

GRASPINNO

Transnational model, strategies and decision support for innovative clusters and business networks towards green growth, focusing on green e-procurement in EE/RES for energy refurbishment of public buildings.

Deliverable: 5.2.1

Guidelines for the Public-Private partnership to achieve EE in Public Buildings

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1. Scope, objectives and structure of the deliverable

This report represents the "Guidelines for the Public-Private partnership to achieve EE in Public Buildings" deliverable for the GRASPINNO project and describes part of the work undertaken in WP5 "Capitalizing". Its main objective is the provision of practical guidelines for SMEs, business supporters (GPP experts, Chambers of Commerce, Business Angels, etc.) and Public Authorities in public building refurbishment.

1.1 Structure of the deliverable

This deliverable is structured in 5 chapters:

Chapter 2, "**Guidelines for EE in public building refurbishment**", provides a general description of guidelines for public and private organizations active in public building refurbishment activities. More specifically, there is a description of approaches for energy consumption and costing analysis, along with a roadmap for taking up the GRASPINNO eGPP platform.

In Chapter 3, "**Guidelines for involvement of companies/SMEs in a PPP procedure**", guidelines for companies/SMEs that offer energy refurbishment proposals of buildings are provided.

Chapter 4 "**Strategic evaluation and contracts and investment readiness for private sector**", describes guidelines for improving the investment readiness of intermediary organizations, SMEs and financing entities. Moreover, includes information about energy performance contracting (EPC) and guidelines for the evaluation of energy contracts by public organizations.

Finally, initiatives and opportunities for the public organizations and authorities (in Italy, Greece and Catalonia-Spain) in order to finance their Energy Efficiency plans, are described in Chapter 5 "**Initiatives & Opportunities to finance EE plans**".

2. Guidelines for EE in public building refurbishment

2.1 Approaches for energy consumption & costing analysis

Aim of this paragraph is describing a fundamental part of the PPP guidelines, that is the preliminary collection of data concerning thermal and electric energy consumption and costs. Every PPP process is based on an accurate data analysis finalized to select suitable buildings for energy refurbishment and decide what kind of intervention has to be implemented. The analysis will be based on a multi-annual collection of energy consumption and costs provided through the bills and a calculation of the CO₂ emissions (or other GHG) and the tons of oil equivalent (TOE).

The idea is offering a complete analysis of available public buildings in a local framework of energy consumption and GHG emissions. This approach allows the opportunity to access to specific funds and assistance tool (for instance, ELENA programme and financings provided by the European Investment Bank or the European Energy Efficiency Fund). A different approach could make harder to obtain this kind of financial resources and the cost of collecting data with other methods could be very higher. A clear demonstration of this assertion will be contained in the Chapter 4 in which a cost approach path will be showed, by highlighting when the PPP way is more appropriated.

To follow the above-mentioned approach, this part of the document deals with of a smart preparation of the **Sustainable Energy Action Plan (SEAP)** in which collecting the energy data of the public buildings; the work is based on the Siena Province case but it is applicable to other contexts. The preparation and its signing of a SEAP is not so rare but very few applications of these plans have given a change in terms of **sustainable development at local level**. This document shows a peculiar application that can give a plus in economic and environmental terms also if applied to other territorial contexts.

A good preparation of a SEAP gives great benefits to all the community. SEAP is a plan signed by a Municipality but its benefits concern PA, private sector (enterprises, citizens) and also the local environment.

The question is: why is this peculiar SEAP application considered smart? There are at least three reasons:

1. **Economies of scale.** The need to implement a synthesis and a scoring model requires to work with large quantity of data coming out from different sources; once identified the province/county (or other large areas) taking part in the analysis, it will be pursued availability of all data related to the necessary VARIABLES for ALL the municipalities in the same province/county (or other large areas). It means that the participation of several municipalities in the SEAP drafting does not necessarily imply more work compared to the need to provide data for a single local administration of a province.

2. **SEAP is a voluntary tool**; to have real result in terms of reduction of energy consumption and CO2 emissions, the plan should be made binding. This paragraph pays a special attention to the Energy Efficiency of buildings even if with the transposition of the European Directive 2014/24 and the consequent GPP energy efficiency binding rules in many national procurement code (Italy included) can make unnecessary the introduction of constraints. If no national/regional strong normative constraints exist the effectiveness of a voluntary plan is quite low with consequence on the real energy refurbishment of (public) buildings.
3. **SEAP has been so far a simple tool** at voluntary membership with a little impact on the emissions reduction, make the municipal level a tile of a mosaic and contribute to assign contents of real political action; it is a crucial challenge in which SEAP becomes an effective tool of governance.

The **Covenant of Mayors** brings together local and regional authorities across Europe, who gives a voluntary commitment to implement energy, **climate mitigation and sustainability policies** on their territories. The initiative, which currently involves more than 6.000 municipalities, was launched after the adoption of the EU Climate and Energy Package in 2009.

The Covenant's aim is to endorse and support the crucial role played by local authorities in mitigating the effects of climate change (80% of energy consumption and CO2 emissions worldwide are associated with urban activity).

As the Covenant of Mayors is the only initiative of its kind **bringing together local and regional players to achieve EU objectives**, the European institutions see it as an exceptional model enabling different levels of government to work together to develop and implement policy.

Municipalities joining the initiative commit to developing and implementing a sustainable energy action plan (SEAP) containing **measures to reduce their energy-related emissions** compared with the emissions calculated or measured in a baseline year.

The smart SEAP is based on a sort of local path to describe how a **sustainable economy can be implemented and preserved** by using a "mosaic" approach where the public buildings is only a part of a long process.

Anyway, this support remains marginal because public sector contributes about 4-6% of the total energy consumption and GHG emissions in a municipality (see the figure 2.a.1).

Energy Consumption

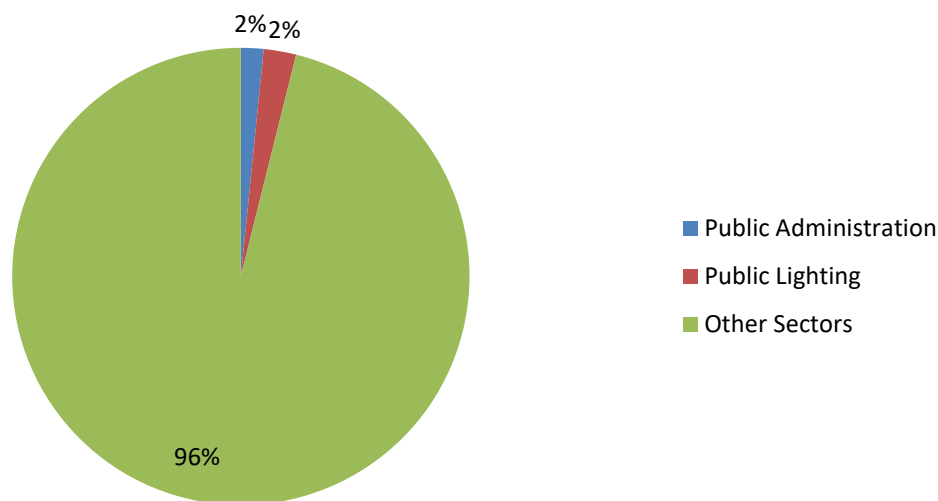


Figure 2.1.a: SEAP – Share of the Public Sector

The application of the **IPCC methodology for Greenhouse** gas emissions Inventory at the province level already foreshadows the enormous potential of the availability of information on municipal level. The “picture” of the whole Italian territory offers the possibility of comparisons and construction of policies that a smaller scale territory makes it impossible.

The **Siena Province Carbon Free Certification** (“Siena Carbon Free” project) indicates the political virtuous process that Siena have undertaken; having pursued the goal of equalization between emissions and absorption is still an important achievement but, as we see in the map (Figure 2.1.b), Siena is not the province of Italy with the minimum level of per capita CO₂ emissions in the atmosphere. That is a **clear signal that much more effort has to be done to reduce GHG emissions**. That is just a simple marker of the potential that this SEAP could have; in fact, it has important implications in terms of economies of scale: the used methodology provides for the availability of data at municipal level of the Italian provinces. The need to implement a synthesis and a scoring model requires to work with large quantity of data coming out from different sources; **once identified the province taking part in the analysis, it will be pursued availability of all data related to the necessary VARIABLES for ALL the municipalities in the same province. It means that the participation of several municipalities in the SEAP drafting does not necessarily imply more work compared to the need to provide data for a single local administration of a province.** The tool, expanded to the use of many municipalities, identifies exactly at this stage the possibility of switching from a simple descriptive local condition about energy consumption and greenhouse gas emissions to a concrete process, able to generate government decisions and actions.

The awareness about the opportunity to extend this approach to all the partners (not only Italian ones) and the level of economies of scales that can be created should stimulate the involvement of as many municipalities as possible.

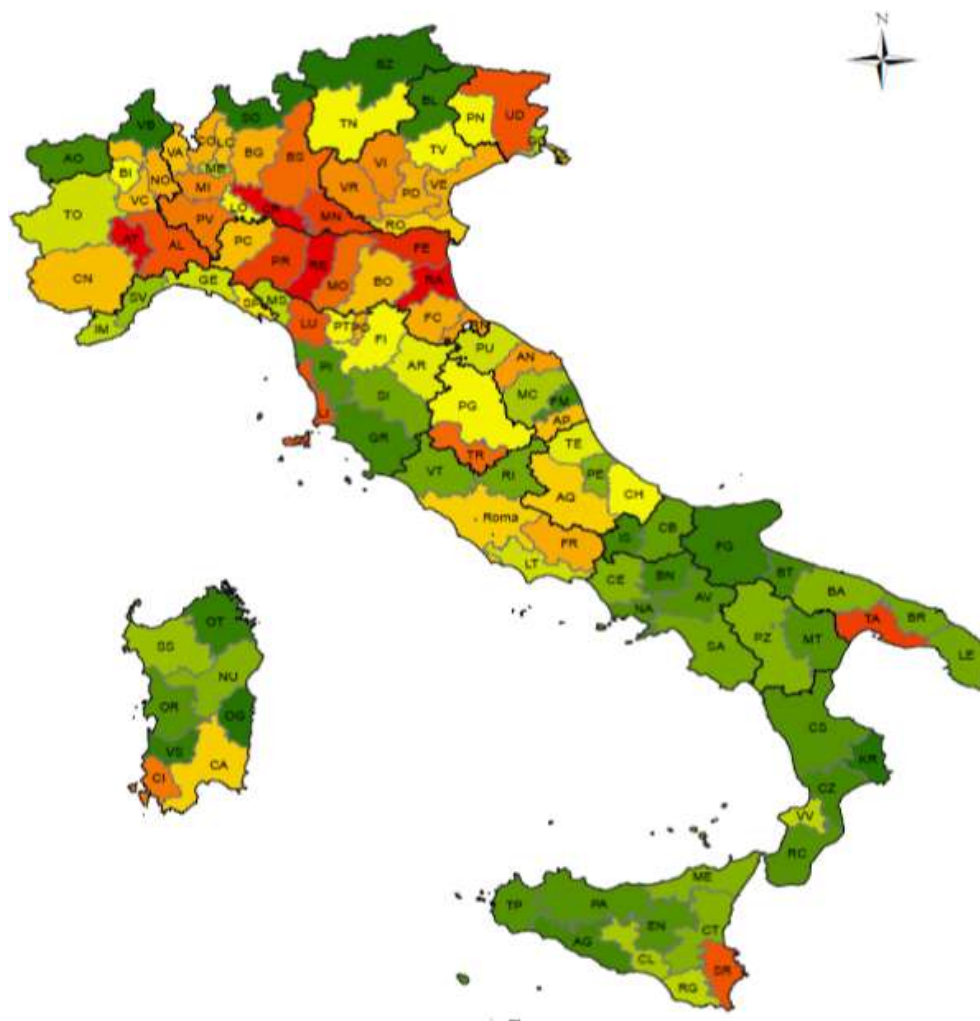


Figure 2.1.b: Per capita CO2 emissions in the Italian Provinces

The implementation through adequate models of the *IPCC methodology for Greenhouse Gas Inventories* can become the basis to extend the possibility of building strategies tool for local management, as a sort of “compass” to orient future policy decisions. Since SEAP has been so far a simple tool at voluntary membership with a little impact on the emissions reduction, **managing the IPCC Guidelines to make them enforceable**, even at the **municipal level** and contribute to assign contents of real political action, **is a crucial challenge**.

The present SEAP monitoring should be integrated with:

- **explanatory analysis of the factors**, making up the energy consumption and the emissions themselves
- **qualifying test** to identify buildings and structures at risk
- **discriminating process** on the potential interventions to realize
- **predicting evaluation** on the conditions in front of us during the planning phase

It means consolidating a path of research and action towards a genuine tool of governance, an operational guideline through energy conservation, energy

efficiency of buildings and companies, real development of renewable without the intervention of incentives, development of sustainable mobility initiatives.

The general idea is following the development goals indicated in the inverted pyramid below, in which the policy is the general preliminary work that flows into detailed plans (SEAP) but take on a compulsory commitment, not a simple analysis, till to identify concrete recommendations.

