ZEROCO2
Interreg Europe

Regional Policy Reports: Regional Policies and Best Practices

COMMON STUDY

Low-carbon economy

€ 1.23 M ERDF

Apr 2016 Mar 2020

REGIONE MOLISE

European Union
European Regional Development Fund

Table of Contents

Introduction

This Common Study is compiled by Molise Region for the project ZEROCO2: Promotion of near zero CO2 emission buildings due to energy use, financed with the support of the European Commission in the framework of the Interreg Europe Programme.

The aim of the project is to improve regional energy policies with regard to environmental sustainability and mitigation of climate change risk, with a special focus on greening the building sector through enhancement of various eco-friendly energy sources and technologies, stressing its importance as an incubator for new markets in the field of energy, technologies, services and business models.

The project represents and implements NEAR ZERO CO2 EMISSION BUILDINGS DUE TO ENERGY USE in policies addressed at the same level as had been done for NEAR ZERO ENERGY BUILDINGS, which means that the buildings do not produce CO2 emissions due their use. EU, national and regional policies do not define near zero CO2 buildings due to energy use.

This publication is the result of the comparison and the study of the Regional Policy Reports and the best practices regarding the regional energy policies and interventions on the building sectors of 7 European Member States involved in the project, carried out thanks to the contribution of the partners coming from Slovenia, Greece, Italy, Lithuania, Malta, Finland and France.

This Report has been produced with the financial assistance of the Interreg Europe Programme. The sole responsibility for the content of this report lies with Molise Region and can under no circumstances be regarded as reflecting the position of the Interreg Europe Programme Authorities.

The first section is devoted to the deepening of the policy context related to legal and regulatory aspects of energy efficiency in Europe and its overall objectives such as: "*to reduce of energy consumption and the use of energy from renewable sources in the buildings sector constitute important measures needed to reduce the Union's energy dependency and greenhouse gas emissions, as buildings account for 40% of total energy consumption in the Union*".

The forthcoming sections, respectively second, third, fourth, fifth, sixth, seventh and eighth represent the Common Study's core and are dedicated to specific in-depth reports undertaken thanks to the research work of the partners in the project.

In particular, section 2 "***Regional Policy Report - Slovenia"*** focuses on the survey carried out by the Lead Partner of the project ***Local Energy Agency Spodnje Podravje.***

Section 3 "***Regional Policy Report - Greece"*** is devoted to an in-depth study of the Greek energy policies, undertaken by ***Mediterranean Agronomic Institute of Chania.***

Section 4, "***Regional Policy Report – Molise Region***" , focuses on Molise Region energy policies and best practices and it is produced by ***Molise Region***, Italy.

Section 5, ***"Regional Policy Report - Kaunas district municipality"*** deepens on regional energy policies of the municipality of Kaunas, developed thanks to the contribution of the partner ***"Municipality of Kaunas District".***

Section 6, ***"Regional Policy Report – Malta"*** is devoted to an in-depth study of the energy policies of Malta, undertaken by "***University of Malta".***

Section 7, "***Regional Policy report - South Ostrobothnia"*** focuses on the survey carried out by the Partner of the project ***" Thermopolis LTD.".***

Section 8, ***"Regional Policy Report – France"*** deepens on regional energy policies of the Region PACA (France), developed thanks to the contribution of the partner ***"A.VI.TE.M – Agency for Sustainable Mediterranean Cities and Territories".***

Finally, Section 9 "***Regional Policies Overviews: strenghts and weaknesses"*** is dedicated to the considerations of the results so far obtained, starting from the study of the Regional Policy Reports, highlighting strengths and weaknesses of the energy efficiency policies applied in the partner's countries involved in the project **ZEROCO2**.

Section 1: Legal and regulatory aspects of energy efficiency in Europe

1.1 Brief outline of the regulatory environment in terms of energy.

The regulatory activities related to the energy strategy starts from the transposition of EU directives on energy efficiency (2012/27/EC), on the development of regional energy sources (RES), on renewable energy sources (2009/28 / EC), the energy performance of buildings (2010/31/EC).

In 2008 the European Union launched the "Climate Package - 20/20/20 Energy" with the following energy and climate goals for 2020:

- 20% reduction of gas emissions of greenhouse effect compared to 1990;
- improve energy efficiency to achieve a reduction in primary energy use terms by 20%;
- obtaining 20% of energy from renewable sources to total energy consumption of the European Union.

Each Member shall contribute to the achievement of this objective according to the percentage set for each country.

These objectives were reformulated in 2014 with a forecast for 2030 making them less demanding than required for 2020, namely:

- a reduction in greenhouse gas (GHG) emissions by 40% compared to the levels of 1990;
- a share of energy from renewable sources by 27%;
- an improvement in energy efficiency (27%).

The same objectives should be integrated with the provisions in the so called Roadmap 2050, whose mission is to provide a practical, independent and objective analysis of pathways to achieve a low-carbon economy in Europe, in line with the energy security, environmental and economic goals of the European Union. The Roadmap 2050 project is an initiative of the European Climate Foundation (ECF) and has been developed by a consortium of experts funded by the ECF, which stands decarbonized economy as a long-term goal, to which all sectors must help, such as the energy sector, the building industry,

transport and agriculture within a new energy model, based on principles and methods completely different than the current ones.

In this context, Member States are engaged in actions that enable the achievement of results, in terms of energy efficiency and sustainable development of renewable energy that exceed the European objectives of the "Climate Package - 20/20/20 Energy.

The pursuit of the objectives set at European Union and national level places, for the Member States, also the need to review the organization and administrative procedures that rule the implementation of energy strategies, in order to ensure their effectiveness. In this regard, the European Directive 2009/28/EC required Member States to identify simplified authorization procedures with the appropriate administrative level.

1.2 Action priorities for energy efficiency and for development of RES

At Community level, there is the introduction of a new governance which provides that Member States shall define annually their energy and national climate plans, assessed and monitored by the European Commission with the aim of reaching the European low carbon economy by 2050, through the 80-95% reduction of greenhouse gas emissions compared to 1990. The energy Roadmap 2050 set, as a long-term goal, decarbonised economy in an absolute new energy system.

Only if we were able to produce energy with zero impact, we might have a significant reduction in the overall level of emissions, consistent with the less catastrophic scenarios of climate change.

Between the pillars on which is based the new energy model provided by the Roadmap 2050 there are still energy efficiency, the reduction of the final energy consumption and the increase of the share of energy produced from renewable sources.

Below a brief and non-exhaustive list of policies, directives, European protocols, European Communications on energy:

- **Directive 2004/8/EC** on the promotion of cogeneration based on useful heat demand in the internal energy market;
- **Directive 2005/32/EC** on eco-design of products, then updated with Directive 2009/125 / EC;

- **Directive 2006/32/EC** on energy end-use efficiency and energy services;

- **Directive 2009/28/EC** on the promotion of energy from renewable sources, amending Directive 2001/77/EC and Directive 2003/30 / EC;

- **Directive 2009/29/EC** amending Directive 2003/87/ECto improve and extend the EU system for the exchange of emission percentage for greenhouse gases;

- **Directive 2010/31/EC** on the energy performance that requires to the Member States to establish minimum energy performance of buildings, the first ones of the public administration; in-depth analysis of the methodology of the energy performance of buildings and introduction of the concept of nearly zero energy buildings, mandatory for new construction buildings from December 31, 2020;

- **Directive 2012/27/EC** on the promotion of energy efficiency that pushes the public sector for being a model and guidance through mandatory energy redevelopment.

- **Communication COM (2011) 112 of 8 March 2011**: "A Roadmap for moving to a competitive low carbon economy in 2050";

- **Communication COM (2011) 885 of 15 December 2011**: "Energy Roadmap 2050";

- **Decision No. 1386/2013 EU** of the European Parliament and of the Council of 20 November 2013, a general program of action of the Union on the environment up to 2020;

- **Objectives 7th EAP (art.2, c.1)** increasing the effectiveness in addressing environmental and climate challenges at the international level.

In particular, **Directive 2009/28/EC** on RES among other things refers to a differentiated and mandatory allocation for each Member State overall target of 20% RES on the overall consumption of energy to be achieved by 2020. They are also introduced increasing amounts of renewable on the needs of a new building or renovated (35% from 01/01/2014 to 31/12/2016; 50% from 1/1 / 2017).

The **Directive 2010/31/EC** on the energy performance of buildings concerns the prospects and guidelines for energy recovery of public property. In particular, the introduction of a type of building, the NZEB, a nearly zero energy building, is determined with tight deadlines (since 12.31.2018 for new buildings of the Public Administration and from 1.1.2021 for all new buildings).

The **Directive 2012/27/EC** on energy efficiency, however, calls the public sector to exercise as a role model and guidance through mandatory energy interventions with minimum annual rate of 3% (with surface area greater than 500 m², starting from 01/01/2014, and with surface area greater than 250 m² starting from 01/01/2016).

To achieve these results the actions to be put in the field must be multiple and coordinated. First it must be completed the liberalization of the electricity and gas sector, to promote energy efficiency and to develop in a sustainable and consistent use of renewable sources, with the aim to diversify the mix of energy sources in line. In compliance with the European Directives and Regulations and, in reference to individual fields of energy (electricity, gas, renewables etc.), different planning tools and guidance on energy have been planned.

The reference magnitude to quantify the energy efficiency target according to **2012/27/EC** is the internal consumption of primary energy.

The reference magnitude to quantify the objective of RES according to **2009/28/EC**is the gross final consumption.

1.3 Promotion of energy efficiency

Energy efficiency is the fundamental issue on which to base the energy and environmental policy of the European Member states. In fact, energy efficiency contributes to the achievement of a series of simultaneous objectives: reducing costs, increasing competitiveness, increasing security and access to energy, growth and environmental quality.

To overcome the barriers that are currently an obstacle to achieve the objectives (note that already in the climate-environment package 20-20-20 targets for efficiency are not binding), it is necessary to act at regulatory and procedural level.

At the regulatory level is necessary to strengthen the available tools, simplifying what currently exists; more specifically, it is necessary to harmonize or activate, if not present, the incentives already available in the European Member States and promote a good dissemination of existing tools, such as the mechanism of Energy Efficiency Titles (White Certificates), the inclusion of new areas of intervention for the incentives, the increase of the tax deductions for the citizens and the entrepreneurs.

At procedural level, it should be provided for the strengthening of the role of ESCOs (Energy Service Companies), the communication and user awareness (citizens and businesses), support to research and innovation.

Many are the important planned actions in order to promote the energy efficiency:

- a commitment by the Member States in upgrading the energy efficiency of the building stock, both public and private;
- assigning a role model to the property of the central public administration buildings; 2014-2020 must be provided for the realization of redevelopment of the PA buildings for the 3% per annum of the useful air-conditioned surface;
- to remember the important role of energy efficiency requirements for purchasing products of the PA (GPP green public procurement);
- it imposes the requirement by large companies to undergo energy audit by 2015, and it is expressly said that SMEs should be encouraged to do so;
- before 30 June 2017 is foreseen the installation of counting systems for the direct and indirect heat for each unit served in the centralized heating and cooling systems;
- it assigns the obligation of Member States to define the potential of the application of high efficiency cogeneration and district heating and cooling, with the detection of a methodology of evaluation carried out even with a cost-benefit analysis;
- are provided provisions for the qualification, accreditation, certification of operators, and information and training to users.

1.4 Towards nearly zero-energy buildings NZCO2.

An analysis of data and energy matches, shows that, at European level, 40% of final energy consumption and 36% of CO2 emissions are attributable to buildings; also 50% of the final energy consumption is represented by the services of heating and cooling and 80% is used in buildings which largely goes to waste. This sector may therefore contribute significantly to the energy efficiency and emission reduction measures.

So, "To achieve our decarbonisation targets, you need to decarbonise the buildings", as highlighted in the **EU Communication 2016/2058 (INI)** of the European Commission.

As the building sector is one of the key sectors to achieve the 20/20/20 targets of the EU and Europe also aims at bringing about drastic reductions of greenhouse gas emissions in the residential and service sectors of 88% to 91% compared to 1990 by 2050, European Commission set to proceed along this track with the recast of the Energy Performance of Buildings Directive (EPBD), that stated 2 important principles for the development of the building sector:

- The principle of nearly zero-energy buildings. The nearly zero or very low amount of energy required should be covered to a very significant extent

by energy from renewable sources, including energy from renewable sources produced on-site or nearby;

- The principle of cost optimality, which gives guidance for the energy performance requirements of new buildings, existing buildings undergoing major renovation, and retrofitted or replaced elements that form part of the building envelope.

In both cases, Member States have to report to the European Commission regarding the related activities, progress and results and the European Commission has to set out rules regarding the methodology - explicitly for the methodology to calculate cost optimal levels, but in a guiding sense also for the principle of nearly zero energy buildings.

Therefore, it is definitely valuable, in that regulatory framework, the scientific and popular contribution resulting from the implementation of the action NZC02, by the European partners participating in the project**"ZEROCO2 Promotion of near zero CO2 emission buildings due to energy use"**, which has greatly promoted the knowledge of individual national energy systems and best practices implemented by each partner within their own contexts, for the realization of the common European goal of improving energy efficiency in buildings.

The project, indeed, aims as a matter of fact to define near zero CO2 emission buildings due to energy use (NZCO2EB) and present the various benefits which result from this type of building and to design state of the art policies, which will aim at promoting NZCO2EB at the local, regional and national level; to present various financial tools in order to promote these types of buildings.

Each partner, within the project has been elaborated, therefore, for the abovementioned purposes, specific Regional Policy Report, underlining the use of renewable energy in buildings, the CO2 emissions compared to the different categories, the promotion of energy efficiency and renewable energy policies of each participating region. An important part of the Regional Policy Report is

dedicated to the best practices implemented in the Region of each partner regarding new building or renewed building with renewable energy source

ZEROCO2 Partners Countries

- SLOVENIA
- GREECE
- ITALY
- LITHUANIA

- MALTA
- GERMANY
- FINLAND
- FRANCE

4

Section 2: Regional Policy Report - Slovenia

This Report has been produced with the financial assistance of the Interreg Europe Programme. The content of this Report is the sole responsibility of the Local Energy Agency Spodnje Podravje.and can under no circumstances be regarded as reflecting the position of the Interreg Europe Programme Authorities

1. POLICIES PROMOTING ENERGY EFFICIENCY AND USE OF RENEWABLE ENERGY RESOURCES

Name of the policy instrument	**Energy Act**
Body responsible for policy instrument	Ministry of Infrastructure
Range that it covers	Transposition of EU legislation into national law
Action(s) that are promoted	The Energy Act is the basic for all other strategies that are promoting actions
Target Sector(s) of Instrument	All sectors
Timeframe	2014 onwards
Type of support	The Energy Act is the basepoint for all other strategies that are promoting actions and providing support.
Foreseen funds	Not applicable
Funds used so far	Not applicable
Duration	2014 onwards
Strengths	This Energy Act is the overall document in which are transposed all energy related EU directives (Energy sector, energy efficiency and renewable energy sources): 2009/72/ES, 2009/73/ES, 2005/89/ES, 9/28/ES, 2009/125/ES, 2010/30/EU, 2010/31/EU, 2012/27/ES, 2004/8/ES, 2004/8/ES. It has 557 articles and is one of the largest acts adopted by the Slovenian parliament. The basic idea was to have all relevant requirements and demands for other legislative measures and regulation requirements in one document. The most important chapter is chapter three, which contains energy policy. Energy policy demands implementation of the energy measures, which improve energy efficiency at the same or decrease costs and capacity of the existing energy system. The most important article No. 23 defines the Energy concept of the Republic of Slovenia, which must be adopted by the Slovenian parliament and has to be renovated in every 109 years. 24. Article defines the national development energy plan, which is based on the Energy concept. Other important requirements of the Energy law are: developing the action plan for energy efficiency every three years, the action plan for renewable energy sources to the 2020, local energy concepts developed and accepted by the municipalities and approved by the ministry responsible for energy.
Weaknesses (gaps)	The complexity of the Energy law demands widely studying of the requirements and it is the base for adopting regulations, which leads to the implementation of the national energy policy defined in the National Energy Concept. There is no information in it regarding financing, subsidies and other financial mechanisms. The main

	weakness of the Energy law is that there are not defined timeframes for adopting important regulations (responsibility of the ministry responsible for energy and minister) or if the timeframe is defined, there is no charges for the Minister or for responsible people. The consequences of the non-adopting important regulation is poor implementation of the energy policy.
Suggestions for improvements	The Ministry responsible for energy and other ministries involved in the process of preparing and adopting need to have implementation plan for adopting energy related regulations defined in the Energy law. This implementation plan would contain the priorities, time frame and corrective actions, ministries involved into preparation of the regulations, responsible people/experts/employees and other measures, which enables monitoring and acceleration of the regulation preparation and adoption. In many cases, when the regulation is set to public hearing and after that to the debate of the parliament, the original version of the regulation (and in many cases of the law) is so changed that lose the original purpose or it is non-efficient after adoption in the parliament. The main suggestion is, that such of regulation has to be prepared by the team of experts and has not to be changed in such way to lose or to weak the original purpose and efficiency of the energy policy implementation.

Name of the policy instrument	**National Energy Efficiency Action Plan 2014-2020**
Body responsible for policy instrument	Ministry of Infrastructure
Range that it covers	Energy efficiency in Buildings, Industry, Transport,
Action(s) that are promoted	The National Energy Efficiency Action Plan summarizes the requirements of the Directive 2012/27/EU(Energy Efficiency Directive. The targets are: • Improvement of energy efficiency by 20 % until 2020; • Renovation of 3 % governmental public buildings per year; • Renovation of 22-mio m2 of building surfaces until 2020; In addition to energy savings themselves, other benefits will be achieved by means of the measures to achieve the energy efficiency target; these include the mitigation of climate change, improvements to air quality, an increase in the share of renewable energy sources, and improvements in the competitiveness and security of the energy supply, as well as wider developmental benefits, such as greater employment, economic benefits and, not least, social benefits, primarily through a reduction in fuel poverty. Actions are promoted in following priority axis:

<table>
<tr><td></td><td>

- Sustainable energy consumption and production and smart grids,
- International competitiveness of research, innovation and technological development in accordance with the smart specialization for enhanced competitiveness and greening of the economy.
- Dynamic and competitive businesses for green economic growth
- Infrastructure construction and measures to promote sustainable mobility.

</td></tr>
<tr><td>Target Sector(s) of Instrument</td><td>The household sector, the public sector, industry and transport.</td></tr>
<tr><td>Timeframe</td><td>2014 - 2020</td></tr>
<tr><td>Type of support</td><td>Subsidies</td></tr>
<tr><td>Foreseen funds</td><td>EE measures also have their funding basis in the Operational Programme for the Implementation of EU Cohesion Policies 2014–2020 (OP EKP), which defines the EE funding activities from the resources of EU funds in Slovenia over that period. Some EE and RES activities will also be financed from the European Agricultural Fund for Rural Development as part of the Rural Development Programme of the Republic of Slovenia 2014–2020.
<table>
<tr><th>[EUR millions]</th><th>2015[84]</th><th>2016</th><th>2017</th><th>2018</th><th>2019</th><th>2020</th><th>TOTAL</th></tr>
<tr><td>EU funds and national budget – buildings</td><td>35.3</td><td>35.6</td><td>36.2</td><td>36.8</td><td>37.5</td><td>38.1</td><td>219.5</td></tr>
<tr><td>EU funds and national budget – smart grids</td><td>4.3</td><td>4.3</td><td>4.3</td><td>4.3</td><td>4.3</td><td>4.3</td><td>25.8</td></tr>
<tr><td>EU funds and national budget – other measures (air quality measures)</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1.1</td><td>1.1</td><td>6.2</td></tr>
<tr><td>EU funds and national budget – EE in the industrial and service sectors</td><td>34.6</td><td>34.6</td><td>34.6</td><td>34.6</td><td>34.6</td><td>34.6</td><td>207.6</td></tr>
<tr><td>Climate fund[85]</td><td>5</td><td>12.8</td><td>16</td><td>16</td><td>16</td><td>16</td><td>81.8</td></tr>
<tr><td>EE contribution</td><td>40.5</td><td>38</td><td>37.4</td><td>38.3</td><td>38</td><td>38</td><td>230.2</td></tr>
<tr><td>Total – guaranteed sources of public funds</td><td>120.7</td><td>126.3</td><td>129.5</td><td>131</td><td>131.5</td><td>132.1</td><td>771.1</td></tr>
<tr><td>Other funds contributing to EE</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>EU funds and national budget – transport[86]</td><td>36.9</td><td>37.2</td><td>37.9</td><td>38.5</td><td>39.2</td><td>39.8</td><td>229.5</td></tr>
</table>
</td></tr>
<tr><td>Funds used so far</td><td>Not applicable</td></tr>
<tr><td>Duration</td><td>2014 - 2020</td></tr>
<tr><td>Strengts</td><td>Energy efficiency measures contribute to improving the competitiveness of the society, to have a positive impact on economic growth and employment, to reduce energy consumption and environmental impact. The benefits of the measures are not only macroeconomic and social; they primarily bring direct financial and other benefits to investors and end users of energy. In last few years, it is one of the important accelerator of the employment in the Slovenian construction industry (green jobs).
It is planned to implement energy renovation of 25 % of the buildings (22 million m^2) resulted in reduction of the energy consumption by 10 %.
The financial sources are also defined: energy efficiency tax and responsibility of the energy distributors for energy efficiency measures at the final consumers.</td></tr>
<tr><td>Weaknesses (gaps)</td><td>The national financing scheme offers two options: energy contracting of the total energy renovation of the government and municipal buildings-40 % cohesion funds, 51 % private partner and 9 % government or municipality. Because, the most energy inefficient buildings have been already full or partly energy renovated, the financial scheme in many cases is not attractive for private investors.</td></tr>
</table>

	On the other hand, the procedures and documents for subsidies are rather complex and the time frame is not appropriate. In many cases, the municipalities have not positive experiences with the private partners and/or ESCO models and usually refuse to adopt and implement ESCO model. Private sector is financed by the Eco-fund. Usually subsidies are between 20 % and 30 %. In case of the implementation of more options, the share of subsidy is higher, approx. up to 40 %. The share of the subsidy is rather too low, the administration requires pre-financing of the implementation, and the households are obliged to require co-financing after implementation with many documents, which are mostly unnecessary. One of the gaps is also the software and methodologies for energy savings calculations (energy balances of the buildings), which are not validated and therefore the results are not coherent and consistent with the requirements of the regulation of the energy efficiency in buildings.
Suggestions for improvements	To change financial scheme of the ESCO model: at least 40 % - 60 % Cohesion fund, 10 % - 30 % public funds and 30 % private partner or to increase share of the public funds to 70 % - 80 %. Eco fund should return the co-financed share in shorter period without administrative and bureaucratically obstacles. Validation of the software and methodologies, or to use the PHPP methodology.

Comments:

The government planned to increase the share of the energy renovation as much as possible and offered ESCO model 40/51/9 % of the financing of the total energy renovation of the buildings to reach or to exceed the 25 % goals (22 million m^2) of the buildings till 2020.

Name of the policy instrument	**National Renewable Energy Action Plan 2010-2020**
Body responsible for policy instrument	Ministry of Infrastructure
Range that it covers	Renewable energy in Transport, Electricity production, Heating and Cooling.
Action(s) that are promoted	Targets: • provide a 25% share of renewable energy in final energy consumption and 10% renewable energy in transport by 2020, • to stop the growth of final energy consumption, • implement energy efficiency and renewable energy sources as a priority of economic development, • in the long term to increase the share of renewables in final energy consumption by 2030 and further.
Target Sector(s) of Instrument	Heating and cooling sector, Electricity sector, transport sector.
Timeframe	2010 - 2020

Type of support

Support schemes to promote the use of energy from renewable sources in electricity

The support scheme approves subsidised purchasing of electricity generated from RES at present guaranteed prices or operating support, which covers the difference between the production price of electricity from RES and its market price.

Support schemes to promote the use of energy from renewable sources in heating and cooling:

- promoting the use of solar collectors in households,
- promoting wood biomass boilers in households,
- co-financing the construction of wood biomass district heating systems,
- co-financing the installation of wood biomass boiler equipment,
- co-financing the construction of geothermal energy district heating systems,
- Energy consulting for households – EnSVet.

Support schemes to promote the use of energy from renewable sources in transport:

- Annual targets of the share of biofuels in the market for the propulsion
- Tax depending on CO2 emission
- Promotion of vehicles with low emissions.

Foreseen funds

Estimated costs and benefits of the renewable energy policy support measures:

Measure/technology	Increased use of renewable energy sources 2010-2020 [ktoe]	Costs of support 2010-2020 [EUR million]	Investments 2010-2020 [EUR million]	Reduction in greenhouse gas emissions (2020) [ktCO2/year]	Job creation for operation and maintenance (2020) [No. of jobs]	Job creation (design, construction, installation) (2010-2020) [man years]
Electricity	**150.13**	**456.06**	**1.313.60**	**607.62**	**339**	**10,603**
Hydroenergy	**79.39**	**57.34**	**692.71**	**321.30**	**87**	**3,226**
sHE (< 1MW)	0.71	2.39	4.41	2.85	1	36
sHE (1 - 10MW)	6.69	7.97	30.60	27.07	7	247
HE (10 - 125MW)	71.99	46.98	657.70	291.38	78	2,944
Solar energy	**11.52**	**90.09**	**311.03**	**46.62**	**40**	**5,487**
Wind energy	**16.39**	**22.90**	**115.88**	**66.34**	**11**	**1,625**
Geothermal energy	**0.00**	**0.00**	**0.00**	**0.00**	**0**	**0**
Biomass	**42.83**	**285.72**	**193.98**	**173.36**	**202**	**266**
Solid	20.96	92.60	43.60	84.82	77	89
Biogas	21.88	193.12	150.38	88.54	125	176
Heating and cooling	**189.28**	**442.06**	**1.801.77**	**435.86**	**246**	**817**
Geothermal energy	**3.24**	**4.14**	**10.34**	**7.47**	**/**	**/**
Solar energy	**17.95**	**32.87**	**469.58**	**41.32**	**/**	**/**
Biomass	**114.62**	**303.85**	**759.63**	**263.93**	**246***	**817****
Solid	86.41	303.85	759.63	198.98	246	817
Biogas	0.00	0.00	0.00	0.00	/	/
Liquid biofuel	28.20	0.00	0.00	64.94	/	/
RES (heat pumps)	**53.48**	**101.21**	**562.22**	**123.14**	**/**	**/**
aerothermal	13.29	6.36	51.94	30.61	/	/
geothermal	36.91	83.76	478.60	84.99	/	/
hydrothermal	3.27	11.09	31.68	7.54	/	/
Transport	**192.21**	**/**	**/**	**592.17**	**/**	**/**
Bioethanol/bio-ETBE	18.50	/	/	56.54	/	/
Biodiesel	173.71	/	/	535.63	/	/

* - direct employment; ** - indirect and induced employment

Funds used so far

Not applicable

Duration

2010 - 2020

Strengths

25 % of the renewable energy sources in the final energy consumption is a strong target. The action plan for renewables is easy to understand to the business sector and private individual investors, which have interest to implement renewable energy sources. On the other side, the documentation for subsidies is rather very complex and demand many documents, which should be prepared in a short time, which is not easy. The max. subsidy of the eligible costs is 40 %. VAT is not included.

