LOCARBO
Interreg Europe

LOCARBO – NOVEL ROLES OF REGIONAL AND LOCAL AUTHORITIES IN SUPPORTING ENERGY CONSUMERS' BEHAVIOUR CHANGE TOWARDS A LOW CARBON ECONOMY

POLICY LEARNING PLATFORM REPORT

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LOCARBO in brief

LOCARBO – "Novel Roles of Regional and Local Authorities in supporting Energy Consumers' Behaviour Change towards a Low-carbon Economy" is an interregional cooperation project for improving low-carbon economy policies. Its overall objective is to improve 7 Policy Instruments (PI) targeting Energy Efficiency (EE) in the built environment through actions performed by regional and local authorities for the promotion of energy consumers' behaviour change.

LOCARBO is unique in focusing its activities on a bottom-up approach, combining innovative practices linked to three strongly interrelated thematic pillars:

1. Supplementary services and products offered by local authorities
2. Innovative cooperation models
3. Innovative smart technologies

7 project partners (PP), from Hungary (HU), Italy (IT), Lithuania (LT), Portugal (PT), Romania (RO) and the United Kingdom (UK), are focused on exploring innovative approaches to be put into practice by regional/local authorities to support the change in energy consumers' behaviour.

The strategy has comprised intensive stakeholder involvement, interregional site visits and the compilation of a Good Practice (GP) inventory.

As a result of this local and interregional activities performed under the Phase 1 of the LOCARBO project, 7 fully feasible Action Plans (AP) have been developed with a focus on improving 7 PI, influencing EUR 100 million in funds.

The LOCARBO partnership is now focused on implementing the planned actions, spreading innovative initiatives to increase EE and the use of Renewable Energy Sources (RES) in buildings, and providing innovative ways of supporting energy consumers' behaviour change.

Introduction

The Policy Learning Platform (PLP) is a new and challenging initiative from the Interreg Europe Programme to enhance a continuous EU-wide policy learning and knowledge management available to all the policymaking community.

To ensure a clear communication and visibility, one PLP was designed per each thematic objective:

- Research & innovation
- Competitiveness of Small and Medium-Sized Enterprises (SME)
- Low-carbon economy
- Environment & resource efficiency

Each PLP provides an extensive service for all project partners and other organisations involved in regional policy around Europe. This service offers technical support from an international team of experts and an interactive web interface designed to share information and analysis on the thematic policy fields addressed by the programme's investment priorities, through thematic reports and publications and a database of relevant practices and results from interregional cooperation projects.

The platforms are a hub of interaction, information and services for continuous learning bringing together communities of policy makers, politicians and experts dealing with regional development policies in Europe. The aim of the learning and collaboration is to improve structural funds and other regional development policies. Each platform offers the following set of services:

1. **Expert support**

The platform is a space for continuous learning and expert or peer support upon the four programme topics. The expert or peer support can be accessed in two ways:

- Onsite peer reviews by thematic experts (for public authorities only)
- Request expert policy advice by sending a query to the expert helpdesk on the four topics covered by the platform

2. **Community**

Allowing EU-wide community connection, through peer learning, sharing and exchanging experiences, is one of the most relevant role features of the PLP. Any interested party or organisation can find upcoming online and in-person events and activities and join discussions and groups on specific topics.

3. Knowledge hub

The knowledge hub offers an extensive set of expert analyses on Interreg Europe projects and their topics, in the form of Policy Briefs released monthly.

4. Good Practice database

A detailed *web-based* database with relevant good practices offers a good opportunity to exploit interregional cooperation project results and make them available to a wider audience of regional stakeholders across Europe.

This Policy Learning Platform Report is a compilation of the relevant experience gained throughout the interregional learning process carried out within the LOCARBO project, and the collected innovative practices from each LOCARBO partnership region.

Ultimately, this report is intended to support knowledge-sharing with ongoing projects, partners and stakeholders.

1. LOCARBO engagement on Policy Learning Platform events

1.1. Experience Fair

On 24-25 April 2018, almost 300 representatives of Interreg Europe projects came together at the Experience Fair, in Sofia (BG), for a journey through project implementation. LOCARBO project has made its contribution to this event objective and has reached an active involvement on the exchanging of experiences among projects.

LOCARBO, represented by Dr. Mezősi Balázs, from MI6, has been invited to share tips and tricks on how to mobilize project stakeholders, one of the most essential (and difficult) issues in the development of a project. Dr. Balázs has given advice on how to do it in a structured way: identify, sort, plan, involve and monitor.

Figure 1 - LOCARBO represented by Mi6 at the Experience Fair, in Sofia (BG), on 24-25 April 2018.

1.2. Thematic workshop on the topic of EE in buildings

On the 28th of June 2018, Interreg Europe organised a 'Thematic workshop on the topic of EE in buildings', in Florence (IT), bringing together 28 representatives of fourteen Interreg Europe projects.

This thematic workshop has focused on how low-carbon projects can work together and maximize its impact. Group discussions on how the PLP can assist Interreg Europe projects

have taken place and participants have discussed the GPs identified by other projects. Zoltan Oletics, from Mi6, has represented LOCARBO and presented the Virtual Power Plant (VPP) Programme, one of the GPs identified by the LOCARBO partnership.

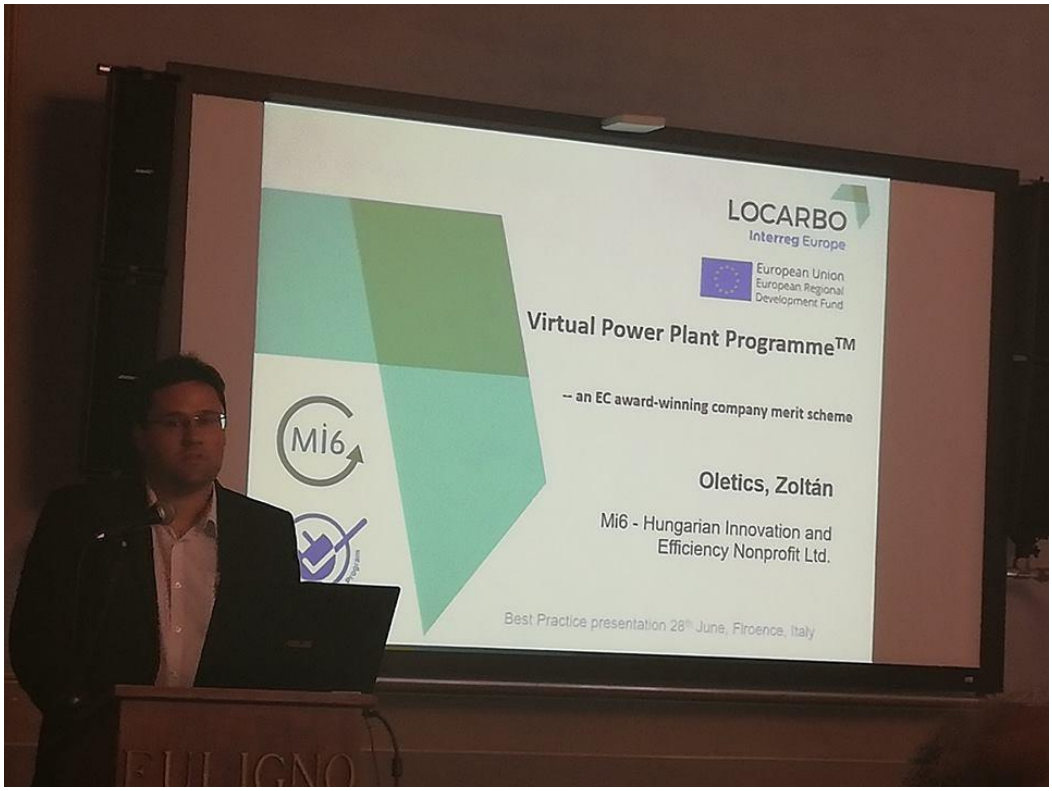

Figure 2 - LOCARBO represented by Mi6 at the Thematic workshop on EE in buildings, on the 28th of June, in Florence (IT).

1.3. Interregional cooperation for energy transition day

The 'Thematic workshop on the topic of EE in buildings' was complemented by an extensive interregional agenda, which included the 'Interregional cooperation for energy transition' day, organised on the 27th of June 2018, by the REBUS project, in cooperation with the VIOLET and SET-UP projects.

The event, designed by Resolvo and supported by the European Institute for Innovation, has been organised within the framework of the Interreg Europe programme and the EU Sustainable Energy Week (EUSEW) 2018.

The 'Interregional Cooperation for Energy Transition Day' agenda, using a mix of interactive panels, keynote speeches and a competition, has encouraged partners to discuss their common challenges to energy transition. Challenges have been established according to a co-creational approach, within which each project had been consulted in advance for their

definition. This inter-project collaboration initiative has gathered 14 different low carbon Interreg Europe projects in a Business Case competition.

Carla Pires from GAIURB, the municipal company of urbanism and housing of the Municipality of Vila Nova de Gaia, partner in the LOCARBO project, has presented an Energy Transition Business Case on New Collaborative and Adaptive Controls for Personalized and User-Friendly Energy Audits.

Figure 3 - LOCARBO represented by the PP from Vila Nova de Gaia Municipality at the Interregional Thematic Event – Interregional Cooperation for Energy Transition, on the 27th of June, in Florence (IT).

1.4. Online meeting on awareness raising and behaviour changes for energy efficiency

On the 5th of December 2018, the Interreg Europe Policy Learning Platform organised an online discussion for all the Interreg projects interested in discussing awareness raising and behaviour changes for energy efficiency.

This online discussion gave projects a chance to share good practices on behaviour change for energy efficiency and discuss their regional challenges and successes.

