



ZEROCO2

Zero Emission Communities

“PPP scheme effectiveness and pertinence assessment”

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Covenant of Mayors

The Covenant of Mayors is a commitment by signatory local authorities to go beyond the objectives of EU energy policy in terms of reduction in CO₂ emissions through the implementation of sustainable energy policies. Local governments play a crucial role in mitigating the effects of climate change, all the more so when considering that 80% of energy consumption and CO₂ emissions is associated with urban activity.

The European Union (EU) is leading the global fight against climate change, and has made it a top priority. Its ambitious targets are spelt out in the EU Climate Action and Energy Package, which commits – inter alia – Member States to reduce their greenhouse gas emissions by 20% by 2020. Signatories of the Covenant of Mayors contribute to these policy objectives through a formal commitment to go beyond this target through the implementation of their Sustainable Energy Action Plan (SEAP).

In order to translate their political commitment into concrete measures and projects, the Covenant signatories undertake to prepare a Baseline Emission Inventory and submit, within the year following their signature, a Sustainable Energy Action Plan outlining the key actions they plan to undertake.

Beyond energy savings, the results of signatories' actions are manifold: creation of skilled and stable jobs, not subject to delocalisation; healthier environment and quality of life; enhanced economic competitiveness and greater energy independence. These actions serve as examples for others to follow, notably through referring to the “Benchmarks of Excellence”, a database of best practices submitted by Covenant signatories. The Catalogue of Sustainable Energy Action Plans is another such unique source of inspiration, as it shows at a glance the ambitious objectives set by other signatories and the key measures they have identified to reach them.

The following steps indicate the different actions that have to be undertaken by the signatory local authority at each stage of the initiative until 2020:

➤ STEP 1: Signature of the Covenant of Mayors

- Creation of adequate administrative structures

For the success of the Covenant of Mayors in each local authority, the internal administrative structures should be adjusted and optimised. Specific departments with appropriate competencies should be assigned as well as sufficient financial and human resources dedicated to the implementation of the Covenant of Mayors commitments.

- Baseline Emission Inventory & SEAP development

The development of a Baseline Emission Inventory or Sustainable Energy Action Plan (SEAP) requires substantial resources. The municipality, especially if it is a small one, might lack the





human/financial capacities and technical expertise to reach its ambitions. However, assisted by the province/region/agglomeration and/or by existing associations of local and regional authorities, such efforts can be shared, and synergies created.

Citizens' involvement is also a key for stimulating the behaviour changes. As Covenant signatory, the municipality is also committed to mobilising and involving the citizens in the whole process. Strategies of information, communication, sensitising, motivation and co-ordination are a crucial ingredient for the success.

➤ **STEP 2: Sustainable Energy Action Plan submission**

- Implementation of the Sustainable Energy Action Plan

Implementing the Sustainable Energy Action Plan (SEAP) will surely take the longest time, efforts and financial means. During the implementation phase, it will be essential to ensure both good internal communication as well as external communication. The organisation of "Local Energy Days" can be a good opportunity to inform and involve the citizens in the process via exhibitions, guided tours, dedicated campaigns, etc. This ensures wide support for the whole process of SEAP implementation and also contributes to the awareness-raising and behaviour change.

- Monitoring progress

Monitoring is a very important part of the SEAP process. Regular monitoring followed by adequate adaptations of the plan allows initiating a continuous improvement of the process. In addition, CoM signatories are committed to submit an 'Implementation Report' every second year following the submission of the SEAP 'for evaluation, monitoring and verification purposes'.

➤ **STEP 3 : Regular submission of implementation reports**

Every two years after having submitted the Sustainable Energy Action Plan (SEAP), the CoM signatory has to report on the SEAP implementation. These implementation reports aim to check the compliance of the interim results with the foreseen objectives in terms of measures implemented and CO₂ emission reductions.

For its unique characteristics - being the only movement of its kind mobilising local and regional actors around the fulfilment of EU objectives - the Covenant of Mayors has been portrayed by European institutions as an exceptional model of multi-level governance.

The up to date CoM signatories by country are displayed in the following table:

Countries	Signatories	Population covered	Submitted SEAPs
Argentina	1	56,825 (0%)	0%



Countries	Signatories	Population covered	Submitted SEAPs
Armenia	1	1,600 (0%)	0%
Austria	12	1,909,181 (23%)	50%
Azerbaijan	1	4,000 (0%)	0%
Belarus	6	221,457 (2%)	17%
Belgium	62	3,088,508 (29%)	63%
Bosnia-Herzegovina	13	1,468,887 (39%)	100%
Bulgaria	22	2,809,690 (38%)	32%
Croatia	44	1,770,607 (42%)	73%
Cyprus	13	313,991 (37%)	46%
Czech Republic	6	336,876 (3%)	33%
Denmark	29	2,355,202 (45%)	66%
Estonia	2	430,641 (34%)	100%
Finland	7	1,716,602 (33%)	86%
France	113	14,674,606 (24%)	55%
Georgia	5	1,737,700 (41%)	40%
Germany	57	17,293,163 (21%)	84%
Greece	69	2,988,825 (28%)	57%
Hungary	17	2,276,272 (23%)	12%





Countries	Signatories	Population covered	Submitted SEAPs
Iceland	1	118,427 (41%)	100%
Ireland	5	1,340,594 (30%)	60%
Italy	2,157	27,373,530 (47%)	59%
Kazakhstan	1		0%
Kyrgyzstan	2	267,300 (5%)	0%
Latvia	19	1,095,776 (50%)	21%
Lithuania	13	1,354,499 (42%)	54%
Luxembourg	2	102,229 (20%)	0%
Macedonia, The Former Yugoslav Republic Of	1	600,000 (29%)	100%
Malta	26	145,081 (36%)	92%
Moldova, Republic Of	11	1,270,483 (36%)	0%
Montenegro	3	141,416 (22%)	100%
Morocco	1	903,485 (3%)	100%
Netherlands	16	3,534,799 (21%)	81%
New Zealand	1	360,000 (9%)	100%
Norway	7	1,161,248 (26%)	100%
Palestinian Territories	1	555,320 (15%)	0%





Countries	Signatories	Population covered	Submitted SEAPs
Poland	33	3,244,564 (9%)	76%
Portugal	61	3,608,818 (34%)	85%
Romania	61	5,440,592 (26%)	36%
Serbia	5	347,870 (3%)	0%
Slovakia	8	572,749 (11%)	38%
Slovenia	11	167,066 (8%)	45%
Spain	1,278	22,455,986 (51%)	67%
Sweden	46	3,985,777 (45%)	85%
Switzerland	9	819,913 (11%)	89%
Turkey	5	3,350,920 (4%)	40%
Ukraine	34	7,630,503 (17%)	24%
United Kingdom	37	18,411,766 (31%)	65%

Table: CoM signatories by country, April 2013 (<http://www.eumayors.eu>)

Sustainable Energy Action Plan

The Sustainable Energy Action Plan (SEAP) is a key document that shows how the Covenant signatory will reach its commitment by 2020. It uses the results of the Baseline Emission Inventory to identify the best fields of action and opportunities for reaching the local authority's CO₂ reduction target. It defines concrete reduction measures, together with time frames and assigned responsibilities, which translate the long-term strategy into action. Signatories commit themselves to submitting their SEAPs within the year following adhesion.





The SEAP should not be regarded as a fixed and rigid document, as circumstances change, and, as the on-going actions provide results and experience, it may be useful/necessary to revise the plan on a regular basis.

The SEAP should concentrate on measures aimed at reducing the CO₂ emissions and final energy consumption by end users. The Covenant's commitments cover the whole geographical area of the local authority (town, city, and region). Therefore the SEAP should include actions concerning both the public and private sectors. However, the local authority is expected to play an exemplary role and therefore to take outstanding measures related to the local authority's own buildings and facilities, vehicle fleet, etc. The local authority can decide to set the overall CO₂ emission reduction target either as 'absolute reduction' or 'per capita reduction'.

The main target sectors are buildings, equipment/facilities and urban transport. The SEAP may also include actions related to local electricity production (development of PV, wind power, CHP, improvement of local power generation), and local heating/cooling generation. In addition, the SEAP should cover areas where local authorities can influence energy consumption on the long term (as land use planning), encourage markets for energy efficient products and services (public procurement), as well as changes in consumption patterns (working with stakeholders and citizens). On the contrary, the industrial sector is not a key target of the Covenant of Mayors, so the local authority may choose to include actions in this sector or not. In any case, plants covered by the ETS (European CO₂ Emission Trading Scheme) should be excluded, unless they were included in previous plans of the local authority

The SEAP has to contain a clear outline of the strategic actions that the local authority intends to take in order to reach its commitments in 2020. The SEAP may cover a longer period, but in this case it should contain intermediate values and objectives for the year 2020.

As it is not always possible to plan in detail concrete measures and budgets for such a long time span, the local authority may distinguish between:

- a vision, with long-term strategy and goals until 2020, including firm commitments in areas like land-use planning, transport and mobility, public procurement, standards for new/renovated buildings etc;
- detailed measures for the next 3-5 years which translate the long-term strategy and goals into actions.

It is also strongly suggested that measures related to the local authority's own buildings and facilities are implemented first, in order to set an example and motivate the stakeholders.





Public Private Partnership

A SEAP's successful implementation requires the sufficient financial resources. It is therefore necessary to identify available financial resources, as well as the schemes and mechanisms for getting hold of these resources in order to finance the SEAP actions.

Energy-efficiency financing decisions must be compatible with public budgeting rules. The local authority should allocate the necessary resources in the annual budgets and make firm commitments for the years to come. As municipality resources are scarce, there will always be competition for available financial funding. Therefore, efforts should be continuously made to find alternative sources of resources. Regarding multi-annual commitment, different political parties should give their approval by consensus in order to avoid disruption in the development of the SEAP when a new administration is elected.

Successful SEAP actions will reduce the long-term energy costs of the local authority, the inhabitants, companies, and in general all stakeholders. In considering the costs of SEAP actions, local authorities should also consider their co-benefits: benefits to health, quality of life, employment, attractiveness of the city, etc.

Local authorities' aim is to create energy-efficient projects towards the cost-optimal solution. However, quick paybacks on investments mean too often that organisations do not pay attention to 'life-cycle costing'. Payback time shall be compared with the lifespan of the goods to be financed. For instance, a 15 years payback time cannot be considered long when it comes to building with a lifespan of 50-60 years.

A bankable project is a clearly documented economically viable project. Building a bankable project starts with sorting out the pieces that make a project economically attractive. Initially, it is required to examine the project's key components, make sure that each aspect is properly assessed and that the plan to effectively manage that aspect is clearly presented. Each component carries a risk factor, and each risk factor carries a price tag. An effective Energy Service Company (ESCO) or financial consulting expert knows how to assess each part of a financial project.

When a financing project is studied by a bank, the objective is to know the level of risk through an assessment procedure. A technical energy audit is not enough for this purpose. Other aspects such as the engineering skills (of an ESCO or the municipal energy agency for instance) or the level of commitment of each part are crucial to making this project attractive for the bank.

Public-private partnership (PPP) is a financing mechanism used for renewable energy sources and energy efficiency projects. The local authority uses a concession scheme under certain obligations. For instance, public administration promotes the construction of a zero-emission swimming pool, or a district heating and cooling installation, by allowing a private company to run it revolving the profits on





the initial investment. This kind of contract should be flexible in order to allow the private company to extend the contract in case of unexpected payback delays. Moreover, a frequent due diligence is also recommended in order to follow up the evolution of incomes.

Overview of the Sustainable Energy Action Plan issues in the Mediterranean area (Italy, Greece, Spain, Portugal)

One of the main aims of the ZEROCO₂ project was the design and implementation of the Sustainable Energy Action Plan (SEAP) in the involved municipalities. Specifically, the Municipalities of **Bagnone**, **Comano** and **Fivizzano** from Italy, the Municipalities of **Syros-Ermoupolis**, **Paros** and **Sifnos** from the region of Cyclades in Greece, the Municipalities of **l'Alcúdia** and **Montortal** from Spain and the Municipalities of **Alter do Chão**, **Avis**, **Gavião**, **Marvão** and **Sousel** from the region of North Alentejo in Portugal were the beneficiaries of this action.

The design of a SEAP involves the development of the Baseline Emissions Inventory (BEI) which requires substantial resources. The partners responsible for this activity (Kyoto Club Service, CRES, AER and AREANATEjo) faced several problems.

The common problem for all the participating municipalities, which are small (main key issue of the project), was the lack of the technical skills required for the elaboration of the BEI. In addition, the collection of data required was a difficult task due to various reasons. The lack of energy consumption data of the municipal assets (buildings, vehicles, street lighting, etc), the lack of technical features of the municipal equipment and facilities and the absence of relevant documents (archives) in the municipal files were faced in many municipalities. In some cases, even the quality of the energy data provided from the energy suppliers was quite doubtful. In Portugal, difficulties were also faced with the introduction of data corresponding to the Transports Sectors. As this isn't a stationary sector, the information on energy consumption was very difficult to obtain. The proximity of North Alentejo to the Spanish borders, where fuels are cheaper, leads to a significant increase of the number of people who fuel their vehicles in Spain.

Regarding the solutions adopted, common approaches were identified among the partners. Training of the technical staff by ad-hoc seminars, email and/or phone communication and face to face meetings contributed to the enrichment of their scientific background. In order to obtain energy data, local data were extracted using guidelines prepared by the Joint Research Centre, JRC (Italian case), national data and data from energy studies and audits were used (Greek case), statistical methods were used for the private transport data and energy audits of the public buildings were carried out where it was needed (Spanish case) and regional data constituted the reference data (Portuguese case).





It is also common to all the participating municipalities that investments related to sectors that do not directly depend on local authorities (e.g. residential buildings, retail, services and transports), cannot be manipulated, although their results will contribute to the overall goal of reducing Municipalities' CO₂ emissions. However, a way to promote energy saving measures in the private sector and to 'guide' citizens towards environmental friendly solutions is the provision of incentives by funding these actions.

As mentioned above, different methodologies were followed for the collection and elaboration of the local energy data for the development of the BEI:

Italy: the analysis of the energy-environmental structure of the three Italian municipalities has been carried out by reconstructing the emissions balance through an analysis of the energy consumption, divided among the different areas as indicated in the Guidelines prepared by the JRC and between different energy carriers. So a top-down approach was followed.

Greece: due to the lack of local data, national data from the Hellenic Statistical Authority and energy studies and audits carried out by CRES were used for the elaboration of the data. So the most suitable approach was the top-down.

Spain: incoming data of energy consumption per sector (municipal buildings and equipment/facilities, residential buildings, retail sector, industries, municipal public lighting, municipal fleet, private transport, production of solar thermal energy, production of PV energy, cogeneration) has been collected. These individual base elements of the global energy consumption in the municipality have been specified in great detail and then have been linked together to form larger subsystems (Building, equipment/facilities and industries, Transport, Production of energy). Processing the data in that way made easier to define actions per sector, as it is absolutely clear where the higher consumptions come from. In addition, no databases of energy consumption per subsystems were available for the municipalities studied. So it was necessary to obtain the data from the bottom to the top (bottom-up approach).

Portugal: the data referred in the Dynamic Energy Matrix - Sustainability Energy Charter from North Alentejo, constituted the reference data for the inventory of energy consumption and CO₂ emissions, aiming the identification and quantification of action measures to reduce energy consumption and CO₂ emissions in the different municipal areas of AA-SEAP. So a top-down approach was followed.

Regarding the implementation of a SEAP, the decision making process on the measures applied in each Municipality had many similarities among the partners. The Town Council or a Municipal Board was the key actors for the decision taken, in collaboration with the national technical partners of the ZEROCO₂ project. The priorities given to each action/measure were based on various parameters, such as the saving potential, the special building regulations and restrictions (Greek islands), the budget of the investment, the ownership of the asset.





Engagement with the local energy awareness strategy

The local experiences, concerning awareness activities, provided interesting results for a general analysis on what kind of opportunities have been provided by ZErO CO₂. This consideration concerns, mostly, the outputs obtained by this specific field of action.

One of the main aims of the project, it was to start a bottom up process throughout the citizens of the involved municipalities; in fact these important pillars were based on the assumption that only well-known and commonly supported ideas or principles can guarantee a project success. But **the way to instil the idea ZErO CO₂ was the main issue to the local energy and efficiency issues**. So it was necessary to develop a strategy to use in communication and awareness activities; a very flexible strategy that could be adapted to different situations among the involved municipalities. On the other hand it must be noted that **European small municipalities, in particular Mediterranean ones, have a lot of similarities that helped in adapting the above mentioned strategy**.

The local awareness activities, leaded by Legambiente, were based on the awareness and communication campaigns. The first step was to develop a proper communication strategy considering the information to communicate and the most effective way to spread it; these are the main issues to deal with in strategic activities.

The perfect approach was a *step by step* operative action plan, as follows:

1) Aim definition

"Spreading of an energy efficiency policy and renewable energy sources use". This could be considered as the project's resume.

2) Analysis

A good analysis session was crucial to identify, related to point 1, how to proceed and develop the communication/action plan. A good management of this phase determined success of the communication plan and related activities. An analysis drafted the rest of the steps; by this initial approach an action model was produced, ready to be spread outside the project area.

3) Location

Concerning the ZErO CO₂ location, it was strictly connected to small municipalities that count less than 10.000 habitants. Less than 10,000 habitants was just a point of reference to recognize right location. However, workshops, meetings, thematic shows, etc., were also organized in other locations, where they were considered as good spreading spots.

4) Targets Identification

It was important to distinguish several levels/types of target groups.





- Private: local (regional) entrepreneurs were the most important target of this category.
- Public: citizens in general. All citizens, following the action plan guidelines, were informed first of all concerning their potential energy saving due to the possible installation of RES and energy efficiency in daily life.
- Local administrators in provinces, municipalities, etc. These actors represented the irreplaceable elements for new policy adoption and also new policy promotion.

5) Intelligence activities

The collection of information, regarding the best way to engage and get involved the subjects previously identified was a crucial phase.

6) Engagement tools

Information on money saving, benefits or even profit, produced by RES/good practices, were properly used as engagements and communication tools.

Example by domain:

Private: spreading of RES technologies for domestic and public issues, production conversion and job opportunities.

Public: news and concrete experience reports on domestic money saving by energy efficiency practices or installation of RES.

Local administration: opportunity in budget saving; perspective of good level of autonomy in energy production, energy tax abatement, etc.

7) Networking

The creation of a solid local network on RES issues was a top objective; spreading of information; feedback from previous local and outside experiences; promotion of exchanges between public and private domains. The networking activity supported the consolidation of the new reality. On the other hand, networking actions provided answers and solutions to all the subjects, concerning their particular requirements.

In this phase, each partner played an important role; because of the networking it was possible to pick up the first results concerning awareness and communication strategy implementation.

This phase was important also for the European dimension of the project: the networking activities demonstrated, in fact, how close the small municipalities' issues are all over Europe, in spite the deep differences and geographical distances.





Lack of proper strategies, technical resources, legal and administrative knowledge in energy matter and last, but not least, lack of adequate funds to realize new sustainable policies and efficiency intervention. These elements were considered as common issues of the 13 involved municipalities; these negative features, at the same time, showed up the way to ride on in order to realize a real European experience. Same problem means same condition and so, a possible common approach to find a solution. ZEROCO₂ provided the requested approach and so the proper tools to begin a new period in these municipalities concerning sustainable policies, new cooperative and effective relationship between citizens and administrators, very useful funds for technical interventions and, most important, a new perspective concerning their task and role in green conversion to sustainability. The citizens of ZEROCO₂ small municipalities, in fact, perceived, after the first phase of the awareness campaigns, the importance of an active participation to the above mentioned process; high participation in public thematic meetings, high attention to local workshops on sustainable life style as well as smart home interventions to the domestic efficiency.

An emblematic example of the “European spirit” by ZEROCO₂ was the ***Climate Caravan***. This was an international road campaign that travelled throughout the partners’ countries and reached the small municipalities in each stop. Twelve international stops made in Italy, Greece, Portugal and Spain; an international crew. It was an important tool considered as a green ribbon to bound European citizens. Citizens, administrators, school, pupils from all 13 municipalities participated in this international itinerant exhibition. The Climate Caravan was also the perfect occasion for thematic workshops and public debates on ZEROCO₂ and related themes. An important element to underline: the exhibition was translated in four languages and exploited in over 10 local schools.

8) Output collection

To take a stock of what has been done it was useful to keep in mind the following index:

- Work accomplishment
- Right/wrong approach
- Update/upgrade of procedures
- Creation of a local expertise concerning RES on technical, political and communication level

9) Experience spreading

Spreading the experience means to make people aware.

Now, after the long ZEROCO₂ experience, it’s important to open new scenarios of application; new networks and cooperation chances. Create a consciousness of the real effectiveness of RES in several application fields, promote new sustainable life style; these elements represent the best way to spread good practices and to make a new policy begin.





The climate change and the energy challenge are, obviously, a global matter to cope with. Small municipalities, and mostly the so deeply linked European ones, will play a key role in this important match; only cooperation and intense networking between similar subjects, will guarantee important outputs in global action for sustainability.

Overview of the Public Private Partnership issues in the Mediterranean area (Italy, Greece, Spain, Portugal)

The set-up of a Public Private Partnership in which the actions/measures were decided based on the developed SEAP in each participating country was a milestone of the project ZEROCO₂.

