



Report on strategies and opportunities in the LAs of the Alpine Space

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Author Sara Giona
Organization PP10 – Ökoinstitut
 Südtirol/Alto Adige

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Short Description

This document defines and describes the local needs of Local Authorities (LAs) based on the results of a desk research and the analysis of the past EU projects.

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Table of Contents

1	Desk research.....	4
2	Identification of the local needs	5
2.1	Methodology	6
2.2	Measures	12
2.3	Analysis/ results	23
3	Previous Projects	25
3.1.1	ENERGY ACTION PLANNING	25
3.1.2	ENERGY MANAGEMENT	28
3.1.3	PUBLIC LIGHTING	28
3.1.4	AWARENESS CAMPAIGNS / ADAPTATION TO CLIMATE CHANGE	29
3.1.5	ENERGY RETROFITS FOR PUBLIC AND PRIVATE BUILDINGS	30
3.1.6	PROMOTION OF RES.....	32
4	Financing Tools.....	33
4.1.1	EEEF (European Energy Efficiency Fund).....	33
4.1.2	JESSICA – Joint European Support for Sustainable Investment in City Areas	33
4.1.3	Horizon 2020.....	34
4.1.4	ELENA (European Local Energy Assistance).....	35
5	Categorization of LAs	36
6	Conclusion.....	37

Introduction

The project PEACE_Alps tackles the problems related to the implementation of Sustainable Energy Action Plans (SEAPs) or any other energy concepts already endorsed by Local Authorities (LAs) in the Alpine Space Area (ASA) by supporting LAs, about 100, in developing concrete actions with an inter-municipal approach. This is the core aim of the project and the way for reaching the main objective: establishing low carbon and adaptation to climate change (CC) policy instruments. The project proceeds by identifying local needs using a bottom-up approach, pooling them to create scale economies and then providing centralized solutions at regional level.

The project, designed to give continuity to the results obtained with the project SEAP_Alps, assumes that actions must be kept at a local level, but the process should be eased and innovated by gathering same needs and setting up centralized solutions exploiting the plus offered by a transnational approach. The addressed topic will be: energy management; energy refurbishment of buildings and public light; local adaptation to CC. These services will be set up and tested with a transnational mutual learning process among Project Partners (PP) and involved LAs. In order to ensure durability to the output, a multi-level cooperation on a long term perspective will be put in place. The outputs and experience gained will be spread out in the ASA (Alpine Space Area) with an effective engagement campaign of new regions interested in developing the same approach with policy recommendation at EU level.

Several countries over the Alpine Space are taking part in the project PEACE_Alps. The implementation of the project is carried on by the following organizations:

Country	Region	Organization
ITALY	Alto Adige	Ökoinstitut Südtirol/Alto Adige
	Torino	Piemont Region
FRANCE	Rhône-Alpes	Rhonalpenergie-Environnement
	Isère	AGEDEN
AUSTRIA	Steiermark	W.E.I.Z.
SLOVENIA	Gorenjska	BSC L.t.d, Kranj
	Pomurska	Development agency Sinergija
GERMANY	Bayern	EZA!
	Bayern	Energiewende Oberland - EWO
SWITZERLAND	Bern/Neuenburg/Jura	Planair SA

Table 1: PEACE_Alps Project's partnership

1 Desk research

Main objective of the WP3/WPT2 is to define local needs for technical support by using a bottom-up approach. The successful implementation of European-wide low carbon strategies significantly depends on the commitment of the stakeholders on local and regional level. Enabling bottom-up initiatives is a new governance approach to deliver a city wide low carbon strategy. The first activity, carried out at the beginning of the project by PP10 in order to get strategic information and prepare the ground for following activities, is the desk research. This research is finalized to: analyze firstly which are the needs of the LAs, secondly divide the involved municipalities into categories: e.g. population, geographical location, environment/climate issues: then to gather examples of approaches or tools that has been set up in other EU projects; finally, to find out which are the opportunities for LAs to use European funding for the implementation of their actions. The results of the desk research will be presented at local level by each PP (save PP9) during a regional start-up

forum involving LAs and interested stakeholders. Moreover, the forum will be an opportunity to start to bring out the real needs of local energy policy makers. A deepening will be made by arranging interviews with selected strategic stakeholders and LAs in order to state out a shared vision of local needs and provide the necessary information for the implementation of possible solutions in WP3/WPT2. At least 100 LAs and 100 stakeholders will be involved. A Regional Advisory Board (RAB) involving regional stakeholders, regional authorities and LAs (about 5 persons each) will have the role to monitor and provide guidance for possible adjustments during the process implementation. A tool, including the description of the process, the general results will be drafted by PP10. This tool will be a strategic instrument for durability and replicability of the project.

2 Identification of the local needs

The first instrument which has been used in order to define the local needs of the LAs is the SEAP of the [Covenant of Mayors for Climate & Energy](#).

The Covenant of Mayors for Climate and Energy is a movement started in 2008. It brings together local and regional authorities who are committed to implement the EU's climate and energy objectives on their territory. Covenant of Mayors objectives include CO₂ reduction and adaptation to climate change. Every signatory aims to reach these shared goals on a local level, in order to provide their citizens with secure, sustainable and affordable energy.

The tools of the [SEAP](#) itself have been developed by the Covenant in order to understand which are the priorities for the municipalities. The acronym SEAP stands, indeed, for Sustainable Energy Action Plan. It is a document which aims to show how the Covenant of Mayors signatories intend to reach their CO₂ reduction goals fixed at a minimum of 20% by 2020. In October 2015 the EU Commission and the Covenant of Mayors have redefined the goal of the CO₂ emissions reduction at a minimum of 40% by 2030. It has also introduced the concept of mitigation, adaptation and safe energy reachable by all.

The document must define actions and measures aimed to reach the targets, as well as time frames and assigned responsibilities. Following the general guidelines, every member of the Covenant can choose the format for its SEAP. It is important to underline that the countries of the Alpine Space have developed around 1.030 SEAPs within their territories.

Despite this, the Sustainable Energy Action Plans are not the only programs related to energy savings and sustainability and not all countries in Europe are familiar with this tool i.e. Germany and Austria, therefore other extensive plans have been included in the research such as the ones related to the [European Energy Award \(EEA\)](#). EEA is a program which

support municipalities willing to contribute to sustainable energy policy and urban development through the rational use of energy and increased use of renewable energies.

2.1 Methodology

In order to gain a full picture of the situation in the diverse regions, and in order to define the needs of the local authorities, the project partners have provided SEAPs or similar energy related programs from their region. As described in the previous paragraph the SEAPs (and similar energy plans) set the goal in term of CO₂ emissions reduction and include a description of the actions and the measures to implement in order to reach the established goals. The SEAPs, basically can be considered a sort of summary of the needs of a LA.

The SEAPs chosen for the analysis provide data from different kind of municipalities. The research has, indeed, took into account large, medium and small sized cities. Furthermore, all cities are different in the matter of temperature, altitude, climate and geographical features. This, in order to guarantee a broad area of analysis, and to guarantee the replicability of the results of the project in the alpine area thanks to the inclusion of all kind of communities presents in the alpine space.

Therefore, 61 SEAPs (and similar energy plans) have been analyzed in 355 municipalities, on a total of 1.534.376 inhabitants, cumulative SEAPs have also been considered (i.e. the Pays Roussillonnais in France and the Hochpustertal in Italy, which are conglomerations of municipalities).