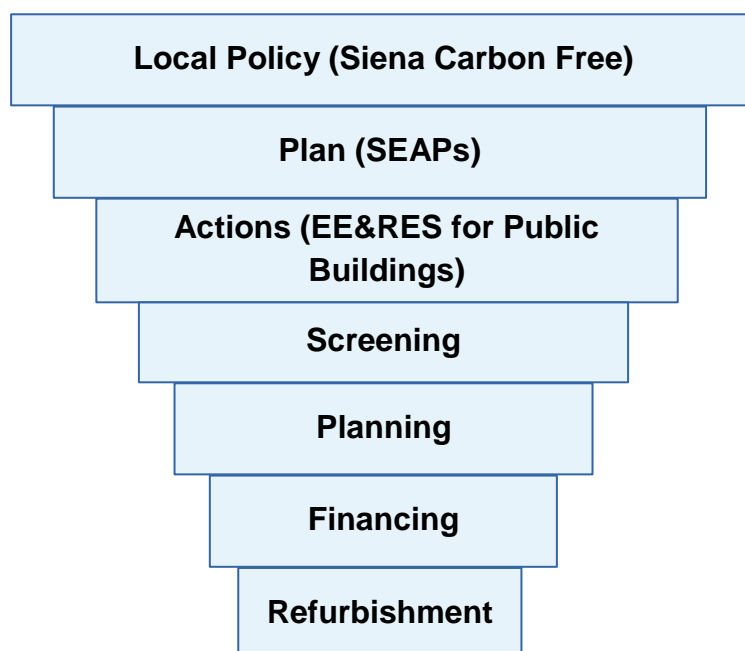


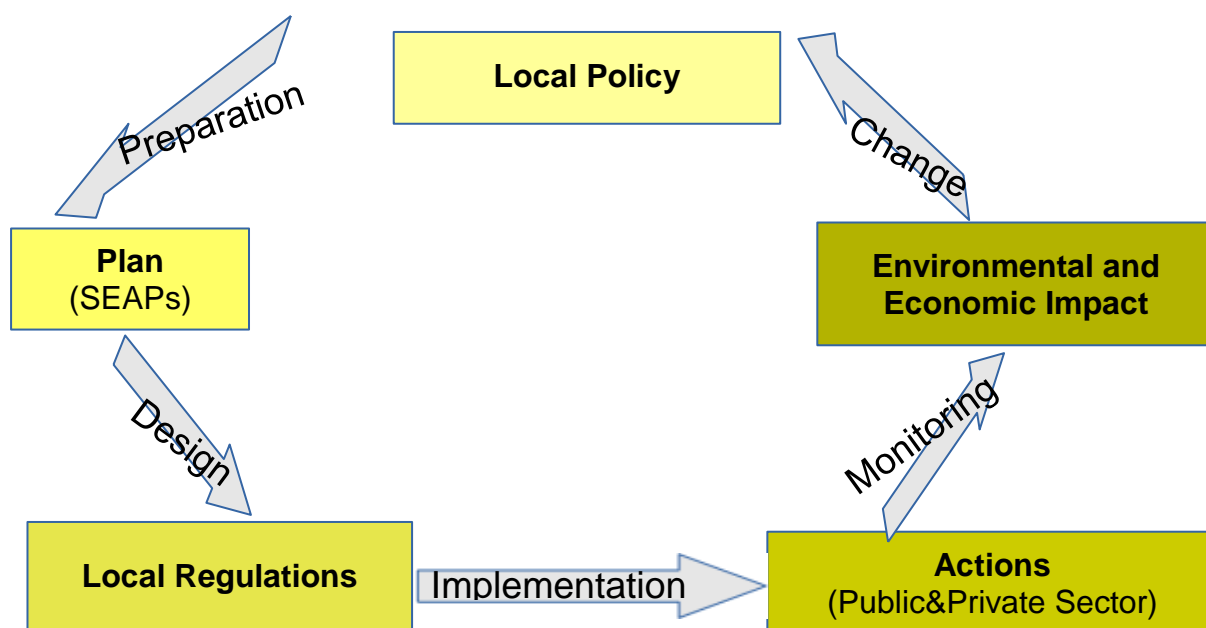
Figure 2.1.c: Local approach for a smart SEAP (Siena case study: the “mosaic tiles” of the path)

This sequential vision starting from a local policy (the reference case in GRASPINNO project is “Siena Carbon Free” but any local energy policy can be considered) is seen as an achieved and consolidated goal. Differently, the next figure introduces not a sequential vision but a **new circular pattern** in which:

- the policy represents the start point with its inertial characteristics;
- SEAP is seen as renewable tool for the governance;
- Municipal planning instruments and their application are strictly related to the SEAP; as regards this aspect, the importance of the use of GPP in the SEAP, has to be emphasized; GPP has to become an integrated protocol to achieve the goals of reducing energy consumption and climate-changing emissions
- the planning of the most effective actions and more efficient maintenance and retrofitting activities in the public or private sector is stimulated
- a new monitoring phase is present to measure the effects of the actions and activities in relationship with the environmental and economic targets. It is a

sort of calibration of the processes, adapting once again the programming tools in a kind of perpetual change.

Figure 2.1.d: GRASPINNO Virtuous Cycle



Practically, the circle is a sort of overcoming of the reverse pyramid (Figure 2.1.d); it can be interpreted as an infinitive process of improvement.

The created propelling force and the diversity and quality of the commissioning projects could achieve **unexpected results**, in the presence of innovative financing solutions.

For offices, schools and public lighting is essential to promote the application of adequate Energy Contracts with Warrantied Result in face of investments on efficiency, taking advantages from all possible sources of possible financial funds and moving towards the public-private partnership in order to bypass budget constraints and improve energy efficiency of public buildings.

A **systematic work implies specific procedures** to have a greater impact on the territory. The screening phase gives a clear framework in which the local stakeholders have to operate. **With this important phase, buildings with the high energy consumption are individuated immediately and credible objectives in terms of saving can be reached.** The tools created in the GRASPINNO project are an important contribution to the planning phase by giving the opportunity to measure economic and environmental result and introducing additional financial resources through Private Public Partnership.

The smart SEAP approach, as used at local level, allows to apply the first step of the figure 2.1.e. **The screening test is a relevant contribution to individuate**

profitable activities in the energy refurbishment of buildings because it maximizes the consumption reduction of the. This approach allows to identify credible Target Energy Class, facilitating also the planning and the research of financing.

The same tools have also a function of **preliminary energy audit** by giving specific indications on the part of the buildings to be refurbished and which products and materials to use (figure 2.1.f and 2.1.g).

When the difference between the initial energy class and the target energy class is very large the **ex ante LCC tool** (this tool will be presented in chapter 4) is able to indicate which part of the building is more profitable to refurbish. After this step will be possible to choose the most performing products (with a database) and their thickness.

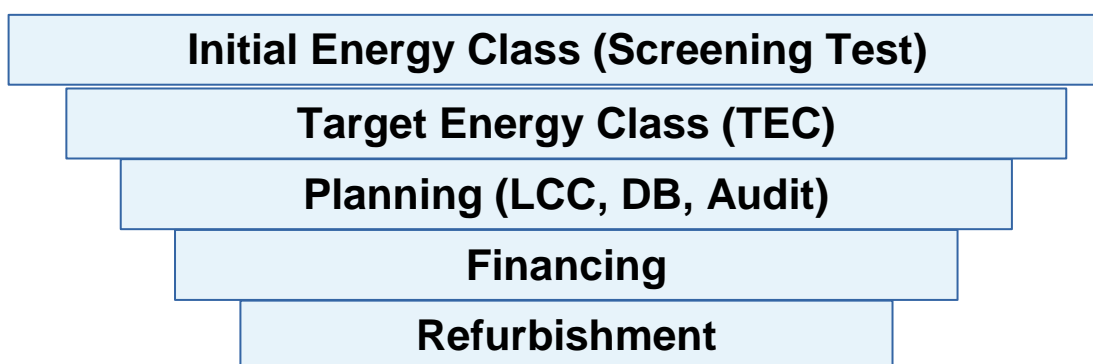


Figure 2.1.e: GRASPINNO procedures for EE of buildings

In this context, the **screening phase represents the pivot of the project activity**. In the following figure (2.1.g) is showed a **scatter plot with the position of the local public buildings** (Province of Siena) classified according to a thermal and electrical index. This representation allows to highlight the critical energy situation of the buildings by providing indications also on the kind of **energy consumption** and, thus, addressing the possible interventions.

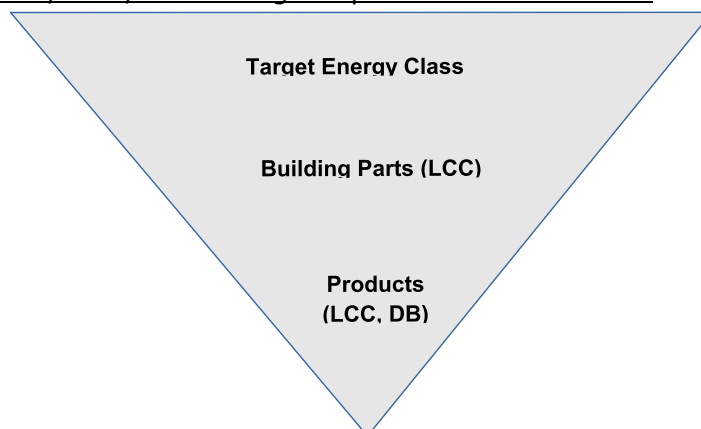


Figure 2.1.f: Target Energy Class and Planning: approach and tools

On the abscissa and the ordinate are reported the consumption in kWh per square meter respectively for the thermal and electrical energy. In green color is represented the area with a low thermal and electrical consumption, the opposite where the color is a darker red. The square with a 60 kwh/sm side on the left in the bottom represents the limit fixed by the European Directive.

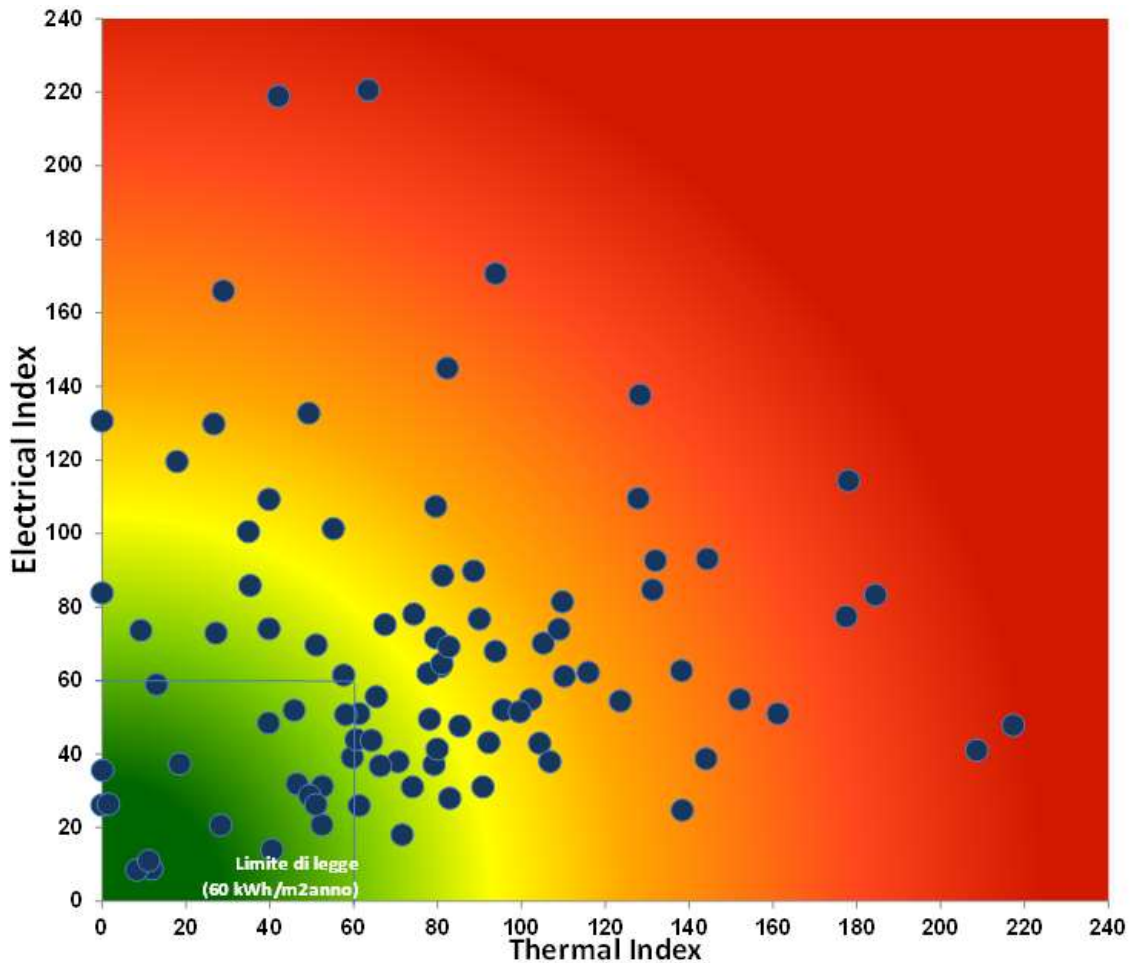


Figure 2.1.g: Scatter plot of Public Buildings classified with a Thermal and Electrical Index

In conclusion, the data collection system and the **methodology of use** is part of an overall strategy that aims to create a complete territorial analysis framework, where, both the data collection phase and their use, should lead to effective implementation of the interventions.