The meeting agenda began with an introduction and policy brief on behaviour change performed by thematic experts from the Interreg Europe Policy Learning Platform, and proceeded with several Good Practice presentations and a moderated session. Carla Pires, from GAIURB, presented the “Sustainability Observatory” good practice (identified within

the LOCARBO project). This good practice was published on the Policy Brief from the Policy Learning Platform on Low-carbon economy from December 2018.

2. LOCARBO's inputs to the Policy Learning Platform Good Practice database

During an intensive mutual learning and knowledge transfer process, LOCARBO's PPs have collected and shared with each other their GPs and have examined their transferability and possible adaptation methods in the context of the targeted PIs.

In accordance with the project's thematic tasks, each PP has selected a set of GPs referring to the TPs of the project:

- TP1 - Supplementary services and products offered by authorities
- TP2 - Innovative cooperation models
- TP3 - Innovative smart technologies

Building on the track record and remarkable results of LOCARBO partners, TP1 GPs include energy consultancy services to end users and energy ambassadors (fast track training for individuals or easy to use energy assessments), public or residential buildings rehabilitation projects, and new district heating generation measures.

TP2 GPs include innovative initiatives of civil actors and entrepreneurial groups cooperating on common goals and strategies linked to EE/RES.

Innovative and smart/Information and Communications Technologies (ICT) summarize TP3 purposes, comprising GPs that focus on collecting and analysing energy data to support new and effective EE/RES regional policy making.

These strongly interrelated TPs are crucial for a successful improvement of regional PI and to explore innovative ways for regional/local authorities to support energy consumers' behaviour change. TPs are strategic objectives that closely interrelate smart technologies (TP3) to provide knowledge and data to build actions and measure results, which is needed to improve services (TP1) and to convince and create new cooperation models (TP2).

2.1. LOCARBO's Good Practice inventory

The GPs collected by LOCARBO PPs (displayed in the table below) have exceeded the indicator (21 GPs) initially set for this activity. 28 GPs have been selected according to previously set principles (resources needed, evidence of success and potential for learning or transfer).

Project Partner	Thematic Pillar	Good Practice	Aim
LP	TP1	**Municipal building heating system powered by woody biomass**	For facing the raising of energy costs, the Municipality of San Chirico Raparo (Potenza Province) has identified the opportunity to install a heating system plant based on wood chips in its city hall building. Local stakeholders are involved in an effective cooperation model, delivering positive impacts on the local system: energy saving and CO_2 reduction; energy costs reduction; new job opportunities and economic development in the biomass production sector.
		Province of Potenza as Coordinator for the Covenant of Mayors for Climate and Energy	A Partnership Agreement was signed between the European Commission and the Province of Potenza, publicly recognizing "the Province as a main actor of the CoM". Province of Potenza provides strategic guidance and technical support to Covenant of Mayors signatories to promote decarbonized and resilient territories.
	TP2	**#weResilient**	The Province of Potenza has constituted a network including its 100 municipalities for developing a common sustainable territorial strategy based on community involvement. The #weResilient strategy aims at pursuing territorial development through a structural combination of environmental sustainability, territorial safety and climate change policies.
		Calvello energetic village	Municipality of Calvello has activated a territorial development strategy, based on its Sustainable Energy Action Plan (SEAP), with a strong community involvement, in the fields of EE and RES.
		Melfi Sustainable Energy Strategy	Melfi Municipality has put in place integrated actions (planned in its SEAP) based on existing technologies and an active community involvement.
	TP3	**EE-SMS**	Energy Efficiency Smart Monitoring System (EE-SMS) is a pilot action developed within Interreg IVC RENERGY, based on an ICT Platform connected with a local sensor network. It constitutes a new approach to monitoring energy consumption and performance in public buildings.
		At school for energy efficiency. EE in Public Lighting Networks of the Industrial Zone of Balvano	This GP represents how a local school community can promote the development of technical contributions for local administration on energy renovation.
		ATER Sustainable Public Housing	This GP represents a model of "sustainable design" promoted by ATER (territorial agency for residential buildings) for social housing. The project has been developed in a peri-urban residential area of the Filiano Municipality in the Province of Potenza and consists in the construction of buildings applying the Green and Sustainable Building principles, methods and architectural techniques with reference to energy saving and RES production systems.
PP2	TP1	**Improve the management of the process of supply of energy**	The Basilicata Regional Energy Company (SEL S.P.A.) aims at improving the management of the entire regional energy supply process. The company acts as a Central Purchasing Body for reducing the costs of electricity and natural gas by aggregating the consumption of regional public bodies. The adoption of an awarding policy for tenders allows participating organizations significant savings on energy costs.
	TP2	**The ERMES integrated agricultural monitoring system for greenhouse gas emissions reduction**	ERMES project (Earth obseRvation Model based on RicE information Service) purpose is to implement services on precision farming. ERMES is an EU - FP7 SPACE project coordinated by the IREA/CNR Institute. ERMES ambitious objective is to create an integrated system allowing to exploit information from different sources and different levels of spatial and temporal

Project Partner	Thematic Pillar	Good Practice	Aim
			granularity (Earth observation data, crop modelling, and user-collected data), to provide useful information for various crop monitoring/management applications.
	TP2	**Promoting low and medium - enthalpy geothermal energy exploitation**	This project aims to promote low-and medium enthalpy geothermal energy exploitation in the northern sector of Basilicata. Moreover, it provides training and information to technical and administrative operators to increase their skills on geothermal energy.
	TP3	**Photovoltaic system with active fluid cooling**	This GP consists in a research work on an innovative technology regarding renewable energy. The idea is to combine classical photovoltaic (PV) technology with an active fluid cooling system to strongly reduce the operative cells' temperature, resulting in an increase in the PV-cell electrical energy production efficiency. Furthermore, heat absorbed by the cooling fluid can be used in solar thermal collectors even if temperatures are lower.
PP3	**TP1**	**Vila d'Este Housing Refurbishment**	Large-scale rehabilitation project coordinated by the Vila Nova de Gaia Municipality. The main strategic objectives of the project were the elimination of existing anomalies, ensuring compliance with current energy and indoor air quality requirements, and the rehabilitation of the entire neighbourhood on an architectural and aesthetics perspective.
	TP2	**School and Sports communities engagement on energy rehabilitation and retrofitting of buildings**	This GP arises from the strategic ambition of Vila Nova de Gaia Municipality to ensure that all municipal school and sports equipment follow the design principles associated with the Nearly Zero Energy Buildings (nZEB) and CO_2 Zero building concepts by 2020. Vila Nova de Gaia Municipality has started an energy rehabilitation process to turn all municipal school and sports facilities into neutral CO_2 equipment.
	TP3	**Sustainability Observatory**	Web-based platform that allows the real-time monitoring of the energy consumption in several municipal equipment. The platform, promoted by Energaia (regional energy agency) with the support of its six associated municipalities, is based on the concept of sharing a platform for managing and monitoring energy consumption and intends to become a reference model for other municipalities allowing them to monitor the impact of sustainable energy measures and to motivate the continuous search for opportunities to improve territorial sustainability.
PP4	**TP1**	**Durham District Energy Study**	Feasibility study to assess the potential for the implementation of EE, district heating/cooling and electricity generation measures in the Durham County.
	TP1	**Schools Carbon Reduction Programme**	Coordinated strategic approach to improve energy use and EE in schools across Durham County by enabling them to access their energy data through an online portal. The Programme also provides support for teachers, pupils, school caretakers and business managers.
	TP1	**BEEP**	Business Energy Efficiency Project (BEEP) aims to promote the use of EE technologies in the SME sector. It provides free guidance, energy audits and grants for installing EE technologies.
	TP1	**SystemsLink**	Energy management software designed to provide a cost-effective way of implementing an Energy Monitoring and Targeting system.
PP5	**TP1**	**BETA**	Housing Energy Efficiency Agency (BETA) represents an example of successful cooperation between stakeholders, coordinated by the national agency for EE.

Project Partner	Thematic Pillar	Good Practice	Aim
	TP1	**Inventive promotion of complex renovation**	The main objective of this project, initiated by the Kaunas Municipality, is to stimulate complex renovations of tenement houses. Projects integrating the energy renovation of more than five buildings will have a bonus service from the municipality for the complex planning and management of the urban environment.
	TP2	**ESCO model in Lithuania**	JSC Lietuvos Energijos tiekimas is the main coordinator of the ESCO cooperation model in Lithuania as the interlink between the customer, contractor and financing company. ESCO projects implemented in production companies are financed according to an agreement established with the final users, based on the savings achieved from efficiency gains.
PP6	**TP1**	**Virtual Power Plant Programme**	The VPP Programme is designed to collect experience and practices, transform them into knowledge, motivate and award the best actors, and cooperate with relevant authorities.
	TP1	**Energy Conscious School Programme**	Awareness raising programme for students and schools in EE, motivating, supporting and awarding role models.
	TP1	**County Climate Protection Platforms**	The aim of this programme is to establish county-level platforms with the involvement of local stakeholders and elaborate climate protection APs.
PP7	**TP2**	**“Recycle with tricycle” Campaign**	This campaign aims to improve the quality of the environment in the local community through educating citizens on the importance of selective waste collection and recycling. The collection of paper and cardboard waste is for free and those who drive the collecting tricycles are people with social problems and low income.
	TP2	**Air quality measurement solution**	An important first step for the Alba Iulia Smart City 2018 pilot project was taken through a cooperation agreement approved by Orange Romania and the Municipality of Alba Iulia. 15 uRADMonitor model A3 detectors have been installed in public transportation, making it possible to monitor precise, real time indications on pollution affecting the city and nearby regions.
	TP2	**Sustainable Energy Action Plan**	The SEAP conducted together with the Alba Local Energy Agency (ALEA) and integrated in the "Development Strategy Alba Iulia" was developed in 2005 and updated in 2016 and is the key document defining energy policies for the local government within a period of 10 years, aiming at reducing CO_2 emissions throughout the city.
	TP2	**ANERGO**	Alba Energy Observatory (ANERGO) was established within the framework of a European project, as a structure within ALEA. Its main role is to fulfil the need to aggregate energy consumption data at local and regional levels, per sector and territorial administrative unit.
	TP3	**Ensuring sustainable alternative energy sources for public institutions**	The overall objective of this project is to ensure sustainable alternative energy sources for the following public institutions in Alba Iulia: Technical College “Dorin Pavel", Home for the Elderly, Day Centre for the Elderly, and Programs Directorate.