The implementation of a PPP in each country is specified by the relevant national legislation.

In Italy, the Legislative Decree no. 163/2006 covers the Italian legal framework for the realization of PPP operations contract in most part. Within it, in line with the directives of the EC 2004, the concessions of public works and services, including the sponsorship contract are defined and ruled. Also the approval of the Government Budget in 2007 made possible the employment of property leasing contracts for the implementation of project.

In Greece, PPPs are defined by the Law No 3389/2005 which establishes the legal framework for the implementation of Public-Private Partnerships. The Law 3855/2010 on energy end-use efficiency and energy services, which transposes the EU Directive 2006/32/EC, sets, among others, the policies, regulations and measures for the development of the Energy Service Market in Greece. Moreover, it foresees the creation of the ESCO's registry, where a company can be registered as an ESCO in the case that meets certain criteria; however it has not been developed yet.

In Spain, PPPs are being promoted by the Royal Decree 6/2010, measures to boost economy and employment that includes measure to promote ESCOs. In the framework of this Royal Decree, on January 2010, an agreement was signed by the Ministries Cabinet to approve the Energy Efficiency Activation Plan in the State Administration Buildings. In addition, the Sustainable Economy Law sets the basis for an environmental friendly energy model based on the security of supply and economic efficiency that establishes energy savings targets for public administration.

In Portugal, the Decree-Law n.º 29/2011 was published in February 28th 2011, establishing the legal regime applicable to the formation and implementation of energy performance contracts to be celebrated between public bodies and Energy Service Companies (ESCOs) to implement measures to improve energy efficiency in public buildings and equipment allocated to the provision of public services. However, the guidelines to implement this type of contracts were only published in February





2013 and must be adopted by the respective entities in all procedures regarding energy management contracts launched under the Portuguese Energy Efficiency Program in Public Administration.

So, it wasn't possible to implement a PPP scheme in all the participating countries. As such, different types of contract models were used for the implementation of the actions.

In Italy, the solution identified was the *Contract of concession to build and management* based on public initiative. This is the traditional concession to build and operate in which the public administration, once the infrastructural needs have been identified, elaborates a preliminary project and adds it in the programming instruments already approved. On the basis of the preliminary project made by the public administration it starts the private tendering procedure to define a winner. The private income is received during the operation phase while there are also financial and technical risks. The public contribution aims to grant to the private the obtainment of an economic and financial balance.

In Greece, since there is no developed ESCOs registry yet and there are legislative restrictions for the participation of public bodies in a PPP, the contract signed between the public and private party included energy efficiency clause based on the achieved energy saving and set an annual energy saving for heating of 15%. The call for bids was carried out as an open tender with limited publication duration due to the small amount of the investment (30.350,00 €) according to the national legislative framework.

In Spain, all contracts whereby a public body awards a work involving an economic activity to a third party are subject to the general principles on the freedom of establishment and the freedom to supply services. So, PPPs have to comply with the requirements of transparency, equal treatment, proportionality and mutual recognition (a tender process is required). Therefore, the contract scheme consists of an agreement between the public body (l'Alcúdia town council) and a technical assistant (AER), also a public body. A tender process must be set for the participation of the private body according to national rules. Regarding the contract model to be signed with the private body according to the ESCO scheme, as l'Alcúdia town council is the owner of the public lighting facility it was decided to celebrate a P4 contract that included three services: maintenance (P2), total guarantee (P3) and works to upgrade and refurbish the public lighting facility (P4). However, as l'Alcúdia municipality has been already working on the maintenance of the public lighting on own resources, the P4 contract includes two services (P3 and P4) as having the maintenance assumed by a third party meant an extra cost. Thus, the private party supplies the equipment and guarantees the percentage of energy saving to be achieved.

In Portugal, due to the delays in the publication of the Decree-Law n. ° 29/2011 that establishes the legal regime applicable to the formation and implementation of energy performance contracts, it was taken into account the Portuguese Public Procurement Code (that establishes the rules of public





procurement) and the Decree-Law n. ° 141/2006 (which aims the definition of the general standards of state intervention in public-private partnerships). A procedure and a tender specification were developed under which CIMAA (Intermunicipal Community of Alto Alentejo) launched a tender to choose an ESCO - Energy Services Company that, later, will provide energy services. This tender procedure focused on the conception, supply, installation and maintenance of Renewable Energy Systems, for the replacement of conventional thermal sources.

The projects described in each contract are as follows:

Italy

Municipality of Bagnone:

- Photovoltaic power of 19.50 kWp on the roof of the Multi-purpose Centre of Bagnone, site location Grottò and photovoltaic power of 9.36 kWp on the roof of the hostel Treschietto, location Palestro.

Municipality of Comano:

- Photovoltaic power of 7.70 kWp on the roof of the City of Comano in via Roma n.17 and replacement of 293 mercury vapor lamps of the public lighting with SAP and flow reducers.

Municipality of Fivizzano:

- Photovoltaic power of 19.50 kWp on the roof of the municipal slaughterhouse, located in the village Ferriera, photovoltaic power of 8.4 kWp on the roof of the stable of the Municipal Slaughterhouse-site location Ferriera and replacement of 60 spotlights 75 W present in a portion of the caves of Equi Terme with LED lamps.

Greece

Municipality of Syros-Ermoupolis:

- Energy refurbishment of the building envelope of the Development Corporation of Local Authorities of Cyclades.

Spain

Municipalities of L'Alcúdia and Montortal:

- Upgrade of the public lighting facility with the aim of improving the energy efficiency in the public lighting.

Portugal

Municipalities of Alter do Chão, Avis, Marvão and Sousel:





- The service to be provided comprises the design, supply, installation and maintenance of seven (7) solar thermal systems and one (1) heating system on biomass (pellets) to be implemented in eight (8) municipal buildings:

- Avis Camping Park
- Avis Municipal Sports Pavilion
- School's Pavilion of Avis
- Avis Municipal Swimming Pool
- Portagem Municipal Swimming Pool (Marvão)
- Municipal Sports Pavilion of Santo António das Areias (Marvão)
- Alter do Chão Municipal Swimming Pool





ITALY

A.1. Sustainable Energy Action Plan issues

A.1.1. Design of the SEAP

A.1.1.i Involvement of third parties / Staff capacity

The Municipalities of Bagnone, Comano and Fivizzano joined the Covenant of Mayors and its membership is committed to develop a Sustainable Energy Action Plan for Sustainable Energy and undertake all the necessary activities for the involvement of the entire community (citizens and stakeholders) in the project. The goal of reducing the amount of CO₂ emissions will only be reachable with clear starting point, point of destination and intermediate steps to achieve the goal by 2020.

The process started with the definition of energy consumption of the base year (2005) and outlines possible scenarios and evolutionary aspects of fuel consumption and associated emissions for the goal year (2020).

In order to achieve the goal the Municipalities, in the preparation of the SEAP, are committed to:

1. perform an energy and environmental analysis of the area and the activities that they are involved, through the definition of the energy balance and the preparation of the inventory of CO₂ emissions (BEI);
2. evaluate and identify potential actions, namely the potential reduction of the total final energy consumption in different sectors of activity and the potential to increase the local production of energy from renewable energy sources or other low impact sources, even though the redefinition of the possible scenarios for the evolution of the local energy system;
3. monitor the actions in order to assess the level of achievement of the objectives set.

Specifically, for this purpose the technicians of the municipalities were trained by Kyoto Club Service and Legambiente through a learning-by-doing methodology and dedicated face-to-face classes organized during the project implementation. The Municipalities' employees and technicians also attended several public events organized by the partnership in order to:

- ☐ Promote the development and dissemination of renewable energy sources in the public and private sectors;
- ☐ facilitate the development of virtuous behaviour in the community, through communication campaigns and awareness raising;
- ☐ promote the spread of a culture of sustainable mobility, encouraging the use of less polluting vehicles or alternatives to the car;





- ☐ reduce the energy consumption related to the public lighting, through retraining and improvement of management;
- ☐ support the implementation of purchasing groups of technologies using renewable sources;
- ☐ improve the energy and environmental quality of buildings, through the adoption of standards in the Urban Building;
- ☐ organize events targeted the citizens in order to inform them about the project.

In addition the partnership, led by the Province of Massa Carrara, has redefined the municipalities' structure in relation to the activities undertaken by this initiative, identifying a responsible figure and organizing a working group to manage the relationship with the European Commission. In this way, the municipalities had also the opportunity to strengthen the energy domestic skills. The need of training the employees is based on the capability of handling the future management processes, empowered to take action and behaviour fit with the objectives. It also coincides with the essence of the spirit of transformation promoted by the Covenant of Mayors and fulfils the need for transparency and shared decision making processes durable and truly sustainable.

The designed SEAP has become the instrument of environmental/energy programming that the municipalities will follow in the coming years so as to achieve the objectives set out.

A.1.1.ii Data collection

The analysis of the energy-environmental structure of the three Italian municipalities has been carried out by reconstructing the emissions balance (BEI) through an analysis of the energy consumption, divided among the different areas as indicated in the Guidelines prepared by the JRC and between different energy carriers. In particular, an approach has been used that makes an estimate of the emissions through an expression (in accordance with "2006 IPCC Guidelines for National Greenhouse Gas Inventories"), that relates the activity of the source with the emission and this, in general, can be attributed to the following:

$$E_i = A * F_{ei}$$

where:

E_i = emission of the pollutant "i" (t / year), or the amount of pollutant "i" (generally expressed in tons) generated and emitted into the atmosphere as a result of a business;

A = activity indicator, which is the parameter that best describes the activity that creates an issue, which is associated with a pollutant, compared to the unit of time (usually a year). They may be, for example:





Consumption of fuel used in the case of generation of heat and power (e.g. amount of fuel consumed / year); Unit of product for industry and agriculture (product quantity / year);

Fei = emission factor of pollutant i (g of pollutant / unit of output, g of pollutant / unit of fuel consumed, etc...), or the amount of pollutant emitted into the atmosphere per unit of activity indicator.

The definition of the emissions and energy flows allowed to:

1. know the state of affairs of the municipality energy;
2. identify sectors and areas most critical;
3. plan the action to reduce emissions and increase energy production from renewable sources in the short, medium and long term.

The inventory concerns not only the sectors that have the greatest impact on the emissions, but also on the distribution among the various energy carriers, since possible actions of reduction will also aim to determine a shift from more polluting energy carriers (fuel oil heating, petrol, diesel) to those that have less impact (woody biomass, LPG, methane).

The sectors considered in the reconstruction of the emissions of the municipalities were: CIVIL SERVICES, which include the residential, commercial, public buildings and public lighting. TRANSPORT which includes the private mobility, municipal fleet and public transport.

The reference year for defining the baseline was chosen to be 2005, in line with the JRC, and this is a year that a large number of data and information are available. The emission factors used (Appendix 1) are the standard, (IPCC 2006) also reported in the Guidelines of the SEAP. The exception is the emission factor of the electricity that has been calculated considering the presence in the municipal area of production facilities.

A.1.1.iii Measures defined

Membership of the Council to the Covenant of Mayors commits the Administration to undertake a series of actions and interventions that can lead to a reduction by 2020 of the total CO₂ emissions by at least 20% compared to the base year taken as reference, i.e. 2005. This objective, given the regulatory powers, the limited availability of economic resources and the constraints imposed by higher-level laws, is a difficult goal to be achieved by a local Administration. At the same time it can benefit from this by highlighting the real opportunities for saving and rationalization of energy consumption, which can generate resources to invest in further actions to increase the efficiency of the energy system. Based on the analysis carried out in the municipal energy, critical and specificity of the analysed territory, a number of possible actions were also determined, mainly with low or no cost, which may facilitate the administration in an attempt to affect especially on the most energy-intensive





and the public sector. Interventions in the latter field, while in most cases they do not contribute significantly to the reduction of the overall emissions of the territory, have the advantage of being within the direct administration and also to be able to generate a flywheel effect to changes in behaviour. Besides, the actions of the public sector are easier to predict and control than the private sector, thus ensuring greater certainty on the estimated emissions reduction.

Municipality of Bagnone:

On the basis of the proposed actions, the public sector can result in the most ambitious goal by reducing the emissions nearly 98%. A major contribution to this reduction is given by the cogeneration plant to be installed in Grottò, whose emissions are divided among three sectors according to the type of users that will be connected: residential (housing), commercial (offices of the province) and public (public buildings). With regard to the residential sector, which is the cause of most of the CO₂ emissions of the township, is expected to reduce the emissions by approximately 23%. Regarding the mobility, the prediction of the emissions reduction resulting from the proposed interventions is only 6%. In this sector the behavioural change of the citizens is fundamental, in order to reduce car use for travel within the municipal area and the reduction of road freight transport. It is also important to improve the efficiency of the vehicle fleet, which, however, is determined by a technological improvement to which the municipality can contribute only a small part. As a precaution, it was decided not to act consistently on this area to achieve the 20% reduction in emissions, while considering the fundamental policies that promote a different way of moving within its territory. As regards the service sector, the absence of large companies and therefore structures of particular importance linked to them makes it difficult to realize ad hoc interventions. It must be said, however, that in this particular context the territorial tertiary sector definitely tends to get confused, in terms of structures and consumption, with the residential sector. Therefore, it can be said that some of the actions that have an impact on the residential sector (see Building Regulations), will have an effect on the service sector; the extent of these effects in terms of reduced CO₂ emissions have not been considered and this can provide an extra margin of safety on the achievement of targets. As mentioned earlier it was considered the installation of a cogeneration plant, which will serve the various utilities, also owned by the Province,. Finally, information and awareness campaigns were intended to be carried out, including thematic areas related to energy and environment: renewable energy, energy efficiency, sustainable mobility and, in particular, strengthening the transport service public. A list of the proposed actions including the energy saving achieved and the reduction of CO₂ emissions are shown in the table below.





FIELD OF INTERVENTION	ACTION	DESCRIPTION	MWh savings	tCO ₂ saved
Public Sector	PA 1	Public Lighting	57	27
	PA 2	Green Energy Certified	-	160
	PA 3	PVs on Public Buildings	106	45
	PA 4	Energy Services Public Buildings	65	13
	PA 5	Central Heating Systems	1.550	444
Residential Sector	RES 1	PVs	477	231
	RES 2	Solar Thermal Systems and Efficient Boilers	350	77
	RES 3	Green Energy Certified	589	285
	RES 4	Building Code with Energy Regulation	635	135
Transport Sector	MOB 1	"Zone 30": max speed 30 km/h	77	19
Transport Sector	MOB 2	Public Administration Vehicles	1,6	0,4
Information & Communication	INFO	Web Page SEAP	68	17
Total			3,976	1,454

Municipality of Comano:

On the basis of the proposed actions, the residential sector which has the highest percentage of emissions can result in the most ambitious goal by reducing the emissions nearly 75%. As for the public sector, it is expected to reduce the overall CO₂ emissions by 25%. This reduction is mainly due to the upgrading of public lighting planned in the short term and the replacement of votive lamps, action that has already been made. Regarding the mobility, there are no actions foreseen. It still requires a change of behaviour of citizens, in order to reduce car use for travel within the municipal area and the reduction of road freight transport. Moreover, it is important to improve the efficiency of the vehicle fleet, which, however, is determined by a technological improvement to which the municipality can contribute only a small part. As regards the service sector, the absence of large companies and therefore structures of particular importance linked to them makes it difficult to realize ad hoc interventions. It must be said, however, that in this particular context the territorial tertiary sector definitely tends to get confused, in terms of structures and consumption, with the residential



sector. Therefore, it can be said that some of the actions that have an impact on the residential sector (see Building Regulations), will have an effect on the service sector, and the extent of these effects, in terms of reduced CO₂ emissions, have not been considered and this can provide an extra margin of safety on the achievement of targets. Finally, information and awareness campaigns were intended to be carried out, including thematic areas related to energy and environment: renewable energy, energy efficiency, sustainable mobility and, in particular, strengthening of the transport service public. A list of the proposed actions including the energy saving achieved and the reduction of CO₂ emissions are shown in the table below.

FIELD OF INTERVENTION	ACTION	DESCRIPTION	MWh savings	tCO ₂ saved
Public Sector	PA 1	Public Lighting Requalifying	130	63
	PA 2	Cemetery Light System Requalifying	65	31
	PA 3	Green Energy Certified and public lighting	-	28
	PA 4	PVs on Public Buildings	10	5
	PA 5	Energy Services Public Buildings	12	3
	PA 6	Public Building Intervention	7	2
Residential Sector	RES 1	PVs	186	90
	RES 2	Solar Thermal Systems and Efficient Boilers	177	138
	RES 3	Green Energy Certified	230	111
	RES 4	Building Code with Energy Regulation	486	55
Information & Communication	INFO	Web Pages , Energy Desk, InfoPoint	24	6
Total			1,327	531

Municipality of Fivizzano:

On the basis of the proposed actions, the public sector can result in the most ambitious goal by reducing the emissions nearly 90%. This figure is particularly high in relation to the intervention that provides for the purchase of certified green electricity, thus with zero emissions to cover the total consumption of residues in the public sector. With regard to the residential sector, which as seen





above is the cause of most of the CO₂ emissions of the township, is expected to reduce the overall emissions by approx. 27%.

Regarding the mobility, the reduction of emissions resulting from the proposed intervention is only 2%. In this sector, it is fundamental the behavioural change of the citizens, in order to reduce car use for travel within the municipal area and the reduction of road freight transport. It is also important to improve the efficiency of the vehicle fleet, which, however, is determined by a technological improvement to which the municipality can contribute only a small part. As a precaution it was decided not to act on this area to achieve the 20% reduction in emissions, while considering the fundamental policies that promote a different way of moving within its territory. As regards the service sector, the absence of large companies and therefore structures of particular importance linked to them makes it difficult to realize ad hoc interventions. It must be said, however, that in this particular context the territorial tertiary sector definitely tends to get confused, in terms of structures and consumption, with the residential sector. Therefore it can be said that some of the actions that have an impact on the residential sector (see Building Regulations), will have an effect on the service sector, and the extent of these effects in terms of reduced CO₂ emissions have not been considered and this can provide an extra margin of safety on the achievement of targets. Finally, information and awareness campaigns were intended to be carried out, including thematic areas related to energy and environment: renewable energy, energy efficiency, sustainable mobility and, in particular, strengthening of the transport service public. A list of the proposed actions including the energy saving achieved and the reduction of CO₂ emissions are shown in the table below.

FIELD OF INTERVENTION	ACTION	DESCRIPTION	MWh saving	tCO ₂ saved
Public Sector	PA 1	Cemetery Public Light Substitution and PV System	300	145
	PA 2	Green Energy Certified for Public Building and Lighting	-	567
	PA 3	PVs on Public Buildings	45	22
	PA 4	Public Building Retrofitting	330	67
	PA 5	Public Lighting Tourist Caves of Equi	7	3





FIELD OF INTERVENTION	ACTION	DESCRIPTION	MWh saving	tCO ₂ saved
	PA 6	Energy Services Public Buildings	162	33
	PA 7	Central Heating Systems	698	141
Residential Sector	RES 1	PVs	2,814	1,359
	RES 2	Solar Thermal Systems and Efficient Boilers	2,329	937
	RES 3	Green Energy Certified	2,606	1,259
	RES 4	Building Code with Energy Regulation	3,186	570
Mobility Sector	MOB 1	"Zone 30": max speed 30 km/h	494	125
	MOB 2	Public Administration Vehicles	6	2
Information & Communication	INFO	SEAP web page and energy desk	n. q.	n. q.
	ALTRO	Information and awareness campaigns	6	70
Total			12,983	5,299

A.1.2. Implementation of the SEAP

The board of the municipalities council is the steering group for the SEAP-Implementation (political level), and the technical office has the lead for the implementation of the measures and the organisation of the work (administration level). Two experts are working as project managers with SEAP implementation. Every three months the SEAP project officers meet the Head of the municipal administration and all Head of departments for reporting of the implementation process and discussing next steps. Also the Mayor of the municipalities is participating as a link between municipal administration and politics. The working group is a forum for information exchange and joint planning for implementation of policies and measures. ZEROCO₂ SEAP has been presented and discussed with all departments and all political committees. All departments have developed implementation plans in their own fields of responsibility.





ZEROCO₂ municipalities implement a yearly energy inventory for energy consumption within the municipal administration, which serves as a basis for decision making. For the municipalities as a geographical area, data access and quality is still relatively poor, but the municipalities are actively working on improvements. With support of the Province of Massa Carrara and future activities of the project PAST, some corrections could be possible made in the BEI.

A.1.3. Engagement with the local energy awareness actions

The participatory process in the Covenant of Mayors: ZEROCO₂ Small Communities, for Big Changing under the Regional Law for Participation in the LR 69/2007, was carried out by Kyoto Club Service and Legambiente to share with their citizens choices that will be adopted in the energy and environmental performance. In 2011 and 2012 the municipalities of Bagnone, Comano and Fivizzano have joined the Covenant of Mayors, a voluntary initiative of the European Commission, which commits the participating cities to reduce their emissions by 20% by 2020 compared to a reference year. Within a year of joining the Covenant of Mayors, the municipality must submit to the Commission a program document, the SEAP – Sustainable Energy Action Plan, which is composed of two parts: 1) basic inventory of municipal emissions (BEI), which quantifies how much carbon dioxide they emit within the local authority for the areas of interest, 2) emission reduction actions that the Administration intends to take so as to achieve the goal of reducing emissions. For drafting the SEAP and the realisation of the participatory process the council has decided to rely on an energy and environmental consulting firm, the Kyoto Club Service, which was selected following a public tender.