In other words, the intent is to **create a framework of analysis** where the various parts intersect like tiles in a mosaic whose overall vision is nothing more than a systematic path towards the implementation of local energy policies. The

methodology is independent of the geographical context in which it is applied and can be implemented in whole or in part to different territorial areas. Beyond the means and the territorial resources available, **the system is completely modular and can be completed in several stages**. This means that the management of the activities can be organized in different steps, according to the financial instruments available at the time of the implementation.

2.2 eGPP roadmap

The target groups, which can, potentially, use GRASPINNO eGPP platform in order to achieve Energy Efficiency (EE) for public building refurbishments have been identified as follows:

- State administration structures, Ministries and Universities interested in “green” tenders;
- local and regional authorities/procurers involved in adopting innovative solutions in the energy sector;
- other public and semi-public bodies and key agents in their territories such as:
 - Chambers of Commerce, Business and Industry, Technology and Innovation Agencies,
 - Universities, especially those with competence in renewable energy and energy efficiency;
 - Private sector bodies, SMEs and associations.

Below a brief step by step roadmap for the use of the GRASPINNO eGPP platform by the target groups and stakeholders in order to achieve EE during buildings’ refurbishment is presented.

Step 1: Reinforce political commitment

All EU countries are complying with the two directives (Directive 2014/24/EU, Directive 2014/25/EU) regarding “green” public procurement, providing in this way significant support to tools and procedures, such as the GRASPINNO eGPP platform. In order to further strengthen the platform’s use and impact, a reinforcement of the political commitment is required. The previous experience from related initiatives has shown that without the appropriate political backing, innovative tool’s and initiatives such as the GRASPINNO eGPP platform, may fail.

Step 2: Targets setting

There should be an identification of the targets to whom GRASPINNO platform is aiming at. There should be two different types of targets: a) operational targets, and b) targets related to purchasing actions. The first type is related to operational targets regarding the operation of the platform (e.g. procurement staff/relevant senior managers & finance officers, 50 public authorities and/or SMEs will receive training on GRASPINNO platform, within 1 year after the platform’s deployment).

The second type of targets is related to the core purchasing activities (e.g. proportion of Tender Information Packages (TIPs) extracted by the platform and finally led to specific “green” products/services, value of contracts with ambitious environmental criteria, as a proportion of the total spending on the product/service group).

Step 3: Tendering activities to be covered

Identification of the appropriate environmental purchasing requirements, following market sounding (i.e. assessing the capability and capacity of the market to meet the purchaser’s requirements), according to the identified EU “green” criteria for specific products/services; identification of specific opportunities for joint procurement in order to reduce cost and environmental footprint.

Step 4: Development of the marketplace

Adaptation to national/regional/local requirements and trust foster among the users, since building user confidence is a key factor for the establishment of a marketplace. Moreover, attraction of the most valuable and significant buyers (public authorities) and sellers (SMEs, individuals, etc.). The innovative elements of the GRASPINNO eGPP platform (i.e. single sign-on module, most updated EU “green” criteria, matching between specific criteria and products/services, LCC tool, TMN, etc.) helps towards this direction of attracting valuable procurers and suppliers.

Step 5: Initiation of GRASPINNO platform preparatory activities

Implementation of specific preparatory activities:

- Identification of bodies (public/private) which are active in the field of “green” public procurement;
- Update of the platform’s databases with the most updated “green” criteria;
- Communication with SMEs in order to introduce in the platform’s databases their “green” products/services;
- Gathering information on specific legislative aspects (i.e. GDPR, Ecolabel, etc.) related to the deployment and operation of the GRASPINNO eGPP platform.

Step 6: Communication

Proper communication of the eGPP platform (i.e. what it stands for, the benefits it offers and the innovation it introduces). Indicative communication/dissemination activities may include:

- Promotion of the GRASPINNO eGPP platform’s benefits and demonstration of specific best practices in order to establish the operation of the platform.
- Raise awareness activities for all stakeholders (i.e. workshops, seminars, newsletters, brochures, flyers, info days, etc.).
- Communication activities (i.e. seminars for informing the suppliers about the “green” requirements of products/services to be procured in the future) in order to cultivate specific intentions to suppliers prior to the actual procurements. By conducting such kind of activities, the suppliers are offered the required time and information to adapt to the new “green” requirements of products/services.

Step 7: Deployment of the GRASPINNO eGPP platform

This step includes technical activities, required for the successful deployment and smooth operation of the GRASPINNO eGPP platform. More specifically, it includes:

- Access to appropriate IT infrastructures to install the selected platform elements.
- The selection and installation of specific GRASPINNO platform elements (i.e. eGPP tool, LCC tool, GRASPINNO Databases, etc.).
- Appointment of specialized personnel (human resources) for the operation, maintenance and support of the GRASPINNO platform.

Step 8: Training

It is of paramount importance, to ensure that the platform users will receive appropriate training on the platform's functionalities. More specifically, practical training workshops in all aspects of the GRASPINNO eGPP platform elements should be organized in order the procurers to familiarize with the platform's technical aspects; the procurers and the financial staff of the public authorities with the life-cycle costing; the suppliers on the use of the platform and the sustainable use of products and services.

Step 9: Monitoring of the GRASPINNO eGPP platform operation

The entity, that will use the GRASPINNO eGPP platform in order to achieve EE during refurbishment works, should apply monitoring activities (to the extent possible) related to the platform operation, such as through internal audit functions. More specifically, indicative KPIs should be measured on annual basis in order to assess the platform's operation and impact. An indicative (but non-exhaustive) list of such KPIs, include:

- Total number of TIPs extracted
- Total number of "green" products/services available in platform's DBs
- Total planned spending on "green" products/services
- Ratio of planned vs actualized spending on "green" products/services
- Total planned spending per product/service group
- Number of "green" units/scope of "green" services to be purchased

3. Guidelines for involvement of companies/SMEs in a PPP procedure

The success of a PPP procedure is based on a good involvement of companies/SMEs that should offer energy refurbishment proposal of buildings on the data collected in the preliminary phase.

In many EU Countries the commitment rules of the private sector for public procurement are very precise and cogent in order to guarantee maximum transparency. There are two different methods to involve company in this process but a preliminary phase (Living Labs) could help to have results with specific proposal on different buildings or a group of buildings.

IN GRASPINNO project has been used a **Living Lab process** to develop new solutions and concepts in the field of innovative energy refurbishment and green public procurement by transferring the knowledge obtained within the project's pilot actions and exchanging experiences or concerns for green growth, especially including end-users, and so setting the base for further actions. Two main types of stakeholders in particular were targeted – public sector and product providers (especially Small and Medium sized enterprises (SMEs)); they are also the main actors of a PPP process.

The main goal of GRASPINNO LLs is to develop new solutions and concepts in the field of innovative energy refurbishment and green public procurement by transferring the knowledge obtained within the project's pilot actions and exchanging experiences or concerns for green growth, especially including end-users, and so setting the base for further actions. The GRASPINNO Living Labs were established in six different countries: Greece, Italy, Slovenia, Spain, Cyprus and Bosnia and Herzegovina. All LLs have followed joint methodology consisting of six operational phases of Living Lab i.e. Connect, Educate and train, Implement, Improve, Evaluate and Disseminate. Although Living Labs have addressed different problems and challenges, such as green public procurement, green funding, green policy, electricity consumption, they all had a common aim - to co-create new solutions and to transfer knowledge for more green sustainable growth.

Two main types of stakeholders in particular were targeted – public sector and product providers (especially Small and Medium sized enterprises (SMEs)). Involvement of policy stakeholders with power to design public policies for eco-innovation, action plans for energy refurbishment of public buildings, framework of models, strategies, methods, database and tools to support the green energy MED policies, is especially important. Beside mentioned, mentoring/financing experts were involved to share their expertise in funding/mentoring opportunities, to invent/produce/use eco-innovative solutions in eGPP/building refurbishment.

Seven GRASPINNO Living Labs were established in six different countries: Greece, Italy, Slovenia, Spain, Cyprus and Bosnia and Herzegovina (Figure **Σφάλμα! Το αρχείο προέλευσης της αναφοράς δεν βρέθηκε.**).

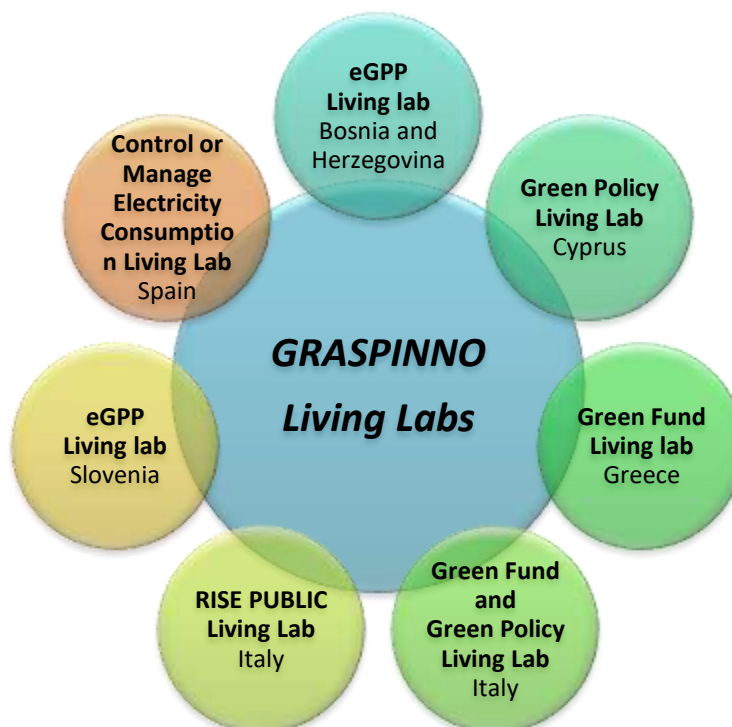


Figure 3.a: GRASPINNO Living Labs

All the LLs are very useful to create a Public Private Partnership for energy refurbishment of public buildings. The table 3.a summarizes the scope of each Living Lab, the tested solutions and participants. In this chapter will be paid a particular attention to one of this in which the scope was overcoming obstacles for energy refurbishment of public buildings, creation of formal or informal dialogue between stakeholders to find specific financial solutions for analysis, planning, financing and refurbishment of public buildings. A part of the work carried out by the initiators (Terre di Siena Lab and Comunità Montana dell'Alto Basento) was having a clear framework of financial opportunities, understanding when each of them is appropriated by adopting a precise criterion of evaluation: the Life Cycle Cost. This tool will be analyzed in Chapter 4. The Living Lab has been a virtual place in which exchanging ideas and giving availability of a relevant quantity of data on energy consumption of public buildings. This information, described in the chapter 2.a and shared in the Living Lab process, has been essential for the presentation of future PPP proposals. The presence of a relevant quantity and quality of data did start an official PPP procedure.

Country	Living Lab Title	Lab	Scope	Solutions tested	Initiator	No. of DoP
Bosnia and Herzegovina	eGPP Lab	Living	Increasing awareness of GPP and educating stakeholders on energy efficiency to improve capacity of public building owners in managing energy efficiency towards achieving almost-zero-energy buildings.	eGPP tool GRASPINNO Unified Platform	- Department for Development and International Projects of Zenica-Doboj Canton	6 PA 4 SMEs/private
Cyprus	Green Policy Living Lab		Transferring knowledge and exchange of experiences regarding green policies and GPP, making use of the eGPP tool as a public tool for green procurement.	eGPP tool LCC tool GRASPINNO Unified Platform	- Department of Public Works	3 PA 1 SMEs/private 1 Other
Greece	Green Fund Living Lab		Identification of opportunities and promotion of funding and mentoring mechanisms for green growth, ensuring tailored mentoring or financing to SMEs and PAs for eco-innovation actions.	eGPP tool GRASPINNO Unified Platform	- University of Patras - General Secretariat of Commerce and Consumer Protection - ATLANTIS Consulting	9 PAs 8 SMEs/private

Table 3.a.I

Country	Living Title	Lab	Scope	Solutions tested	Initiator	No. of DoP
Italy	Green and Policy Lab	Fund Green Living	Overcoming obstacles for energy refurbishment of public buildings, creation of formal or informal dialogue between stakeholders to find specific financial solutions for analysis, planning, financing and refurbishment of public buildings	LCC tool GRASPINNO Unified Platform	- Terre di Siena Lab - Comunità Montana Alto Basento	24 PA 3 Other
	RISE PUBLIC – Energetic refurbishment of public buildings		Addressing the problem of refurbishment of public building for seismic safety and energy efficiency in line with the principle of circular economy.	eGPP tool GRASPINNO Unified Platform	- Veneto Region - Unioncamere del Veneto	4 PA 2 SMEs/private 1 other
Slovenia	eGPP Lab	Living	Encouraging PAs, SMEs and other stakeholders to use green electronic public procurement tool.	eGPP tool GRASPINNO Unified Platform	- University of Maribor	4 PA 3 SMEs/private
Spain	Control or Manage Electricity Consumption Living Lab		Improving energy management through the knowledge of own consumption, proposing a solution to improve business activities.	eGPP tool GRASPINNO Unified Platform Monitoring system	- Chamber of Commerce, Industry and Services of Terrassa	1 PA 2 SMEs/private 3 Other

Table 3.1.II

As written previously, the commitment rules of the private sector for public procurement are in many countries very precise and cogent. There are two ways to activate PPP procedures: the presence of a **Promoter** or an innovative path named **Competitive Dialogue**.