2.2. LOCARBO's Good Practices selected for the Policy Learning Platform Database

This subchapter synthesizes LOCARBO's GPs selected to integrate the Policy Learning Platform Database on the low-carbon economy domain. These GPs were validated by thematic-experts, thus proving its success and potential to be transferred to other contexts. 21 of the 28 GPs identified by LOCARBO now integrate the database.

	Virtual Power Plant Programme
Location	Hungary
Summary	Collect experience and practice, transform them into knowledge, motivate and award the best actors, cooperate with relevant authorities.
Detailed description	International research shows that mechanisms of awareness, rationalization, metering and checking of energy consumption can result in 10% of energy savings. Conscious energy consumption hardly requires investment, only a change in attitude and corporate practices. This has catalysed the process through which the idea of the VPP Programme was born. The VPP Programme will set off a virtual power plant producing 200 MW of electricity with proven energy savings (direct and indirect) by 2020. Building the virtual power plant starts with assessing existing EE projects. The energy savings of a company are verified by experts from participating universities and converted into saved fossil primary energy. The savings in fossil energy and electricity will be registered on the accounts of the company participating in the VPP Programme in a yearly basis. These savings serve as "building blocks" of a NEGAWATT power plant that is "virtual" since it prevents building a new fossil power plant. To calculate the power plant production equivalent, it is assumed a fossil plant with a 50% efficiency rate and 6,000 working hours a year.
Resources needed	The VPP Programme is financed through the contribution of mentor companies and procedure fees from award nominees. A team of four runs the VPP Programme.
Timescale	April 2011 - ongoing
Evidence of success	6 years of successful operation, with 8,500 partner companies, resulting in over 150 awarded companies, EUR 10 million invested in the EE market (research and policy analysis and development support), and the 2015 EU Sustainable Energy Award nomination (reaching top 3 out of 500 EE projects) underpin the success of the VPP Programme. Currently, the counter shows 207 MWe in savings, meaning that VPP Programme corresponds to the 7th largest power plant in Hungary. The goal is to be 2nd by 2030.
Potential for learning or transfer	This GP is fully transferable, adaptable and scalable. The VPP Programme is being transferred to the UK (County Durham) and will soon be transferred to Italy and Romania.
Further information	http://virtualiseromu.hu/en
Expert opinion	This GP is an awareness campaign on energy efficient behaviour linked to measuring the savings and putting them into perspective of contribution to switch off a coal fired power plant. It is highly transferable and should work in diverse cultural and political contexts. The ratio CAPEX/impact is interesting as it targets the low-hanging fruit in efficiency that is locked in behaviour changes and does not require investment into hardware.

	Energy Conscious School Programme 
Location	Hungary
Summary	EE awareness raising programme for students and schools. Motivating, supporting and awarding role models.
Detailed description	The Energy Conscious School Programme aims at providing knowledge transfer to students and schools on sustainability and EE. Students are provided with EE presentations and discussion opportunities at school and at the Mi6 EE demo building. Students learn how EE technologies work and that these are already accessible and usually cheaper (considering full life cycle costs) and much greener than traditional ones. Students also get access to a graded Facebook quiz on EE with prizes. Schools receive a LED bulb for each 20 students participating. The most participative schools receive the Energy Conscious School title for a year. Schools are required to submit their SEAP to the programme for knowledge sharing for further awards. Schools may also apply for the Energy Efficient Mentor School title.
Resources needed	Cross-financed from the revenue of market activities. Run by a team of 3.
Timescale	2016 - ongoing
Evidence of success	The programme started in 2016 with the target of reaching 2,500 students per year. Attracted by the quick success of the programme, the State has decided to support it actively: with the involvement of the Ministry for Human Resources and their Non-profit Ltd. Programme, representatives were invited to share the knowledge gained in state-owned schools (the majority of schools) and the programme reached 350,000 students in 2017 and 2018.
Challenges encountered	Financing and reaching more schools and students requires capacity, HR and logistics. The programme is moving towards an e-learning format to increase coverage.
Potential for learning or transfer	The programme is fully transferable, adaptable and scalable to other communities and countries, as it is based on technology, demonstration and competition – all being assumedly independent in local context or regulatory framework. Showing students that EE technologies are not the future, but the present, helps spreading existing technology. Students have influence on their parents' decision making, which results in a leverage effect on the programme's reach.
Further information	http://www.mi6.hu/az-energiatudatos-iskolrt-palyazat/
Expert opinion	This practice is an example of raising awareness on EE in schools. Ingraining EE practices at an early age helps to set life-long habits, and such a scheme can be established in any region with sufficient resources for arranging activities.

	School and Sports community engagement on energy rehabilitation and retrofitting of buildings 
Location	Vila Nova de Gaia, Portugal
Summary	Vila Nova de Gaia Municipality has started an energy rehabilitation process to turn all municipal school and sports facilities into neutral CO_2 equipment.
Detailed description	This GP arises from the strategic ambition of Vila Nova de Gaia Municipality to ensure that all municipal school and sports equipment follow the design principles associated with the nZEB and CO_2 Zero building concepts by 2020. The Municipality of Vila Nova de Gaia has received technical support from municipal organizations – Gaiurb and Energaia – both for technical solutions and awareness activities directed to buildings' users. In 2014, EE solutions were integrated in 3 sports halls and 2 swimming pools: installation of solar thermal systems for heating sanitary hot water and biomass boilers as support; replacement of existing lighting and air treatment units for highly efficient systems; and installation of monitoring and management systems for energy consumption and air quality. In 2015, existing lighting systems were replaced by more efficient technology (LED) in 12 schools.
Resources needed	• EUR 780,688, including municipality own capital for roof and wall insulation and window and lighting replacement, and a contribution of 85% from Structural Funds from the National Strategic Reference Framework (QREN) 2007-2013 for EE equipment upgrade to centralized management systems • EUR 80,000 under the Plan for Promoting Efficiency in Energy Consumption (PPEC) for roof and wall insulation and window and lighting replacement
Timescale	January 2014 - ongoing
Evidence of success	• 5 sports equipment have been subject of energy retrofitting processes • 12 schools have been intervened with the replacement of existing lighting systems by LED technologies • Energy consumption has been monitored in 5 schools • Estimated final energy saved of 1.49 GWh/year • Estimated final energy production by RES of 0.10 GWh/year • Estimated reduction of 207.5 tons CO_2e/year
Potential for learning or transfer	This initiative is highly relevant within the scope of the EU energy policy framework for 2020 and 2030. Addressing concepts like nZEB and CO_2 Zero buildings, it promotes the efficient use of resources and energy and encourages the implementation of renewable energy and low-carbon solutions/technologies. This GP consists of an innovative way for regional/local authorities to support and encourage energy consumers' behaviour change and staff capacity building.
Further information	http://www.cm-gaia.pt/pt/noticias/mais-de-5-milhoes-de-euros-para-reabilitar-escolas-do-concelho/
Expert opinion	The practice shows how structural funds can be utilized for EE retrofitting of public buildings. Impact was maximised by employing external experts to work on design and monitoring, and by investing in awareness raising among the building users. The appropriateness of the interventions is ensured by following the design principles associated with the nZEB and CO_2 Zero concepts.

	Business Energy Efficiency Project
Location	County Durham, United Kingdom
Summary	Low carbon/EE project offering free energy assessments and grants to SMEs.
Detailed description	SMEs form a large proportion of the businesses operating in County Durham where around 87% of business have fewer than 10 employees. BEEP is an initiative suited to offer free energy assessments and grants to help improve business productivity, EE and lower carbon emissions by reducing energy and water costs. Because of their size SMEs are often ineligible for this type of support and grant funding, yet they report that resource costs are a key concern for the economic viability of their operations. This programme therefore helps SMEs to reduce business costs and increase their environmental sustainability credentials by funding EE and low carbon technology. BEEP achieves this using a team of auditors that carry out energy assessments at participating businesses to devise cost effective strategies to reduce site energy and water costs. This leads to the organisation receiving an EE plan that details, low, medium and high cost interventions that are tailored to the needs of each business. Once the EE plan has been developed, the SME can access an ERDF grant for up to 40% of the capital cost of installing low carbon and EE technologies with the remaining 60% provided by the business. The SME receives training to ensure they understand their plan and BEEP also offers online support and information through its website.
Resources needed	The project is funded via a European Regional Development Fund (ERDF) grant: EUR 597,439 matched by EUR 168,140 from Durham County Council and EUR 224,187 from SMEs.
Timescale	October 2016 - September 2019
Evidence of success	Success is evidenced by SME sign-up and against the outcomes the project is required to meet: estimated reductions in carbon emissions (2,060 tonnes) and number of enterprises supported (240 in total). BEEP is expected to meet these targets easily by the end of the project. Success is also measured qualitatively from interest in the project from SMEs telling each other about the project. Partner agencies who engage with businesses also report positive messages about the BEEP project.
Challenges encountered	There was concern when the project began that businesses would not come forward to take part but there was no problem once engagement with SMEs began. Word of mouth between SMEs has been a powerful tool in maintaining interest.
Potential for learning or transfer	This model is extremely transferrable and could be adopted in most regions, nationally or internationally. There is interest from several regions across England in sharing BEEP's experiences and learning from the best practice delivered. The interactive website and social media support associated with the project also facilitates learning transfer. Another opportunity for learning or transfer is associated with the assessment findings. These provide powerful insights for better understanding the challenges SMEs face with respect to energy provision by considering energy demands or opportunities for low carbon technology.
Further information	http://www.beep.uk.net/
Expert opinion	EE measures provide economic benefits for businesses, but SMEs often lack the capital and the capacity to implement them. Considering the prevalence of SMEs in the European economy (99% of all businesses have less than 250 employees), it is clearly essential to assist them in making changes. BEEP is an excellent example of targeting public funding, providing an initial assessment of the business's performance, followed by a plan of potential actions, supported with grant funding of up to 40%. This practice could be taken up by almost any region, using ERDF funding to support their local businesses, though having the capacity to perform audits and to reach out to businesses will be key challenges.