The Administration, through the work of stratification registry office, selected a sample of about 40 people, who were first contacted by phone and at a later stage have received a letter of invitation. The stratification includes categories considered to be representative of the population. The level of response of the citizens didn't reach the quota of 20 participants, which was the minimum goal of participating in the Committee. For this reason, the sample selected in this way was integrated with the citizens belonging to the specified number of associations in the area of Lunigiana, which have, in fact, acted as a filter between the administration and citizens. It is, therefore, those who are already active in the participation and involvement in the activities organised in the communal area.

The Committee met twice at the conference room of the library. During the first meeting, which was held on the 19th November, a consultant from the Kyoto Club Service presented the results of the emission inventory and outlined a number of possible reduction measures that can be implemented in the territory Lunigiana, highlighting the pros and cons. In the next phase the jurors (21 participants) discussed, trying to identify which of the proposed actions were really viable in their territory and to create a priority list of the proposed actions. All the indications that emerged during the discussion were collected in a document at the end of the meeting and this was distributed to all the members of





the Committee. During the second meeting, which took place on the 6th December, the final recommendations of the Committee were elaborated, which the Administration must take into account in drafting the SEAP or, if not, explain why they are not accepted. The discussions of the Committee and drawing up the recommendations were driven by two experts in moderation and conflict management company Legambiente.

The participatory process is part of a broader process of involvement of the entire community (citizens and stakeholders) made by the Municipalities of Bagnone, Comano and Fivizzano after the accession to the Covenant of Mayors. For this reason, a meeting open to all citizens and two meetings with the local stakeholders were organised. During the meetings, the phases of the project were presented, trying to highlight the contribution that each of the members of the community can make to its implementation, especially in the implementation of actions to reduce emissions.

PREPARATORY PHASE: In this phase the logistics of public meetings with citizens and local stakeholders for the project presentation have been prepared. At the same time all the necessary activities for the formation of the Committee and the realization of the meetings have been carried out: stratification of the population, selection of the sample of citizens, contact by phone and a letter of invitation, and the formation of the Committee.

PHASE OF COMMUNICATION: this phase is extended during the participation process and a communication campaign has been proposed, including the organization of an evening public event.

UNDER CONSTRUCTION: meetings scheduled for both the implementation of the SEAP (citizens and stakeholders) and the realization of the participatory process (meetings of the Committee) were organized.

PHASE OF RETURN at the end of the participatory process, the document containing the final recommendations was sent to the members of the Committee. Once the SEAP was submitted to the European Commission, a celebration event for the dissemination of the information concerning the results of the project will be organized and a dedicated page on the website of the City will be developed, which will also include information concerning the future monitoring.

A.2. Public Private Partnership issues

The Government in its mission to ensure public services, uses, increasingly, procurement models that are essentially based on the collaboration between the public and private sectors, having in mind the idea of the provision of services in order to benefit the community, taking as a basic principle the risk sharing among partners.

This model, known as Public-Private Partnership (PPP) constitutes a privileged contractual form so that the Government can ensure such services taking advantage from innovation, know-how and





flexibility of the private sector funding, thus ensuring that the provision of services can be developed in a more profitable way in comparison with traditional models.

A PPP contract refers to a contract between private and public partners, in which the main responsibility for the creation, funding and operation of the infrastructure belongs, as a rule, to the private partner.

In this case, the Government goes by a provider role to a regulatory one, being only responsible for the definition, characterization and quantification of essential public needs, thus hiring this provision in partnership with the private sector. This situation has the goal of maximizing the Value for Money (VfM) and minimizing the risk of involvement of the public partner.

A.2.1. Preliminary work: call for bids

The Province of Massa Carrara, under the Operational Programme "MED", transnational program of European territorial cooperation, which was approved by the European Commission Decision EC (2007) 6578 of 20 December 2007, accepted by Resolution of the Provincial Council No. 59 of March 5, 2010 as leader, the project proposal "ZERO Emission Communities (ZEroCO₂)" made in the course of the program MED 2009 Priority 2 - Protection and promotion of sustainable development in the area - OB 2.2. Further investigation on the projects presented, the region Provence-Alpes-Côte-d'Azur (PACA), Single Managing Authority of the MED Programme, by letter dated 31 May 2010 (protocol STC DM / TR / LG / CC / PF - 10/29) announced the Province of Massa-Carrara approval and funding of the project "Zero Emission Communities (ZEroCO₂)". The project supports 13 small municipalities, identified by the project partners in their respective territories (Italy: Province of Massa-Carrara, Portugal: Alto Alentejo, Spain Comunidad Valenciana; Greece Cyclades), into a concrete program of best practices for energy efficiency and use of renewable sources of energy. In municipalities identified for the Province of Massa-Carrara are those of Comano, Fivizzano and Bagnone, there is a program of local action and animation to support the preparation of an Action Plan for Sustainable Energy (SEAP), which has identified actions to be taken in the medium and long term to achieve the objectives of municipal energy virtuosity and consequent reduction of emissions (energy saving and efficiency, political and virtuous behaviour of mobility, housing, lifestyle, use of renewable energy sources, etc.), The preparation and presentation of SEAP by the three municipalities is, together with the accession of the municipalities themselves to the "Covenant of Mayors", one of the objectives of the project "ZEroCO₂" together to achieve some concrete actions identified with the formation of SEAP.





A.2.2. Description of the project

The Province of Massa-Carrara, with resolutions of the Provincial Council n. 188 of 08.21.2012 and n. 219 of 05.10.2012 approved the preliminary design for the first intervention "pilot" above, consisting of technical report, Economic Framework, Cards interventions, Performance-Special Chapter. The measures are divided into two separate parts dealing respectively with the municipalities of Bagnone Comano (Lot 1) and Fivizzano (Lot 2). The Province of Massa-Carrara in implementing the provisions of the determination to bargain n. 3562 of 7 November 2012 will activate the procedure for the conclusion of mixed contracts for works, supplies and services, with a prevalence of supplies, pursuant to art. 125 of Legislative Decree no. 163/2006 and subsequent amendments, relating to:

- a) Final design-executive photovoltaic systems, substitution of mercury vapor lamps with SAP and flow reducers and spotlights (including coordination of safety in the design phase);
- b) supply and installation of photovoltaic systems (including all charges, without exception for the connections, the entry into operation of photovoltaic systems in accordance with the provisions of the GSE, preparation laying surfaces of the affected areas, etc.);
- c) commissioning and management "post production" (including ordinary and extraordinary maintenance and insurance);
- d) replacement of mercury vapor lamps of public illumination with SAP and flow reducers including delivery and installation;
- e) partial replacement of lighting fixtures with lamps / LED spotlights with protection degree suitable for wet areas and / or in contact with water;

and specifically:

LOT 1

City of Bagnone:

- Photovoltaic power of 19.50 kWp on the roof of the Multi-purpose Centre of Bagnone, site location Grottò and registered at NCEU the sheet 53, map 760 (SHEET 1 - Annex C PDB);
- Photovoltaic power of 9.36 kWp on the roof of the hostel Treschietto, location Palestro and registered at NCEU the sheet 32, map 846 (SHEET 2 - Annex C PDB);

City of Comano:

- Photovoltaic power of 7.70 kWp on the roof of the City of Comano in via Roma n. 17 and registered at NCEU the sheet 51, map 547 (SHEET 5 - Attachment 4 Preliminary Design);
- Replacement of 293 mercury vapor lamps of the public lighting with SAP and flow reducers (TECHNICAL REPORT - Annex A Preliminary Design);





LOT 2

Fivizzano:

- Photovoltaic power of 19.50 kWp on the roof of the municipal slaughterhouse, located in the village Ferriera, Via Posara 4 and listed at NCEU at folio 80, map 128 (SHEET 4 - Annex C PDB);
- Photovoltaic power of 8.4 kWp on the roof of the stable of the Municipal Slaughterhouse-site locations Ferriera, Via Posara 4 and listed at NCEU at folio 80, map 128 (SHEET 3 - Annex C PDB);
- Replacement of 60 spotlights 75 W present in a portion of the caves of Equi Terme with LED lamps (TECHNICAL REPORT - Annex A Preliminary Design) as described in the preliminary design and content approved by management Determinations Nos. 188, 21/08/2012 and 219 of 19/10/2012.

Specifications

Photovoltaic means for a production plant of electrical energy by the direct conversion of solar radiation, through the photovoltaic effect. It is composed mainly of a set of photovoltaic modules, multiple groups of converting direct current into alternating current, electrical elements other minors and the connection to the grid existence. This system is intended to operate in parallel to the electricity distribution network and not in island missing when the network itself.

How to install photovoltaic systems

In each system, the photovoltaic field will be located on the roof of the building and will be divided roughly into six subfields. The solutions proposed in the preliminary draft are to be considered only as indicative. In any case, the following method of installation has to be respected:

c) Modules installed on flat roofs or on roofs with slopes up to 5°: if there is a perimeter fence, the maximum share, related to the median axis of the modules must be no more than the minimum height of that railing. If there is not a perimeter fence the maximum height of the modules with respect to the floor should not exceed 30 cm.

d) Modules installed on pitched roofs: The modules must be installed in coplanar with the surface of the roof with or without replacement of the same surface. In the absence of elements perimeter or in the presence of perimetral elements as high as 30 cm from the ground ($H \leq 30$ cm), the maximum height of the modules (H1) with respect to the floor should not exceed 30 cm. The modules, in order to be coplanar, should be mounted while maintaining the same inclination of the surface that receives them, it is necessary, furthermore, that the distance between the module surface and the surface coverage is reduced to the minimum necessary. In any case, the modules must not project beyond the pitch of the roof photovoltaic modules will be offered with crystalline silicon cells with a rated power of 240Wp. The modules have an upper structure in glass and frame in aluminium and will be equipped with a junction box with bypass diodes and connectors. The choice of the proposed modules will





ensure the degree of absolute reliability, durability and performance also in function of the average temperatures of the site of intervention. The photovoltaic modules provided will be equipped with a label containing the name of the manufacturer, model number, power Wp and serial number.

They will be assembled with crystalline silicon cells. The cables supplied will be pre-wired to be of the type section min 2.5 mm² with connectors. Each module will be accompanied by a bypass diode to minimize the loss of power to phenomena of shading. The mechanical connection between modules and between them and the secondary metal support structures will be made by means of brackets and anodized aluminium profiles with galvanized steel bolts.

Certification of photovoltaic modules

The PV modules must be tested and verified by accredited laboratories for specific tests required to verify the modules, according to UNI CEI EN ISO / IEC 17025, by certification bodies belonging to EA (European co-operation for Accreditation) or have established mutual recognition agreements with EA or within ILAC (International Laboratory Accreditation Cooperation). In carrying out the type tests for testing of photovoltaic modules please refer to the following standards:

- The CEI EN 61215, including variants, upgrades and extensions following the same rules, sets out the requirements under which the laboratory should test and verify the crystalline silicon PV modules for terrestrial applications, the purpose of classifying and project approval type;
- The CEI EN 61646, including variants, upgrades and extensions following the same rules, sets out the requirements under which the laboratory should test and verify thin-film photovoltaic modules for terrestrial applications, for the purposes of qualification and type approval of the project;
- The CEI EN 62108, including variants, upgrades and extensions following the same rules, sets out the requirements under which the laboratory should test and verify modules and systems concentrated photovoltaic (CPV) for the purposes of qualification and approval of the project kind.

As proof of the certification, upon GSE's request, one of the following documents must be submitted (written in Italian or English):

- The certificate of type approval, issued directly by an accredited test laboratory, following the execution of the tests described in the standard reference above;
- The certificate of conformity issued by a certification body, as a result of tests performed by an accredited test laboratory. In this case, the certificate must contain information about the laboratory that performed the testing and must state the number of the test report form. The modules must be produced within the validity period of the certificate.

Support structures of the photovoltaic modules

The support structures of the PV modules must be made in hot galvanized steel, or aluminium or





plastics resistant to atmospheric agents. The structures will have to play their role for all the years of the life of plants which are estimated around 25-30 years. In the portion of pitched roofs affected by the work, the tiles must be removed. The brackets must be anchored with appropriate chemical anchors and sealing should be restored and / or made from scratch where missing, with patches of suitable sheath for each bracket. Subsequently the tiles will have to be repositioned in the original position with replacement of those which may be damaged during installation of the modules. Any damage caused by the laying on flat roof and roof covering must be adequately restored to prevent infiltration of water to the structures underneath the cover.

Static converters ç.ç / c.a.

Group II for conversion must be fit for the transfer of power from the PV generator to the network, in compliance with regulatory requirements and technical safety standards. The values of the voltage and current input of the conversion assembly must be compatible with those of the photovoltaic generator, while the values of the voltage and output frequency are compatible with those of the network to which is connected the system.

The converters must be equipped with a guarantee of at least 10 years against defects in workmanship and materials directly declared by the manufacturer, have a maximum efficiency greater than or equal to 94%.

Switchboards

The switchboards shall contain the switchgear and protection, according to CEI 23-3 or 17-5, and overvoltage.

These frameworks must be provided with nameplate consists of: name or trademark of the manufacturer, the type number or other means of identification; CE marking.

Electrical conduit

The electrical connection between the photovoltaic modules, expected to pose in view, must be made by certified single core cables with quick connectors ponds to the corresponding connectors assembled at the factory on the terminal box and the modules. These cables will be subjected to UV and high temperature, therefore they should be "solar", single pole with tinned copper conductors and insulated and sheathed in rubber, rated voltage 600/1000 V. The cable cross section must not be less than 4 mm². The remaining wires must be made with cables without a protective conductor, contained in closed channels and / or tubes made of insulating material (for all paths with a view to presenting no danger of mechanical damage) and / or metal hot galvanized (for all paths in view of presenting a danger of mechanical damage) with degree of protection at least IP 4X and offer specific guarantees of the fire behaviour. For all non-linear paths on demand and for the connection of enclosures and switchboards electric flexible conduit must be used, where there is armed for the presence of risk of





mechanical damage. Connections shall be made with the appropriate terminals. Connections within tubes of circular cross-section or other shape are not permitted. Connections are allowed within channels for cables admitted that the terminals are the type IPXXB.

Testing facilities

Prior to the issuance of the certificate of technical inspection of the plant must be performed by the fitter, the presence of technical inspection by the contracting authority or the supervisor, the control on the works carried out which will involve the construction of a "perfect workmanlike "and according to the project plan.

In particular, the checks will include: 1. verification of the electrical continuity of the connections between the photovoltaic modules; 2. functional tests on the system static conversion with reference to the operating and maintenance; 3. measurements of the insulation resistance of all circuits; 4. verification of selectivity of the protections electrical prepared; 5. verification threshold thermal relays and differential relays; 6. testing electrical and mechanical interlocks (if any); 7. Verification of the proper marking of terminal blocks, boxes, cable terminals, etc.; 8. verification of the correct name plate of the equipment inside and outside the cabinet; 9. compliance with the following two conditions:

a) $P_{cc} > 0.85 * P_{nom} * I / ISTC$, where:

- P_{cc} is the power in DC current measured at the output of the photovoltaic generator, with accuracy better than $\pm 2\%$;
- P_{nom} is the nominal power of the PV generator;
- I is the radiation [$W/(mC)$] measured in terms of modules, with a precision better than $\pm 3\%$;
- $ISTC$, $1000 W/(mC)$, and irradiation in standard test conditions;

This condition must be valid for $I > 600 W/(mC)$.

b) $P_{ca} > 0.9 * CCP$, where:

- P_{ca} is the active power into alternating current measured at the output of the conversion assembly the current generated by the photovoltaic modules into alternating current, with precision better than 2%. The measure of the power P_{cc} and power P_{ca} must be carried out under conditions of radiation (I) on the surface of the modules above $600 W/(mC)$.

A.2.3. Legal requirements of the private party

The applicant for the Public Private Partnership must include a set of documents concerning the participation to the call for bid otherwise the authority will sanction it. The necessary documentation is listed below:





1. Penalty of exclusion for admission to tender with the directions of the object, Lot for which they submit the bid, the amount of the service, data and Tax Code of the owner or legal representative of the company, the location of the headquarters office and operations, the VAT and / or Code Tax of the company, the company registration number, phone number, fax, and if in possession, E-mail address, a statement of the registered competent INPS, the company code, the PAT INAIL and / or other bodies of enrolment according to the legal status of the competitor, the C.C.N.L. applied, the number of employees (firm size) and the category of economic operator in accordance with Law no. 180/2011 (Micro, Small, Medium) with which the competitor asks to be allowed to tender and: (Form Annex 1) a) hereby authorizes the Contracting Authority to use the fax number for communication; declares to know and accept without restrictions the general and special conditions governing the bidding procedure, as well the obligations arising from the requirements of the Special High Performers, declares to be aware of all the local conditions and the general and special circumstances that may have affected the determination of the prices and the quantification of the offer; b) undertakes to perform the service in the manner and within the period prescribed by the Tender Special High performance; c) declares that the bid submitted shall take into account the security charges and accepts the quantification; d) claims to be in possession of SOA, valid, appropriate for category and ranking the requests expressed by the notice; e) declares to have or NOT have certification of quality system that complies with European standards, f) declares that they have not issued without authorization pursuant to Art. 1 of L. 386/90 or not have provided pursuant to art. 2 of Law 386/90, check or multiple checks at a time close and on the basis of a unified planning of more than € 51,645.69 and not to have the previous five years, committed two or more violations of the provisions of the aforementioned Articles. 1 and 2 for an amount exceeding a total of € 10,329.14, with proven executive order; g) states the non-existence of the situations listed in paragraph 1, letter a), d), e), f), g), h), i), m), m-bis), art. 38 of the Code Contracts. h) states that the company which is not found in any control situation in art. 2359 of the Civil Code, respects to any person participating in the race and has independently formulated the offer or not to be aware of participation in the same procedure of persons who are, with reference Company to the writer, in one of the situations referred to in Article Control. 2359 of the Civil Code and has made the offer independently or to be aware of participation in the same procedure of persons who are, with reference the writing business, in a relationship of control as set out in Article. 2359 of the Civil Code and having made the offer itself, i) states that the Company has complied with the provisions of Law 12 March 1999. 68, art. 17 or that the Company shall not be subject to the obligations arising from the provisions of Law of 12 March 1999. 68, Art. 17. j) hereby authorizes, if a bidder armies - under the law en. 241/90 - the right to "access to documents", the Administration issued a copy of all the documentation presented to the invitation to tender or not to authorize access to share the technical offer will be expressly indicated with the submission of the application, as justifiably as secret technical / commercial.

2. *penalty of exclusion statement* (Form Annex 2) on plain paper holder, and technical director if





required in the case of an individual trader, partners and technical director intended for general partnership, the general partner and technical director if required in the case of a limited partnership, the directors with power of representation and the technical director and the expected social single individual or the majority shareholder natural person in the case of companies with less of four members, if it is another type of company or consortium, the inexistence of situations referred to in paragraph 1, letters b), c), m-ter) and paragraph 2 of Article 38 of the Code of Contracts (with reference to art. 38, paragraph 1, letter c), the competitor indicates all the sentences passed, including those for which it has benefited not to mention. The candidate is not required to refer only to convictions for offences decriminalized or declared extinct, or sentences revoked, or those for which it has been rehabilitated.

3. *substitute statement under penalty of exclusion* (form Attachment no. 3) pursuant to art. 46, Presidential Decree 445/2000 of the legal representative of the registration certificate with the competent 7/12 Chamber of Commerce, Industry, Agriculture and Crafts stating that the purpose of the economic operator is consistent with the subject of race and its properties. In the case of body, not bound by the obligation of registration with the Chamber of Commerce, it will be made always in the form of self-certification pursuant to Presidential Decree 445/2000, the statement of the legal representative that declares the absence of such an obligation of registration with the C.C.I.A.A. In this case they must be used to produce copies of the Memorandum and Articles of Association.

4. *penalty of exclusion declaration as a declaration form of the legal representative which shows that in the year preceding the date of this letter of invitation:* a) has not been replaced, nor ceased to serve the owner or the technical director expected in the case of an individual trader, the shareholders or the Director technician if required in the case of partnerships, the general partners or the technical director if required in the case of a limited partnership, the directors with powers of representation or the technical manager if required the sole shareholder or the natural person or the majority shareholder in the event of a natural person companies with less than four partners in the case of other types of companies or consortium (Form Attachment no. 4 / a); b) if there has been a change or termination, has not been pronounced in them judgment of conviction by a court or issued criminal irrevocable judgment of conviction or penalty upon request pursuant to art. 444 of the CPP for serious offences against the State or the Community that affect professional conduct. However, due to exclusion the sentence by a judgment which has the force of res judicata for one or more offences of participation in criminal organization, corruption, fraud, money laundering, as defined by acts Community (Form Attachment no. 4 / b); c) if there has been a change or termination and was handed against the judgment of conviction by a court or issued criminal irrevocable judgment of conviction or penalty upon request pursuant to art. 444 of the CPP for serious offences against the State or the Community that affect professional conduct or conviction, which has the force of res judicata for one or more offences of participation in a crime, corruption, fraud, money laundering, as defined by Community legislation, that there was complete and effective criminal prosecution of dissociation of conduct which must be





accompanied by a copy. (Form Attachment no. 4 / c).

