive 2012/27/EU on energy efficiency (EED), also presents the objective expressed as the absolute amount of final energy consumption in 2020. The aforementioned objective pertains to the revised projections for final energy consumption which take 2010 values as baseline. In view of the energy consumption realized in 2012, and the trend which will quite probably continue in 2013, it will be necessary to draw up new projections for final energy consumption and redefine the objectives expressed as the absolute amount of energy consumption in 2020. Reduction of consumption in public building is important part of achievement of goals set in this plan.

2.3 Cyprus

In December 2012, Cyprus transposed Directive 2010/31/EU in the national legislation by the Law 210(I)/2012 which amends the Law for the regulation of the energy performance of buildings. Based on the new legal framework, the cost - optimal levels of minimum energy performance requirements were calculated and revised, minimum requirements on technical systems were implemented and measures to promote Nearly Zero-Energy Buildings (NZEB)

have been taken. The implementation of the EPBD in Cyprus is the overall responsibility of the Ministry of Energy, Commerce, Industry and Tourism (MECIT).

The energy efficiency of buildings is backed by the implementation of Directive 2012/27/EU on energy efficiency. Cyprus put in place the legislative framework for energy auditors in 2013, and for ESCOs and energy performance contracting in 2014.

The current minimum energy performance requirements for new residential buildings regulate the building elements and the building as a whole and promote the use of Renewable Energy Sources (RES). The building elements requirements consist of maximum U-values for the building envelope and a maximum shading factor for windows. The requirements regarding RES remain as they were in the 2010 ministerial order which requires the installation of a solar heater for the production of Domestic Hot Water (DHW) and the necessary provision in the event that RES will be installed in the future for the production of electricity. An energy class of B or better is required.

The first minimum energy performance of buildings requirements in Cyprus were introduced with a ministerial order in December 2007. The national scheme for the Energy Performance Certification of new and existing buildings was introduced in 2009 and was taken into force the 1/1/2010.

The EPC is required to be issued when a new building is constructed, or when a building is being sold or rented out. It is also required for buildings with a useful floor area of over 500 m² that is occupied by a public authority and is frequently visited by the public.

The definition of NZEB for residential and non-residential buildings in Cyprus is prescribed by the Requirements and the Technical Characteristics of the NZEB ministerial order of 2014 (K.Δ.Π.366/2014). For the NZEB it is required to reach energy class A (the best class), however, the EPC format was not affected for the moment.

Since 2013, the requirements are separated for new buildings, new building units, existing buildings that are above 1,000 m² and undergo major renovations and building elements that are replaced or retrofitted on existing buildings with minimum requirements of U-values and an EPC category of at least B.

Additionally, the 3% the total floor area of buildings that are owned and used by central government authorities are to be renovated each year. The renovations should be made to at least fulfil the current minimum energy performance requirements. Already by decision of the Cabinet of Ministers, the Minister of Communications and Works has been authorised to submit a comprehensive plan for upgrading the energy efficiency of public buildings.

2.4 Greece

In Greece, Directive 2012/27/EU has been implemented in the country's legislation through the 5825/2010 Common Decision of the Ministries of Economy and Environment (A Regulation regarding Energy Performance of Buildings called "KENAK" in Greek), as well as the pertinent Law 4122/2013. These define the implementation of Energy Efficiency necessary data and features for building stock to be taken into account when measuring energy performance by Energy Auditors. An energy performance certificate according to KENAK is then issued for each building, according to its current status and measures needed to improve its energy class.

The institutional Framework for Energy Efficiency in the country includes:

- Thermal insulation regulation (late 1970's)
- Regulation of Rational Use and Energy Saving (2000)

- **Law 3661/2008 on “Measures to reduce energy consumption in buildings”**
minimum requirements for energy efficiency in new and existing buildings,
methodology for the calculation of energy consumption in buildings)
- **Law 3855/2010 on “Measures to improve energy efficiency in end- use, energy services and other provisions”** (national targets for energy saving = 9% of the average annual final value of energy consumption)
- **Law 3851/2010 on “Accelerating the development of Renewable Energy Sources to address climate change, of the Ministry of Environment, Energy and Climate Change”** (also applies for the use of RES in buildings)

All issues related to Energy auditors are tackled through the Presidential Decrees 72/2010 and 100/2014.

Directive 2010/31/EU has been transferred to the Greek State through the Law 4342/2015, according to which: all buildings hosting public services should reach by 2020 a minimum Energy Class C”.

Further information can be found at: <http://www.ypeka.gr/Default.aspx?tabid=338>

2.5 Italy

Legislative decree n°102/2014 – implementation of the Directive 2012/27/EU, it establishes a framework of measures for the promotion and improvement of energy efficiency, that contribute to the national target about energy saving, which was set in 20 million of TEP for primary energy consumption. The aim of the decree is also to lay down rules designed to remove barriers in the energy market and overcome market failures that inhibit efficiency in the supply and end-use efficiency.

The Standard provides that, as from 2014 and until 2020, the interventions are made on buildings of the central public administration, including peripheral properties, and able to achieve the energy upgrading of at least 3 per cent per annum of the indoor floor area heated, or that, alternatively, they carry a cumulative energy saving in the period 2014-2020 of at least 0,04 Mtep. In parallel the decree encourages the regions, in implementation of its energy planning tools, and in collaboration with local government agencies and municipalities (such as MCR), to implement interventions helping to achieve the national target.

The decree identifies in ENEA (Italian National Agency for new technology, Energy and sustainable Economic Development) the main actor for the promotion of the energy efficiency in buildings, delegating the task of drafting of the EEAP (National Action Plans for Energy Efficiency); within the EEAP, ENEA must elaborate, starting in 2014 and every three years, a proposal for medium and long-term measures, to improve the energy performance of buildings. This proposal, sent to the European Commission after government internal Approval (the EEAP was approved on 17 July 2014 by Ministerial Decree), covers both public and private buildings, and contains at least the following elements:

- An overview of the national building stock;
- Identification, based on methodology defined in article 5 of Directive 2010/31/EU, of the interventions more efficient in term of costs, divided according to the type of building and the climate zone;
- An updated list of measures, existing and planned, to boost the financial support, provided by public and private entities, for energy retrofit and major renovations of buildings, accompanied by examples of application and the achieved results;

- Analysis of the technical, economic and financial barriers that prevent the implementation of measures to improve energy efficiency in buildings and of simplification and harmonization measures needed to reduce cost and time of interventions and attract new investment;
- An estimate of the energy savings and additional benefits to be obtained annually through improved energy efficiency of the national building stock, based on historical data and forecasts on the annual renewal rate.

For what concern energy consumption of the buildings, the energy audits become mandatory for large companies and must be performed by ESCO in according to national standards UNI 16247 and updated every four years.

Furthermore, as regards the energy performance contracts (EPC), they are made mandatory in case of public procurement in matter of provision of energy services and management system of the public administration, and they must include the following minimum elements:

- A clear and transparent list of the energy efficiency measures to be applied and the results to be achieved in terms of efficiency;
- Guaranteed savings to be achieved by applying the measures provided for in the contract;
- The duration and the fundamental aspects of the contract, the manner of performance and the estimated times.
- Data or dates of reference for determining the savings achieved;
- a clear and transparent list of steps for implementing a measure or a package of measures, and the associated costs;
- The obligation to implement fully the measures provided for in the contract and documentation of all changes made during the project;
- Clear and transparent indication of the financial implications of the project and the share of participation of both parts to the monetary saving achieved (i.e. remuneration of the service providers);
- Transparent rules for quantification and verification of the guarantee saving achieved, quality checks and guarantee of results;
- Detailed information on the obligations of both contractor parts and the sanctions in case of default;
- Determination of cases in which it is necessary to proceed to the rescheduling of financial conditions due to changed market conditions (see variation in energy prices).

Lastly, the decree make mandatory, starting from April 2017, the installation of the thermostatic valves, variable speed pumps, and the evaluation, by qualified technician, of the actual energy consumption of individuals' unit of the condominiums (central heating systems), also based on actual solar exposure and other elements.

Ministerial Decree 26/06/2015 (national guideline for buildings energy performance class), implementation of the Directive 2010/31/UE, and in substitution of the previous national guideline (ministerial decree 26/06/2009 in according to Directive 2002/91/CE).

The decree aims to promote consistent and coordinated application of the certification of the energy performance of buildings, throughout the national territory. The decree defines:

- a) national guidelines for buildings energy performance class and its certification (input of the new calculation methodology based on updated rules UNI TS 11300, new format for energy label as output, obligation to carry out at least one site inspection, rules to make independent and impartial the energy certifier role, etc.);

- b) the connecting tools, coordination and cooperation between central state and regions and local government;
- c) the creation of a common information system for the entire national territory, for the management of a national register of energy performance certificates and the heating system. This system called SIAPE, represent the national database of energy certificates and it is filled by the regions and local authorities in according to their specific skills;
- d) The regions also have the obligation to provide to control of the accuracy of the EPC (Energy Performance certificates) not less than 2% of amount, for each year.

The certification system of the building energy performance, contains, at least, the following elements:

- a) the mandatory information that must be contained inside EPC, including data related to energy efficiency of buildings, the current values required by law, the reference values or performance classes that enable people to compare and asses energy performance of the building, in synthetic and not technical form, suggestions and recommendations on the most significant and cost-effective interventions for improvement of the energy performance;
- b) the technical reference standards according to those developed at European and national levels;
- c) the procedures and the methods for calculating the energy performance of building, including the simplified methods, when applicable.

Finally, the requirement criteria to ensure the qualification and independence of those responsible for energy performance certificate of building, in according to decree of President of the Republic n° 75 of 16/04/2013, constitute essential elements of the certification system.

2.6 Malta

Legal Notice 376 of 2012 – Energy Performance of Buildings Regulations, 2012

The aim of the regulations included in the LN 376 of 2012 is to transpose the Directive 2010/31/EU on the energy performance of buildings and give effect to its provisions. These regulations promote the improvement of the energy performance of buildings within Malta, taking into account outdoor climatic and local conditions, as well as indoor climate requirements and cost-effectiveness. The policy identifies a common general methodology for calculating the integrated energy performance of buildings and building units. In this framework, the document sets the guidelines for the application of the minimum requirements for the energy performance of new buildings and existing buildings, which are subject to major renovation (Legal Notice 261 of 2008 – Minimum Requirements on the Energy Performance of Buildings Regulations updated through the Technical Guidance Document F, 2015).

The Building Regulation Office is the authority responsible for the process and enforcement of the Energy Performance of Buildings Regulations and Certifications. In collaboration with the Planning Authority, it takes the necessary administrative measures to establish a system to monitor and enforce the upgrading of the energy performance of the building or, in the case of buildings which undergo major renovation, the renovated part thereof, in order to meet minimum energy performance requirements, set in accordance with regulation 5, in so far as this is technically, functionally and economically feasible.

Furthermore, this Legal Notice provides, under Clause 10, that by 31st December 2020 all new buildings should be nearly zero-energy buildings and by 31st December 2018 new buildings occupied and owned by public authorities. In order to outline a strategy concerning

the achievement of these targets a National nearly Zero-Energy Building (NZEB) Plan has been drawn up in 2015.