On the experiences from boom investments in photovoltaics and biogas, the government has introduced two phases in co-financing

	of the electricity produced from renewable sources. The conditions are very strong after application form to the Energy agency and on the second phase, there is negotiation for feed-in tariffs takes place. This means that the only economic feasible investments would be implemented at the moderate feed-in tariffs. Private sector is enhanced by the subsidies from Eco fund for implementation biomass boilers and heat pumps for heating.
Weaknesses (gaps)	The action plan provides supporting scheme for electricity generated from RES and in high-efficiency cogeneration of heat and power. Actually, the feed-in tariffs have dropped and investors is obliged to negotiate for the feed-in tariff. Cohesion policy is non-efficient with the financing scheme with 40 % subsidy, 51 % of private sector and 9 % public sector. The minimum eligible costs for total energy renovation is set to 700.000 EUR, and smaller communities are forced to create consortiums. The whole procedure is too long and require project documentation, which should be ordered through public procurement. Mostly the most important condition is price and this leads to the inappropriate projects documentation which causes additional investment costs during implementation. Subsidies (25 % - 45 %) for wood biomass district heating are rather appropriate and Slovenia has big potential for biomass district heating systems but there has to be organized biomass supply chains and provided more subsidies. There are also financial incentives for construction of the low-energy and passive buildings available through Eco fund. There are no information regarding weaknesses instead there is lack of knowledge and low prices for project documentation, which leads to inefficient solutions. There are no consequences if the goals set in the National Renewable Energy Action Plan 2010-2020 are not achieved even if supervision is responsibility of the inspections.
Suggestions for improvements	There is only used top down approach. The administration does not aware of the real situation on the local level. The consortium of the Slovene Local Energy Agencies has provided the real problems and data regarding situation on the local level, which are not accepted by the responsible administrators. On the other hand, on the creation and implementation of the energy policy are influenced by the biggest national traders and distributors of the non-renewable energy sources (natural gas, LGP, heating oil). Subsidies schemes have to be as simple as possible, there has to be enough time available to prepare necessary documents. Here is to be prepared flexible subsidy schemes because of type and energy consumption of the public buildings.

Name of the policy instrument	**National Action Plan for the nearly zero-energy buildings for the period up to 2020**
Body responsible for policy instrument	Ministry of Infrastructure
Range that it covers	All buildings
Action(s) that are promoted	• Construction of Near zero energy buildings; • Near zero energy renovations of residential and non-residential buildings and public buildings.
Target Sector(s) of Instrument	Single and multi - apartment buildings, public buildings, other non-residential buildings
Timeframe	Until 2020
Type of support	Supports included in other action plans (National Energy Efficiency Action Plan 2014-2020)
Foreseen funds	Not applicable in this document. The funds are foreseen in other documents.
Funds used so far	Not applicable within this document, the funds are provided in other action plans mostly through Eco fund.
Duration	Until 2020
Strengths	The valid regulation of the energy consumption in buildings (PURES) allows 38 kWh/(m^{2}a) of the primary energy consumption for the new buildings. The main goal set by the action plan is 15 kWh/(m^{2}a), which leads to near zero energy buildings. With adopting the net metering concepts this is good base for achieving not only near zero but also plus energy buildings. The action plan defines the potential for the reconstruction of nearly zero energy buildings: for new and renovation of the existing buildings. The action plan provides energy renovation of the existing residential buildings (89 % of all residential buildings are single apartment buildings). This will be difficult to implement because almost all residential buildings are private and it will be needed much effort and subsidies for near zero energy building renovation (NZEB). The action plan also contains plan for NZEB renovation of the non-residential buildings (mostly public buildings). This action plan also predicts the construction of the new NZEB construction till the year 2030. NZEB are similar to near zero CO2 buildings if in the renovation or in new buildings integrate RES (biomass, heat pump, biogas, small CHP plants, Stirling technology and of course energy storage and/or net metering in this is base for the smart grid system. And this is one of the most important key point addressed in the policy instrument addressed in the application form. It is expected that documentation for such the project is complex task and a lot of knowledge transfer, know-how is to be needed

Weaknesses (gaps)	The real question which should be addressed and of course cleared are: • How to encourage the private owners to renovate or build new near zero or even plus energy buildings? • If the government has enough funds to implement such the renovation of the existing buildings? • Special approaches should be focused on the energy renovation of the buildings under culture heritage protection. • Do we have enough financial means and subsidies for such complex task? • The costs of the non-renewable energies are rather low including electricity and there is no long-term prediction of the cost increasing.
Suggestions for improvements	First, public (or even private) sector should start with the demonstration projects-energy renovation of existing buildings into NZEB and to demonstrate the construction new NZEB, both should be also considered as near zero CO2 buildings. For such projects, which should be internationalized, the EU and national funds should be reserved and the demonstration effect should be multiplicated.

Name of the policy instrument	**Long-Term Strategy for Mobilising Investments in the ENERGY RENOVATION OF BUILDINGS**
Body responsible for policy instrument	Ministry of Infrastructure
Range that it covers	Buildings of wider and narrow public sector, service sector, housing sector
Action(s) that are promoted	Energy renovations
Target Sector(s) of Instrument	Public and Private sector
Timeframe	Continuous
Type of support	Non-refundable subsidies
Foreseen funds	**HOUSING STOCK (2015 – 2023):** • 387 mio EUR of non-refundable subsidies from various programmes; • 72 mio EUR of reimbursable grants. **Public sector (2016 – 2023):** • 115 mio EUR – Cohesion fund; • 50 mio EUR - Reimbursable grants; • 20,3 mio EUR - Self-participation of the State (in the frame of Cohesion fund); • 124,4 mio EUR – ESCO;

	• 30,1 mio EUR - Resources from the integrated budget. **Private sector(2016 – 2023):** • 91 mio EUR
Funds used so far	Not applicable
Duration	Up to 2023
Strengts	1. Providing an overview of the Slovenian building stock 2. Providing a list of measures with an economic analysis
Weaknesses (gaps)	• The possibility of shortage of funds • The prediction of the NZEB renovations is low, there is lack of instruments for promoting such the renovation, lot of questions appears at the culture heritage buildings, private and business buildings. • Additional funds e.g. through energy contracting is not realistic. • The pilot projects as is predicted to renovate to NZEB of the central government buildings is unrealistic because the government does not have available responsible experts
Suggestions for improvements	• Demonstration project should be implemented by the responsible agency with the knowledge, experience and know-how, such as Local Energy Agency. • Much effort is to be done in looking for appropriate funds (subsidies, credits, research and demonstration funds etc.). • - Flexible financing scheme (the share of the financing of the renovation (public, private, Cohesion) depends on the type of building, energy efficiency, savings potential and existing savings achieved by the implementation of simple measures).

Name of the policy instrument	**Operational Programme for the implementation of the EU cohesion policy in the period 2014-2020**
Body responsible for policy instrument	Ministry of Infrastructure
Range that it covers	Research and technological development, improving the competitiveness of SMEs, the transition to a low carbon economy, conservation and environmental protection, resource efficiency, promoting sustainable and quality employment, etc.
Action(s) that are promoted	The programme supports 11 thematic objectives. Within the fourth thematic objective – TC4"sustainable use, energy generation and smart grid" the following investment priorities will be supported: • supporting energy efficiency and the use of renewable energy in public buildings and the housing sector, • promoting the production and distribution of energy from renewable sources,

	• development and use of smart distribution systems that operate at low and medium voltage, • promoting low-carbon strategies for all types of territories, in particular urban areas, including the promotion of sustainable multimodal urban mobility and mitigation relevant adaptation measures.
Target Sector(s) of Instrument	All sectors
Timeframe	2014 - 2020
Type of support	Returnable and non-returnable subsidies, investments
Foreseen funds	**Total - 3,2 billion EUR.** TC1 - 461 mio EUR, TC2 - 68 mio EUR, TC3 - 526 mio EUR, **TC4 - 281 mio EUR,** TC5 - 83 mio, TC6 - 400 mio EUR, TC7 - 263 mio EUR, TC8 - 287,7 mio EUR, TC9 - 380 mio EUR, TC10 - 228 mio EUR, TC11 – 62 mio EUR.
Funds used so far	Not applicable
Duration	2014 - 2020
Strengths	Operational programme is divided to the different objectives (areas). One of them is a detailed information and prediction of cofounding options for the whole energy sector. The document contains all Slovenian Cohesion policies including the renewables, energy efficiency, rational energy consumption and low energy building including smart grid and net metering.
Weaknesses (gaps)	There are many options for co-financing of comprehensive energy renovation of buildings, mostly in the public sector. Partly energy options are often considered as non-eligible.
Suggestions for improvements	Partly energy renovation options is to be also co-financed through Eco fund not only for private but also for public sector. It will be used progressive conditions: More options, higher subsidy. Problem is administrative burdens and lot of documents provided for the application form.

Name of the policy instrument	**Operational Programme of measures to reduce GHG emissions by 2020**
Body responsible for policy instrument	Ministry of Environment and Spatial Planning

Range that it covers	GHG emission reduction until 2020 with measures in the energy sector, transport sector, agricultural sector and waste management.
Action(s) that are promoted	Target: Reducing GHG emissions until 2020. Actions: Incentives for combustion plants using biomass to heat buildings or settlements, green public procurement to promote energy efficiency, including the use of biomass as an energy source, Incentives for district heating systems that use: 1. RES in cogeneration 2. waste heat 3. natural gas in high efficient CHP systems.
Target Sector(s) of Instrument	Residential and service sector, Transport sector, Energy sector, Industry SMEs, The agricultural sector, Waste management sector.
Timeframe	2014 - 2020
Type of support	Supports included in other action plans (National Energy Efficiency Action Plan 2014-2020)
Foreseen funds	1,019 billion EUR
Funds used so far	Not applicable
Duration	2014 - 2020
Strengths	The Government places great emphasis on the reduction of greenhouse gas emissions. In this Action Plan are covered in detail all the areas that cause greenhouse gas emissions and measures for increasing the GHG emissions.
Weaknesses (gaps)	The Funding measures for the reduction of greenhouse gas emissions are provided in a number of other action plans, which often leads to many misunderstandings.
Suggestions for improvements	Arranging funding schemes by making them more transparent.

2. GOOD PRACTICE EXAMPLES

1ST GOOD PRACTICE: Energy renovation of buildings of Kindergarten Ptuj

Kindergarten Ptuj comprises 10 buildings. In 2013, the Municipality of Ptuj, as owner of the kindergartens, tackled energy renovation with the aim of reducing energy consumption for heating and ensure favourable conditions for children in terms of the education and training process. In the implemented action were renovated 7 buildings with the total heating surface of 4,408 m2.

Name of the good practice	**Energy renovation of buildings of Kindergarten Ptuj**
Short presentation	Kindergarten Ptuj comprises 10 buildings. In 2013, the Municipality of Ptuj, as owner of the kindergartens, tackled energy renovation with the aim of reducing energy consumption for heating and ensure favourable conditions for children in terms of the education and training process. In the implemented action were renovated 7 buildings with the total heating surface of 4,408 m2.
Context	High consumption of energy for heating and a bad condition of the buildings envelope (windows, ceilings, and facades) were the reasons for the renovation.
Type of actions	Implementation of measures on the buildings envelope: - Windows (935 m^2) - Façade (2323 m^2)

	- Attic (4408 m^2)
Duration	October 2013 – August 2014
Beneficiaries	Kindergarten Ptuj
Type of support	Subsidy
Policy instrument	Energy renovation of primary schools, kindergartens, health centres and libraries owned by local communities, for the period 2007 - 2013
Total investment	1.028.130 EUR
Co-financing	749.712 EUR (European cohesion fund)
Other funding's	Local community – own sources
Outcomes	Energy savings of 544.5 MWh/year
Explanation	It's a remarkable case of a good practice (on a municipal level) in terms of improving and ensuring environmentally friendly and energy-efficient spatial conditions for children in the context of educational process and improving working conditions for employees. These renovations can be easy transferred into other regions.

2ND GOOD PRACTICE: Energy renovation of Primary school Anica Černejeva Makole

Name of the good practice	**Energy renovation of Primary school Anica Černejeva Makole**
Short presentation	The Primary school Makole building has been built in 1980. Due to high energy costs for heating, the owner of the building (Municipality Makole) has decided to renovate the building.
Context	High consumption of energy for heating was the reason for renovation.
Type of actions	Implementation of measures on the buildings envelope: - Windows - Façade - Attic Implementation of measures on technical systems: - Optimization of the heating system - Installation of a wood pellet boiler
Duration	June 2013 – October 2014
Beneficiaries	Primary School Anice Černejeve Makole
Type of support	Subsidy
Policy instrument	Co-financing of operations for energy rehabilitation of buildings owned by local communities
Total investment	332,289.54 EUR
Co-financing	234,394,74 EUR (European cohesion fund)
Other funding's	Local community – own sources (97,894,80 EUR)

Outcomes	Energy savings:115,432 MWh/year, Energy production from renewable sources: 103,202 MWh/year
Explanation	It is a good practice in terms of improving in terms of ensuring environmentally friendly and energy-efficient spatial conditions for children in the context of educational process and improving working conditions for employees. These renovations can be easy transferred into other regions.

Section 3: Regional Policy Report – Greece

This Report has been produced with the financial assistance of the Interreg Europe Programme. The content of this Report is the sole responsibility of the MEDITERRANEAN AGRONOMIC INSTITUTE OF CHANIAand can under no circumstances be regarded as reflecting the position of the Interreg Europe Programme Authorities.

1. POLICIES PROMOTING ENERGY EFFICIENCY AND USE OF RENEWABLE ENERGY RESOURCES

Name of the policy instrument	**USE OF SUSTAINABLE ENERGIES IN PUBLIC AND MUNICIPAL BUILDINGS**
Body responsible for policy instrument	Region of Crete
Range that it covers	Use of sustainable energy technologies in public buildings
Action(s) that are promoted	Increase of energy efficiency and use of renewable energies in public buildings
Target Sector(s) of Instrument	Public sector
Timeframe	2014-2020
Type of support	Financial subsidies in energy renovation of existing public buildings in order to increase their energy efficiency.
Foreseen funds	18,000,000 € (for the Region of Crete)
Funds used so far	0
Duration	It has not been announced yet, closing date 31-12-2022 launching and closing date. if not yet closed, please refer to the envisioned ending date.
Strengths	There are many public authorities in Crete mainly municipalities who are willing to renovate their buildings in order to use sustainable energies in them. they could adapt their action plan to support buildings which would reduce or zero their co2 emissions.
Weaknesses (gaps)	Main weakness of this policy tool is the fact that due to current economic crisis public authorities have not the required budget to co-finance their energy investments.
Suggestions for improvements	Municipalities and other public authorities should increase their budget concerning energy investments in their buildings. Region of Crete should require a substantial reduction of CO2 emissions in the subsidized buildings.

Comments:
If subsidies will be high enough it is expected that many public authorities would be interested in energy renovation of some of their buildings. energy investments in public buildings could be financed from ESCOS due to economic difficulties of the public institutions.

Name of the policy instrument	**INSTALLATION OF SOLAR-PVs IN BUILDINGS AND ENTERPRISES OFFSETING THEIR ANNUAL CONSUMPTION (NET-METERING)**
Body responsible for policy instrument	Region of Crete
Range that it covers	Use of sustainable energy technologies in buildings
Action(s) that are promoted	Increase of energy efficiency and use of renewable energies in buildings-installation of pvs.
Target sector(s) of instrument	Public and private sector
Timeframe	2015 onwards
Type of support	Installation of photovoltaic panels in buildings with the net-metering principle
Foreseen funds	Public funds are not required, private funds use is unlimited
Funds used so far	Unknown
Duration	2015 onwards
Strengths	This policy measure does not need co-financing from the government it does not require high investment from the owner of the building the documentation for obtaining the licence to install pvs in the building is not complicated
Weaknesses (gaps)	Due to the fact that the electric grid in Crete is isolated from the continental grid, there is limited number of pvs which are allowed to be installed in buildings with this policy measure.
Suggestions for improvements	The licence for the use of pvs in buildings through net-metering could be related with their transformation to zero co2 emissions buildings.

Comments:
This policy measure combined with the use of other renewable energies could result in the creation of buildings with zero co2 emissions due to energy use in them.

Name of the policy instrument	**INCREASE OF ENERGY EFFICIENCY AND USE OF RENEWABLE ENERGIES IN RESIDENTIAL BUILDINGS**
Body responsible for policy instrument	Region of Crete
Range that it covers	Use of sustainable energy technologies in private buildings through energy renovation.
Action(s) that are promoted	Increase of energy efficiency and use of renewable energies in private buildings in order to improve their energy behaviour.
Target Sector(s) of Instrument	Private sector
Timeframe	2014-2020
Type of support	Financial subsidies and bank loans in energy renovation of existing private buildings in order to increase their energy category.
Foreseen funds	Approx. 30,000,000 €
Funds used so far	0
Duration	It has not been announced yet, closing date 31-12-2022
Strengths	There are many house owners who want to improve the energy category of their houses through energy renovation. the financial subsidies in energy investments are very attractive to them. the same initiative in the previous programming period was very popular and many house owners were benefited.
Weaknesses (gaps)	Main weakness of this policy tool is the fact that due to current economic crisis there are house owners who cannot afford to pay their own contribution.
Suggestions for improvements	Reduction of the required bureaucratic procedures which reduce the attractiveness of this policy measure.

Comments:
it is expected that many house owners will try to benefit from this initiative. the same policy measure in the previous programming period (2007-2013) was very successful resulting in a high number of energy renovated buildings.

Name of the policy instrument	**PROMOTION OF SUSTAINABLE ENERGIES IN PRIVATE ENTERPRISES**
Body responsible for policy instrument	Ministry of Economy
Range that it covers	Use of sustainable energy technologies in enterprises including increase of the energy efficiency in their buildings
Action(s) that are promoted	Increase of energy efficiency and use of renewable energies in their buildings
Target Sector(s) of Instrument	Private sector (hotel buildings , industrial buildings etc)
Timeframe	It has not been announced yet, until 2022
Type of support	Financial subsidies, tax reliefs
Foreseen funds	More than 50,000,000 €
Funds used so far	Unknown
Duration	It has not been launched yet
Strengts	Various enterprises will benefit improving their energy efficiency in a profitable way due to financial subsidies
Weaknesses (gaps)	There is currently lack of financial resources in many enterprises and difficulties in banks due to low liquidity to lend money to them.
Suggestions for improvements	This policy measure could be supported from ESCOS which could finance the energy investments

Comments: it is expected that in Crete many hotels will benefit from this policy instrument and they will improve the energy efficiency of their buildings. various buildings of industrial companies would benefit as well.

Name of the policy instrument	**INSTALLATION OF SOLAR-PVs ON BUILDING ROOFS**
Body responsible for policy instrument	Ministry of Environment
Range that it covers	Use of photovoltaics on the building roofs
Action(s) that are promoted	Installation of photovoltaics up to 10 kwp on the building roofs
Target Sector(s) of Instrument	Buildings of the private and public sector
Timeframe	2010 onward
Type of support	Guaranteed feed in tariffs in the generated solar-pv electricity
Foreseen funds	Not required
Funds used so far	Not required
Duration	Unknown
Strengths	Current tariffs guaranteed for a long period result in a small profit to the investors. This investment does not require high capital resources.
Weaknesses (gaps)	The resulting profit is small
Suggestions for improvements	It should be allowed the installation of pvs in building roofs with higher nominal power up to 20 kwp (instead of 10 kwp which is currently allowed)

Comments: The installation of solar-PVS in building roofs will promote also distributed power generation. due to the fact that currently the initially high offered (few years ago) feed-in tariffs have been reduced substantially compared to few years ago the attractiveness of this policy instrument has been reduced.

Name of the policy instrument	**LAW 3855/2010 REGARDING CREATION OF ENERGY SERVICE COMPANIES**
Body responsible for policy instrument	Ministry of Economy
Range that it covers	2010 onwards
Action(s) that are promoted	Creation of energy service companies
Target Sector(s) of Instrument	All sectors
Timeframe	2010 onwards
Type of support	Energy investments
Foreseen funds	Unknown
Funds used so far	Unknown
Duration	Since 2010 onwards
Strengths	This policy instrument facilitates investments in sustainable energy technologies in organizations without utilizing the limited financial resources of the organization. it utilizes financial resources of the private sector to support energy investments in the public sector.
Weaknesses (gaps)	ESCOS could invest in sustainable energy projects. awareness raising is limited among public and private organizations and lack of some good practices regarding energy investments of ESCOS limits their acceptance.
Suggestions for improvements	Since this tool could improve energy investments in various organizations in the era of limited financial resources, awareness raising and mobilization is needed regarding their prospects.

Comments: energy service companies have not been developed so far in Greece. However, they could contribute significantly in the promotion of investments of sustainable energies in buildings particularly in the public sector. Since ESCOS should have enough capital resources for the energy investments , the current economic crisis in Greece hinders their operation.

Name of the policy instrument	**Greek law 4122/2013 for public and private buildings with near zero energy consumption (near zero energy buildings)**
Body responsible for policy instrument	Ministry of Environment
Range that it covers	New public and private buildings after 2018 and 2020
Action(s) that are promoted	All new buildings must have near zero energy consumption
Target Sector(s) of Instrument	All buildings except industrial
Timeframe	2018 onwards
Type of support	Unknown at the moment
Foreseen funds	Unknown at the moment
Funds used so far	Zero
Duration	Since 2019 onwards
Strenghts	The regulatory framework is obligatory for public and private buildings.
Weaknesses (gaps)	Probably the financial resources will be limited. The construction cost for new buildings and energy renovation cost of existing buildings will be high. the technologies and techniques for creation of NZEBS are currently expensive.
Suggestions for improvements	It is necessary to support the creation of NZEBS with financial resources. it is also necessary to increase awareness raising among citizens and public authorities. creation of training seminars and offering of technical support regarding the available technologies and techniques for NZEB would be helpful.

Comments: priorities in the allocation of the European structural funds should be given to support Public Authorities in order to achieve the target of NZEBS.

2. GOOD PRACTICE EXAMPLES

1ST GOOD PRACTICE: Creation of a zero CO2 emissions residential building

Name of the good practice	**Creation of a zero CO2 emissions residential building**
Short presentation	The residential building is consisted of two independent apartments, located in the ground and first floor of a building with covered surface of 65 m2 each. Both apartments are privately owned and they are located in Western Crete , Prefecture of Chania , Municipality of Platanias , approx. 14 km west of the city of Chania.
Context	The reason for using various renewable energy systems is the maturity , the reliability and the cost effectiveness of them. The use of PVs in buildings with the net metering initiative was allowed in Greece in the end of 2014 with a new legislative framework and the first applications were realized during 2016.
Type of actions	The apartments achieved the zeroing of their CO2 emissions with the use of A) Solar thermal energy for hot water production (Thermosiphon solar thermal heater) B) Solid biomass (olive trees wood) for space heating (Burning in wood stoves) , and C) Photovoltaic panels for electricity generation used for lighting and operation of various equipment in the two apartments.
Duration	Solar thermal energy as well as solid biomass were used for few years and the PV panels were installed in the end of 2016
Beneficiaries	Owners of the apartments
Type of support	The consumed electricity is offset annually from the generated electricity from the installed PVs.
Policy instrument	Installation of PVs with the net-metering initiative
Total investment	For the two apartments the cost of PVs was 12,000 € , the cost of the solar thermal heaters 1,400 € and the cost of biomass burning systems 1,200 €. The total cost for both apartments was 14,600 € or 112.3 €/m2 of covered surface.
Co-financing	The installation was financed from the owners of the apartments

Other funding's	No
Outcomes	Renewable energies used result in reduction of CO2 emissions and in the decrease of the energy cost in the apartments. a) The reduction in CO2 emissions due to the use of renewable energies has been estimated in 5.2 tons CO_2/year; b) The reduction in the electricity cost of the apartments due to the use of photovoltaics is 2,000 €/year.
Explanation	We believe that the abovementioned installation is a good practice in our territory and it could be transferred in other territories as well because of a) The renewable systems used are mature , reliable and cost effective b) The installation cost of those systems is relative low compared with the cost of the building c) The operating cost is also low compared with the use fossil fuels instead of renewable energies d) The same technologies could be used in other territories with high solar irradiance and availability of solid biomass resources.

2ND GOOD PRACTICE: **Creation of a zero CO2 emissions commercial building which is not interconnected with the electric grid**

Name of the good practice	**Creation of a zero CO2 emissions commercial building which is not interconnected with the electric grid**
Short presentation	The building is not interconnected with the electric grid and it is used as the main office of the small size local company DYNAMIS

	(http://www.dynamis.com.gr/) which is involved in the installation of various renewable energy systems. It is using a hybrid solar-PV(2.7 KWp) and wind energy system(1.4 KWp) providing electricity which is stored in batteries and used in the building. It is also using a solid biomass burning system (12 KW) (Burning olive tree wood) for space heating. The building is located in Stalos , 7 km west of Chania.
Context	The reason for using various renewable energy systems is their availability ,the maturity , the reliability and the cost effectiveness of them. Since the building is autonomous and it is not using fossil fuels its CO2 emissions due to energy use are zero.
Type of actions	The building achieved zero CO2 emissions with the use of A) Solid biomass (olive trees wood) for space heating (Burning in wood stoves) , and B) Photovoltaic panels for electricity generation used for lighting and operation of various equipment in the two apartments. C) Wind turbine for electricity generation used in the building D) Electric batteries for electricity storage.
Duration	The systems were installed 12 years ago
Beneficiaries	DYNAMIS , SME company
Type of support	State subsidy for energy investments in SMEs
Policy instrument	Support of energy investments in Enterprises (Subsidies of their capital cost) through the European structural funds.
Total investment	The cost of PVs was 12,000 € , The cost of biomass burning systems was 2,200 €. The cost of the wind turbine was 7,500 €.
Co-financing	The installation was co-financed from the owners of the building
Other funding's	No
Outcomes	Renewable energies used result in zeroing CO2 emissions and in the decrease of the energy cost in the commercial building. The reduction in CO2 emissions due to the use of solid biomass is estimated at 2.5 tons per year. The reduction in CO2 emissions due to the use of solar-PVs and the wind turbine is estimated at 1.5 ton per year. Total CO2 emissions have been estimated at 4 tons per year. The cost of olive tree wood used (3 tons/year) has been estimated at 450 €.
Explanation	We believe that the abovementioned installation is a good practice in our territory and it could be transferred in other territories particularly in Southern European countries, particularly in buildings which are not interconnected with the electric grid, because of The renewable systems used are mature, reliable and cost effective The installation cost of those systems is relative low compared with the cost of the building

	The operating cost is also low compared with the use fossil fuels instead of renewable energies The same technologies could be used in other territories with high solar irradiance and availability of solid biomass resources.