			Inhabitants	Surface km ²	Altitude MASL	Degree Day *	Population density (Inhabitants + tourists) Inh./km ²	
Italy	Ökoinstitut Südtirol/Alto Adige	1	Bolzano	104.841	52	262	2.791	12.771
		2	Rovereto	38.611	51	204	2.713	7.682
		3	Bressanone	20.689	85	559	3.507	6.281
		4	Hochpustertal *	10.738	395	1.226	4.411	4.764
		5	Tione di trento	3.595	33	565	3.272	889
		6	Vermiglio	1.905	104	1.261	4.358	1.282
		7	Spiazzo Rendena	1.256	71	645	3.405	3.023
		8	Malles	5.149	247	1.051	4.131	1.189
		9	Nuova Ponente	3.902	112	1.357	4.642	2.943
		10	Egna	5.176	24	214	2.899	1.085
		11	Cortina	645	2	212	2.721	14.148
		12	Villandro	1.906	44	880	3.826	3.129
		13	Anterselva	2.878	122	1.030	4.285	3.710
		14	Laces	5.180	79	639	3.443	3.064
		15	Naturno	5.554	67	554	3.118	7.416
		16	Fortezza	975	62	749	3.596	433
		17	Tiers	978	42	1.028	4.050	2.749
		18	Rio di Pusteria	2.961	84	777	3.646	7.904
	Regione Piemonte	19	Alpignano	17.118	12	330	2.825	2.412
		20	Coazze	3.247	56	750	3.479	95
		21	Giaveno	16.506	71	506	3.113	397
		22	Poirino	10.543	75	249	2.727	394
		23	Orbassano	23.050	22	273	2.634	2.176
		24	Unione NET *	120.874	142	229	2.651	2.077
Slovenia	BSC	25	Kranj	55.000	148	400	3.400	792
		26	Tržič	15.000	155	400	3.900	109
		27	Škofja Loka	23.000	145	350	3.450	223
		28	Gorje	3.000	119	600	3.950	114
		29	Bohinj	5.300	338	500	4.000	949
		30	Žiri	5.000	49	480	3.600	109
		31	Jezerško	600	69	900	4.700	114
	Sinergija	32	Razkrižje	1.363	10	367	3.001	139
		33	Moravske Toplice	6.203	145	203	3.201	46
		34	Kuzma	1.642	23	218	3.201	72
		35	Odranci	1.718	7	172	3.201	249
		36	Puconci	6.256	108	206	3.201	67
		37	Rogašovci	3.342	40	240	3.201	83
		38	Turnišče	3.495	24	169	3.201	147
France	Ageden	39	Oisans	10.800	546	720	3.375	1.219
		40	Grésivaudan	51.000	212	400	2.500	2.623
		41	CAP1-CCVT	126.028	343	640	2.405	572
		42	Trièves	9.750	631	640	2.690	199
	Rhonalpenegie	43	Roussillonnais	51.000	212	400	2.600	703
		44	Departement Rhône *	471.000	2.715	850	2.499	540
		45	Comunità d'agglomeration du Pays Viennois *	68.200	275	500	2.524	452
Switzerland	Planair	46	Corgémont	1.650	18	663	3.657	94
		47	Parc régional Chasseral *	37.000	387	800	3.657	96
		48	Parc du Doubs *	59.700	294	1.047	4.299	203
		49	Ville la Clode	10.422	2.314	950	4.299	5
Austria	WEIZ	50	Vorau	4.783	81	660	3.480	191
		51	Steirisches Wechselland *	10.390	190	190	3.560	116
Germany	EWO	52	Benediktbeuern	3.563	38	606	4.038	2.900
		53	Bernried am Starnberger See	2.211	14	600	3.906	18.758
		54	Eberfing	1.374	26	610	3.906	53
		55	Miesbach	11.241	32	697	4.038	2.013
		56	Penzberg	16.174	26	596	3.906	1.357
		57	Günzburg	19.858	55	470	3.725	3.861
	EZA!	58	Durach	6.813	21	714	3.906	746
		59	Wertach	2.467	46	915	3.906	3.102
		60	Füssen	14.881	44	808	3.906	22.854
		61	Wiggensbach	4.875	32	857	3.906	1.578

Table 2: List of SEAPs analyzed ¹

* The degree day is a conventional measure that defines how many days in a year the temperature was below the temperature, established at the comfort temperature (i.e. in Italy the fixed temperature is 20 degrees whereas in Germany is 15 degrees). The bigger is the number related to the degree days, the colder is the area.

The results of the SEAPs and similar have been summarized according to the size of the different municipalities as follows:

- 9 SEAPs (or similar) planned by municipalities with a population over 50.000 people
- 10 SEAPs (or similar) planned by municipalities with a population between 50.000 and 15.000 people
- 42 SEAPs (or similar) planned by municipalities with a population less than 15.000 people

Moreover, the data collected has been normalized and the relevance of the action fields is based on the number of the measures foreseen by a municipality in a particular action field compared with the total number of the measures listed in that field, that means that the normalization was executed by the division of the total number of the X's in one action fields with the number of measurements in this action fields. In this way it is possible to calculate the preferences of the different municipalities and to compare the different action fields without being misled/conditioned by the number of the measures in the different fields.

The analysis of the SEAPs pointed out that all the municipalities involved in the research share the need to improve their energy performance within six big action fields:

1. **Public lighting**, in this category it is possible to find all measures that aim in replacing or plan new public lighting system.
2. **Promotion of renewable energy sources**: in this category fit all the interventions aimed to develop energy production systems that use renewable energy sources available in the area.
3. **Energy efficiency improvement in public building**.
4. **Sustainable mobility**: measures planned by the municipalities for the reduction of emissions from vehicular traffic and reduction and mitigation of the traffic itself are listed in this action field.

* The marked items are conglomerations of municipalities:

- Hochpustertal = 5 municipalities
- Unione NET = 6 municipalities
- Departement Rhône = 228 municipalities
- Comunità d'agglomeration du Pays Viennois = 18 municipalities
- Parc regional Chasseral = 21 municipalities
- Parc du Doubs = 16 municipalities
- Steirisches Wechselland = 5 municipalities

-
5. **Awareness campaigns:** this includes all actions aimed at raising awareness and public involvement in energy conservation and issues such as climate change, and CO₂ reduction. Some examples are education campaigns in schools and/or for public employees or citizens.
 6. **Energy management:** measures identified by the municipalities to encourage the use of energy accounting systems and energy management systems, aimed at obtaining a better and efficient management of energy consumption by municipalities have been gathered together in this category.

Each field of action included a few intervention measures, which have been synthesized in 76 measures. Table 3 shows the list of measures identified according to how many times the measure has been applied, whereas figure 1 shows which measures are most frequently planned and used in the examined municipalities and regions.

N°	N° of applications	List of actions
1	35	Intervention in the public lighting sector
2	35	Energy refurbishment plan for public buildings
3	34	Informative campaigns for climate and environmental issues (CO2 reduction etc.)
4	32	Software for energy accountancy
5	31	To appoint an energy manager
6	30	Promotion of the photovoltaic system
7	28	Energy audits for municipal buildings/energy certification
8	27	To adopt measure in urban development planning and in land-use planning
9	25	Environment, climate and energy education in schools
10	24	Promoting traffic reduction (pedestrian areas etc.)
11	24	Promotion of low emission cars
12	22	Informative campaigns about climate change (webpages, articles, flyers)
13	21	Increasing the district heating network
14	20	Promotion of green purchases
15	19	Cycling lanes development
16	19	Carrying out a municipal energy balance or implement the SEAP
17	18	Municipal mobility plan
18	18	Car sharing
19	18	Energy consulting
20	17	Installation of solar thermal systems on residential buildings
21	17	Staff training about energy savings
22	16	Replacement of the existing heating systems with the renewable energy systems
23	16	Replacement of the lighting system in public buildings
24	16	Green events and contests planning
25	15	Promotion of biogas and biomass system to produce electrical and thermal energy
26	12	Increase the hydroelectric power use
27	12	Energy efficiency incentives
28	11	Promotion of energy savings and local product consumption
29	11	To be involved in the EEA program or similar
30	10	Promotion of local public transport
31	8	Promoting renewable energy development
32	8	Replacement of electronic devices/household electrical appliances
33	7	Improving pedestrian paths
34	7	Planning of car parking spaces
35	7	Use of biofuels
36	6	Energy cadastre for municipal buildings
37	6	Promotion of cycling
38	6	Coordination and promotion of private purchasing groups
39	6	Campaign "thermography for all"
40	5	Use of geothermal energy
41	5	High standard for new buildings (Casa Clima A 40l/mq)
42	5	Replacement of diesel boilers with biomass boilers
43	5	Modal split model (studying the utilization rate of the different means of transportation)
44	4	CHG syngas system
45	4	Promoting electricity generation from wind turbine
46	4	Promption of electric vehicles
47	3	Replacing public lighting with LED
48	3	Promoting the replacement of lamps and household electrical appliances
49	3	Installation of heat pumps
50	3	Informative campaigns for eco-driving
51	3	Meeting with biomass producers and technicians
52	2	Promoting the installation of heat pumps
53	2	Meet 50% of the energy needs of the new buildings from renewable energy sources
54	2	Improving the energy efficiency of the productive processes
55	2	Energy cadastre for private buildings
56	2	Identifying investors to finance the energy efficiency measures
57	2	Improving the efficiency of the public transport (timing systems, pass etc.)
58	2	Optimization of the public lighting system
59	2	Debating/exchanging ideas about energy efficiency
60	2	Using "ISO 5001/14001" as an energy management system
61	1	Flow regulators for public lighting
62	1	Innovative technical systems aimed to purchase 60% of the hot water needs from renewable energy
63	1	Energy meter
64	1	Installation of thermostatic valves
65	1	50/50 project for the public buildings bills (split the savings)
66	1	Replacing windows
67	1	Improving indoor air quality in public buildings
68	1	Restrictions of the movement of Euro 0 and Euro 1 vehicles
69	1	Limited traffic zone in the downtown
70	1	City Logistic (distribution of goods in the downtown)
71	1	Implementing mobility management in bad weather conditions (information, buses etc.)
72	1	Mail delivery by e-bikes
73	1	Public information through "Parco delle Energie Rinnovabili"
74	1	Energy management promotion (notification of PUM)
75	1	Establishment of an "alta pusteria" supra-municipal body for the execution of the SEAP
76	1	Registration of EMAS