5. *evidence of the successful establishment of provisional deposit* equal to 2% of the race and then € 3,988.60 to € 2,281.90 LOT 1 and LOT 2 (Art. 75 of the Contracts Code) with validity not less than 60 days from the date of the tender submission. If the procedure is longer than 60 days, it will request from the competitors appendix of extension of the validity of the provisional deposit. Failure to submit will result in exclusion from the tender procedure. The deposit can be paid in the following ways: bank guarantee or insurance policy or insurance policy issued by financial intermediaries, entered in the special in art. 107 of Legislative Decree no. 01.09.1993 n. 385 that engage exclusive activity of issuing guarantees being authorized by the Ministry of Economy and Finance. In this case, it must conform to the schema type 1.1 in DM 12/03/2004 n. 123 and must expressly provide pursuant to art. 75, paragraphs 4 and 8 of Decree. n. 163/06 and then penalty of exclusion: 1. The loss of the benefit of preventative redemption of the principal debtor; 2. The waiver exception in art. 1957, paragraph 2, of the Civil Code, as well as required by art. 75 paragraph 4 of Legislative Decree no. N. 163/06; 3. The operation of the guarantee within 15 days upon request of the Contracting Authority;

6. penalty of exclusion payment of the contribution to the Supervisory Authority on Contracts Public Works, Services and Supplies of € 20.00 for Lot 1 (Lot 2 for the payment is due), made in one of the following ways: - On-line with Credit Card of Visa, MasterCard, Diners, American Express by connecting to the website of the Central Bank "service recovery" at <http://www.avcp.it/riscossioni.html> following the instructions on the portal. As proof of payment, the competitor must attach a copy printed receipt sent by the collection system; - In cash, bearing the model of payment issued by the collection service at all stores of the network of tobacconists, lottery shops authorized to pay bills and bulletins, following the operating instructions available on the website at <http://www.avcp.it/riscossioni.html>. As proof of payment, the company competitor must attach the original receipt issued by the store.

7. if the competitor intends to subcontract, he must attach a statement with the indication of the categories to be subcontracted in accordance with art. 118 of the Code of Contracts (form Attachment no. 5). In the absence of the statement, the declaration will not be subcontracting authorized.

8. the Performance-Special Chapter (Annex D) should be signed for acceptance at the bottom and initialled on each page, pursuant to art. 1341 of the Civil Code. The subscription shall be affixed by the owner or the legal representative of the competitor. In the event that the bid documents are to be signed by the prosecutor of the economic competitor he must submit a copy of power of attorney and, under penalty of exclusion, the documents referred to in paragraph 2.

A.2.4. Type of the PPP implemented

The Italian Legislative Decree covers the Italian legal framework for the realization of PPP operations contract in most part no. 163/2006. Within it, in line with the directives of the EC 2004, the





concessions of public works and services, including the sponsorship contract are defined and ruled. Also the approval of the Government Budget in 2007 made possible the employment of property leasing contracts for the implementation of project.

For the purpose of the MED ZERoCO₂ project and for the action identified within the SEAP of three municipalities, the solution identified was the *Contract of concession to build and management based on public initiative* (art.143 of “Code of public contracts for works, services and supplies”, D.Lgs. n.163 of 2006). This is the traditional concession to build and operate in which the public administration, once the infrastructural needs have been individuated, elaborates a preliminary project and adds it in the programming instruments already approved. On the basis of the preliminary project made by the public administration the private tendering procedure to define a winner started. The private income is received during the operation phase while there are also financial and technical risks. The public contribution aims to grant to the private the obtainment of an economic and financial balance.

A.2.5. Financial issues and obligations

The budget of the project (excluding the management and maintenance costs) is presented in the following table:





QUADRO ECONOMICO DI SPESA

A. IMPORTO PER FORNITURE E LAVORI	A. Importo dei Lavori e delle forniture		
	A.1	Importo dei lavori a base d'asta	€ 285.000,00
	A.2	Importo delle forniture a base d'asta	
	A.3	Oneri per la sicurezza non soggetti a ribasso	€ 4.275,00
		Totale importo dei lavori e delle forniture (A.1+A.2+A.3)	€ 289.275,00
B. SOMME A DISPOSIZIONE DELL'AMMINISTRAZIONE	B. Somme a disposizione dell'Amministrazione		
	B.1	Spese tecniche, coordinamento sicurezza in fase di progettazione comprensive di contributi previdenziali	€ 28.250,00
	B.4	Imprevisti	€ 5.785,50
	B.5	Acquisizione aree o immobili	
	B.6	Accantonamento di cui all'articolo 133 del D.Lgs.163/2006	
	B.7	Spese per attività di consulenza o di supporto, compresi oneri R.U.P. di cui all'art. 92 del D.Lgs. 163/2006	
	B.8	Spese per commissioni giudicatrici	
	B.9	Spese per pubblicità	
	B.10	Spese per accertamenti di laboratorio e verifiche tecniche previste dal capitolato speciale d'appalto, collaudo tecnico amministrativo, collaudo statico ed altri eventuali collaudi specialistici	
		Totale Somme a disposizione dell'Amministrazione (B.1+....+B.10)	34.035,50
C. I.V.A.	C. I.V.A.		
	C.1	I.V.A. 10% su Lavori e Forniture compreso imprevisti e oneri sicurezza	€ 28.927,50
	C.2	I.V.A. 21% su spese tecniche	€ 5.932,50
		totale C1+C2	€ 34.860,00
TOTALE COMPLESSIVO (A+B+C)			€ 358.170,50
TOTALE SPESA COFINANZIAMENTO			224.670,00
TOTALE DA FINANZIARE CON PPP			133.500,50



A	IMPORTO LAVORI SOGGETTO A RIBASSO AL NETTO IVA			
a.1	<i>A corpo: realizzazione impianti fotovoltaici (compreso la preparazione dei piani di posa delle coperture)</i>	€.	200.000,00	
a.2	<i>A corpo sostituzione lampade illuminazione pubblica con SAP</i>		70.000,00	
a.3	<i>A corpo sostituzione faretti Grotte di Equi</i>		15.000,00	285.000,00
B	IMPORTO SPESE TECNICHE SOGGETTO A RIBASSO AL NETTO IVA			
b.1	Progettazione definitiva-esecutiva e Coordinamento sicurezza in fase di progettazione		28.250,00	
b.2	Collaudi tecnici		Conv. comuni	28.250,00
	TOTALE IMPORTO A BASE DI GARA SOGGETTO A RIBASSO (A+B)	€.		313.250,00
C	Oneri di sicurezza non soggetti a ribasso al netto IVA	€.	4.275,00	4.275,00
	TOTALE COMPLESSIVO (A+B+C)	€.		317.525,00

STIMA VALORE LOCAZIONE OPERATIVA IMPIANTI FOTOVOLTAICI

STIMA VALORE LOCAZIONE OPERATIVA/FINANZIARIA IMPIANTI FOTOVOLTAICI		COSTI	IVA	TOTALE
COSTI REALIZZAZIONE IMPIANTI FOTOVOLTAICI COMPENSIVI PRATICHE GSE ALLACCIO RETE A CORPO	€.	200.000,00	20.000,00	220.000,00
PROGETTAZIONE DEFINITIVA ESECUTIVA E COORDINAMENTO SICUREZZA IN FASE DI PROGETTAZIONE	€.	24.000,00	5.040,00	29.040,00
IMPREVISTI	€.	4.060,00	406,00	4.466,00
ONERI SICUREZZA		3.000,00	300,00	3.300,00
IMPORTO TOTALE INVESTIMENTO	€.			256.806,00



STIMA COSTI SOSTITUZIONE LAMPADE		COSTI	IVA	TOTALE
PUBBLICA ILLUMINAZIONE A CORPO	€.	70.000,00	7.000,00	77.000,00
SOSTITUZIONE LAMPADE GROTTE	€	15.000,00	1.500,00	16.500,00
PROGETTAZIONE DEFINITIVA ESECUTIVA E COORDINAMENTO SICUREZZA IN FASE DI PROGETTAZIONE	€	4.250,00	892,50	5.142,50
IMPREVISTI		1.725,50	172,55	1.898,05
ONERI SICUREZZA		1.275,00	127,50	1.402,50
IMPORTO TOTALE INVESTIMENTO	€.			101.943,05

For the implementation of the interventions a public tender will be carried out, for the selection of contractors aimed at the conclusion of a public private partnership pursuant to art. 15-ter of Legislative Decree 163/2006. Actions with a total cost estimated at € 358,170.50 will be funded for a maximum of 60% with the resources of the project MED ZEROCO₂ and the remaining 40% from the private party with the distribution estimated in the table below:

TOTALE COMPLESSIVO INTERVENTI	€ 358.170,50
TOTALE SPESA COFINANZIAMENTO	224.670,00
TOTALE DA FINANZIARE CON PPP	133.500,50

The estimated value of the operating lease of the lot photovoltaic systems is equal to the total €. 231,060.00 (two hundred thirty one thousand and sixty euros), excluding VAT, of which:

- €. 228,060.00 for the costs of initial investment subject to downward, consisting of:
 - Construction costs of the plant and work net of security;
 - Technical costs of: final project-executing, safety coordination during design and technical tests;
 - Unexpected costs



- € 3,000.00 for additional expenses that the initial investment is not subject to downward, consisting of:

- Security charges not subject to downward; Estimated value of the services "post production" - € 6,000.00 per year for other investment expenditure for:
- Insurance facilities for non-production, theft, fire and weather events
- Exceptional;
- Management, operation, supervision and monitoring of works, including maintenance
- Ordinary expenses related with safety;
- Extraordinary maintenance of the inverter electrical components, including their replacement in case of failure with related expenses of safety;

2.1 The estimated value for the realization of replacement lamps is equal to total € 92,250.00 (ninety two thousand, two hundred and fifty euros) excluding VAT, of which:

- € 90,975.00 for the costs of initial investment subject to downward, consisting of:

- Cost of construction of the plants and work net of security;
- Expenses techniques: final project-executing, safety-coordination of
- Design and technical tests;
- Unexpected costs

- € 1,275.00 for additional expenses that the initial investment is not subject to downward, consisting of:

- Income security not subject to downward;

The amount for the construction of photovoltaic (DURABLE GOODS) will be paid in 60 monthly instalments n° calculated and laid down in the tender notice. The Company will recover their investment by the proceeds of the sale to GSE and / or metering the energy produced by an n° x years according to the following hypothesis account economic minimum.





Ipotesi Costo economico Minima

Investimento iniziale	€ 133.500,50
Ammortamento investimento iniziale per anni	7

Costi annuali		Importi	Ricavi annuali		Importi
a)	Ammortamento dell'investimento iniziale	€ 19.071,50	c)	Contributo GSE	€ 32.000,00
b)	Costi annuali manutenzione	€ 6.000,00	d)	Vendita scambio sul posto	€ 3.000,00
Totale		€ 25.071,50			€ 35.000,00

Utilità marginale (EBIT) € 9.928,50
 Utilità marginale (EBIT %) 28,37 %

A.2.6. Security interests

The Province of Massa-Carrara may, at any time, terminate this contract for the supervening public interest with notice of at least 1 (one) month. In case of withdrawal, the Buyer will be recognized for payment of the tasks performed, if correctly carried out, according to the amount and the terms agreed, giving the same, as of now, any further possible claims, including compensatory in nature, and any additional remuneration and compensation and / or reimbursement of expenses, notwithstanding the provisions of art. 1671 of the Civil Code. It is forbidden the Buyer to cancel the contract. Any dispute arising out or related to the contract, if the Province of Massa-Carrara is plaintiff or defendant, the agreement between the parties, pertaining to the jurisdiction of Massa, will be expressed through the waiver of the partner.

A.2.7. Monitoring and evaluation

Supervisory Board has established the implementation of this Agreement composed of a representative of the responsible entity (as chairman) and one representative from each party. The board shall have the following functions: is responsible for the eve punctual fulfilment of this Agreement and shall set, in the exercise of powers, a substitution in the event of default of the parties of the Agreement.



A.3 Lessons learnt

I. SEAP design and implementation

I.A.3.1. Legal constraints and how to overcome them

The last few years have been marked by a change in policy approach in energy / environment, in particular in two respects. The first is the integrated approach to energy issues, as well as the pursuit of purpose purely energy, such as security of supply, the exploitation of national resources, competitiveness of the sector, which are also associated with environmental purposes: 1. preserve the local and global environment 2. improve the performance and avoid waste 3. rationalize the use of resources 4. serve users in a fair way. The second change is the shift from a policy of "command and control" type to a pro-active type, based on the consultation process and the voluntary agreements. In this perspective, the National Conference on "Energy and environment" was held in Rome, 25 to 28 November 1998, in which the system voluntary agreements was chosen as privileged procedure to define actions for sectorial and territorial issues. Energy - environmental objectives are thus defined by consensus between the Public Administration and stakeholders (eg. Pact for the "energy and the environment").

I.A.3.2. Technical difficulties and how to overcome

In order to develop a successful SEAP or a similar local energy-related program it is necessary to have detailed data on energy production and consumption in the territory of the municipality. In this way it is possible to identify which sectors cause the largest problems in terms of GHGs released, and determine which sectors in the sustainable energy transition can be implemented. This will support planning effective actions and measures in the local government operations as well as the whole community. Having access to reliable energy data will further enable municipalities to monitor the effectiveness of implementation without strategies and plans. These data are usually generated by energy producers and providers (who offer the energy service to clients). They are reluctant to provide information on energy production and consumption to the two consumer data protection, fear of the competition.

I.A.3.3. How to replicate

The development of the BEI, which is the basis for the design of the SEAP, faced many difficulties, due to the lack of data and knowledge. It is essential to define specific technical staff that will be responsible for data collection of energy because it is a long time procedure and cooperation with energy suppliers, other municipalities' officials, private and individual parties if a bottom-up methodology is taking place. To overcome these barriers and easily replicate, the support structure





can play a crucial role in the development of a common methodology to collect and monitor the data used. The province of Massa Carrara, has already moved forward on it, and thanks to an INTERREG project, is developing common guidelines for remaining municipalities based on the MED ZEROCO₂ experience.

I.A.3.4. Conclusions

More than 50% of GHG emissions and over 80% of global energy consumption is generated in urban areas; this means that local public authorities play a key role in policies for energy efficiency in Europe. The European Union in 2006, through the Plan of Action for Climate and Renewable Resources (EU Climate Action and Renewable Energy Package), identified a fundamental question: "Mitigating climate change through the implementation at the local level, sustainable energy policies, policies that create new jobs and an overall improvement in the quality of life of citizens, thus reaching the important goal of reducing by 20% by 2020, CO₂ emissions thanks to an increase of 20% energy efficiency and supply from renewable sources. "

While this may be an achievable goal for medium and large cities, it can be much more complicated for small towns; this difficulty is determined primarily by the lack of funds to invest in such interventions and the lack of specific skills aimed to assist local authorities to implement effective action plans for energy sustainability and goal achievement "zero emissions". To overcome this obstacle and achieve the objectives set, the European Union has been committed in recent years to the promotion of responsible climate policies at the municipal territories. One such movement is the Covenant of Mayors (Covenant of Mayors), an initiative of a network of cities, later adopted by the European Commission and aimed at the involvement of local authorities in achieving the objectives of energy saving and energy efficiency and energy production renewable sources. The Covenant of Mayors, see today involved about 4,100 municipalities, among which are many small towns. This high level of participation of entities with populations of less than 5,000 inhabitants denotes the strong demand for support of the territories sub-urban and rural areas to address climate change in progress. With the advent of many administrations of the Covenant of Mayors, higher institutional level (provinces, Communities, Regions) will have support structures for strategic planning and technical Action Plans for Sustainable Energy (SEAP) in the peripheral areas. If any part of the technical and professional skills are slowly identifying the public and private sector, many difficulties are still encountered in obtaining the necessary funds for interventions. This difficulty is accentuated by the recent economic crisis, finance and climatic conditions; it must be noted that on the one hand, the crisis made it difficult for the public sector budgets - highlighting at the same time the waste of money and energy - on the other hand the creation of new forms of public private partnerships have been stimulated, supported by the introduction of incentive systems for Energy Efficiency (White Certificates, Tax Deduction 30% - 55%, Certificates Blacks, EU ETS) and renewables (Energy Bill, Green Certificates market Volunteer





emissions). The common finding having to comply with the commitments undertaken by the national government, in terms of reduction of the pollutant emissions, have begun to invest in its facilities, and a lack of available local authorities and actors in the energy sector, have revitalized the market for public-private partnerships with new financial schemes. This financial instrument (Public Private Partnership), which originated in Europe in the 70s and commonly known as Project Financing, has enabled many Public administrations to realize in recent decades important infrastructures, such as hospitals, highways in a state of rigid chapters expense and with limited financial resources. So three fundamental aspects are emerged for the complete realization of the commitments made at Community level on a local scale and the creation of conditions for a full use of the funds available in public private partnership: an adequate governance structure (public), market participants prepared (private) and citizens. Regarding the governance some important issues remain to overcome, including: (a) issues arising from the number of actors involved in the decision-making process (government, regions, local authorities), which are not always able to establish a common vision and, therefore, to start synergistic actions that unite public and private entities, (b) the administrative and bureaucratic procedures often exhausting, (c) a knowledge of the opportunities for intervention is not yet sufficient, (d) lack of access to certain types of incentives and of finance especially for the interventions of limited size. If a market with strong growth prospects can attract new operators in quantity, the problem is to minimize the impact of those professionals who don't have the necessary skills and know how to create the conditions for operators in the sector of energy production and distribution invest in socially more restricted size. The third and perhaps the most important aspect is the dissemination of the culture of energy efficiency in end users. It's the point on which a great progress has been accomplished. Although there are notable improvements, many activities remain to be done to empower citizens and give them the tools to ask for and get the best in energy efficiency by operators in the sector.

II. PPP set-up and implementation

II.A.3.1. Legal constraints and how to overcome them

Aspects of the broader legal and regulatory environment for services can act as significant barriers to the PPP. Distortions in the overall incentive such as the tax system, photovoltaic systems incentive, prevention of cultural heritage for the reconstruction energy efficiency, import restrictions, labour laws, along with bank credit scheme. Even over-regulation and restrictions may also inhibit private sector participation. The cumulative effect of regulation is very important. Therefore, before special partnership opportunity for the realization of a project is approved, the service must be examined in detail to ensure that there are no legal or regulatory barriers for PPP.



Legislative and regulatory environment	
Incentive scheme framework	One of the incentives that will attract private partners is the ability to minimise the pay-back time. It is likely that municipalities will have to investigate incentive-related obstacles on a project-by-project basis. As these issues are complex and subject to on-going changes, the PPP management team may wish to seek outside assistance for this part of the analysis.
Establishing the rules of the game	The main reason for the difficulty in establishing a level playing field between public and private companies is that the costs of a private contractor for the provision of services are often different from those considered by the public sector. The private service providers are often at a competitive disadvantage compared to providers in the public sector because they have to recover all costs, and taxes to pay and make a reasonable profit. Public services, on the contrary, often operate at a loss; receive subsidies in the form of grants, soft loans, the use of public land, staff time and other resources.
Local government policy	The policy of the local government for the provision, financing and cost recovery of RES or EEFF interventions will be an important factor in determining whether or not the public-private partnerships are considered as an acceptable approach to service delivery. In addition to the service of local government and funding policies, municipal energy managers must also consider the implications of the partnership for other policies, including climate change and development policies, the balance financial savings and economic development.
Contract-related constraints	
Contract size	Smaller contracts often contain a number of limitations, they offer fewer opportunities to exploit economies of scale, the average household income tends to be lower than in large municipalities, in order to limit the returns; municipal capacity is inevitably weaker than that in large cities, and the system itself is often relatively complex and divided by a small population.
Transaction and bidding costs	Projects involving the private sector generally involve high transaction costs. These costs amount to an average of about 5% to 10% of the total costs of the project.
Time frame	Time frames related political cycles (election) can force the authorities to solve a problem of supply of services with methods of implementation of the project that are more familiar than the PPP arrangements.

II.A.3.2. Technical difficulties and how to overcome

Difficulties in contract specification and administration	For PV or Solar Thermal Installation, there is a continuing role for the public sector in contract administration – that is, in monitoring, administration and enforcing the contract during its lifetime and bargaining over unspecified contingencies. Difficulties in contract specification also underline the need to include in contracts clauses allowing both parties to renegotiate terms in the event of significant unexpected changes. The difficulties of contract specification suggest that short-term contracts may have advantages, because fewer future contingencies need to be considered. Longer-term contracts provide, however, an opportunity for greater efficiency gains and have other advantages. For example, longer contracts give contractors more time to recover costs and enable them to increase the scope of services. An important problem of shorter-term contracts, meanwhile, is that they may reduce incentives for maintenance and deter the incumbent from making investments in sunk assets.
Lack of tendering and contracting capacity	The basic principle of the PPP - providing value for money for public services - can be satisfied only when a fair and transparent procurement process is in place. Many municipalities have little experience in the negotiation and management of concession contracts, which can lengthen the procurement process and increase the cost of supply. Decision makers may also lack the confidence to renegotiate the contract in such a way that meets the objectives redefined by the municipality. The development of negotiation skills is essential for the public sector partner.
Financial analysis and planning	A constraint for the effective implementation of a contract may be the lack of financial analysis and planning by the municipality in relation to the related subjects. The reason for this lack of analysis of the PPP could result from a narrow understanding on the part of the incentives' scheme and the calculation of the pay-back time.
Community capacity	It is important to strengthen community participation – as in ZEROCO ₂ through the participatory process - and to facilitate the creation of public debate under the harmonized legislation to support community involvement for the partnership.