The first solution, although with some differences between countries on the timescales and procedures, starts with the request for access to documents and specific inspections for one or more buildings of a public body. The next phase consists of an **Expression of Interest** in which the promoter that can be a company or a company network presents an offer for the energy efficiency of one or more buildings, through a somewhat detailed project. The public body must give a negative or positive response to the promoter of the proposal; if the answer is positive, a tender procedure is launched in which other companies or business networks are invited to submit similar proposals. After the closing of the tender procedure, there will be the evaluation phase in which the same institution chooses the winning proposal.

The second procedure is longer and more complicated than the previous one. Competitive Dialogue was created by the 2004 Public Procurement Directives as a new and more flexible solution for public authorities wanting to award contracts for such projects. According to Art. 1(11)(c), Directive 2004/18 defines Competitive Dialogue as “a procedure in which any economic operator may request to participate and whereby the Contracting Authority conducts a dialogue with the candidates admitted to that procedure, with the aim of developing one or more suitable alternatives capable of meeting its requirements, and on the basis of which the candidates chosen are invited to tender”.

The use of the Competitive Dialogue procedure by public authorities wishing to award “particularly complex” contracts is very explicitly (though not exclusively) linked with the implementation of Public Private Partnerships (PPP).

This solution can be used only under conditions:

- First premise is the presence of a particularly complex contract, in reference to cases in which the Administration is not objectively able to define technical means to meet its needs and its objectives;
- the second opportunity to use Competitive Dialogue is given when the Administration is not objectively able to specify the legal or financial setting of the project. However, this opportunity is subject not only to the complexity of the contract, but also to the non-culpable lack of know-how of the contracting authority; this is why it is a residual instrument among the award procedures and involves the need for closer public-private partnerships.
- The contracting authority has to provide specific reasons for the existence of the conditions, therefore the decision to contract must be properly motivated.
- The third prerequisite is the award criterion which can only be that of the **most economically advantageous tender**.
- The procedural process is divided into two distinct phases which are sub-articulated.
- The first phase begins with the publication of a call for tenders and a descriptive document, which is part of it, in which the requirements for admission to the dialogue are established, together with a deadline by which the interested parties can present the request for participation. Basically in

this first phase the contracting authority makes manifest the objectives it intends to achieve, the work to be carried out and the needs it intends to satisfy.

Once the candidates who possess the prequalification requisites have been selected and the suitable participants have been identified, the real dialogue procedure begins, in which the Administration sends to the selected companies the special conditions with the invitation to produce a project containing indications, descriptions, implementation and modalities of the project. In this phase a dialectic relationship is established between the contracting authority and the individual candidate, in which equal treatment must be guaranteed between all candidates and confidentiality, with the express prohibition imposed on the contracting authority to disclose information that can guarantee some participants with respect to others or to reveal the proposed solutions or other confidential information.

Once the dialogue has started, the contracting authority will identify the solution or solutions that best suit the needs indicated in the announcement. During this phase the contracting authority may provide for the dialogue to take place in successive stages, so as to reduce the number of participants gradually, applying the award criteria indicated in the notice or in the descriptive document.

- In the second phase the contracting authority, after declaring the dialogue concluded and informing the participants, invites the selected companies to present the final offers on the basis of the chosen project, which must contain all the elements required and needed for the execution of the project.

To give an "easy track" of the proposed solutions a summary table has been prepared in order to give a clear map for the use and interaction of the opportunities.

Solutions	Approach	Timing	Complexity
Living Lab	Informal	Short	Low
Expression of Interest	Formal	Short	Medium
Competitive Dialogue	Formal	Long	High

Table 3.b

The table highlights the difference between informal and formal (contained in the procurement code) tools. Informal tools, like Living Lab, can always be used as support to the formal procedures requested by the national procurement codes; in fact, it could facilitate spontaneous Expressions of Interest. It can be also a relevant support when the available time to attract interest of private sector is short.

4. Strategic evaluation and contracts and investment readiness for private sector

4.1 Public sector

In the previous chapter 3, the relationship between some PPP procedures and the Most Economically Advantageous Tender (MEAT) is already clear but also considering the sector analysed (energy efficiency of the public buildings) the European directives and many national procurement codes (for instance, the Italian one) have specific indications on the percentage of tenders out of the total amount in which the selection criterion has to be suitable with the Green Public Procurement (GPP) rules. GPP in EU countries is a transposition of the European legislation in the national context based on the concepts of GPP criteria and MEAT.

This process should give a complete compatibility between environmental criteria and economic issues. In other words, the methodology should allow a situation in which the **introduction of GPP criteria implies also a lower Life Cycle Cost of the product/intervention.**

This results in benefits for Public Administrations and SMEs; on one hand, Public Administrations can be sure of real savings and in a higher environmental compatibility, on the other hand, SMEs improve their competitiveness by offering best solutions at a right price.

Although with differences and limitations between the various countries, **contracting authorities award contracts on the basis of the MEAT criteria** identified on the basis of the best value for money, or based on the price or cost element, following a cost/effectiveness comparison criterion such as the cost of the life cycle.

The lowest price should be used for specific cases only; for instance:

- a) for works of an amount equal to or less than below a certain amount, taking into account that compliance with the quality requirements is guaranteed by the obligation that the tender procedure will take place on the basis of the executive project;
- b) for services and supplies with standardized features or whose conditions are defined by the market;
- c) for services and supplies of an amount less than the Community threshold, characterized by high repetitiveness, except for those of considerable technological content or which have an innovative character.

For services and supplies *"with standardized features or whose conditions are defined by the market"* they must be understood as those services or supplies which, even with reference to the production practice developed in the reference market, cannot be modified at the request of the contracting authority or which comply with certain national, European or international standards.

The services and supplies "*characterized by high repetitiveness*" meet generic and recurring needs and are connected to the normal operation of the contracted stations, requiring frequent supplies in order to ensure continuity of the service.

In essence, the European legislation and the national transpositions **allow contracting authorities** (and economic operators) **to avoid costs**, in terms of time and costs, of a competitive comparison based on the best value for money, when the benefits deriving from such comparison are null or reduced (in relation to the amount of the contract).

Since it is an exception to the general principle of the most economically advantageous tender, the contracting authorities wishing to proceed with the award using the criterion of lower price, must give **adequate reasons for the choice made** and specify in the call for proposals the criteria used to select the best offer (think of the use of effectiveness criteria in the case of cost/effectiveness approach also with reference to the life cycle cost).

In the explanatory statement, the contracting authorities, in addition to justifying the use of the elements at the basis of the exemption, must demonstrate that a particular supplier has not benefited by using the lowest price, for example the **characteristics of the product** offered by the individual are considered standardized.

Tenders should always be awarded on the basis of the best value for money the contracts relating to:

- a) social services and hospital catering, assistance and education;
- b) labour-intensive services;
- c) engineering and architectural services as well as other technical and intellectual services for amounts exceeding a certain amount.

It is recommended:

- a) in the planning phase: to define the characteristics of the assignment that allow to verify the existence of the conditions for which the national procurement codes and guidelines prescribe or allow the use of a particular award criterion;
- b) in the planning phase: to start the definition of the evaluation criteria and the relative scores;
- c) in the adoption of the decision: to contract and process the tender documentation, proceed to complete definition of the additional elements.

It should be noted that the national procurement codes, incorporating the indications contained in Directive 2014/24 / EU, provide that the cost element within the MEAT must be assessed using a lifecycle cost-based approach.

This concept includes all the costs that emerge during the **life cycle of the works, supplies or services**. Pursuant to Recital 96 of the aforementioned Directive, "*the concept covers internal costs, such as research to be carried out, development, production, transport, use and maintenance and final disposal costs but it can also*

include costs attributable to environmental externalities such as pollution caused by the extraction of raw materials used in the product or caused by the product itself or its manufacture, provided that they can be monetized and controlled ".

The cost criterion, as a cost of the life cycle, therefore allows to appreciate the costs connected to the various phases of the life cycle of the works / goods / services and to proceed with an overall assessment of the economic impact of the same as well as an assessment of the costs that most directly fall on the contracting authority (ultimately summarizable in a "price"); the price criterion makes it possible to appreciate the consideration provided within the offer, as a concise and direct index of the economic profiles of the offer.

To apply the MEAT criterion there are 2 options:

1. a system based on the best quality/price ratio;
2. following a cost/effectiveness comparison criterion such as the life cycle cost (LCC).

It means that by **applying the GPP criteria as minimum criteria** (threshold) to have a Green Public Procurement the MEAT criterion can be respected by using the Life Cycle Costs.

LCC is a powerful instrument because, in addition to a possible selection criterion for the tender (MEAT to be used with GPP criteria), it is also a quite complete economic and environmental assessment tool.

To understand this assertion a linguistic approach can be very useful; the French definition of "Sustainable Development" is "développement durable" a term more suitable than English one to explain:

- I. a higher replicability of productive processes and factors (more duration)
- II. Indication of the maximum level of the Anthropic pressure for a chosen technology (performance)

These elements are 2 fundamental cost items of the LCC. All the elements of the LCC can be described in the following list:

- purchase price,
- product lifespan, (I.)
- performance, (II.)
- maintenance costs,
- disposal costs/resale value,
- externalities (emissions, in particular GHG but also other emissions)

In other words, by **using the LCC as a MEAT criterion**, we are introducing very detailed and **precise economic and environmental considerations** on the procurement cycle. By using these tools, the Public Administration can improve the quality of its expenditure under an economics and environmental point of view. A systematic use of the tools means to make sustainable the local economy. **The LCC tools measure the Life Cycle Cost of products or services offered in a tender.** In GRASPINNO project 2 versions of the tool has been used: an old version to assess the winning choice carried out after the tender publication; a new one to

be used before the tender publication in order to implement it correctly. An ex-post use is related to an already concluded and therefore unchangeable tender, while with an ex-ante use the aim is to prevent a possible economic and environmental damage with the execution of the intervention. To deepen the practical use of the tools made available with the GRASPINNO project we recommend the use of the specific guidelines (Deliverable 3.4.2 and Deliverable 3.10.3).

The tools can be used for the **comparison of a large variety of products** but in a more general view they are able to visualize in many cases **the economic and environmental benefits of the choices**. Public Administration staff can utilize this tool to simply reduce costs within the organization, or it can be used within a strategic assessment of Sustainable Energy Action Plan (SEAP) to reduce energy consumption and the emission of greenhouse gasses.

The ex post LCC tool gives a correct evaluation of the tender in economic and environmental terms but the assessment arrives when the tender is already published and eventual corrections to it are not possible anymore. With an ex-post evaluation only the experience can help to formulate the tender with a correct setting and the verification is useful only in perspective. GRASPINNO testing phase has been exploited to introduce an ex-ante application to be used after the audit or like a pre-audit system. This usage allows the Public Administration to avoid, in absence of a prompt audit, to prepare a tender where the winning company has to prepare a refurbishment together with a planning. This kind of tender is a correct GPP procedure but it is generally considered unclear and dangerous by the small municipalities because the real costs and benefits are defined by the company that will refurbish the building. Small Public Bodies often are not able to control the real cost of this kind of operation not having at own disposal the right instruments and available human resources. A third part approach with an ex-ante application of LCC could help to guarantee an equal distribution of cost saving between company and Public Administration.

The Directive 2014/24/EU significantly innovates the process of tenders awarding, through assigning a relevant importance to LCC. New contract award criteria have been introduced in Article 67: "The most economically advantageous tender from the point of view of the contracting authority shall be identified on the basis of the price or cost, using a cost-effectiveness approach, such as life cycle costing. It means that in any country in which there is a transposition of the Directive into the national legislation would be possible to adopt the same procedures.

The figure 4.1.a represents a **strategic path** explaining when the use of a PPP is desirable that goes hand in hand with the new LCC tool (ex ante application) especially when small municipalities or other public bodies with a scarce availability of financial resources aim to refurbish their buildings. The local experience originated by local GRASPINNO pilots showed contexts in which the local body had no financial opportunities to prepare a specific audit or project. In these cases the tool seems somewhat **effective in implementing the tender correctly** and allowing the execution of the compulsory preliminary steps (energy audit and project) through a Public and Private Partnership (PPP) where the choices are

carried out by selecting the intervention through a payback ranking in which products or services are chosen starting from those with the shortest payback. For other traditional (public) solutions, the ex ante tool leaves the opportunity to use the Life Cycle Cost of the interventions as a ranking criterion instead of the payback, by starting from those with the lowest cost.