	Sustainability Observatory 
Location	Northern Region, Portugal
Summary	Web-based platform that allows real-time monitoring of the energy consumption of several municipal equipment.
Detailed description	The Observatory, promoted by Energaia with the strong support of its six associated municipalities, began to be developed in March 2012 with the design and test-bed phase of the web-based platform and was publicly announced in 2014 during the European Week of Energy Sustainability. After this, the platform has become available to six associated municipalities of Energaia with the aim to support them in the management of energy consumption in buildings, fleets and street lighting, and monitoring the generated impacts of EE measures. The Observatory has been subjected to continuous improvement, since the objective is that this tool will provide real-time consumption management, besides the monitoring procedures. This has included the integration of smart metering equipment, the addition of new features related to real-time monitoring, and the implementation of training sessions addressed to municipal technicians, which will be the users and operators of the platform. The platform is based on the concept of sharing support for managing and monitoring energy consumption and intends to become a reference model for other municipalities allowing them to monitor the impact of sustainable energy measures and to motivate the continuous search for opportunities to improve territorial sustainability.
Resources needed	Human resources are ensured by Energaia as the main technical and conceptual developer of the platform. Funding resources have been provided by the financial instrument ON.2 – O Novo Norte – Northern Portugal Regional Operational Programme.
Timescale	March 2012 – ongoing
Evidence of success	• 5,500 buildings are monitored • More than 4,000 local street lighting grids are currently registered • More than 1,000 municipal fleet vehicles are also controlled by the platform
Potential for learning or transfer	According to the most recent EU energy policy guidelines, this GP offers an innovative management tool that promotes the implementation of EE measures contributing to the sustainability and competitiveness of the engaged territories, the integration of self-generation energy, the reduction of energy waste and costs, and the increase of the quality of the built environment. The Sustainability Observatory promotes a progressive implementation of EE measures through the employment of innovative technologies that ensure a continuous monitoring of energy consumption in municipal buildings and equipment. The perspective of an integrated management is already allowing the inclusion of new municipalities, and in a forward-looking perspective, this web-based platform is expected to integrate industries and SMEs, creating a Territorial Sustainability Platform.
Further information	http://www.observatorio.energaia.pt/
Expert opinion	This web-based platform for monitoring the performance of municipal electrical equipment helps the municipalities to manage their energy bills for these equipment, producing reports and alerts for monitoring performance to highlight where change is needed. The observatory has shown tremendous success and could be taken as an example for any municipality looking to improve its energy performance.

	#weResilient 
Location	Basilicata, Italy
Summary	The Province of Potenza has constituted a wide territorial network including all its 100 municipalities for developing a common strategy based on the combination of sustainable development, territorial safety and climate change policies with the active involvement of stakeholders and communities.
Detailed description	The Province of Potenza outlined the #weResilient strategy for pursuing territorial development. The milestone of the strategy was the approval in 2013 of the Provincial Territorial Coordination Master Plan. This new concept of territorial governance provides for the structural introduction of 'resilience' and 'sustainable development' into territorial development policies to be implemented through specific actions at local and urban levels. In the strategy implementation, most efforts have been devoted to setting-up a complex system of progressive social involvement having the main purpose of entrusting and engaging social groups and citizens in institutional policy-making regarding territorial and urban sustainable and resilient development. #weResilient main achievements and results: • Permanent networking with cities, stakeholders and major groups for a comprehensive sustainable territorial development • Performing programmes and actions to include communities and people in relevant institutional decision-making processes, building capacity, raising awareness, and increasing political will and public support in topics such as climate change and low carbon economy • Building local to transnational partnerships to promote cooperation and GP exchange
Resources needed	Human resources with deep experience in the fields of sustainable development, climate change and community engagement. Available material and financial resources have been capitalized and new mechanisms to attract the private sector have been promoted.
Timescale	November 2013 - ongoing
Evidence of success	On the 25th of January 2015, the Province was recognized for this GP as a Role Model for Inclusive Resilience by the UN Office for Disaster Risk Reduction. The Province has also received a formal recognition as "Champion in the Reduction of the Disaster Risk for IDDR 2015", for its "inclusive" way of working to implement resilience with a network approach.
Challenges encountered	• Need for public support and dialogue with within stakeholders • Resources • Skills and capacity • Community engagement in decision making
Potential for learning or transfer	This GP is based on a network approach, a consolidated methodology in EU cooperation actions. For the implementation of this GP few 'easy to be found things' are necessary: • Strong and consolidated relationship among public Authority, communities and citizens • A shared vision • A bottom-up approach that ensures following-up by communities
Further information	https://www.facebook.com/provpzresilient/
Expert opinion	This is a good example of consensus building and co-creation within a region. Sustainable development and the transition to a low carbon economy require systemic changes, engaging all parts of society, which can be a slow process to which people may be resistant. Strategies such as #weResilient can help to engage citizens and other stakeholders in policy making, so that they feel part of the process, with ownership of the outcomes.

	Province of Potenza as Coordinator for the Covenant of Mayors for Climate and Energy
Location	Basilicata, Italy
Summary	Province of Potenza provides strategic guidance and technical support to Covenant of Mayors (CoM) signatories to promote decarbonized and resilient territories.
Detailed description	On 25th September 2010, a Partnership Agreement was signed between the European Commission and the Province of Potenza, publicly recognizing "the Province as a main actor of the CoM with the role of Supporting and Coordinating Structure of the European Commission for the territory of the Province of Potenza". Provincial municipalities have subscribed with the Province and the Regional Energy Company of Basilicata (SEL) an ''Agreement and Commitment Act'' within which the process of drawing up the SEAPs has started. In October 2016 the Province of Potenza joined the new CoM, with the following objectives: • Promote policies and focused actions to combat climate change, to be implemented with the engagement of the municipalities of provincial territory • Provide technical, methodological and strategic assistance to municipalities, supporting the development and implementation of local strategies, plans and actions • Identify and/or facilitate resources to support municipalities and communities in the development and implementation of local strategies, plans and actions • Monitor the results achieved and identify and implement corrective actions
Resources needed	The existing network attracts regional/national/ European funds. The municipalities in some cases use their royalties from oil or wind farms. Human resources with technical skills on EE and RES are also required.
Timescale	September 2010 - ongoing
Evidence of success	• 61 municipalities joined the CoM (the goal was 45) • 40 SEAPs approved by the City Councils • 11 SEAPs in progress • 24 monitoring reports • Kyoto Club Award 'Spend without money' to Calvello SEAP drawn up by SEL • A+ CoM Award to Sasso di Castalda SEAP drawn up by SEL The critical mass gained by having 61 municipalities signing up to this agreement has been key to the effectiveness of this GP.
Challenges encountered	Some problems have been reported by few municipalities in collecting real consumption data and calculating emissions for some sectors. These have been overcome thanks to a strong inter-institutional cooperation model and a collaborative and bottom-up approach.
Potential for learning or transfer	This GP is replicable to other EU territories and contexts. In fact, it includes members from a wider EU initiative (he EU CoM) highly transferrable to other regions and contexts. For the implementation of this GP few highly replicable elements are necessary: • The framework of the CoM • Public authority with the willingness and commitment to support signatories within their geographical scope and with a close and consolidated relationship with its municipalities and communities • A shared vision on climate change policies • A bottom-up approach that ensures following-up by communities
Further information	https://www.covenantofmayors.eu/en/
Expert opinion	CoM is a voluntary association of local governments looking to implement climate and energy actions and contribute to Europe energy targets. CoM has thousands of regional authorities as members and is open to other regional authorities to apply for membership. Members should, within two years of joining, create a Sustainable Energy and Climate Action Plan outlining their intended actions. In this case, the province of Potenza is providing support to municipalities. This approach is replicable with enough political will and enabled by the CoM framework.