Section 4: Regional Policy Report – Italy

4PILLARS_1This Report has been produced with the financial assistance of the Interreg Europe Programme. The content of this Report is the sole responsibility of the Molise Region and can under no circumstances be regarded as reflecting the position of the Interreg Europe Programme Authorities

1. POLICIES PROMOTING ENERGY EFFICIENCY AND USE OF RENEWABLE ENERGY RESOURCES

Name of the policy instrument	**Regional Operational Programme ERDF - ESF of Molise 2014-2020**
Body responsible for policy instrument	Molise Region
Range that it covers	To contribute to the EU2020 strategy and to encourage the use of renewable sources within territory of Molise Region.
Action(s) that are promoted	Molise Region improve and encourage the use of renewable sources within its territory, through the Regional Operational Programme ERDF-ESF 2014-2020, with the axis 4"SUSTAINABLE ENERGY", whose thematic objective is "Supporting the transition to a low-carbon economy in all sectors", through the following actions: 4.1.1 Installation of energy production from renewable sources for own use associated with interventions to improve energy efficiency by giving priority to the use of high-efficiency technologies; 4.2.1. Incentives aimed at reducing energy consumption and climate-gas emissions of enterprises and productive areas including the installation of plants for renewable power production for self-consumption, giving priority to high-efficiency interventions; 4.3.1. Realization of intelligent energy distribution networks (smart grids) and measures concerning strictly complementary transmission networks, introduction of equipment equipped with digital communication systems, smart metering and monitoring and control as infrastructure of "the cities" of the peri-urban areas; 4.4.1. Construction of infrastructure and interchanges aimed at increasing collective mobility and environmentally friendly goods distribution and related transport systems; 4.4.2 Smart Transport Systems; 4.4.3 Development of the necessary infrastructures needed to the use of the system with a low environmental impact through initiatives of charging hub; 4.5.1. Promotion of energy efficiency through district heating and cooling and the installation of cogeneration and trigeneration plants.
Target Sector(s) of Instrument	Sustainable energy - Supporting energy efficiency, intelligent energy management and renewable energy use in public infrastructures, including public buildings, and in the housing sector and correct access of the technologies for the production of electricity from renewable sources within the territory.
Timeframe	2014-2020
Type of support	European Regional Development Fund (ERDF)
Foreseen funds	€ 20.121.188,00
Funds used so far	Approximately € 53.000.000,00 through Regional Operational Programme ERDF of Molise 2007-2013

Duration	2014 –2020 expected ending date approximately by 2022
Strengths	The programme promotes: • reorientation of spending towards areas such research and innovation; • support for small and medium-sized enterprises; • education and training aimed at the growth of individuals and organizations; • labour market able to generate quality employment and social cohesion.
Weaknesses (gaps)	Hypothetical weaknesses: • the complexity of bureaucratic procedures for the realization of interventions related to sustainable energy sector such as installation of energy production from renewable sources or construction of infrastructure may not allow access to the foreseen incentives to a wide target; • no integrated intervention on the buildings, but actions limited to individual interventions, such as replacement of insulating windows, replacing traditional light bulbs with LED, installation of photovoltaic panels, etc; • the implementation of improvement measures on public buildings of marginal importance in terms of energy savings.
Suggestions for improvements	The improvement of the policy instrument, through the exchange of best practices, can lead a better allocation of resources from the Structural Funds. In order to promote the near zero CO2 emission buildings, the targeted policy instrument could foresee the creation of new financial instrument. Further improvement could derive from the simplification of procedures.

Name of the policy instrument	**REEP (Regional Environmental Energy Plan)**
Body responsible for policy instrument	Molise Region
Range that it covers	To contribute to the achievement of national and regional objectives for renewable energy sources (RES) introduced by Directive 2009/28/EC, which sets national targets for 2020 for the different EU Member States and by the 15/03/2012 Decree of the Ministry of Economic Development (Decree burden sharing), which distributes the national target among the different Italian Regions and autonomous Provinces.
Action(s) that are promoted	Guidelines for reaching the RES targets set out in Directive 2009/28 / EC and Decree 15/03/2012.
Target Sector(s) of Instrument	Sustainable energy - Supporting energy efficiency, intelligent energy management and renewable energy use in public infrastructure, including public buildings, and in the housing sector and correct

	access of the technologies for the production of electricity from renewable sources within the territory.
Timeframe	From 2017 - onwards
Type of support	None
Foreseen funds	None
Funds used so far	None
Duration	Unlimited
Strengts	The Regional Environmental Energy Plan is the technical and administrative tool for achieving the goals of energy independence from fossil fuels to be implemented in the transposition of the National Energy Strategy (NES 2013). The plan aims: • achievement the energy independence from fossil fuels by deploying actions that are intended to direct and guide investment in renewable energies; • pushing the exploitation of best available source ensuring the promotion of a respectful attitude of the cultural, environmental and architectural territory.
Weaknesses (gaps)	Weaknesses: • difficulties to fit the contents of the REEP both with choices and needs expressed by the policy makers and with the environmental and cultural characteristics of the areas identified for the location of the plants; • difficulties to fit the concrete interests of the various involved stakeholders; • low dissemination of the REEP and its actions among the stakeholders.
Suggestions for improvements	A good dissemination of this new policy instrument among the stakeholders can contribute positively to a sustainable development as the Plan promotes, in the sustainable energy sector, simultaneously many economic, social, political and environmental advantages.

Name of the policy instrument	**Information Technology system for the management of the energy certification process of buildings**
Body responsible for policy instrument	Molise Region
Range that it covers	To contribute to computerize the process of cataloguing about the degree of energy efficiency of buildings at the Regional level
Action(s) that are promoted	Creation of a Regional IT system, to be implemented in collaboration with ENEA (National Agency for New Technologies, Energy and Sustainable Economic Development), through an agreement approved by resolution of the regional council (D.G.R. n. 475 of 14/10/2016) for the cataloguing of the energy certification of buildings,

	pursuant to the n.10/91 Law, with which the criteria of building construction are certified in accordance with the energy regulation.
Target Sector(s) of Instrument	Sustainable energy - Supporting energy efficiency, intelligent energy management and renewable energy use in public infrastructure, including public buildings, and in the housing sector and correct access of the technologies for the production of electricity from renewable sources within the territory
Timeframe	From 2017 onwards
Type of support	Regional Funds
Foreseen funds	€ 40.000,00
Funds used so far	None
Duration	Unlimited
Strengths	The IT system develops significant synergies for better implementation of programs regulated by the European Union Directive 2006/32/EC and by the Italian State with the Legislative Decree no. 115/2008, between the various involved bodies
Weaknesses (gaps)	The weaknesses will be encountered during the utilization stage of the IT system by the users, if the implemented system could be not user friendly.
Suggestions for improvements	The improvement of this policy instrument will allow a simplification for the management of the energy certification, in order to promote the process of cataloguing about the degree of energy efficiency of buildings

2. GOOD PRACTICE EXAMPLES

1ST GOOD PRACTICE: GEOTHERMAL LOW ENTHALPY

Name of the good practice	**GEOTHERMAL LOW ENTHALPY**
Short presentation	Demolition and reconstruction of the adjoining gym Institute Comprehensive "Alighieri" of the Municipality of Ripalimosani (CB)
Context	Works of reconstruction of the adjoining gym on the municipal school complex, as part of the proposals for improvement bids during the tender in relation to sub-item 1 "improving heating system energy efficiency and air resulting in reduced consumption energy ". The contracting firm, after analysis of the final design based on race and subsequently made to the inspections, has identified improving solutions of great impact in terms of energy consumption and management
Type of actions	The works carried out are in summary the construction of a heating system with geothermal heat pump at low enthalpy, with heat exchange through vertical probes, and terminal elements in floor radiant panels
Duration	2016
Beneficiaries	Students in the morning hours; sports associations, or more generally, all the citizens in the afternoon hours and on holidays
Type of support	Public funding for seismic improvement interventions in the post-quake reconstruction
Policy instrument	National Fund (Fund development and cohesion) Molise Region
Total investment	Approximately € 45.000 (heating system)
Co-financing	None
Other funding's	None
Outcomes	As more fully detailed in the analysis of energy attached to the project is evident the improvement of the energy performance quantified in a range of values comprised between 25% and 30%. Furthermore, the replacement of the traditional system provided (gas boiler - storage tank - solar thermal system) with a geothermal heat pump system has resulted in an undoubted "simplification" of plant. This choice has therefore had important consequences in terms of ease and cost of managing and operating the plant over the years

Explanation	The actions proposed and implemented represents a solution characterized by elements of great interest both in terms of technological innovation and environmental sustainability. The choice of low energy geothermal and radiant floor undoubtedly represent an easily replicable model and in other local contexts and for other structures to different intended uses. Also the use of heat pumps integrates seamlessly with other low environmental impact solutions such as photovoltaics. Choices of this type represent a real breakthrough towards the goal of a nearly zero energy buildings (NZEB - nearly zero energy building)

2nd GOOD PRACTICE: New regional headquarters of F.I.G.C. / L.N.D. Molise

Name of the good practice	**New regional headquarters of F.I.G.C. / L.N.D. Molise (Italian Football Federation / National Amateur League)** **Address: Contrada Pesco Farese - Housing development "Primavera"- 86025 Ripalimosani (CB)**
Short presentation	Type of building: Administrative offices of F.I.G.C. / L.N.D. Molise with conference room, medical room, headquarters of the Italian Football Referees and an area dedicated to the archive. Properties: Football Federation (Federcalcio) - Rome Location: Contrada Pesco Farese - Lott. Spring - 86025 Ripalimosani (CB) Surface: 1,310 square meters. (Ground floor: 550 sqm; 1st Floor: 520 sqm; 2nd floor: 240 sqm) Promoter: Mr. Piero Di Cristinzi, regional president, and Board of Directors Building Companies: TM Immobiliare S.r.l. - Vinchiaturo (CB), Scarnata Costruzioni srl – Campobasso Plant engineering Company: Di Totalmpianti - Campobasso General coordinator of the project: Prof. Arch. Gian Carlo Presicci - Rome Building-structural design: Ing. Michele Gioia - Ripalimosani (CB) Systems and renewable sources design: Ing. Leone MARTINO - Campobasso Energy Class: A3

Context	The building is a large building located in the suburbs, in an isolated place, exposed to the weather conditions. For these reasons the building would be subject of high energy consumption both for heating and for cooling if methodologies improving the energy efficiency and the use of sources renewable were not used, at the design stage first and then in the building phase.
Type of actions	Design and installation of: - Highly insulated outer walls; - Highly insulated attics border; - Windows frames with, high-performance glazing frames; - Curtains shielding the solar irradiation (interiors); - Chillers with inverter heat pump, high COP / EER - SCOP / SEER, for winter/summer air-conditioning; - Local plants for fresh air ventilation with air quality control and heat recovery with cross and bypass flows; - Heat pump with high COP, to integrate water heater; - internal temperature control system (local, both with general timer) - Solar thermal panels for hot water production; - Installation of interior lighting with LED panel for lighting the spaces with sensor for the automatic adjustment of the brightness; - External lighting system with LED lights; - Photovoltaic system for the self - production of electricity; - Fan coils installed in the false ceiling in order to increase the spaces usable by beneficiaries and furnishings; - Use of components (glass, aluminium, etc.) and materials (stone, asphalt, recycled, etc.) made in Molise Region in order to guarantee the locally sourced; - Maximizing the recycling of construction waste.
Duration	Start of construction: July 2013 - Completion: May 2016 Inauguration: 15-July-2016
Beneficiaries	employees, users, visitors
Type of support	None. The Football Federation – Rome is completely in charge of the support.
Policy instrument	None
Total investment	€ 1,709,653.29
Co-financing	None
Other funding's	None
Outcomes	Even if the living comfort was increased, it has been decrease (due to the adoption of the above actions) the following technical and economic variables: - management costs; - emissions in the atmosphere. The abovementioned variables obtained energy independence objectives from fossil fuels and make "greener" the offices building sector.
Explanation	The intervention is a good practice for our territories by adopting a high level of energy efficiency achieved through proper planning and a good choice of materials as well as careful management of heating and sanitary water consumption. The best practice can be transferred to other territories contextualizing them to the specific

	situation as well as possibly adopting other systems, renewable energy sources or waste- available in the surrounding area (such as: rain water recovery, reduce of the island of urban heat with adoption of ventilated roofs - roof gardens, use of certified and sustainable timber exploitation, incentives for sustainable mobility (bicycle), reducing water consumption, non-potable water use for watering green areas - for technological purposes, heat pump ground water, low materials emission of pollutants composites) respectful of the rural and natural heritage of the territory.

Section 5: Regional Policy Report – Lithuania

4PILLARS_1This Report has been produced with the financial assistance of the Interreg Europe Programme. The content of this Report is the sole responsibility of the Kaunas district Municipality and can under no circumstances be regarded as reflecting the position of the Interreg Europe Programme Authorities

1. POLICIES PROMOTING ENERGY EFFICIENCY AND USE OF RENEWABLE ENERGY RESOURCES

Name of the policy instrument	**Kaunas district municipality strategic development plan 2013-2020**
Body responsible for policy instrument	Kaunas District Municipality Council
Range that it covers	3 long-term priorities set in Kaunas district municipality strategic development plan 2013-2020: 1. Competitive economy 2. High quality of life 3. Clean and safe environment In order to implement each of these priorities specific objectives and goals are foreseen.
Action(s) that are promoted	PRIORITY A: COMPETITIVE ECONOMY A.1. OBJECTIVE: TO IMPROVE MUNICIPAL MANAGEMENT Goal A.1.1:to improve quality of district management; Goal A.1.2:to increase the availability of information technologies and use of information services, to improve access to internet; Goal A.1.3: to make public administration more efficient, to prepare and amend common territorial plans, other documents of planning, which concern the quality of public services. A.2. OBJECTIVE: TO ATTRACT INVESTMENT Goal A.2.1:to promote entrepreneurship, establishment and development of small and medium-sized business; Goal A.2.2:to attract investment for implementation of Municipality's programmes; Goal A.2.3:to improve public tourism infrastructure, to create attractive image of the region and promote it. A.3. OBJECTIVE: TO ENSURE SUSTAINABLE AGRICULTURAL AND RURAL DEVELOPMENT Goal A.3.1:to ensure reconstruction/repairs and supervision of land reclamation, hydro buildings, land drainage systems; Goal A.3.2:to promote smart farming, to develop non-traditional, alternative and ecologically balanced economic activities in rural areas. A.4. OBJECTIVE: TO ENSURE SUSTAINABLE TRANSPORT DEVELOPMENT Goal A.4.1: to develop and improve district transport infrastructure and all means of communication; Goal A.4.2:to balance traffic flows in municipality's territory and optimize public transport system; Goal A.4.3: to promote the use of alternative fuel transport. PRIORITY B: HIGH QUALITY OF LIFE

B.1. OBJECTIVE: TO DEVELOP WELL-BALANCED CULTURAL INFRASTRUCTURE, ENGAGING RESIDENTS TO PARTICIPATE IN CULTURAL ACTIVITIES AND MAINTAIN CULTURAL HERITAGE.
Goal B.1.1:to improve infrastructure and material base of cultural institutions;
Goal B.1.2: to protect and foster ethnic culture, local traditions and cultural heritage by ensuring openness and dissemination;
Goal B.1.3:to create conditions for local community to participate in cultural activities by strengthening community's creative capacities, making information and cultural activities of libraries more effective.
B.2. OBJECTIVE: TO DEVELOP BALANCED EDUCATION AND TRAINING SYSTEM.
Goal B.2.1: to develop the network of educational institutions, to renovate and modernize educational institutions and their infrastructure;
Goal B.2.2:to improve quality of education process;
Goal B.2.3:to promote lifelong learning and non-formal education system, to increase diversity of children and youth employment;
Goal B.2.4:to promote community's computer literacy.
B.3.OBJECTIVE: TO INCREASE PHYSICAL ACTIVITY IN THE COMMUNITY
Goal B.3.1: to improve and develop sports infrastructure;
Goal B.3.2:to improve activities of sport schools;
Goal B.3.3: to promote physical activity from childhood, to organize sporting events.
B.4. OBJECTIVE: TO ENSURE ACCESS TO SOCIAL SERVICES
Goal B.4.1:to reduce social exclusion and promote social integration;
Goal B.4.2:to optimize the network of social and public services, to improve quality and access to social services.

PRIORITY C: CLEAN AND SAFE ENVIRONMENT
C.1.OBJECTIVE: TO ENSURE ENVIRONMENTAL QUALITY AND MODERNIZATION OF PUBLIC UTILITIES
Goal C.1.1:to implement monitoring of environmental quality;
Goal C.1.2:to promote establishment of green areas;
Goal C.1.3:to set up and develop modern waste management, air pollution and noise prevention systems;
Goal C.1.4:to improve quality and access to communal services;
Goal C.1.5:to make energy production and consumption more efficient, to promote the use of renewable energy resources;
Measures:

C.1.5.1. Renovation and construction of public buildings;
C.1.5.2.Renovation of multi-apartment buildings;
C.1.5.3. Modernization of boiler stations and adaptation to the use of renewable energy resources, development of district heating systems;
C.1.5.4. Promotion and set up of modern methods for energy production from alternative and renewable energy resources, use of cleaner green energy, public awareness raising;
C.1.5.5. Preparation of renewable energy resources development plans and programmes;

	C.1.5.6. Reduction of energy consumption, saving of energy resources and use of local energy resources (peat, etc.) for heating. Goal C.1.6:to raise public awareness of environment issues, to encourage community's initiatives in this field. C.2. OBJECTIVE: TO IMPROVE QUALITY AND ACCESS TO PRIMARY HEALTH CARE SERVICES AND ENSU435,2RE SAFE LIVING ENVIRONMENT Goal C.2.1:to improve access to primary health care services and their quality; Goal C.2.2:to increase community's safety, implement tobacco and alcohol use, crime prevention; Goal C.2.3:to foster social activities of community.
Target Sector(s) of Instrument	Municipal management Investment attraction Fostering of cultural heritage and culture Education and training Physical activity and healthy lifestyle Social services Environmental quality and modernization of public utilities Health care and safety
Timeframe	2013–2020
Foreseen funds	Municipal budget, state budget, EU funds, other
Funds used so far	Municipal budget, state budget, EU funds, other
Duration	7 years
Strengths	Priority C (Clean and safe environment) set in Kaunas district municipality strategic development plan 2013–2020 is directly addressing issues of energy efficiency and use of renewable energy sources. In order to implement this priority, Goal C.1.5 (to make energy production and consumption more efficient, to promote the use of renewable energy resources) underC.1. Objective (to ensure environmental quality and modernization of public utilities) is set. The abovementioned goal foresees such measures as: 1) renovation and construction of public buildings; 2) renovation of multi-apartment buildings; 3) modernization of boiler stations and adaptation to the use of renewable energy resources, development of district heating systems; 4) promotion and set up of modern methods for energy production from alternative and renewable energy resources, use of cleaner green energy, public awareness raising; 5) preparation of renewable energy resources development plans and programmes; 6) reduction of energy consumption, saving of energy resources and use of local energy resources (peat, etc.) for heating.
Weaknesses (gaps)	This policy instrument is not applicable directly to promotion of RES and energy efficiency. Strategic development plan does not address neither to the notion of nearly zero-energy buildings, nor to zero CO2 emission buildings. Financial resources to support RES and energy saving projects are scarce, financial instruments of municipality are insufficient to promote sustainable and renewable energy

	development in the area. This does not create conditions for sufficient exploitation of potential local energy resources. Strategic development plan is oriented towards public sector, does not foresee any direct support for individual community members. However, individual members benefit from overall development of the district.
Suggestions for improvements	The policy instrument could be extended by more energy efficiency promoting objectives and measures. Strategic development plan does not address neither to the notion of nearly zero-energy buildings, nor to zero CO2 emission buildings. Kaunas district has high biomass, municipal and industrial waste resources that could be used for energy purposes. Funding for the promotion of RES and energy efficiency measures should be more intense.

2. GOOD PRACTICE EXAMPLES

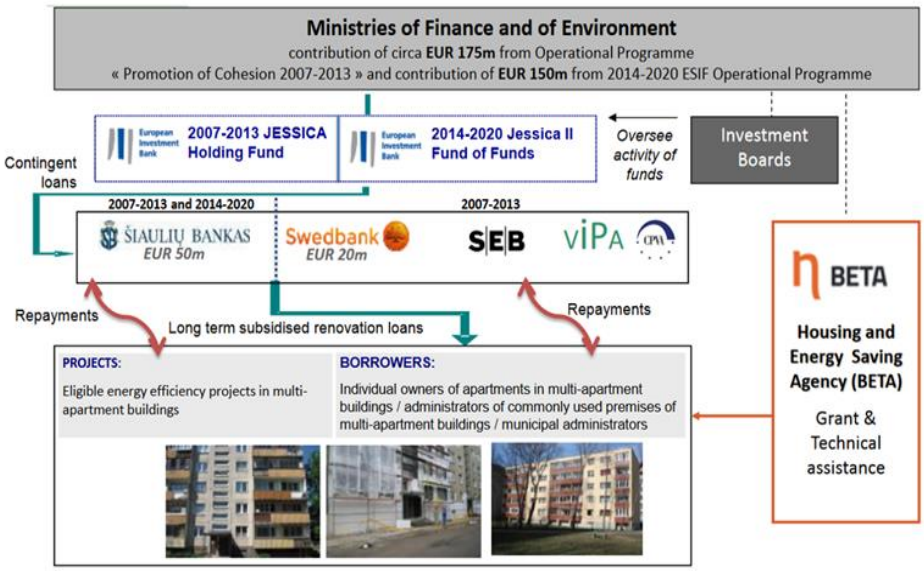
1ST GOOD PRACTICE: Renovation of multi-apartment buildings

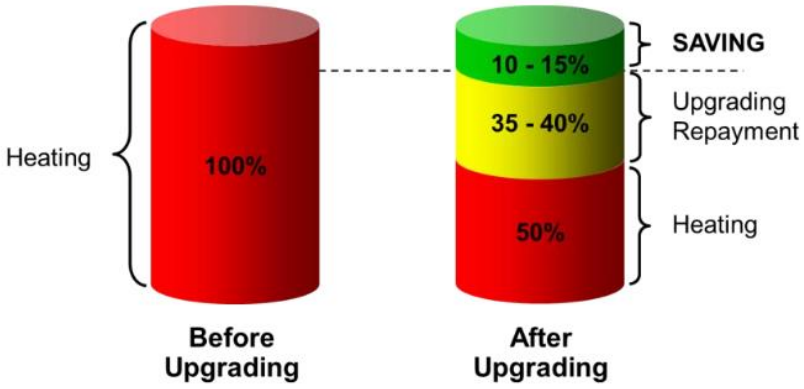
After renovation

Before renovation

Name of the good practice	**Renovation of multi-apartment buildings**
Short presentation	Type of building– multi-apartment building Location – A. Kriščiūno str. 3B, Žiegždriai, Kaunas district municipality Year of construction – 1979 Area of apartments – 1790,81 m2 Number of floors – 4 Number of apartments – 32 Energy class before renovation – E, after renovation – C Heating before upgrade – 263,73 kWh/m2, after upgrade – 86,87 kWh/m2 Energy saving – 67% Reduction of CO2emission to80,61 t/year
Context	Population in Lithuania is approximately 2,8 mln inhabitants. 66% of population live in multi-apartment buildings built before 1993. There are over 38000 multi-apartment buildings and over 800 000 apartments. 97% are privately owned, only 3% – municipal rental stock. 65% of buildings are supplied by district heating system. Population in Kaunas district is over 91 thousand. 35% of population live in multi-apartment buildings. In total, in Kaunas district municipality there are 688 multi-apartment buildings. Most of them are built before 1993. Average apartment is 55m2.Average energy consumption in houses build before

	1993 is 160-180 kWh/m² per year. Around 24.000 multi-apartment buildings need to be refurbished all over Lithuania. Majority of old multi-apartment buildings are obsolete, their state does not comply with residents' needs. Due to lack of maintenance, value of these buildings is decreasing. Major problems in old multi-apartment buildings: – poor Soviet construction standards and little maintenance – inefficient heating systems and engineering equipment – poor quality of windows, roofs, seals between panels. Heat insulation does not comply with current requirements – high energy consumption – huge energy losses through outside panels of building – people lack of information on energy saving measures. Main goals for renovation of multi-apartment building were: – to increase energy efficiency – to decrease expenses related to heating – to improve building conditions – to prolong building's life cycles – to improve living conditions
Type of actions	Implemented measures: – - insulation of external surfaces: walls (1792,81 m2) and roof (684,12m2) – replacement of windows and external doors – glazing of balconies – upgrade of heating and ventilation systems – modernization of lightening system (change of wires, automating system)
Duration	Refurbishment works – 5 months (March, 2015 – August, 2015)
Beneficiaries	Residents of building, owners of apartments, general public
Type of support	In general, financial tools for refurbishment of multi-apartment buildings are State budget, JESSICA fund, flat owners' contribution and other financial resources. Lithuania is one of the first countries in the EU, which uses European Commission policy initiative JESSICA for the refurbishment and improvement of energy efficiency in multi-apartment buildings. In

	partnership with the European Investment Bank (through the JESSICA and JESSICA II funds), a renovation loan scheme has been established, whereby loans are offered at preferential terms for the refurbishment and improvement of energy efficiency in multi-apartment buildings to homeowners in multi-apartment buildings that commit to energy saving measures. State support: 40% of costs of construction contract work. Since 2017 – 35%; 100% of technical design project preparation costs. Since 2017 – 50%; 100% of building maintenance and project administration costs. Since 2017 – 50%; 100% of all costs for low income households. **Financial support scheme for the refurbishement of multi-apartment buildings** 
Policy instrument	Multi-apartment Buildings Renovation (Modernization) Programme (national) Special Programme for Climate Change (national) Kaunas District Municipality Energy Efficiency in Multi-apartment Buildings Programme (local) Since 2013 investment projects of multi-apartment buildings' refurbishment are implemented based on the Energy efficiency programmes approved by municipalities. According to Kaunas District Municipality Energy Efficiency in Multi-apartment Buildings Programme: investment projects are prepared on the municipality's initiative;

	projects are implemented by the Programme administrator appointed by the municipality; long-term loan is taken by the Programme administrator. Fixed interest rate of 3%. Loan is repaid by each apartment's monthly building-management fees; Programme administrator organizes procurement, takes all the responsibilities on the implementation and financial management.
Total investment	522 336,95 Eur
Co-financing	Any co-financing by municipality
Other fundings	State support: 40% of costs of construction contract work (188 416,07 Eur) 100% of technical design project preparation costs (22 778,61 Eur) 100% of building maintenance and project administration costs (1 752,2Eur) Renovation costs covered by residents of the building – 309 390,07Eur. Long term subsidized renovation loan for 20 years. Borrower – Programme administrator appointed by the municipality.
Outcomes	Main benefits of multi-apartment building's refurbishment: – increased energy efficiency – reduced energy consumption up to 70% and lower heating costs – reduced CO2 emission – improved living environment and increased level of comfort Distribution of costs to consumers before and after renovation 

Explanation	Multi-apartment Buildings Renovation (Modernization) Programme in Lithuania is being implemented since 2005. Until 2012 only 479 multi-apartment buildings have been modernized all over the country. The programme became extremely successful when following corrective measures were introduced by the government in 2013: municipalities were involved by drawing a list of the worst performing buildings and mandating/requiring them to appoint renovation administrators, who could do off-balance borrowing on behalf and in favour of apartment owners in order to implement modernization project it is sufficient that 50% +1 of apartment owners vote in favour compensation of monthly loan instalments to low-income apartment owners gradual phase-out of heating bill compensation for low-income apartment owners who vote against modernization technical and financial support for all related parties for preparation and implementation of projects (paid from national funds) 1545 multi-apartment buildings have been modernized in Lithuania since 2013. There are almost 1 980 multi-apartment building under renovation right now. The main goal of Multi-Apartment Buildings Renovation (Modernization) Programme is to reduce energy consumption for heating in multi-apartment buildings built until 1993 not less than 20% (1 000 GWh per year) and CO2 emission not less than 230 000 t/per year compared to 2005. Kaunas district municipality has been participating in Multi-apartment Buildings Renovation (Modernization) Programme since 2013. As a result,39 multi-apartment buildings have been refurbished so far. Kaunas district municipality is considered as the leading municipality in Kaunas region and among TOP10 municipalities in Lithuania regarding implemented multi-apartment buildings' refurbishment projects. Since June, 2016 new approach to increase energy efficiency in buildings has been introduced – pilot project of quarters renovation also including heat production and distribution, street lightening and other engineering infrastructure.

