PROJECT

PRO-ENERGY

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Activity:	**5.6.1** Integrated cloud-based joint ICT platform
Activity Leader:	**National Agency of Natural Resources**
Deliverable:	**5.6.1**

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Editor:	**Roalb Studio shpk** 		

DISCLAIMER:

The common challenge of PRO-ENERGY is to improve energy efficiency of public buildings (municipal/provincial/regional buildings, schools, universities, health centers, hospitals, museums, sports facilities etc.). This is a common problem faced by the territories participating in the project characterized by old facilities, outdated/degraded building façades, materials & equipment (insulation, electrical appliances, cooling/heating systems etc.), low energy consciousness & awareness, lack of skilled civil servants, etc. leading to high-energy consumption & CO2 emissions.

IDENTIFICATION SHEET

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Project Acronym	***Pro-Energy***
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INTRODUCTION

The common challenge of PRO-ENERGY is to improve energy efficiency of public buildings (municipal/provincial/regional buildings, schools, universities, health centres, hospitals, museums, sports facilities etc.). This is a common problem faced by the territories participating in the project characterized by old facilities, outdated/degradated building façades, materials & equipment (insulation, electrical appliances, cooling/heating systems etc.), low energy consciousness & awareness, lack of skilled civil servants, etc. all leading to high energy consumption & CO2 emissions. Combined with the fact that participating territories are energy import dependent it is more than evident that there is room for improvements in energy consumption & more efficient use of energy. More importantly, the exemplary role of the public sector should be promoted by increasing energy savings in public buildings. PRO-ENERGY aims to address these issues by developing & implementing a Joint Strategy & Action Plan, increasing competences of buildings' owners & operators, developing& applying technologies& tools to reduce energy consumption in public buildings,& promoting generated good practices& results to local/regional/national entities in the Balkan-Med region. The project addresses the policy & institutional level (Joint Strategy& Action Plan),human resources level (Capacity Building of Energy Managers)& the managerial systems level (ICT Platform&CBA Modeller&Energy Performance Contracting-EPC). The novel energy saving technologies promoted by PRO-ENERGY refer to Behaviour-based Energy Efficiency. Behavioural efficiency programs introduce cost-effective ways to reduce energy consumption, as literature & practice suggests. The overall objective is to promote Energy Efficiency in public buildings in the Balkan Med area & to create a practical framework of modelling & implementing energy investment interventions through specific ICT monitoring & control systems,& through EPC. The innovativeness of PRO-ENERGY lies on the EPC use, a proven in EU projects, practical& effective "creative financing" tool enabling funding of energy upgrades& on the fact that most energy efficiency measures involve technological interventions but equally have to rely on people adjusting their energy consumption behaviour. To do so, consumers should be provided with meaningful, clearly communicated&continual feedback. PRO-ENERGY focuses on non-domestic consumers (employees/visitors etc. of public buildings), because in this segment initiatives are normally delivered at the organisational level & there is no direct link to personal wealth of the individual users. Motivation for those users to engage in energy efficiency behaviours is therefore very different from domestic

users& must rely on corporate & social responsibility objectives & societal norms' reinforcement. Behaviour change measures at work may inspire consumers to act differently at home increasing thus multiplier effects.

The present document provides the contribution of the AKBN in the JointCost-benefit Analysis tool. The first version of the CBA tool was designed and provided by the Region of Epirus – Regional Unit of Thesprotia to all Project Partners in order to contribute to the final version to be delivered at project level.

The AKBN tested the Cost-benefit tool (version 1) on its pilot building, following the energy audit and the Energy Performance Certificate issued in the previous activities of the PRO-ENERGY.

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1.Monitoring report of pilot projects and demonstrative actions in school "Koto Hoxhi" Gjirokaster

Rationale

The realization of the pilot projects and demonstrative actions will obviously produce some benefits for the territories hosting them. The main goal of the Pro-Energy project is however that of promoting energy sustainability on a much wider scale in the Balkan Med area, so we need to capitalize at best from these pilot initiatives.