	Energy Efficiency Smart Monitoring System
Location	Basilicata, Italy
Summary	EE-SMS is a pilot action developed within Interreg IVC RENERGY. It is based on an ICT Platform, connected to a local sensor network, allowing a model for monitoring energy consumption and performance in public buildings.
Detailed description	EE-SMS aims to increase awareness among operators and local communities interested in the management/use of energy in public buildings. Through real-time data, it allows the evaluation of energy savings resulting from sustainable habits. The system has been implemented in 5 school buildings in Potenza Province and in Avrig Municipality (RO). Real data concerning energy consumption allows: • Improving energy management in buildings • Promoting awareness in energy management This GP's objective is to exploit the potential of real data availability on energy consumption to stimulate empowerment actions on: • Energy management models in public buildings • Users' awareness in energy usage in public buildings Physical and technological results: • Installed ICT monitoring systems • Web platform for data visualization Community involvement results: • Local groups of students performed training activities
Resources needed	• Interreg IVC RENERGY fund: about EUR 87,000. • Human resources with technical skills in the use of open source software and hardware.
Timescale	October 2014 - December 2015
Evidence of success	Real-time open information has been effectively a stimulating factor for users. Community involvement has been achieved, as well as increased awareness on energy consumption and efficiency thanks to the performed training activities for local students.
Potential for learning or transfer	This GP is intended to be the starting point for deeper community involvement towards sustainability. As the EE-SMS ICT framework has been developed using an open source approach, no costs related to software licenses are required. Also, the sensor network is based on open hardware equipment with low costs associated. This means high sustainability at low budget. The approach in design, development and assessment is compatible with EU requirements. Moreover, this GP is a result of cooperation among EU partners.
Expert opinion	Energy performance monitoring is vital for implementing optimal energy management systems. Making information on performance available can help to illustrate where savings can be made; either through the introduction of new technologies, or via behaviour change interventions. ICT systems and sensor technologies now make this a more convenient activity than ever before, and this kind of real-time feedback can be a very powerful tool for changing attitudes and behaviour.

	Energy Supply Company Encouraging Energy Efficiency Practices
Location	Lietuva, Lithuania
Summary	Encouraging companies to increase EE as the basis for more rational solutions within the company.
Detailed description	This initiative has been developed and implemented by an Energy Supply Organization (ESO). Companies are encouraged to implement measures to increase EE, using a proactive and practical apprach – to use as much energy as necessary. The "Green protocol" is the commitment through which parties confirm their willingness to apply the following environment friendly measures: • Implementation of EE measures • Contribution to the European and global goals concerning mitigation of environmental impact and carbon emissions • Implementation of incentives for employees to apply EE measures "Green protocol" is an open and voluntary initiative and its membership is free of charge. All companies and juridical persons acting in the territory of Lithuania, willing and capable to contribute to the increase of EE are able to join this covenant.
Timescale	January 2012 – ongoing
Resources needed	Companies use EU funding for the implementation of EE measures.
Evidence of success	The main evidence of success is the fact that this initiative is still active and 206 have signed the "Green Protocol".
Potential for learning or transfer	The best practices of the year are awarded and presented at the annual conference on EE. The best practice is selected based on strict criterions, being that the main criterion is the EE rate achieved. Results are disseminated via the media. This conference is an opportunity for all interested parties to share best practices and discuss EE related issues.
Further information	http://www.eso.lt/stream/27812/zp_final_sarasas.pdf
Expert opinion	The Energy Efficiency Initiative encourages companies to invest in EE measures through the voluntary Green Protocol. Although such schemes are voluntary, they can encourage businesses to change by giving them the chance to promote themselves as being supporting of sustainable business activities. The practice also monitors impact and performance, and the annual award for best performer adds a competitiveness angle that can encourage companies to try to outdo each other.

	Ensuring sustainable alternative energy sources for public institutions
Location	Centru, Romania
Summary	Ensuring sustainable alternative energy sources for the Technical College "Dorin Pavel", the Home for the Elderly, the Day Center for Elderly, and the Programs Directorate.
Detailed description	The overall objective of this project has been the improvement of the quality of life of Alba Iulia's residents, as well as the promotion of the municipality's sustainable development, reducing local emissions of CO_2, in accordance with agreements and strategic priorities assumed by Romania within the UN Convention on climate change Framework and the EU. Sustainable energy production has been ensured in four public institutions (Technical College "Dorin Pavel", Home for the Elderly, Day Centre for the Elderly and Programs Directorate), using local solar potential to produce electricity though the installation of 1,714 PV panels with an aggregated installed power of 257 kW.
Resources needed	• Local Authority's own resources, EU Funds & Programmes • Budget: 10,729,416.26 RON • 14 temporary jobs created • 5 permanent jobs created
Timescale	January 2009 - October 2011
Evidence of success	• Technical College "Dorin Pavel": 920 PV panels (138 kW) installed; 105 tons/year CO_2 emission reduction • Home for the Elderly: 524 PV panels (78.6 kW) installed; 86.35 tons/year CO_2 emission reduction • Day Center for the Elderly: 54 PV panels (8.1 kW) installed; 6.05 tons/year CO_2 emission reduction • Programs Directorate: 216 PV panels (32.4 kW) installed
Potential for learning or transfer	This GP can be replied in other public buildings in the Alba Iulia Municipality and by other local authorities to reduce local emissions of CO_2.
Expert opinion	This is a good example of the benefits of suing solar energy. It has involved the installation of solar panels to provide sustainable energy for a care home, making use of available European funds. It has, as a result, created jobs and reduced regional CO_2 emissions.

	Calvello Energetic Village  Comune di Calvello portale istituzionale
Location	Basilicata, Italy
Summary	Municipality of Calvello has activated a territorial development strategy, based on its SEAP, with a strong community involvement.
Detailed description	In 2010 Calvello joined the CoM initiative and adopted its SEAP with the aim of developing a new energy policy to allow citizens to come into direct contact with the opportunities and advantages deriving from a smart use of existing resources. Calvello municipal area is included in the process of regional oil fields exploitation. From this carbon-based energy feature, Calvello has invested in RES and EE to express the ambition of transition towards a Low Carbon Energy framework. With a strong community involvement, the municipality has promoted actions in the field of EE and RES applied to strategic intervention areas: • Sustainable energy production • Public and private building renovation • Transports • Waste collection and recycling The local users' community has been involved in this renovation process, following the concept of 'democratization of energy' (e.g. economic contribution by the municipality for EE and RES interventions for individuals and small businesses). The renewal process has also triggered virtuous investment mechanisms within which local entrepreneurs have played a key role. The overall objectives of this GP are to reduce CO_2 emissions through: • Rationalization of energy consumption • Energy optimization of wood waste • Energy valorisation of residual gases and biogas from zootechnical activities • Promotion of RES plants • Raising awareness on energy sustainability • Territorial requalification and tourism growth
Resources needed	The Municipality of Calvello uses its own funds mostly deriving from oil extraction royalties. EUR 650,000 have been invested to achieve the objectives defined within the SEAP (e.g.: in 2010-13, about EUR 200,000 from oil royalties were assigned for EE and RES interventions implemented by individuals and small businesses).
Timescale	June 2010 - ongoing
Evidence of success	• 244.4 MWh produced from biomass in public facilities: 31 tons CO_2e saved • Direct interventions: 185 tons CO_2 saved • CO_2 emissions saved from indirect interventions: methane network (38.5 tons/year); thermal building coats (247 tons/year); condensing boilers (5.75 tons/year); PV systems for individuals and companies (1,355 tons/year); wind (802.2 tons/year) In 2016, 27.1% of the energy consumed came from RES and a reduction of 45.7% was achieved in CO_2e emissions.
Potential for learning or transfer	Close collaboration between the municipality and citizens, promoting awareness and sharing the objectives and strategies to be applied are key elements to guarantee the transferability of this initiative in other contexts. This initiative can be replicated in other EU territories and contexts, considering its scope within a wider EU initiative (CoM) that is highly transferrable to other contexts.
Further information	http://www.comune.calvello.pz.it/ccalvello/home.jsp
Expert opinion	This GP shows the importance of local energy strategies, taking a dual approach of using renewable energy and improving EE. Municipal strategies and goals are vital for bringing all stakeholders together and giving them direction. The resulting CO_2 reductions are testament to the success of this practice.

	ATER Sustainable Public Housing 
Location	Province of Potenza, Basilicata Region, Italy
Summary	ATER developed a model of "sustainable design" oriented to promote energy savings, the use of innovative materials with low environmental impact and the use of RES technologies on a set of public housing units.
Detailed description	This project represents an operative model of "sustainable design" principles, methods and architectural techniques with reference to RES systems. The aim of the implemented interventions has been to apply the ITACA Protocol for the energy-environmental audit of buildings. The regional "Energy-environmental audit system for residential buildings" (made available by the Department of Public Infrastructure Works and Mobility of the Basilicata Region) has been applied to the sustainability evaluation of 18 new houses. The building techniques were intended to achieve an adequate insulation and to eliminate thermal bridges using environmental friendly materials with high thermal performance levels. RES technologies and heating systems with low operation temperature (underfloor heating systems, condensing boilers, PV and solar thermal) have been installed. Settled in a small neighbourhood (Filiano) of a peri-urban residential area of the Province of Potenza, this GP represents an operative example of a new social housing sustainable model reinforced by an active participation of the user to ensure the optimum energy performance of its own residence.
Resources needed	Total cost of about EUR 2.5 million: National and regional public funds, managed by the public agency for social housing, have been used.
Timescale	May 2013 - ongoing
Evidence of success	The application of Green Building and Sustainable principles in social housing development is an indicator of residential high quality. 18 energy class A houses have been constructed.
Potential for learning or transfer	This GP is transferable to other public agencies committed with social housing. The design method is reproducible and transferable to other contexts implementing the most suitable RES systems and materials for optimizing resources utilization, thermal efficiency and energy production.
Further information	http://www.aterpotenza.it/
Expert opinion	This practice represents the application of sustainable construction standards to social housing blocks. The methodology used was replicable across 18 different buildings. Other regional authorities and bodies working with social housing can examine these building standards and apply them to their own constructions.