2ND GOOD PRACTICE: Modernization of boiler stations at schools and adaptation to use of biofuel

Name of the good practice	**Modernization of boiler stations at schools and adaptation to use of biofuel**
Short presentation	Type of building – secondary school Location – Vytauto str. 4, Garliava, Kaunas district municipality Area – 5438 m2 Type of school's boiler station – 2 water heating boiler (each of 2000 kW) Year of last reconstruction of boiler station – 1995 Fuel used before modernization – natural gas, after modernization – biomass Natural gas consumption before upgrade – 50250 nm3/per year CO2 emission before upgrade– 98,29 t/per year, after upgrade – 6,83 t/per year
Context	Major problems: • annual energy consumption before modernization – 426350 kWh/ per year • high costs of heat generation (around 30 000 Eur/ per year) • boiler station provides heat only for school. Power of existing boilers is 10 times bigger than actual needs for school heating • Main goals for modernization of boiler station: • to increase energy efficiency • to decrease expenses related to heating • to reduce CO2 emission
Type of actions	Implemented measures: • Installation of 1 biomass-fired water heating boiler Technical parameters: Nominal capacity – 400kW Fuel – biomass Calorific value of fuel –>1000 kcal/kg Moisture content – max 65% Ash content – max 10% Density – 650…850 kg/m3

	The maximum working pressure – 3 bar Installed capacity – 9 kW Automated fuel delivery system
Duration	18 months (October, 2013 – April, 2015)
Beneficiaries	Municipality administration, school administration, school community
Type of support	In general, financial tools for modernization of boiler stations at schools and adaptation to use of biofuel are subsidies of Special Programme for Climate Change fund, municipal budget, other financial resources.
Policy instrument	Special Programme for Climate Change (national). Programme's funds are used in the following areas according to established percentages: • no less than 40% must be allocated to projects enhancing the efficiency of energy production and consumption (e.g. renovation of buildings); • no less than 40% must be to projects promoting the usage of renewable energy resources and the installation of environment-friendly technologies (e.g. installation of biomass boilers); • the remainder is allocated towards reforestation and afforestation, education and consultation on pressing climate change issues, provision of climate finance to developing countries, implementation of measures of the national strategy on climate change management, administration of Programme funds, financing of the management of the GHG registry and other measures aimed at the effective management of climate change policy.
Total investment	145 646,14 Eur
Co-financing	Co-financing by municipality – 21 392,03 Eur
Other funding's	Funding by Special Programme for Climate Change–124 254,11 Eur. Main sources of Programme's funds are sale of Assigned Amount Units (AAUs) and EU Emission Allowances (EUAs). Other sources include donations by natural and legal persons (e.g. carbon offsets) and economic penalties to operators. The funds of the Programme are used in accordance with the annual funding estimate, which is drafted by the Ministry of Environment.
Outcomes	Main benefits of boiler station's modernization: • increased energy efficiency • decrease of heating costs

	• reduced CO2 emission
Explanation	In 2015 boiler stations at 7 schools were modernized. Total investment – over 1 mln Eur. Modernization of boiler stations at educational institutions helps to significantly reduce costs of heating production and CO2 emission.

Section 6: Regional Policy Report – Malta

4PILLARS_1This Report has been produced with the financial assistance of the Interreg Europe Programme. The content of this Report is the sole responsibility of the University of Malta and can under no circumstances be regarded as reflecting the position of the Interreg Europe Programme Authorities

1. POLICIES PROMOTING ENERGY EFFICIENCY AND USE OF RENEWABLE ENERGY RESOURCES

Name of the policy instrument	**Promotion of Renewable Energy sources** (Photovoltaics): • Option 1: Feed-in tariffs (FIT) for 20 years (for those who opt not to benefit from capital grants) for photovoltaic installations(residential and non-residential sectors) less than 1MWp • Option 2: Feed-in tariffs for 6 years plus a grant on capital cost (residential sector only)
Body responsible for policy instrument	The Energy and Water Agency within the Office of the Prime Minister and Regulator for Energy and Water Services (REWS)
Range that it covers	Photovoltaics up to a maximum of 1600 kWh/kWp/year Extra energy generated is bought at the spill-off electricity cost (which is set once a year)
Action(s) that are promoted	Promotion of renewable energy sources (photovoltaics) through capital grants and feed-in tariffs
Target Sector(s) of Instrument	Residential and non-residential buildings, structure integrated and roof-top installations
Timeframe	Ongoing since 2006, although grant limits and FIT rates change according to PV market prices
Type of support	Financial
Foreseen funds	Funds foreseen for the period up to 2020 include: • Funds assigned to in the Operational Programme 2014-2020 • An estimated maximum of €140 million (over 20 year lifetime of systems) under the scheme notified to and approved by the Commission for systems larger than 1MWp • An estimated maximum of €6 million per annum (active as from 2015, over 20-year lifetime of systems) for feed-in tariff for systems smaller than 1MWp An estimated €33 million in feed-in tariff scheme for systems in the residential sector (granted for a period of 6 years from installation of system)
Funds used so far	Part 1: Capital grant schemes for residential buildings issued by MRA/REWS: Between 2010 and 2015, a total of € 39.1 million Euro were paid from ERDF. This figure is related only to PV systems installed in the residential sector that have benefitted from a grant administered by the Regulator for Energy and Water Services (previously the Malta Resources Authority) [10, 11] Part 2: ERDF 2007-2013 capital grant schemes for non-residential issued by Malta Enterprise – Between 2009 and 2013, a total of 11,405,188 Euro were given as grants to industry and commercial entities for investing in energy efficiency and renewable [18]

	Part 3: ERDF 2007-2013. By end of 2012, Capital grants issued by PPCD for various EU funded projects (under both OP 2007-2013 and 2014-2020) – PA4 Climate Change and Resource Efficiency 2,807,183 Euro [19] Part 4: Feed-in tariff expenditure for PV: 2010: 0, 2011: 0, 2012: €623,421, 2013: €5,000,000, 2014: €5,000,000, 2015: €7,000,000 [20]
Duration	Issuing of schemes/grants is on going in order to achieve Malta's renewable energy target in 2020.
Strengths	• P – Political: Easiest way for reaching RES 2020 targets is through electricity generation from PVs, because solar energy is predictable and Malta has the best solar resource in Europe. Also, the implementation of many small-scale PV systems is easy, fast and requires minimum permission procedures. Increased security of supply thanks to PV installation. Measure has been successful from an uptake point of view. • E – Economic: FIT rate changes according to the price of PVs on the market. • S – Social: Easy to estimate payback period so there is little investment risk for PVs. Energy generation (benefits) are seen immediately by the owner. Scheme is relatively simple to understand. On a more grande scale, a government led initiative for 2016 has seen the introduction of a communal solar PV farm scheme (1 MWp) that is planned to be built on top of large water reservoirs and specific land of low environmental value. This scheme has also given the opportunity for residential households with no access to rooftops to benefit from PVs. The scheme has been fully subscribed and households had the opportunity to invest up to the limit of 3 kWp. • T – Technological: Little maintenance, little technical preparation (no detailed energy audits or environmental impact assessment are required), PVs are relatively easy to install, energy generation is easy to forecast and is not subjective. • E – Environmental: Substantial reduction in CO2 emissions possible. Contributes towards achieving the RE target for 2020. • L – Legal: Installation regulations from a planning policy impact point of view are defined (DC15 [1]) and are being regulated. The Electricity Network Code governs electrical safety and other networking standards, whilst the Malta Competition and Consumer Affairs Authority (MCCAA) has issued best practice standards for PV installations.
Weaknesses (gaps)	• P – Political: Energy efficiency measures in addition to PVs should also be given priority and support. PV market still cannot grow independently as it needs support, which comes from schemes linked to annual national budgets and funds available under the EU Operational Programme. • E – Economic: Measures that incentivise energy demand reduction may be more economically beneficial if properly implemented. The overall investment in PV capacity is still expensive. By the end of 2015, Malta had approximately 75 MWp, up from negligible capacity in 2010, which has costed

	around 160 million Euro to install (average cost of 2,133 Euro/kWp installed), but they only produce 4% of the total primary energy consumption of Malta. • S – Social: Visual impact of PVs, rebound effect of households that may end up consuming more electrical energy given that they have installed PV systems. PVs do not bring about as much non-energy benefits (thermal comfort) as passive approaches such as insulation brings about. Various authorities are involved when applying for the installation of solar systems and FIT, which calls for the introduction of a one-stop shop. • T – Technological: Does not follow the energy hierarchy of reducing energy demand first and increasing energy efficiency prior to introducing renewable energy. Electrical load balancing may become an issue in certain areas due to high concentration of PV installations. • E – Environmental: energy demand reduction and energy efficiency not prioritised which is more beneficial for the environment. • L – Legal: Solar rights not protected, roof ownership (landlord/tenant) issue, PV planning installation requirements to minimize visual impact may have become too stringent (refer to DC15[1]),which might impact PV installation and generation potential.
Suggestions for improvements	• Any future government communal solar farm projects could be extended to households who cannot install PVs due to shading. • Solar rights should be better protected, but implementation in practice is complex given that this is a lands civil issue between private parties. • PVs alone won't enable one to reach near ZEROCO2 targets. A bundle of approach policy scenarios including energy efficiency measures should be adopted. One approach would be to mandate the cost savings from PVs to be used to increase energy efficiency for envelope and equipment of inefficient buildings that benefit from FIT. • Issue of load balancing should be better tackled. • A one-stop shop for policy application and technical advice service to the general public is highly recommended. • Bundled PV and solar thermal Schemes may make better sense for households.

Name of the policy instrument	**Grant Scheme for Domestic Solar Water Heating**
Body responsible for policy instrument	The Energy and Water Agency within the Office of the Prime Minister and Regulator for Energy and Water Services (REWS)
Range that it covers	Small-scale Domestic Solar water heaters

Action(s) that are promoted	Promotion of solar water heating through capital grants
Target Sector(s) of Instrument	Residential
Timeframe	Ongoing since 2006
Type of support	Financial
Foreseen funds	Approximately €0.25 million per annum
Funds used so far	Approximately €3.5 million (end 2015) from national funds
Duration	Ongoing
Strengths and Weaknesses	• P – Political: Investment in new solar heating systems has seen a constant decline over the past few years. No major intervention is planned to rescue this technology from dying. The current scheme has not changed in conditions or in monetary value, even though the price of solar heaters has slightly increased over the years. Conflicting use of roof space between PV (which has significantly dropped in price) and SWH has resulted in this decline. On the positive side, solar heaters occupy less space than PVs to produce the same amount of energy. • E – Economic: PVs are regarded by the public as being more financially attractive. The solar thermal generation effectiveness is linked to demand-supply matching characteristics (summer low demand for hot water), and also it is not easily measured, which makes people less convinced of the true savings. • S – Social: Payback period is more difficult to estimate than PVs so there is a higher risk in investment No alternatives provided for the public who do not own a roof-top. However, such a scheme would require investment in a distribution network infrastructure. • T – Technological: Reduces the demand for energy and is today the only RE technology that can store energy and reduce evening peak loads at the power station (given that over 90% of the population use electric boilers to heat water) [12]. Requires more technical preparation (more detailed sizing is required – not a one size fits all solutions), more maintenance required than PVs, energy savings benefits are more difficult to forecast, mature technology, however inferior products exist on the market. • E – Environmental: Substantial reduction in CO2 emissions if solar water heaters are properly sized and managed. • L – Legal: The impact of the new planning regulation as published in DC2015, whereby solar panels cannot be higher than 1 metre above roof level or otherwise have to be installed horizontal would jeopardise the prevailing and cheaper thermosiphon solar heating systems. Solar rights not protected. Roof sharing is not always possible. Landlord/tenant issues.
Suggestions for improvements	• Grants should not be limited only to solar water heaters for hot water but should also be provided for heat pump water heaters, especially for dwellings with no rooftop access. The grant value

	for solar heaters needs to be revised upwards given that costs works associated with solar heating installations are significantly high. • Increased training to installers to correctly size and install solar water heating systems is important. Increased awareness should also be given to users as how best to manage the use of solar water heating to ensure maximum savings. The initiative by the Energy and Water Agency to provide free energy efficiency support to households can be enhanced to promote this awareness. • Bundled incentives for PV and thermal systems, whereby households can benefit from specific grants when purchasing a bundled system rather than PVs only. • A cost benefit analysis should be performed to provide a grant that better incentivizes this technology. • A study to incentivise solar water heating and heat pump water heaters for commercial buildings such as hotels and restaurants should also be considered.

Name of the policy instrument	**Promoting financial instruments for energy efficiency**
Body responsible for policy instrument	The Energy and Water Agency within the Office of the Prime Minister and Regulator for Energy and Water Services (REWS)
Range that it covers	Roof insulation and double glazing
Action(s) that are promoted	Promotion of energy efficiency measures
Target Sector(s) of Instrument	Residential
Timeframe	Ongoing since 2006
Type of support	Financial
Foreseen funds	Approximately €50,000 per annum
Funds used so far	Approximately €350,000 (end 2015)
Duration	On going
Strengths and weaknesses	• P – Political: The current scheme has not changed in conditions or in monetary value showing little incentive to progressively update support measures. • E – Economic: the eligible costs are only for the double-glazed glass pane but not for the frame or the labour costs. Studies have shown that dwellings have typically 5-15% of the total external walls made of glass. This grant aims at retrofitting of glazing in existing residential buildings. Existing homes have flat concrete roofs without insulation. The average U-value is 2 W/m²K. The

	minimum energy efficiency Technical Guidance F for new buildings requires roofs to have a threshold U-value of 0.59 W/m²K. Government offers a capital grant for insulating existing roofs to bring them to the equivalent requirement of new buildings. However, the eligible part is only on the insulation material and not on the other necessary works such as labour, top roof concrete (screed) finishing and water proofing. The cost of insulation material is only 10-15% of the total cost for renovating rooftops. • S – Social: Public may not be aware of these incentives as publicity for RES and energy efficiency measures from companies who sell green products is mainly on PVs. Public is also given the wrong message that double glazing is one of the most important factors to improve energy efficiency of buildings in Malta, while a number of local studies have shown that other factors such as shading and insulation of single walls are more effective [13, 14]. • T – Technological: Various studies have shown that double glazing should not be high on the priority list for energy savings given Malta's mild climate [15]. Shading of glazed apertures is much more effective in promoting thermal comfort and improving energy efficiency and should be incentivised instead. For flatted dwellings, roof insulation will only provide energy savings benefit to the top most apartment. Insulation of single walls is very effective but no incentive is given. Most buildings have over 60% of external walls being single. • E – Environmental: Potential to reduce emissions by installing double glazed windows is low, mainly because Malta's climate is mild and there is no large temperature difference between indoors and outdoors for most of the year. • L – Legal: Not applicable.
Suggestions for improvements	• Policies should be revised and research studies consulted to promote the highest energy savings for buildings first, based on scientific evidence. • The building stock should be well studied and the most suitable and effective package of measures (not single measures) should be incentivised for the different building types. This is required to ensure deep energy retrofitting required to reach NZEB targets.

2. POLICY MEASURES TOWARDS NEAR ZERO CO2 BUILDINGS – DRIVERS, BARRIERS AND POLICY PRIORITIES TO RETROFIT PUBLIC BUILDINGS TOWARDS NZCO2EB

The current policies and strategies in place for public buildings to reach NZEB can be found in the 2015 Nearly Zero Energy Buildings Plan for Malta[2]. The main policy measure is a regulatory one (Technical Guide F [3][4]), which stipulates binding minimum energy requirements for the building's envelope and the building services. The main financial instruments have been highlighted above:

- New policies worth a mention include:
- The 2016 communal PV farm scheme (https://energywateragency.gov.mt/en/Pages/Communal-PV-Scheme.aspx),
- National incentives for SMEs to undergo energy audits will soon be introduced in line with the requirement of energy audit promotion and related information dissemination under Article 8 of the Energy Efficiency Directive.
- A soft measure was introduced which includes energy efficiency support to households (https://energywateragency.gov.mt/en/Pages/energy-efficiency-support.aspx).

The questionnaire results of the Second Stakeholder's Seminar, held in Malta on 24th November 2016 summarizes the drivers, barriers and policy priorities to retrofit buildings to NZCO2EB as put forward by the different stakeholders. These drivers are replicated below.

The aim of the questionnaire was to understand which factors stakeholders consider to be the most relevant barriers and drivers towards reaching NZCO2EB, and what should the policy priorities be to achieve this goal.

As can be shown from Table 1, the main drivers for retrofitting a public building to ZNEB include energy cost savings and financial incentives with the promotional aspect of advertising a building as environmentally friendly. Tax rebates were also mentioned as a driver.

Prioritising the different barriers was more challenging, as many barriers resulted in having the same impact rating (refer to table 2). It is clear however that the issues are:

1. lack of financial instruments,
2. lack of demonstration projects,
3. the requirement for realistic NZCO2EB targets for buildings to be retrofitted, which should be specific for the different building types,
4. the conflicting advice given by suppliers on energy efficiency and renewable energy
5. the fact that customers are not demanding that public buildings become NZCO2EB rank high on the barrier impact rating. All the barriers on the list should however be considered and tackled accordingly.

Table 1 : Drivers and the rating of their importance as provided by the various stakeholders

Drivers	IMPORTANCE RATING											
Energy cost savings												
Financial incentives (grants, soft loans etc.)												
Availability of best practice /clear guidelines/demonstration projects of how to best build/renovate to NZ												
Increase in value of building												
Promotion of public building as environmentally friendly												
Improved thermal and visual comfort												

On the other hand, a number of barriers have been identified as shown in Table 2. One stakeholder pointed out that maintenance of the various energy efficiency systems scares building owners. Other stakeholders stated that a change of attitude by improved education is to be provided, including an understanding of the negative impacts of carbon emissions on health and the environment.

Another stakeholder mentioned the difficulty to retrofit occupied buildings as the occupiers would have to find alternative premises while retrofitting works are being done. This results in additional costs, inconvenience and downtime resulting in a much higher expense than the actual retrofitting works. Bureaucracy is also seen as a barrier and the planning authority should give energy efficiency projects a priority.

The other barrier is the widespread expectation for short payback period, i.e. that one does something for monetary gain, forgetting other benefits that one may achieve. Proper education requires to change this state of mind.

Table 2: Barriers and the rating of their importance as provided by the various stakeholders

BARRIERS	IMPORTANCE RATING
1. Design Process + legislation barrier	
The **holistic (Integrated) Design Process** poses challenges (knowledge and time) which architects and engineers are not being trained for.	
Realistic and clearly defined NZCO2EB targets for retrofitted buildings which may be different from those of new building do not exist.	
Clear definition of deep renovation and a clear way forward for tackling NZEB in staged renovation is lacking.	
Complex building e.g. hotels/shopping are not being given specific NZEB performance requirements (which are different from those of office buildings)	
Energy declarations of a building do not provide valuable suggestions on energy efficiency.	
There is **no process of measurement and Verification** of energy performance (once EPCs are carried out) – thus monitoring and control systems/ occupancy behaviour are not being given the importance they deserve.	
2. Financial barriers	
High **initial cost of investments or the long payback** to build/retrofit a building to NZCO2EB.	
Low energy prices increasing the payback time of investments.	
Energy costs are **only a small proportion of the total operating costs** of large public buildings such as hotels/ shopping malls not giving an incentive to owners to invest.	
There is a lack of financial instruments available for major renovations of existing buildings.	
Competing purchase decisions to energy efficiency and renewable energy measures (such as offering a better service to customers) are being given priority.	
Price signals and fluctuating energy prices**: Owners are unaware of future electricity prices.**	
Investors are unable to **quantify the increase in value of the building** by investing in RES and Energy efficient technologies.	
3. Awareness, advice and skills barriers	
The limited technical skill in the decision making process at public institutions.	
Conflicting advice provided by different suppliers.	
Bad customer experiences making decision makers lose trust in local suppliers/ energy efficiency and RES measures due to bad quality of workmanship.	
There is a lack of skills and knowledge related to professionals and installers of energy efficient and RES technologies.	
Lack of demonstration projects and lack of transparent information resulting from these projects (initial costs, estimating real energy savings, O&M costs etc.) which increases investment uncertainties.	
4. Other barriers	
Customers are not demanding that public buildings are NZCO2EB.	
The **split incentive barrier**.	
Downtime to refurbish including unknown existing building conditions.	
Even if energy auditing and savings estimates are done correctly, **future demands, occupancy behaviour, and future climate are unknowns.**	

Given such barriers, the stakeholders are demanding the following policy measures to be given priority (refer to Table 3):

1. **Integrated Design (ID) approach training** to architects and engineers. A detailed explanation of the integrated design approach to reach NZCO2EB targets is given in the project ZEMeds [5], Entranze[6] and IEA Task 40[7].

2. **Focus and incentivise on measures targeted towards deep renovation so as to achieve NZCO2EB rather than on shallow renovation** by using the 3 stage approach:

   1) Reduce energy demand;
   2) Increase equipment energy efficiency and;
   3) Install renewable energy sources. Currently the measures for NZCO2EB are focused on renewable energy that does not do much to improve comfort and customer experience in the building.

3. **Provide long term strategy and clear targets up to 2030/2050** – not stop and go measures or measures that are closely linked to annual national budgets. Such long term targets are needed in Malta, so as to enable and empower the energy efficiency market to grow and become self-sustaining.

4. Ensure measures that **incentivise energy efficient occupant behaviour and energy management.** Currently, focus is being given on compliance for issuing energy performance certificates, which in themselves have no binding requirement to apply energy efficient measures or improve occupant behaviour.

5. Provide a **one-stop shop** for all financial incentive measures, while reducing bureaucracy, costs and time.

Encouraging **banks to calculate maximum loan limits for potential property buyers** based on the energy performance of the property was also given priority by a lot of stakeholders, however others do not feel this measure should be considered. Putting in place a system where property tax will depend on building energy performance was also regarded a priority by many stakeholders.

It can be also seen from Table 3 that training, the provision of tailored NZCOEB requirements/ specific market based financial instruments, ensuring that energy efficient opportunity is not missed during refurbishment, progressive update of requirements, more demonstration projects, ensuring compliance with regulations and more accessible information also ranked high on the importance rating.

There were various stakeholders who feel that mandating improvement of building stock through restrictions on sale and rent, and fixing the price of renting a property depending on energy performance should not be considered. There were also mixed opinions on providing possible packages solutions that can be easily replicated for the diverse building stock.

Some other interesting policies that were mentioned by the stakeholders included mandatory LEED or BREEAM certifications for buildings such as hotels and high rise, education campaigns starting from primary school and promotion of measures and education through popular media and social networks.