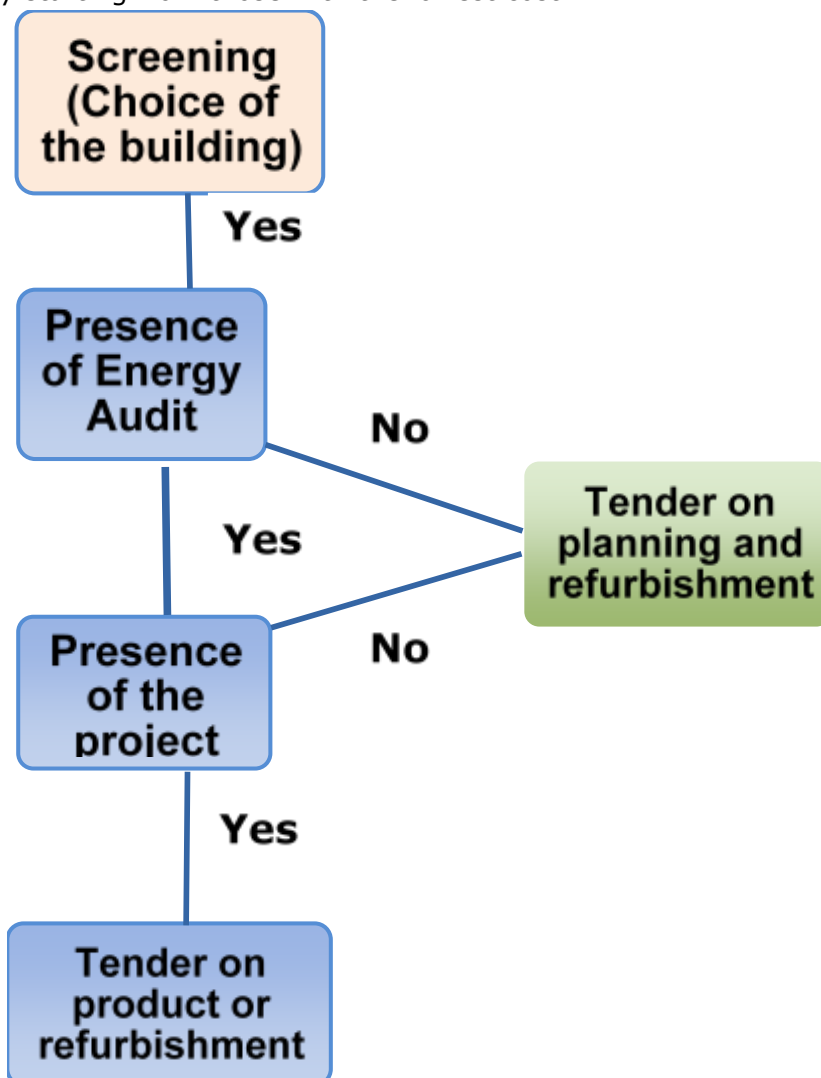


Figure 4.1.a: Strategic framework: cases with recommended use of PPP and LCC Ex-Ante Application

Another interesting characteristic of the new LCC tool is the use of real preliminary data to calculate the energy class of the building; this is possible if the data collection is carried out with the same approach used in the paragraph 2.a. Energy efficiency software instruments often use theoretical estimations of the energy consumptions but this can give a relevant bias in the overall assessment because of a great difference between the estimation of the theoretical value and the real value of the energy index. The ex ante tool avoids this problem by uploading real data obtained in the GRASPINNO analysis through the collection of electricity and natural gas bills for a relevant number of buildings. The following figure shows this issue with a study **carried out by CasaClima / KlimaHaus Agency**, located in Alto Adige / Südtirol. **The image includes some contents in**

Italian and German languages, but it easily represents the possible bias in calculating the energy class before (prebound) and after (rebound) the intervention. Not always facing this problem is possible but, by uploading real data on energy consumption, the “prebound” bias can be eliminated.



Figure 4.1.b: Prebound and rebound. Study carried out by CasaClima / KlimaHaus Agency. The image shows the real energy ratio before of the intervention (prebound) and after the intervention (rebound).

A series of possible interventions considers the main solutions used in the energy refurbishment of the buildings (building automation, lighting, solar heating, voltage transformer, boiler, insulation of roof and walls, insulation of windows and doors) but the greatest difference, in comparison with the ex post LCC tool, is the modality of use. In fact, the new instrument can be utilized **before the tender in order to implement it correctly** through some indications of cost that highlight the limit parameters to obtain a lower LCC. In other words, the tool works as a simulation of the refurbishment by giving indication on prices, quantities and typologies of products that allow to face a series of issues and guarantee good results in economic and environmental terms in a real tender.

The use of the new LCC tool is very flexible; it gives the opportunity to set the **amount of energy savings by indicating the target percentage** identifying the thermal and electrical class. After this step, the user can choose the type of intervention to achieve the goal, with full awareness of following a specific strategy that can be a shortest payback or a lower LCC. The strategy is chosen by the Public Administration on the framework illustrated in figure n. 4.1.a: a traditional path (public funds) that arrives at a tender on products or refurbishment or, alternatively, a PPP solution in which the subject of the tender can be the planning

and restructuring phase. A different path is important for defining the selection criteria. For a traditional path, the prevalence is the public interest and the strategy identified is LCC, while for the PPP the priority is the private financier and the chosen strategy is the shortest payback. Hybrid strategies that simultaneously take into account public and private interests are possible.

A new technical evaluation was needed to measure the different capability of the new and old tools to improve their effectiveness in reducing the LCC in the building refurbishment. According to the European and national legislations, a GPP tender is regular when it contains all the requested criteria, but it still can present some negative environmental and economic impacts. The LCC tools (ex ante and ex post) try to verify these aspects. In other words, the tool gives the opportunity to avoid this bias through some Technical Performance Indicators (TPIs). For the individuation of Technical Performance Indicators (TPIs) an evaluation table (see below) has been introduced with three levels of efficiency. Every tender can be assessed with this method.

A first level of efficiency is given by the timing of the use; in particular, an ex ante use of the LCC tool has a higher value of efficiency because it can avoid the generation a bad result after the implementation of the tender (a bad implementation means a generation of a higher value of LCC or CO₂). In theory, this level would be enough for assessing the tender and the further levels wouldn't be needed because the ex ante application is able to avoid a bad result by modifying some specifications of the same tender before the publication. It means that if the LCC or GHG emissions value is higher than the previous situation, a Public Administration should change products for the energy refurbishment (increasing the performance) or try to reduce their price.

A second level of efficiency is given by a LCC value that can be obtained by comparing the results of the tender as calculated through the *ex post* tool; if the value of the new product/service is higher than the old one, then the tender has had a bad result. This level is considered to be higher than the third one, because it can offset a higher emission value, the sole element measured by the third order level. In fact, LCC value contains also the emissions value, if the cost is lower than a previous situation it means that is able to offset the value of the emissions.

As above stated, the third level of efficiency is given by the emission value obtained through the *ex post* tool; if the value is higher than before the intervention, then the tender has had a bad result.

A clear representation of the scheme of the Technical Performance Indicators (TPIs) is available in the table 4.1.c

Level	Order	Presence (score)	Absence (score)
Ex ante LCC	I	Yes (3)	No (0)

Level	Order	Presence (score)	Absence (score)
application			
New product with lower LCC value	II	Yes (2)	No (0)
New product with lower CO2 emission value	III	Yes (1)	No (0)

Table 4.1.c: Measurement of the efficiency of the LCC tools

With this system of Technical Performance Indicators the partnership is able to classify the results of any tender on the basis of the table described in the table 4.1.c. The first level indicator would be already enough to establish that the tender procedure is correct.

Even if the presence of human errors cannot be excluded, in theory a technician has a powerful instrument (ex ante LCC tool) to avoid a bad result in the tender procedure. An unexpected results that could occur with the ex post LCC tool, can be corrected only changing the specifications of the future tenders that have the same characteristics; moreover, with the old tool the presence of errors doesn't mean that the tender is not valid but even if the procedure seems formally correct, the tender could be not set up well.

In the event of an ex post application, the second and the third levels should be verified. As previously written the second-level indicator has a higher importance than the third because it can offset a higher CO2 emission value but the greenhouse gas negative effects cannot be excluded only by analyzing the second level.

The presence of the positive condition for each level (cells with "Yes" in green color) classifies the tender as best performer. If the positive condition is not present for each level, the first order is the most important and, on the contrary, the third one is the worst. The qualitative system of evaluation can be transformed in a quantitative assessment by using a different numerical value for every specific characteristic reported in the table 4.1.c: (3) for ex ante application, (2) for lower LCC value and (1) for lower emissions value). The absence of each of the above mentioned characteristics gives always a value equals to 0. This measurement, also reported in the table with the numbers in the brackets, allows to consider a minimum level of efficiency and productivity of the tools' application.

The ex ante LCC tool has been created as a **dynamic and incremental system**. In other existing tool/software the data entered are often fixed and referable to a past period of time. The GRASPINNO tool is much more suitable if the aim is **setting the tender in a cost-effective way**. In simpler words: if the aim is setting an energy performance of the intervention, the new tool gives the opportunity to choose new technologies or new materials with very high performance, also giving, as an additional characteristic, the opportunity to update product price. This is a relevant advantage in comparison with other existing tool in which the values remain steady because the technology remains old and/or not upgradeable in a simple way. **A full integration with a vast product database would make the ex ante LCC tool very powerful.**

The new ex ante LCC tool, by anticipating its use before the publication of the tender, should be able to contribute to a correct tender setting, **maximizing the economic and environmental positive effects**. The systematic use of the tool before the publication of tenders should strongly contribute to make sustainable the local economy.

4.2 Energy Performance Contracting

Energy performance contracting (EPC) is a mechanism for organising the energy efficiency financing. For a brief description of the EPC scheme a main EU official EU source is used (<https://e3p.jrc.ec.europa.eu/articles/energy-performance-contracting>) but some changes that can be introduced in the presence of local opportunities will be briefly described. Under an EPC arrangement an external organisation (Energy Service Company: ESCO) implements a project to deliver energy efficiency, or a renewable energy project, and uses the stream of income from the cost savings, or the renewable energy produced, to repay the costs of the project, including the costs of the investment. Essentially the ESCO will not receive its payment unless the project delivers energy savings as expected.

The approach is based on the transfer of technical risks from the client to the ESCO based on performance guarantees given by the ESCO. In EPC ESCO remuneration is based on demonstrated performance; a measure of performance is the level of energy savings or energy service. EPC is a means to deliver infrastructure improvements to facilities that lack energy engineering skills, manpower or management time, capital funding, understanding of risk, or technology information. Cash-poor, yet creditworthy customers are therefore good potential clients for EPC. Figure 4.2.a illustrates the concept.

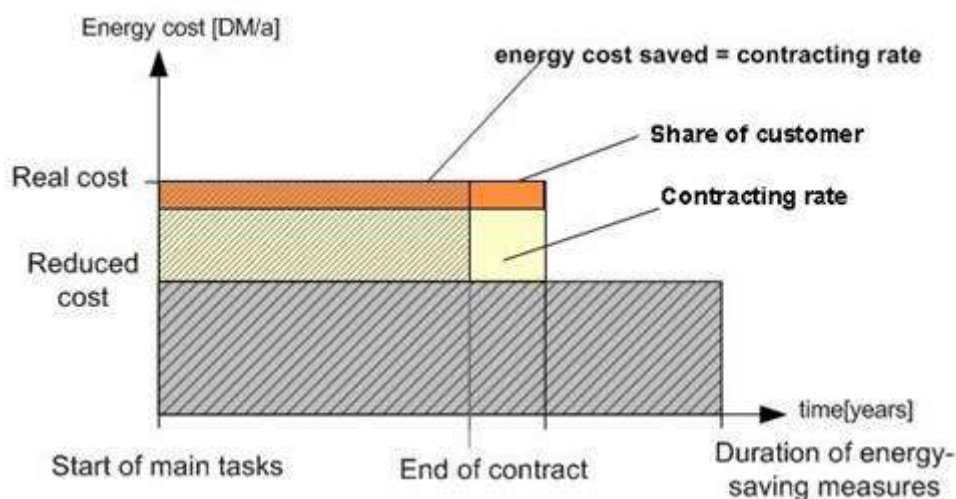


Figure 4.2.a Energy Performance Contracting;

Contracting models (guaranteed savings and shared savings)

Figures 4.2.b and 4.2.c illustrates the relationships and risk allocations among the ESCO, customer and lender in the two major performance contracting models: shared savings and guaranteed savings. Brief descriptions are also given.



Figure 4.2.b

Under a **shared savings** contract (Figure 4.2.b) the cost savings are split for a pre-determined length of time in accordance with a pre-arranged percentage: there is no 'standard' split as this depends on the cost of the project, the length of the contract and the risks taken by the ESCO and the consumer.

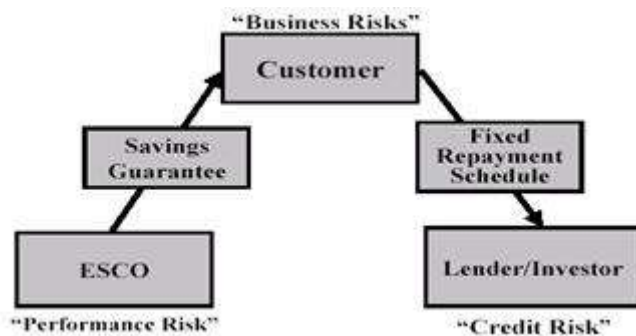


Figure 4.2.c

Under a **guaranteed savings** contract the ESCO guarantees a certain level of energy savings and in this way shields the client from any performance risk.

An important difference between guaranteed and shared savings models is that in the former case the performance guarantee is the level of energy saved, while in the latter this is the cost of energy saved.

Under a guaranteed savings contract the ESCO takes over the entire performance and design risk; for this reason it is unlikely to be willing to further assume credit risk. Consequently guaranteed savings contracts rarely go along with **Third Party Financing** (TPF) with ESCO borrowing. The customers are financed directly by banks or by a financing agency; an advantage of this model is that finance institutions are better equipped to assess and handle customer's credit risk than ESCOs. The customer repays the loan and assumes the investment repayment risk (the financing institution (FI), of course always has some risk for loan non-payment. The assessment of customer's credit risk is done by the FI; it is one of the factors that define interest rates). If the savings are not enough to cover debt service, then the ESCO has to cover the difference. If savings exceed the guaranteed level, then the customer pays an agreed upon percentage of the savings to the ESCO (However, changes in energy consumption – e.g. business expansion and/or changes of processes or production lines are likely to bring increased energy that can deteriorate the targets).