The Legal Notice 376/2012 also regulates the provision of the EPC (energy performance certificate) and all necessary measures to establish and maintain a system of registration of the EPC. As stated in Art. 12, the EPC shall include the EPB (energy performance of the building) and reference values such as minimum energy performance requirements, in order to make it possible for owners or tenants of the building or building unit to compare and assess its energy performance. The EPC shall also include recommendations for the cost-optimal or cost-effective improvement of the EPB or building unit and provide information on the steps to be taken to implement the recommendations.

Malta's Energy policy 2012

The document outlines the general Government's energy policy, the priority areas and the overall goals and objectives for the development of the energy sector in the island. The Malta's energy policy is significantly influenced by a number of EU energy and environmental policies, as the Directive 2012/27/EC and the Directive 2009/28/EC. The National Energy policy document includes a set of strategies in relation to energy use and saving, reduction of CO₂ and GHG emissions and renewable energies. One of the key policy areas to attain the stated policy objectives is the energy efficiency strategy, which is then translated and detailed in the NEEAP (National Energy Efficiency Action Plan).

NEEAP_National Energy Efficiency Action Plan, 2014

NEEAP is a stand-alone roadmap for the general guidance of the public and stakeholders in Malta to reach energy savings targets, and it also serves as action plan for presentation to the European Commission as required by Article 24 of Directive 2012/27/EC. The document contains a set of policy measures and target actions in the sectors of: Buildings, Public bodies, Electricity and water management, Transport, Heating and cooling. NEEAP lists a series of actions and horizontal measures to be implemented with the aim of achieving the established targets. These measures comprehend: Energy or Environment Management, Energy Audits, Financing schemes, Training and education, EU funded Energy Grant initiative for businesses, the Eco-Gozo plan, Local SEAPS, Energy Saving in public buildings, etc.

NEEAP (2014) sets a target of 27% savings in primary energy consumption by 2020 (the Nearly Zero Energy Building target for Malta), as required by Article 3(1) of the EED and the expected impact of the target on primary and final energy consumption in 2020. Moreover it analyses the national intermediate target for nearly zero energy buildings for 2015 in accordance with recast EPBD Articles 9(1) and 9(3b) for new buildings.

National nearly Zero-Energy Building (NZEB) Plan, 2015

The aforementioned Legal Notice 376 of 2012, establishes (under Clause 10) that by 31st December 2020 all new buildings should be nearly zero-energy buildings and by 31st December 2018 new buildings occupied and owned by public authorities. In order to outline a strategy concerning the achievement of these targets a National nearly Zero-Energy Building (NZEB) Plan has been drawn up in 2015.

The plan specifically addresses the consequences of the recast EPBD for new buildings and the accompanying stricter requirement for energy performance, and its relation to the methods used to calculate the Energy Performance of Buildings. NZEB plan also covers the policy and measures regarding transformation of existing buildings that are renovated to become nearly zero-energy buildings.

The plan expects to update the minimum requirements (seen in Technical Guidance Document F) with stricter parameters and made them mandatory for all dwellings. Quantitative targets are being adopted to increase the number of nearly-zero energy buildings in the period prior to 2020. Initiatives such as financial incentives, promotional campaigns and research projects are envisaged to assist in the progression towards the achievement of these targets.

Document F_ Technical Guidance Conservation of Fuel, Energy and Natural Resources, (Minimum requirements on the Energy Performance of Buildings) 2015.

The Document F is a technical guidance for the conservation of energy and natural resources applied to building design and redevelopment. The document lists a comprehensive set of recommendations to achieve energy efficiency, from the calculation of the energy performance of the building elements to the integration with the energy systems (including RES and water conservation measures). The document specifies the minimum energy performance requirements to be applied to all new buildings, as well as existing ones where major redevelopment, renovation or alterations were being undertaken. These are legislated by the aforementioned Legal Notice 237/2012 "Energy Performance of Building Regulations".

The document also gives indications on how one can meet these requirements, as for instance, the use of thermal insulation building materials to reduce the passage of heat; the design of apertures to decrease the effect of solar overheating; improved heating and cooling systems, etc.

The regulation sets maximum U-values for each building element and guides in the definition, calculation and achievement of those parameters applied to walls, floors and roofs, windows and roof-lights, for the different types of buildings. In addition, maximum allowable areas of glazing are introduced for apertures (depending on the orientation) and roof-lights. The document has been revised in 2015 to achieve the 2020 performance levels and introduce a nearly zero-energy building standard into legislation between 2015 and 2018.

2.7 Portugal

Decree-Law 118/2013 approves the Energy Certification System for Buildings, the Energy Performance Regulation for Housing Buildings and the Energy Performance Regulation for Trade and Service Buildings, which transposes Directive 2010/31/EU, on the energy performance of buildings.

In addition to the transposition of Directive 2010/31/EU, this decree-law revises national legislation, thus improving the application by including in a single document the Energy Building Certification System (SCE), the Energy Performance Regulation Of Housing Buildings (REH) and the Energy Performance Regulation for Trade and Service Buildings (RECS).

This update allowed a simplification and easiness of interpreting since this question was previously regulated by three diplomas, then being updated to one.

There was also a clear separation of the application of REH and RECS, where the former acts exclusively on residential buildings and the latter on those of trade and services, also facilitating the technical management of the processes and recognizing the technical specifications characteristic of each type of building.

The thermal behaviour and the efficiency of the systems are taken as pillars for the definition of requirements and the evaluation of the energy performance of the buildings. In the case of trade and services buildings, the installation, conduction and maintenance of technical systems are also taken into account.

Energy efficiency requirements are introduced for the main types of building technical systems (HVAC systems, hot water, lighting, renewable energy management).

In addition to energy efficiency, the promotion of the use of renewable energy sources is also taken into account.

In this document, the concept of building with nearly zero energy needs arises, which will become the pattern for the new constructions from 2020 or 2018, in the case of new buildings belonging to public entities, as well as a reference for the major interventions in the existing buildings.

Resolution of the Council of Ministers no. 20/2013 approves the National Action Plan for Energy Efficiency (PNAEE) and the National Action Plan for Renewable Energy (PNAER) in order to ensure continuity of measures to ensure the development of an energy model with economic rationality, ensuring sustainable energy costs that do not compromise the competitiveness of companies or the quality of life of citizens. The contributions in the reduction of the energy consumptions are distributed by the various sectors of activity. The current Plan will cover six specific areas: 1) Transports; 2) Residential and Services; 3) Industry; 4) Municipalities and public bodies; 5) Behaviors; 6) Agriculture.

Based on the best international practices and complying with the provisions of Decree-Law no. 319/2009 of 3 November, the Government launches the National Energy Efficiency Action Plan (PNAEE) and the ENE 2020 Program Of Energy Efficiency in Public Administration - ECO.AP, through which it aims to achieve a level of energy efficiency of around 20% in the public services and public administration bodies, by the current values. ECO.AP is an evolutionary program which translates into a set of energy efficiency measures for short-, medium- and long-term implementation in public services, bodies and equipment and aims to change behavior and promote the rational management of energy services, including through Of the contracting of energy services companies (ESE).

The National Energy Strategy with the horizon of 2020 (ENE 2020), approved by the Resolution of the Council of Ministers no. 29/2010 of 15 April, provides as one of its main objectives the development of an industrial cluster Associated with the promotion of energy efficiency, ensuring the creation of jobs and generating a predictable investment of € 13 billion by 2020.

Portugal didn't transpose yet the European Directive 2012/27/EU. The way in which Portugal has chosen to meet the required annual reduction in final energy consumption has been through the implementation of measures of the PNAEE, some of which are difficult to monitor and with data that require greater transparency so that the effect of current policies can be well evaluated. An increase in benefits or a result that is due to other factors and is accounted for compliance with legislation.

2.8 Slovenia

The EPBD was implemented into national legislation by the already existing Building Construction Act (giving the legal basis for Building Codes with minimum requirements and the calculation methodology), the Environmental Protection Act (addressing the inspection of boilers), and by the Energy Act which on 17 November 2006 was amended to include the rest of the EPBD requirements. The secondary regulation announced in 2008, set out new minimum requirements, the calculation methodology, feasibility studies, and regular inspection of Air- Conditioning (AC) systems, while the regulation on energy performance certification was adopted in 2009. The training and licensing of independent experts working on the energy performance certification and AC system inspections of buildings, as well as the protocols relating to the registry of the Energy Performance Certificates (EPC) were defined in detail in the 2010 Regulation on training of independent experts. The regular inspection of boilers was implemented in 2004 under an existing scheme for chimney sweeper services and upgraded with details on concessions in November 2007. A revision of the relevant legislation was initiated in mid-2010 in order to comply with the requirements of the

Directive 2010/31/EU, which on 22 February 2014 resulted in the adoption of a new Energy Act.

In order to implement the Directive 2010/31/EU, Slovenia updated the minimum energy performance requirements for new energy-efficient buildings and, if relevant, existing buildings upon major renovations and maintenance works, in the 2010 Rules on efficient use of energy in buildings with a technical guideline (PURES 2010). Minimum requirements apply to all new buildings, as well as to major renovations, i.e., if at least 25% of the area of the building envelope is subject to renovation. In case of maintenance works on the building envelope, if a renovation (when a building permit is needed) is less than 25% of the thermal envelope area, and for buildings with a floor area smaller than 50 m², only the minimum requirements for the U-values of the envelope must be considered (i.e., an additional insulation layer will be mandatory). For major renovations of the heating system, and in case of maintenance and replacement works, minimum requirements for the systems, subsystems and elements are of the same level as those required for new buildings. The use of RES is mandatory for all new buildings since 2008, i.e., a minimum of 25% of the total final energy used for the building's energy systems' operation must be covered by RES.

In December 2014, a new regulation on the methodology for energy performance certification was adopted, while revision of other regulations is still ongoing. This includes the Building Codes PURES 2010 which on 1 January 2015 put in place more severe minimum energy performance requirements according to the existing transitional provisions. Further changes are planned in line with the new set of CEN EPBD standards and the results of the cost-optimal study. National plan for Nearly Zero-Energy Buildings (NZEBs) was adopted on 22 April 2015.

The 2012/27/EU directive is implemented in National legislation through Energy act, adopted in 2014 and different regulations, strategies etc. Directive on energy efficiency has a special emphasis on energy efficiency on public buildings. Article 4 (Building renovation) and Article 5 (Exemplary role of public bodies' buildings) of the directive were implemented in national legislation through Long-Term Strategy for Mobilising Investments in the energy renovation of buildings, adopted in October 2015.

The Strategy's operational targets up to 2020 or 2030 are as follows:

- the renovation of 3 % of public buildings owned or occupied by central government each year (between 15.000 and 25.000 m²)
- the renovation of 1.8 million m² of the floor area of buildings in the wider public sector between 2014 and 2023 (OP EKP);
- an improvement in the ratio between public funds invested and investment incentives in the public sector to 1:3 (OP TGP 2020);
- the implementation of five energy renovation demonstration projects for different building types

Article 5 also demands to put in place an energy management system for public buildings. In July of 2016, a Decree on energy management in the public sector was adopted, which requires implementation of energy management system for all public organizations by the end of 2017.

Article 6 (Purchasing by public bodies) is implemented in national legislation through Energy act and through Decree on green public procurement. The Energy act requires that all new public buildings built after 31. of December 2018 are Nearly zero-energy buildings.