Table 3: List of measures

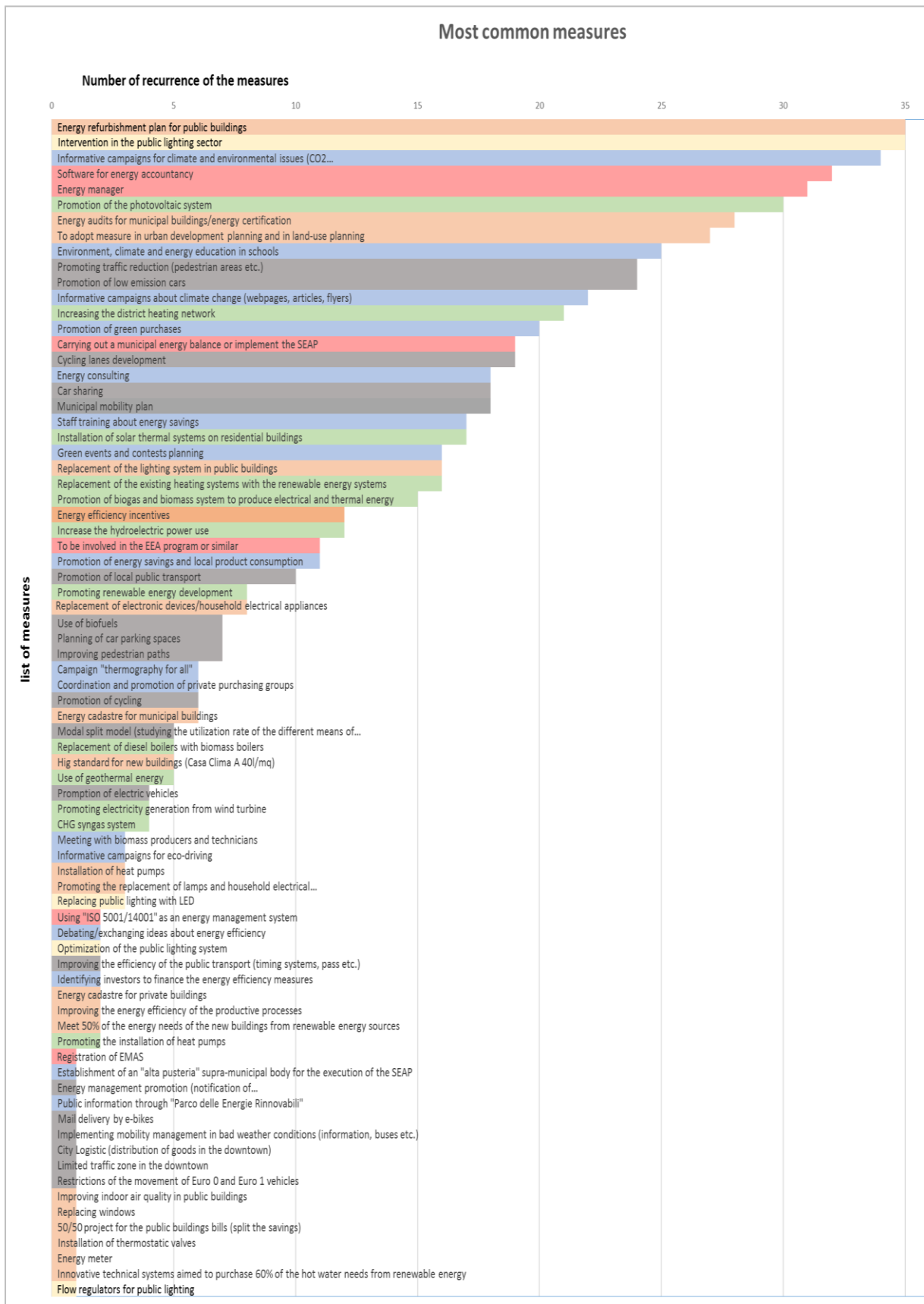


Figure 1: Most common measures

2.2 Measures

In order to better understand which are the needs perceived by the different local authorities in the area a clear list and a brief description of the measures chosen by the municipalities in their SEAPs is needed, therefore, in the following paragraph several measures divided per categories will be listed. The first sector studied is related to the macro-area of energy efficiency in public building, in which the most common measures are:

1. **Energy refurbishment plan for public buildings:** basically to plan and to prioritize the refurbishment of public buildings.
2. **To adopt measure in urban development planning and in land-use planning** in order to improve energy efficiency both in renovation of old buildings and in the constructions of new buildings.
3. **Energy audits for municipal buildings or energy certification:** i.e. the analysis of the public buildings and the definition or implementation of a building energy certification system.
4. **Replacement of lighting in public buildings:** i.e. changing the light-bulbs with more efficient ones (e.g. LED).
5. **Energy efficiency incentives:** i.e. definition of a set of rules and a budget that can help citizens to renovate their houses.

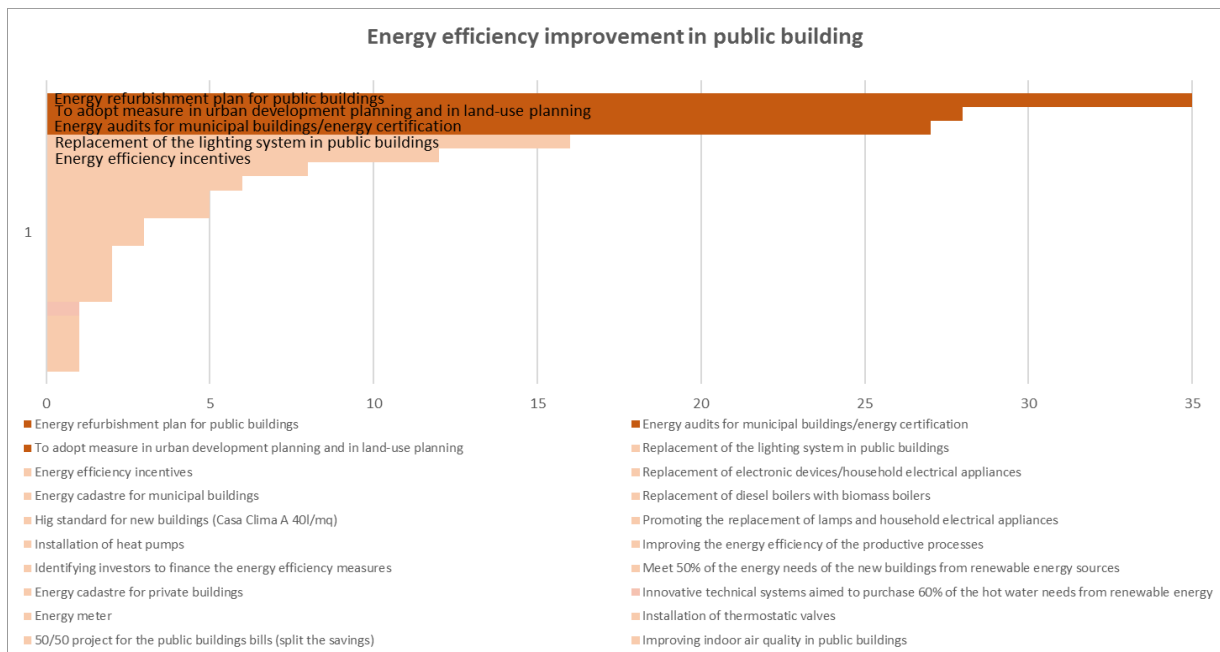


Figure 2: Most actions applied within the field of Energy efficiency improvement in public building