Conversely, a contraction of business (e.g. an empty hotel) or a smaller production output will result in energy savings. Therefore crucial issues to consider involve setting the baselines and associated growth projections, setting the system boundary and conditions, as well as avoiding leakages). Usually the contract also contains a proviso that the guarantee is only good, i.e. the value of the energy saved will be enough to meet the customer debt obligation, provided that the price of energy does not go below a stipulated floor price (Performance contracting is risk management and dropping fuel prices gave rise to this provision). A variation of guaranteed savings contracts are *pay from savings* contracts whereby the payment schedule is based on the level of savings: the more the savings, the quicker the repayment.

The guaranteed savings scheme is likely to function properly only in countries with a well established banking structure, high degree of familiarity with project financing and sufficient technical expertise, also within the banking sector, to understand energy-efficiency projects. The guaranteed savings concept is difficult to use in introducing the ESCO concept in developing markets because it requires customers to assume investment repayment risk. However, it fosters long-term growth of ESCO and finance industries: newly-established ESCOs with no credit history and limited own resources would be unable to invest in the project they recommend and may only enter the market if they guarantee the savings and the client secures the financing on its own.

Conversely under a shared savings the client takes over some performance risk, hence it will try to avoid assuming any credit risk. This is why a shared savings contract is more likely to be linked with TPF or with a mixed scheme with financing coming from the client and the ESCO whereby the ESCO repays the loan and takes over the credit risk. The ESCO therefore assumes both performance and the underlying customer credit risk – if the customer goes out of business, the revenue stream from the project will stop, putting the ESCO at risk. In addition such contractual arrangement may give rise to leveraging problems for ESCOs, because ESCOs become too indebted and at some point financial institutions may refuse lending to an ESCO due to high debt ratio (Experience in the US shows that lenders tend to require a variety of credit enhancements for this type of financing, such as bonding or insurance). In effect the ESCO collateralizes the loan with anticipated savings payments from the customer, based on a share of the energy cost savings. The financing in this case goes off the customer's balance sheet (under off-balance sheet financing, also called non-appropriation financing, financiers hold title to equipment during the term of the agreement.).

A situation where savings exceed expectations should be taken into account in a shared savings contract. This setting may create an adversarial relationship between the ESCO and customer, whereby the ESCO may attempt to 'lowball' the savings estimate and then receive more from the 'excess savings' (Deliberate estimation of lower value of savings also is however not only restricted to the shared savings model; it is a standard practice for the ESCO to secure itself for the guaranteed performance with some buffer. The real questions are how big this buffer/cushion is and how the 'excess' savings above the estimated ones are split between the client and the ESCO).

Furthermore, to avoid the risk of energy price changes, it is possible to stipulate in the contract a *single energy price*. In this situation the customer and the ESCO agree on the value of the service upfront and neither side gains from changes in energy prices: if the actual prices are lower than the stipulated floor value, then the consumer has a windfall profit, which compensates the lower return of the project; conversely if the actual prices are higher than the stipulated ceiling, then the return on the project is higher than projected, but the consumer pays no more for the project. In effect this variation sets performance in physical terms with fixed energy prices, which makes the approach resemble guaranteed savings approach.

The shared savings concept is a good introductory model in developing markets because customers assume no financial risk (the customers may have different reasons to be reluctant to assume financing, even if the cost of capital is higher for ESCOs than for customers. Among the reasons are adversity to assuming debt, borrowing limits and budgetary restraints). From ESCO's perspective the shared savings approach has the added value of the financing service. However, this model tends to create barriers for small companies; small ESCOs that implement projects based on shared savings rapidly become too highly leveraged and unable to contract further debt for subsequent projects. Shared savings concept therefore may limit long-term market growth and competition between ESCOs and between financing institutions: for instance, small and/or new ESCOs with no previous

experience in borrowing and few own resources are unlikely to enter the market if such agreements dominate. It focuses the attention on projects with short payback times ('cream skimming').

Another variation is the '*first out*' approach whereby the ESCO is paid 100 % of the energy savings until the project costs – including the ESCO profit – are fully paid. The exact duration of the contract will actually depend on the level of savings achieved: the greater the savings, the shorter the contract. Table 4.2.a summarizes the features of the guaranteed and shared savings models.

GUARANTEED SAVINGS	SHARED SAVINGS
Performance related to level of energy saved	Performance related to cost of energy saved; the ESCO bills upon actual results
Value of energy saved is guaranteed to meet debt service obligations down to a floor price	Value of payments to ESCO is linked to energy price; betting on price of energy can be risky
ESCO carries performance risk Energy-user/customer carries credit risk	ESCO carries performance and credit risk as it typically carries out the financing
If the energy-user/customer borrows, then debt appears on its balance sheet	Usually off the balance sheet of energy-user/customer
Requires creditworthy customer	Can serve customers that do not have access to financing
Extensive M&V	Equipment may be leased
ESCO can do more projects without getting highly leveraged	Favours large ESCOs; small ESCOs become too leveraged to do more projects
More comprehensive	Favours projects with short payback ('cream skimming')
	How to share the 'excess' savings

Table 4.2.a. Guaranteed savings and shared savings: a comparison

Other contracting models

While there are numerous ways to structure a contract and hence any attempt to be comprehensive in describing EPC variations is doomed, other contractual arrangements deserve attention. Here we describe the **'chauffage' contract, the 'first-out', the Build-Own-Operate-Transfer (BOOT) contract and leasing contract.**

A very frequently used type of contract in Europe is the 'chauffage' contract, where an ESCO takes over complete responsibility for the provision to the client of an agreed set of energy services (e.g. space heat, lighting, motive power, etc.). This arrangement is an extreme form of energy management outsourcing. Where the energy supply market is competitive, the ESCO in a chauffage arrangement also takes over full responsibility for fuel/electricity purchasing. The fee paid by the client under a chauffage arrangement is calculated on the basis of its existing energy bill minus a percentage saving (often in the range of 5-10 %). Thus the client is guaranteed an immediate saving relative to its current bill. The ESCO takes on the responsibility for providing the agreed level of energy service for lower than the current bill or for providing improved level of service for the same bill. The more efficiently and cheaply it can do this, the greater its earnings: chauffage contracts give the strongest incentive to ESCOs to provide services in an efficient way.

Such contracts may have an element of shared savings in addition to the guaranteed savings element to provide incentive for the customer. For instance, all savings up to an agreed figure would go to the ESCO to repay project costs and return on capital; this figure they will be shared between the ESCO and the customer.

Chauffage contracts are typically very long (20-30 years) and the ESCO provides all the associated maintenance and operation during the contract. Chauffage contracts are very useful where the customer wants to outsource facility services and investment.

A BOOT model may involve an ESCO designing, building, financing, owning and operating the equipment for a defined period of time and then transferring this ownership across to the client. This model resembles a special purpose enterprise created for a particular project. Clients enter into long term supply contracts with the BOOT operator and are charged accordingly for the service delivered; the service charge includes capital and operating cost recovery and project profit. BOOT schemes are becoming an increasingly popular means of financing CHP projects in Europe. Figure 4.2.d shows the relationships between parties in a BOOT contract.

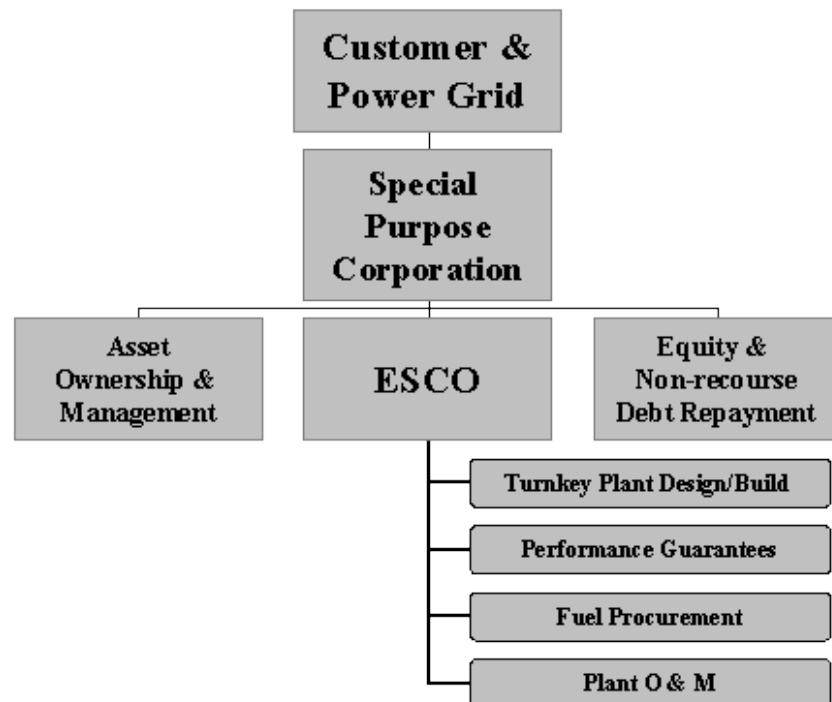


Figure 4.2.d Build-Own-Operate-Transfer (BOOT) model

Leasing can be an attractive alternative to borrowing because the lease payments tend to be lower than the loan payments; it is commonly used for industrial equipment. The lessee makes payments of principal and interest; the frequency of payments depends on the contract. The stream of income from the cost savings covers the lease payment. The ESCO can bid out and arrange an equipment lease-purchase agreement with a financing institution. If the ESCO is not affiliated to an equipment manufacturer or supplier, it can bid out, make suppliers competitive analysis and arrange the equipment. There are two major types of leases: capital and operating. Capital leases are installment purchases of equipment. In a capital lease, the client (lessee) owns and depreciates the equipment and may benefit from associated tax benefits. A capital asset and associated liability appears on the balance sheet. In operating lease the owner of the asset (lessor – the ESCO) owns the equipment and essentially rents it to the lessee for a fixed monthly fee; this is off-balance sheet financing source. It shifts the risk from the lessee to the lessor, but tends to be more expensive to the lessor. Unlike in capital lease, the lessor claims any tax benefits associated with the depreciation of the equipment. The non-appropriation clause means that the financing is not seen as debt.

The framework on the EPC presented so far is already quite complex but there are contractual aspects that can be originated by local peculiarities. One of these features concerns planning characteristics; in the case of the energy efficiency of

buildings, the design can include extremely complex issues such as building management and seismic vulnerability. With new design techniques such as Building Information Modeling (BIM) these aspects can be included and considerably complicate the refurbishment. At the same time, a systematic approach to building renovation and management may foster access to public financings. The opportunity of using significant public resources can significantly change the characteristics of the energy performance contract. **The recommended approach is to consider all aspects in a separate way in order to highlight those that is the energy performance after the intervention and then change the length of the contract when important public resources are identified and / or when economies of scale with other issues concerning the building have been found.**

4.3 Investment readiness coaching for intermediary organization, SMEs and financing entities

“Investment readiness” refers to the capacity of a Business Project (presented either by a new or would be entrepreneur/organization) to be ready for private/public investments. However, while the concept of “investment readiness” is easily deducible, it is often not clear for new or would be entrepreneurs/organizations which characteristics their business project should have in order to be ready for private/public investments. The innovativeness of the Business Idea is not sufficient alone to make a business project interesting to Business Angels as investors take into consideration many other aspects such as the team, the market of reference, the quality of the pitch etc.

In the following sections, useful suggestions directed to all main stakeholders (i.e. intermediary organizations, SMEs, financing entities) involved in private investment processes, are described. The main aim is to provide a contribution to the promotion of the investment readiness level of such kind of organizations/entities.

4.3.1 Intermediary Organizations / Financing entities

In this section, useful information/guidelines will be provided to intermediary organizations/financing entities for efficiently promoting the investment readiness level. In this context, these guidelines will try to offer to Intermediary Organizations active in the field of Energy Efficiency interesting hints for successfully managing relationships both with investors and with final beneficiaries.

The Intermediary Organizations/Financing Entities are often considered by final beneficiaries as the main reference point for all forms of support to new businesses. More specifically, they are considered as entities that provide services for matching new entrepreneurs and private/public investors in general for helping new entrepreneurs in the search of funding.

In order to improve intermediary organizations investment readiness, coaching activities should include:

- A. *Make intermediary organization/financing entity precisely understand which is the “supply and demand of funding in their region/territory.”* “Investment readiness” elaborated data should be collected (e.g. via hundreds of

questionnaires and interviews administered to all main stakeholders of the organization's region/territory), pointing out both public and private funding opportunities and investigating their efficiency, their level of diffusion and the effectiveness of their promotion.

B. Spread an "investment readiness culture" by periodically organizing seminars or other initiatives on the subject. There should be different kinds of seminars:

- i. **1-hour IR seminars:** Objective, if a short one hour seminar is to deliver an introduction into a specific aspect of access to funding. The topic should be chosen based on the results of research into typical gaps in the knowledge of entrepreneurs locally so it could deliver the best added value.
- ii. **Half a day IR seminars:** Half a day seminar takes the one hour seminar to the next level by bringing in guest speakers to illustrate the content and the main message. For example, if the topic is Investment Process, the best guest speaker is either an entrepreneur who has began the process and received the investment, or an investor who could give insights into how to best work with them. It would be extremely useful to bring in experience lawyers to talk about typical investment terms and an accountant when discussing exits and valuations. To deliver best added value, the organiser must ensure the audience is at appropriate level in their fund-raising journey.
- iii. **2-days IR seminars:** The objectives of a two-day seminar are:
 - To provide in-depth introduction into Venture Capital;
 - Enable entrepreneurs shape their business plans in the context of investor requirements (through coaching);
 - Help them structure 10min investor pitch;
 - Provide an opportunity to pitch and gain feedback from local funders.