Article 7 (Energy audits) is implemented in national legislation through Regulation on energy audits, which was adopted in June of 2016.

2.9 Spain

Royal Decree 56/2016, 12th February 2016, regarding efficiency energy, energy audits, accreditation of energy services providers and energy auditors, etc.

The royal decree seeks to promote energy efficiency actions related to primary energy consumed, as well as to optimize the energy demand of energy consumption in installations and equipment. It also aims to increase the number of competent and reliable professionals to ensure the implementation of Directive 2012/27/EU. It also promotes the development of energy services market in order to ensure the availability of demand and supply of these services.

Law 8/2013, 26th June 2013 about rehabilitation, regeneration and urban renewal.

This law seeks to actively contribute to environmental sustainability and to social cohesion improving the quality of life of all citizens. The law focuses its efforts on housing and public and private buildings, and urban spaces. The European Union set up several recommendations in relation to "Energy and Climate Change" for 2020 that have been included in Spain through this law. These three compulsory targets have been established for the 27 member countries: to reduce 20% of greenhouse gases' emissions; to reach 20% consumption through renewable energy; and to improve efficiency energy by 20% in buildings, housing, etc.

Link: https://www.boe.es/diario_boe/txt.php?id=BOE-A-2013-6938

Order FOM 1635/2013, 10th September 2013, upgrade the Building Technical Code DB-HE "Saving Energy"

This order is the first step to achieve the goal that all new buildings will be zero energy building by 31th December 2020, and that before the end of 2018, new buildings that are occupied and owned by public authorities are also zero energy building.

Royal Decree 314/2006, 17th March 2006, the Building Technical Code.

This Royal Decree fulfils some basic building requirements related to structural safety, welfare of people, fire protection, sanitation, noise protection, energy conservation or accessibility for people with disabilities. It contributes decisively to the development of sustainability policies. From this royal decree, it results the Plan of Action for the Energy Saving and Efficiency Strategy. It is also a resource to fulfil international commitments of the Spanish Government on environmental issues, such as the Kyoto Protocol or the Gothenburg Strategy. Link: http://www.boe.es/diario_boe/txt.php?id=BOE-A-2006-5515

3 Other relevant regulations at regional and local level

Local and Regional Authorities also play a part in regulations regarding the energy efficiency of buildings. There is a large variation on how involved Regional and Local Authorities are in the different countries of the ENERJ partners' consortium. In most of the small EU countries, there is no regional or local regulations since it is done at a National level. Larger countries like Portugal, Italy and Spain do have different regional regulations and regional development strategies.

3.1 Albania

With the decentralization, the local authorities are going to become key players in energy and environment matters, particularly in the energy efficiency issues. As a part of the ongoing decentralization process, Albanian Municipalities are transferred the responsibility and budgetary obligations for:

1. Operation and maintenance (incl. energy) for administrative buildings, schools, kindergartens and hospitals
2. Street lighting

3. Water supply
4. Waste and garbage

The existing municipal and public buildings do not fulfil the Albanian Energy Building Code conditions, they have walls with a high coefficient of thermal losses and inadequately insulated windows & doors; consequently they result with great energy/heat losses. With future increase of the energy tariffs, the focus on energy efficiency will increase, and more capacities and skills will be needed to ensure a sustainable development at the municipal level. The year 2015 is the fourth year that the Norwegian Government is supporting an Energy Efficiency Capacity Building Programme in Albania, and one component of this programme is dedicated to support awareness raising and capacity building in the Albanian Municipal Sector.

Regional Energy Efficiency Action Plan which is prepared and will support the country to achieve National Energy Efficiency Targets and to create an Action Plan on Education for Sustainable Development. This plan will help mainstream low-emissions pathways in Albania, particularly at the regional level, and it will be followed by three pilot regions, of Tirana, Durrës and Elbasan.

The Government adopted secondary law No. 38, dated 16.1.2003, "The Technical Norms of Heat Saving in Buildings", According to the Decree, the physical or legal persons dealing with designing of buildings, either private or public, shall observe these norms, rules and conditions. The Councils of Regulatory Adjustment in municipalities or counties approve construction permission only when the designs meet the requirements contained in this code.

3.2 Croatia

Croatia, as a small country, doesn't have regulations on regional and local level concerning the energy efficiency of public buildings. All regulations are provided in national Building Act and national Technical regulations on rational consumption of Energy and Energy performance of buildings. These regulations are the same for all public buildings in Croatia.

3.3 Cyprus

For the issuing of the building permit, a submission of an electrical installation plan, a mechanical installation plan and the Energy Performance Certificate, performed by accredited specialists in each area, ensures that the most efficient equipment is used in terms of electrical and mechanical installations, as well as indicating with the EPC the energy performance of the construction and the U-values of walls, windows and roof. Furthermore, The installation of a solar thermal system for DHW is compulsory and there must be a necessary provision for the future installations of RES.

3.4 Greece

All regulations in Greece are at national level only.

3.5 Italy

L.R. Lazio, n° 6 del 27/05/2008 – *regional provisions on sustainable architecture and green building*—the Lazio Region, in order to safeguard the environment, the land and the health of the inhabitants, promotes and stimulates the energy and environmental sustainability, in the design and construction of public and private building works, by identifying and promoting the adoption and dissemination of principles and its sustainable architecture techniques and green building, **included those aimed to improving the energy performance of buildings in accordance with the provisions of Legislative**

decree 19 august 2005, n. 192 (implementation of Directive 2002/91/EC on energy efficiency on buildings) and subsequent amendments. The Region also establishes a system of evaluation and certification of the energy and environmental sustainability of buildings. In particular the article 5 of the law specifies that in renovation construction, new construction and urban renewal prescribed by local building regulations, it is mandatory the installation of facilities for the use of renewable energy sources to meet:

- a) energy consumption of domestic hot water (DHW), for at least 50% (i.e solar thermal generator)
- b) electric energy consumption not less than 1 kWp for each housing unit and not less than 5 kWp for industrial, commercial and service with surface extension of at least 100 square meters (i.e. photovoltaic systems).

The environmental sustainability certificate is made on a voluntary basis, except for the building of the Lazio Region for which is mandatory, and it is promoted through mechanism that provide for the reduction of construction costs (expenses to be paid to local governments). For the same purpose, regional incentives are provided, in case of new interventions and major renovation, up to 50% of the total cost of their implementation.

This kind of certification doesn't replace, but complements, the energy performance certificate (EPC) made compulsory by national law in case of new building, major renovation and, for the existing buildings, in case of rental or sale of the property.

DGR (Regional Council Decree) Lazio Region n° 557/2015 on substitution of the DGR 654/2014, called Itaca protocol – it is a complex of measures that updates the previous ones and it is based on the new rules and implementing national guidelines according to Directive 2010/31/UE. The Decree changes and thereby improves the mechanism of environmental sustainability certificates and its related incentives, in residential and not residential (both for new building and for existing ones). The law introduces the numerical evaluation of the criteria that are included in the environmental certificate, such as: the consumption of resources during the working (i.e. the energy performance rating obtained by the comparison between what actually the building consume, and the same parameter of the reference building 2019/2021), the use of renewable sources such as solar thermal and photovoltaic systems, the use of environmentally friendly materials, drinking water consumption and the related recovery systems, the evaluation of environmental loads, such as air emission expected during the year, and finally the assessment of the quality of the micro climate of the indoor environment.

Resolution of the Municipality of Rome n° 48/2006 and subsequent updates – it is an important measure as it is directly operating on the local authority's plan and make the massive use of renewable sources, mandatory, since 2006, in case of new buildings and in particular: forces to satisfy at least 50% of the total energy consumption of building, through the use of technically usable renewable sources, (solar thermal, photovoltaic systems, geothermal, etc.); requires the use of rainwater recovery systems for irrigation purposes and the hygienic sanitary (the bathrooms drains).

3.6 Malta

Being a small country, Malta does not have regulations on regional and local level concerning the energy efficiency of public buildings.

3.7 Portugal

Alto Alentejo region developed a Regional Development Strategy where it was defined a set of actions and priorities of intervention for this territory. These actions and axes were defined

taking into account the opinions of all relevant entities in the territory. One of the priority axes of action identified is Energy Efficiency in public buildings and thus a priority intervention for the Municipalities in the period between 2014-2020. In this way, all interventions of this nature are framed within this regional strategy that lists a set of other measures that should be developed.

3.8 Slovenia

All legislation and regulation is provided on national level. Regions are not defined as administrative or political entities (only geographical definition), so there is no regional governance. Municipalities can not define local regulations or provisions on energy efficiency in buildings.

3.9 Spain

ANDALUSIA

Law 1/2014, 18th March 2014, Program to promote Sustainable Buildings in Andalusia

The law targets citizens including communities of owners and housing cooperatives. It promotes actions regarding energy savings, improvement on energy efficiency or use of renewable energy. These actions have to be contemplated in restoration works, building renewal or improvement of energy efficient systems.

Link: <http://www.juntadeandalucia.es/boja/2014/58/1>

Law 7/2007, 9th July 2007, Promotion of Renewable Energies and Energy Saving and Efficiency in Andalusia

The law is an instrument to promote the use of renewable energy, energy saving and efficiency, from its production to its consumption, as well as the rational use of energy resources in the territory of the Autonomous Community of Andalusia, under the principle of collective solidarity in energy use.

Link: https://www.agenciaandaluzadelaenergia.es/sites/default/files/ley_2_2007.pdf

OTHER REGIONS

[Madrid] Royal Decree 2066/2008, 12th December 2008, approval of National Housing and Rehabilitation Strategy

The law focuses on housing renewal and new building to improve energy efficiency levels, accessibility and security in buildings.

Link: https://www.boe.es/diario_boe/txt.php?id=BOE-A-2008-20751

[Catalonia] Royal Decree 233/2013, 5th April 2013, building rehabilitation and urban regeneration and renewal.

The law regulates funds allocated to refurbish communal spaces for housing and public building, to upgrade quality and sustainability of housing stock or to improve buildings accessibility.

Link: <http://www.boe.es/boe/dias/2013/04/10/pdfs/BOE-A-2013-3780.pdf>

[Basque Country] Decree 317/2002, 30th December 2002, in relation to rehabilitation of urbanised and built heritage. This Decree regulates legal instruments for rehabilitation initiatives that promote the housing industry.

The Decree aim is to improve housing and public building requirements on several fields like: accessibility, fire risk or efficiency energy. This Decree is focused on housing buildings blocks.

Link: http://www.euskadi.net/cgi-bin/k54/ver_c?CMD=VERDOC&BASE=B03A&DOCN=000110652&CONF=/config/k54/bopv_c.cnf

[Castilla La Mancha] Law 7/2014, 12th September 2014, legal initiatives in relation to housing and urban rehabilitation, urban renewal, sustainability and coordination in the field of urban planning.

It defines that housing rehabilitation and urban renewal must be the main objectives of Castilla La Mancha urban strategies. This must be especially contemplated in complex urban spaces where converge conditions like urban obsolescence, abandoned spaces or damaged building take place. Other factors should be taken into account like social exclusion based on unemployment, low incomes, age, disabilities or any another element link to social risks.