Table 3: Policies and the rating of their importance as provided by the various stakeholders

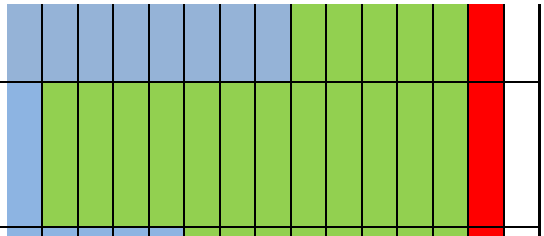
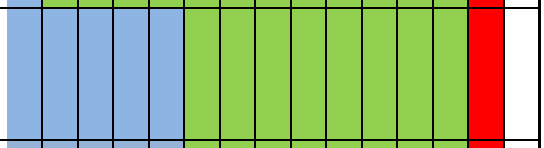
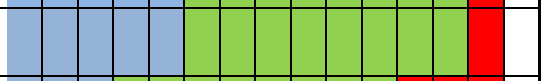
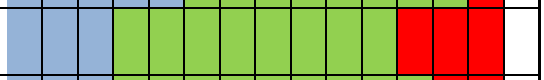
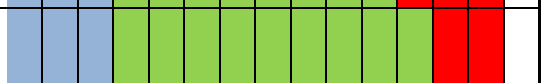
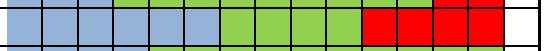
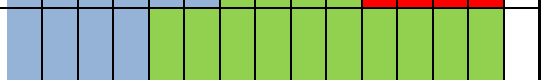
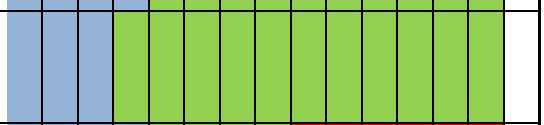
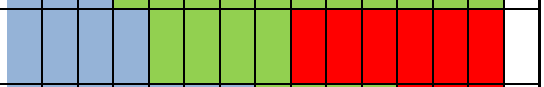
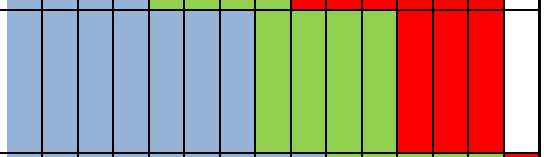
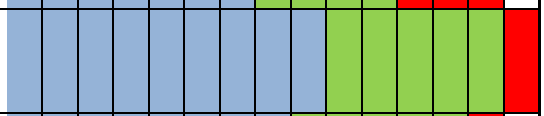
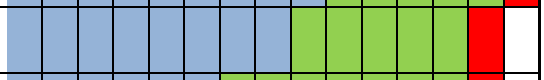
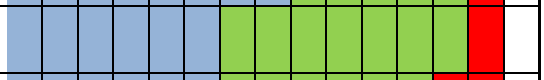
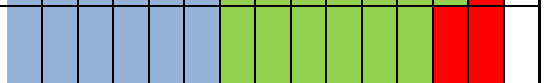
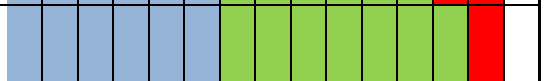
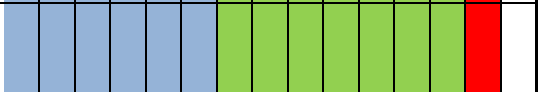
Key: Blue box: Policy to be given priority

Green box: Policy to be considered

Red box: Policy not to be considered

White box: No response

POLICY MEASURE	IMPORTANCE SCALE
Integrated Design (ID) approach training to architects and engineers.	
Tailored NZCO2EB performance requirements for different (new and existing) buildings depending on age, size, function and type.	
Ensure in depth knowledge of the building stock to be able to provide informed performance requirements and **possible packages solutions** that can be easily replicated.	
Provide progressive update of requirements and standards in response to experience and new technical solutions.	
Provide a better understanding of how one is to abide by regulations when a **staged retrofit approach is chosen**- to ensure that the energy efficiency opportunity is not missed when a building is retrofitted.	
Ensure compliance not only regulations.	
Focus/ incentivise on measures targeted towards NZEB/ deep renovation not shallow renovation by focusing on the 3 stage approach 1) Reduce energy demand, 2) Increase equipment energy efficiency and 3) Install renewable energy sources.	
Provide a **long term strategy** and clear targets up to 2030/2050 – not stop and go measures.	
Provide a **bundle of instruments approach** – train staff including technicians and provide courses for the ID approach including building service engineering courses with policies/incentives.	
POLICY MEASURE	**IMPORTANCE SCALE**
Provide measurement and verification systems in addition to EPC'S. Allow certification to be carried out by more advanced dynamic software's (e.g. EnergyPlus) – so as not to replicate work carried out by the design engineers.	

Ensure measures that **incentivise energy efficient occupant behaviour** and **energy management**.	
Mandate **renovation roadmaps** and implement them following energy audit studies. Using such a roadmap the most cost effective measures can be applied at first to finance the least cost effective measures.	
Promote awareness among financial advisors to tackle energy efficient measures + RES investment decisions from a **lifecycle approach (e.g. NPV)** not simple payback taking into considerations comfort and the environment.	
Target the financial support **towards specific market segments** not generic.	
Mandate improvement of building stock through **restrictions on sale and rent.**	
Factor in **monetary value of co-benefits (health, employment**) in funding decisions.	
Remove all **subsidies on fossil fuels.**	
Promote **innovative funding mechanisms** such as Third party (Energy Performance) contracting.	
Provide a similar approach to **green deal in the UK** where the key principle is that the repayment costs of the measures are covered by the savings on lower fuel bills.	
Make the **maximum rental price for a property** dependent on the energetic standard reached.	
Encourage banks to give loans based on the energy performance of a property. The higher the energy performance means the lower the operating costs and the more money available to pay bank loans.	
Provide a **one stop shop for all financial incentive measures**- and easy guidance on how such forms should be filled in – reduce bureaucracy and costs.	
Put in place a system where **property tax** will depend on building energy performance.	
Provide incentive approaches based on a **package of solutions** to facilitate NZCO2EB.	
Reduce transaction costs: Provide a government **one stop shop** for advising investors regarding possible technology and retrofit interventions based on scientific information.	
Market successful demonstration projects, with capital costs, O&M costs and equipment performance transparently available.	
Provide publicly accessible database demonstrating EP of renovated buildings and info of how to undertake deep renovation possibly on packaged solutions.	
Implement regulations **that distribute the costs in a fair way between landlord, tenant and the society.**	

3. GOOD PRACTICE EXAMPLES

1ST GOOD PRACTICE: Energy renovation of the Siggiewi primary school building

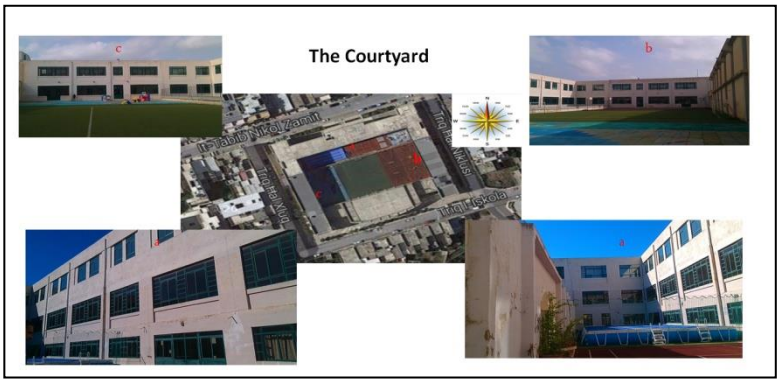


Figure 1:The Siggiewi primary school prior to the interventions

Figure 2: Unglazed pool solar thermal system and PV overhangs on the south courtyard facade (left image) and roof mounted Photovoltaics (right image)

Figure 3: BMS controlled movable external vertical louvers on the East and west facades

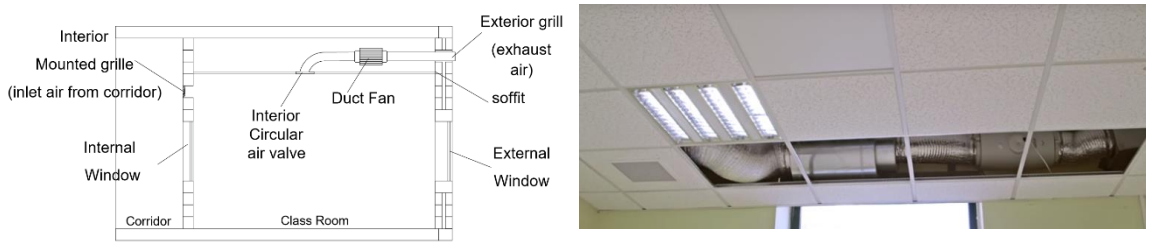


Figure 4:BMS and Demand controlled ventilation using CO_2 sensors installed in the classrooms

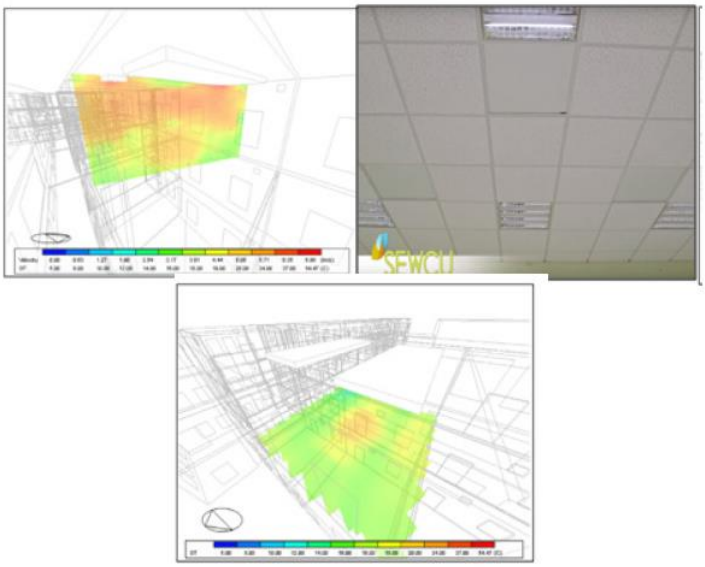


Figure 5 : BMS and black bulb sensor controlled Infra Red panel heaters installed in the classrooms (middle image) - CFD analysis of a North facing classroom when simulated with mechanical ventilation and infra-red panel heaters (2 kW) during winter design conditions showing comfort is met (left and right images)

Name of the good practice	**Energy renovation of the Siggiewi primary school building**
Short presentation	The Siggiewi primary school in Malta, a school building with a total floor area of approximately 4,500 square meters was deep energy retrofitted to attain positive-energy performance. The project leader for the project was the Energy and Water Unit within the Office of the Prime Minister (Energy and projects).
Context	The project was co-financed under ERDF 2007-2013 and is a pilot project so as to identify how best such school buildings should be renovated.
Type of actions	In this study, an intelligent, energy efficient, and cost-effective retrofitting approach was adopted to retrofit a primary school building in Malta to meet the Minimum Energy Performance Requirements which is circa zero kWh/m2/year. Comfort analysis using DesignBuilder-EnergyPlus building software simulation showed that for summer, the school can attain adaptive

	comfort if its glazing is externally shaded and night purging is introduced. In contrast, for the winter period, mechanical ventilation plus an active heat source is required to achieve thermal comfort. • External shading and demand controlled mechanical ventilation were therefore introduced in the school. The portable radiative heaters were replaced with a more energy efficient active heating source (Infra-red panel heaters). In addition, in order for the building to achieve the ZERO or better POSITIVE energy performance status : • Photovoltaic solar systems were installed both on the roof and on the facade also to protect the building from solar radiation. • Electrical storage water heaters were replaced with instant water heaters. • Inefficient lighting was replaced with energy efficient light sources (T5 and LEDs) and controls were introduced. • Internal Insulation was applied in only some sample classrooms as insulation was shown from the software to be less cost effective than other measures. • A fully automated pool cover was installed to reduce evaporative heat losses from the pool. In addition unglazed solar absorbers were designed to provide at least half the heating energy required by the pool. • A Building management system (BMS) was installed at the school to fully monitor and optimise the comfort and energy performance of the school. Further research will analyse the data from the BMS to compare the actual school performance with the DesignBuilder-EnergyPlus software simulated results and further optimise the retrofitting requirements for schools in Malta.
Duration	July 2014 to December 2015
Beneficiaries	All staff and students, and the policy makers who are in the process of identifying a best practice example of how to renovate a school for Energy Efficiency purposes
Type of support	Financial support (over 1 million Euro in investment) for the energy efficiency measures was provided from ERDF 2007-2013. Photovoltaics were financed from local funds and the resulting Feed-in tariff was provided to the school, so as to maintain and optimise the installed technologies.
Policy instrument	Promotion of Renewable Energy Sources (Photovoltaics)
Total investment	Over 1 million Euro
Co-financing	ERDF 2007-2013
Other funding's	Local funds
Outcomes	Positive energy school, improvement in visual, thermal comfort and indoor air quality, reduced CO2 emissions by 115 tonnes/annum, higher awareness among the students and the public in general of

	the benefits of combining energy efficiency with renewable energy sources.
Explanation	The school was well studied using state of the art building energy software simulation and optimization tools so as to ensure the best measures are chosen in terms of energy reduction, thermal and visual comfort. Once further studies from the Building management system are carried out, a best practice guide on how to best retrofit schools can be completed. This can be used for other schools, as most schools in Malta have similar characteristics.

Section 7: Regional Policy Report – Finland

4PILLARS_1This Report has been produced with the financial assistance of the Interreg Europe Programme. The content of this Report is the sole responsibility of the Thermopolis LTD. and can under no circumstances be regarded as reflecting the position of the Interreg Europe Programme Authorities

Introduction

This report is an overview of the political instruments promoting energy efficiency and the use of renewable energy resources available in the Region of South Ostrobothnia and in Finland at the time the report was written (January 2017). To gather information for the report a stake holder group meeting with open discussion was held.

The Regional Strategy of South Ostrobothnia is the target instrument in this report. The other policies are mentioned as they help understand the current political frame work in Finland in relation to energy efficiency, buildings and renewable energy.

1. REGIONAL POLICIES PROMOTING ENERGY EFFICIENCY AND USE OF RENEWABLE ENERGY RESOURCES

Name of the policy instrument	**The Regional Strategy of South Ostrobothnia**
Policy instrument related website(s)	http://www.epliitto.fi/frontpage
Body responsible for policy instrument	1. The preparation of the Regional Strategy is the task of the Regional Council of South Ostrobothnia. 2. The coordination of the region's strategic system of development is the task of the South Ostrobothnia region's cooperation team (MYR).
Range that it covers	The Regional Strategy covers a broad area of issues from business to environment and from wellbeing to development. It outlines the vision of the future that South Ostrobothnia is pursuing up to 2040 and contains the region's development targets, the key projects and actions, as well as a plan for financing them for 2014–2017.
Action(s) that are promoted	The actions promoted are divided under thematic objectives and targets. • Low carbon economy is a cross cutting theme in all priorities. • Thematic Objective 4 and Target 10 is the main section dealing with energy efficiency. Thematic Objective 1: Regenerative Local Industry and Commerce Target 1: Growth and Promoting Activities That Support Regeneration Target 2: Selections of Focus Areas for Commercial and Industrial Life Thematic Objective 2: Future Competence Requirements Target 3: Building a High-Quality "Turning Information into Action" Innovation Chain in the Selected Focus Areas Target 4: Developing an Activating Educational System Thematic Objective 3: Healthy People and Communities Target 5: Increasing Inclusion and the Ability to Function

	Target 6: Developing the Production of the Services Promoting Well-being Target 7: Improving the Magnetism and Living Environment of the Area Thematic Objective 4: Integrated Regional Structure and Environment Target 8: Strengthening Transport Connections and Development Corridors Target 9: The Future Logistics Centre as the Facilitator of the Region's Competitiveness Target 10: Protecting Natural Resources and Cementing Energy Know-how
Target Sector(s) of Instrument	The policy instrument is based on the Finnish law on the development of regions and the administering activities concerning structural funds. The Regional Strategy gives guidelines for the development direction of the region for actors in many sectors (municipality, industrial, business, healthcare, NGO etc.).
Timeframe	The Regional Strategy has two parts. 1. The Regional Development plan is a view of the future until 2040. 2. The Regional Programme 2014-2017 The Implementation Plan for the Regional Programme is related to the Regional Strategy. This Plan is created biannual and based on the Regional Strategy. The current Implementation Plan is for the years 2017-2018.
Type of support	The Regional Strategy is used as a guideline for evaluating projects that are applying for regional funding. The available funding is from different sources. These programmes have been important tools for the implementation of the Regional Programme. • the Rural Development Programme for Mainland Finland (partly funded by ESF and partly by national funds), • Sustainable growth and employment 2014-2020 structural fund (ESF and ERDF) In addition, the Centre for Economic Development, Transport and the Environment for South Ostrobothnia has funds from the ESF and the Rural Development Programme for Mainland Finland that are used to implement the Regional Strategy. Also, Local Leader groups have funds from the Rural Development Programme for Mainland Finland that are used to implement the Regional Strategy. The most important programme of the EU Territorial Cooperation Objective in South Ostrobothnia has been the Baltic Sea programme. The significance of the EU's independent programmes and European Territorial Cooperation programmes for the Region of South

<table>
<tr><td></td><td>Ostrobothnia will continue to grow over the coming programming periods.</td></tr>
<tr><td>Foreseen funds</td><td>The following table presents funds that are set apart for the South Ostrobothnia Region for the years 2014-2020. The unit in the table is million €.
<table>
<tr><th>Programme/fund</th><th>EU+ national government (million €)</th><th>Municipality or other public body (million €)</th><th>Total public funding (million €)</th></tr>
<tr><td>ERDF</td><td>24.4</td><td>3.5</td><td>27.9</td></tr>
<tr><td>ESF</td><td>12.7</td><td>1.8</td><td>14.5</td></tr>
<tr><td>Rural Development Programme– project and business support, via Centre for Economic Development, Transport and the Environment for South Ostrobothnia</td><td>56.8</td><td>1.4</td><td>58.2</td></tr>
<tr><td>Rural Development Programme – project and business support, via Leader-groups</td><td>23.8</td><td>5.9</td><td>29.7</td></tr>
<tr><td>Total</td><td>118.1</td><td>12.6</td><td>130.7</td></tr>
</table>
On top of these funds there are others such as the regional innovation and pilot initiation fund which amounts to around 0.350 million euros a year for South Ostrobothnia.</td></tr>
<tr><td>Funds used so far</td><td>Reserved project funding (updated 10.1.2017)
<table>
<tr><th>Programme/fund</th><th>EU+ national government (million €)</th><th>Municipality or other public body (million €)</th><th>Total public funding (million €)</th></tr>
<tr><td>ERDF *</td><td>7.02</td><td>1.73</td><td>8.75</td></tr>
<tr><td>ESF*</td><td>4.16</td><td>1.55</td><td>5.71</td></tr>
<tr><td>Rural Development Programme – project and business</td><td>18.76</td><td>1.2</td><td>19.96</td></tr>
</table></td></tr>
</table>

	support, via Centre for Economic Development, Transport and the Environment for South Ostrobothnia				
	Rural Development Programme – project and business support, via Leader-groups	7.36	1.5	8.86	
	Total	**37.3**	**5.98**	**43.28**	
Duration	1. The Regional Development plan is until 2040. 2. The Regional Programme 2014-2017. 3. The Implementation plan for the regional programme is biannual and based on the Regional Strategy. The current Implementation plan is for the years 2017-2018.				
Strengths	• Stakeholders were included in the preparation process. The Regional strategy was prepared by five theme-specific teams. These were the industrial and commercial team, the competence team, the well-being team, the land use, housing and transport team and the energy and climate team. Each team had members from relevant stakeholders. This increases the relevance of the chosen topics and the commitment of the stakeholders to the strategy. • The Regional Strategy covers a broad set of issues, and topics have been dealt with in a board and inclusive fashion, so that new innovations will be able to find their relation to the strategy. • Key targets are low carbon community, smart and energy efficient systems. Including these topics as important themes, helps each sector to start to realise their share in these issues. • The topics are broken down to a level that can be used when planning educational targets. • The strategy is very forward orientated and takes a stand on upcoming issues. • Forrest- and agriculture are taken into account. • Innovative companies are mentioned (e.g. Atria, Skaala) as assets to the Region. • Smart and energy efficient building and buildings are included and stated clearly in the Strategy. • Efficient Energy production in all scales is mentioned. • After the Strategy was completed it has been evaluated and will be updated again for the years 2018-2021. This time frame provides stability for decision making and flexibility to react to the changing political, economic and social environment.				

Weaknesses (gaps)	• Covering a wide range of topics on a general level creates the risk that set goals are abstract and/or hard to achieve. • In spite of the inclusive preparation process, the stakeholders (e.g. private business owners, municipality officials, the general public) not directly involved with the preparation process and/or with the implementation of development projects related to the strategy are not aware of the Regional Strategy and its targets. • The strategy has only a short reference to building refurbishment, even though the average age of buildings in South Ostrobothnia is around 42 years and the heating of buildings consumes around 41 % of the energy consumed in the region. Heating buildings is thus a significant energy consumer in the Region. Another consideration is that a significant amount of wealth is tied into buildings in Finland and not caring for the buildings decreases their value. Buildings located in the countryside are at risk of losing their value due to location. Also, many buildings have problems with air-quality that lead to health issues. • The development of energy transfer and storage methods could also be considered. For example municipality owned district heating networks could be opened up to heat feed-in from building specific production. • Energy security is not mentioned even though energy self-sufficiency is. • The funding mechanisms come with their own limitations. • The low regional GDP and economic issues in the region can hinder the implementation of the Strategy, especially as the funding mostly requires co-funding. • The increase of automation in buildings and systems can be difficult to use and malfunction. • The use of peat in South Ostrobothnia causes debate. On one hand peat is a local fuel that provides employment and many of the existing district heating and CHP plants have been designed so that they require a mix of peat and biomasses to achieve an optimal efficiency. On the other hand, the use of peat can be seen as an obstacle for increasing the use of regionally available biomasses. • The low price of grid electricity is also a hindrance to the uptake of renewable energy. • Are the set goals ambitious enough? • Increasing energy production on buildings is combined with the general statement of increasing energy production of all scales. The ZEROCO2 factor could be more underlined.

	• The Regional problem is not lack of information of energy efficient technologies and solutions but the implementation and coordination of regional and local objectives. • Indicators of change for the monitoring of the success of the targets are needed.
Suggestions for improvements	• The Implementation plan for the regional programme which is based on the strategy is meant to show the more practical approach that will be taken in the next 2 years to reach the set targets. • The Regional Strategy is a guide of the direction the Region will take in the coming years. Stakeholders that apply for funding related to the document are already required to state the relevance of their proposal to the Regional Strategy. However, it could serve as a benefit to carefully examine the intended target group of the Regional Strategy and investigate how familiar they are with it and to create ways of increasing the visibility of the strategy and its targets. For example choosing weekly topics and starting discussions in a social media outlet. This would provide information for the future development of the Strategy. • The Regional Strategy and/or the Implementation plan should have statements on the refurbishment of buildings. As refurbishment requires careful consideration training of experts as well as lay people should be a target. Air quality improvement could be stated as a target that can partly be reached via refurbishment. And the decrease of energy consumption via refurbishment could also be added as a target. There is also the issue of how to encourage owners to renovate their buildings especially while the value of older buildings in the countryside is decreasing. For the implementation plan it is important to have statements about the importance of considering the building as a whole during renovations. For example increasing insulation requires better air-tightness to prevent moisture build up and increased airtightness requires that the ventilation system is updated as well to prevent air quality issues. If a building is in very poor condition, the option of demolition should also be an option. • Distributed energy production is mentioned in the strategy. However, the energy system should be taken into consideration as a whole: energy production, energy transfer, storage and end-users. Distributed energy production will require rethinking the transfer and storage of energy, even in the district heating systems. • Energy self-sufficiency is mentioned as a target. However, energy security could also be included in the strategy. • The funding available for implementing the Regional Strategy comes with limitations. There is no easy solution for this problem.

	Having stakeholders committed to the Regional Strategy will increase the likelihood that private investments are made that work towards the set targets. • Economic issues can be a large hindrance to the implementation of the strategy. There is no easy solution for this problem. • As automated and smart buildings (and systems in general) are a target in the Strategy careful attention should be placed on usability of the systems. Also privacy, security and maintenance of the systems are an important issue that could be mentioned as a part of the smart housing goal. • Peat is mentioned in the Strategy as it is a Regional resource. The promotion of local biomasses would be a way to increase the use of renewables. Also, the positive impact the use of local biomasses has on employment should be emphasized. The goal would be to decrease the use of peat in a controlled fashion so that peat is not replaced with coal but with local biomass. • The low price of electricity is not mentioned in the Strategy as it is not something that the strategy can change. However, as it is the reality the mater could be stated and possible counteractions could be presented in the Regional Program and or the implementation plan. • The ambition level of set goals is always something that must be considered and evaluated again in the process of preparing the Regional Program for the next years. For example the cross cutting theme of a low carbon economy could be more specific. • Combining energy production with buildings could be included in the Strategy as suggested in points 3, 4 and 5. • The Strategy itself aims at working to overcome these issues of co-operation and coordination. Having more stakeholders aware of the Regional Strategy and committed to its targets could be a way to success. • Some indicators for following the success of energy related targetsdo exist, but more indicators could be considered and developed. Especially the cross cutting theme of a low carbon economy would need indicators that could be followed to see if the target has been reached.

Comments:

Encouraging building owners (public and private) to refurbish or build ZEROCO2 buildings, would help in achieving the cross cutting theme of a low carbon economy as well as increase the Region's energy self-sufficiency.

The government of Finland is preparing a change in the roles of regional operators and municipalities. The change will move tasks from the municipalities to regional operators. The change offers challenges and new possibilities for the Region.

Name of the policy instrument	**Land use planning**
Policy instrument related website(s)	http://www.ymparisto.fi/en-US/Living_environment_and_planning/Land_use_planning_system in Finnish http://www.epliitto.fi/maakuntakaavoitus
Body responsible for policy instrument	"Local master plans and local detailed plans are drafted and approved in municipalities. Regional land use plans are drafted and approved by regional councils. Municipalities may also cooperate in drafting a local master plan. Regional plans and legally effective master plans are approved by the Ministry of the Environment. The development of land use planning is the responsibility of the plan makers and the environmental administration (the Ministry of the Environment and the Centres for Economic Development, Transport and the Environment)." Quote from the Joint website of Finland's environmental administration. (http://www.ymparisto.fi/en-US/Living_environment_and_planning/Land_use_planning_system) Apart from the Regional Strategy and related regional development, the other major task of regional councils in Finland is regional land use planning. Here we will look into the possibilities in land use planning to improve energy efficiency.
Range that it covers	All levels of land use planning
Action(s) that are promoted	Land use planning is a political instrument that municipalities and Regional Councils use. Even though land use planning must follow strict regulations, there is the possibility to consider energy related issues.