Partner	**National Agency of Natural Resources (PB6)**
Municipality	**Gjirokastra**
Intervention title	Implementation energy efficiency measures and Renewable Energy in Public Buildings in Koto Hoxhi School in Gjirokastra
A Structured description of the implemented action	
A.1 General description	
The project is carries out in frame of collaboration of Balkan MED Programme with Albania through the Program, titled "**Sustainable Energy Supply for Communes.**" The overall objective of the Program is to promote economic growth and productivity enhancement in the Albanian economy, through the promotion of suitable and viable Energy Efficient investments. The program includes "The promotion of Energy Efficiency in Public Buildings, Albania. The main scope of this part of the Program is to promote energy efficiency measures in Albanian Public buildings, by selecting cost-effective projects with high visibility, ensuring high benefit to the end-users, energy savings and environmental benefits, contributing to the growth and productivity of the Albanian economy. The subjects of the supplies, works and services is divided into two phases: **Phase n°. 1**: Energy Efficiency Measures at the building envelope Turnkey supply and installation of fully functional systems: • Installation of external thermal insulation and roof insulation at the building and also floor thermal insulation (together with the thermal insulation of the floor).	

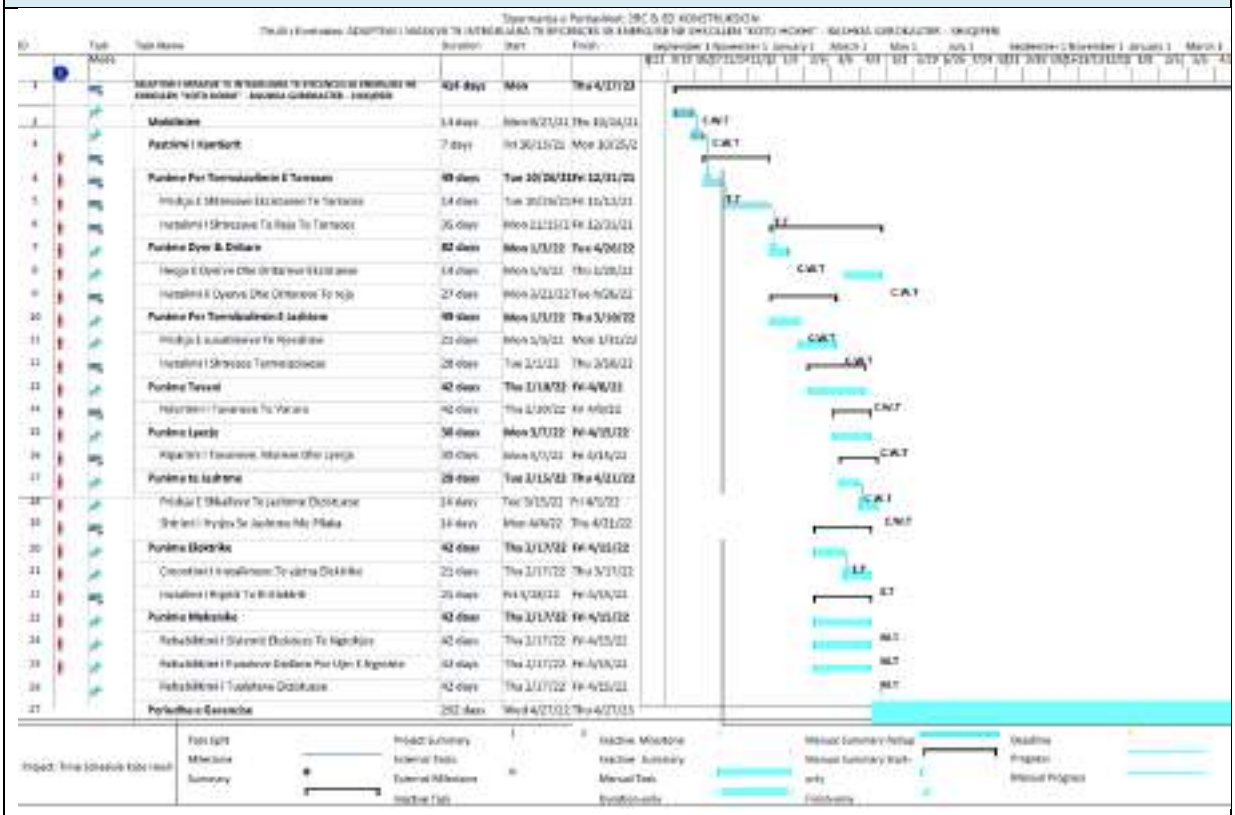
- Supply and installation of new PVC double-glass windows and doors
- Providing supporting energy efficiency measures (which have no direct impact in energy efficiency, but they are necessary to guaranty lifespan of energy efficiency), like: reconstruction of the toilet and internal walls, repairing internal doors, placement of inside doors and painting of all walls.