This type of 2-day course has proved (by the business and technology incubators) in giving early stage entrepreneurs great insight into their readiness to select the right kind of investment for their venture and how to make a case to the appropriate type of investor.

C. Build a solid network with investors active in the region of reference. All Intermediary Organizations should build a solid link with Business Angels Networks (BAN) active in their region as well as with other private investment networks.

D. Organize pitching events. Pitching events are very important exercises for all stakeholders: by pitching more and more times, the stakeholders will finally learn how to optimally present their business projects to investors. For selecting Business teams admitted to pitch their ideas in front of Business Angels, Intermediary Organizations could organize business competitions. The organization of a typical business competition could be articulated in to the following main stages:

- i. Publication of the tender/call for participation: In the call for participation it could be a good idea to fix a maximum number of participants, so as to avoid organizational problems in the following stages: the tender/call should also specify which criteria will be adopted, in case of reception of an excessive number of proposals.
- ii. Promotional campaign
- iii. In case of reception of an excessive number of applications, Business Projects admitted to the competition will be selected.
- iv. Organization of: a) training courses open to all participants (on Business Model/Business Plan drafting, pitching, Investment Readiness, ecc); b) a tutoring service: all participants will have the opportunity to hold a face to face meeting with the Intermediary Organization staff, aimed at collecting useful hints/suggestions about the drafting and/or improvement of their Business Plan.
- v. Sending of Business Plan by all participating teams.
- vi. Selection of the most suitable Business Plans. The optimal solution is to involve Business Angels/investors in the evaluation committee.
- vii. Organization of the final pitching event: representatives of the winning teams will be invited to pitch their ideas during the final event in front of the jury, thus winning the chance to pitch directly in front of Business Angels.

Intermediary Organizations/Financing entities should attentively manage the follow up of the event. For example, in order to offer an efficient “Investment readiness” service, it is extremely useful to:

- Give a feedback to all participating teams: telling them why their business plan hasn’t been selected for the final/what should be improved means to give them extremely useful suggestions for further developing their ideas.
 - Manage the “mentoring relationships” that could emerge between private investors and some of the participating teams (see the “Mentoring training manual” for all information at this regard).
- E. *Support stakeholders to become investment ready, employing a combination of offline and online tools.* While many organizations already provide to their final beneficiaries a “face to face” helpdesk giving to entrepreneurs useful suggestions or a consultancy services for improving their investment readiness level, very few of them employ online tools in this phase. It is important that Intermediary Organizations start taking advantage of ICT technologies, to improve their support services. In this context, GRASPINNO Unified Platform will help towards this direction and will improve their investment readiness.

4.3.2 SMEs

Regarding SMEs, having a valuable business plan/project isn’t sufficient to be invested by an investor (i.e. Business Angel/ Venture Capital etc.). In order to be “interesting” to investors, SMEs need to:

- Know all innovative funding opportunities available to them.

- Understand the private investor “point of view” (in other words, understand what the investor is searching in their Business Projects)
- Be able to effectively present their business project and relate to investors.

In the following paragraphs we describe and investigate the bullet listed above.

Knowing all funding opportunities available for SMEs

In order to have a complete view of all funding opportunities and/or tenders regarding public buildings refurbishment available in their regions/territories, SMEs can:

Find information they need online: In particular a list of all active tenders (including all the necessary tender information) published by Public Authorities in the field of Energy Efficiency will be available in the GRASPINNO Unified Platform.

- Deepen/ask clarifications or additional information about data found online to Intermediary Organizations active in their region/territory.

Understanding the investor’s point of view

When reviewing their investment readiness related to their offered products/services in the Energy Efficiency field, SMEs should analyze the following 4 areas:

- Team (Management)
 - The quality and track record of the founding team is a key aspect.
 - Is there deep technical expertise?
 - Do founders have sales skills? Can they bring customers and sales?
 - Track record: have they previously sold businesses?
- Product (or service)
 - Is the product/service innovative, protectable, “green”, unique?
 - Does it solve a real problem regarding energy efficiency?
 - Who owns the Intellectual Property (IP)?
 - What will stop others from copying your product/service? What are the barriers to entry?
 - Can the business generate valuable IP others would like to buy?
- Energy Efficiency Market
 - The bigger is better.
 - Is it growing worldwide or shrinking? Or is it niche?
 - Who are the customers, what and why they buy?
 - How are you going to get to your customers?
 - What are your channels to market?
- Scalability of a Business Model
 - This is how businesses make the money, who from, with what and when.
 - Can it deliver returns to the investors?
 - Can you describe top three sources of revenue?
 - When is the breakeven?”

How to relate with investors?

Firstly, SMEs need to learn “the art of pitching”: presenting all the most important aspects of their business projects/products/services in a simple, synthetic and

extremely effective way is key to attract private investors interest towards the Business Project/product/service.

An optimal elevator pitch should be extremely brief (many speak of a time-limit of 30 seconds, but the reality is that often pitches last 5 till 7 minutes) and should contain information about: the need targeted by the Business Project/product/service and the proposed solution, the market (the trend of the market/clients/competitors), the innovation, the team, the business model, the required investment, the planned exit.

However, pitching isn't something SMEs can learn just from handbooks or online sources: the best way to learn how to do an effective pitch, is to exercise: SMEs should participate in as many business competitions and/or pitching events as possible: by this way, both they will improve their capacity to effectively present their business idea/product/service and they will collect precious feedbacks/hints for the improvement of their business project from experienced investors/entrepreneurs.

5. Initiatives & opportunities to finance EE plans

5.1 Italy

A great part of the approach described previously can be presented with the specific activities carried out by Italian partners in GRASPINNO; also a preliminary phase, such as data collection is present; Terre di Siena Lab has been able to collect SEAP data for 11 public bodies (8+3 in progress) equivalent to the energy data consumption for more than 160 public buildings. After data collection, a screening phase was carried out having as a result a Pilot Plan with 30 pilot buildings. It allowed to start the refurbishment of the selected buildings using available financial resources.

The local path has continued with 2 Living Labs: RISE PUBLIC Living Lab and Green Policy Living Lab. The Green Fund and Green Policy Living Lab in Italy focused obstacles for the energy refurbishment of public buildings because the resources (when available) mainly concern the final part (interventions) of a long and complicated process. This process is composed by more steps and a correct approach should grant that available finances cover all stages. With downturn of available public finances, it is becoming harder to ensure adequate financing of all steps and more often public finances are activated only for the final part of the refurbishment process.

Consequently, only larger municipalities are able to overcome this problem thus only few buildings are refurbished because many public bodies are unable to complete initial steps of the process. In fact, without investing own resources for energy audits, projects cannot be prepared and many small and rural municipalities cannot gain access to available public finances for the refurbishment. For this reason, a Public-Private Partnership (PPP) is proposed in order to finance preliminary steps.

Considering the size and characteristics of the involved territories the selected topic is very important for local institutional players. Furthermore, the LL topic is in line with some of the most important development policies implemented by Toscana Region and Basilicata Region at regional level having the aim to involve private sector in the refurbishment of public buildings (even using ESI funds). Moreover, the involved stakeholders (especially PA) intend to cooperate to set-up new local governance model, in order to improve the local capacity building and the joint management of energy policies.

Green Fund and Green Policy Living Lab introduces innovative financing procedures shared by all the stakeholders (Public and Private Partnership) and shapes specific policy recommendations in order to have a correct approach in terms of buildings' refurbishment planning. A further effort should be done to include results in the local procurement platform.

Green Fund and Green Policy Living Lab in Italy offers new services in the energy sector for the associated local public bodies that will be part of the local procurement platforms and are focused on the refurbishment of the buildings.

Different but complementary goals have been chosen with the strategy to offer modular and pragmatic solutions; each of them can be considered individually or as a whole in which any solution can be considered a step of a planned path.

The general idea is to analyse the entire process, starting from the preliminary information flow needed to select energy actions and measures, buildings and financial solutions, passing from audit and planning. This can be represented in the following figure, where local public bodies can be in any of the stages of the process. The LL should recognize the position of every single public body leading it towards the final target (energy refurbishment).

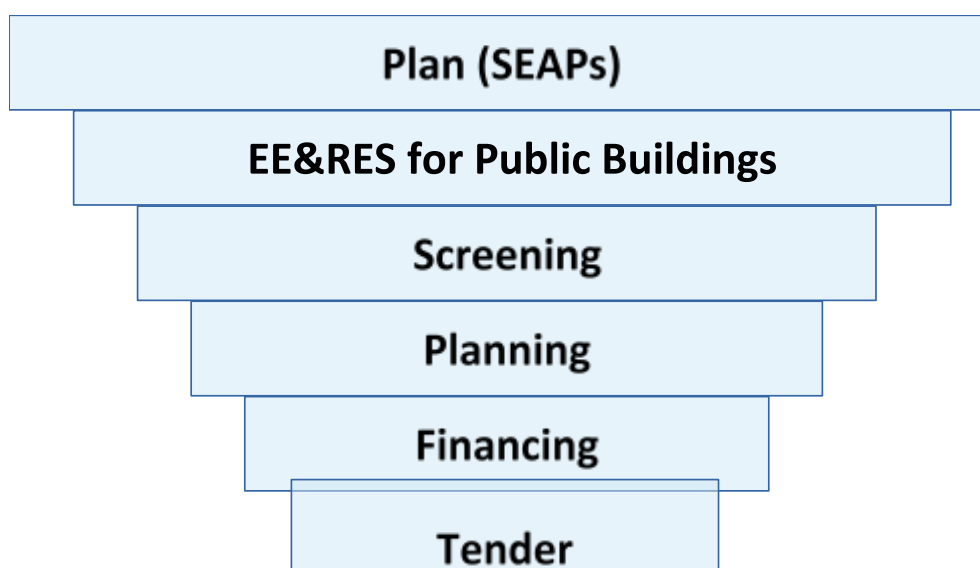


Figure 5.1.a: The whole process of energy refurbishment of the buildings

The different activities include a SEAP path implementation, the identification of specific buildings together with the public administrations and local energy companies; a formal private sector involvement has been implemented with a formal procedure through a promotor. This approach should produce an expression of interest in a short term and if the Public Administration will accept it a second round with improved proposals through a specific call for tender.

The LL activities are part of the path showed in the previous figure 5.1.a; after a first contact with specific meetings, energy data on buildings is collected and re-elaborated to define the "screening" step. This is followed by the training phase for a correct "planning" step using also LCC tools.

The core activity of LL was to create an informal dialogue between different stakeholders (mainly PA and companies) to find specific financial solutions that should be able to cover all the steps: analysis, planning, financing and refurbishment. During this phase, companies present proposals respecting indications/information provided by the other stakeholders. It allows a public entity, pursuing predefined outcome but not knowing how best to achieve it, to discuss possible solutions in the dialogue phase to be used in following PPP formal

procedures. After a first round, the received proposals need to be improved with further indications (improvement phase of the LL) and assessed (evaluation phase) to conclude with a dissemination or a proposal that could arrive to a publication of a final tender with real bids (formal solution) or recommendations containing suggestions to be included in local public procurement platform (informal solution). Practically, this LL was a process to stimulate private initiatives through detailed discussion on collected data about public buildings.

TSL and CMAB as LL initiators organized meetings, training sessions and lead the cooperation process. LL members test the solutions, discuss experiences, propose solutions and work together to joint recommendations for improvements. The stakeholders of this LL are presented in the table below. The reached conclusions will have to respect the European and national compulsory regulation needed to start a PPP.

The main topic discussed were:

- The GRASPINNO project and the monitoring of the energy consumption of public buildings;
- The analysis of the effective consumption recorded in the buildings belonging to the Province of Siena: analysis of current situation and the related opportunities;
- How to build a participatory path in the framework of the energy saving in the schools.

All participants were interested in understanding the topic of the energy saving and in crossing this topic with the lack of financial resources for school buildings.

LL initiator TSL made available educational material developed within GRASPINNO explaining the use of the project's tools with emphasis on LCC tool and the basic information about measures to improve energy efficiency and reduce the dependency on fossil fuels by using renewable energies. Each measure was not described in depth, but rather by using a collection of references and links to more specific documents from reliable sources of GRASPINNO.

The implementation process is focused on two main topics:

MAIN TOPICS	PROBLEMS	WHY LL?
1. Removing the obstacles for the energy refurbishment of public buildings	Lack of financial resources (which are usually available just in the final part of interventions)	To encourage PPP in order to finance preliminary steps
2. Improving the governance model in the field of EE/RES	Small and rural villages can't plan and manage mid and long term EE/RES strategies (lack of funds and lack of specific competences)	To encourage the joint management of the EE/RES energy policies and interventions

Table 5.1.a: Implementation main topics

The Topic n.1 has the following specific objective: "Introducing innovative financing procedures (Public and Private Partnership) and preparing specific recommendations for public and private players".

The Topic n.2 has the following specific objective: "Promoting green and smart growth in rural areas by introducing new public services (e.g. energy management, eGPP) and boosting cooperation between local institutions. Proposals, ideas and findings will be provided as recommendations".

The final objective of the Living Lab was finding new solutions for energy efficiency and to reduce consumption of public buildings through the participation of all the actors involved.