Link: https://www.boe.es/diario_boe/txt.php?id=BOE-A-2014-9961

4 Plans at regional and local level

Sustainability and Energy Efficiency Actions are common in Member States for regional and local level plans with a large number of local authorities also implementing their SEAPs, being signatories of the Covenant of Mayors (7,305 signatories) and the Pact of Islands. Some strategies are also in place at regional level for RES penetration and EE, with some incentives also in place for facilitating the implementation towards low-carbon economy.

4.1 Albania

Albania's 1st NEEAP was developed to comply with the transposition of European Union (EU) Directive 2006/32/EC (the Energy Services Directive) and by 2009 Decision of the Ministerial Council of the Energy Community. The plan was adopted by the Government of Albania in September 2011 and envisaged the achievement of annual energy savings of 3% in 2012 and 9% in 2018, calculated as a proportion of the average final energy consumption of the five-year period 2004–2008 inclusive.

The draft NEEAP-2 extends this target to an 11% increase in energy efficiency of final energy consumption although does not specify the base year for this calculation. The measures proposed, together with expected savings both by 2018 and 2020 are as follows:

- Development and adoption of secondary legislation on energy efficiency in buildings requirements regarding external envelope of the buildings with cost optimal calculation of requirements for building envelope elements
- Enforcement of implementation of minimum requirements for new buildings – further enforcement through building quality checks,
- Cost optimal definition of energy efficiency requirements for new and existing buildings, and definition of nearly zero energy buildings based on lifecycle cost for single family buildings, multi-apartment buildings and non-residential buildings
- Tax exemption model development for existing building refurbishment based on defined cost optimal requirements for new and existing buildings and nZEB,
- Direct CO₂ emissions levy for building based on energy performance of buildings.

Establishing an integrated information system for monitoring the implementation of the energy efficiency policy.

4.2 Croatia

According to Act on Energy Efficiency every County (Croatia has 20 counties + City of Zagreb) and all town bigger than 35.000 people are obligated to prepare regional/local Annual Plan for Energy efficiency and Action plan of Energy efficiency.

Energy Efficiency Action Plan contains:

- review and assessment of the situation and the needs of the final energy consumption,
- long-term goals, including an indicative energy savings target, measures and indicators to improve energy efficiency,
- holders of activities and deadlines for implementation,
- measures to improve energy efficiency in accordance with the National Energy Strategy and other strategic documents of the Croatian Government,
- calculation of planned energy savings in accordance with the national rules for Monitoring, measurement and verification of energy savings,
- method of monitoring of progress and reporting
- method of financing the plan.
- Annual energy efficiency plan includes:
 - review of measures implemented in the previous year,
 - holders of activities and deadlines for implementation,
 - measures to improve energy efficiency in accordance with the National Energy Strategy and other strategic documents of the Croatian Government,
 - calculation of planned energy savings in accordance with the national rules for Monitoring, measurement and verification of energy savings
 - method of monitoring the execution of the plan,
 - method of monitoring of progress and reporting
 - method of financing the plan.

Plan execution monitoring is carried out in the next annual plan which contains an overview of the implemented measures in the previous year and the application SMIV - System for monitoring, measurement and verification of energy savings. According to data submitted in the Action Plans, a national body elaborates the National Energy Efficiency Action Plan.

In IRENA's area of interest, County of Istria, there are two public institutions which are obligated to prepare Annually an Action Plan; County of Istria and City of Pula. For both institutions, IRENA is elaborating their Plans for EE.

Besides these obligatory EE Plans, many counties, towns and municipalities in Croatia develop their own voluntary energy plans like Regional Energy Strategies (on regional level) and SEAP's (on local level). Also, energy measures are often included in different Regional/local Development Strategies.

In Istrian County, our area of interest, there are multiple voluntary energy plans:

- on regional level; The program of energy efficiency in final energy consumption in Istrian County is a kind of master plan for energy efficiency in final energy consumption of Istrian County. The program analyses the direct energy consumption of the Istrian Region in accordance with the requirements of Directive 2006/32 / EC. Indicative energy efficiency goals are set at 3% (1% per year - 0.13 PJ) of the total annual consumption of final energy consumption with the exception of large customers that use coal and natural gas for energy transformation and technological purposes of high temperature energy conversion. Regarding the policy of energy efficiency is stated that the biggest obstacles in realization of EE projects are finances and legislatives. Financial limitations or unavailability of financing sources (various funds, national and regional institutions, credit or loans from banks and various financial companies) is the biggest obstacle in realization of EE projects.
- on local level; 9 cities (Pula, Novigrad, Buzet, Labin, Poreč, Rovinj, Umag, Buje and Pazin) and 3 municipalities (Barban, Grožnjan and Oprtalj) had developed SEAP's. These towns and municipalities have joined the initiative of the European Commission with the primary goal of reducing emissions of greenhouse gases. In accordance with the commitments

undertaken by joining, each of these cities made their own Sustainable Energy Action Plan, which defines the measures for energy efficiency in the building sector, traffic and public lighting, enforceable by 2020. Measures defined in SEAP's should be monitored by city/municipal officials, but as these plans are voluntary their monitoring is often neglected and it is hard to find the date about their implementation.

4.3 Cyprus

Signatory local authorities of the Covenant of Mayors (24 local authorities) and the Pact of Islands (6 local authorities) include in their SEAP's measures for the energy efficiency upgrading of their building stock, as well as monitoring (8) their energy consumption. Furthermore, the signatories have set targets for 2020 and with the new CoM for the 2030 in the reduction of their CO₂ emissions where the total energy efficiency of the local authority is addressed for improvement.

4.4 Greece

Certain municipalities in the area of intervention have drafted their SEAP's (mainly with the assistance of ANATOLIKI Development Agency): Municipalities of Kalamaria, Thessaloniki, Pylaia-Hortiatis, Neapolis-Sykies, Pavlos Melas, Edessa (these 6 had their SEAPs prepared and submitted by ANATOLIKI), plus other 11 Municipalities with SEAP in the Region of Central Macedonia. Many others do not have SEAP yet. However, there is no formal procedure of monitoring the implementation of SEAP, which is thus performed on a rather voluntary basis by the Municipalities themselves. ANATOLIKI has implemented one SEAP Monitoring so far for the city of Thessaloniki.

At regional level, the Region of Central Macedonia has recently published a call for the implementation on a large scale of energy efficiency analysis of all regional public buildings after they are recorded and this is expected to improve the overall situation in the Region.

However, as mentioned before, this is a policy decided at national level.

4.5 Italy

As regards local-level the Lazio Region approved, in 2016, its own strategic document for the energy plan, that represents the preliminary evaluation for the next regional energy plan. It provides the strategy that will be implemented in that future plan, to achieve the targets established by Ministerial Decree of 15 March 2012, so-called "Burden Sharing"; The decree assigns, for each region, a minimum amount of energy increase (electricity, Heat and mobility) from renewable sources (RES), which is necessary to achieve a national goal – at 2020 – of 17% of the gross final energy consumption, goal assigned to Italy by Directive 2009/28, implemented by Legislative Decree n° 28/2011. The Energy Plan should be issued in 2017.

DGR (Regional Council Decree) Lazio Region n° 557/2015 on substitution of the DGR 654/2014, named Itaca protocol – it is a complex of measures that updates the previous ones and it is based on the new rules and implementing national guidelines according to Directive 2010/31/UE. This rule changes and thereby improves the mechanism of environmental sustainability certificates and its related incentives, in residential and non-residential (both for new buildings and for existing ones). The law introduces the numerical evaluation of the criteria that are included in the environmental certificate, such as: the consumption of resources during the working (i.e. the energy performance rating obtained by the comparison between what actually the building consumes, and the same parameter of the reference building 2019/2021), the use of renewable sources such as solar thermal and photovoltaic systems, the use of environmentally friendly materials, drinking water

consumption and the related recovery systems, the evaluation of environmental loads, such as air emission expected during the year, and finally the assessment of the quality of the micro climate of the indoor environment.

The MCR (former Province of Rome), has joined the Covenant of mayors, initiative launched by European Commission for climate and energy, acting as a supporting structure and it decided to implement it with a dual following commitment:

- Develop its own Sustainable energy action plan (**SEAP**) for the territory of Province of Rome (now MCR) with indications of short term (2010-2013) priorities about energy actions, and the same actions for the medium term (2013-2020), and with indications of the organizational structure and financial means to pursue the goal set, the actions to be taken and the expected results (SEAP was approved on 11/06/2009);
- Support the adhesion to the Covenant of the municipalities in our territory, through strategic, technical and financial support. Currently there are 31 municipalities that have issued their own SEAP based on the guidelines described. Among the most relevant SEAP, we mention that one of the Guidonia municipality, which implemented some very important measures, like energy improvement of the street lighting and public indoor lighting, in addition to other described in good practice paragraph, point 6.

Most of the action implemented or going within SEAP are those that depend directly by municipalities, while the activities to be implemented by other stakeholders have not yet started, in particular those in the industrial areas. In total for the 21 municipalities of which we have collected information, there were monitored 597 actions, of which 101 completed (17%), 259 are still in working progress (43%) and 237 have not been initiated or have been postponed (40%). There are 5 new actions added to the list that were not initially present in the SEAP.

4.6 Malta

EcoGozo Plan – A vision for an Eco-Island

EcoGozo, or the Eco-Island vision for Gozo, is a Local Sustainable Development strategy for the Island of Gozo adopted by Government in 2009. Through a holistic approach, the EcoGozo strategy seeks to achieve an enduring environmental improvement while at the same time, fostering economic development and social progress on the region of Gozo. Eco-Gozo Action Plan is a comprehensive guideline that proposes a set of measures to steer the Island of Gozo in a more sustainable direction and transit towards a low-carbon economy. Its general objectives are in line with the Europe 2020 strategy and the National Reform Programme.

EcoGozo plan is intended to solve the complex target of sustainability into a set of practical recommendations, which strive to improve the island on different levels, and through the integration of many different sectors. Following the guidelines proposed by the EcoGozo strategy, the island of Gozo in collaboration with Local Councils, adopted measures in energy efficiency and renewable energy resources installations in public buildings. Other measures related to the improvement of the environment, quality of life, culture and identity, job and education are also being carried out. Moreover Eco-Gozo seeks to promote the active participation of the Local Councils to the Covenant of Mayors, expecting that the island will be a benchmark for renewable and energy efficiency interventions.

Local Sustainable Energy Action Plans (SEAP) In Malta, 24 Local Councils had signed the Covenant of Mayors initiative and submitted their SEAPs, which include all the data regarding the energy consumption and CO₂ emissions per sector, as well as the planned measures for the energy efficiency upgrading of their building stock, and the monitoring plan foreseen. Recently, the signatories had submitted an updated SEAP that includes the new energy

efficiency targets for 2020 and the reduction of their CO₂ emissions according to the new CoM for the 2030 targets.

4.7 Portugal

With the collaboration of CIMAA, AREANATEjo prepared, in 2012, a joint SEAP for 4 Municipalities that belong to its intervention area (Alter do Chão, Avis, Marvão and Sousel). The design of this SEAP took into account the areas and sectors of intervention previously identified, the identification and characterization of several action measures that contribute to the objectives of the Covenant of Mayors - the reduction of, at least, 20% in CO₂ emissions in municipal area.