phase n° 2: Heating, solar, and lighting systems

Turn key supply, installation and commissioning of fully functional systems as follows:

- Supply, installation, commissioning, testing and regular maintenance of a new complete wwod/pellets stoves and solar hot water system with a hot water tank for the supply of sanitary hot water
- Supply, installation, commissioning and testing of flat-plate glazed solar collector system at the rooftop of the building, with a hot water tank connected to the sanitary hot water supply system (heated by the boiler).
- *Supply, installation, operation of a new energy efficient lighting system to all spaces of the building and also replacement of electrical system of the building and smart sensor systems the recording of energy consumption & the measurement of the impact of behavioral change measures*.

A.2 implementation times



Electrical Energy Consumption Meter

Device (emri i Paisjes)	EUI (kodi i paisjes)	Location (Vendidhja e paisjes)	Comments on the location (Komentet Cfare te dhenash mat
Energy measuring unite	19R007170420	Power distribution central unit	Total energy parameters
Energy measuring unite	19R007170421	Power distribution unit floor 00	Energy parameters on floor 00
Energy measuring unite	19R007161215	Power distribution unit floor +1	Energy parameters on floor +1
Energy measuring unite	19R007210525	Power distribution unit floor +2	Energy parameters on floor +2

B Technical and economic impact

B.1 Impact on the energy balance Energy Efficiency

Energy situation in Albania almost directly is impacting as well as energy supply situation in Gjirokastra region. It is important also to point out that energy situation in each unit including as well as distect of Gjirokastra has two sides: consumption (in the past), demand in the future and supply side. Since, Albanian energy system is unic one especially related with power system, its pros and cons influence power supply also for all residential, service, SMEs enterprises of Gjirokastra region. Establishing a sustainable energy balance of supply for Gjirokastra will depend totally from its renewable energy resources potential and as well as EE potential in residential, service, SMEs enterprises. It is important to be mentioned that most of the measures that will be recommend for having a sustainable energy development for Gjirokastra region are similar with those presented in Albanian RES Action Plan and Albanian EE Action Plan (approved from Albanian Government on Sept 9, 2020). Under Albanian EE Action Plan it is requested that each Municipality and each Commune to prepare its energy sustainable plan and this is first good attempt to fulfill such important task.

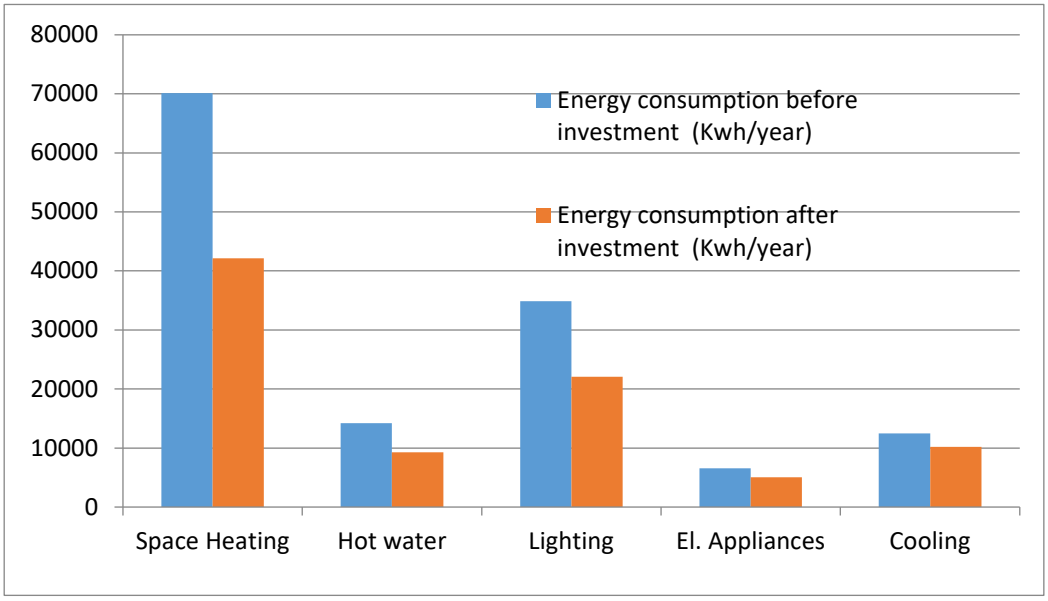
The common challenge of PRO-ENERGY is to improve energy efficiency of public buildings (municipal/provincial/regional buildings, schools, universities, health centers, hospitals, museums, sports facilities etc.). This is a common problem faced by the territories participating in the project characterized by old facilities, outdated/degraded building façades, materials & equipment (insulation, electrical appliances, cooling/heating systems etc.), low energy consciousness & awareness, lack of skilled civil servants, etc. leading to high-energy consumption & CO2 emissions.