II.A.3.3. How to replicate

As a first step, municipalities are able to assess the current legal systems to ensure that their national and regional legislation has adequate legislative framework to support private investments. Even when the legal environment is suitable, the municipalities may lack the experience in terms of preparation, negotiation and implementation of this type of agreement. This lack of capacity can be a problem. In this regard, municipalities should carefully consider the specific type of PPP that intend to pursue and promote the particular legal and economic conditions existing in their country.

II.A.3.4. Conclusions

Project Financing which was originated in Europe in the 70s, has enabled many public administrations to realize in recent decades important infrastructures, such as hospitals, highways in a state of rigid expenditure items and with limited financial resources. The particular structures allow the public to invest in smaller numbers due to concessions for the management and use of the same work by the private sector, while the private sector reaps the benefits generated by the insurance and financial aspects of the operation. If it is true that the PPP facilitates raising capital from the public sector for infrastructure works, the high figures of these interventions expose to entities in the financial and insurance risks of the investment. Such problems also emerged during the activities of ZEROCO₂ project. As already mentioned difficulties related to budget constraints and the availability of local authorities to invest can be overcome through the use of third party financing (FTT), a special formula of PPP emerged in the energy sector in recent years. It is required that the investment of a third party (i.e. ESCO) that provides the financial resources necessary to carry out the intervention, is characterized by a stable cash flow, which originated from the energy savings. Such a tool, in many situations, has also been used for operations in the domestic sector, citizenship, with the formulas (1) Group Purchase for photovoltaic, solar thermal, boilers, fixtures and (2) plant timeshare. Fortunately, many lenders, past the shock of the financial crisis, begin to acquire the skills needed to properly evaluate investments in energy efficiency and to enable innovative ways of credit. But many actions remain to be done. Little attention is given to the need for greater capitalization of ESCOs (by public or private, venture capitalists) and to a greater availability of public guarantee funds; tools that can provide a great help at this stage.





GREECE

B.1. Sustainable Energy Action Plan issues

The municipalities of Syros-Ermoupolis, Paros and Sifnos are willing to implement sustainable energy policies in order to mitigate the effects of the climate change. The measures planned for the municipalities are focused on the building sector. Greek islands have many advantages for the implementation of sustainable energy planning, because they usually have a significant potential of renewable energy sources (wind and sun), which remains practically unexploited, whereas energy demand depends highly on imported conventional fuels.

However, inadequate economic resources, insufficient knowledge of the Covenant of Mayors initiative and the lack of technical skills for the design and implementation of the SEAP are the main reasons for not developing any sustainable energy policy yet. Another important factor is that there is no legislative obligation for the development of a sustainable energy action plan so as the municipalities to be active on this issue.

B.1.1. Design of the SEAP

B.1.1.i Involvement of third parties / Staff capacity

The collection of the data required for the elaboration of the Baseline Emissions Inventory (BEI), was undertaken by CRES' staff. Contact by phone and email communication was carried out with the responsible staff of the municipalities so as to inform them on the activities for the design of the SEAPs; specifically the requested material was sent to each municipality in order to provide their data on energy issues. Frequent communication with the three municipalities was carried out and clarifications were given for the correct information and data entry in the Baseline Emission Inventory (BEI).

B.1.1.ii Data collection

The data collected for the elaboration of the BEI were based mainly on the national data from the Hellenic Statistical Authority and energy studies and audits carried out by CRES due to the difficulties of collecting data from each municipality. The sectors which were analysed are i) municipal buildings, equipment/facilities, ii) tertiary (non-municipal) buildings, equipment/facilities and iii) residential buildings. In the following tables the final energy consumption and the CO₂ emissions for each municipality and sector are shown.





Municipality of Syros-Ermoupolis	FINAL ENERGY CONSUMPTION [MWh]		
	Electricity	Heating oil	Biomass
BUILDINGS, EQUIPMENT/FACILITIES AND INDUSTRIES:			
Municipal buildings, equipment/facilities	221.8	147.6	-
Tertiary (non-municipal) buildings, equipment/facilities	5,837.4	3,143.2	-
Residential buildings	37,596.5	11,568.1	17,352.2
Total	43,655.7	14,858.9	17,352.2

Municipality of Syros-Ermoupolis	CO ₂ emissions [t] / CO ₂ equivalent emissions [t]		
	Electricity	Heating oil	Biomass
BUILDINGS, EQUIPMENT/FACILITIES AND INDUSTRIES:			
Municipal buildings, equipment/facilities	253.7	28.8	-
Tertiary (non-municipal) buildings, equipment/facilities	6,687.0	612.2	-
Residential buildings	66,337.1	4,501.7	1,819.1
Total	73,277.8	5,142.7	1,819.1

Municipality of Paros	FINAL ENERGY CONSUMPTION [MWh]		
	Electricity	Heating oil	Biomass
BUILDINGS, EQUIPMENT/FACILITIES AND INDUSTRIES:			
Municipal buildings, equipment/facilities	259.1	172.8	-
Tertiary (non-municipal) buildings, equipment/facilities	8,143.7	4,385.1	-
Residential buildings	31,243.7	9,613.4	14,420.2
Total	39,646.5	14,171.3	14,420.2



Municipality of Paros	CO ₂ emissions [t] / CO ₂ equivalent emissions [t]		
	Electricity	Heating oil	Biomass
BUILDINGS, EQUIPMENT/FACILITIES AND INDUSTRIES:			
Municipal buildings, equipment/facilities	301.8	34.1	-
Tertiary (non-municipal) buildings, equipment/facilities	9,476.8	865.7	-
Residential buildings	56,034.6	3,801.7	1,511.7
Total	65,813.3	4,701.6	1,511.7

Municipality of Sifnos	FINAL ENERGY CONSUMPTION [MWh]		
	Electricity	Heating oil	Biomass
BUILDINGS, EQUIPMENT/FACILITIES AND INDUSTRIES:			
Municipal buildings, equipment/facilities	92.9	62.0	-
Tertiary (non-municipal) buildings, equipment/facilities	3,672.2	1,977.3	-
Residential buildings	9,136.3	2,811.2	4,216.7
Total	12,901.4	4,850.4	4,216.7

Municipality of Sifnos	CO ₂ emissions [t] / CO ₂ equivalent emissions [t]		
	Electricity	Heating oil	Biomass
BUILDINGS, EQUIPMENT/FACILITIES AND INDUSTRIES:			
Municipal buildings, equipment/facilities	104.0	11.8	-
Tertiary (non-municipal) buildings, equipment/facilities	4,107.4	377.3	-
Residential buildings	15,738.8	1,073.7	442.1
Total	19,950.2	1,462.8	442.1



B.1.1.iii Measures defined

Greek islands have significant tourism related activities – many hotels are open during the summer period only - resulting in high seasonal variations in energy demand. It is important to apply energy saving measures in the building sector (municipal buildings, domestic and tertiary sector) since most of the buildings are with no thermal protection resulting in large amount of energy consumption and thus CO₂ emissions. Due to the special building regulations in the islands regarding the building facades and roofs, there are restrictions on the application of renewable energy sources systems such as solar panels and PVs. Taking into account these restrictions and the high energy consumption in the building sector the main interventions refer to the building envelope and building installations for heating and cooling. So the replacement of windows (single glazing with double glazing with high thermal properties and old window frames with new high efficiency) and the installation of external thermal insulation where it is allowed and internal thermal insulation where it is feasible in the non-insulated spaces are the main energy saving measures. Regarding the installations, the old heating systems (boilers and/or heating piping systems) will be replaced with new ones of high efficiency.

In the following tables the actions and measures for each municipality are shown.

Municipality of Syros-Ermoupolis	KEY actions/measures <u>per field of action</u>
BUILDINGS, EQUIPMENT / FACILITIES & INDUSTRIES:	
<i>Municipal buildings, equipment/facilities</i>	Action 1: Replacement of windows (single glazing with double glazing with high thermal properties and old window frames with new high efficiency) Action 2: Installation of external thermal insulation where it is allowed and internal thermal insulation where it is feasible in the non-insulated spaces Action 3: Replacement of the old heating systems (boilers and/or heating piping systems) with new ones of high efficiency
<i>Tertiary (non-municipal) buildings, equipment/facilities</i>	Action 1: Replacement of windows (single glazing with double glazing with high thermal properties and old window frames with new high efficiency) Action 2: Installation of external thermal insulation where it is allowed and internal thermal insulation where it is feasible in the non-insulated spaces Action 3: Replacement of the old heating systems (boilers and/or heating piping systems) with new ones of high efficiency



<i>Residential buildings</i>	Action 1: Replacement of windows (single glazing with double glazing with high thermal properties and old window frames with new high efficiency) Action 2: Installation of external thermal insulation where it is allowed and internal thermal insulation where it is feasible in the non-insulated spaces Action 3: Replacement of the old heating systems (boilers and/or heating piping systems) with new ones of high efficiency Action 4: Conversion of old fireplaces to high efficiency ones
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Municipality of Paros	KEY actions/measures per field of action
BUILDINGS, EQUIPMENT / FACILITIES & INDUSTRIES:	
<i>Municipal buildings, equipment/facilities</i>	Action 1: Replacement of windows (single glazing with double glazing with high thermal properties and old window frames with new high efficiency) Action 2: Installation of external thermal insulation where it is allowed and internal thermal insulation where it is feasible in the non-insulated spaces Action 3: Replacement of the old heating systems (boilers and/or heating piping systems) with new ones of high efficiency
<i>Tertiary (non-municipal) buildings, equipment/facilities</i>	Action 1: Replacement of windows (single glazing with double glazing with high thermal properties and old window frames with new high efficiency) Action 2: Installation of external thermal insulation where it is allowed and internal thermal insulation where it is feasible in the non-insulated spaces Action 3: Replacement of the old heating systems (boilers and/or heating piping systems) with new ones of high efficiency
<i>Residential buildings</i>	Action 1: Replacement of windows (single glazing with double glazing with high thermal properties and old window frames with new high efficiency) Action 2: Installation of external thermal insulation where it is allowed and internal thermal insulation where it is feasible in the non-insulated spaces Action 3: Replacement of the old heating systems (boilers and/or heating piping systems) with new ones of high efficiency Action 4: Conversion of old fireplaces to high efficiency ones





Municipality of Sifnos	KEY actions/measures <u>per field of action</u>
BUILDINGS, EQUIPMENT / FACILITIES & INDUSTRIES:	
<i>Municipal buildings, equipment/facilities</i>	Action 1: Replacement of windows (single glazing with double glazing with high thermal properties and old window frames with new high efficiency) Action 2: Installation of external thermal insulation where it is allowed and internal thermal insulation where it is feasible in the non-insulated spaces Action 3: Replacement of the old heating systems (boilers and/or heating piping systems) with new ones of high efficiency
<i>Tertiary (non-municipal) buildings, equipment/facilities</i>	Action 1: Replacement of windows (single glazing with double glazing with high thermal properties and old window frames with new high efficiency) Action 2: Installation of external thermal insulation where it is allowed and internal thermal insulation where it is feasible in the non-insulated spaces Action 3: Replacement of the old heating systems (boilers and/or heating piping systems) with new ones of high efficiency
<i>Residential buildings</i>	Action 1: Replacement of windows (single glazing with double glazing with high thermal properties and old window frames with new high efficiency) Action 2: Installation of external thermal insulation where it is allowed and internal thermal insulation where it is feasible in the non-insulated spaces Action 3: Replacement of the old heating systems (boilers and/or heating piping systems) with new ones of high efficiency Action 4: Conversion of old fireplaces to high efficiency ones

The implementation of actions and measures will depend on the Municipalities policy activities in terms of the priority given for the public buildings and their incentives given to the citizens for the buildings' energy upgrade.

B.1.2. Implementation of the SEAP

In order to define which measure will be applied based on the developed SEAPs, many discussions were made with the Development Corporation of Local Authorities of Cyclades and the municipalities. The Greek legislation about the funding rules under the General Secretariat for Investments and Development sets specific conditions for the projects funded by the National Strategic Reference Framework (NSRF). Specifically, the partners cannot give grants to the local authorities from the



projects funded by the NSRF. So the action applied based on the SEAP had to be managed by the local partner, which is the Development Corporation of Local Authorities of Cyclades. Since the developed SEAPs are focused on the building sector, it was decided to implement energy saving measures in the building of the Development Corporation of Local Authorities of Cyclades; a building that belongs to the local authority. Therefore, the action 1 'Replacement of windows (single glazing with double glazing with high thermal properties and old window frames with new high efficiency)' was decided taking into consideration that this building is a listed/protected building (there are building construction restrictions and requirements), there are roof and wall paintings and wooden coatings in the walls that make impossible the installation of neither external nor internal thermal insulation.

An energy audit was carried out in the building of the Development Corporation of Local Authorities of Cyclades. A questionnaire (in Greek) was prepared including general building information (year of construction, type of building use, building area, building surroundings, etc), information on the building envelope (materials of the transparent and opaque building surfaces, dimensions, etc) and electromechanical installations (type of heating and cooling system, type domestic hot water system, office equipment, etc). It was filled in by the relevant staff of the Development Corporation of Local Authorities of Cyclades with the assistant of CRES staff and after the elaboration of the data, calculations of the building energy consumption were made by using a software tool ("TEE KENAK" software tool which has been developed based on the Energy Performance Regulation for Buildings (KENAK)). Several scenaria (glasses with different thermal properties) were examined so as to define the best solution in terms of cost and energy benefits. The energy consumption of the building was also calculated based on the fuel consumption of the last years. The external temperature conditions were taken into account so as to evaluate the energy consumption under real conditions (climate correction data).

The following tables illustrate the results of the calculations made for the definition of the intervention applied on the building of the Development Corporation of Local Authorities of Cyclades:

		Energy Consumption (kWh/m ²)	Climate Correction Data for Energy Consumption (Wh/(m ² *HDD))	Energy Saving (%) based on software calculations
Year of 2011	Building Energy Consumption based on fuel consumption	53.0	55.5	-
	Building Energy Consumption based on software calculations	63.0	79.7	-
	Building Energy Consumption for Scenario 1: Replacement of glasses with U=3.2 W/(m ² *K)	56.6	71.6	10.2
	Building Energy Consumption for Scenario 2: Replacement of glasses with U=2.8 W/(m ² *K)	50.9	64.4	19.2





	Building Energy Consumption for Scenario 3: Replacement of glasses with $U=1.85 \text{ W/(m}^2\cdot\text{K)}$	47.5	60.1	24.6
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Year of 2011	<i>Heating Degree Days based on real climatic data</i>	955.8
	<i>Heating Degree Days based on the Technical Guidelines of TEE (Energy Performance Regulation for Buildings-KENAK)</i>	790.0

		Energy Consumption (kWh/m ²)	Climate Correction Data for Energy Consumption (Wh/(m ² *HDD))	Energy Saving (%) based on software calculations
Year of 2012	Building Energy Consumption based on fuel consumption (January-April)	47.0	53.5	-
	Building Energy Consumption based on software calculations (January-April)	44.1	77.9	-
	Building Energy Consumption for Scenario 1: Replacement of glasses with $U=3.2 \text{ W/(m}^2\cdot\text{K)}$ (January-April)	39.9	70.5	9.5
	Building Energy Consumption for Scenario 2: Replacement of glasses with $U=2.8 \text{ W/(m}^2\cdot\text{K)}$ (January-April)	35.9	63.4	18.6
	Building Energy Consumption for Scenario 3: Replacement of glasses with $U=1.85 \text{ W/(m}^2\cdot\text{K)}$ (January-April)	33.5	59.2	24.0

Year of 2012	<i>Heating Degree Days based on real climatic data (January-April)</i>	877.7
	<i>Heating Degree Days based on the Technical Guidelines of TEE (Energy Performance Regulation for Buildings-KENAK) (January-April)</i>	566.0

After the above analysis, the best solution for the replacement of windows in the building of the Development Corporation of Local Authorities of Cyclades is the windows with U-value equal to $1.85 \text{ W/(m}^2\cdot\text{K)}$.



B.1.3. Engagement with the local energy awareness actions

The implementation of the measures applied based on the developed SEAP didn't require the direct engagement of the local citizens. During the ZEROCO₂ project, local awareness activities took place in order to inform them on the related issues. Specifically, local information campaigns were held and the audience was informed on energy issues, the importance of the implementation of energy saving actions not only in national level but also in local and individual level by applying energy saving measures on their homes and daily life; the current National legislative framework on energy issues was presented, the energy performance/consumption of the buildings based on the energy performance certificates (EPCs) issued according to the Energy Performance Regulation for Buildings (KENAK). In addition they were informed on the energy saving measures/actions they can implement, examples of real building cases were presented and related material was distributed.

More local energy awareness actions (information campaigns, energy days, seminars, etc) will be held so as to ensure and strengthen citizens' active involvement when it is required (recycling, reduction of the energy consumption, behaviour change measures, etc) and their acquiescence to the investments made by the local authorities (RES installations).

B.2. Public Private Partnership issues

In Greece, PPPs are defined by the Law No 3389/2005 (J.O. A' 232) which establishes the legal framework for the implementation of Public-Private Partnerships in Greece. The law defines the Public Entities (Central Administration, local government organizations, legal entities under public law) that can implement partnership contracts with Private Entities, in areas falling within the scope of their competence.

The Law 3855/2010 on energy end-use efficiency and energy services, which transposes the EU Directive 2006/32/EC, sets, among others, the policies, regulations and measures for the development of the Energy Service Market in Greece. The Law also describes the context and principles of the Energy Performance Contract (EPC) and allocates obligations and responsibilities among ESCOs and customers. Moreover, it foresees the creation of the ESCO's registry, where a company can be registered as an ESCO in the case that meets certain criteria, which has not been developed yet.

ESCOs market in Greece is considered to be still in a very primary stage and has not been deployed yet either in the public, or in the private sector, although there is a large energy saving potential mainly in the tertiary sector (public administrative buildings, hospitals, hotels, sports centers etc.), as well as in other sectors such as the industrial one. In now days, only few attempts have been implemented by ESCOs, mainly on RES projects especially for PV installations or/and street lighting. Nevertheless,





these applications cannot be considered as typical EPC examples, but more as guarantee contracts or leasing of equipment.

In addition to the abovementioned, according to the Greek Law 3389/2005 “Public Private Partnerships”, only Public Entities as they are defined in this law (Central Administration, local government organizations, legal entities under public law) can implement partnership contracts with Private Entities and the Development Corporation Of Local Authorities Of Cyclades S.A. is not a Public Entity as it is defined in the Law 3389/2005.

Taking into consideration these legal constraints, it was decided to implement a kind of PPP scheme which includes energy performance criteria and provisions, which refer to the energy saving target achieved by the investment.

B.2.1. Preliminary work: call for bids

The procedure for the call for bids and the specifications of the tenders were developed by the Development Corporation of Local Authorities of Cyclades and CRES.

Taking into consideration the national legislation for both the implementation of PPPs and ESCOs registry, it was decided to follow the general provisions for an open tender with limited publication duration due to the small amount of the investment (30,350.00 €) according to the General Secretariat for Investments and Development.

B.2.2. Description of the project

The contract signed between the Development Corporation of Local Authorities of Cyclades and the private company includes the energy upgrade of the building envelope of the Development Corporation of Local Authorities of Cyclades through the replacement of the windows.

The service provided by the company includes the removal of the existing windows, the preliminary works, the installation of the new ones and their maintenance of a period of 10 years. For a period of twenty (20) days the contractor has to maintain any damage or failure caused during the works. After the completion of the works, the energy consumption of the building will be monitored so as to evaluate the energy saving (taking into consideration the external temperature conditions-climate correction data). In case the energy saving target is not achieved, the private partner is obliged to compensate the amount (CompAmount) equal to the difference (DiffRealPlanned) between the real energy saving and the initially planned one multiplied by the cost of the investment (InvCost), that is $(\text{CompAmount}) [\text{€}] = (\text{DiffRealPlanned}) [\%] * (\text{InvCost}) [\text{€}]$. If the deviation of the achieved energy saving and the initially planned is less than 3%, the private partner has compensation relief.





B.2.3. Legal requirements of the private party

According to the Greek legislation regarding the open tenders, the contractors can be an individual or a legal entity that has to submit all the legal documents that prove their legal status. In addition he must submit all the technical specifications of the proposed solutions so as to evaluate his offer in terms of the energy performance of the windows.

B.2.4. Type of the PPP implemented

The contract signed between the Development Corporation of Local Authorities of Cyclades and the private company includes the removal of the existing windows, installation of the new ones, restore any damage or failure caused during the works for a period of twenty (20) days, provide the maintenance for a period of 10 years and provide the necessary instructions for the operation of the windows to the building users. The duration of the contract follows the expiration of the warranty and maintenance period (i.e. 10 years).