The characterization of the action measures underlying the baseline scenario of atmospheric emissions took into account the following descriptions: specific objective, implementation period, associated cost, period of return on investment, promoter, funding, energy reduction and emissions avoided. These plans included the identification of measures to improve efficiency in public buildings (administrative, school and/or sports buildings) with a special focus on HVAC systems, lighting and thermal insulation, the use of renewable energy (solar thermal, solar photovoltaic and/or biomass) and in the installation of smart meters. With a total budget of approximately €7,2M, this SEAP will allow an annual cost reductions of approximately €1,75M, in addition to the CO₂ reduction targets that will be reached by 2020.

The methodology for monitoring and evaluating the implementation of the measures (the first follow-up report was done in 2015) was taken up with particular attention: (1) Selection of measures: the selection of action measures requiring more rigorous monitoring and evaluation took into account the greater potential of reducing CO₂ emissions taking into account the overall value of each Municipality; 2) Selection and development of indicators: in order to guarantee the achievement of the objectives defined in the SEAP, monitoring and evaluation indicators were developed for each selected action measure; 3) Definition of reassessment processes: the results obtained in the aforementioned points will serve as a basis for preventing and making changes and/or planning adaptations considered relevant and necessary; 4) Definition of communication methods and reporting of results: annual reports are drawn up to measure the evolution of action measures and to enable stakeholders a transparent communication of results.

With this first evaluation, it was possible to verify the level of implementation of each measure in each one of the Municipalities and to determine which sectors need additional intervention.

4.8 Slovenia

There are no plans on regional level. Every municipality has to prepare a Local energy concept. Local energy concept has to be prepared at least every 10 years. The essential part of local energy concept is an action plan, where goals and measures to reach those goals are identified. The goals and measures have to be in line with national plans and operative programs. As for public buildings, community preparing a Local energy concept has to elaborate at least "a walk through" energy audit of all the public buildings it owns. By this action, a general overview of energy use, energy efficiency and usage of RES in public buildings is obtained, which enables definition of weak points in municipal public building stock. Then, a concrete action plan is elaborated, defining appropriate measures for each individual building. Also a common goal for public building sector is set with a performance indicator expressed in energy use per square meter (kWh/m²). Local energy concept has to be submitted for approval to the Ministry of infrastructure, and is finally accepted by municipal council. Monitoring of action plan implementation is done by annual report which has to be submitted to Ministry of infrastructure.

As an example, Municipality of Nova Gorica has accepted local energy concept in 2016.

The average specific energy consumption of public buildings in Municipality of Nova Gorica is 140 kWh/ m² per year, or 95 kWh / m² per year for heating only. The municipality set a realistic goal of reducing average energy consumption to total of 95 and under 70 kWh/m² for heating up to the year 2024. Total energy use for public buildings will decrease by 2,25 GWh and savings will amount to approximately € 245,953 annually.

To reach this goal a concrete set of measures is proposed for each individual building. For example, in the municipal administrative building, thermostatic valves installation, additional thermal insulation of the roof and installation of new windows is foreseen.

Some of the municipalities have also elaborated a SEAP. By comparing SEAP-s and Local energy concepts we can conclude, that the level of data and the definition of measures is much more elaborated in Local energy concepts.

4.9 Spain

Energy Planning in Andalusia

Energy planning in Andalusia face a historic cycle change marked by the need to urgently and decisively tackle on a world scale the problem that addresses having a quality, safe and sufficient energy supply without creating imbalances in the global ecosystem, especially those associated with the great challenge caused by climate change.

Until the Andalusia Energy Planning 2003-2006, energy planning studies had been focused on anticipating the energy demand that society would need over a certain period, with the aim of covering this demand with an approach that considered energy as an infinite resource. However, the demonstrated effect that this energy model together with the energy systems had on the environment with its important contribution to global warming meant that we needed an urgent solution to change the energy model.

Actually, Andalusia works on the framework of the Energy Strategy for Andalusia 2020. This strategy reflects the energy model that Andalusia pursues, based on the progressive establishment of a low-carbon economy, and from reducing greenhouse gases, as a response to the great challenges that arise today in the European Union: high energy dependence on foreign energy, economic growth and competitiveness of companies and environmental protection.

It is the result of the experience and results obtained from previous energy planning (Andalusia Sustainable Energy Plan 2007-2013 and Andalusia Energy Plan 2003-2006) and it has been developed through a process based on governance, counting on the participation of citizens, the most representative actors of the sector and the Administration.

Energy Strategy for Andalusia 2020

It reflects the energy model that Andalusia pursues, based on the progressive establishment of a low-carbon economy, and from reducing greenhouse gases, as a response to the great challenges in Andalusia: high energy dependence on foreign energy, economic growth and competitiveness of companies and environmental protection. The strategy collects the strategic guidelines governing the regional energy policy in coming years towards an adequate energy model, low in carbon, intelligent and of quality, without losing sight of the horizon 2030-2050.

The strategy is based on 5 principles with constitute the commitments for the energy future in Andalusia. They are:

- Contribute to an efficient and smart use of energy prioritising the use of autochthonous sustainable resources, as well as self-consumption systems
- Place the sectors of renewable energy and energy saving and efficiency as drivers of the Andalusian economy

- Guarantee the quality of energy supply, promoting the transition of energy infrastructures towards a smart and decentralised model, integrated in the landscape
- Act from the demand to make citizens the protagonist of the energy system
- Optimise energy consumption in the Administration of the Andalusian Regional Government, improving the efficiency of its installations and incorporating management criteria aimed at energy saving

Based on these principles, the strategy proposes action in all sectors of the Andalusian society: citizens, businesses and industry and administrations. It seeks to achieve some goals like: reduce by 25% the primary energy consumption, increase 5% self-consumption of electricity generated with renewable energy sources, or improve 15% the quality of the energy supply.

The strategy is implementing through five action programmes:

- Intelligent energy. Collects actions and measures to set up a more efficient energy system mainly in sustainable building and mobility.
- Improving competitiveness. Collects actions and measures to increase energy efficiency use and promote innovation for the development of energy products and processes.
- Improving infrastructure and quality of energy services. Collects actions that guarantee the energy supply with high quality standard and use of autochthonous resources.
- Energy culture. Collects actions and measures to bring about behaviour change among citizens, businesses and the administration towards a better use of energy
- Energy management in the Andalusian public administration. Collects actions and measures for the management of energy consumption in the Andalusian administration and optimisation of the energy bill.

Local Sustainable Energy Action Plans (SEAP)

The EU committed itself to reducing its overall emissions to at least 20% below 1990 levels by 2020. Local authorities are playing a key role in the achievement of the EU's energy and climate objectives. The European Union launched an initiative (Covenant of Mayors) to involve towns, cities and regions to reduce their CO2 emissions voluntarily through the implementation of Sustainable Energy Action Plans. In this context, more than 500 Andalusians' municipalities have joined the Covenant of Mayors drafted their Local Sustainable Energy Action Plans according to the objectives of CO2 reduction target by 2020.

SEAPs includes measurements of the energy consumptions of the city (preliminary Baseline Emission Inventory) - divided by sector - to identify the best fields of action and opportunities for reaching the local authority's CO2 reduction target. This defines concrete reduction measures, together with time frames and assigned responsibilities, which translate the long-term strategy into action.

The main target sector for the Andalusian's signatories are municipal buildings (publics and privates), urban transport and municipal public lighting. In addition, some SEAPs also includes actions related to local electricity production and local heating/cooling generation.

Monitoring is a very important part of the SEAP process. Local authorities should compile a Monitoring emission inventory report every 4 years that contains quantified information on measures implemented, their impacts on energy consumption and CO2 emissions, and an analysis of the SEAP implementation process, including corrective and preventive measures when this is required.

SEAP Seville

The SEAP of Seville is a strategic energy plan aimed at fighting climate change. Its target, therefore, is not to improve energy efficiency per se, but reduce the emissions of GHG. Before

this plan, Seville had a local strategy for fighting climate change, dated to 2005, and an energetic plan for the period 2002-2006. These plans were prepared in coordination. In a way, the SEAP integrates both tools, but now the emphasis is on energy management for the reduction of gas emissions and an increase in the number of carbon sinks. It is of note that no deadline has been defined for its implementation.

Objectives of SEAP Seville related to efficiency energy in public building are:

- To foster a rational use of energy, promoting an efficient use of energy in all sectors and the municipal services
- To support a good use of local energy resources by producing and using renewable energy
- To adapt construction normative to the new energy-related challenges

The SEAP of Seville includes an emission target that was calculated with a Carbon print calculation tool for Andalusian municipalities unlikely it does not includes details on how it could be evaluated. The SEAP of Seville also identifies what policies have an effect on energy use in public building and includes them in its action plan however it does not mention any funding sources. The description of the actions includes an estimated cost which is linked with the relevant departmental policies. Similarly, it does not offer an overall assessment of the measures listed, alone a timeline for achieving the targets set.

The SEAP of Seville includes a monitoring plan to determinate the impact positive or negative produced in the city thanks to the implementation of the measures and actions developed. To do that, SEAP of Seville proposes an indicators system based on three aspects:

- Applicability at the local level
- Competences at local level. Capacity to implement the measures and actions
- Availability of data with the level of disaggregation required.

Regarding to the indicators linked to public building actions, SEAP of Seville includes:

- Save energy estimated
- N° of energy efficient lifts installed
- Photovoltaic power installed in municipal buildings

SEAP Maracena

Maracena is a town of almost 22.000 inhabitants. Maracena has joined the Covenant of Mayors in 2009. The SEAP of Maracena is a strategy energy plan that includes an estimation of potential emission saving achievable through action in certain areas of intervention (energy efficient installations, transport/mobility planning, Efficiency energy and Energy-saving in Public Building, Public Lightings, Urbanism, etc.)

In the SEAP of Maracena, the set of actions is well balanced between energy efficiency and energy saving measures. However, it does not include details on how it could be evaluated and only energy-savings are reported. Similarly, it does not offer an overall assessment of the measures listed, alone a timeline for achieving the targets set.

Some interesting measures tackling municipal buildings are:

- Implement actions described in the Optimization Energy Plan
- Rooftop PV on public buildings: giving for rent roofs to enterprises that will install and operate PV plants. Produced electricity will be sold to the grid

Regarding to implementation and monitoring, three people are responsible for the implementation, monitoring and following up the SEAP of Maracena action plan.

SEAP of Maracena proposes to elaborate an evaluation, control and verification report each couple of years. Despite the facts that at present many municipalities have an indicators

system to measure SEAPs, the Maracena city council proposed to create a evaluation's system focused in direct control of the actions developed.

5 Overview of available databases

The database for the public building stock is made available in most Member States although it is common to be partially available or incomplete and sometimes not readily accessible. The public buildings don't all have an EPC in place to facilitate data collection, with usually part of the building stock given emphasis for issuing EPCs up to now.