Target Sector(s) of Instrument	Land use planning defines the future of land use. The areas to be preserved, the type of buildings that can be built and where and how the building can take place.
Timeframe	Land use planning is a process. After a land use plan (Regional, local master or local detailed) has been approved, it is valid until another land use plan of the same level for the same area is approved.
Type of support	This political instrument does not offer financial support; it is a binding legal instrument. The Regional Council and municipalities must budget for land use planning in their respective budgets.
Foreseen funds	-
Funds used so far	-
Duration	Continuous
Strengts	• When used correctly the hierarchy of land use planning provides a long time frame in which the details of land use for certain areas can be considered carefully. • As the land use planning goes down in hierarchy the more precise the details become. This means that regional land use plans are rather broad and allow for local details to be taken into consideration. • Land use planning is an open process to which citizens are able to comment. • Land use planning also directs the type of transportation that will be used. • Energy efficiency can be considered in the land use planning. This includes planning the location of larger energy production units, providing areas that have a building density and energy need that makes district heating viable, planning the location of smaller energy production units, planning energy transfer lines (district heating and electricity), considering the possibilities of public transportation, etc. • It is possible to direct the construction of buildings towards energy efficiency for example by considering the placement of buildings on lots. • In South Ostrobothnia, the Regional Council has been developing partial regional land use plans. The first and the third partial regional land use plans deal with energy related issues. The first one, which maps out locations for wind farms in the region, has been approved. If all the mapped out wind farms are constructed the Region will be self-sufficient in

	electricity production. The third partial land use plan is being developed. It will map out peat production, swaps that need to be conserved, bioenergy production plants, energy wood terminals and culturally valuable sceneries.
Weaknesses (gaps)	1. Energy land use planning in the region of South Ostrobothnia faces the challenge of a low population density. There is also the fact that many wish to live outside of city centres. 2. There is the risk that only the central area of the Region will be developed by land use planning, while smaller areas are forgotten. 3. It is possible to develop the local detailed plan and ignore the local master plan. However, when this is done an overall picture of the situation is lost. This leads to poor overall planning.
Suggestions for improvements	1. Low population density could also be seen as an asset for planning decentralized energy production. 2. Smaller areas should be developed alongside the central areas of the Region. This will increase the overall attractiveness of the region. 3. Following the hierarchy of the land use process is a good way to have an over view of the situation. This could be stated as a target in the Regional Strategy.

Comments:
Land use planning is a very powerful tool. The consequences of poor land use planning and the benefits of good land use planning carry far into the future. The potential to influence energy efficiency and energy production via land use planning should be used.

2. NATIONAL POLICIES PROMOTING ENERGY EFFICIENCY AND USE OF RENEWABLE ENERGY RESOURCES

Name of the policy instrument	Ara provides housing related subsidies, interest subsidy for loans and state guarantee for loans. The available subsidies are Investment subsidies for special-needs groups, Renovation subsidies(for the elderly and the disabled), Initiative subsidies for building rental apartments, Change of the building purpose subsidies and Demolishing subsidies.
Policy instrument related website(s)	http://www.ara.fi/en-US

Body responsible for policy instrument	Ara grants subsidies, grants and guarantees. ARA supervises the ARA housing stock (i.e. buildings that have received Ara funding). ARA monitors and directs non-profit housing corporations to ensure the sound management of finances and the allocation of government subsidies to residents.
Range that it covers	The subsidies are used to develop sustainable, high-quality and reasonably priced housing and to improve the housing conditions of people with low or average incomes and special-needs. Special-needs groups include homeless people, refugees, students, people with mental health or substance abuse problems, disabled people, people suffering from memory illness and old people in poor physical condition. Maximum subsidy amounts are scaled according to the recipients, with the subsidy percentage increasing according to the number of exceptional arrangements required to support the group's housing. The maximum percentages are 10, 25, 40 and 50 % of approved investment costs.
Action(s) that are promoted	The objective of ARA is to create a functional, agreeable, economical and sustainable community structure. Even though the goal is to produce affordable housing, the funded buildings must meet appropriate standards of habitability and be functional. Overall targets are to construct long-lasting, functional, aesthetically and technically durable, and energy-efficient(with a low heating-energy requirement and/or energy needs are satisfied with renewable forms of energy) buildings. Another goal is to set an example for the construction sector.
Target Sector(s) of Instrument	Subsidies are for people with special needs, local authorities or other public corporations (i.e. principally Finnish municipalities), corporations that fulfil certain preconditions laid down in regulations each time in force and designated by the competent authority, and limited liability companies of various types in which one or more of the three organizations mentioned above have direct dominant authority. Funds are used for renovating, acquiring or building social housing (i.e. rental housing at a low price). The loan guarantees are given for the construction of rental apartments that are not specifically meant for special needs groups. This type of support is open to a broader group of applicants. These are the general rules, but each subsidy and loan guarantee type has its specific regulations.
Timeframe	Continuous
Type of support	Subsidies and loan guarantees

Foreseen funds	For the year 2017 the budget for subsidies is 474 million euro and for providing loan guarantees 1460 million euro.
Funds used so far	In 2015, ARA used 197,4 million for subsidies and offered guarantees for loans up to a total worth 1281 million euros.
Duration	Continuous
Strengts	• The funding is used to provide much needed affordable rental apartments • Finland's first zero-energy block of flats was built with the support of Ara funding. • ZeroCo2 project targets of promoting energy efficient buildings that produce their own energy are targets for this financing mechanism.
Weaknesses (gaps)	1. Subsidies are tied to a rather narrow group. 2. There are several types of funding, with different types of conditions, which at first glance can be confusing
Suggestions for improvements	1. The purpose of Ara is to implement the national residential building policies in Finland. The target group are chosen through the national policies. This narrows the target group. 2. As Ara is a national policy instrument, the way to influence its operations is through national policy makers.

Comments:

The building stock in Finland is aging and there is a need for serious refurbishment. Also in Finland around 14 % of the heating need for buildings is covered by oil as stated in the Regional study: The use of Renewable Energy Sources in South Ostrobothnia and Finland. In South Ostrobothnia, the figure is 34 %. Ara funding has a share in tackling these problems. However, as the funding is limited to specific groups and activities, the overall situation is not improved. Public buildings, privately owned buildings that are not for special needs groups are left outside.

Name of the policy instrument	**Energy Aid**
Policy instrument related website(s)	http://tem.fi/en/energy-aid https://www.tekes.fi/en/funding/SME/energiatuki/
Body responsible for policy instrument	Tekes is responsible for the processing, decision-making and management of energy aid. Larger projects with investment costs exceeding 5 million euro and projects involving new technology are processed by the Energy Department of the Ministry of economic affairs and employment (MEAE).

Range that it covers	Energy aid is for investments and studies. "Energy aid is particularly intended for promoting the introduction and market launch of new energy technology. Based on the assessment by Tekes or MEAE of each project in question, the MEAE can grant energy aid to companies, municipalities and other organizations for climate and environment investments and studies that promote: 1. the production or use of renewable energy 2. energy saving or more efficient energy production or use 3. the reduction of environmental damage caused by energy production or consumption. The primary aim of the aid is to launch investments by increasing their profitability and minimizing the financial risks associated with the introduction of new technology." Quote from the website of the Energy Department of the Ministry of economic affairs and employment. (http://tem.fi/en/energy-aid)
Action(s) that are promoted	• renewable energy audits in the municipal sector • energy audits in the municipal sector, microenterprises and SMEs • other energy audits, analyses and studies • investments concerning renewable energy sources and energy efficiency, using new technology • investments concerning renewable energy sources and energy efficiency, using conventional technology • other investments in reducing the environmental damage caused by energy production
Target Sector(s) of Instrument	Companies, municipalities and other organizations
Timeframe	Continuous
Type of support	Depending on the type of activity and the type of applicant a maximum of 30 to 60 % of eligible costs can be covered. Energy aid is tied to the voluntary Energy Efficiency Agreements which are used as a tool to increase energy efficiency in Finland. Applicants for Energy aid that have joined in their sector's Energy Efficiency Agreement are able to apply for higher shares of co-funding.
Foreseen funds	For the year 2017 the government budget includes 35 000 000 euro for energy aid.
Funds used so far	The budget for the year 2016 was the same as for 2017.
Duration	Continuous
Strengts	• The energy aid has been found by the target groups Promotes.

	• Energy aid is tied to the Energy Efficiency Agreements and through this to the national goals of energy efficiency. • Energy aid can be used for investments in production of renewable energy and thus can be a tool that helps achieve ZEROCO2 project goals
Weaknesses (gaps)	• Some operators consider the low percentages of co-funding and the related paper work a poor combination and decade not to apply. • The support is targeted at big operators.
Suggestions for improvements	

Comments: Other financial aids related to energy and energy efficiency that are available in Finland, are the Investment Aid for Renewable Energy and New Energy Technology (especially targeted to the creation renewable transport fuels or testing of new energy technology to produce electricity, heat or CHP by renewable energy) and the Investment Support for LNG. These financial aids are from the budget of the National Government of Finland.

Name of the policy instrument	**The National Building Code of Finland**
Policy instrument related website(s)	http://www.ym.fi/en-us/Land_use_and_building/Steering_of_construction
Body responsible for policy instrument	"The Ministry of the Environment is responsible for the general steering and monitoring of construction in Finland. It issues legislation on construction and maintains the National Building Code of Finland. Each municipality is responsible for the steering and monitoring of construction in its area. A board or other organ appointed by the municipality (but not the municipal board) takes care of administrative functions related to the monitoring of building activities. Each municipality must have a building inspector, who provides advice on and monitors construction. " Quote from the website of the ministry of environment. (http://www.ym.fi/en-us/Land_use_and_building/Steering_of_construction)
Range that it covers	• The construction of all new buildings, • The energy efficiency of old buildings after a refurbishment that requires a permit.

	• Contains the instructions on the calculation of Energy certificates for buildings.
Action(s) that are promoted	• The construction of safe, healthy and high quality buildings, that suite the environment they are built. • Special attention is placed on energy efficiency. • After 2018 all new buildings will be near zero-energy. • The energy efficiency of old buildings after a refurbishment that requires a permit. The owners decided when and what they plan to renovate. The building code set the parameters as to how energy efficiency needs to be considered.
Target Sector(s) of Instrument	The construction sector, the construction monitoring sector, those building new houses or renovating old ones.
Timeframe	Continuous
Type of support	Inapplicable
Foreseen funds	Inapplicable
Funds used so far	Inapplicable
Duration	Continuous
Strengths	• The building code provides a bases for construction projects and provides the frame work for monitoring the quality of construction • The Building Energy Certificate calculation includes using politically chosen co-efficient that are used to promote cleaner energy sources. Depending on the source of energy the calculated energy consumption is multiplied be a co-efficient. These are the co-efficients: o Electricity 1,2 o District heating 0,5 o District cooling 0,28 o Fossil fuels 1,0 o Renewables used onsite 0,5 So the energy class of the building is heavily influenced by the type of energy used. • The Building energy Certificate also distinguishes energy produced onsite from bought energy.
Weaknesses (gaps)	1. The calculation of the Building Energy Certificate is based on theoretical values even for existing buildings. Thus the final value for energy consumption differs from the actual energy consumption. This has caused lots of criticism. 2. The Finnish Building Code has been updated several times in the past years and the final update for the near future will be

	effective in 2018. The goal has been that all new buildings will be near zero -energy buildings. The time frame has been criticized saying that building methods and quality cannot keep up with the change. Also the increase of insulation has been criticized as it is believed to create buildings that are susceptible to water condensing in the structures creating mold.
Suggestions for improvements	1. The theoretical value of the Building Energy Certificate is meant to be used as a driver towards cleaner energy. 2. Training of professionals and lay people on building quality and the proper use of a building is very important.

Comments:

The National Building Code of Finland has been updated in a rapid pace. Other countries could learn from the process, when planning to update their own building code.

3. QUESTIONS TO BE ADDRESSED IN THE ACTION PLAN

The policies mentioned in this report all have a role in increasing energy efficiency and the use of renewable energy. For example the National building code already takes steps to encourage the use of renewables in new buildings via the energy co-efficients and by distinguishing energy produced onsite from bought energy. And for building refurbishment there are energy efficiency requirements. Financial funds are available for specific need groups.

However, practice has shown that the policies have fallen short especially when it comes to encouraging the refurbishment of buildings and/or buildings (new or old) that are near ZeroCO2 in their energy usage. How should this short coming be fixed? How to get building owners, both private and public, to see the benefit of investing in energy efficiency and renewable energy production? What actions can the Region of South Ostrobothnia take?

4. GOOD PRACTICE EXAMPLES

1ST GOOD PRACTICE: Solar electricity for a village club house

Figure 1. Solar panels on the roof of a building owned by Kätkänjoki village club. Source: Pamaus-karavaanari blog (http://pamaus-karavaanari.blogspot.fi/p/aurinkosahko-5.html).

Name of the good practice	**Solar electricity on for Kätkänjoki Village Society buildings**
Website of good practice	http://pamaus-karavaanari.blogspot.fi/p/aurinkosahko-5.html
Short presentation	The Village Society of Kätkänjoki bought the old village school complex that is now used for village activities and can be rented for private events. The complex also includes a residential flat. The building was originally heated with an oil boiler, but it has been replaced by a wood pellet boiler. Two air-to-air heat pumps have been added. The latest addition was a photovoltaic system.
Context	After purchasing the building and changing the heating system, the village society considered different possibilities to improve their energy system. After comparing different options solar electricity production was chosen.
Type of actions	A PV system of 5.1 kWp was installed. The produced electricity is fed via an inverter into the electricity main and used mainly onsite. Excess electricity is sold to the grid.
Duration	The investment and installation was done in 2016.
Beneficiaries	The village society
Type of support	• an energy investment • co-funding granted by Leader group Kuudestaan ry.

Policy instrument	Funding from the
Total investment	10 000 €
Co-financing	75 %
Other funding's	-
Outcomes	In the first year of operation, the system produced around 19 kWh a day from May to mid-August. This replaced around 33 % of the used electricity during the mentioned time period. Excess electricity was fed into the grid.
Explanation	Solar energy (thermal and electricity) is often thought to be expensive and unproductive in Finland due to the dark winters and to the low price of electricity. Here a policy instrument is used to overcome these barriers.

2ND GOOD PRACTICE: Bioenergy steam plant, an example of Energy Aid

Name of the good practice	**A STEP Oy owned bioenergy steam plant to provide Hankkija's Seinäjoki feed plant with steam and thermal energy.**
Website of good practice	http://stepenergy.veolia.fi/ajankohtaista/kauran-kuorta-hyodyntava-hoyrykattilalaitos-otetaan-kayttoon-seinajoella
Short presentation	The biomass steam plant provides steam for the plant process of Hankkija's Seinäjoki feed plant. The steam boiler 2.5 MW will produce approximately 12 500 MWh of energy. The used fuel is oat husk a left over from the factories operations, grain dust and locally produced biofuels (mainly woodchip).
Context	The new plant replaces an old oil boiler.
Type of actions	A new biomass burning steam boiler.
Duration	Completed in 2015
Beneficiaries	
Type of support	Investment co-funding
Policy instrument	Energy Aid
Total investment	Unknown
Co-financing	435 450 €
Other funding's	Private

Outcomes	"The new steam boiler plant replaces the use of heavy fuel oil in energy production at the factory and should decrease Hankkija's carbon dioxide emissions from fossil fuels by 3,500 tons per year. It also brings significant reductions in the need for transporting fuel and oat husks." Quote from Step website. http://stepenergy.veolia.fi/ajankohtaista/kauran-kuorta-hyodyntava-hoyrykattilalaitos-otetaan-kayttoon-seinajoella
Explanation	Energy Aid is used to increase the use of renewable energy close to the consumption point.

3RD GOOD PRACTICE: Quality training for builders of small residential buildings in Oulu

Name of the good practice	**Quality training for builders of small residential buildings as a part of the building permits process.**
Website	In Finnish http://www.ouka.fi/oulu/rakennusvalvonta/laatukoulutus
Short presentation	The city of Oulu, which is located in the Oulu Region, has created a Quality training program that is offered to all who plan to build a small residential building with-in the city. The price of the training is included in the permit process prices.
Context	A building project even of a small residential house is very complex and requires help from different types of professionals. Often people who are building small residential buildings are not professionals in the construction business. However, they need to make important decisions that will affect the buildings energy consumption for years to come. They also are required to supervise or hire someone to supervise the actual construction. The quality training created by the city of Oulu aims at supporting small home builders in their task and at preventing the increase of problematic buildings. Also as the National Building Code has been developed towards zero energy buildings and the quality of building is becoming more and more important. For example a building's airtightness must be up to standard so the thick insulation is not damaged be water vapour. Airtightness leads to a need of mechanical air ventilation and increased insulation requires careful consideration of heating and cooling needs.
Type of actions	Quality training for builders of small residential buildings.
Duration	Continuous

Beneficiaries	Builders of small residential buildings, The city in encouraging the construction of safe and well-built residential buildings. Future homeowners who purchase well-built residential buildings. The environment is a beneficiary, as set energy efficiency targets for buildings are actually met.
Type of support	Knowledge transferring via training events
Policy instrument	Related to the Finnish National Building code and to land use planning.
Total investment	Not applicable.
Co-financing	Not applicable.
Other funding's	Not applicable.
Outcomes	By the offering training for usually inexperienced homebuilders, the result is energy efficient, healthy buildings.
Explanation	Often the building energy efficiency related policies do not take into account that many non-professionals will undertake the construction of their own home. Without proper training there are many points were they can go wrong. Even professionals need extra training in building zero energy buildings. The type of training provided in Oulu is a good practice that can be learnt from in South Ostrobothnia and in other regions.

4TH GOOD PRACTICE: Alanurmo School

Name of the good practice	**Alanurmo School**
Short presentation	Alanurmo elementary school (2620 m2, 13 440 m3) is owned by the city of Lapua. The school was developed and constructed as a pilot case for the FP7 Concerto Initiative via the project SOLUTION. Special attention was payed to the energy efficiency of the building and to energy production.
Context	The school was planned as an example of renewable energy production on an energy efficient building. The school was developed and constructed as a pilot case for the FP7 Concerto Initiative via the project SOLUTION.
Type of actions	The school is connected to small district heating network that is fuelled by woodchips. On the roof of the school there is an integrated solar collector array of 80 m2 with a peak production of 64 kW. The solar thermal system includes a 4 000 l water tank accumulator. Excess heat from the solar thermal system is fed into the district heating network. The school is also equipped with a heating /cooling system. This system consists of bore holes piping a circulation pump and radiators located in the air ventilation system. In the cooler seasons the system preheats the entering fresh air and in the warmer seasons the system cools the air.
Duration	The school opened for the fall semester in 2013.
Beneficiaries	The school serves as a learning experience for all involved in the planning and construction process, it also serves as an example for the whole community.
Type of support	Received funding from the FP7 Concerto Initiative as a pilot in the project SOLUTION (2009 - 2014).
Policy instrument	FP7 CONCERTO initiative
Total investment	4 500 000 €.
Co-financing	293 000 €
Other funding's	-
Outcomes	The pilot is an example of an energy efficient public building that uses and produces renewable energy. Especially the borehole based preheating and cooling system has proven to be energy efficient providing cooling 8 times more efficiently than a traditional cooling system.
Explanation	This is one of the first pilots in Finland were solar thermal energy is fed-into a district heating system. The district heating that provides heat for the school and the surrounding residential area is relatively small only 700 kW. Lesson learnt from this pilot, such as the importance of

	planning and up keeping a monitoring and controlling system for a hybrid system is important, are transferable to all territories.

Section 8: Regional Policy Report – France

4PILLARS_1This Report has been produced with the financial assistance of the Interreg Europe Programme. The content of this Report is the sole responsibility of the A.VI.TE.M – Agency for Sustainable Mediterranean Cities and Territories and can under no circumstances be regarded as reflecting the position of the Interreg Europe Programme Authorities

1. POLICIES PROMOTING ENERGY EFFICIENCY AND USE OF RENEWABLE ENERGY RESOURCES

a. European Regional Development Fund Operational Program

Name of the policy instrument	**Priority Objective 3: Energy transition and Sustainable valuation of resources** Thematic objective: Support the transition towards a low carbon economy in all sectors. Specific objective 4c – Increase energy efficiency of housing and public buildings(from 4.2 Mtep/year to 3.5 Mtep/year).
Body responsible for policy instrument	Provence Alpes Côte d'Azur Regional Council
Range that it covers	Support energy efficiency, the smart management of energy and the use of renewable energy in public buildings and social housing.
Action(s) that are promoted	• Upstream technical and human resources mobilization: studies, expertise (technical, organizational, sociological, legal and financial), actions increasing capacities of regional stakeholders, public authorities, private sector, to implement strategies that massify energy rehabilitation of the building stock. • Energy and environmental audits on buildings or planning areas in view of multi-year programming of works, engineering in terms of innovative technical and financial mechanisms set-up. • Support to sectoral or territorial initiatives contributing to environmental and energy rehabilitation dedicated to users, managers, and contracting authorities. • Heat and/or cold production based on renewable energy sources.
Target Sector(s) of Instrument	Thermal renovation of buildings in Mediterranean climate.
Timeframe	2014 - 2020
Type of support	Financial
Foreseen funds	ERDF: 30 million Euros / Region: 30 million Euros
Funds used so far	6 million Euros
Duration	7 years

Strengths	Only finances the additional costs beyond national standards to encourage exemplary projects. Calls for projects allow for selection and emergence of the most performing projects, in addition to results-oriented criteria. Projects coupled with the Housing Rehabilitation Energy Improvement Program (see table RHEA Program).
Weaknesses (gaps)	Calls for projects in 2015 and 2016 only funded social housing projects rather than public buildings projects: Application forms can appear as thorough and demanding, requiring a constraining set-up which do not match local authorities' own calendar. The objective to reduce the public buildings energy use (-17.000.000 kWh/year) might not be achieved on time. Carbon approach not included in the Calls for projects even though renewable energy and bio-sourced materials are encouraged.
Suggestions for improvements	Include carbon approach in Calls for projects. Encourage public buildings projects emergence.

b. Support to public buildings rehabilitation

Name of the policy instrument	**Housing Rehabilitation Energy Improvement Program III- RHEA**
Body responsible for policy instrument	Provence Alpes Côte d'Azur Regional Council
Range that it covers	Rehabilitation of social housing to reach the BBC - low energy building objective.
Action(s) that are promoted	• Support rehabilitation works responding to BBC standard: minimum 38% energy saving and C+ standard to receive Region co-financing. Minimum 50% energy saving and B standard to combine co-financing from Region and ERFD funds. • Contribute to costs reduction through tenants' support and performance follow-up of heating installations. • Promote approaches that assist tenants in using rehabilitated housing. • Delete oil and propane as heating energy sources.
Target Sector(s) of Instrument	Social landlords

Timeframe	2017 - 2021
Type of support	Financial
Foreseen funds	4 million Euros (+9 million Euros ERDF) in 2017 (unknown for the upcoming years). • Housing rehabilitation and energy performance improvement: 8 to 16% of eligible costs depending on energy performance and saving. • Purchase/Rehabilitation operations: 3 000 € to 9 000€ per housing depending on energy performance and saving.
Funds used so far	/
Duration	5 years (budget to be voted each year)
Strengths	• Tenants considered as active participant throughout the rehabilitation project duration to impact on behaviour change regarding energy use. • In itinere evaluation of the program to double-check energy use before and after rehabilitation works. • Massification objective with an increase in energy standards requirements towards B rather than C+. • Regular working groups to build capacity and learn from experiences and failures
Weaknesses (gaps)	• Partitioning of housing and energy policies and services. • Low-carbon approach is not included in the reflection even though renewable energy and biosourced materials are encouraged. • No complementary components linked to renewable energy production challenges. • Uncertain financial visibility as budget unknown for the upcoming years.
Suggestions for improvements	• Greater coordination of housing and energy policies. • Focus to be put on low-carbon summer comfort. • Include incentives to integrate passive building standards rehabilitation works.

Name of the policy instrument	**Technical support and advice to local authorities**
Body responsible for policy instrument	Energy Management Advisor ALEC – Local Climate Energy Agencies
Range that it covers	Support to municipal energy public policies implementation
Action(s) that are promoted	• Take stock of municipality's buildings energy use over the last 3 years and elaborate an action plan to reduce energy use for lesser investment (3/4 years) including a broad range of actions (street lighting, heat/AC, etc). A multi-year action plan can be then defined based on bigger investments (e.g., loft insulation). • Support Terms of reference drafting to better target municipality's demand.
Target Sector(s) of Instrument	Public buildings energy rehabilitation
Timeframe	/
Type of support	Technical
Foreseen funds	ADEME financial aid + municipalities' membership fees (50 cents/inhabitant/year)
Funds used so far	/
Duration	3 years
Strengths	• Projects create synergies between local officials and their constituents as it builds momentum for citizens' agenda while spreading public awareness on renewable energy use. • Rapid return on investment.
Weaknesses (gaps)	• Local authorities lack financial and human resources to respond to calls for proposals and the delay to submit projects is short (6 months). • Lack of staff to cover the whole territory and provide advice to a broad range of local authorities (in Marseille Metropolis, 5 out of 17 municipalities benefit from Energy Management Advisor).
Suggestions for improvements	• Need for a greater focus on renewable energy production, especially thermal solar. • Summer comfort issue is not sufficiently addressed by local authorities: thermal quality of buildings to be enhanced.

	• Reach out to other local authorities that do not have access to these advices yet. • Host staff in the regional platform for energy transition (see related table dedicated to this instrument).

c. Towards energy efficient new buildings

Name of the policy instrument	**Energy + and Carbon – Label – Towards positive energy and low-carbon buildings**
Body responsible for policy instrument	Energy, Planning and Housing Regional Office – DREAL Ministry of Environment, Energy, and Sea
Range that it covers	Implement a unique environmental standard for new buildings
Action(s) that are promoted	Promote and roll out the Label experimentation over the PACA territory that foreshadows the preparation of the future environment legal framework (to come into force in 2018 or 2020). This will be done through the spread of positive energy buildings and the rollout of low carbon footprint buildings throughout their lifecycle, from design (lifecycle analysis funding) to demolition phases.
Target Sector(s) of Instrument	Energy efficiency of new buildings
Timeframe	2016 - 2018
Type of support	Financial, technical and administrative
Foreseen funds	/
Funds used so far	/
Duration	2 years
Strengths	• Include an evaluation of the building energy performance related to GHG emissions to reduce equipment carbon footprint and buildings energy use. • The experimentation will generate experiences feedback to assess the label technical feasibility and economic sustainability in order to tailor the future legal framework requirements.