The contract includes energy efficiency clause, as mentioned in paragraph B.2.2, and sets an annual energy saving for heating of 15%.

B.2.5. Financial issues and obligations

The budget of the project in the call for bids was 30,350.00 € (thirty thousand three hundred fifty Euros), VAT excluded which is 16%. The budget as offered by the winner company is 27,378.89 € (twenty seven thousand three hundred seventy eight and eighty nine cents) VAT excluded. The payment will be done in three phases according to the following:

- 30% (thirty percent) of the budget when the replacement works are finished and the windows are operated.
- 40% (forty percent) of the budget when the monitoring period of the heating oil consumption is finished (March 2013).
- 30% (thirty percent) of the budget when the final works are finished.

In case the energy saving target is not achieved, the private partner is obliged to compensate the amount (CompAmount) equal to the difference (DiffRealPlanned) between the real energy saving and the initially planned one multiplied by the cost of the investment (InvCost), that is (CompAmount) [€] = (DiffRealPlanned) [%] * (InvCost) [€]. If the deviation of the achieved energy saving and the initially planned is less than 3%, the private partner has compensation relief.





B.2.6. Security interests

The private company must ensure the proper operation of the equipment supplied and installed as defined in the contract and must provide occasional maintenance for a period of 10 years, without additional charges to the Corporation of Local Authorities of Cyclades.

B.2.7. Monitoring and evaluation

When the replacement works are finished (December 2012), CRES will monitor the heating oil consumption for a period of three months (December 2012-March 2013). The external temperature conditions will be taken into consideration so as to calculate the energy consumption based on the climate correction data.

B.3 Lessons learnt

I. SEAP design and implementation

I.B.3.1. Legal constraints and how to overcome them

There were no legal constraints for the SEAP design.

I.B.3.2. Technical difficulties and how to overcome

During the design of the SEAP, technical difficulties were faced as they are presented in the following table.

DIFFICULTIES	SOLUTIONS ADOPTED
Collection of data for all the sectors.	The national data from the Hellenic Statistical Authority and energy studies and audits carried out by CRES were used.
Lack of technical staff from the municipalities to work on the collection of the data.	Frequent communication with the municipalities to inform the relevant staff about the data collection
Lack of energy consumption data for the municipal assets (buildings, vehicles, street lighting, etc). In many cases, there are no documents (archives) for these energy data.	Use of statistical methods.



Quality of the energy data from the energy providers.	Installation of local meters so as to have a municipal monitoring system.
Inadequate data from the energy providers.	Continuous communication and regular update of the data.

I.B.3.3. How to replicate

The elaboration of the BEI which is the basis for the design of the SEAP faced many difficulties, as described above. In order to overcome these difficulties, it is crucial to define specific technical staff that will be in charge of the energy data collection since it is a time consuming procedure and collaboration with the energy providers is required.

However, in case of absence of any local data, the elaboration of the national data may be a way to carry out a BEI. In addition, the SEAPs developed for the municipalities of Syros-Ermoupolis, Paros and Sifnos, which are located in the Cyclades region, can be replicated to other Municipalities of the region since they are islands and have similar energy consumption profiles.

I.B.3.4. Conclusions

The elaboration of the BEI for the design and implementation of a SEAP, gives the opportunity to a local authority to define and prioritize the energy consuming sectors of its territory. It is noted that even this procedure can result in an energy saving of approx. 15% because any leakages, broken pipeline systems and other non-functional operations of the municipal assets are registered and fixed. However, this is a time consuming procedure and many efforts have to be made in order to collect the data.

A SWOT analysis is presented below:

Positive	Negative
Strengths ✓ Enrichment of the scientific background of the Municipality personnel regarding the legal and technical obligations deriving from the national objectives of '20-20-20'. ✓ Participation of the Municipality in the Covenant of Mayors initiative.	Weaknesses ✓ Inadequate economic resources for the implementation of energy projects. ✓ Lack of technical skills in the municipality staff for the design and implementation of the SEAP.



Positive	Negative
Opportunities ✓ Implementation of energy saving measures towards the sustainable energy policy. ✓ National or European funding schemes (e.g. National Strategic Reference Framework, NSRF, ELENA, EEEF, JESSICA, etc.) for the implementation of energy projects.	Threats ✓ Insufficient knowledge of the Covenant of Mayors initiative. ✓ Change of the Municipality's Board due to elections (every four years). ✓ No legislative obligation for the development of a sustainable energy action plan.

II. PPP set-up and implementation

II.B.3.1. Legal constraints and how to overcome them

Regarding the legal constraints for the set-up and implementation of a PPP, the lack of relevant legislative issues are important. Even though the relevant Law (No 3855/2010) has been issued, the creation of the ESCO's registry is not developed yet and there are no guidelines for the contract scheme of a PPP. In order to accelerate the ESCOs' active involvement in the public sector, the Ministry of Environment, Energy & Climate Change recently announced a new program targeting to the development of Greek ESCO market through the implementation of five (5) pilot ESCO projects in buildings of the public sector. In specific, five public buildings will be selected and energy saving measures will be implemented to them using the EPC approach. For this reason companies will be invited to act as ESCOs.

II.B.3.2. Technical difficulties and how to overcome

The main technical problem was related with the definition of the terms and conditions for the contract scheme to be signed between the public and private sector. In order to overcome this barrier, guidelines for the contract scheme of a PPP have to be developed.



II.B.3.3. How to replicate

The contract scheme used for the implementation of the energy saving measure in the municipality of Syros-Ermoupolis can be replicated, however it is not considered as a full version of a PPP; it includes energy efficiency clause where technical and energy specifications have been considered.

II.B.3.4. Conclusions

As mentioned above, in Greece the guidelines to implement a PPP scheme and the ESCOs' registry have not been developed yet, so it was not feasible to celebrate this kind of contract.

However, during the project period related with the set up and implementation of a PPP, the following can be concluded in a SWOT analysis form:

Positive	Negative
Strengths ✓ Less time for the construction of the investments due to the involvement of the private party. ✓ In many cases, design, construction, and maintenance are under one single entity (private party).	Weaknesses ✓ Legislative issues have to be finalized (ESCOs registry, guidelines for the PPP contract scheme). ✓ Time consuming procedure for the selection of the private party.
Opportunities ✓ Better techno-economic conditions due to the competition among the interested parties. ✓ New job opportunities for the private sector to perform tasks that would otherwise be undertaken by the public sector.	Threats ✓ Change of the public body (local authority) due to elections (every four years). ✓ Financial crisis that makes the private sector reluctant to invest.



SPAIN

C.1. Sustainable Energy Action Plan issues

L'Alcúdia local government is strongly committed to the reduction of GHG emissions in order to contribute to mitigate the effects of climate change. L'Alcúdia Town Council is willing to implement policies that lead to the reduction of the pollution that is provoking global warming by adopting energy efficiency programmes in sectors such as transport and municipal and residential buildings. The promotion of renewable energies is another target of l'Alcúdia Town Council to struggle against climate change. In fact they have also implemented measures to reduce energy consumption in the transport sector (Mobility Sustainable Action Plan, awareness campaigns, etc) and have also worked actively in the contribution of the municipality to the production of energy through renewable energies (L'Alcudia Town Council owns a PV plant).

However, the ignorance on the Covenant of Mayors initiative together with the lack of technical skills and the constraints in economic resources provoked that no planned strategy for a sustainable energy development was defined.

By being involved in the ZEROCO2 project, l'Alcúdia Town Council has been able to overcome the above mentioned barriers and has succeeded in the elaboration and further implementation of a SEAP.

C.1.1. Design of the SEAP

C.1.1.i Involvement of third parties / Staff capacity

The collection of the data required for the elaboration of the Baseline Emissions Inventory (BEI), that is the first step for the elaboration of the SEAP, was undertaken by AER's staff. A first meeting with representatives of the Town Council was held in order to explain what the SEAP is and the information to be collected. Afterwards, contact persons in l'Alcúdia Town Council were assigned who were in charge of providing the information required by AER. Also the analysis of the data and the elaboration of the action plan were undertaken by AER's staff that played the role of external expert for the Town Council.

C.1.1.ii Data collection

The sectors covered in the production of the SEAP are:

Buildings, equipment/Facilities and industries:

Municipal buildings, equipment/facilities:





The energy consumption in this sector is calculated through the consumption data provided by l'Alcúdia Town Council (readings of electricity and gas consumption registered in the invoices). An inventory of all municipal buildings, equipment and facilities was provided by the Town Council together with the electricity and gas invoices of each item.

Residential buildings, Retail sector and Industries (excluding industries involved in the EU Emission Trading scheme):

Calculating the **electricity consumption** in these sectors represents a difficulty as there are no registers available. However, the electricity suppliers are obliged by the Spanish law to pay a tax to the municipality as a consequence of the occupancy of public soil by the electric network (Royal Decree Law 2/2004). This tax varies depending on the characteristics and number of supplies. Depending on the characteristics of the supply it is included in a specific tariff described in Royal Decree 1436/2002 and the Order ITC/3801/2008 that revise the tariffs from 2009 on. The different sectors studied are included in the tariffs shown in the table below:

Table 1. Tariffs per sector.

Sectors	Tariffs 2003 (RD 1436/2002)	Tariffs 2009 (Order ITC/3801/2008)
Public lighting	B0	3.1, 3.0, 2.1
Municipal buildings, equipment/facilities	2.0, 3.0	2.0, 2.1, 3.0
Residential buildings	2.0	2.0, 2.1
Retail sector	2.0	2.0, 2.1
Industries	3.0, 4.0	3.0, 3.1, 6.1

On the other hand, retailers and industries are registered in the Town Council since the moment they start up.

In order to calculate the electricity consumption in residential buildings, retailer sector and industries, the Town Council provided the register of retailers and industries as well as the register of the tax paid by the electricity supplier.

Table 2. Number of enterprises per sector. Years 2003 and 2009.

	2003	2009
Retail sector	940	1,194
Industries	89	220



Thus the electricity consumption by the retail sector and industries was estimated. As the energy consumption of the municipal buildings and the public lighting was also known, the remaining energy consumption corresponds to the residential buildings.

Regarding the **natural gas consumption**, the data were requested to the distributor (Gas Natural SDG S.A.). The volume of gas supplied to l'Alcúdia Municipality was classified per sector and tariff:

- Industrial sector and big retailers: tariffs 2.1, 2.2, and 2.4.
- Residential buildings and small retailers: tariffs 3.1, 3.2, 3.3 and 3.4.

The problem faced was to split up residential buildings from small retailers. As it was not possible, it was assumed that all the gas consumption in this section was due to the residential buildings, as it was considered that the percentage of gas consumed by small retailers in comparison to residential buildings is inappreciable.

The consumption of **gas butane** was requested to the suppliers (Butagarsa, CANSO Carburantes, Eliseo Espert S.A, Espert Agüir S.A.). The main difficulty was due to the fact that one of the suppliers (Butagarsa) had no register of the bottles sold per municipality. However, as the majority of clients are from l'Alcúdia, it was assumed that the data of gas butane sold per year provided by the supplier were consumed in l'Alcúdia. It was considered that the energy consumption from gas butane corresponds to the residential buildings sector due to the fact that gas butane bottles are mainly bought by households.

Municipal public lighting:

The energy consumption in this sector is calculated through the consumption data provided by l'Alcúdia Town Council (readings of electricity registered in the invoices).

Transport:

Municipal fleet:

The data were provided by the Town Council through the invoices that register the volume of oil (gasoline, gasoil, biodiesel) bought.

Public transport:

There is no public transport neither in l'Alcúdia nor in Montortal.

Private transport:

The total amount of gasoline, diesel and biodiesel sold in the years considered for the study have been required from the local oil station. However the consumption in this sector has been estimated as the oil supplied by the oil station is consumed not only in travels within l'Alcúdia and Montortal municipalities but also for longer distances outside the municipality that must not be considered in the





study. It has been considered that 30% is consumed in local travels. It is recommended to undertake a study on mobility behaviour for the fine tuning of the data obtained, as there are no reliable sources to obtain accurate data of oil consumption in local travels.

Production of energy:

L'Alcúdia and Montortal municipalities produce energy by:

- Renewable energies: solar thermal, photovoltaic.
- Non-renewable energies: natural gas cogeneration.

Solar thermal:

In order to obtain the solar thermal energy produced in **municipal building and facilities**, data was provided by the Town Council, which prepared an inventory with the buildings and equipment and the kWh produced per buildings/equipment.

Regarding **residential sector, industries and retail sector**, data were obtained by fieldwork, obtaining: number of installations, collectors and surface of absorbance. These data were calculated by using the F-chart method that provides the energy produced per year in GJ.

Photovoltaic:

The data were obtained from the Spanish Ministry of Industry, which publishes the list of PV installations or projects that are registered as a previous step to start producing electricity.

Cogeneration:

There is only one cogeneration installation in l'Alcúdia that belongs to a fruit company. Electricity and heat is produced by the combustion of natural gas. The company provided natural gas consumption data and energy production data (heat and electricity) in 2003 and 2009.

The **methodology** for the development of the SEAP has followed a **bottom-up approach**. Incoming data of energy consumption per sector (municipal buildings and equipment/facilities, residential buildings, retail sector, industries, municipal public lighting, municipal fleet, private transport, production of solar thermal energy, production of PV energy, cogeneration) has been collected. These individual base elements of the global energy consumption in the municipality have been specified in great detail. These elements have been then linked together to form larger subsystems (Building, equipment/facilities and industries, Transport, Production of energy). Processing the data in that way made easier to define actions per sector, as it is absolutely clear where the higher consumptions come from. In addition, no databases of energy consumption per subsystems were available for the municipalities studied. So it was necessary to obtain the data from the bottom to the top.





C.1.1.iii Measures defined

After the data collection, the diagnosis of the municipality regarding energy consumption and GHG emissions in the different sectors was undertaken. The conclusions of the diagnosis highlighted the priorities of actions to be implemented in order to reduce a higher percentage the energy consumption as well as the GHG emissions. Thus, a series of actions per sectors were defined as well as the budget, energy saving achieved, GHG emissions reduction expected, person in charge of implementation of the action, indicators of the correct implementation of the action.

The list of actions per sector is shown in the table below.

Table 3. Measures defined for l'Alcúdia and Montortal.

Category		Action
BUILDINGS	EQUIPMENT / FACILITIES AND INDUSTRIES	
Municipal buildings, equipment/facilities		1.1.- For schools and sports centre, reducing the CO₂ emissions in domestic hot water production (DHW) and space heating based on natural gas by installing solar thermal energy and biomass facilities 1.2.- Improving the energy efficiency of air conditioning systems of municipal buildings except schools and sports centre 1.3.- Reducing energy consumption of the municipal swimming pool by optimizing the operation of its facilities and the implementation of regulation and control systems 1.4.- Creating the position of Energy Manager and the City's Energy Committee 1.5.- Designing new buildings and the facilities included (air conditioning, electric, fluid, etc) with energy efficiency criteria and enforcing the installation of renewable energy systems 1.6.- Improving the energy efficiency of air conditioning systems in schools and sports centre 1.7.- Improving the energy efficiency of lighting systems prioritizing the use of daylight in buildings 1.8.- Developing a manual for each municipal building that explains how to use energy consuming facilities and designate those responsible for the control of each facility
Tertiary buildings, equipment/facilities	(non-municipal)	2.1.- Promoting the installation of renewable energy systems and improving the energy efficiency in the tertiary sector
Residential buildings		3.1.- Promoting the installation of renewable energy systems in residential buildings 3.2.- Implementing a control system for the installation and



	maintenance of solar thermal executed facilities in the municipality by the implementation of the Technical Building Code (CTE) and the development of a municipal solar ordinance 3.3.- Promoting the rehabilitation of the facade's and external window's thermal isolation
Municipal public lighting	4.1.- Optimizing energy consumption in municipal public lighting by improving the energy efficiency of the facility
Industries	5.1.- Promoting the installation of renewable energy systems and improving energy efficiency in the municipality's industry
TRANSPORT	
Municipal fleet	6.1.- Improving the efficiency of the municipal fleet by incorporating hybrid cars or electric-based technologies that reduce emissions 6.2. Using biodiesel as the only fuel for the entire diesel municipal fleet
Private and commercial transport	7.1.- Replacing 25% of the private fleet by electric or hybrid cars 7.2. Encouraging the use of biodiesel by conducting awareness campaigns and/or negotiating competitive prices 7.3.- Encouraging the use of public transport to college by paying public transport tickets 7.4 Promoting mobility management plans in companies to increase the use of public transport and car sharing
LOCAL ELECTRICITY PRODUCTION	
Photovoltaic	8.1.Encouraging the installation of photovoltaic solar energy plants in municipal buildings 8.2. Promoting the installation of photovoltaic solar energy plants in residential buildings and industries
LOCAL DISTRICT HEATING/COOLING, CHPS	
Combined heat and power	9.1.- Promoting the development of biomass plants
LAND USE PLANNING	
Strategic Urban Planning	10.1.- Incorporating high standards of energy efficiency in buildings and public areas in the planning process and urban development (ECO NEIGHBOURHOOD) 10.2.- Assigning public land for the installation of RES
Transport/Mobility Planning	11.1.- Encouraging walking and cycling by the implementation of the measures proposed in l'Alcúdia's Sustainable Mobility Plan and the Active Access Project
PUBLIC PROCUREMENT OF PRODUCTS AND SERVICES	





Requirements for energy efficiency	12.1.- Implementation of a Green Public Purchase Program, including evaluation criteria for companies when bidding contracts and services
WORKING WITH THE CITIZENS AND STAKEHOLDERS	
Advisory services	13.1.- Creation of a Green Office to inform the public about grants and subsidies for the installation and purchase of products that reduce energy consumption and/or are powered by renewable energies
Awareness raising and local networking	14.1.- Developing environmental education campaigns aimed at citizen in terms of rational use of energy (organization of seminars, workshops, etc)
Training and education	15.1.- Organizing efficient driving courses for municipal workers and public in general
OTHER SECTOR(S)	
Waste	16.1.- Carrying out information campaigns to promote the collection of domestic oil waste

C.1.2. Implementation of the SEAP

The procedure for deciding which action was more suitable for implementation was agreed with the Town Council. It was based on two axis: prioritizing the most energy reducing actions, because the saving potential is crucial for the feasibility of an ESCO scheme, and focusing on those sectors the Town Council is able to decide on their own and that are managed by themselves as there was no time for negotiations with external actors (concessionaires, private sector) because the action/s must be implemented within the project life time. Thus it was decided that the sectors to consider should be *Municipal buildings, equipment/facilities* and *Municipal public lighting*.

Energy consumption in municipal buildings, equipment and facilities has increased 407.16% between 2003 and 2009 in l'Alcúdia though has decreased 85.86% in Montortal. It represents 4.41% of global energy consumption on l'Alcúdia and 0.05% in Montortal.

Municipal public lighting increased 13.78% in l'Alcúdia and 9.90% in Montortal in the same period. It represents 1.53% of global energy consumption on l'Alcúdia and 3.96% in Montortal.

The first actions proposed for l'Alcúdia municipality were focused on municipal buildings, while in Montortal it was considered that reducing energy in public lighting was the most suitable action.

The most energy consuming buildings in l'Alcúdia are the swimming pool (1,734.25 MWh) and the sports facilities (610.86 MWh). Thus, the actions proposed were:



Action 1.1. For schools and sports centre, reducing the CO₂ emissions in domestic hot water production (DHW) and space heating based on natural gas by installing solar thermal energy and biomass facilities.

Action 1.3. Reducing energy consumption of the municipal swimming pool by optimizing the operation of its facilities and the implementation of regulation and control systems.

The swimming pool is managed under a concession, so the implementation of the actions must be negotiated with the concessionaire. This fact might lead to a delay in the implementation of the action. As a consequence action 1.3 was discarded.

Regarding action 1.1, several studies were undertaken for combining solar thermal energy and biomass with the existing natural gas powered heaters for hot water production. However, a very long time lag between investment and payback made the project unfeasible, as compete with the current low cost of natural gas with renewable energy technologies is not possible nowadays. Offers were requested from several ESCOs but no viable proposals/projects were obtained.

Once these interventions were discarded, municipal public lighting became more energy consuming (1,633.24 MWh) than the sum of the remaining municipal buildings (1,017.71 MWh).

Therefore, the action to be implemented during the project period in l'Alcúdia and Montortal is:

Action 4.1 Optimizing energy consumption in municipal public lighting by improving the energy efficiency of the facility.

C.1.3. Engagement with the local energy awareness actions

Public participation was not required for the decision of the actions to be implemented as it was considered that involving citizenship would mean a longer process unable to be finished within the project lifetime. However, local energy awareness actions were used as a tool for teaching on the importance of undertaken actions that lead to a reduction in the energy consumption so that citizens would support the investments to be made for the implementation of the SEAP, especially nowadays that the economic situation is critical.

Local awareness plan actions were planned with two objectives: informing on the impacts of energy consumption and presenting the actions that can be undertaken in order to minimize those impacts. By having knowledge on the issue, people are more willing to accept the implementation of the measures included in the SEAP as they understand the benefit.