	At school for energy efficiency. EE in Public Lighting Networks of the Industrial Zone of Balvano
Location	Basilicata, Italy
Summary	This GP represents how local school community can develop technical contribution for local administration on energy renovation.
Detailed description	Teachers and students of the Secondary High School "Ten. Remo Righetti" in Melfi implemented a project to participate in the PlayEnergy 2012/2013 competition announced by ENEL Inc., proposing the use of "Green Technology" to benefit from energy savings. The involved class has realized an in-depth study of the existing public lighting system in the Industrial Zone of Balvano to develop an energy redevelopment project focusing on the use of state-of-the-art technology products with the aim of promoting the development of policies aimed at reducing consumption. The project has demonstrated a possible reduction in electricity demand of more than 50%. A win-win approach has been identified: the school has access to quality teaching approaches and training experiences putting in practice effective design activities for students; local administration has received effective contributions allowing the identification of local intervention solutions in EE sector. This project aimed at implementing an energy analysis of the public lighting system, an assessment on energy consumption and its reduction without compromising visual comfort and lighting quality, the promotion of an energy saving culture and the adoption of smart technological devices. This GP has favoured continuous development of skills to support local administration in the sustainable management of public lighting systems.
Resources needed	The project has been carried out without any specific funding. Human resources needed: highly motivated teachers with technical skills in the field.
Timescale	September 2012 - June 2013
Evidence of success	In coherence with provisions of the Regulatory Requirements on Sustainability of Public Services, this project has set up a model to support EE, smart energy management and the use of renewable energy in the public sector and promoted low carbon strategies for all kind of territory, particularly urban areas. In the PlayEnergy 2012/2013 the project ranked second (among 2,929 projects and 8,306 Italian and foreign schools).
Potential for learning or transfer	Public lighting is a critical sector throughout Europe, representing a large expenditure in municipal budgets, deriving from low EE levels and inadequate skills of administrators who are called to "direct and supervise" a service in which complex and very diverse themes are involved. This GP represents an easy and replicable way to support public administrations in the sustainable management of public lighting systems thanks to continuous development of skills. This win-win approach is easy and useful to apply in other EU contexts, providing: • High schools with access to quality teaching approaches and training experiences putting in practice effective activities for students in the field of EE • Local administrations with data for the identification of local intervention priorities in EE
Expert opinion	This GP presents an excellent example of practical training for students of a technical school. The students get hands on experience of working to plan EE interventions, and the local administration, in return, gets advice on where improvements can be made in their street lighting. This kind of practical project can be hugely rewarding for students, moving away from purely theoretical studies and benefitting the local community.

	Housing Energy Efficiency Agency 
Location	Lietuva, Lithuania
Summary	BETA represents a successful practice of cooperation between stakeholders based on the coordination of national programmes on EE projects.
Detailed description	BETA is responsible for the implementation of national programmes on EE projects. The Agency provides consulting services and assistance for homeowners on matters related to the renovation of multi-apartment buildings. It also evaluates and approves submitted investment plans and procurement documents, cooperates with municipal authorities, engineering consultancy companies, educational institutions, nongovernmental organizations, etc. There are 2 ongoing programmes related with the renewal of multi apartment buildings and public buildings. The Ministry of Environment of the Republic of Lithuania is the founder of BETA. The agency activities are coordinated at 10 branch offices in Lithuania. The main office is in the capital city, Vilnius, including different departments.
Resources needed	National coordination is essential to foster a smooth implementation of EU structural policies. BETA makes essential work in Lithuania, speeding information for various stakeholders, communicating with municipalities and supervising renovation processes. Moreover, BETA participates in EU-funded international projects, which strengthen the cooperation with partners from other countries and enhances skills and experience in developing projects related to the application of alternative energy resources in multi-apartment buildings, and in generating ideas for the construction of passive houses. The agency also performs activities related with encouraging homeowners to renovate multi-apartment buildings.
Timescale	January 2013 - ongoing
Evidence of success	There have been more than 1,500 implemented projects in 3 years. Average results per renovation project: Heat savings – 50-60 %; Household costs savings - 10-15 %. After the establishment of the new model in 2013, new evidences stand out: • All documents are standardized • Projects' interim payment can be done • An open credit line became available for projects
Potential for learning or transfer	The agency has been created based on national requirements and social/cultural context. Therefore, the transferability of this GP to other countries could be partly done. It is possible to adapt measures which have been created and applied by BETA: communication and educational programmes, BETA calculator, data collection and analysis, etc.
Further information	http://www.betalt.lt/en
Expert opinion	The Housing Energy Efficiency Agency manages and co-ordinates EE programmes in Lithuania, providing a single contact point for those looking to set-up an energy renovation project for multi-apartment and public buildings. Centralised agencies can ensure high specialisation and increased visibility for programmes, attracting more applications and providing services to support applicants.

	SystemsLink energy management software at Durham County Council 
Location	Tees Valley and Durham County Council, United Kingdom
Summary	This Energy Management software has been designed to provide a cost-effective way of implementing an Energy Monitoring and Targeting system.
Detailed description	Durham County Council has over 800 buildings including offices, leisure centres, libraries and depots. For each one it manages electricity, gas and water consumption, at a large annual cost. Each building is unique, with different opening hours and numbers of occupants, different age and condition, and very different functions. The Council has estimated that up to 10% of total energy and water costs could be saved if this data could be managed well. However, the Council at this time was using a very complex and inflexible set of paper bills and Excel spread sheets to manage consumption data so it was not able to manage its consumption well. A great deal of staff time (6 full time staff) has been taken up in managing utility bills and trying to identify waste, with limited success. As a result, the decision has been taken to invest in new energy management software called SystemsLink. The software can be used across multiple utilities accounts, and has an interactive webportal function, allowing individual site access, so that building users can see how much energy they are using and compare consumption for previous weeks, months or years and a wide range of reporting tools. Energy and water consumption data is collected half hourly for each site meaning that the data can be managed by identifying energy waste (such as boilers being left on out of hours and holidays), water leaks and billing mistakes.
Resources needed	The initial cost of the system was £1,6945 + VAT, and there is a small annual ongoing fee for maintenance and updates. Less than 3 FTE members of staff are now employed to use the system, and much of their time can be spent on proactively following up data to save energy and money.
Timescale	January 2011 - ongoing
Evidence of success	The software has saved Durham County Council money and enabled it to meet its carbon reduction targets. More importantly, it has empowered users at all levels to manage energy and resources more efficiently, and to act proactively to do so. Under the old system, staff time was spent on reactive work through checking bills. Now, staff both in the energy team and in building management have data at their fingertips to use and act on promptly.
Challenges encountered	When setting up the system, the challenge was the accurate manual uploading of data, which the contractor supported Durham County Council with, and the setting of appropriate targets for energy reduction. Ongoing, skills development to ensure best value is achieved.
Potential for learning or transfer	Almost all public or private sector organisations consume energy and water in their buildings and can therefore benefit from using effective energy monitoring and targeting software. Systems that have been developed with understanding of the role of the energy officer are likely to be most beneficial. This means that the benefits of using energy management software such as SystemsLink has very broad transferability across countries and sectors.
Further information	https://www.systems-link.com/about/
Expert opinion	Measuring and recording energy usage is a vital step in the elaboration of an effective EE strategy. SystemsLink is a good example of an energy management system, collecting data from more than 800 buildings to highlight where savings are possible. An initially high investment cost can be off-putting for some local authorities, but the case needs to be made that in the long-run, cost, energy and effort savings can be achieved. Regional authorities should bear in mind that the data collected can be used not only for influencing behaviour change strategies, but also investment decisions regarding new low-carbon technologies and building renovations.

	Municipal building heating system powered by woody biomass
Location	Basilicata, Italy
Summary	The Municipality of San Chirico Raparo has implemented biomass heating systems for public buildings.
Detailed description	San Chirico Raparo is a small Italian town of 1,120 inhabitants, located in the Nation Park of the Lucano Appennin. in the Province of Potenza. The surrounding area is characterized by forests from which it is possible to obtain large quantities of wood chips. For facing raising energy costs, the municipality has identified the opportunity to implement a heating system plant based on wood chips for its town hall building. The three-floor building has a heated surface of approximately 350 square meters. About 90,000 kWh must be annually provided by the new plant. The quantity of wood chips annually used amounts about 32 tons for a total operation of 900-1,000 hours. Local stakeholders are involved in an effective cooperation model, delivering positive impacts (energy savings and CO_2 reduction; energy costs reduction for the municipality; new job opportunities and economic development in the biomass production sector).
Resources needed	EUR 320,000 for the implementation of biomass heating systems (including heating for the town hall, nursing home and school).
Timescale	December 2016 – ongoing
Evidence of success	This GP's success elements are its ability to combine the implementation of innovative energy solutions and to promote the economic development capacity of small local businesses with valorisation of local resources. Thanks to this GP, an estimated reduction of around 50% in heating costs is achieved in public buildings, quantified at EUR 17,000 per year.
Potential for learning or transfer	Transferability is related to two conditions: 1. Small size of the municipality 2. Territorial context characterized by forests and high demand for economic development and employment The use of locally available resources and the inward investment in energy that benefits the municipality are key success factors that can be adopted by other regions. This GP represents an example of an operative perspective for policy integration within a very weak territorial context. This GP shows that investment alternatives should be strongly connected with endogenous territorial resources (natural, cultural, human, financial etc.). There is good potential for knowledge transfer within these sectors, similar biomass producing areas and areas that have other locally available energy sources.
Further information	http://www.comune.sanchiricoraparo.pz.it/
Expert opinion	This is a good example of using local complementarities and resources for a sustainable energy supply, through a renewable heating system using local biomass. It can help to diversify the income of farmers and forestry owners, as well as reducing CO_2 emissions. Transferability is reliant on a local, exploitable biomass resources, and companies willing to take part in the value chain. Public authorities can, of course, play a role in bring the value chain together.