5.1 Albania

Data regarding the energy performance of public buildings may be accessible by the concerned public authorities in Albania (National Agency of Natural Resources and INSTAT)

5.2 Croatia

In Croatia, public authorities implement Sustainable Energy Management, which includes strategic energy planning and sustainable management of energy resources. In ISGE database are entered all relevant static data of each public building, which include general, construction and energy performance of the building (total heated surface, type of heating system, energy audits and certificates, etc.) and then the dynamic data that include energy consumption on a monthly basis according to the submitted invoices from suppliers and consumption on a weekly or daily basis collected directly by reading the consumption meters. Also, the system is designed so that in the future it can accept almost instantaneous readings of energy consumption of buildings where embedded systems for remote reading devices are installed. ISGE is used just by public officers. Currently, in the system are uploaded data for 17.234 public buildings (961 complexes, 4.036 buildings in the complex, 9.005 buildings, and 3.232 parts of buildings) owned by cities, counties and the Croatian Government. These buildings include administrative buildings, hospitals, schools, kindergartens, museums, etc. Structure of ISGE system:

- EMIS system is a web application on a central server with the corresponding database.
- User access is possible from local servers, desktops, laptops and handheld computers on the Internet.
- It is possible to directly connect the measuring equipment at the facility to the central database, thus achieving automatic remote monitoring of consumption.
- There are a number of user profiles (guest, user, energy administrator, energy manager, system administrator) in accordance with the level of responsibility.
- Key features of ISGE system:
 - collection and entry of basic data on buildings and control of energy and water consumption on a monthly, weekly or daily basis
 - easy access to information about the total amount of consumed energy and water
 - calculations and analysis of consumption with a view to detecting unwanted, excessive and irrational consumption and identify opportunities for achieving energy and financial savings
 - verification of savings
 - automated alerting of critical events and malfunctions
 - elaboration of reports which include detailed analyses of each building

ISGE users are obligated to enter monthly/weekly data in the system for the buildings in their responsibility (school/school complex, hospital/hospital complex, etc.). ISGE administrators (which are in charge of monitoring all building in town or county ownership) monitor if all

ISGE users enter the data as they are obligated and once a year elaborate the annual report about absolute consumption for each building/complex they are responsible for. Annual reports include analysis, graphs and tables for energy consumption for reported year in total and by months. System also provides possibility of elaboration of reports of any given period (etc. months, years) and to elaborate the reports for any group of selected buildings/complexes.

Partner IRENA is ISGE administrator for all buildings in ownerships of Istrian County. IRENA monitors and elaborates reports for 199 buildings. Each ISGE administrator can see just the data of the buildings for which he is responsible, but it is possible to send the request to system administrator for the delivery of reports for all buildings in Croatia.

5.3 Cyprus

A record produced yearly by the Energy Service of the Ministry of Energy, Commerce, Industry and Tourism (MECIT) can provide an overview on the types of public buildings, their total area, energy consumed and the existence of an EPC and the energy category of the EPC. Furthermore, studies done by the Energy Service include equipment characteristics (e.g Energy Star), cooling and heating system typology and presence of energy efficient lighting. The data provided is accessible for the public but is incomplete.

5.4 Greece

There is no formal database as of today for energy data of buildings in the partners area of interest (that is, the Region of Central Macedonia). However, the work mentioned before in 4.4 will eventually lead to the establishment of a relevant database for all public buildings at regional level.

At national level, the objective of the National Energy Data System of the Ministry of Environment, Energy and Climate Change is to develop a computer tool regarding developments of the national energy strategy as well as establishing a service providing information to the general public. The main sections include:

- info on the competent organizations, legislation and standards.
- a data base with statistics regarding production, processing and consumption of energy. The presentation of such statistics facilitates their use for the compilation of analysis and reports on the energy system.
- The Geographical Information System deals with charts of energy networks, sites of installations, fields as well as detailing the capacity of Renewable Energy Sources.

5.5 Italy

At local level, Lazio Region has implemented, in accordance with Legislative decree n°102/2014, a new data base that represents the register (the included data have a restricted use by public authorities) of the energy performance certificates of buildings located within the regional territory. The Lazio Region has the obligation to keep these certificates and to perform the control activities about them. In a special way, it must verify the accuracy of the input data inside them and the subsequent output performance class, for at least of 2% of all certificates issued each year.

For what concerns the MCR, we have the energy performance certificates of all school buildings, in which the energy performance rate and the related energy class are indicated. Part of data contained in those certificates will be available to fill in the template connected to public buildings energy audit (D 3.2.3), for example the geometric data of the buildings

and the total specific energy consumption, but many other data required, will be collected through measures, bills and other kind of evaluation.

Another important database (software for collecting and updating data) and under development, is represented by **technical electronic register of the building of MCR** in which will be reported, besides the geometrical data of the school buildings and the updated energy certificates, even the technological and electric plant's data, including those connected to the boilers for heating and DHW. These data are not yet available and their collection should be completed by 2017. Once the most of them will be available, it will be possible to have more input data and to perform more energy audits and to plan, therefore, a greater number of energy retrofit actions in the medium term. The technical electronic register has output data as graphs and table and it is a very interesting dynamic tool because it allows to update the output data in case of variation of the input data, or addition of new ones.

5.6 Malta

In terms of public buildings, Malta has compiled an inventory of central government buildings as required by Article 5 of Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC. The data was collected through energy audit reports that were performed between 2010 and 2013 and through on-site visits specifically carried out to obtain useful floor areas and energy performance of the buildings occupied by central government buildings. The most energy consuming buildings were selected by identifying a threshold for energy consumption in offices. These offices will be retrofitted to achieve the best energy consumption. This measure will be then extended to other public buildings to include retrofitting aimed at obtaining energy efficient buildings. In 2013, the Buildings Regulations Office set up a meeting with the organisations occupying Public Buildings. During this meeting all occupants were informed that an Energy Performance Certificate (EPC) of the building they occupy is required to be displayed in each building. As a result the Buildings Regulations Office has been providing advice on a case by case basis as regards refurbishments and/or certification.

Furthermore, specific work aimed at addressing information gaps in the public sectors has already started or is in the process of being initiated. This work includes:

A survey to have a better understanding of the energy consumption in educational buildings. The survey will be targeted to have a register of all local schools and their corresponding electricity consumption in the past three years. A similar exercise will be carried out in the hospitality and health sector. This will enable detailed policies and measures to be set up to target the decrease of energy consumption in schools, hospitals, hotels and restaurants.

A study commissioned by the Ministry for Energy and Health (MEH) to identify cost effective energy efficiency technologies aimed for the retrofitting of a hospital residence for old people. The results of this study will enable their application in similar hospitals within Malta and Gozo.

Since in Malta there is no public register for energy certification performance of buildings, data regarding the energy performance of public buildings may be accessible only by the concerned public authorities in Malta and Gozo.

5.7 Portugal

In recent years, AREANATEjo and CIMAA integrated several national and international projects with the main goal of collecting data on the ground, processing it and making it available to local decision-makers.

In this way, field surveys, georeferencing, cadastre, energy audits and other studies were carried out in order to serve as basis in the development and implementation of interactive platforms that process and make this information available both to general public and municipal technicians.

Taking this into account, we highlight:

A) Public Lighting: it was carried out the survey and characterization of the entire lighting network of the 15 Municipalities of Alto Alentejo region, accounting for 980 transformation stations and more than 48.000 light points. They were also developed 15 websites, gathering all the information related to this survey. The websites are available to the general public for consultation and allow the edition of data by the Municipal technicians.

B) Energy Audits: a Portfolio was developed within the framework of POCTEP - Portugal/Spain Cross-Border Cooperation Program, which includes the data of 21 energy audits developed. Besides that, AREANATEjo (and, consequently, the Municipalities involved) have access to data of more than 150 municipal buildings, with special focus on HVAC systems, lighting, domestic water heating, renewable energies, among others.

C) Wind potential: Within the framework of RETALER 2 Project (funded by POCTEP), it was carried out a wind potential assessment in the Municipalities of Castelo de Vide and Gavião, with the aim of characterizing the local wind regime based on data measured by anemometric stations, in a 12 months period. This work also presents the wind resource mapping for the two places under study (maps referring to the spatial distribution of wind average speed, incident power flux and number of hours equivalent to nominal power), as well as the results of energy production estimates.

D) Solar potential: Within the framework of RETALER 2 Project, it was also started a survey of the solar potential of 8 Municipalities of Alto Alentejo region. This work was complemented in the scope of Direct Solar Radiation Mapping in Alentejo (d.n.i.) Project, funded by INALENTEJO.

E) SIGAA allows the structuring and centralization of the geographic information in order to increase the quality of the technical service provided and the degree of satisfaction of the citizens. In addition to the integration of all existing information at the municipal level, the project intended to provide geographic information on the WEB (Intranet and Internet). Today, in the SIG Alto Alentejo you can find all the cartographic information of regional scope and connections to the geographical information Municipal.

5.8 Slovenia

Every public building with usable area more than 250 m² has to have an energy performance certificate (EPC) elaborated. For public buildings, a “measured” EPC is made, based on 3-year average of energy consumption. In case of a new building, a calculated EPC is obtained. Besides the energy performance indicators, EPC also contains data on type and state of HVAC installations, usage of renewable energy sources, types of exterior constructions and presence of any insulation materials, type of windows etc. Some generic proposals for energy efficiency measures are also given. The EPC database is publicly available in the national registry of real estate data <http://www.e-prostor.gov.si/>

As the EPC certification scheme in Slovenia was set in motion in 2014, most of the data in the certificates is still accurate today. Therefore, data can and will be used for the purpose of ENERJ project. Nevertheless, additional data verification will be made with persons responsible for building management and maintenance.

Another useful source of data is Local energy concepts, which by law have to be publicly available on municipal web pages. As previously described, a simplified “walk through” audit

has to be carried out within the elaboration of Local energy concept for each individual public building, which gives us an additional data about the state of the building concerned.

Other useful databases with data relevant to subject do not exist.

5.9 Spain

Andalusian Register of Energy Certificates

Andalusia has an Andalusian Register of Energy Certificates that collects all energy certificates made in public and private buildings in Andalusia. The regulation and structure of the Andalusian Register of Energy Certificates includes a database with energy certificates made in public buildings (that includes new buildings and existing buildings)

The information included in this database and reports is:

- Building information (location, cadastral reference)
- Verification of compliance with regulations related to the use of renewable energy, energy saving and efficiency.
- Energy demand for heating and cooling
- Description of the energy characteristics of the building: thermal envelope, thermal and lighting installations, operating and occupancy conditions, thermal comfort, lighting, etc.
- Building Energy rating
- Measures for improving energy efficiency
- Environmental requirements required for thermal installations.

Data included in the Andalusian Register of Energy Certificates are public and can be consulted through internet (user identification through user digital certificate is required) in the webpage of the Department of the Economy, Innovation, Science and Employment. Link:

<https://www.juntadeandalucia.es/economiainnovacionyciencia/oficinavirtual/inicioSesion.do?sessionid=61EDFEC272B76DFB986674060382D8F1>

Alternative ways available to demand information are:

mail (buzonweb.sac.ceice@juntadeandalucia.es) and telephone (0034 955 063 910)

Register of Building Evaluation Report (City Councils)

The Building Evaluation Report is a document that evaluates buildings (public and private) in relation to their state of conservation, level of energy demands etc. Urban departments of city councils can require it to the owners of buildings according to their local laws.

Royal Decree 7/2015 regulates the structure of the Building Evaluation Report. According to section 6 - article 29, owners of buildings required to carry out the Building Evaluation Report must send a copy to the institution determinate by the Regional Governments.