Weaknesses (gaps)	• Not to have projects representing a broad scope of energy cases, especially regarding PACA buildings functionalities and climate specificities. • Complex framework and not enough flexible with regards to regional specificities. • Only based on a voluntary approach.
Suggestions for improvements	• Encourage the emergence of regional projects presenting PACA regional climate and functional specificities (such as summer comfort). • Greater involvement of regional and local public authorities to facilitate its implementation.

d. Support to renewable energy production

Name of the policy instrument	**Heat Fund**
Body responsible for policy instrument	ADEME – Agency for Environment and Energy Management
Range that it covers	Development of heat production coming from biomass, geothermal, thermal solar, biogas, heat recovery systems, and heat network.

Action(s) that are promoted	• Co-finance set-up or replacement of heat production equipment to that use renewable energy through regional call for projects. Financial support allows for renewable heat to be competitive compared to heat produced by conventional energy.
	• Set up territorial contracts with local stakeholders groups, or heritage contract with a municipality targeting its overall municipal heritage.
	• Experiment with new fields (emerging technology, methodology) to better mobilize renewable energy in view of their wider application.
	• Help decision-making based on ADEME technical knowledge, professionals' network, and tools (guidebooks, terms of reference, toolbox, etc.).
	• Support successful projects design: studies, training, communication, evaluation and investment facilities.
	• Criteria:
	  o Efficiency (Installation performance)
	  o Profitability (5 to 15 years)
	  o Energy use (Cep)

Target Sector(s) of Instrument	Renewable energy production (municipal heritage and social housing)

Timeframe	2015 - 2020
Type of support	Financial
Foreseen funds	/
Funds used so far	/
Duration	6 years
Strengths	• Willing to include new actors (such as energy unions, municipalities that are "forest"-labelled). • Well-known by local authorities and articulated with the State-Region plan. • Anchor the territory in energy policy.
Weaknesses (gaps)	• Co-generation not included. • Low consideration given to cooling networks using renewable energy sources. • PACA region still lags behind other regions in terms of renewable energy sources production.
Suggestions for improvements	• Stronger focus to be put on cold/cooling networks. • Launch an information and advocacy campaign to encourage local authorities to submit projects for funding, liaising with regional and local public authorities.

Name of the policy instrument	**Flexgrid program**
Body responsible for policy instrument	Provence Alpes Côte d'Azur Regional Council through ARII– Regional Agency for Innovation and International Development of Enterprises Capénergies
Range that it covers	Rollout of smart grid technology solutions to address the energy transition challenges
Action(s) that are promoted	Gather the regional academician and industrial ecosystem and local authorities. Support SMEs and the Smart Grid sector ecosystem through measures targeting markets and clients, tailored training, and promotion and development at global level. Encourage photovoltaic self-production and self-consumption projects. Promote synergies between renewable energy sources.

	Facilitate territorial projects targeting energy optimization and storage capacities increase.
Target Sector(s) of Instrument	Renewable energy production
Timeframe	2016-2021
Type of support	Financial
Foreseen funds	Over 150 million Euros for public and private investment 50 million Euros in the framework of large investments 40 million Euros driven by national electric grids' managers(RTE et ERDF)
Funds used so far	/
Duration	6 years
Strengths	The Flexgrid program has just been launched, hence no information is available on its impact.
Weaknesses (gaps)	
Suggestions for improvements	

e. Structuring supply and demand

Name of the policy instrument	**Regional Platform for Energy Transition**
Body responsible for policy instrument	ADEME – Agency for Environment and Energy Management ALEC – Local Climate Energy Agencies
Range that it covers	Set-up of 13 Regional Platforms for Energy Transition that cover the whole PACA territory
Action(s) that are promoted	The objective is to provide advice and service to private stakeholders and households willing to engage in renewal works of their housing by: • Running and coordinating local stakeholders' existing networks. • Carry out an energy performance diagnosis of the building • Referencing energy rehabilitation professionals. • Providing an integrated service for energy rehabilitation.

	• Mobilizing financial tools and actors. • Mobilizing economic and private stakeholders.
Target Sector(s) of Instrument	Private buildings energy rehabilitation
Timeframe	2016 - 2018
Type of support	Financial and technical
Foreseen funds	5.850.000 Euros
Funds used so far	600.000 Euros
Duration	3 years
Strengths	Optimize public funding. Support stakeholders and households over the long-term, throughout the project duration, from the upstream to the downstream phases. Enhance synergies among actors. Rationalize existing advice supplies (to be located in the same place).
Weaknesses (gaps)	If these platforms only target private stakeholders, they nonetheless provide indirect benefits to local authorities by structuring supply. Local officials have expressed a strong interest in benefitting from the same services for public buildings renovation. In doing so, even though local authorities can rely on an Energy Management Advisor (co-financed by ADEME and the local authority), they often lack financial resources to finance such additional staff. In addition, this facility does not benefit all local authorities in the PACA territory. A lack of visibility and communication around these platforms does not facilitate the mobilization and awareness raising of households. Inertia of public authorities to spread wider public awareness.
Suggestions for improvements	Explore an articulation between platforms and Energy Management Advisors. A greater rationalization of financial and human resources would go through the dedication of a staff to local authorities' advice within each platform. As such, all local authorities could benefit from the same services to engage in public building energy rehabilitation. Enhance communication efforts around the platforms at local level targeting a wider public.

Name of the policy instrument	**Mediterranean Sustainable Buildings Approach**
Body responsible for policy instrument	EnvirobatBDM
Range that it covers	Energy efficient buildings tailored to Mediterranean climate.
Action(s) that are promoted	Propose a decision-making toolkit, available online, facilitating and testing the construction of the rehabilitation of a sustainable building from its design to its final evaluation. Sustainable buildings should respond to several criteria ranging from water reduction, solar inputs management, to rainwater drainage, and plants adapted to Mediterranean climate. Assessment of the projects conducted by a panel of experts who will reward them according to 4 standards.
Target Sector(s) of Instrument	Environmental-friendly and energy-efficient buildings
Timeframe	/
Type of support	Technical
Duration	/
Strengths	Promote the use of local bio sourced materials hence take into account a low-carbon approach. Adapted to the Mediterranean climate, especially summer comfort issues. Participative approach that gathers all concerned professions and stakeholders and based on experiences feedback. Adopt a field focus.
Weaknesses (gaps)	Not recognized as a standard or a label
Suggestions for improvements	Stabilization of allocated resources. BDM to be recognized as a standard allowing for developing fiscal and financial support from national authorities.

Name of the policy instrument	**MedGreenB program**
Body responsible for policy instrument	ARII – Regional Agency for Innovation and International Development of Enterprises
Range that it covers	Massification of energy rehabilitation works of Mediterranean buildings while rolling out global solutions of supply services
Action(s) that are promoted	Encourage the emergence of integrated rehabilitation supply solutions. Support decision making to engage in rehabilitation works through a practical, technical and learning guidebook. Raise industrial sector's awareness on building global supplies to improve buildings performance regarding energy efficiency, architecture, comfort and heritage assets. Analyse the relevance of a unique regional supply to co-finance this sector in order to generate sufficient volume. Promote the regional ecosystem and export the model on international targeted markets. Connect the project to ecosystems to ensure its territorial anchoring, crosscutting actions and promote resources' pooling. Raise regional public authorities' awareness to convey the need for rehabilitation vis-à-vis professionals and large public audience.
Target Sector(s) of Instrument	Private co-ownership energy rehabilitation market
Timeframe	2016 -2020
Type of support	Technical
Foreseen funds	/
Funds used so far	/
Duration	Pilot actions: 3 to 5 years
Strengths	Encourage the emergence of a new profession that plays the integrator role. Build the momentum and lay the foundations for pilot demonstrations. Ambition to create a label.

Weaknesses (gaps)	Close follow-up needed to ensure the quality and the management of these global solutions and consortium. No guarantee that the private sector adopts the concept of a general enterprise that supervises the whole operation. Strong need for stakeholders' training.
Suggestions for improvements	Need for public policies on co-ownership buildings including rehabilitation works constraints.

2. GOOD PRACTICE EXAMPLES

1ST GOOD PRACTICE: Thermal solar equipment installation for social housing

Name of the good practice	**Thermal solar equipment installation for social housing**
Short presentation	Construction of a new social housing building (49 housing) adopting an energy efficiency approach: buildings were constructed according bioclimatic architecture with North-South exposure, and large windows to increase solar inputs. Special attention was given to insulation and adapted equipment (sun-shading, VMC, double glazing, water saving flush, etc.)
Context	Reduce hot domestic water energy use
Type of actions	Installation of thermal solar equipment for hot domestic water
Duration	2012 - 2014
Beneficiaries	Tenants of social housing
Type of support	Financial and technical support: thermal solar equipment installation and a two-year follow-up and support mission.
Policy instrument	Heat Fund

Total investment	7.6 million euros including 59 000 Euros for thermal solar installation
Co-financing	40 300 Euros
Other funding's	/
Outcomes	• 69 square meter solar collectors installed to produce hot domestic water (55°C). If hot water is not completely used, it is redirected towards heat network, especially during mid-season, in order to optimize solar inputs. • Individual meters to inform inhabitant about real-time heat and water consumption. • Awareness-raising and sensitisation visits organized to exchange with tenants on their practices towards energy-saving behaviours. • 45 227 kWh solar produced per year. • 67.5% of annual needs covered. • 9.3 tons of CO2 avoided per year.
Explanation	Why do you think this is a good practice for your territories? Can this be transferred to other territories? This practice could inspire other territories as the technology options that were used allow for greatly reducing CO2 emissions. In addition, 67.5% of annual needs are covered by renewable energy sources, showing a high energy-efficiency degree.

2ND GOOD PRACTICE: Thermal rehabilitation of social housing buildings in Aix-en-Provence

Name of the good practice	**Thermal rehabilitation of social housing buildings in Aix-en-Provence**
Short presentation	Rehabilitation of 733 social housings in Aix-en-Provence built in 1975. Beyond the energy performance of the buildings, the rehabilitation approach also integrated a bioclimatic dimension regarding comfort (thermal, lighting, acoustic, etc.). To reduce energy use, energy installations of all housings were replaced. In addition, an information and communication campaign was launched to

	initiate a participatory process throughout the rehabilitation duration (regular meetings, newsletters, website, guidebook, etc.).
Context	Technical problems resulting in energy losses. Deteriorated living environment of inhabitants High level of discrepancy in terms of energy bills depending on the housing location.
Type of actions	Thermal insulation Thermal insulation of roof and tightness Insulation of crawl spaces Tightness of joinery Renewal and optimization of VMC Replacement of condensing boilers Replacement of radiators and installation of thermostat valves Bioclimatic upgrading of balconies Thermal comfort: replacement of shadowing Energy meters Optimization of common areas lighting
Duration	2016 - 2018
Beneficiaries	Tenants of social housing
Type of support	Financial
Policy instrument	Housing Rehabilitation Energy Improvement Program II - RHEA
Total investment	19 742 121 € (10 997 828 € energy rehabilitation works)
Co-financing	1 656 032€
Other funding's	ERDF: 3 298 653 € Aix Union of Municipalities: 6 323 614 € Department Authority:1 177 128 € ADEME- Agency for Environment and Energy Management: 46 715 € Own funding: 2 375 804 € Loans: 4 864 175 €
Outcomes	Improvement of buildings energy performance: From - CEP = 155 kW hep/sq. meter/year (D performance standard) - GHG = 32 kgCO2ep/ sq. meter/year (D performance standard) To - CEP = 45,5 kW hep/sq. meter/year (A performance standard) - GHG = 8 kgCO2ep/sq. meter/year (B performance standard) Energy savings: 70% Energy performance increase of heating, ventilation, lighting installations: 40% Reduced energy bills
Explanation	Why do you think this is a good practice for your territories? Can this be transferred to other territories?

	The innovative and participatory approach that was undertaken to prepare and conduct rehabilitation works could be replicated in other territories. The bioclimatic consideration is also of utmost importance to take into account climate conditions in order to optimize energy performance and savings. In addition, there will be a two-year follow-up and assessment of the buildings energy exploitation, which contributes to ensuring a quality monitoring of the project impacts on energy efficiency. In parallel, a new maintenance contract is to be launched that will integrate equipment quality and energy performance in order to ensure a close and thorough follow-up of the buildings energy exploitation. Furthermore, the social landlord does not require rental fees increase.

Section 9: Energy Regional Policies Overviews: strengths and weaknesses

From an overall reading of the Regional Policy Reports contents, it is possible to estimate that, the awareness of the need to achieve the energy quality objectives and the well-being induced in the living, work and study environment by implementing energy regional policies and with the adoption of direct interventions aimed at making the sustainable consumption of electricity for buildings, has been key issues for all partners of ZEROCO2 project.

Given the extreme variability of climatic conditions of the European Union Member Countries participating in the project, the proposals that emerged in all represented cases in the study have the common denominator of finding the best available technology for heating and cooling buildings, whatever their destination.

It appears, also, obvious that the best way to achieve the expected objectives of ZEROCO2 project can only take place through coordination and participation of partner's representatives in the educational process stated in the project and through the involvement of local stakeholders, with the recommendation to transfer across all sectors of society, public and private, the culture that a bigger energy independence means a better quality of life.

Hence, there is a need for the involved territories to help raise of awareness and to ensure the direct involvement of the private and public sectors and wider society organisations and enterprises.

Each partner's country is oriented to improve the growth and a long-term strategy to support the reduction of CO2 emissions from public and private buildings, basically derived from the programming tools and the adoption of innovative technologies, as evidenced by all the Regional Policy Reports.

From the examination of the illustrated above Regional Policy Reports in the details, it is possible to highlight the following insights to better understand the orientation of each ZEROCO2 partner and the common points and the differences among the involved EU Countries.

Slovenia: LOCAL ENERGY AGENCY SPODNJE PODRAVJE

The programming tools adopted are:

- Energy Act;
- National Energy Efficiency Action Plan 2014-2020;
- National Renewable Energy Action Plan 2010-2020;
- National Action Plan for the nearly zero-energy buildings for the period up to 2020;
- Long-term strategy for mobilizing investments in the energy renovation of buildings;
- Operational program for the implementation of the EU cohesion policy in the period 2014-2020;
- Operational program or measures to reduce GHG emissions by 2020.

From the adopted programming tools, Slovenia stands for the adoption of a National Action Plan (ENERGY ACT), that states the guidelines of the strategies to be promoted in the energy field, provides support schemes for both the production of energy from renewable sources in order to achieve the goal of providing a share of 25% renewable energy in final energy consumption, and to promote the reduction of energy use for heating or cooling by encouraging the insulation measures in buildings.

The potential for development, correlated with the incentives provided in the operational programs, also in relation to orographic characteristics of the region and the forest area, is directed mainly towards the exploitation of biomass, both for the installation of a combustion plant for heating the buildings and for district heating.

In the long-term subsidies for energy efficiency works in both public buildings and private are provided, in particular as previously mentioned, will be invested in heating and cooling for approximately 1,801,770,000 Euros, while the production of energy from the source solar is further fed for about 469.58 million euro.

The geothermal source for heating is promoted in a minimum part and the prevailing orientation is aimed to the use of source for thermal purposes, widespread in the country.

The good practices examinated, in particular the interventions for the improvement of "Anica Černejeva Makolee school" and the school "Kindergarten Ptuj" mainly have been conducted through the rebuilding the roof with insulation systems, with the realization the outer coat and with the improvement of the heating system. All actions that can be easily adopted and evaluate in other regions of European Union Member States.

Greece: MEDITERRANEAN AGRONOMIC INSTITUTE OF CHANIA

The programming tools adopted are:

- Use of sustainable energies in public and municipal buildings;
- Installation of solar-PVS in buildings and enterprises offsetting their annual consumption (net-metering);
- increase of energy efficiency and use of renewable energies in residential buildings;
- promotion of sustainable energies in private enterprises;
- installation of solar-PVS on building roofs;
- law 3855/2010 regarding creation of energy service companies;
- Greek law 4122/2013 for public and private buildings with near zero energy consumption (NZEROCO2 energy buildings);
- creation of a zero co2 emissions residential building.

An analysis of the regulatory and financial environment of the Region of Crete shows that the energy efficiency of buildings both public and private is among the priorities of the Greek national policies. The reason is verifiable from the responsibility attributed to energy consumption by buildings, quantified in 36% of consumption of the national total.

One of the main reason for which the Greek buildings are characterized by a high-energy consumption is in their apparent absence of external cladding, due to the building construction system in recent years. Therefore, the main efficiency system consists in the possibility to intervene with an isolation of the outer surfaces.

In addition to the implementation of the finish coat, the Greek national strategy identified, also in relation to the potential of the renewable source such as the sun, due to its favourable latitude of the Nation, is the photovoltaic, both

for the production of electrical energy and for the production of sanitary hot water. However, even if the National policy instruments foreseen to install photovoltaic panels on the buildings, the attractiveness of this system is very low because the profits are very low and the enterprises and the organization of the private sector do not considerably invest in this kind of tools.

Italy: MOLISE REGION

The programming tools adopted are:

- Regional Operational Programme ERDF - ESF of Molise 2014-2020;
- REEP (Regional Environmental Energy Plan);
- Information Technology system for the management of the energy certification process of buildings;

The Molise regional policy on energy efficiency has grown, in the financial sector, along the lines of the 2007 – 2013 Regional Operational Program in the energy sector, and in the forthcoming implementation, which covers the period 2014 - 2020, all hinged on: competitiveness, sustainability and social inclusion, to support the transition towards a low-carbon economy, with actions aimed at reducing energy consumption in the civil public and private sectors, residential and non-residential, with particular attention the emblematic role of the PA; between the activities funded or to be funded, have been pointed out: installation of smart remote control systems, control and energy management systems for the individual accounting thermal and electrical energy, introduction of innovative systems for reducing the transmission of heat through the casing (insulation systems), innovative systems of production, distribution and utilization of the thermal energy.

Increasingly, in terms of transposition of European Directives on renewable energy and energy efficiency at regional level, should be stressed the next establishment of a register of energy performance certificates (EPCs) to provide information on the efficiency of the current energy systems of buildings and thus be able to correctly assess the relative value.

In order to determine the end of the paper version, Molise Region is going to establish a Computer Electronic System that will, with whom will be possible to use all the information contained in EPCs to learn about the energy situation of local buildings and assets policies for their improvement; moreover, the system will support the checks and the claim of the penalties for bogus certificates.

With the Regional Environmental Energy Plan of Molise (REEP), after an analysis of the regional context, the possible actions aimed at the development

and growth of the regional energy sector, have been identified, in the production sector, in a pattern of energy characterized by the increase of RES such as small hydro and micro-cogeneration system, programmed sources and capacity market and electrical and thermal renewable as the residential biomass. As for transport and efficiency, a Roadmap 2030 was planned in a program based on structural investment (nets and accumulations) and pursuing energy efficiency, especially for public property.

The aims pursued by the adoption of REEP and its implementation tools, are well integrated with the choices made programmatically for the period 2014-2020. The supporting energy efficiency and use of renewable energy and efficient use of resources is present in the Axis 4 of the Molise Region ERDF ROP 2014 – 2020 with 19% of the total financial allocation, about 20 million euro, to be implemented both through specific interventions of energy efficiency associated with the production of energy from renewable sources in the public and in production systems structures. Moreover, the realization of intelligent networks for the distribution and measurement, control and energy monitoring, generation and cogeneration, mobility sustainable in the urban areas are planned in order to eliminate the existing barriers for a consistent development of energy efficiency issues and renewable energy sources.

In this context, the Molise intends to implement actions that allow the achievement of results, in terms of energy efficiency and sustainable development of renewable energy, which exceeds the European objectives, always in line with the principles of the National Energy Strategy (NES) and the SO-CALLED Burden Sharing (Ministerial Decree Economic Development March 15, 2012 - Definition of regional targets for renewable sources).

In this regard, it should be noted that the Burden Sharing set to the Molise Region the goal of achieving 35% use of renewable sources for the production of energy with respect to the gross final consumption. The Region as a result of a significant reduction in fuel consumption, with a percentage of 34.7% has already reached the target of 35%. Moreover, all electrical final consumption in Molise are met with renewable sources (100%), Molise export electricity (126 ktep, equal to 102% of the internal consumption), among the renewable primary resources, bioenergy cover a share of 54.3% (119 ktoe of 219 ktoe total and the efficiency of processing of Molise is greater than the Italian efficiency (79.4% versus 78.1%).

Lithuania: KAUNUS DISTRICT MUNICIPALITY

The programming tools for the development and achievement of quality goals of life and energy savings in buildings adopted by the Kaunus District Municipality are mainly related to the KAUNAS DISTRICT MUNICIPALITY STRATEGIC DEVELOPMENT PLAN 2013-2020.

This instrument identifies relevant measures such as the renovation and construction of public buildings; the restructuring of condominiums; the modernization of boilers and suitability for use of renewable energy resources, development of district heating systems; promotion and development of modern methods for the production of energy from alternative and renewable energy sources, the use of biological detergents, public awareness; preparation of development plans for the use of renewable energies; Reduction of consumption, conservation of energy resources and use of local resources (peat, etc.) for heating.

However, as is clear from the report, these funds are not directly related to the realization of buildings NEAR ZEROCO2, but only to the modernization of public buildings, given that the existing apartment buildings and the ones used by most of the population are derived from Soviet construction standards, strongly characterized by design solutions with little attention to the aspects related to energy consumption for their livelihood.

Ultimately, the tool does not apply directly to the promotion of renewable sources but to maintain existing public buildings, not providing interventions in the private sector.

The Kaunus District has huge potential for development in the energy saving sector in relation to energy efficiency measures in buildings, since, in all of Lithuania territory, there are 24,000 apartment buildings in need of improvement works, and only in the town of Kaunas there are 688 buildings, most built before 1993, with outdated construction standards and not adapted to national legislation in the energy field.

The main actions tending increase energy independence of the buildings and, as a consequence, to the reduction of CO2 emission, are connected with the heating interventions; in fact, as proposed in the case study, the Municipality has been adopted insulation measures of the outer surfaces, replacement of fixtures with the introduction of thermal break fixtures and installation of boilers with a high yield.

The natural characteristics of the region are such that it is a favourite of biomass exploitation, both for the production of energy to be allocated to heating and for direct use within boilers.

Lithuania is one of the first EU countries that used the political initiative of the European Commission "JESSICA" for restructuring and improving energy efficiency in apartment blocks. In cooperation with the European Investment Bank (through JESSICA and JESSICA II funds), it has established a loan renewal program, under which the loans are offered preferential terms for restructuring and improving energy efficiency in condominiums, home owners in multi-apartment buildings that undertake to adopt energy saving measures.

Ultimately, the program for the renovation of buildings in Lithuania has been strongly implemented since 2005 and led to the improvement of 1545 buildings until to 2013 and nowadays the buildings under renovation are about 1980.

Malta: UNIVERSITY OF MALTA

The support schemes incentivising energy efficiency and renewable energy adopted in Malta are:

- promotion of renewable energy sources (photovoltaics);
- grant scheme for domestic solar water heating;
- financial instruments for promoting energy efficiency;

In the area of project's interest, the policy initiatives undertaken are related with the incentives for photovoltaic systems to be integrated on the roofs of both residential and non-residential buildings, which the funds can be found among the priorities of the 2014-2020 European Union-inspired operational program.

Another policy which one may consider to be further incentivised is related to the solar energy for the production of hot water, given that the uptake of solar water heaters has had a steady decline in recent years. The main reasons for this decline are related to the conflicting use of roof space with PV, which price have reduced and are seen as having a higher investment potential.

In this sector, it has been earmarked investments of 0.25 million euro/year for residential buildings.

Among other initiatives worthy of consideration and public investment, the insulation of roofs and the double glazing must be considered relevant. As stated in the University of Malta report, the potential to reduce CO2 emissions from double glazing is small and shading of glazed apertures is more effective.

Although the support measures in this sector will be stimulated in a long-term perspective, the incentive is currently estimated at € 50,000 per year, so far only € 350,000 have been spent in the implementation of these actions.

Currently, in close relation with the objective NZEROCO2 in buildings, the Zero Energy 2015 Plan for Malta is in force. The Technical Guide F stipulates binding minimum energy requirements for the building's envelope and the building services.

The mild climate, tending to warm in this region, could boost the reduction of CO2 emissions. This can be achieved by using passive strategies such as natural ventilation when outside conditions permit in combination with shading to as to reduce energy consumption from active cooling sources.

The represented case study from the University of Malta, also useful as a pilot project for the design of school buildings, has been financed with ERDF funds 2007-2013. The projects has shown that by using appropriate passive measures of shading and natural ventilation, which appropriateness was verified by using state of the art software software simulation tools, one can obtain thermal comfort in summer without the requirement of active cooling sources. In winter, thermal simulation of the school has shown that active heating sources coupled with mechanical ventilation is needed at certain times in the winter to assure comfort. Despite this fact, the consumption of heating and ventilation was minimized by the use of CO2 sensors, movement of warmer air from corridors to classrooms and via the use of highly energy efficient infra-red panel heaters.

Finland: THERMOPOLIS Ltd – FINLANDIA

The programming tools adopted are:

- ARA - the housing finance and development center of Finland;
- Energy aid;
- the national building code of Finland;
- the regional strategy of South Ostrobothnia;
- land use planning;

The report on policy tools that promote energy efficiency in buildings and the use of renewable energy resources in the South Ostrobothnia region in Finland is based on European programs such as the ESF funds 2014-2020 and on funds coming from international cooperation such MAR Baltic Programme.

The presented good practices, have involved the installation of a photovoltaic plant for the production of electrical energy and the installation of a pellet boiler in a building of the "Village Club in Kätkänjoki".

The use of biomass for the production of energy and heat is widespread in Finland, given the enormous availability of woods and of organic origin waste coming from industries for the production of paper; it also shows how the National programming is oriented to the replacement of plants fueled with oil plants with plants fueled by biomass system.

The other example of case study the elementary school in the city of Lapua pointed out that in the Region of South Ostrobothnia the main source for the production of heat is of plant origin, as the heating system of the school is connected to a heating network fueled by wood chips.