B. Energy Impact

Promotion of efficient and economic use of energy and with a minimal effect on the environment, in a way that the energy sector to be a supporting sector for the sustainable development of all the other economic and social sectors of Albania .

Nr.	Energy services	Energy consumption before investment (Kwh/year)	Energy consumption after investment (Kwh/year)	Energy Savings, kWh/year)	Energy Savings, %
1	Space Heating	86,420	42,142	44,278	51%

2	Hot water	14209	9250	4,959	35%
3	Lighting	34870	22075	12,795	37%
4	El. Appliances	6563	5055	1,508	23%
5	Cooling	12450	10200	2,250	18%
6	Energy for m2	205	104	101	49%
7	Total Energy	**154512**	**88722**	**65790**	43%



B.2 Impact on the CO_2 emissions

The environmental benefits of the foreseen energy efficiency measures to be introduced into public buildings are numerous and include:

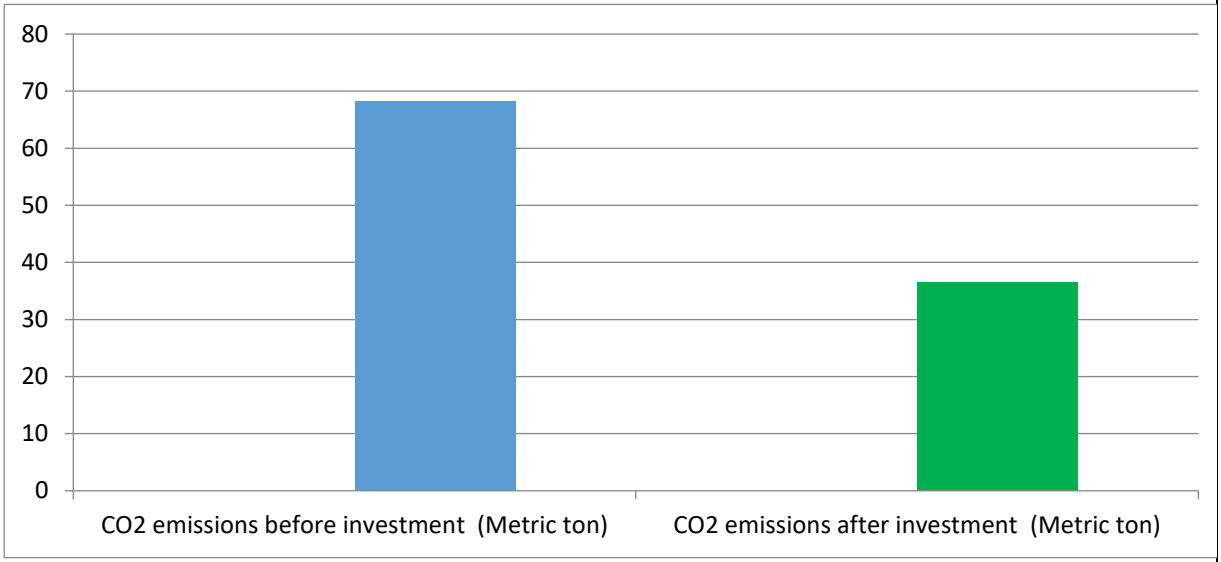
- reduction in air pollution
- reduction of GHG emissions
- Use of environmentally friendly materials as replacements for the existing ones (such as window frames, roof materials, floors, doors, light bulbs, etc).

In terms of the impact of the proposed measures on other emissions, public building mainly use different energy commodities for their heating systems and by decreasing energy consumption, air pollution, including CO2, will be reduced 31.75 metric ton.