Actually, the local governments are responsible of collects the Building Evaluation Report in Andalusia. However, a very few local governments have launched their registers to collect building evaluation report and very little information is accessible.

The city planning department of Seville City Council has launched a public application to consult information related to the building evaluation report. Access to this information is public through internet (link: http://www.sevilla.org/urbanismo/paginas/ite/registro_edificios.asp). However only a few administrative information is showed:

- Date of presentation
- Results of the report
- File number

6 Good practices of national/regional/local regulations

Some good practices arise from the approach each country and region take, in order to improve their buildings energy efficiency and also to promote the use of RES. In most cases, countries take different approach according to the socioeconomic state of the country. In general, measures from SEAPs that each area are developing have shown to be good examples for replication either in other areas or other countries. Some energy efficiency refurbishment measures of public buildings, national funding mechanisms and national regulations on RES penetration to buildings are considered good practices.

6.1 Albania

Energy efficiency projects focus on in integration measures:

- Installation of external thermal insulation and roof insulation at the building, outside walls and the laying of the piles (together with the thermal insulation of the floor)
- Supply and installation of new PVC double-glass windows and doors,
- Establishment of supporting measures for energy efficiency (with no direct impact in energy efficiency) like: reconstruction of toilets, inside walls, placement of inside doors, painting of inside and outside walls.
- Supply, installation, of district heating or individual heating stoves which operate with fire-woods (pallets, LPG), laboratory, teachers hall and all the other school environments.
- Supply, installation, of the solar collector system located in the roof of the building together with the hot water tank which is connected with the supply system of hot water (with back up electricity heating).
- Supply, installation and operation of a new energy efficient lighting system to all spaces of the building together with the replacement/reparation of the electrical network of the building.

Public building

- Energy Efficiency Refurbishment Measures in the "Raqi Qirinxhi" School, 2012
- Energy Efficiency Refurbishment Measures in the "Pellumbat" Kindergarden 2009
- Energy Efficiency Refurbishment Measures in the "Kamza" Kindergarden 2009
- **The schools of CERME E SIPERME (Commune Terbuf), SULZOTAJ (Commune Terbuf), CERME PROSHK (Commune Terbuf), GRABIAN and commune's building of Grabian in Lushnje, Albania**
- **The schools of Kakarriqit, Ures se Muratit, Marlecaj of commune Balldre, Gurrez, commune Fushe Kuqe and Tale, commune Shenkoll in Lezhe, Albania**

6.2 Croatia

In Croatia, there is no national/regional/local regulation that obligates owners of public buildings to use specific energy measures or use RES, but they are obligated to implement Sustainable Energy Management (SME), to elaborate Energy audits for all building bigger than 250 m² and to comply with Technical obligation on energy and thermal protection in buildings.

According to requirements of SGE, public officers must enter energy and water consumption on a monthly, weekly or daily basis in ISGE for all building bigger than 250 m², and analysis of consumption with a view to detecting unwanted, excessive and irrational consumption and identify opportunities for achieving energy and financial savings (more detailed explanation is provided in previous question).

Energy certificate are obligated for all old public building with a total useful floor area exceeding 250 m², new public buildings prior to the issuance of the use permit and all public buildings that are for sale, rent, lease, or lease. The energy certificate must be displayed in a clearly visible location near the main entrance of the building. First page of energy certificate, with general information on the building and the energy class, must be exposed at the entrance of the building. Energy certificate proposes measures to improve the energy performance of buildings that are economically justified and recommendations how to use the building in energy saving way.

Technical obligation on energy and thermal protection in buildings provides the maximum coefficients of thermal transmittance of building elements to fulfil the design of new building and reconstruction and adaptation of existing building.

6.3 Cyprus

Legislations for the construction of all new buildings in Cyprus include the compulsory installation of solar thermal systems for DHW and compulsory provision for the installation of RES.

A new support scheme called 'Save - Upgrade' has been commenced since the end of 2014 for upgrading the energy performance of existing buildings. This new scheme is co - funded by the EU for the period of 2014 - 2020 and is planned to supply more than 30 M€ for the renovation of households and buildings used by small - and medium sized enterprises. The scheme provides a subsidy of 50% for renovations (reaching class B or 40% energy savings) or a 75% subsidy for upgrading an existing building up to the NZEB level. There are also other incentives which are not for NZEB, but can be used to complement a building owner's effort to build or renovate an existing building to NZEB levels. These comprise, e.g., the directive issued by the Ministry of Interior in 2014 where an additional 5% extra useful area can be allowed to be built if the building has energy class A and at least 25% of energy consumption is covered by RES.

In addition, the scheme 'Solar Energy for All' gives the opportunity for households and local authorities to install photovoltaic (PV) systems of up to 5 kW under net-metering. The subsidy on the initial cost of PV systems is provided only to low income families and other socially disadvantaged consumers. Additionally, the scheme allows businesses and local authorities to install PV systems on their buildings.

6.4 Greece

One good example in Greece has been the implementation of the National Energy Savings Program called "Exoikonomo", a program dedicated to the improvement of the energy efficiency of the building stock, which targeted both municipal as well as private buildings. In the former period 2007 - 2013, more than 40.000 dwellings have been supported up to 70% of the total costs, to improve the energy efficiency, either through the installation of more efficient windows and/or additional insulation layers of the building, or through the installation of renewable energy systems, such as photovoltaics, solar heating, biomass boilers, LNG boilers, etc.

The success of "Exoikonomo" has led to its adoption by a new government initiative and the foreseen implementation of a second round of private investments for the period 2014 - 2020 for a total amount of 250 M€.

6.5 Italy

The MCR, since 2010, using financial tools of so-called national incentive decrees, has installed photovoltaic power plants over 220 school buildings roof for a total of 251 PV plants; 155 of them were implemented by public/private partnership through project financing tool. The contract provided that the private society, chosen through a public tender, would invest for the construction of the 155 photovoltaic system plants, and it would get as profit, all government incentives for 18 years and part of the economic value of the energy saving achieved, so as to meet the economic and financial plan drawn up for risk avoidance. The private company also has the task to take over the maintenance of the system plants for 20 years. In the same contract it was provided that the other 96 old photovoltaic system plants (installed before of 2010 with own funds of the MCR) were restored and reactivated (most of them were shut down) and the company get as profit, the public incentives for the last 2 years too (in addition to the first 18 years) and part of the economic value of the energy saving achieved. The entire photovoltaic stock has been producing 4 GWh per year around 13% of electricity global consumption. 50% of this energy is self-consumed and the remaining part has supplied the power network.

Another best practice is represented by Guidonia Municipality (very important municipalities of MCR for territorial extension and population), like a good example of implementation of SEAP (Sustainable energy Action Plants) thanks to the action of MCR that in 2008 approved the covenant of mayors protocol adhesion; this tool supported municipalities in elaborating local SEAP. Within Guidonia Municipality's SEAP, the following measures were implemented:

- substitution of 10.000 fluorescent lamps for street lighting by LED technology;
- substitution of 5.200 fluorescent lamps for public buildings.
- Those interventions were implemented by public/private partnership thanks to project financing tool. They allowed to achieve an energy saving of around 50% of global energy consumption corresponding to approximately to 2.5 GWh per year;
- new contract for energy global service that included, like additional energy performance, upgrading of energy efficiency of 43 thermal power plants and the upgrading of energy efficiency of 500 air conditioners;
- new buildings regulation for transposition of national and regional regulations in matter of energy efficiency, both existing and new buildings and incentives about construction in green building;
- to perform EPC (energy performance certificate) and energy audits for all municipal buildings;
- Installation of 20 photovoltaic system plants on school building roof, for an amount of 425 kWp.

6.6 Malta

Eco Gozo Green initiatives:

Eco-Gozo Action Plan is a comprehensive guideline that proposes a set of measures for achieving sustainability standards in the island of Gozo. The measures adopted in the first 2 phases of the plan and the ones planned for the future, encompass a wide range of objectives touching different fields of action. The Eco-Gozo Vision 2013-2015 plan focuses on energy-related issues and proposes actions and recommendations in this field. These actions, some of which already implemented, are specifically aimed at improving energy efficiency of public buildings and promoting the exploitation of green energy sources.

The work on the implementation of the Eco-Gozo measures is estimated to have involved 180 projects for the first 2 years¹, involving the Ministry for Gozo, other Government Ministries, Local Authorities and almost 60 different organisations in the voluntary and the private sector. Ministry for Gozo gives the possibility to organizations, local councils and schools to apply for funding inserted in the Eco-Gozo scheme. Up to the end of the first phase eight Gozitan local councils and three hamlets were together awarded a total grant of €660,588 from the Eco-Gozo budget to fund 95% of the total cost of each of the 13 projects selected amongst those submitted. Every local council or administrative committee benefited from up to a maximum of €70,000 grant for the implementation of one or more projects that are listed in the short-term measures.

An example of initiative carried out in the framework of EcoGozo Plan and its funding scheme is the installation of photovoltaic system and energy retrofitting measures at the premises of the Ministry for Gozo.



The project involved the installation of photovoltaic panels system on the Ministry for Gozo from January to June 2012. Shortly after its installation the roofs were able to generate around 40,000 units of electricity. With this installation, the Ministry is generating around 30% of all the energy demand from all the departments, offices and other sections operating within this administrative building or the equivalent energy consumption of 20 families in a year. It was agreed that the savings resulting from reduced electricity consumption would be

re-invested in more panels in order to increase the sustainable use of alternative sources. After the installation of more panels during the beginning of this year, the yield capacity quadrupled. By the end of 2012, the photovoltaic system installed is generating 60% of the electricity consumption with the installation of more panels on the roofs of the Ministry for Gozo.

The real-time production data of the photovoltaic system is available here:

<https://www.sunnyportal.com/Templates/PublicPageOverview.aspx?page=6e2f2011-0cb4-488e-8c3a-f4e4916719e8&plant=ff4ad98e-c464-4e44-b872-81d8d017b635&splang=en-GB>

6.7 Portugal

The installation of solar thermal systems for domestic water heating in new buildings is mandatory whenever there is a proper sun exposure of the building. Since 2008, new buildings must have at least class B- of efficiency, according to the Energy Certification System of buildings.

6.8 Slovenia

The Decree on energy management in the public sector was adopted in July of 2015 and introduced obligatory monitoring and targeting of measured energy indicators in public buildings. By the end of December of 2017, all public buildings over 250 m² are obliged to

¹ Up to the second quarter of 2012, from the total set of recommendations made by the public in the Eco-Gozo consultation process included in this vision document

have energy management in place. Besides energy indicators, a yearly program of planned measures and yearly report of measures carried out in previous year has to be prepared. The data shall be collected electronically by special applications for energy management and then stored in a national e- registry.

6.9 Spain

Sustainable Construction Programme (Andalusia Regional Government)

This programme launched by the Andalusian Regional Government was awarded with the RegioStars awards in 2015.

The programme has attracted EUR 132 million of support from the ERDF to make the region's construction sector more sustainable in terms of its energy use, impact on the environment and ability to create skilled jobs. It provides a range of measures to achieve this including incentives for citizens and businesses, and grants' financing for companies. The energy saving measures implemented through the programme should also deliver significant improvements to the region's building stock.