Linked to the previous topic is the energy management: which includes all those measure related to the analysis of the energy consumptions of a municipality: In this broad area, the most common measures are:

1. **To adopt a software for energy accountancy** such as EBO® or similar, which helps to reduce the energy consumption through a periodical check of the energy consumptions.
2. **To appoint an energy manager:** i.e. a technician that not only is responsible for all the issues concerning energy but also to find new funding system in order to implement the measures established in the planning phase.
3. **Carrying out a municipal energy balance or implement the SEAP,** i.e. municipalities decide to perform an analysis of their CO₂ emission and then to plan actions to reduce those emissions though a clear planning (SEAPs or other Energy plans).
4. **To be involved in the EEA program or similar** e.g. e5, KlimaGemeinde, which support the municipalities to plan, check and control the activities linked to the energy sector through a set of standardized measures.
5. **Using "ISO 5001/14001" as an energy management system** or other quality management systems help the municipalities in the standardization of the energy saving process.

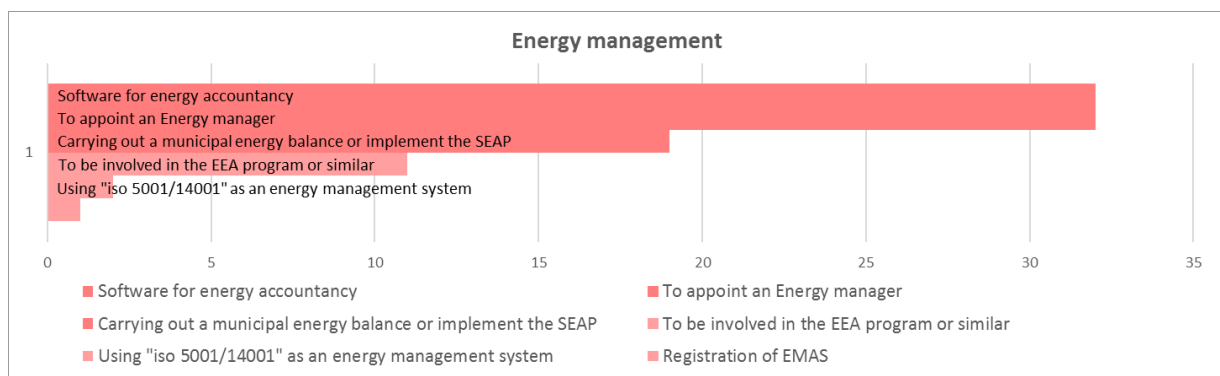


Figure 3: Most actions applied within the field of Energy management

In the awareness campaign macro area have been included all the actions aiming in producing a behavioral change in citizens. The main action listed in the SEAPs are:

1. **Informative campaigns for climate and environmental issues (CO₂ reduction etc.),** in other words campaigns aimed to educate the population and the internal staff of the municipalities trough events and fairs.
2. **Environment, climate and energy education in schools** i.e. the promotion of a different and more sustainable life style (use of energy) in the youngest generations.
3. **Informative campaigns about climate change (webpages, articles, flyers),** this action includes all the campaigns aiming at educating the population only trough media and press.
4. **Promotion of green purchases,** the creation and the use of guidelines for green purchase in the public procurement procedure.
5. **Energy consulting:** create an info-point where citizens can have a free-consultancy on energy issues (i.e contracts, findings, technology).

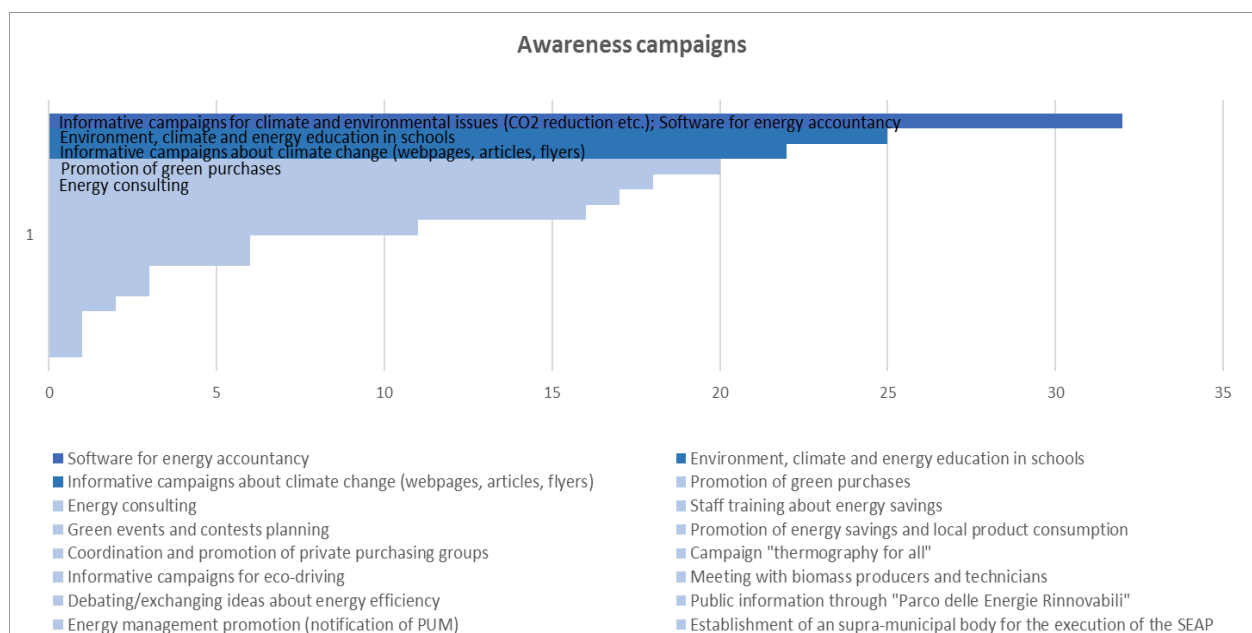


Figure 4: Most actions applied within the field of Awareness campaigns

Another topic arose in the analysis of the SEAPs is the public lightening, in this which the main actions listed are:

1. **Intervention in the public lighting sector**, which often includes the implementation of a public lighting plan.
2. **Replacing public lighting with LED** which helps in reducing the costs and the consumption of the PL though the installation of new public street lamp.
3. **Flow regulators for public lighting**: installation of flow regulators for public lightening in order to reduce the lighting pollutions and costs related.