C.2. Public Private Partnership issues

PPPs are being promoted in Spain thanks to **Royal Decree 6/2010, measures to boost economy and employment** (Real Decreto-ley 6/2010, de 9 de abril, de medidas para el impulse de la recuperación económica y el empleo), that includes measure to promote ESCOs. In the framework of this Royal Decree, on January 2010, an agreement was signed by the Ministries Cabinet to approve the **Energy Efficiency Activation Plan in the State Administration Buildings** (Resolución de 14 de enero de 2010, de la Secretaría de Estado de Energía, por la que se publica el Acuerdo de Consejo de Ministros del 11 de diciembre de 2009, por el que se aprueba el plan de activación de la eficiencia energética en los edificios de la Administración General del Estado). In addition, the **Sustainable Economy Law** (Ley 2/2011, de 4 de marzo, de Economía Sostenible.) sets the basis for an environmental friendly energy model based on the security of supply and economic efficiency that establishes energy savings targets for public administration.

However, PPPs are not explicitly disciplined by the Spanish law, although all contracts whereby a public body awards a work involving an economic activity to a third party are subject to the general principles on the freedom of establishment and the freedom to supply services. As a consequence, PPP contracts have to comply with requirements of transparency, equal treatment, proportionality and mutual recognition.

Finally, contracts between public administration and private parties are regulated by the **Spanish Law on Public Sector Contracts (LCSP)** (Ley 30/2007, de 30 de octubre, de Contratos del Sector Público).

According to LCSP, contracts signed by public bodies are determined by (i) the type of public body and (ii) the object of the contract. As a consequence, a contract with the same object is subjected to different rules depending on which public body is signing it (Ministry, Managerial Public Body of a Regional Administration, Public Enterprise in competition with private enterprise).

Moreover, these rules are divided into (i) rules related to preparation and award of contracts and (ii) rules related to rights and duties of the parties, deadlines, etc.

Article 5 of the LSCP defines six typologies of contracts: (i) works, (ii) work concession, (iii) public utilities management, (iv) supply, (v) services (vi) contract of collaboration between public and private sector (CPP) and (vii) mixed contracts.

With the aim of providing energy services, the typologies that better fit are: (v) services, (vi) contract of collaboration between public and private sector (CPP) and (vii) mixed contracts. Within these contracts, the services contract is the more suitable one. However, the agreement cannot exceed four years (article 279, LCSP) and the variety and complexity of energy services usually require a longer contract. In order to solve this handicap, mixed contracts and, for more complex features, CPP





contracts accomplish the needs of the two parties (public body and private party) and speed up the procedure.

The mixed contract might include features of all the other typologies of contracts included in the LCSP, so it can be adjusted according to the needs of the two parties for a specific energy service. Under the contract of collaboration between public and private sector, the Public Authority contracts a private organisation during a predetermined period of time, depending on depreciation rules, to carry on a global intervention that includes investment, construction and supplies for the global maintenance of complex installations.

C.2.1. Preliminary work: call for bids

The procedure to launch the bid involved three actors:

- The Energy Agency of la Ribera (AER): their role was advising on technical issues to l'Alcúdia Town Council. Two engineers were involved in the preparation of the bid.
- l'Alcúdia Town Council: it was the entity that launches the call for bids. They lack of the skills required for the fine tuning of the technical issues of the bid. The person involved was the Environment City Councillor.
- Private companies: their role was providing feedback on technical requirements and budget with the aim of preparing a bid appealing for private companies to participate in the call for bids.

The AER and l'Alcúdia Town Council signed an agreement by which AER provides assistance and technical advice to the Town Council in order to define and implement actions that lead to a reduction in the municipality energy consumption as well as an increase in the energy produced by renewable energies. Within the scope of the agreement, the AER carried on the tasks required for the launching of the call for bids.

The whole procedure took more than one year as it is necessary to combine the Town Council will, the state-of-the-art technology and the need of preparing a bid appealing enough for private companies to participate. In order to succeed, the preparation of the bid involved the three actors above mentioned in a process where the feedback among the different actors was crucial. The first step was the agreement with the Town Council for the technical solution that better fitted their needs. Different proposals with different technologies were studied by AER's staff and checked with private companies. Their feedback was crucial as the technical requirements included in the bid must be feasible for companies to fulfil. The characteristics of this specific bid, that follows the ESCO scheme, made it necessary checking also the financial issues to made the bid attractive enough (i.e. the





formula to be defined in order to establish the conditions for the recovering of the investment through the energy savings). After this iterative process, a final bid was prepared taking into consideration legal issues.

During the procedure, several problems had to be faced. Firstly, the lack of up to date technical data on the public lighting facility. An audit needed to be undertaken in order to find out the data required for the fine definition of the facility (number of lights, power installed, lighting level, etc.) as a first step for proposing energy efficient improvements. On the other hand, the Town Council was undecided on the solution to be implemented as they were suspicious of the solutions proposed. The assessment of the AER in the state-of-the-art technologies, their pros and cons, was crucial at this stage of the procedure. Furthermore, the ignorance on the ESCO formula by the Town Council made them distrust on using this kind of contract. However the perspective of reducing the financial effort to be made by the Town Council, especially in the current scenario of cuts in the public sector, together with the information received on the characteristics of the ESCO scheme and case of study within the ZEROCO₂ project, made up their mind.

C.2.2. Description of the project

The project consists of the upgrade of the public lighting facility with the aim of improving the energy efficiency in the public lighting in l'Alcúdia and Montortal. The owner of the facility is The Town Council. The duration of the contract is linked to the time required for the cost recovery. It is expected that the cost recovery will be done in two years.

The investment is shared between the public body and the private party: the public body assumes the initial investment in the framework of the ZEROCO₂ project. This initial amount represents the 63% of the cost of the project. The remaining 37% is assumed by the private party. The cost recovery mechanism adopted is guaranteed savings (the private party guarantees a saving in the facility to the Town Council) with savings at the end of the project (the savings achieved are entirely used to finance the project. The Town Council doesn't perceive any reduction in the energy bill till the private party recovers the investment in order to shorten the duration of the contract).

The payment of the remaining 37% will be done bimonthly according to the economic savings obtained as a consequence of the improvement of the energy efficiency in the public lighting. 100% of the savings will be used for this purpose.

The procedure for calculating energy savings and related economic savings is based on the difference between the energy consumption in 2011 per lighting sector and the energy consumption after the execution of the project. The baseline energy consumption data are included as an annex in the contract. The cost of the kWh to be used for calculating the economic savings is also included in the





contract. The technical characteristics of each lighting sectors are included in the contract as an annex.

C.2.3. Legal requirements of the private party

According to the Spanish legislation, all contracts whereby a public body awards a work involving an economic activity to a third party are subject to the general principles on the freedom of establishment and the freedom to supply services. That means that the private party must win a tender process to participate in a PPP.

The role of the private party in the PPP was the provision of a service that cannot be assumed by the public body on own resources (the upgrade of the public lighting system in order to improve the energy efficiency). The service to provide includes tasks defined as work as well as services in the LSCP. Therefore it fits under the typology of mixed contract and this scheme adopted in the preparation of the bid.

C.2.4. Type of the PPP implemented

PPPs are not explicitly disciplined by Spanish law, although all contracts whereby a public body awards a work involving an economic activity to a third party are subject to the general principles on the freedom of establishment and the freedom to supply services. As a consequence, PPP contracts have to comply with the requirements of transparency, equal treatment, proportionality and mutual recognition. That means that the involvement of the private body will require a tender process.

As a consequence of those legal restrictions, the scheme to follow consists of an agreement between the public body (l'Alcúdia town council) and a technical assistant (AER), also a public body. Its purpose is explained on section C.2.1. A tender process must be set for the participation of the private body according to national rules.

Regarding the contract model to sign with the private body according to the ESCO scheme, as l'Alcúdia town council is the owner of the public lighting facility it was decided to celebrate a P4 contract that included three services: maintenance (P2), total guarantee (P3) and works to upgrade and refurbish the public lighting facility (P4). However, as l'Alcúdia municipality is already working on the maintenance of the public lighting on own resources, the P4 contract will finally include two services (P3 and P4) as having the maintenance assumed by a third party meant an extra cost. Thus, the private party supplies the equipment and guarantees the percentage of energy saving to be achieved.



	Positive	Negative
Internal factors	Strenghts ✓ The main features of the contract are based on an energy audit. ✓ The contract gathers maintenance and energy services supply. ✓ The contract conditions are fine tuned for every single project.	Weaknesses ✓ The private party of the PPP is supposed to change for every single project to be implemented. ✓ A tender process must be carried out for the implementation of every different project. ✓ The scheme of contract must be redefined for every single project.
External factors	Opportunities ✓ The ESCO is included in the PPP through a tender process. The competition among tenderers leads to an improvement of the economic and technical conditions of the service to be provided or the project to be implemented.	Threats ✓ The public body is represented by politic representatives that might change in every municipal election and may affect the continuity of the PPP.

C.2.5. Financial issues and obligations

The budget of the project in the call for bids is 268.500 € (VAT excluded). The final budget as offered by the winner is 260,187.04 € (VAT excluded). The payment will be done in two phases according to the following dates and concepts:

- A first payment of 165,000 € out of the global budget will be done at the beginning of the project and before the 31st January 2013. This amount is financed by the MED programme through the ZEROCO₂ project.

Payments on the second phase will be done bimonthly according to the savings achieved from the end of the ZEROCO₂ project till the cost is completely recovered. 100% of the savings will be used to finance the project. The saving will be calculated by substracting the baseline consumption to the



current consumption. The baseline consumption and the cost of the kWh to be considered are settled in the contract.

C.2.6. Security interests

According to the bid, the activity of the concessionaire must be directly related to the object of the contract. In addition, they are obliged to have enough human force and means for the proper execution of the contract as well as the means to be in direct contact with the Town Council to solve any inquiry or problem that might arise during the installation of the equipment.

It is also laid down in the bid that the concessionaire will constitute and pay in to the Town Council a guarantee equivalent to 8% the winning economic proposal (VAT excluded). They are obliged also to contracting an insurance that must prevent the Town Council from any prejudice resulting from noncompliance with the concessionaire's obligations under the contract.

Regarding security interest in physical assets, the bid sets that the physical assets to be submitted by the concessionaire should accomplish with the law requirements as well as the features included in the list of technical requirements of the tender process. In addition, the concessionaire is responsible of the quality of the material and equipment surveyed. The concessionaire can elude this responsibility only when the material or equipment is damaged as a consequence of an order given by the contracting authority.

Finally, in the event of non-compliance with the obligations set in the bid, the law or the contract signed between the Town Council and the concessionaire, penalties might be imposed.

C.2.7. Monitoring and evaluation

The concessionaire is obliged to install a monitoring system for every sector the public lighting facility is divided in. The system must display real-time data in order to control the proper functioning of the facility and to collect the data to calculate the savings. The Town Council will have access to the data.

It is foreseen that the AER, according to its role of technical expertise within the PPP, will be in charge of calculating the savings and the related payments to be done bimonthly.

C.3 Lessons learnt

I. SEAP design and implementation

I.C.3.1. Legal constraints and how to overcome them

No legal constraints for the design of the SEAP.





I.C.3.2. Technical difficulties and how to overcome

Technical difficulties in the design of the SEAP are described in the table below.

DIFFICULTIES	SOLUTIONS ADOPTED
Collection of accurate data related to the category of private transport as there is no database available	The consumption was obtained through statistical methods.
Collection of gas consumption data for usages different from public buildings	Information required to the headquarters of the energy supplier as the local supplier is not able to provide these data.
Lack of technical features of the municipal equipment and facilities (original project documents not available)	Energy audit of the equipment. Inventory of the public lighting (accurate description of the facility and its technical features)
Lack of technical features of the municipal buildings (original project documents not available)	Energy audit of the public buildings.

Table 1. Technical difficulties in the design of the SEAP and solutions adopted.

Regarding the implementation of the SEAP the main difficulty is the continuity of the Plan. Despite the Town Council commitment on its fulfilment, it is probable that the SEAP ends up forgotten in a drawer.

In order to avoid this, it is essential that the PPP sets up an evaluation plan that defines the schedule for the following up of the action plan, the methodology to carry on the evaluation of the implementation of the actions and the methodology to carry on the evaluation of the completion of the objectives fixed for each action. It is crucial that the evaluation plan includes who is in charge of coordinating the whole evaluation and control procedure and who is in charge of doing the evaluation and control of each action.

I.C.3.3. How to replicate

The milestone of the SEAP is the elaboration of the BEI, as technical skills are required in order to obtain the data and calculate the consumptions. The definition of the actions to be included in the SEAP depends on the results of the BEI and in the local context.



The methodology for carrying out the BEI is comprehensively described in the SEAP document. Sources of information and calculation procedure are included in chapter 2 of this section of the document, which is thought to be a guideline for the elaboration of BEIs.

The implementation of the SEAP is a long lasting procedure that involves the evaluation of the measures implemented and a feedback according to the results obtained. This procedure requires a supportive structure formed by qualified professionals in charge of the evaluation and analysis of results, municipal representatives allowed to take decisions that lead to a redefinition of the plan when necessary and stakeholders that represent the interest of the citizenship and participate in the decision making process.

Chapter 5 of the document of the SEAP includes a proposal to articulate this supportive structure that is thought to manage the implementation of a SEAP in any municipality.

I.C.3.4. Conclusions

1. The main difficulty for the SEAP design is the elaboration of the BEI. Town council staff, especially in small towns, lack of the technical skills required for the elaboration of such document. In addition, data required are not easily available what may mean a barrier for the accurate production of the inventory. Therefore, the support of an external expertise is crucial for succeeding in the SEAP design. As a consequence, financial constraints must be an additional barrier for small municipalities to carry on a SEAP.
2. A milestone in the SEAP implementation that aims to guarantee the continuity of the plan is to set up an evaluation plan. It is essential that the plan includes who is in charge of coordinating the whole evaluation and control procedure and who is in charge of doing the evaluation and control of each action.

II. PPP set-up and implementation

II.C.3.1. Legal constraints and how to overcome them

There are legal barriers for setting up a PPP for the implementation of the entire SEAP as, according to the Spanish Law on Public Sector Contracts (LCSP), any service provided by a private party to a public body must be subject to a tender process. Therefore, in order to involve a private party in the consortium, a tender process is required.

However, a SEAP is formed by several actions focused on reducing energy consumption in different sectors (buildings, equipment, facilities, industries, transport). Therefore, it is difficult to include the implementation of the entire SEAP in a single tender process. As a consequence, for each





intervention, or group of interventions, the private party of the PPP may change as it will be the winner of the tender process.

On the other hand, the preparation of the tender process requires technical skills that staff in small town councils lack. Thus, an external expertise is required in the PPP. In order to avoid the tender process, the role of external expertise should be assumed by another public body by signing an agreement with the local authority.

In order to guarantee the continuity of such PPP that is supposed to last as much as the SEAP implementation process, the local authority, who is the promoter, should commit to the fulfilment of the SEAP. Signing up to the Covenant of Mayors may enforce their political commitment.

II.C.3.2. Technical difficulties and how to overcome

In the definition of the contract that involves the private party in the PPP, especially when introducing the ESCO scheme, two main difficulties arise:

- The deep knowledge of the characteristics of the typologies of contracts according to the ESCO formula in order to choose the one that better fits the action to be implemented.
- Technical knowledge on the concrete services or project to be included in the tender process for the fine tuning of the features to be requested in the bid so that they are reasonable for the companies to participate.

To overcome the first difficulty, guidelines on different ESCO contract scheme may be useful. Anyway, standard contracts must be adapted to the concrete characteristics of each project.

Regarding the second difficulty, it is very important to hold meetings with different companies of the sector and ask for different offers before the preparation of the bid documents. Previously, a study or energy audit of the building, equipment or facility object of the contract must be done in order to evaluate the saving potential and to have clear which improvements can be done for reducing the current energy consumption.

II.C.3.3. How to replicate

The scheme of PPP can be easily replicated. The main difficulty is finding the public body that will play the role of external expertise, as it must be specialized on energy issues. In Spain the organisms that can play this role are:

- Local or regional energy agencies.





- Diputaciones: they are local government institutions that offer services to small municipalities and cooperate with the town councils.
- Conselleria: the Spanish regional government is divided into Consellerias. Each Conselleria is in charge of one of the functions assigned to the regional government. Conselleria of Infrastructures, Land and Environment.

The involvement of this external expertise is crucial for the smooth running of the PPP and for the success of the SEAP. Guidelines are not enough because it is very difficult to reflect all the situations that may arise in the implementation of a SEAP.

II.C.3.4. Conclusions

1. The private party involved in the PPP plays the role of executing the actions included in the SEAP. According to the Spanish law, the involvement of a private party for the execution of a project or for providing a service must be done through a tender process.
2. It is quite difficult launching a single tender process for the implementation of the whole SEAP because of the large variety of projects that includes. Therefore, the private party of the PPP cannot be defined since the beginning. It will change according to the actions of the SEAP to be implemented.
3. For the implementation of a SEAP and in order to guarantee its continuity, an external expertise must be included in the PPP. The role of the external expertise is carrying on the control and evaluation of the SEAP that may lead to a redefinition of the actions, implementing the public participation process and assessing the local authority in the preparation of the tender process required for the implementation of the actions. Due to legal constraints, the external expertise is recommended to be a public body (energy agency, line agencies, etc).
4. The commitment of the Local Government is crucial for the success of the PPP and for the SEAP implementation. Signing up for the Covenant of Mayors may mean an incentive for Local Governments to enforce their commitment and to avoid abandoning as times goes by.





PORTUGAL

D.1. Sustainable Energy Action Plan issues

D.1.1. Design of the SEAP

D.1.1.i Involvement of third parties / Staff capacity

The Municipalities of Alter do Chão, Avis, Gavião, Marvão and Sousel, the main stakeholders in the region and some institutional entities considered essential as an interested party for the design of the SEAP.

The implementation of actions and measures considered in AA-SEAP will depend on the direct action of Municipalities, specifically with regard to policy areas managed by the Municipality itself (municipal buildings, public lighting and municipal fleet) but also on the type of interventions of the main stakeholders of the region and mobilizing citizens through the actions participated in regional and/or municipal policies, in particular concerning the different sectors located within the local authority (residential, services and trade sectors, public and own transports).

AA-SEAP was prepared by AREANATEjo in close cooperation with CIMAA and the above-mentioned Municipalities, namely with the following municipal technicians:

Subjects involved in data collection	Evaluation on the level of participation of local subject in BEI designing				
	Very good	Good	Barely Acceptable	Poor	Very Poor
1. Sérgio Brito (Municipality of Alter do Chão)		X			
2. Sónia Ribeiro (Municipality of Alter do Chão)		X			
3. Maria do Rosário Rodrigues (Municipality of Avis)		X			
4. Emílio Sabido (Municipality of Avis)		X			
5. Madalena Mata (Municipality of Marvão)		X			
6. Márcio Almeida (Municipality of Marvão)		X			
7. Helena Rodrigues (Municipality of Sousel)		X			
8. Jorge Pereira (Municipality of Sousel)		X			





CIMAA (Intermunicipal Community of North Alentejo region) is an official Covenant Coordinator (http://www.pactodeautarcas.eu/about/covenant-coordinators_pt.html?structure_id=205&signatories), playing a decisive role in reaching out to local authorities in its territory and providing signatories (Marvão, Avis and Sousel – by now) with the technical, financial, administrative and political support necessary to fulfil their commitments.

D.1.1.ii Data collection

The data referred in the Dynamic Energy Matrix - Sustainability Energy Charter from North Alentejo¹, constituted the reference data for the inventory of energy consumption and CO₂ emissions, aiming the identification and quantification of action measures to reduce energy consumption and CO₂ emissions in the different municipal areas of AA-SEAP. Thus, the reference scenario considered in the AA-SEAP concerns the year 2010, the last year for which there are available data for the inventory of CO₂ emissions of the involved Municipalities.

The following table presents the results of estimations carried out:

Municipality	Energy Consumption [MWh]	CO ₂ Emissions [Tonnes]
Alter do Chão	19,732	7,110
Avis	35,365	11,837
Gavião	15,358	5,645
Marvão	16,519	6,524
Sousel	34,220	11,356

The methodology used for the baseline emissions inventory (BEI) of the AA-SEAP included the following reference data:

- Sectorial energy consumption from Dynamic Energy Matrix – Sustainability Energy Charter from North Alentejo, which relate to the year 2010;

¹ The Dynamic Energy Matrix – Sustainability Energy Chart from North Alentejo contextualizes the situation of the region in terms of energy policies and national and European environmental policies to mitigate climate change. It combines as well patterns of consumption and technical data of endogenous generation in order to establish a Dynamics and Territorialized Energy Matrix.



- Emission factors from Intergovernmental Panel on Climate Change (IPCC Guidelines), according to the methodology of MIT Portugal (“Local Energy Sustainability Assessment - Methodological guide for the application of energy sustainability indicators at local level, 2009”).

These figures were worked out independently for each Municipality and the methodology used was transverse to them all and is presented in detail below.