Opportunity of a Public-Private Partnership (PPP) was introduced in order to solve the problem of lack of energy audits and intervention projects that are the preliminary and essential steps without which restructuring cannot take place. The discussion on data of the energy consumption of public buildings provided through GRASPINNO has been crucial. It has produced an **official proposal of refurbishment for 6 school buildings of the Province of Siena with a PPP solution that allows the retrieval of financial resources, minimizing the impact on public budgets.**

As regards TSL, the implementation will be carried out with a trilateral agreement between the Province, TSL and CET (Tuscany energy consortium). This agreement should be signed in a very short time and will be the base of all the possible PPP proposals for the energy refurbishment of the provincial buildings. The agreement provides for the availability of the Province's buildings, the technical expertise of CET for the technical preparation of the tender and the monitoring activity of TSL as regards energy consumption and the verification of conformity of the contract between the Public Administration and the companies. This agreement will be the reference point for other public administration (municipalities).

5.2 Greece

Greece, being an EU Member State, under the EU Directive 2012/27/EC is obliged to draft and submit to the European Commission National Sustainable Energy Action Plans which should include the establishment of a set of binding measures to help the EU reach its 20% energy efficiency target by 2020. Under the Directive, all EU countries are required to use energy more efficiently at all stages of the energy chain, from production to final consumption. In this context, various initiatives are used to finance activities regarding the energy efficiency for the refurbishment of public buildings. In the following paragraphs we briefly describe such initiatives/opportunities available in Greece.

"Energy upgrade of public buildings" initiative

The "Energy upgrading of public buildings" initiative aims at the energy upgrading of energy-intensive public buildings, the utilization of the energy saving potential and the improvement of the public buildings' energy efficiency. Some of the most energy

consuming infrastructures in Greece are the public buildings. For example, hospitals are among the high energy-consuming public buildings and, due to this fact, the Ministry of Health has studied specific energy saving measures. The main objective of the program is to reduce the energy consumption of public buildings while reducing CO₂ emissions through the improvement of energy efficiency and the use of Renewable Energy Sources (RES) in public sector infrastructure, through the adoption of energy-efficient systems for space cooling and heating and the production of DHW, as well as through the implementation of energy saving technologies.

The energy upgrades concern energy saving measures, some of which will be:

1. Energy upgrading and energy saving interventions such as adding insulation, replacing window frames and glasses with new ones certified and of high energy efficiency, replacement of burners/boilers/pipe systems with systems that allow the use of RES, replacement of old air conditioning systems, passive solar systems etc.
2. RES actions such as the construction of a co-generation plant with high energy efficiency, the construction of a production facility for the production of heat from CHP and/or RES for cooling production, etc.

Specific requirements for energy upgrading of public buildings will be defined with a view to implementing interventions that exceed the minimum required energy efficiency levels or, if economically and technically feasible, their upgrading to energy classes B+, A, A+, or almost zero-energy consuming buildings. The coverage of the energy target will be ensured by conducting an energy audit by an Energy Inspector both before and after the implementation of the interventions.

The first call for this program is entitled "Actions for Energy Upgrade and Energy Saving and Utilization of Renewable Energy Sources (R.E.S.) in Sports Facilities". The program is co-funded by the European Union (European Regional Development Fund (ERDF)) and National Resources through the Regional Operational Programs (ROP), the Operational Program "Competitiveness, Entrepreneurship, Innovation" and the Operational Program "Transport, Infrastructure, Environment and Sustainable Development" of the Greek NSRF 2014-2020. The total Public Expenditure of the action amounts to €244.93 million. The Public Expenditure in the context of the call for "Energy Efficiency and Energy Saving Actions and Utilization of Renewable Energy Sources (RES) in Sports Facilities" amounts to €27 million.

Portfolio Fund under the name "Infrastructure Fund" - Projects for energy upgrade of public buildings

The Portfolio Fund under the name "Infrastructure Fund", which was established with the Ministerial Decision 6269/29-11-2017 (Governmental Gazette B', 4159) aims at maximizing the use of financial instruments to cover the financial gap, among others, in the fields of Energy Saving and Renewable Energy Sources (RES). Under the Fund, funds will be mobilized from the Operational Program "Competitiveness, Entrepreneurship, Innovation" (CEI) which relate to the above sectors combined with national resources from a European Investment Bank (EIB) loan and refunds from the JESSICA financial instrument of the 2007-2013 period.

Through the Infrastructure Fund, the liquidity of public and private entities will be facilitated for the implementation of projects with favorable financing conditions. In the energy sector, the projects that will be funded by the Infrastructure Fund and are related to the resources to be provided by the CEI will concern projects for the energy upgrading of public buildings as well as for projects for the production and distribution of energy from RES.

The main objective of the program is to reduce energy consumption of public buildings while reducing CO₂ emissions by improving energy efficiency and RES use in public sector infrastructure, through the adoption of energy-efficient systems for space cooling and heating and hot water production, as well as through the implementation of energy-saving technologies. The initiative is aimed only at public buildings and the project implementation area is the whole country.

The upgrading of the buildings will indicatively include interventions on the buildings' shell (thermal insulation), replacement of windows, replacement of cooling and heating systems, etc.

In order to achieve the Fund's objectives in the field of Energy Saving:

- Specific requirements for the energy upgrading of public buildings will be defined with a view to implementing interventions that exceed the minimum required energy efficiency thresholds or, if economically and technically feasible, their upgrading to energy classes B+, A, A+ or in almost zero-level energy consuming buildings.
- The required interventions should be defined.
- Meeting the energy target will be justified by conducting an energy audit by an Energy Inspector both before and after the implementation of the appropriate interventions. The target fulfillment will result from the Energy Performance Certificate (EPC) or from the Energy Audit results for the interventions not covered by the EPC.

The initiative is funded by the Operational Program "Competitiveness, Entrepreneurship, Innovation" (CEI) combined with national resources from a European Investment Bank (EIB) loan and refunds from the JESSICA financial instrument of the 2007-2013 period. The total resources of the Fund amount to €450 million, while the resources of the CEI Operational Program for the Development of the energy sector amount to €128.7 million.

Energy upgrading of road lighting

The Program "Implementation of Energy Efficiency Improvement Actions in municipal road lighting facilities" is an initiative of the Deposits and Loans Fund (DLF), with the collaboration of the Center for Renewable Energy Sources and Saving (CRES) for the supply and installation of energy-efficient equipment for road lighting of municipal Authorities of A and B grade. The main aims are the resources saving, the reduction of operational and maintenance costs and the improvement of the lighting quality of local municipalities.

The eligible actions for funding under the program are:

1. Supply of modern technology luminaires, their on-site transportation, installation, their connection to the local electricity network and the execution of proper functioning tests.
2. Supply of modern technology lamps, their on-site transportation and their installation in existing lighting fixtures.
3. Supply and installation of new luminaire arms for instances where modern luminaires cannot rely on existing arms.
4. Supply and installation of lightning protection equipment for the street lighting installation.
5. Supply of lamps accessories (power supply, etc.) for storage.
6. Disposal of existing old-technology lighting fixtures, their removal, transportation and disposal, in accordance to the applicable legislation.
7. Disconnection of arm luminaires, removal, transportation and throw away, in accordance to the applicable legislation.

Funding will be through a low-interest loan from the DLF, with funding sources being the European Investment Bank and DLF. The loan duration will be up to 10 years at a floating or fixed rate of interest. It is possible for each interested municipal authority to apply either for the whole or for part of the total project budget, in case it decides to finance the remaining part of the project from a different funding source.

5.3 Catalonia – Spain

The Catalan Energy Institute (ICAEN) is the entity of the Government of Catalonia responsible of developing and carrying out the Catalan energy policy, especially in the field of improving energy saving and efficiency and the development of the renewable energies.

The energy policy of the Government of Catalonia is a priority of the first order whose mission is to achieve an economy and a society of low energy intensity and low carbon emission, innovative, competitive and sustainable in line with the European objectives in terms of energy for the year 2020.

The Catalan Institute of Energy develops sectorial energy plans and programs, in collaboration with the different sectors of the Department of Business and Employment and with the different Departments of the Government of Catalonia.

Current plans:

- National Agreement for the Energy Transition of Catalonia
- Energy and Climate Change: 2012-2020 (PECAC)
- Energy saving and efficiency plan for the buildings and equipment of the Government of Catalonia 2018-2022
- Action Plan for Energy Efficiency in the Industry of Catalonia
- Strategy to promote the energy use of forest and agricultural biomass

Concretely for GRASPINNO field the following plans are consider interesting:

Energy saving and efficiency plan for the buildings and equipment of the Government of Catalonia 2018-2022

This Plan is part of the process of transition towards a new, clean, sustainable and democratic energy model.

This plan is aligned with the energy policy of the European Union, with the Climate Change Law and the National Agreement for the Energy Transition, with the aim of laying the foundations of this new energy model and facilitating the transition process.

The Plan gives continuity to the latest savings plans updating different factors that include:

- The need to improve the buildings of the Government of Catalonia energetically by making more efficient and monitored models.
- The review of the increase in energy costs.
- The variation of the internal distribution of energy costs between the fixed part and the variable part.
- The need to achieve the exemplifying role of the Government of Catalonia in the field of energy efficiency.

Objectives:

The Energy Saving and Efficiency Plan for the buildings and equipment of the Government of Catalonia (2018-2022) is a project of the Government as a whole, with the following objectives:

- Reduce 7.7% of the energy consumption of the buildings of the Government of Catalonia in 2022 with respect to 2017 consumption.
- Set an objective for the implementation of renewable energies in the Government of Catalonia.
- Install a minimum of 20 MW of photovoltaic solar energy in self-consumption in the buildings of the Government of Catalonia.
- Install a minimum of 200 points of recharge infrastructure for electric vehicles.
- Design new building buildings as almost no power consumption buildings.
- Implement the energy accounting service in existing buildings.

With the extension and revision of the Plan, a total investment in energy efficiency improvements of € 47.5M is expect to generate in the 2018-2022 period, preferably from the energy service companies.

The overall objective of savings will be distribute among the different Departments of the Government of Catalonia according to their energy consumption.

The plan also contemplates carrying out energy audits in all public buildings, compliance with design criteria for new construction or large refurbishments so that they are almost non-existent and the extension of energy management services to all buildings and equipment.

Methodology:

This set of improvement actions, to achieve the savings objectives, will be carry out preferably by service companies, with no contribution from their own budget and according to two contractual models:

Energy performance model with guaranteed savings. These contracts include two services: energy efficiency and maintenance service, and the improvement of the facilities and facilities of the buildings is tender. In this case, the term of the contract can be up to 12 years to allow companies to recover the cost of providing the energy efficiency service based on the guaranteed savings.

Energy management model. In cases with a reduced energy bill or in cases where facilities are already sufficiently efficient, contracts may be of a shorter duration (around 4-5 years). In this case, the tender can be with or without maintenance.

- **Action Plan for Energy Efficiency in the Industry of Catalonia**

The objective is to reduce the energy intensity of this sector - that is, the energy needed to produce a unit of GDP - and, therefore, contribute to increasing its competitiveness. The main lines of the Plan are in the framework of a process of participation of the entities and sectoral associations of the Catalan industry.

The Government of Catalonia promotes the **Energy Performance Contracting with guaranteed savings:**

The Government of Catalonia has the conviction and the need to implement progressively efficient and innovative contracting systems to achieve a high level of efficiency in its operation in all areas of work. The new Law on Public Sector Contracting can contribute to this goal.

The new Law 9/2017, of November 8, on Contracts of the Public Sector, which came into force on March 9, 2018, incorporates for the first time the possibility of including energy efficiency as one of the criteria that *the contracting body* may decide to award a tender.

Concretely, the article n.145 of the new Law on Public Sector Contracts contemplates, for the first time, the possibility of including "environmental characteristics" as one of the aspects to be taken into account in the qualitative award criteria. These environmental characteristics may refer, "among others", to the reduction of the level of emissions of greenhouse gases; the use of measures of saving and energy efficiency and the use of energy from renewable sources during the execution of the contract; and to the maintenance or improvement of natural resources that may be affected by the execution of the contract.

The same article also establishes the cost of the life cycle, which, beyond the cost of acquisition, places value in aspects such as the reduction of energy consumption during its useful life, as a criterion for awarding. This factor is key to promoting investments in energy efficiency or renewable energies that, despite being able to cost more than a conventional solution, this surcharge is amortize with energy savings.

On the other hand, the law indicates *that the offers will be reject* if it is verify that they are abnormally low because they do not meet the obligations applicable in environmental, social or labor matters.

In this global framework, from the ICAEN and in agreement with the General Intervention the Model performance contracts with a guarantee of savings, for energy efficiency contracts and the introduction of renewable energies.

This contractual modality allows:

- ✓ To ensure that these contracts do not imply a debt to the Generalitat, establishing that the facilities provided by private companies are property of the company throughout the duration of the contract and become the property of the administration, at zero cost, upon termination of the contract.
- ✓ To define that the duration of the services contracts related to these operations can be up to 12 years due to the contractor's remuneration for the energy efficiency service is solely derived from the energy savings derived from the contract, not assuming for the Generalitat an increase of the budget line.
- ✓ Eliminate the risk for the Generalitat of Catalonia. Establishing that the remuneration to be paid to companies that provide the energy efficiency services and that will be fixed at the beginning of the contract, is less than the economic value of the savings achieved, of so that the economic risk the Energy Services Company assumes corresponding to the achievement of the guaranteed savings.