	Promoting low and medium enthalpy geothermal energy exploitation in Basilicata
Location	Basilicata, Italy
Summary	Project aimed at promoting low- and medium-enthalpy geothermal energy exploitation in the northern sector of Basilicata.
Detailed description	Despite the extraordinary potential of Italian geothermal resources, there appears to be little knowledge or understanding of this opportunity and its implications for the general society. Therefore, following results of recent works that have highlighted hydrothermal manifestations in the northern sector of Basilicata, a deep characterization and modelling of this area of both hydrogeological and geothermal interest have been carried out. The study of this area from the geological, structural, hydrogeological, and geophysical point of view is very important for the activities related to the exploitation of potential hydrothermal and geothermal applications. The studied area has revealed significant local thermal gradients. Therefore, it was then possible to provide for the installation of technological systems to produce heat and hot water (by means of heat pumps and low-enthalpy geothermal wells) in a school in the studied area, integrating the already existing solar and PV plants. To encourage greater exploitation of geothermal resources, an updated database was created. Moreover, the project provides training and information to technical and administrative operators to increase skills on the various aspects of geothermal energy.
Resources needed	Total financial resources have amounted EUR 45,000. Activities have been carried out by the Institute of Methodologies for Environmental Analysis of the National Research Council (CNR-IMAA), in collaboration with the Universities of Basilicata (UNIBAS) and Bari (UNIBA).
Timescale	January 2011 - January 2013
Evidence of success	The conducted study has led to the formulation of feasibility scenarios regarding the exploitation of geothermal resources in the northern area of Basilicata. The ITCG "Gasparrini" of Melfi school has been equipped with a geothermal system for heating and cooling. The estimated production equals 68.04 MWh/year. Emission reduction amounts 4.35 tons CO_2/year.
Potential for learning or transfer	Costs to produce heat and domestic hot water using fossil fuels are destined to rise, in proportion to the tax imposed and the reduction in the availability of hydrocarbons. Therefore, the knowledge and skills acquired under this GP can and should be transferred to everyone who desires to exploit geothermal resources in other areas of Basilicata.
Expert opinion	Geothermal energy is a widely available, but underutilised resource. As a first step, regions can undertake surveys to determine their resource availability, as has been done here in Basilicata. Making that information widely available can help to demonstrate the potential and encourage investments. In this case, a database was established to resource availability, which led to the installation of a geothermal system for a school. Databases should ideally not be made accessible only to public authorities, but also to other stakeholders including the public, and commercial enterprises, such as construction and architecture firms.

	County-level Climate Protection Platforms
Location	Közép-Magyarország, Hungary
Summary	The general aim of this programme is to establish county-level platforms with the involvement of local stakeholders, and to develop climate protection action plans.
Detailed description	This programme is governed by the Association of Climate Friendly Settlements and aims to raise awareness among the community for a more active involvement in climate change mitigation related actions. MI6 runs three of these platforms. It provides a successful example of broad engagement and coordination of stakeholders for the sake of promoting climate change mitigation. It is both a supplementary package of awareness raising and knowledge sharing services and an innovative cooperation model for engaging all type of local stakeholders dealing with climate protection and climate change mitigation. The programme requires that each county establishes a County-level Climate Protection Platform. Each Platform is required to carry out activities: at least two conferences, three workshops and four awareness raising actions or campaigns. These activities build links and trust among local players and provide a solid foundation for further actions, e.g. preparation of policy support schemes, monitoring climate actions, etc.
Resources needed	Financial resources are available for the first two years of operation. Funding is not foreseen after 2018.
Timescale	January 2016 - ongoing
Evidence of success	After two years of operation, the programme continues. The platforms have been well managed in the last two years (regular meetings, meaningful discussions, etc.). There are plans to embed a SECAP Platform to the VPP Programme using this initiative.
Challenges encountered	Financing post 2018 activities is clearly a challenge. Lack of capacity within the management body is also a challenge on the long run. It is an immanent challenge that these platforms use a specific methodology, elaborated in Hungary by the management body for climate action planning, different from SECAP.
Potential for learning or transfer	The idea and the operational experience are fully transferable and scalable. Chosing the right scale of transfer is crucial.
Further information	http://www.mi6.hu/
Expert opinion	This is a good example of regional stakeholder mobilisation, bringing stakeholders into the process of elaborating climate protection action plans. Efforts at community building and co-design have clearly been successful, supporting the elaboration of Sustainable Energy and Climate Action Plans in some cases. Particularly interesting is that this national programme sets a framework but is not overly prescriptive. Whilst each county must fulfil certain actions (numbers of events, for example), there is scope for adaptation for regional context.

	Sustainable Energy Action Plan and school community engagement (Municipality of Melfi)
Location	Basilicata, Italy
Summary	Melfi Municipality has put in place integrated actions (planned within its SEAP) based on the use of existing technologies and the promotion of active community involvement.
Detailed description	The actions included in the SEAP of the Municipality of Melfi aim at achieving the sustainable development of the urban system using existing technologies and promoting active community involvement. Through its SEAP, approved in 2013, the municipality committed to achieve an ambitious goal: to reduce CO_2 emissions in 20 to 25% by 2020. Within the framework of the SEAP, concerning investment on energy and structural renovation of public school buildings, a win-win informal cooperation has been established between the municipality and the school community (students, teachers and their families). The school community has delivered technical contributions for the design of the intervention and has also been engaged in the municipal EE policy making process.
Resources needed	Capitalization of Municipal/Regional/National/European funds and of royalties from wind farms to implement actions planned in the SEAP.
Timescale	March 2013 - ongoing
Evidence of success	Melfi's BEI has estimated 75,859 tons of CO_2 emissions in 2009, associated with the energy consumption of 253,092.9 MWh. The difference in consumption and emissions between 2009 and 2015 is linked to the results of the implemented actions. Total emission reduction to date amount 24,686.25 tons CO_2/year. Another positive outcome of this GP is the fact that schools and private buildings have been upgraded, providing new impetus to the construction sector.
Potential for learning or transfer	The transferability of this project is high and recommendable. The idea of promoting sustainable behaviour within the school community, through ICT tools, connecting infrastructural investment in energy renovation to additional training activities, represents a starting point for deeper community involvement towards energy sustainability.
Further information	http://www.comune.melfi.pz.it/
Expert opinion	SEAPs set out the actions and responsibilities of local authorities to achieve CO_2 reduction targets. The methodology for setting them up is well established and has been well tested across Europe within the context of the CoM. As such, the approach is highly replicable.

	ESCO model in Lithuania
Location	Lietuva, Lithuania
Summary	ESCO is an example of how cooperation between stakeholders can lead to financial benefits and EE.
Detailed description	ESCO are self-financed: the sources of payment to many ESCO are the savings their customers achieve. The risk is on the ESCO's side, which points out the importance of creating a comprehensive energy plan that ensures savings. If the company doesn't deliver the promised energy savings, financial consequences can be severe and long-lasting. ESCO projects involve many actors: • Maintainers, designers, constructors and other actors important for the implementation of the project; • Equipment suppliers; • Banks, leasing companies, financial organizations; • Municipalities, or other governmental organizations – as promoters of the ESCO model to improve EE in municipal or national companies. Cooperation is a guarantee that all the parties are motivated to reach the best results. ESCO model stimulates an innovative way of dealing with energy consumption. The final consumer does not have to deal with technologies and measures. This kind of contracts guarantee that the monitoring of the energy use will be performed after renovation.
Resources needed	The main coordinator of this cooperation in Lithuania is JSC Lietuvos Energijos tiekimas as the interlink between the customer, contractor and financing company. ESCO projects are financed by LET, according to an agreement established with the final users, based on the savings achieved from efficiency gains.
Timescale	January 2016 - ongoing
Evidence of success	16,842,000 kWh have been saved since the beginning of the ESCO projects implementation.
Challenges encountered	• Slow start of FI • Lack of ESCO regulation • Complicated public procurement procedures and no experience with ESCO • Long payback period • State aid • Renewables are not included in eligible expenditure
Potential for learning or transfer	Demand management is important to stimulate a proactive role from end consumers. A reduction on demand can lead to money savings and decreased carbon emissions. ESCO model is an innovative win-win cooperation model and represents a dynamic and constantly evolving business model. Projects must be turnkey to the customer and offer guaranteed EE gains. ESCO demonstrates the transfer from the up-bottom to the bottom-up approach. This ESCO GP is not unique in Lithuania, as many countries are implementing it to stimulate different cooperation models between stakeholders aiming to increase EE. Lithuanian ESCO projects show the importance and effectiveness of the ESCO model applied to production companies, while other countries are applying ESCO to the building sector. Lithuania is making an effort for the acceleration of the ESCO model implementation.
Further information	https://www.ignitis.lt/#popupnaudinga-informacija/esco-sprendimai/
Expert opinion	This is a successful ESCO GP that uses the model of project financing through energy savings as business model. When correctly implemented, ESCO are powerful financial instruments that can enable a faster and wider roll-out of energy refurbishment measures for buildings. The difficulties listed are typical in this type of undertaking, and learning from those who have already successfully set-up and run ESCO is the best way forward.