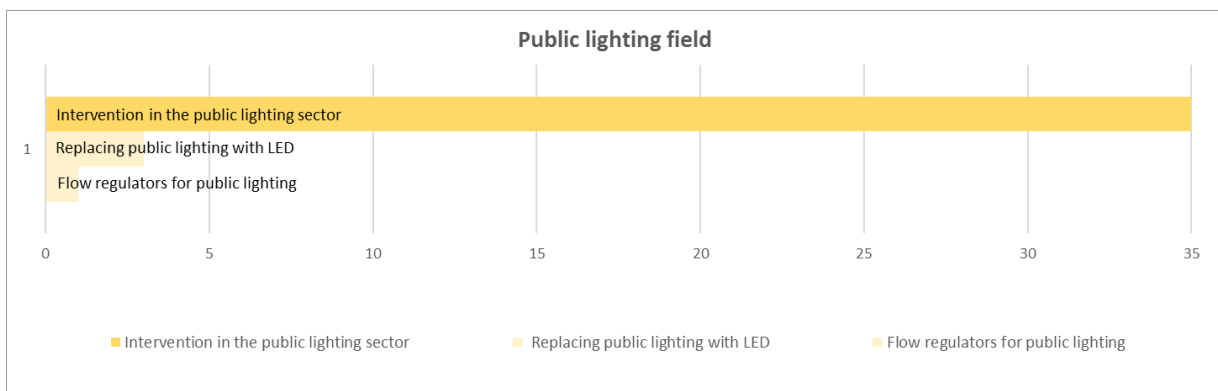


Figure 5: Most actions applied within the field of promotion public lighting

Furhermore, another topic which has been considered in the different energy plans is the promotion of renewable energy sources, which includes measure such as:

1. **Promotion of the photovoltaic system**
2. **Increasing the district heating network.**
3. **Installation of solar thermal systems on residential buildings.**
4. **Replacement of the existing heating systems with the renewable energy systems**
5. **Promotion of biogas and biomass system to produce electrical and thermal energy.**

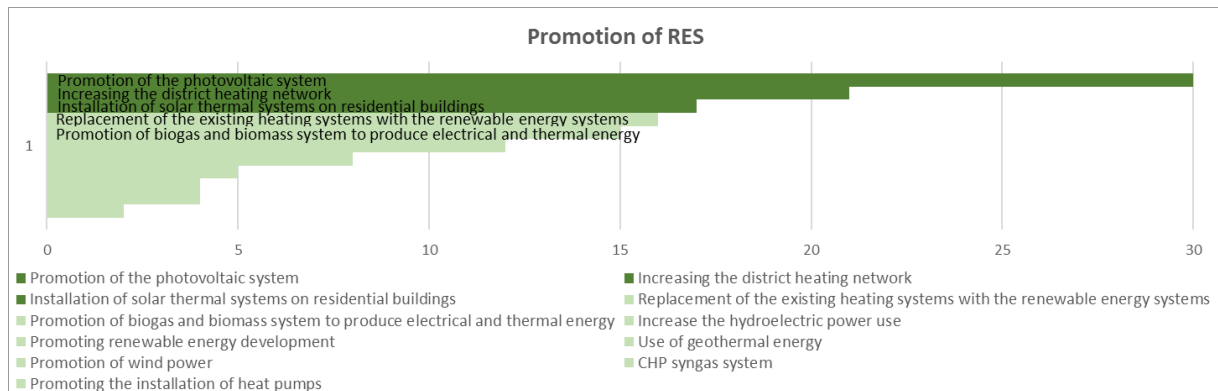


Figure 6: Most actions applied within the field of promotion of RES

Despite not really related to energy issues, another marginal topic mentioned in the plan of action is the mobility, since it is one of the main causes of CO₂ emissions. However, it is important to notice that often municipalities cannot really have an impact on this sector because it is a competence of provinces or regions. In this field the most common action mentioned are:

- 1. Promoting traffic reduction (pedestrian areas etc.).**
- 2. Promotion of low emission cars, by buying new cars.**
- 3. Development of Cycling lanes.**
- 4. Municipal mobility plan.**
- 5. Implementation of a car sharing system.**

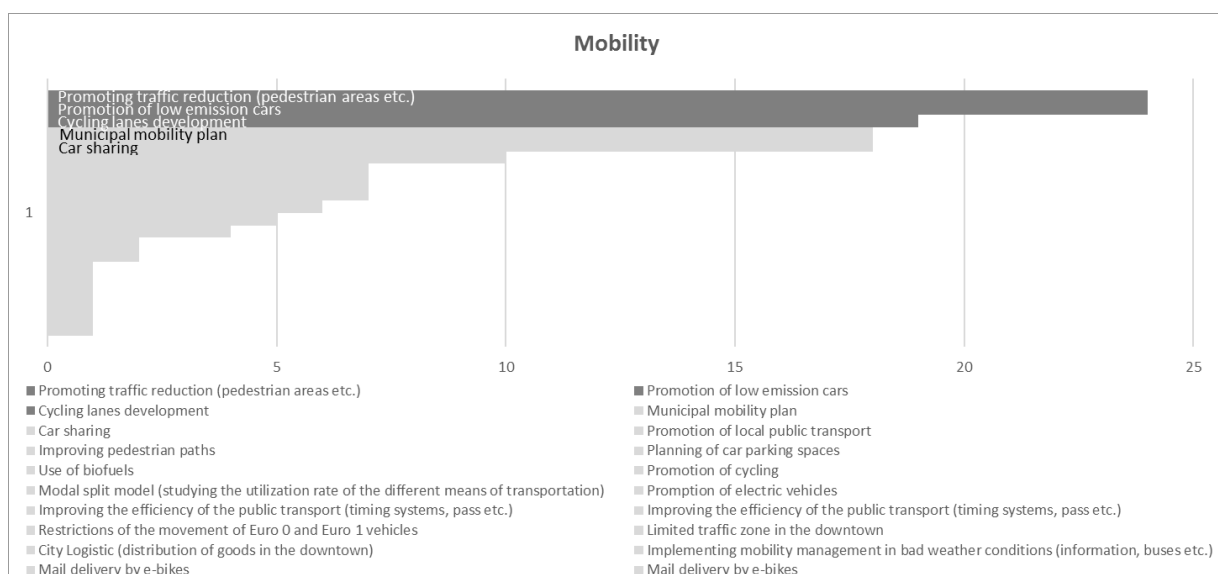


Figure 7: Most actions applied within the field of mobility

As mentioned in figure 8, the most mentioned action field is the energy management, followed by the public lightening; at the third place we can find the promotion of RES, then the awareness campaigns, followed by the sustainable mobility and finally the energy efficiency improvement in public and private building. As mentioned in the methodology, the results have been normalized and are based on all X's given to the possible measures from all municipalities in each action field.

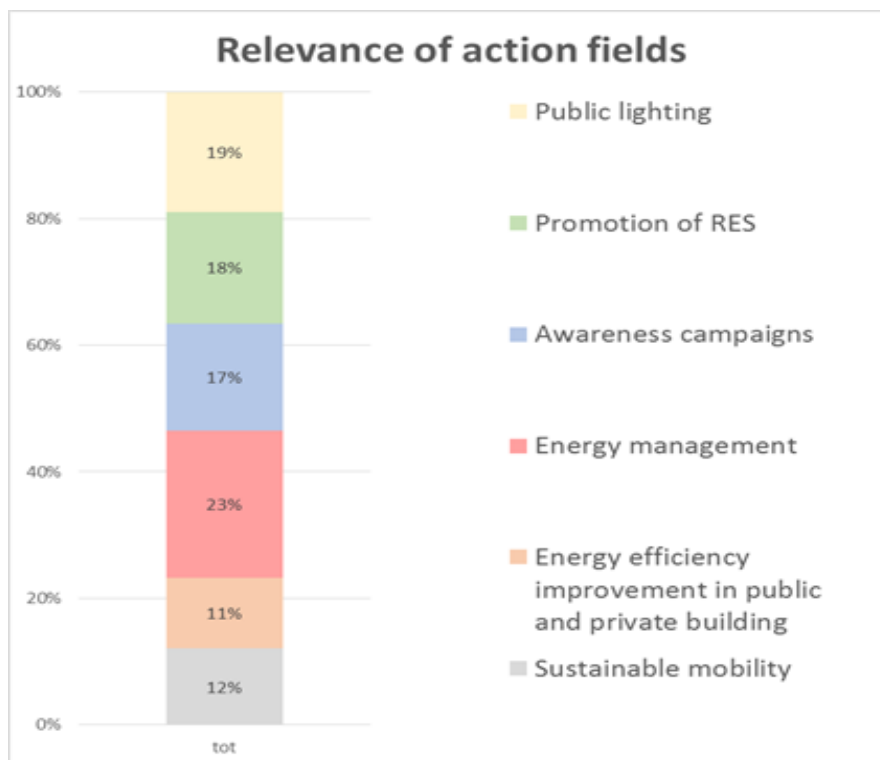


Figure 8 Results of the desk research

In the following figure (9, 10 and 11) the different action fields are represented as a function of municipality size, degree days and countries. Through this categorization it becomes visible whether there is any correlation between the relevant action fields and the prescribed categories.