Table. CO_2 EMISSIONS (ton)

Nr.	Energy services	**CO_2 emissions** before	**CO_2 emissions** after	**CO_2 emissions reduction**	**CO_2 emissions reduction**

		investment (Metric ton)	investment (Metric ton)	[t CO_2]	[% CO_2]
1	Space Heating	48.39	24.00	24.39	50%
2	Hot water	9.80	2.94	6.86	70%
3	Lighting	5.50	2.20	3.30	60%
4	El. Appliances	4.53	4.53	0.00	0%
5	Cooling	3.49	2.79	0.70	20%
6	**Total Energy**	68.21	36.46	31.75	47%



B.3 Impact on the quality of services

The Energy Efficiency Potential of the Public Buildings Stock of the Region of Gjirokastra consists of changes realistically achievable between actual energy consumption and the energy consumption after the implementation of energy efficiency and sustainable measures. The measures has improved energy efficiency are implemented in school Koto Hoxhi, the total energy consumption can be reduced by **138239** kWh/year to **88722** kWh/year, which is a 36% decrease compared to the present situation.

Measures to improve the Energy Efficiency in the public buildings in Gjirokastra Region
Thermal Insulation: Thermal insulation of Koto Hoxhi, in Gjirokastra Region has improved the thermal standards of the buildings in according to the standard for energy conservation. The improvement of the existing buildings stock from the thermal insulation point of view and construction of public buildings based on the new Albania energetic code (that is being prepared AKBN will make possible the saving of energy commodities that are used for the space heating and space cooling.

Interior Renovation of the Heating Systems: For the rehabilitation of public buildings in Gjirokastra Region, are made more efficient heating systems by type and size of insulated buildings.

Energy Efficient Lighting: Koto Hoxhi, in Gjirokastra Region are replacement of all lamps with energy efficient / economic lamps. This measure is expected to bring in future the energy savings of approximately 60 % of the energy consumed for interior lighting.

Non-technical measures (promotion and awareness raising activities). The team of Koto Hoxhi, has organized public awareness campaigns to promote energy efficiency given the specifics of each target group and using concrete facts about motivation.

The benefits of pilots project has been, especially increasing comfort in health sector and perhaps more significant in the long term, such as the reduction of depletion rate of non-renewable energy sources (fuel-wood) and the reduction of atmospheric pollution (greenhouse effect, acid rains, smog, etc.).

C. Social impact

C.1 Social acceptance and impact on the citizen

A social-economic analysis in Gjirokastra region has verified the degree of utility of the intervention for the community. The economic analysis carried out has taken into account any external costs and benefits and indirect costs involved with the intervention. The economic external costs are those related, as example, to other further necessary intervention, the costs of health, costs for time spending. The economic benefits are those accruing to the community as a whole by the implementation and management of the intervention. In this section it is important to refer to Alterenergy activities related to the capacity building and awareness raising carried out in the target communities. It is very important to point out that taken into account above mentioned external elements (included them in economic analysis) was possible to calculated all economic indicators and results shows a positive/feasible analysis.

C.2 Engagement of and impact on the stakeholders

This step aims the initial selection of the groups that will be the target for the local energy efficiency implementation. The purpose of this step is to determine for which groups it is useful to collect additional and detailed information, and which group should be excluded from the programme of Increasing energy efficiency in the Gjirokastra Region and particularly In Koto Hoxhi, stock .

Instruments that local governments are used various legislative measures. Also communication with the target group, together with other intermediaries can be useful instruments. These intermediaries (mediators) has been for the Koto Hoxhi, of Gjirokastra Region:

- Head of the Department for Asset Management,
- Head of the Department for Public Services,
- Head of the Department for Health and Social Protection,
- Head of the Department for Urban Planning and Environment Protection,

- Head of the Department for Economy and Finance,
- Environmental association NGO (non-governmental Organization)
- Construction Association NGO (non-governmental Organization)
- Agriculture association NGO (non-governmental Organization)

The impact of stakeholder are In focusing on the final energy consumers, many possible target-groups appear in public building stock of Region. Looking at the policy fields that Koto Hoxhi, has to deal with, energy efficiency and Renewable energy as well as the promotion of pilot projects in Koto Hoxhi, stock in Gjirokastra Region

C.3 Wider social and economic impacts

In terms of **Wider social and economic impacts of Alterenergy project and pilot projects**, one benefit that has generated a great deal of interest is job creation. Jobs are created as a result of efficiency programs in three categories:
Direct.
Direct jobs are in firms that are actually receiving the efficiency program and doing the energy efficiency work that a program is targeting (e.g., construction, engineering, architecture).
Indirect.
Indirect jobs are jobs in firms supplying goods and services to energy efficiency firms (e.g., manufacturing, accounting).
Induced.
Induced jobs are those created by the demand generated by wage and business income from energy efficiency investments and by energy bill savings.