France: A.VI.TE.M. – AGENCY FOR SUSTAINABLE MEDITERRANEAN CITIES AND TERRITORIES

The programming tools adopted are:

- European regional development fund operation program;
- support to public building rehabilitation;
- towards energy efficient new buildings;
- support to renewable energy production;
- structuring supply and demand;

The French partner underlined how at the National level, with the adoption of the new EPP (Energy Multiannual Program), it has been set targets to 2023 for the development of various renewable sources, which in addition to the definition of distinct potential for each renewable source, also provides a consistent reduction of energy consumption in heating, sustainable mobility, in intelligent networks, in the renovation of buildings and in the 'feed-in of biomethane.

Among the involved EU Member States in the project ZEROCO2, France is one of the most sensitive and most active country for achieving the NEAR ZEROCO2 of buildings, given the wide range of provisions of policy tools, both for new buildings and for the adaptation of existing ones.

The main programming tool is the ROP ERDF 2014-2020 and among the specific objectives of this tool there is the need to increase the energy efficiency of buildings with the aim to reduce from 4.2 Mtoe to 3.5 Mtoe, and a budget of 30 million euro to reach the set limit.

Among the actions of development, a specific attention deserves the tools finalized exclusively to the adoption of measures focused on the production of heat; specifically, with the "Heat Fund" is promoted the production of heat resulting from biomass, solar thermal, biogas, heat recovery systems, and the heat distribution network.

No less important appear the programming tools such as the Regional Platform for Energy Transition and Sustainable Approach of the Mediterranean; with the first, the goal is to provide advice and assistance to private individuals and families who want to invest in renewal works of their homes, while the second also proposes the use of biomaterials to locally find, so with low carbon impact.

The Mediterranean mild climate of the Region of PACA supports the adoption of an integrated design of bioclimatic type, already useful to reduce energy consumption, providing the North-South exposure adoption, the use of large windows to increase solar inputs and the preparation of a controlled mechanical ventilation also useful in case of cooling, coupled also to the installation of solar thermal systems strongly encouraged with the above-mentioned programs. This allows to achieve significant reductions in CO2 emissions and improving the quality of living and working environments.

Conclusions

From the overview of the Regional Policy Reports elaborated by the ZEROCO2 partners, it can be underlined that the idea behind the reduction of energy coming from fossil sources often has, as its starting point, the increased production of energy from renewable sources. Actually, we should focus also on the concept of reducing energy consumption, by working on technical and system characteristics of the buildings which account for about 2/3 of the gross final consumption of energy.

The examined best practices and the proposed technical solutions, show that the programmatic choices and the proposed technical variables depend on the climatic characteristics, on the economic availability of the involved Regions and on the needs of beneficiaries.

In European regions where the solar radiation is stronger and more insistent and where the seasonal temperatures are higher (Italy, France, Greece, Malta), one can minimizes the requirement for active heating and cooling by optimizing passive design that use natural energy flows, insulation, shading + optimal glazing to wall ratios that provide day lighting and passive heating while minimizing direct sun radiation during the cooling system. Therefore, in these mild climates, when the buildings make proper use of passive design, the use of active space heating and cooling systems can be reduced or not required during periods when outdoor conditions are favorable.

The European regions where the climate is harsher and where exposure to light and solar heat is reduced (Slovenia, Finland, Lithuania), prefer to use technological installations such high efficiency boilers fueled by biomass, always combined with insulation systems of external surfaces in order to guarantee the energy efficiency system.

It can also be stated the use of envelope insulation (which insulation requires having different U-value specifications depending on the climate in question), and the use of energy efficient technical systems to produce hot water (such as new generation boilers) are two important systems to promote energy efficiency irrespective of the climate conditions.

The building heritage of the ZEROCO2 partners consists of buildings dating back to the 80s in the 70% of cases, therefore it is inappropriate respecting to the energy standards of environmental quality that the European Union states by law. Only targeted national and regional policies and appropriate financial tools can reduce the gap between what is available and what is required by law.

The improved national and regional energy policies, the promotion of research programs aimed at identifying the best projects to implement considering the availability of local resources, the greening of the building sector should be the dominant factors to follow to reach the objectives NZEROCO2.

The project ZEROCO2, considering the active contributes of its partnership and the relevant information acquired, seems oriented to the right direction to illustrate the state of art of the energy efficiency in the building sector and to promote relevant initiatives in this matters.

References

SLOVENIA

1. http://www.energetika-portal.si/dokumenti/strateski-razvojni-dokumenti/energetski-koncept-slovenije/
2. Energetski zakon (EZ – 1); (Uradni list RS, št. 17/14 in 81/15), http://www.pisrs.si/Pis.web/pregledPredpisa?id=ZAKO6665
3. National Energy Efficiency Action Plan 2014-2020 (AN URE 2020); Republic of Slovenia, Ministry of Infrastructure, http://www.energetika-portal.si/fileadmin/dokumenti/publikacije/an_ure/neeap_slo_2014-2020_eng.pdf
4. National Renewable Energy Action Plan 2010-2020 (NREAP); Ljubljana, July 2010, http://www.energetika-portal.si/fileadmin/dokumenti/publikacije/an_ove/an-ove_eng.pdf
5. National plan for increasing the number of nearly zero-energy buildings in accordance with Article 9 of the Recast EPBD; Republic of Slovenia, Ministry of Infrastructure, July 2014, http://www.energetika-portal.si/fileadmin/dokumenti/publikacije/an_snes/an_snes_slovenija_en.pdf
6. Long-Term Strategy for Mobilising Investments in the ENERGY RENOVATION OF BUILDINGS; Republic of Slovenia, Ministry of Infrastructure, Ministry of public administration, October 2015, http://www.energetika-portal.si/fileadmin/dokumenti/publikacije/dseps/building_strategy_slovenia_en.pdf
7. Operativni program za izvajanje evropske kohezijske politike v obdobju 2014–2020; Služba Vlade RS za razvoj in evropsko kohezijsko politiko, Ljubljana 2015, http://www.eu-skladi.si/sl/dokumenti/kljucni-dokumenti/op_slo_web.pdf
8. Operativni program ukrepov zmanjšanja emisij toplogrednih plinov do leta 2020; Government of the republic of Slovenia, 17.12.2014, http://www.energetika-portal.si/fileadmin/dokumenti/publikacije/op_tgp/op_tgp_2020.pdf
9. Municipality Ptuj
10. Municipality Makole

GREECE

1. Tselepis,S. "The PV market development in Greece , Net-metering study cases retrieved from http://www.cres.gr/kape/publications/photovol/new/S%20%20Tselepis%20%20The%20PV%20Market%20Developments%20in%20Greece%20%20Net-Metering%20Study%20Cases%2031st%20EUPVSEC%202015%20Hamburg%20%207DV.4.26.pdf
2. Personal communication with the managing authority in the region of Crete.

3. Ministrial decision ΑΠΕΑΛ/Α/Φ1/ οικ 24461, 31/12/2014, concerning net-metering
4. Energy saving in residential buildings, Retreived from http://exoikonomisi.ypeka.gr/Default.aspx?tabid=698
5. Energy saving in residential buildings, Retreived from http://www.dikaiologitika.gr/site/tag/%CE%95%CE%9E%CE%9F%CE%99%CE%9A%CE%9F%CE%9D%CE%9F%CE%9C%CE%A9%20%CE%9A%CE%91%CE%A4%CE%9F%CE%99%CE%9A%CE%9F%CE%9D
6. Greek Law 4399/22-6-2016, Support of private investments, retrieved from https://www.ependyseis.gr/anaptyxiakos/files/n4399_2016.pdf
7. Zero energy building, retrieved from http://www.zeb.gr/en/esco.html
8. Greek law 3855/2010 on energy end-use efficiency and energy service companies
9. Greek law 4122/2013 for the creation of public and private buildings with near zero energy consumption
10. Energy savings in residential buildings, retrieved from http://geonews.gr/eksoikonomish-katoikon-espa/
11. Greek law 4414/ 9-8-2016, Promotion of co-generation of heat and power of high efficiency, retrieved from https://www.taxheaven.gr/laws/law/index/law/769
12. Energy saving and use of renewable energies in the building sector, retrieved from http://www.cres.gr/kape/pdf/download/RES&ES_techn.pdf
13. Methods of financing renewable energy investments in Greece, retrieved from http://www.cres.gr/kape/pdf/download/F_RES.pdf
14. Ground source heat pumps, retrieved from http://www.cres.gr/kape/pdf/download/PDF_GREEK_VERSION_WEB.pdf

ITALY

1. Livio de Santoli, La comunità dell'energia, Quodlibet, 2011;
2. https://ec.europa.eu/energy/en/topics/energy-efficiency/buildings/nearly-zero-energy-buildings;
3. National plan for increasing the number of "nearly-zero energy buildings". Guidelines and development framework, 22 October 2013;
4. www.regionemolise.it;
5. http://www3.regione.molise.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/11487;
6. http://www.regione.molise.it/web/Assessorati/autorit%C3%A0_ambiente.nsf/0/5FA9C85E8AC2B10EC125744E00353ECC?OpenDocument

LITHUANIA

1. Gatautis, R., 2016, Challenges for District Heating: Lithuanian case, Lithuanian Energy Institute, Kaunas
2. Iržikevičiūtė, S., 2012, Experience of Lithuania in Financing Multi-apartment Housing Refurbishment, Housing and Urban Development Agency
3. Kaunas District Municipality Strategic Development Plan 2013-2020 m., Kaunas district municipality council, European Regional Development Research Institute, 06/27/2013, No. TS-256
4. National Plan for Increasing the Number of Nearly – Zero Energy Buildings, 2012, Ministry of the Environment of the Republic of Lithuania, Vilnius
5. Serbenta, V., 2015, Framework Conditions on Energy Efficiency in Urban Areas in Lithuania, Housing Energy Efficiency Agency
6. Sirvydis, V., 2014, The Residential Energy Efficiency Program in Lithuania. Scaling Up Energy Efficiency in Buildings in the Western Balkans, Case Study, World Bank Group
7. Valuntiene, I., 2009, Contextualising behavioural change in energy programmes involving intermediaries and policymaking organizations working towards changing behaviour, Case Study 12: Modernization Multi-apartment programme, Lithuania

MALTA

1. Malta Environmnet and Planning Authority (MEPA), "Development Control Design Policy, Guidance and Standards 2015," http://www.mepa.org.mt/Documents/dc2015.pdf.
2. Building Regulation Office, "Nearly-zero energy buildings plan for Malta," Malta, 2015, https://secure2.gov.mt/EPC/file.aspx?f=131
3. B. R. Office, M. for Transport, A. Infrastructure, and Malta, "Technical Guide F Part 1: Minimum Energy Performance Requirements for buildings in Malta," 2015, https://secure2.gov.mt/EPC/file.aspx?f=188
4. B. R. Office, M. for Transport, A. Infrastructure, and Malta, "Technical Guide F Part 2: Minimum Energy Performance Requirements for Building Services in Malta," 2015, https://secure2.gov.mt/EPC/file.aspx?f=137
5. ZEMedS, "ZEMedS School Technical & Financial Toolkit nZEB* renovation for Mediterranean schools," 2015, http://www.zemeds.eu/sites/default/files/TOOLKIT_anci_140115_v9.7%20%281%29.pdf.
6. Entranze, "Entranze" http://www.entranze.eu/
7. I. SHC, "IEA SHC Task 40," 2015. [Online], http://task40.iea-shc.org/.
8. European Parliament, "Directive 2012/27/EU," Off. J. Eur. Union, Vol. L315/1, pp. 1–56, 2012.
9. EU News: State aid: Commission approves support schemes for renewable energy in Malta and Luxembourg", accessed from https://ec.europa.eu/malta/news/g%C4%A7ajnuna-mill-istat-il-kummissjoni-tapprova-skemi-ta-appo%C4%A1%C4%A1-g%C4%A7all-ener%C4%A1ija-rinnovabbli-fmalta-u_en

10. REWS, The uptake of solar systems in Malta (Status as at the end of the year 2015), http://downloads.rews.org.mt/files/46aa0169-abb5-4fd8-96b6-b074853cbe13_d8d73ab2-cae1-473b-9999-da1ac64ad343.pdf
11. Gordon Cordina, Stephanie Vella and Alexandra Zammit, Expert evaluation network delivering policy analysis on theperformance of Cohesion policy 2007-2013Year 3 – 2013Task 2: Country Report on Achievements of Cohesion PolicyMalta, E-Cubed Consultants Limited, http://ec.europa.eu/regional_policy/sources/docgener/evaluation/pdf/eval2007/2013_een_task2_mt.pdf
12. Aaron Grech and Charles Yousif, Lifestyle Trends for Heating and Cooling in Maltese Households, Proceedings of the 13th European IAEE Conference, Dusseldorf, Germany, 18-21 August 2013
13. Charles Yousif, Assessing Energy Efficiency of a Typical Residential Apartment Block, Proceedings of Intelligent Buildings: The 24th Annual Engineering Conference, Chamber of Engineers, Golden Bay, Malta, 5th May 2016, published in Engineering Today, Issue 54, August 2016, pp. 18-27
14. Polanco Gonzalez, Javier and Yousif, Charles, Prioritising Energy Efficiency Measures to Achieve a Zero Net-energy Hotel on the Island of Gozo in the Central Mediterranean, Energy Procedia Journal, Vol. 83, 2015, pp. 50-59, DOI 10.1016/j.egypro.2015.12.195, Elsevier Publishers, http://ac.els-cdn.com/S187661021502860X/1-s2.0-S187661021502860X-main.pdf?_tid=7bbabbea-bacc-11e5-8011-00000aacb362&acdnat=1452782491_6cdd0d188e7ea892b580b15a133d4747
15. Trevor F. Caruana and Charles Yousif, The Effect of Different Glazing Apertures on the Thermal Performance of Maltese Buildings, Proceedings of the 2016 International Sustainable Built Environment Conference (SBE2016) Europe and the Mediterranean Towards a Sustainable Built Environment, 16-18 March 2016, Valletta, Malta, pp 435-442, ISBN 978-99957-0-935-8
16. Damien Gatt and Charles Yousif, Renovating Primary School Buildings in Malta to Achieve Cost-Optimal Energy Performance and Comfort Levels, Proceedings of the 2016 International Sustainable Built Environment Conference (SBE2016) Europe and the Mediterranean Towards a Sustainable Built Environment, 16-18 March 2016, Valletta,Malta, pp 453-461, ISBN 978-99957-0-935-8
17. Damien Gatt, Charles Yousif, Simon Scicluna, Alexandra Camilleri, Robert Portelli, John Chircop, Roberta Vella, Aaron Cutajar, Maurizio Schembri, Nadine Borg, James Mifsud, Intelligent Retrofitting of a Primary School Building in Malta,Proceedings of Intelligent Buildings: The 24th Annual Engineering Conference, Chamber of Engineers, Golden Bay, Malta, 5th May 2016, published in Engineering Today, Issue 54, August 2016, pp. 28-35
18. Malta Enterprise, List of Beneficiaries of EU Funding through the European Regional Development Fund 2007-2013, ERDF Energy Grant Scheme, http://www.20millionforindustry.com/Portals/1/UserPDF/List%20of%20Beneficaries%2014-05-2015.pdf, pp. 5-15
19. Planning and Priorities Division, Office of the Prime Minister, List of Approved ProjectsPA4 https://eufunds.gov.mt/en/Operational%20Programmes/Operational%20Programme%20I%20Approved%20Projects%20and%20Beneficiaries/Documents/Approved%20Projects%202015/List%20of%20Beneficiaries_OPI%20ERDF%20Malta_ppcdwebsite_AS%20AT%2031.10.2015.pdf
20. National Statistics Office, Request for information no. NSO001-64-17, sourced from the annual government financial estimates.

FINLAND

1. Regional Council of South Ostrobothnia, "South Ostrobothnia's Future Path – Regional Development Plan 2040 Regional Programme 2014-2017" The Regional Streategy,http://www.epliitto.fi/images/A44_SouthOstrobothniaRegionalCouncil_FuturePath_2014.pdf.
2. R09D Rakennukset käyttötarkoituksen, lämmitysaineen ja kerrosalan mukaan. 'Tilastokeskuksen arvioidut rakennusten lämmityksen ominaiskulutuskertoimet', Excel- table, Estimations of building type specific heat coefficients, For South-Ostrobothnia and for Finland email 16.8.2016
3. Statistics Finland, Excel- table, Environment and energy-data, email 16.8.2016
4. Statistics Finland, Rakennuskanta (kevytöljym raskas öljy ja kaasu kulutus) Building stock, South ostrobothnia, Excel-table, Buildings stock – in South Ostrobothnia, email 16.8.2016
5. Energy sources for space heating by type of building, Excel-table, YEAR, BUILDING TYPE, ENERGY SOURCE, TJ http://pxweb2.stat.fi/sahkoiset_julkaisut/energia2015/html/suom0006.htm referred [30.8.2016]
6. Final consumption by sector, E-database, YEAR, SECTOR, TJ, TWh, TWh, PROPORTION %, ANNUAL CHANGE % http://pxnet2.stat.fi/PXWeb/pxweb/en/StatFin/StatFin__ene__ehk/?tablelist=true, 23.8.2016
7. Finnish Energy 1, ENERGY YEAR 2014 - DISTRICT HEATING, http://energia.fi/en/slides/energy-year-2014-district-heating, Published: 21.01.2015, Updated: 16.11.2015, [referred 24.8.2016]
8. Finnish Energy 2, ENERGY YEAR 2014 – ELECTRICITY, http://energia.fi/en/slides/energy-year-2014-electricity-0, Published: 21.10.2015, Updated: 21.10.2015, [referred 24.8.2016]
9. Finnish Energy 3, District heating in Finland 2014, Statistical yearbook, http://energia.fi/en/statistics-and-publications/district-heating-statistics/district-heating, [referred 24.8.2016]
10. Joint website of Finland's environmental administration, http://www.ymparisto.fi/en-US/Living_environment_and_planning/Land_use_planning_system
11. ARA – The Housing Finance and Development Centre of Finland, http://www.ara.fi/en-US
12. Statistics Finland, 'Number of buildings by inteded use and year of construction on Dec. 2015, E-database, http://pxnet2.stat.fi/PXWeb/pxweb/en/StatFin/StatFin__asu__rakke/010_rakke_tau_101.px/?rxid=21b2fb9c-65de-4e9a-9209-a2ad48a2d5df, reffered [18.1.2017].
13. Tekes, Energy aid, https://www.tekes.fi/en/funding/SME/energy-aid/
14. Finland's Ministry of Economic Affairs and Employment, Energy aid, http://tem.fi/en/energy-aid
15. Finland's Ministry of the Environment, The National Building Code of Finland, http://www.ym.fi/en-US/Land_use_and_building/Legislation_and_instructions/The_National_Building_Code_of_Finland
16. Finland's Ministry of the Environment, Steering of construction, http://www.ym.fi/en-us/Land_use_and_building/Steering_of_construction

17. Blog, Pamaus karavaani, http://pamaus-karavaanari.blogspot.fi/p/aurinkosahko-5.html
18. Suomen Teollisuuden Energiapalvelut - STEP Oy, Media release, http://stepenergy.veolia.fi/ajankohtaista/kauran-kuorta-hyodyntava-hoyrykattilalaitos-otetaan-kayttoon-seinajoella
19. Oulu, Urban and Environmental Services, Quality training for builders of small residential buildings, in Finnish, http://www.ouka.fi/oulu/rakennusvalvonta/laatukoulutus
20. Lapua City, Energy services, email 1.12.2016

FRANCE

1. http://www.alecmetropolemarseillaise.fr/
2. http://www.paca.developpement-durable.gouv.fr/
3. http://www.paca.ademe.fr/
4. http://arii-paca.fr/
5. http://www.capenergies.fr/
6. http://www.envirobatbdm.eu
7. http://www.regionpaca.fr/developpement-durable.html

Websites

1. http://www.energetika-portal.si/dokumenti/strateski-razvojni-dokumenti/energetski-koncept-slovenije/
2. http://www.pisrs.si/Pis.web/pregledPredpisa?id=ZAKO6665
3. http://www.energetika-portal.si/fileadmin/dokumenti/publikacije/an_ure/neeap_slo_2014-2020_eng.pdf
4. http://www.energetika-portal.si/fileadmin/dokumenti/publikacije/an_ove/an-ove_eng.pdf
5. http://www.energetika-portal.si/fileadmin/dokumenti/publikacije/an_snes/an_snes_slovenija_en.pdf
6. http://www.energetika-portal.si/fileadmin/dokumenti/publikacije/dseps/building_strategy_slovenia_en.pdf
7. http://www.eu-skladi.si/sl/dokumenti/kljucni-dokumenti/op_slo_web.pdf
8. http://www.energetika-portal.si/fileadmin/dokumenti/publikacije/op_tgp/op_tgp_2020.pdf
9. http://www.cres.gr/kape/publications/photovol/new/S%20%20Tselepis%20%20The%20PV%20Market%20Developments%20in%20Greece%20%20Net-Metering%20Study%20Cases%2031st%20EUPVSEC%202015%20Hamburg%20%207DV.4.26.pdf
10. http://exoikonomisi.ypeka.gr/Default.aspx?tabid=698
11. http://www.dikaiologitika.gr/site/tag/%CE%95%CE%9E%CE%9F%CE%99%CE%9A%CE%9F%CE%9D%CE%9F%CE%9C%CE%A9%20%CE%9A%CE%91%CE%A4%CE%9F%CE%99%CE%9A%CE%9F%CE%9D
12. https://www.ependyseis.gr/anaptyxiakos/files/n4399_2016.pdf
13. http://www.zeb.gr/en/esco.html
14. http://geonews.gr/eksoikonomish-katoikon-espa/
15. https://www.taxheaven.gr/laws/law/index/law/769
16. http://www.cres.gr/kape/pdf/download/RES&ES_techn.pdf
17. http://www.cres.gr/kape/pdf/download/F_RES.pdf
18. http://www.cres.gr/kape/pdf/download/PDF_GREEK_VERSION_WEB.pdf
19. https://ec.europa.eu/energy/en
20. https://ec.europa.eu/energy/en/topics/energy-efficiency/buildings/nearly-zero-energy-buildings;
21. http://www3.regione.molise.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/11487;
22. http://www.regione.molise.it/web/Assessorati/autorit%C3%A0_ambiente.nsf/0/5FA9C85E8AC2B10EC125744E00353ECC?OpenDocument
23. http://www3.regione.molise.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/11487
24. http://www3.regione.molise.it
25. http://www.mepa.org.mt/Documents/dc2015.pdf
26. https://secure2.gov.mt/EPC/file.aspx?f=131
27. https://secure2.gov.mt/EPC/file.aspx?f=188
28. https://secure2.gov.mt/EPC/file.aspx?f=137
29. http://www.zemeds.eu/sites/default/files/TOOLKIT_anci_140115_v9.7%20%281%29.pdf.
30. http://www.entranze.eu/
31. http://task40.iea-shc.org/.

32. https://ec.europa.eu/malta/news/g%C4%A7ajnuna-mill-istat-il-kummissjoni-tapprova-skemi-ta-appo%C4%A1%C4%A1-g%C4%A7all-ener%C4%A1ija-rinnovabbli-fmalta-u_en
33. http://downloads.rews.org.mt/files/46aa0169-abb5-4fd8-96b6-b074853cbe13_d8d73ab2-cae1-473b-9999-da1ac64ad343.pdf
34. http://ec.europa.eu/regional_policy/sources/docgener/evaluation/pdf/eval2007/2013_een_task2_mt.pdf
35. http://ac.els-cdn.com/S187661021502860X/1-s2.0-S187661021502860X-main.pdf?_tid=7bbabbea-bacc-11e5-8011-00000aacb362&acdnat=1452782491_6cdd0d188e7ea892b580b15a133d4747
36. https://eufunds.gov.mt/en/Operational%20Programmes/Operational%20Programme%20I%20Approved%20Projects%20and%20Beneficiaries/Documents/Approved%20Projects%202015/List%20of%20Beneficiaries_OPI%20ERDF%20Malta_ppcdwebsite_AS%20AT%2031.10.2015.pdf
37. http://www.epliitto.fi/images/A44_SouthOstrobothniaRegionalCouncil_FuturePath_2014.pdf
38. http://pxweb2.stat.fi/sahkoiset_julkaisut/energia2015/html/suom0006.htm
39. http://pxnet2.stat.fi/PXWeb/pxweb/en/StatFin/StatFin__ene__ehk/?tablelist=true
40. http://energia.fi/en/slides/energy-year-2014-district-heating
41. http://energia.fi/en/slides/energy-year-2014-electricity-0
42. http://energia.fi/en/statistics-and-publications/district-heating-statistics/district-heating
43. http://www.ymparisto.fi/enUS/Living_environment_and_planning/Land_use_planning_system
44. http://www.ara.fi/en-US
45. http://pxnet2.stat.fi/PXWeb/pxweb/en/StatFin/StatFin__asu__rakke/010_rakke_tau_101.px/?rxid=21b2fb9c-65de-4e9a-9209-a2ad48a2d5df
46. https://www.tekes.fi/en/funding/SME/energy-aid/
47. http://tem.fi/en/energy-aid
48. http://www.ym.fi/en-US/Land_use_and_building/Legislation_and_instructions/The_National_Building_Code_of_Finland
49. http://www.ym.fi/en-us/Land_use_and_building/Steering_of_construction
50. http://pamaus-karavaanari.blogspot.fi/p/aurinkosahko-5.html
51. http://stepenergy.veolia.fi/ajankohtaista/kauran-kuorta-hyodyntava-hoyrykattilalaitos-otetaan-kayttoon-seinajoella
52. http://www.ouka.fi/oulu/rakennusvalvonta/laatukoulutus
53. http://www.alecmetropolemarseillaise.fr/
54. http://www.paca.developpement-durable.gouv.fr/
55. http://www.paca.ademe.fr/
56. http://arii-paca.fr/
57. http://www.capenergies.fr/
58. http://www.envirobatbdm.eu
59. http://www.regionpaca.fr/developpement-durable.html


LEA
Spodnje Podravje


CIHEAM
MAI CHANIA


REGIONE MOLISE


University of Malta
L-Università ta' Malta


Europäisches Institut für Innovation


AViTeM
Agency for sustainable Mediterranean cities and territories


Thermopolis


ZEROCO2
Interreg Europe


Interreg
Europe
European Union | European Regional Development Fund