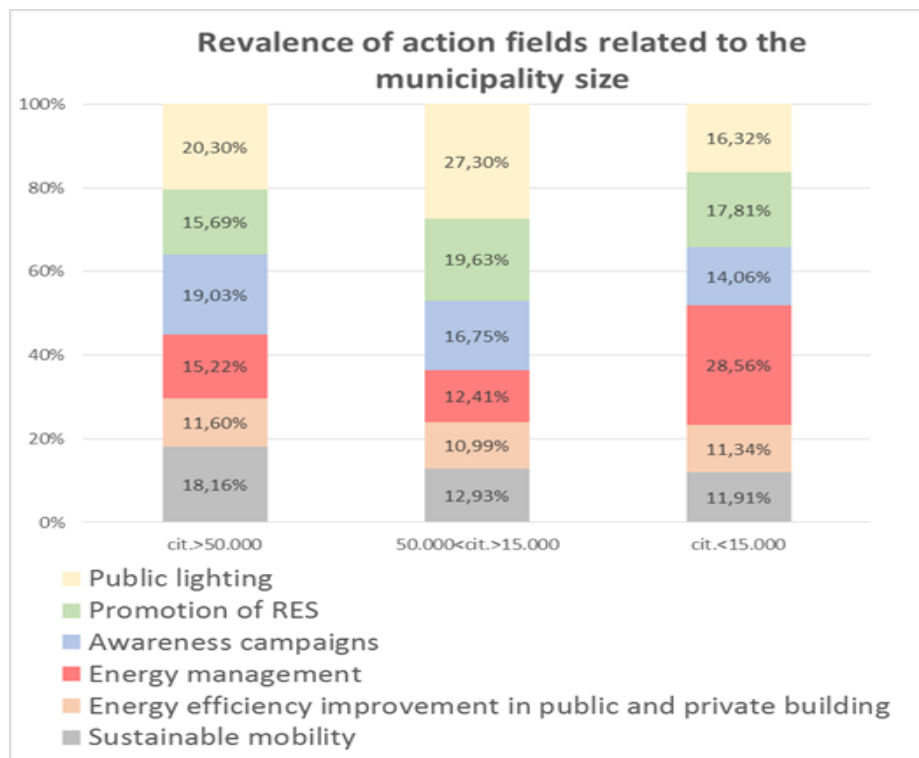


Figure 9 Relevance of action fields related to the municipality size

The two main statements you can derive from figure 9 are: “the bigger the municipality the more relevant is the action field sustainable mobility” and “the smaller the municipality the less important is the action field awareness campaigns”. The percentage in the action field energy efficiency is independent from the municipality size (in each size category about 11 %). What clearly can be seen, is that the action field energy management, is far more important for small municipalities in comparison to the other size categories in the diagram. This is probably due to the fact that alpine municipalities are usually smaller and characterized by harsh climate conditions and therefore, they have developed a particular attention to a more efficient energy management with a particular focus to the heating consumptions. Figure 10, which underlines the correlations between the action fields and the degree day, confirms the previous mentioned hypothesis.

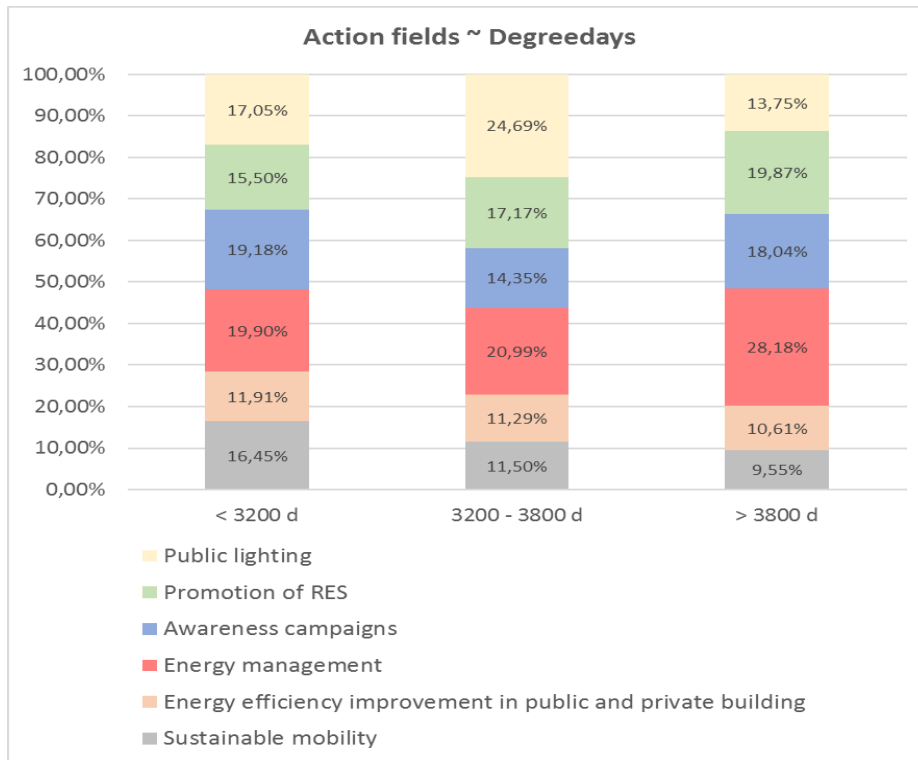


Figure 10 Relevance of action fields related to degree days

The two most relevant effects, you can see in figure 10 are that the relevance of the action fields promotion of RES and energy management increase with the number of degree days. There is also an effect in the action field of sustainable mobility. One possible explanation for the effect in sustainable mobility could be that municipalities with more degree days' focus more on energy issues, because it is more urgent for them in comparison to municipalities with less degree days. These municipalities focus more on the action fields where they can make sure they have the most CO₂-reduction and the most economic saving.

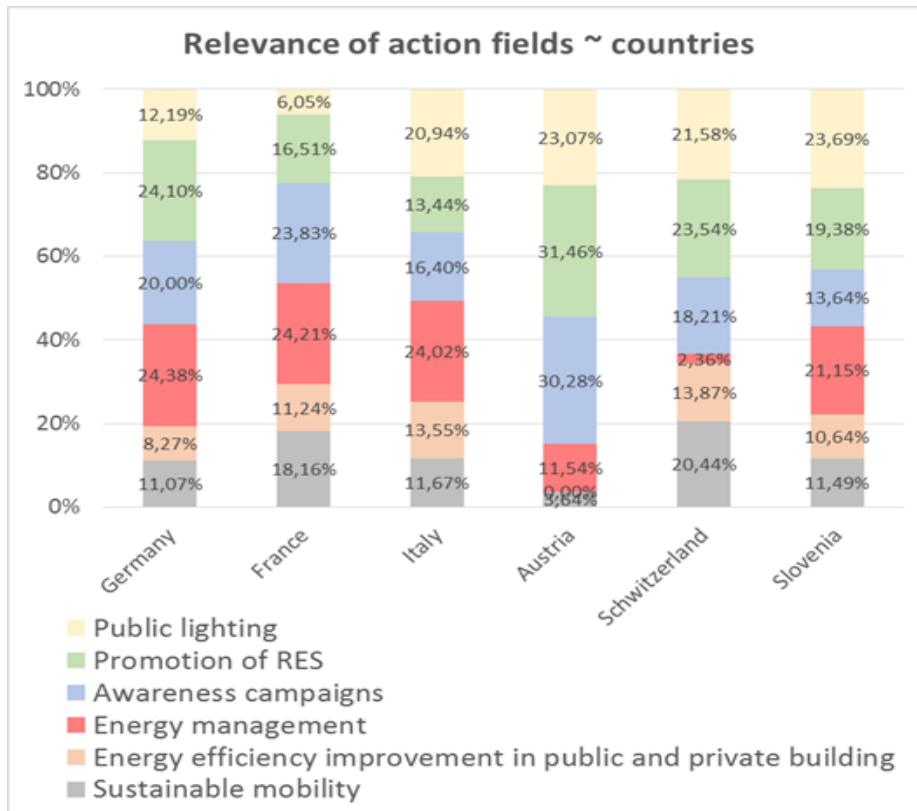


Figure 11 Relevance of action fields related to countries

Figure 11 shows that depending on the country the relevance of the different action fields differs from each other. Regarding the graphic it is important to notice that in Austria just two municipalities were evaluated. This is one possible reason, why the percentage for energy efficiency improvement in public and private building is zero, while this action field reached about 10 % in mean in the other countries.