The programme's incentive scheme provided an opportunity to introduce energy saving measures and products to existing buildings. Its objective was to upgrade the most energy inefficient buildings to a point where they could offer savings on energy use of more than 70%. This part of the programme was being delivered with the help of more than 7.600 partner companies, most of whom were SMEs.

The programme also created a Sustainable Construction Roundtable with more than 70 experts from different disciplines. They worked together and pool their knowledge about key industry issues including its competitiveness, supply and demand, renewable energy, innovation, employment and legislation. The resulting work was a Development Plan for the sustainable construction and rehabilitation of Andalusia buildings, Horizon 2020.

The programme generated a number of concrete results for 60.000 local people across 600 neighbourhood as well as 2.500 companies involved. Disadvantaged groups benefited greatly. 23% of incentives was used to improve housing quality for more than 7.000 low income families. The work done to improve energy efficiency in buildings has led to an estimated reduction in CO2 production of 62.000 tonnes and energy savings of about 26.000 tonnes/years. Around 14.000 jobs were created thanks to actions undertaken through the programme, with more than 55% of the companies involved.

Conclusion

The EU Directive 2010/31/EU on the Energy Performance of Buildings (EPBD) introduces the concept of nearly zero-energy buildings (nZEB) as the EU considers the energy efficiency of the building sector one of the key sectors into a more sustainable future. It requires member states public authorities to purchase or rent nZEB after the 31st December 2018 but also to draw up National plans for the energy refurbishment of buildings. The efficient use of energy is underlined in the Energy Efficiency Directive (EED) 2012/27/EU where measures are to be promoted into Member States for reaching the 2020 targets of 20% energy efficiency.

The EU directives are Nationally transposed in the Member States in National Laws/Decrees and Acts. In Albania, the Law No. 10113 introduces the energy labelling and with Law No 124/2015 some key provisions are adopted of the 2012/27/EU directive. Furthermore, the Law No. 116/2016 sets the guidelines for the minimum requirements on the buildings energy performance as per the 2010/31/EU directive. In Croatia, Law 127/14 implements both the aforementioned EU directives and a National Energy Efficiency Action Plan is done periodically since 2008 where the Energy Efficiency obligations are introduced. In Cyprus, the Law 210(I)/2012 implements the 2010/31/EU Directive and the 2012/27/EU has been introduced in stages putting in place the energy audits in 2013, the EPCs in 2013 where all new buildings need to be category B or above and with the K.Δ.Π (Act) 366/2014 the technical characteristics of a nZEB are defined. In Greece, Laws 5825/2010 and 4122/2013 transpose Directive 2012/27/EU and Law 4342/2015 the Directive 2010/31/EU. In Italy, Law 102/2014 transposes the Directive 2012/27/EU and the Ministerial Decree 26/06/2015 the Directive 2010/31/EU. Furthermore, a National Action Plan by ENEA is in place since 2014 and is reviewed every three years. In Malta, the Legal Notice 376-2012 transposes the Directive 2010/31/EU and the National Energy Policy the Directive 2012/27/EU. In Portugal, the Decree-Law 118/2013 transposes the Directive 2010/31/EU and the energy efficiency requirements of the main types of technical system in buildings are set, along with the Energy Building Certification System, the Energy Performance Regulation of Housing Buildings and the Energy Performance Regulation for Trade and Service Buildings. In Slovenia, the new energy Act was adopted on 22 February 2014 to transpose the 2010/31/EU and 2012/27/EU Directives. Furthermore, an Energy Management System is compulsory since June 2016. Lastly in Spain, the Royal Decree 56/2016 promotes Energy Efficiency and transposes the 2012/27/EU Directive. The Law 8/2013 for housing public and private buildings and urban spaces and the Royal Decree 314/2006 for building requirements and development of sustainable policies also facilitate the implementation of the EU directives.

Local and Regional Authorities also play a part in regulations regarding the energy efficiency of buildings. In Albania, the Municipalities are responsible for the operation and maintenance of administration buildings, schools, kindergartens and hospitals. A regional action plan is in place for the pilot low-emission pathways in three regions and Law No. 38 (16/1/2003) gives the regional technical requirements for heat saving in buildings. In Cyprus, Local Authorities are responsible for reviewing the efficiency of new buildings through the submission by accredited professionals for electrical and mechanical designs along with EPCs. In Italy, L.R. Lazio no 6 del 27/05/2008 is a regional provision on sustainable architecture and green building. Environmental sustainability is compulsory in the Lazio Region with a demand that 50% of DHW is produced by solar panels and at least 1 kWp PV has to be installed per house and 5kWp PV per non-house building that have an area of more than 100 m². The Regional Council Decree of the Lazio Region no 557/2015 facilitates the implementation of the National policies for 2010/31/EU by improving the environmental sustainability certificate. Moreover, with the resolution of the Municipality of Rome no 48/2006 at least 50% of the energy consumption in the city of Rome has to come from RES. In Portugal, the Alto Alentejo regional development strategy identifies Energy Efficiency in public buildings as a priority axis. In Spain, Regions have set their own laws regarding energy efficiency. In Andalusia, Law1/2014

is a promotion of sustainable building and therefore a promotion of Energy Efficiency actions and Law 7/2007 promotes RES, energy savings and efficiency from local production to consumption. In Madrid, the Royal Decree 2066/2008 concerns housing refurbishment and new buildings with improvements on various aspects including Energy Efficiency. In Catalonia, the Royal Decree 233/2013 allocates funds for the refurbishment of communal spaces and public buildings that amongst others include energy Efficiency. In the Basque Country the Decree 317/2002 concerns housing and public building Energy Efficiency refurbishments and in Castilla La Mancha Law 7/2014 is a strategy of Efficiency refurbishment in housing deprived areas. The countries of Croatia, Greece, Malta and Slovenia have no regional policies since all the policies are on National level.

Sustainability and Energy Efficiency Actions are common in Member States for regional and local level plans with a large number of local authorities also implementing their SEAPs, being signatories of the Covenant of Mayors (7,305 signatories) and the Pact of Islands. In Albania, Sustainability and Energy Efficiency Actions include a tax exemption model for refurbishments and a CO₂ emissions levy. In Croatia, all Counties with more than 35,000 inhabitants have to develop an Action plan on Energy Efficiency including monitoring. Furthermore, the Istrian County has voluntarily developed energy plans and 9 cities and 3 Municipalities have developed their SEAPs. In Cyprus a total of 30 local authorities have developed their SEAPs and 8 of them have started their monitoring phase. In Greece, 17 Municipalities submitted their SEAPs and the Region of Central Macedonia has already carried out an energy analysis of 100 buildings. In Italy, the Energy Strategy plan by the Lazio region includes a minimum percentage of RES penetration. Additionally, 31 Municipalities have issued their own SEAP with 597 actions monitored and 101 actions completed. In Malta, the Local Sustainable development of the Island of Gozo (EcoGozo) promotes a low-carbon economy Energy Efficiency plans and RES in public buildings. In Portugal, AREANATEjo has prepared joint SEAPs for 4 Municipalities with a total budget of € 7.2M with annual cost reductions of approximately € 1.75 M. In Slovenia, the Local Energy Concept is created every 10 years for each Municipality and includes energy audits for all public buildings. The monitoring is done annually and is submitted to the Ministry of Infrastructure. Additionally, some SEAPs have been developed. In Spain, the Energy strategy for Andalusia 2020 for a low-carbon economy also keeping sights on the horizon 2030-2050 aims in the reduction of 25% of primary energy, increase by 5% the self-consumption and improve by 15% the quality of energy supply. Furthermore, 500 Andalusian Municipalities have joined the Covenant of Mayors and therefore have developed their SEAPs.

The database for the public building stock is made available in most countries although it is common to be partially available or incomplete and sometimes not readily accessible. In Albania, data for public buildings is accessible in Albania by the National Agency of natural resources and INSTAT. In Croatia, the sustainable Energy Management implemented in all public authorities includes all the public building data. The ISGE users enter monthly/weekly data. In Cyprus, a yearly record is produced by the Energy Service on behalf of the Ministry of Energy, Commerce, Industry and Tourism along with mechanical and electrical equipment characteristics. In Greece, no formal data is available for the Region of Central Macedonia. In Italy, the EPCs are only available for public authorities and MCR have all the EPCs for school buildings. Additionally, a technical register is being prepared to be ready within 2017, where all relevant data for schools will be collected. Data regarding the energy performance of public buildings may be accessible by the concerned public authorities in Malta and Gozo. In Portugal, AREANATEjo and CIMAA have collected data through national and international projects that is made available to local decision-makers. In Slovenia, a collective data is available through their EPCs for all buildings above 250 m². In Spain, the EPCs are available online for both public and private buildings in Andalusia. Furthermore, according to the Royal Decree 7/2015 a building evaluation report as city council level has to be sent and this has been made public by the city of Sevilla.

Some good practices arise from the approach each country and Region take, in order to improve their buildings energy efficiency and also to promote the use of RES. In Albania, Energy Efficiency refurbishments have been carried out in public buildings such as schools and kindergartens. In Croatia, buildings are obliged to implement Sustainable Energy Management and for buildings above 250 m² to elaborate an Energy Audit. The measures also include the weekly/monthly uploading of energy and water consumption. In Cyprus, for all new buildings an installation of Solar thermal systems for DHW is compulsory along with a provision for RES. Furthermore, a funding scheme is in place for energy upgrading buildings and a scheme is also available for installing PV systems of up to 5kWp with net-metering. In Greece, A funding programme for energy refurbishment of public and private buildings is in place. In Italy, PVs have been installed in 220 schools and the companies who invested in the project get 18 years government incentives. In Malta, the Eco-Gozo Green incentives budget provides funding for projects regarding Energy Efficiency of public buildings and exploitation of green energy sources. In Portugal, the installation of solar thermal for DHW is mandatory. In Slovenia, all public buildings above 250 m² are obliged to have an energy management system in place. In Spain, the Sustainable Construction Programme of Andalusia Regional Government for a more sustainable construction sector in terms of energy use and impact on the environment provides a budget for upgrading buildings with low efficiency with a target to reduce their energy use by 70% involving 7,600 companies in the process.

The table below summarises the Transposition of the EU directives along with the plans and the good practices in each partner country. In red are the areas where countries do not have anything present, in grey where it is partly present or incomplete and in green where it is present. The numbers indicate the number of plans or good practices in the respective countries.

	Albania	Croatia	Cyprus	Greece	Italy	Malta	Portugal	Slovenia	Spain
Transposition of EU directive 2010/31/EU									
Transposition of EU directive 2012/27/EU									
Other relevant National regulations		3	1			5	2	3	3
Relevant regulations at local and regional level	2		2		3		1		6
Plans at regional and local level	1	3	1	2	3	2	1	1	2
Database available	1	1	1	1	3	1	1	1	2
Good practices national level	1	1	4	1			1	1	
Good practices regional level	2				1	1			1
Good practices at local level	3				1				

present	
partly present	
not present	

In general, there are some similar approaches in Member States but also some very different approaches. The Covenant of Mayors and other similar initiatives have mobilised Local Authorities to produce Sustainable Energy Action Plans. It is also visible that some countries

had plans and measures in place, before the two EU Directives, whereas others have only recently started to transpose the two Directives. Funding schemes available, as well as incentives, play an important role in facilitating energy upgrades in the building sector.