The global and sectorial energy consumptions of Municipalities are presented in the following table:

Total of Energy Consumption [MWh]							
Intervention Area	Intervention Sector		Municipality				
			Alter do Chão	Avis	Gavião	Marvão	Sousel
Buildings	Municipal	Administrative	2,053	5,295	1,779	3,108	1,817
		Sports Complexes					
	Services	Schools	6,500	7,245	6,556	5,650	9,060
		Trade and Services					
Community	Energy	Tourism	1,296	1,325	293	914	808
		Public Lighting	857	1,379	939	1,094	999
		Traffic Lights	16	10	15	16	5
Transports	Municipal		1,264	1,147	1,431	723	1,690
	Public		4,778	15,044	2,180	1,485	16,729
	Individual						
Total [MWh]			19,732	35,365	15,358	16,519	34,220



Finally, taking into account the circumstances mentioned in the previous paragraphs, the baseline scenario of atmospheric emissions of the year 2010 is presented:

Total of Emitted CO ₂ [Tons]							
Intervention Area	Intervention Sector		Municipality				
			Alter do Chão	Avis	Gavião	Marvão	Sousel
Buildings	Municipal	Administrative Sports Complexes Schools	737	1,852	665	1,237	686
	Residential		2,574	2,897	2,567	2,312	3,618
	Services	Trade and Services	1,255	1,622	915	1,513	1,324
		Tourism	543	527	116	390	338
Community	Energy	Public Lighting	369	593	404	470	430
		Traffic Lights	7	4	6	7	2
Transports	Municipal		343	311	388	196	459
	Public		1,282	4,031	583	399	4,499
	Individual						
Total [Tons of CO ₂]			7,110	11,837	5,645	6,524	11,356

D.1.1.iii Measures defined

AA-SEAP aims at giving Municipalities a document that outlines the strategy, on an individual basis, on how they will achieve the proposed goal: a reduction of at least 20% of CO₂ emissions on the horizon 2020.



The commitment of reducing emissions resulted in concrete actions and measures to be followed, which resulted in estimates of CO₂ reduction (in tons) for the different intervention areas/sectors:

Area	Sector		
Buildings	Municipal	Administrative	
		Sports Complexes	
		School	
	Residential		
	Services	Trade and Services	
Tourism			
Community	Energy	Public Lighting	Lighting
			Traffic Lights
Transports	Municipal		
	Public and Individual		

The Municipalities of Alter do Chão, Avis, Gavião, Marvão and Sousel, the main stakeholders in the region and some institutional entities considered essential as an interested party.

The implementation of actions and measures considered in AA-SEAP will depend on the direct action of Municipalities, specifically with regard to policy areas managed by the Municipality itself (municipal buildings, public lighting and municipal fleet) but also on the interventionist nature of the main stakeholders of the region and mobilizing citizens through the actions participated in regional and/or municipal policies, in particular concerning the different sectors located within the local authority (residential, services and trade sectors, public and own transports).

The outlining of the AA-SEAP took into account the areas and intervention sectors a.m. and includes the identification and characterization of several action measures that contribute to the objectives of the Covenant of Mayors - the decrease in at least 20% of CO₂ emissions in the municipal area.

The characterization of action measures underlying the baseline scenario of CO₂ emissions was the subject of the following descriptive: Specific Goal, Implementation Period, Cost, Pay-back, Promoter, Funding, Energy Reduction and Avoided Emissions.

Subsequently, the action measures presented for each policy area were based in 11 municipal strategies, namely:

- Strategy 1. Improvement of energy efficiency in municipal administration;



- Strategy 2. Improvement of energy efficiency in sports complexes;
- Strategy 3. Improvement of energy efficiency in school buildings;
- Strategy 4. Improvement of energy efficiency in buildings;
- Strategy 5. Improvement of energy efficiency in trade;
- Strategy 6. Improvement of energy efficiency in tourism;
- Strategy 7. Improvement of energy efficiency in public lighting;
- Strategy 8. Improvement of energy efficiency in traffic lights;
- Strategy 9. Improvement of energy efficiency in municipal fleet;
- Strategy 10. Improvement of energy efficiency in public and individual transports;
- Strategy 11. Improvement on Municipal Energy Management (MEM).

D.1.2. Implementation of the SEAP

The monitoring and evaluation of AA-SEAP is an issue that shall be focused with particular attention, since it may be useful in the distinction between natural changes or changes arising directly or indirectly from municipal action. So, the methodology used in the monitoring and evaluating of AA-SEAP will be:

- 1) **Measures Selection:** The selection of action measures that require a more strict monitoring and evaluation took into account the greatest CO₂ emissions reduction potential for reducing CO₂ emissions, taking into account the overall value of each Municipality;
- 2) **Selection and development of indicators:** In order to ensure the achievement of the objectives set out in AA-SEAP, some monitoring and evaluation indicators were developed for each action measure selected:

Intervention Sector	Action Measures	Monitoring and Evaluation Indicators
Buildings	Solar thermal systems for hot water and/or air	Number of solar thermal panels and/or other equipment
	Solar photovoltaic systems for electricity production	Number of solar photovoltaic panels



	Improvement of the efficiency of HVAC systems and/or ventilation	Number of pellet boilers and/or other equipment
	Improvement of the efficiency of lighting systems	Number of lamps and/or other equipment
	Improvement of thermal insulation	Number of buildings
	Implementation of energy management systems	Number of smart metering
	Application of thermal covers in municipal swimming pools	Number of thermal covers
	Improvement of water supply systems and/or water consumption	Number of taps and/or other equipment
	Training, Information and Awareness Campaigns	Number of campaigns
Public Lighting	Installation of optimization systems on PL operating time	Number of astronomic clocks
	Removal of unnecessary points of light on PL network	Number of points of light
	Installation of more efficient lamps in the IP	Number of lamps
	Installation of dimmers in the IP	Number of dimmers
	Installation of systems for control and monitoring of PL	Number of remote management systems
	Installation of LED on traffic lights	Number of LED optics
Transports	Promoting the acquisition of more efficient vehicles	Number of vehicles
	Introduction of alternative propulsion systems (electric vehicle)	Number of electric vehicles
	Introduction of alternative fuels (biofuels)	% of biofuel
	Implementation of vehicle management systems	Number of fleet management systems
	Training, Information and Awareness Campaigns	Number of campaigns
Other Measures	Implementation of a "Green Procurement" policy	Number of energy and environmental criteria included in public contracts for purchase of goods or services
	Creation of the figure "Local Energy Manager"	Creation of a Local Energy Manager



- 3) **Definition of review processes:** The results obtained in the above-mentioned points serve as a basis to anticipate and make planning changes and/or adaptations of considered relevant and necessary;
- 4) **Definition of communication methods and reporting of results:** Preparation of annual reports aimed at measuring the evolution of action measures throughout the use of progress indicators, as well as allowing the interested parties a clear communication of the results.

D.1.3. Engagement with the local energy awareness actions

One of AA-SEAP focuses is the importance of performing awareness, information and communication campaigns, in order to better contribute to the implementation of the action measures a.m.

This way, and in order to raise awareness on a high and diversified target, it was suggested the promotion of training, information and awareness campaigns on the issues of energy, water and waste: lighting, air conditioning, introduction of energy efficiency criteria in the acquisition of equipment, introduction of criteria for water consumption' reduction in the acquisition of equipment, promotion of recycling, etc.

D.2. Public Private Partnership issues

The possibility of implementing Energy Performance Contracts between public bodies (Municipalities or Municipalities' Associations) and private entities (as ESCO) provides an opportunity to strongly boost the energy efficiency activities and meets the requirements of Directive 2006/32/EC on the promotion of energy services.

In Portugal (North Alentejo region, specifically), the installation of 7 solar thermal systems is envisaged and one biomass boiler for heating, in a total of 8 buildings of four Municipalities participating in ZEROCO₂ Project.

The Decree-Law n.º 29/2011 was published in February 28th 2011, establishing the legal regime applicable to the formation and implementation of energy performance contracts (management contracts for energy efficiency) to be celebrated between public bodies and Energy Service Companies (ESCOs) to implement measures to improve energy efficiency in public buildings and equipment allocated to the provision of public services.

The rules of the tendering procedures for this type of intervention are set within this document, namely in terms of content of the Procedure Program and Tender Specifications, as well as the level of qualification of ESCO for the development and implementation of energy efficiency measures to contract.





However, in Portugal, the guidelines to implement this type of contracts were only published in February 2013 and must be adopted by the respective entities in all procedures regarding energy management contracts launched under the Portuguese Energy Efficiency Program in Public Administration.

Thus, being not possible to wait for the publication of the a.m. legislation to implement this task along the lines initially set out, and after the positive opinion of IFDR (the Portuguese National Authority), CIMAA started the implementation of this action based on another type of procedure, namely a Green Public Procurement. This type of tender, socially and environmentally responsible, obeys the Portuguese rules in terms of procurement and is not only ruled by the economic value of the purchase of goods/services in question, and may include various award criteria that compromise the private entity (competitor) in meeting the planned targets, particularly in terms of minimum reduction of energy consumption for facilities covered under warranty and maintenance of equipment for a period equivalent to the period of return on investment and risk sharing, thus reaching the objectives of the Energy Performance Contracts.

D.2.1. Preliminary work: call for bids

A procedure and a tender specification were developed under which CIMAA (Intermunicipal Community of Alto Alentejo) launched a tender to choose an ESCO - Energy Services Company that, later, will provide energy services.

In terms of legislation, and due to delays in the publication of the Decree-Law n. ° 29/2011, February 28th (that establishes the legal regime applicable to the formation and implementation of energy performance contracts), it was taken into account the Portuguese Public Procurement Code (that establishes the rules of public procurement) and the Decree-Law n. ° 141/2006, July 27th (which aims the definition of the general standards of state intervention in public-private partnerships).

D.2.2. Description of the project

The contract to be signed between CIMAA and the contractor aims to supply energy services under the Decree-Law n. ° 29/2011, February 28th, which establishes the legal regime applicable to the formation and implementation of energy performance contracts (management contracts for energy efficiency).

The service to be provided comprises the design, supply, installation and maintenance of seven (7) solar thermal systems and one (1) heating system on biomass (pellets) to be implemented in eight (8) municipal buildings:





- Avis Camping Park
- Avis Municipal Sports Pavilion
- School's Pavilion of Avis
- Avis Municipal Swimming Pool
- Portagem Municipal Swimming Pool (Marvão)
- Municipal Sports Pavilion of Santo António das Areias (Marvão)
- Alter do Chão Municipal Swimming Pool

In addition a Facility Maintenance Plan and Agreement (during the whole duration of the contract) was also included in this tender process.

D.2.3. Legal requirements of the private party

The risk sharing between the public contractor and the enterprise to be contracted follows the principle that the different risks should be shared between both parties according to their ability to manage them.

The private entity must present a statement of performance warranty of the solution presented (overall value of the contribution if renewable energy sources), by facility and by Municipality, according to the minimum results to obtain, as following:

MUNICIPALITY	FACILITY	Energy Consumption (kWh)	Contribution of RES (kWh)	Contribution of RES (%)	Reduction of CO ₂ emissions (t)
Alter do Chão	Swimming Pool	117,983	70,200	59.5%	7.2
Avis	Camping Park	12,600	9,944	79.2%	3.2
	Swimming Pool (outdoor)	9,000	4,649	51.7%	1.5
	Pavilion	6,100	3,756	61.8%	1.2
	Pavilion (School)	6,100	3,756	61.8%	1.2
Marvão	Swimming Pool (outdoor)	16,600	6,645	74.9%	2.1



	Pavilion	39,000	17,125	43.7%	5.4
Sousel	Swimming Pool	306,000	306,000	100.0%	89.40
TOTAL		513,383	422,075	82.21%	111.2

D.2.4. Type of the PPP implemented

This tender procedure focuses on the conception, supply, installation and maintenance of Renewable Energy Systems, for replacement of conventional thermal sources, to be implemented under ZEROCO₂ project. The contracting authority is CIMAA - Intermunicipal Community of Alto Alentejo and the contract to be celebrated will end with the expiration of the period of warranty and maintenance.

Taking into account that this is a Green Public Procurement, this procedure sets as annual results to achieve the following ones: contribution of RES of 351,875 kWh (89%) and reduction of CO₂ emissions of 104t.

D.2.5. Financial issues and obligations

The base price for this procedure was € 168,500.00 (one hundred sixty eight thousand and five hundred Euros), plus VAT at the legal rate.

The tendering was made according to the criteria of the most economically advantageous offer taking into account the following factors, in decreasing order of importance, and with the following weightings:

- a) Total Price of conception services, supplies, maintenance and monitoring (expressed in Euros) - 60%
- b) Contribution of renewable energy sources (expressed in %) - 30%;
- c) Warranty and maintenance period (expressed in years).

D.2.6. Security interests

The contractor must ensure the proper operation of the equipment supplied and installed during the term of the contract and must provide timely maintenance during this same period, without additional charges to the contracting authority.





D.2.7. Monitoring and evaluation

It was considered necessary, at least two (2) annual visits to each facility for verification of preventive and/or corrective actions, described in the previous paragraph, as well as for measurement of energy consumption and costs to properly monitor the evolution of the performance of the facility.

They are excluded from the guarantee that all the defects that notoriously result from a misuse, improper use or negligence by the contracting authority, as well as all defects that result from fraud and third-party actions.

In case of anomaly detected on the object of supply, the Contractor commits himself to intervene without prejudice to the right to the payment of due fees, if the anomaly results from a fact not attributable to the contractor.

D.3 Lessons learnt

I. SEAP design and implementation

I.D.3.1. Legal constraints and how to overcome them

In compliance with the commitments made under the Covenant of Mayors initiative, the inventory of CO₂ emissions of the Municipalities of Alter do Chão, Avis, Gavião, and Marvão Sousel characterizes the counties in terms of final energy consumption and related CO₂ emissions, defining action strategies whose implementation will allow these Municipalities to achieve, in 2020, the goal of reducing CO₂ emissions in the order of 33% (Alter do Chão), 28% (Avis), 33% (Gavião), 30% (Marvão) and 24% (Sousel).

Result of the inventory held, it was clear that the most “energy consuming” components corresponded to house buildings and public & private transport (outside the direct action of Municipalities), followed by trade & services buildings and municipal buildings. In what concerns the energy sector, generally, in 2010 there were higher consumptions of diesel, followed by electricity.

AREANATEjo faced some difficulties in SEAP development, namely on goals’ achievement, because the biggest consumers are the private sectors (residential, agriculture, industry), whom don’t have a direct action of Municipalities. So, the goal of 20% of reduction on energy consumption becomes more difficult to achieve when we consider these sectors in the SEAP.

In terms of legal constraints, it can be pointed out the fact of the Municipality of Gavião decided, in Municipal Assembly Meeting, not to join the Covenant of Mayors’ initiative and not to submit the SEAP.





I.D.3.2. Technical difficulties and how to overcome

While filling up the Baseline Emission Inventory AREANATEjo faced some difficulties in the introduction of data corresponding to the Transports Sectors. As this isn't a stationary sector the information on energy consumption was very difficult to obtain. The proximity of North Alentejo to the Spanish borders, where fuels are cheaper, lead to a significant increase of the number of people who fuel their vehicles in Spain.

I.D.3.3. How to replicate

Alto Alentejo Sustainable Energy Action Plan (AA-SEAP) comprises 5 Municipalities from North Alentejo region (Alter do Chão, Avis, Gavião, Marvão and Sousel), but it can be easily replicated to other Municipalities of this region, as they all have similarities regarding the energy consumption.

The outlined strategy is reflected in the identification of concrete action measures, grouped according to different policy areas, namely: municipal buildings, residential buildings, services buildings, public lighting, traffic lights, municipal transport and public and individual transports, reflected in estimates of CO₂ tons reduction.

I.D.3.4. Conclusions

Alto Alentejo Sustainable Energy Action Plan (AA-SEAP), which comprises 5 Municipalities from North Alentejo region (Alter do Chão, Avis, Gavião, Marvão and Sousel), aims at showing how they will achieve the proposed/set out goal.

The outlined strategy is reflected in the identification of concrete action measures, grouped according to different policy areas, namely: municipal buildings, residential buildings, services buildings, public lighting, traffic lights, municipal transport and public and individual transports, reflected in estimates of CO₂ tons reduction. These action measures realize a reduction potential of CO₂ emissions that exceeds the 20% regulated by the EU and the Covenant of Mayors:

Municipality	CO ₂ Emissions [Tons]	CO ₂ Emissions [%]
Alter do Chão	2,374	33
Avis	3,276	28
Gavião	1,891	33
Marvão	1,929	30



Sousel	2,766	24
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In order to assure the prosecution of the goals set in AA-SEAP, they were already developed 22 indicators for monitoring and evaluating the identified action measures.

Finally, a SWOT analysis of AA-SEAP is presented:

Positive	Negative
Strengths ✓ Existence of many projects related to energy and environmental issues already or in the process of development. ✓ Integration of the Municipality in the Covenant of Mayors initiative. ✓ Distinction of the Municipality in matters of energy and environmental sustainability.	Weaknesses ✓ High investments for implementation of action measures; ✓ Changes in the municipal officers ✓ Lack of awareness on issues related to sustainability.
Opportunities ✓ Strong contribution to the achievement of goals designed for energy and environmental panorama. ✓ Existence of several National and European funding addressed to the themes of energy and environment. ✓ Possibility of intervention from the private sector.	Threats ✓ Difficulty in implementing projects related to public contract. ✓ Existence of policy areas that have no direct dependence on the Municipality.

Marvão SEAP was formally approved in June 21st 2012 and submitted on June 29th 2012, with an overall CO₂ emission reduction target of 30% (http://www.pactodeautarcas.eu/about/signatories_pt.html?city_id=1944&seap).

Sousel SEAP was formally approved on May 21st 2012 and submitted on August 28th 2012, with an overall CO₂ emission reduction target of 24%



(http://www.pactodeautarcas.eu/about/signatories_pt.html?city_id=4445&seap) and Avis SEAP was formally approved on July 11th 2012, being submitted on August 28th 2012, with an overall CO₂ emission reduction target of 28% (http://www.pactodeautarcas.eu/about/signatories_pt.html?city_id=4691&seap).

II. PPP set-up and implementation

Within project objectives CIMAA intended to implement a public tender on energy under the recent Portuguese Legislation regarding the ESCOs (Decree-Law no. 29/2011, from February 28th). This Decree-Law highlights public sector's role in the promotion and development of a market for energy services as well as in the adoption of measures to improve energy efficiency. In Portugal, hiring an Energy Services Company through an open competitive process (public treaty) allows them to identify potential energy savings in buildings and public facilities, thus implementing procedures designed to enhance energy efficiency gains, reflected in the final energy bill. This Decree-Law establishes the requirements of the hiring conditions for this type of process but does not include the rules to be adopted by public authorities to establish an energy performance contract.

However, and due to several delays in the approval of the Portuguese guidelines to implement this type of contracts (only published in February 2013), CIMAA launched a Green Public Procurement, obeying to the principles of Portuguese Public Procurement rules.

So, as a ZEROCO₂ Project's main action, this contract will comprise the installation of systems, technologies and equipment that encourage the improvement of energy efficiency and the use of renewable energy sources in the chosen Municipalities' buildings (namely solar thermal systems and biomass boilers).

II.D.3.1. Legal constraints and how to overcome them

In what concerns legal constraints, it can be pointed out that besides AREANATEjo preparation of the needed documents for the public treaty, including the Contract to be celebrated between CIMAA and the ESCO to be selected, the national regulation on energy performance contract rules for public bodies and ESCOs was only published in February 2013, (after the launching of GPP by CIMAA). Following this constraint CIMAA contacted Portuguese National Authority (IFDR) in order to have a clarification about alternative procedures (according to Portuguese Public Contract Legislation) to implement such action. So, this was a huge time consuming task.





II.D.3.2. Technical difficulties and how to overcome

There were no technical difficulties for the PPP set-up and implementation.

II.D.3.3. How to replicate

In terms of replication, and taking into account the approval of the guidelines of PPP contracts in February 2013, it is believed now that public entities are able to proceed with the procedure that meets the specific goals of Decree-Law no. 29/2011.

An alternative option can still be the launching of a public tender (according to the Portuguese rules), which includes some terms relating to green public procurement, i.e., a tender socially and environmentally responsible which is not governed only by the economic value of the acquisition.

II.D.3.4. Conclusions

One of ZEROCO₂ project main goals is the implementation of Energy Performance Contracts (Public Private Partnerships) between public entities (Municipalities or Municipalities' Associations) and private entities (ESCO). However, in Portugal the guidelines to implement this type of contracts were only approved on 5th February 2013, thus allowing the celebration of contracts with ESCOs.

Alternatively, the National Authority has been asked on the possibility of CIMAA (public entity) proceed with the implementation of this action based on another type of tender procedure, namely a "green" tender (Green Public Procurement). This type of tender, socially and environmentally responsible, obeys to the Portuguese rules in terms of procurement and does not take into account only the economic value of the purchase of goods/services, but including as well several award criteria that compromise the private entity (competitor) in meeting the planned targets, namely in meeting the minimum level of reduction of energy consumption in the covered facilities, and in the guarantee and maintenance of the equipment for a period equivalent to the period of return on investment and risk sharing, reaching the objectives of the Energy Performance Contracts.

As a main conclusion, AREANATEjo and CIMAA regret for not having been possible to Alto Alentejo region to be pioneer in Portugal on an ESCO procedure involving public buildings, but consider that this ZEROCO₂ opportunity, namely in what concerns the creation of a PPP, was very fruitful to enhance awareness among public entities (municipalities) about the advantages on energy efficiency and renewable energies' investments.