Two further interesting results concern the correlation between the degree days and the altitude of the various municipalities, with the percentage of impact of the measures of the two action fields energy management and energy efficiency. Figure 12 and figure 13 show those municipalities with a high annual number of degree days and located at a higher altitude (with a greater need of heating systems during the year) are precisely those municipalities which have provided the greatest number of measures in the field energy efficiency of buildings. The results are valid for small, medium and large municipalities.

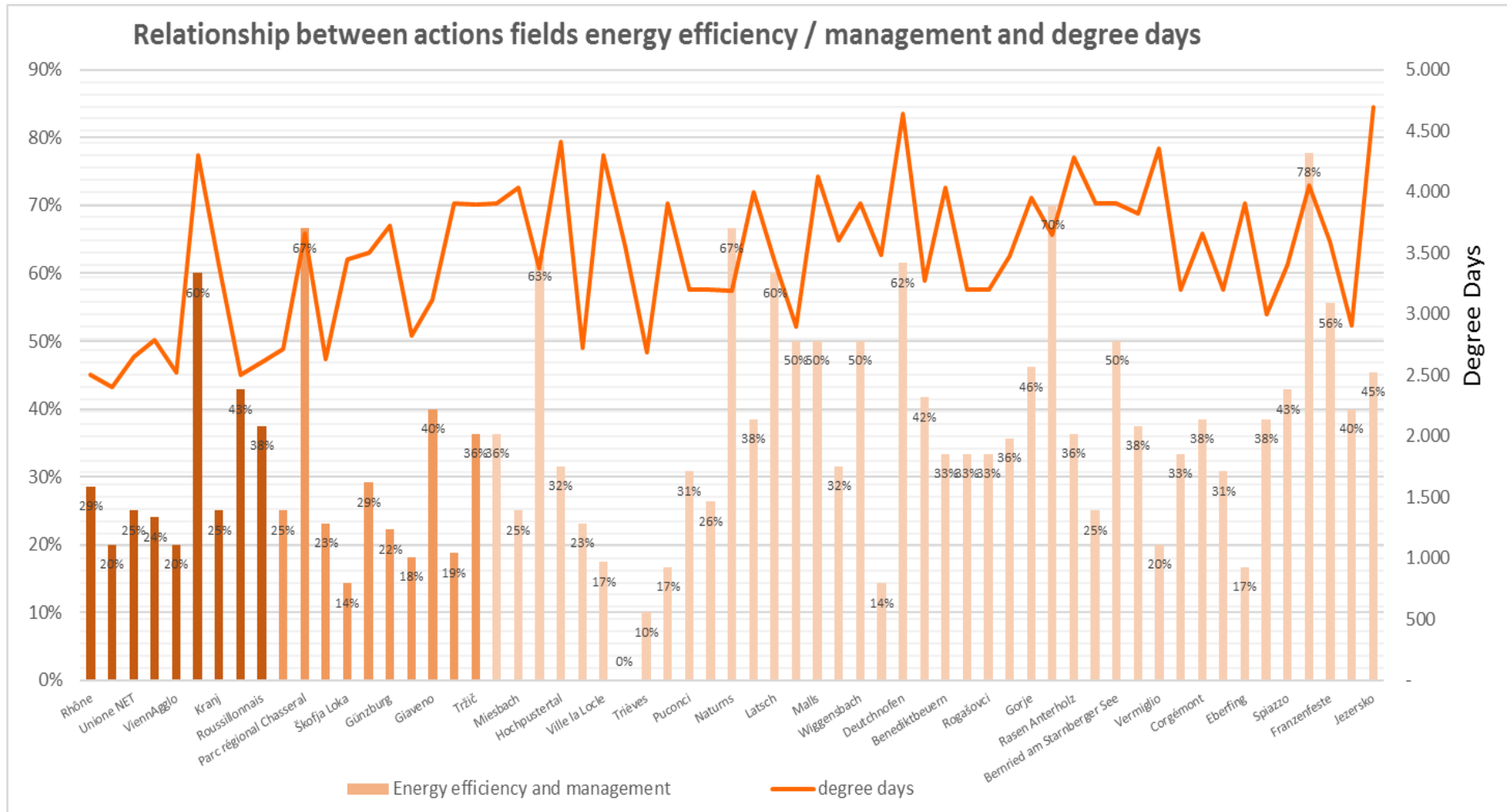


Figure 12: Relationship between energy efficiency improvement in public building and degree days (listed by municipality size)

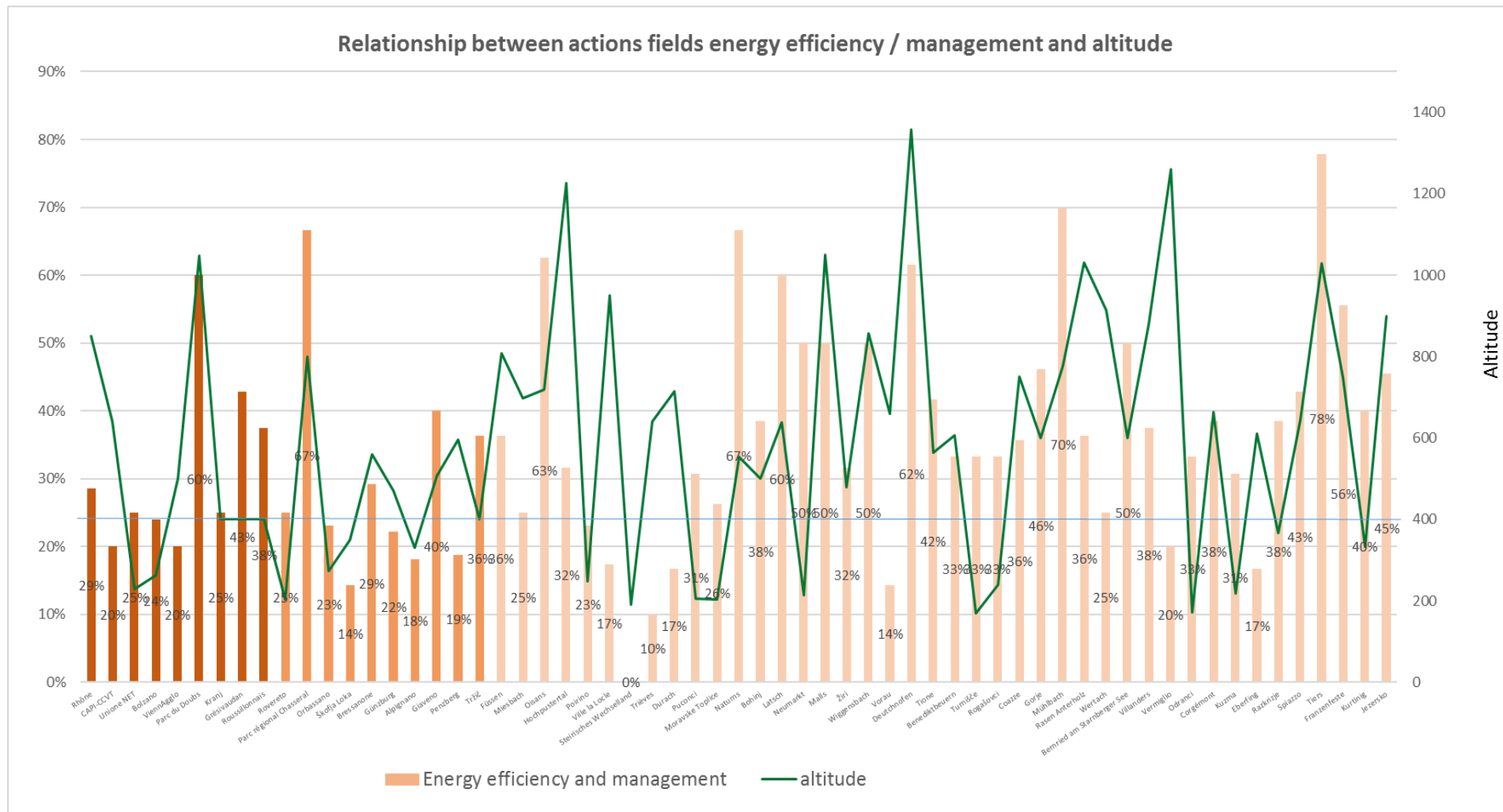


Figure 13: Relationship between energy efficiency improvement in public buildings and altitude (listed by municipality size)

2.3 Analysis/ results

As mentioned in the introduction of this document the PEACE_Alps project will address only the following topics: energy management; energy refurbishment of buildings and public light; local adaptation to climate change. Therefore, the analysis of the desk research will be focused on only four of the above mentioned action fields, which are: energy management, public lighting, awareness campaigns/adaptation to climate change, energy retrofit for public buildings. It is important to notice that the four action fields, which are in line with the project objective – cover about the 70% of the measures adopted by the municipalities surveyed. The remaining percentage is related to measures concerning sustainable mobility and development of renewable energy.