D. Impact on the local administration

D.1 Difficulties and obstacles encountered in the realization of the intervention

- Social and behavioural barriers: lack of knowledge/information of citizen and investors about the existing incentive system, professional (engineers, architects, intstallers, etc.) conservatism on new renewable energy and energy efficiency solutions, media presentation of information about environmental issue; citizen acceptance of the status quo and disjunction between verbal support and willingness to take action about environmental issue, a lack of widely available and understood cost-comparison data about existing solutions on sustainable topic.
- Institutional barriers: complex regulations in theme of renewable energy and unstable market both at national and local level, complex and slow 'red tape' processes needed to gain authorization for renewable sources systems or energy efficiency investiments, lack of willingness of local administrators about European and national initiative to support energy sustainability, lack of experts or personell committed on energy topic in local administrations.
- Economic barriers: limited cost effective impact of some solutions (especially in tertiary industry), lack of economic and financial resources to carry out investments, return of investment in energy sustainable solutions have often long time horizons, conflicting interests about investment in building energy efficiency between owners and teneant, local monopolies that increase cost of micro-renewable installations and/or energy efficiency interventions.

D.2 Lessons learnt

The lessons learnt during the implementation of the pilot projects or demonstrative action, individuating the "good practices". There is a wide range of surveying approaches to determine these benefits. These include willingness to pay and willingness to accept contingent valuation (CV) studies, comparative or relative valuations, and other revealed preference and stated preference approaches. Surveys are used specifically for determining relatively subjective program participant benefits when quantification is difficult and/or expensive. However, pilot projects can be used for almost all benefit types where participants and non-participants can be asked to provide data (e.g., energy population, how many people they hired for determining job impacts, whether they believe their indoor air quality is better, if there are distribution projects that were delayed). Good proctise has been in technology 'know how', spread across some involved territories, in specific operational areas and with regards to some application areas of energy efficieny and Renewable energy.

D.3 Impact on internal competences

Impact on internal competences for Gjirokastra Region has been at:

- Supporting local level management of energy resources and propose ways of improving energy availability.
- Through the evaluation of energetic situation in Local Territories, carry out analysis for the implementation of energy efficiency measures in the Public Buildings Stock.
- Supporting pilot implementation of energy efficiency measures in selected Public Buildings.
- Providing guidance, and advice and capacity building in the energy planning and energy efficiency within the local government level.

D.3 Impact on energy and territorial planning

Energy efficiency is not just about new technologies; it is about new behaviors and better decisions. Local authorities through the experience of Alerenergy project have established energy efficiency programs to support the development of, implementation of, and compliance with Albania Action Plan of Energy Efficiency. These programs include efforts such as emerging technology programs, compliance-enhancement programs, and stretch (or reach) goal programs, as well as training on different stakeholders for building code officials, builders, contractors, and designers. Local Authorities have all possibilities according the experience of Alterenergy project to implement of the intervention impacted on local territorial/urban and energy planning as well as air pollution reduction and GHG mitigation goals

E. Replicability

E.1 Potential for evolution and replication at local level

Potential for evolution and replication at local level could be replicated one or two years or even longer due to condition of public buildings in Albania. The point at which programs are being designed is ideally when the impact, market, and process evaluation planning process should begin. This is primarily so that the program budget, schedule, and resources can properly take into account evaluation requirements and opportunities. It is also a way to reinforce the concept that evaluation is an integral part of the portfolio process, supporting the portfolio's success through an assessment of the program's impacts as well as the program's theory for how savings are to be achieved.

E.2 Potential for replication in different urban contexts in the Adriatic area

The implemented action could be replicated in the wider Balkan Med area which is in Coherence between the project and Albania Energy Strategy for the development of the sector for energy efficiency and the creation of energy from renewable sources.