	Improve the management of the process of supply of energy
Location	Abruzzo, Italy
Summary	Through "Energy consumption management", the Regional Energy Company SEL S.P.A. proposes to improve the management of the entire energy supply process.
Detailed description	The involvement of numerous local authorities and public facilities implicated a fragmented negotiation with private operators on the price of energy. Furthermore, it was necessary to monitor the energy consumption of all public facilities to eliminate losses and inefficiencies. The Regional Energy Company acts as a Central Purchasing Body, reducing the costs of electricity and natural gas by aggregating the consumption of regional public bodies. Public procurements are periodically launched to select the economic operator for the supply of electricity and gas in favor of regional public bodies. The adoption of an awarding policy for tenders allowed participating organizations to achieve significant savings on energy costs. The main beneficiaries are all public bodies of the Basilicata region (Regine Basilicta, municipalities, provinces, public health companies, other public companies).
Resources needed	Internal human resources of the Energy Company.
Timescale	January 2013 - ongoing
Evidence of success	In 2013, the third tender for the supply of electricity called "SEL EE3" was completed, within which the affiliated organizations had a discount of 16 EUR/MWh, while the CONSIP (national tender) offered 10 EUR/MWh discounts, being the average cost of electricity around 80 EUR/MWh. This resulted in saving around EUR 1 M, VAT included. Participating public players have also achieved electricity consumption savings over the years.
Potential for learning or transfer	The approach used within this GP is transferable as it allows the aggregation of multiple public agencies' electricity and gas consumption, enabling a better energy supply service (that is, one that offers a lower price) through public tendering procedures.
Further information	http://www.societaenergeticalucana.it/
Expert opinion	This is an interesting practice for reducing the costs of energy for public authorities through the aggregation of energy consumption in public buildings, allowing for a competitive public tendering process. The costs savings are impressive, and demonstrate the power of co-operation amongst local authorities. The central body also monitors energy use and has contributed to a reduction in energy consumption, including supporting authorities to adhere to the Covenant of Mayors, and investing in renewable energy installations. The practice is transferable to other regions where local authorities are interesting in co-operating to improve their economic and energy performance.

3. Interregional site visits

During LOCARBO's Phase 1, four Interregional Site Visits have been organized to ensure that interregional exchange findings would be embedded in a structured and continuous way.

3.1. Durham County Council, England

Durham County Council was the hosting partner of the LOCARBO launch event and 2nd TWT meeting, held on 18-19 October 2016.

During this event, a set of 3 site visits was organized, in the thematic of supplementary services and products offered by regional and local authorities (TP1). The visits were held to the Thorn Lighting Ltd, the Brandon Primary School, and the Framwellgate Moor Community Centre.

The visit to Thorn Lighting Ltd, an energy efficient lighting solutions company from Spennymoor, County Durham, was a valuable experience for project partners, who were able to visualize and understand the extensive offer of Thorn high performance lighting solutions for outdoor and indoor contexts.

Besides the extensive area of lighting and components manufacturing and assembly, LOCARBO partners also visited the innovative Thorn Academy of Light, which aims to improve knowledge of and creativity in professional lighting and design.

Figure 4 - Site visit to Thorn Academy of Light, in Durham County Council.

The site visits to Brandon Primary School offered a diverse experience of EE technologies installed, and the Framwellgate Moor Community Centre outlined its operating system by the local community (based on an agreement with Durham County Council).

3.2. Kaunas City, Lithuania

When Kaunas University of Technology hosted the 3rd SG and TWT meetings of LOCARBO project, on 13-14 March, the following site visits were conducted in Kaunas City:

- Multi-apartment building, built in 1975 and renovated in 2015, as an example of advanced renovation, where the best technologies and cost-effective solutions were implemented;
- Residential quarter subjected to integrated energy rehabilitation and urban renewal actions in 2016-17. The project was funded by the City of Kaunas with the aim to stimulate complex renovation of buildings and demonstrate how this can improve its living conditions;
- Santaka Valey, the Department of Polymer Chemistry and Technology of KTU which works as a transdisciplinary research and industry collaboration institution.

Figure 5 - Site visit to a multi-apartment building (build up in 1975) renovated in 2015, in Kaunas.

3.3. Alba Iulia Municipality, Romania

The Municipality of Alba Iulia hosted the 4th LOCARBO project event on 7-8 September 2017.

A guided site visit was carried out to a public transport company using an innovative system to increase power efficiency in fuel economy filtering, and to three public institutions (the

Dorin Pavel Technical College, an elderly home and a day centre for the elderly) where Solar PV Panels were installed with the support of European funds, producing at least 50% of these buildings' energy needs.

Figure 6 - Solar PV Panels installed on an elderly home at Alba Iulia municipality.

3.4. City of Budapest, Hungary

Budapest was the stage of the 4th SG and 5th TWT meetings on 6-7 March 2018.

A guided site visit to an Energy Efficiency Demo Building (Passive House) allowed the visualization and understanding of its systems and appliances.

Figure 7 - Site visit to an energy efficiency demo house launched by Mi6, in Budapest.

4. LOCARBO's Action Plans

As a result of the previously described activities, Action Plans have been developed with a focus on improving 7 Policy Instruments. The LOCARBO partnership is now focused on implementing the planned actions, spreading innovative initiatives to increase energy efficiency and the use of renewable energy sources in buildings, and providing innovative ways of supporting energy consumers' behaviour change.

4.1. Province of Potenza

The Province of Potenza Action Plan is based on the involvement of communities on energy efficiency and climate change awareness sessions and networking building initiatives, anchored on the Provincial Territorial Coordination Master Plan and the Strategic Framework to Combat Climate Change.

Criteria for the selected actions included ensuring an integrated approach, feasibility and effectiveness in implementation. The operative vision of the Action Plan has a focus on the following domains of intervention:

- Young people in action: addressing school communities with specific Energy Efficiency and Climate Change awareness-raising actions;
- The Province of Potenza network of municipalities: reinforcing inter-institutional dialogue and collaboration;
- Communities for change: the new Covenant of Mayors as a driver for territorial innovation on energy and climate.

4.2. Basilicata Region

The Action Plan of the Basilicata Region proposes the application of Pre-Commercial Procurement (PCP) to improve the Regional Operational Programme (ROP) ERDF Basilicata 2014-2020. It foresees the creation of a standard call for tenders within the ROP, addressing the implementation of specific actions to contribute to the transition to a regional low-carbon economy. PCP is a tool for the prototyping of new products and/or services not on the market.

The PCP becomes a useful means of piloting the potential supply of technological innovation from companies and research centres towards the development of solutions capable of improving energy and environmental performance.

4.3. Municipality of Vila Nova de Gaia

The Municipality of Vila Nova de Gaia Action Plan transposes the strategic aim for the municipal transition towards a low-carbon economy, through the promotion of energy efficiency measures on specific target groups, such as schools/sports communities, municipal buildings managers, and domestic consumers.

The promotion of energy efficiency in buildings and equipment under municipal management is associated to the Nearly Zero-Energy and CO_2 Zero buildings concepts, and will stimulate the use of innovative smart solutions/technologies for preventive and corrective actions on energy efficiency.

Awareness-raising measures on the advantages of rational energy use will be implemented within an active and engaged community network, promoting new energy conscious behaviour.

4.4. Durham County Council

Durham County Council will be supporting the North East Business Energy Efficiency Support with advice and good practices. This is an ERDF funded project the Durham County Council supported partners to bid for, through learning from LOCARBO.

Through the LOCARBO Local Living Lab it has worked with the National Department for Business, Energy & Industrial Strategy (BEIS) to explore different models of energy efficiency after Britain leaves the European Union as part of the Shared Prosperity Fund and the National Clean Growth Strategy. In Phase 2 Durham will work with the BEIS to develop potential options and assess their viability. It will also continue to support the Huddle tool, by working with Local Living Lab partners to ensure that the benefits are maximized.

Durham is also exploring a pilot of a National Virtual Power Plant in the UK. This would incorporate learning from partners Mi6 in Hungary. This will identify greenhouse gas reductions resulting from all Priority Axis 4 projects delivered across England from 2014 to 2020, analysing these and calculating their impact in terms of a virtual power station.

4.5. Kaunas University of Technology

The Action Plan focuses on the improvement of the Policy Instrument tackled by the University of Kaunas within LOCARBO project: Operational Programme for EU Funds Investment in 2014-2020 - Republic of Lithuania - Supporting the shift towards a low carbon economy in all sectors, with the specific objective 4.3.1. reducing energy consumption in public infrastructures and multi apartment houses.

The Plan will be oriented to influencing the implementation of specific projects, to raise the quantity of households with increased energy efficiency class. It will integrate the promotion of complex renovations reaching high energy efficiency standards.

The integration of the end users as proactive actors guarantees the sustainability of the renovation results.

4.6. Hungarian Innovation and Efficiency Nonprofit Ltd (Mi6)

The Hungarian policy instrument selected within the LOCARBO project for further enhancement is EDIOP (Economic Development and Innovation Operational Programme) 2014-2020 - Priority 4 (energy efficiency and renewable energy for SMEs). The Hungarian case is special, as the strategic and structural modification of the policy instrument has already been achieved, accepted and launched in Phase 1 of the project. The purpose of the Action Plan is to provide a framework for implementation towards improving the policy instrument via monitoring and stakeholder engagement.

The Action Plan defines three specific objectives, each of which aims at further mobilizing MI6's strength in bridgebuilding and matchmaking capacity between the policymakers (supply side) and SME applicants (demand side) of the EDIOP-4 calls:

- Improving stakeholder engagement with SMEs using the Virtual Power Plant Programme (demand side);
- Further developing EDIOP Priority 4 (supply side);
- Monitoring the performance of the policy instrument (matchmaking).

4.7. Municipality of Alba Iulia

The vision of the Municipality of Alba Iulia, on a medium and long-term perspective, is to promote EE, smart energy management and RES in public infrastructures.

In this regard, the following actions are proposed:

- Disseminate good practices on public buildings;
- Share findings on new funding sources for greening the public sector;
- Perform campaigns related to green building, outreaching projects and activities;
- Organize workshops with relevant actors for the public building sector;

- Transmit to the Regional Development Agency ideas for improving ROP (Regional Operational Programme) - Axis 3.1;

- Update the city's Plan for Energy Efficiency Improvement, promoting it to the stakeholders from public institutions.