Moreover, it is important to notice that the analyzed SEAPs apparently do not provide many measures regarding the adaptation to climate change. This occurs because this issue is recently arising at the world attention. In the past, politicians and technicians were more focused on reducing the effects of climate change, whereas nowadays the climate change is a reality and the municipalities have to support the society in accepting its effects. Therefore, only recently, municipalities are considering to include measures linked to the adaptation to the climate change in their SEAPs, while the measures the municipalities have undertaken until now were mainly focused on climate change reduction. Nevertheless, since many SEAPs involve the implementation of awareness campaigns and education in schools as well as training courses for employees, if the topic addressed concern preparing people to climate change, they can fall under the macro-area of adaptation to climate change.

With reference to the four areas of action identified by the desk research and relevant to the project, the most actions implemented by municipalities are those shown in Table 4 and Figure 15 in which the measures are listed according to the preferences of the municipalities analyzed in the research.

These measures can be considered as the main needs of the municipalities, defined through the desk research in the PEACE_Alps project area.

N° of applications	List of actions
35	Intervention in the public lighting sector
3	Replacing public lighting with LED
1	Flow regulators for public lighting
32	To adopt a software for energy accountancy
32	To appoint an energy manager
19	Carrying out a municipal energy balance or implement the SEAP
11	To be involved in the EEA program or similar
2	Using "ISO 5001/14001" as an energy management system
34	Informative campaigns for climate and environmental issues (CO ₂ reduction etc.)
25	Environment, climate and energy education in schools
22	Informative campaigns about climate change (webpages, articles, flyers)
20	Promotion of green purchases
18	Energy consulting
35	Energy refurbishment plan for public buildings
28	Energy audits for municipal buildings/energy certification
27	To adopt measure in urban development planning and in land-use planning
16	Replacement of the lighting in public buildings
12	Energy efficiency incentives

Table 4: List of the most planned actions into the four action fields

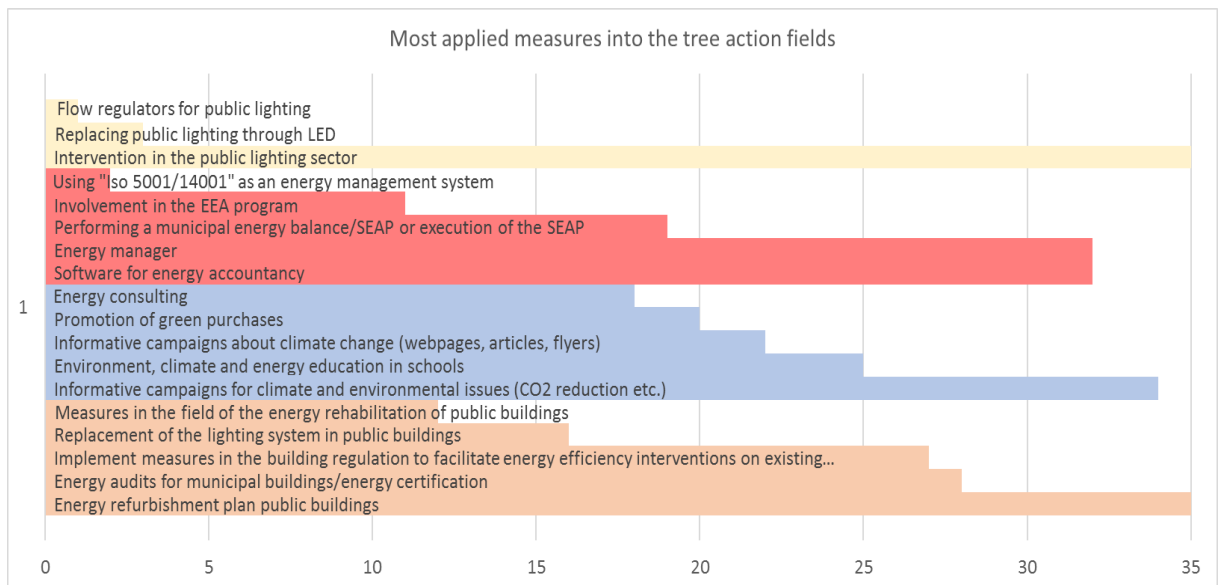


Figure 14: List of the measures applied in the four selected action fields (energy management, awareness campaigns, energy efficiency improvement in public building, public lighting)

3 Previous Projects

After having defined the needs of the LAs, the project aims to find possible standardized solutions, for this reason an analysis of the instruments and tools useful to answer the local need of the Local Authorities developed by a series of EU projects has been carried out.

3.1.1 ENERGY ACTION PLANNING

3.1.1.1 LEAP

Objective:

The LEAP project aimed to foster and to build the capacity of EU local authorities as key actors in speeding up the local uptake of sustainable energy measures and the move towards a low-carbon economy. This happened through the direct exchange of experiences in sustainable energy action planning and implementation between local authorities, focusing on professional and political leadership, skills and knowledge, creating clear policy messages and gaining community and stakeholders support.

Results:

The LEAP project has developed a peer learning methodology including a combination of three elements: shadowing visits, peer review and mentoring.

3.1.1.2 eRENeT

Objective:

The objective of the project was to add value to local actions in rural communities, and supporting them in the development, implementation and monitoring of their Sustainable Energy Action Plans (SEAPs) and capacity building of the related actors, through knowledge transfer from experienced communities.

Results:

The main result of the project is the methodology used by the partnership to define the local needs. The results of the project have been taken into account while writing this desk research.

3.1.1.3 SEAP ALPS

Objective:

The project SEAP_Alps aimed to support local authorities in the development and implementation of Sustainable Energy Action Plans (SEAPs). Within the project, a guideline for the implementation of Sustainable Energy Action Plans has been developed with a special focus on the features of the Alpine Space communities: often small and medium cities with economies based on tourism. The SEAPs are being implemented and evaluated in more than thirty pilot communities of different Alpine regions.

Results:

In the project a tool has been developed that can be used by the several municipalities in order to prioritize the measures in which they want to invest. On the website it is possible to choose an area of intervention and a sub-area. Each of these sub-areas of intervention has an info-sheet that describes the action and the CO₂ saving potential, the estimated costs for a municipality, the ratio of cost-benefit and the implementation time frame.

3.1.1.4 Data4Action

Objective:

The general purpose of Data4Action was the establishment of long-term data exchange models in sustainable energy planning, through a cooperation between public authorities and energy data providers. Long term collaboration models have been implemented through bilateral data exchange cooperation agreements and with the development of twelve regional observatories, representing more than five thousand municipalities.

Results:

The most important result of the project was the creation of a general database and the creation of a network within the data center, that all the stakeholders can address in order to obtain practical information.

3.1.1.1 COOPENERGY

Objective:

COOPENERGY, financed by the Intelligent Energy Europe Program, supports the development of more effective collaboration between regional and local public authorities in

order to maximize positive energy planning outcomes and accelerate reduction of greenhouse gases

Results:

The project has collected a set of best practice examples of multi-level governance collaboration, in order to explain how local and regional authorities across Europe have collaborated with each other in order to develop and to deliver Sustainable Energy Action Plans (SEAPs) and initiatives. A database is available on the website.

3.1.1.1 ENNEREG PROJECT

Objective:

The aim of ENNEREG has been to establish and to inspire EU Regions to take up the challenges of fulfilling the EU 20-20-20 climate and energy targets of at least 20% reduction in greenhouse gas emissions, 20% of increase in energy efficiency and 20% of energy from renewables by 2020.

Results:

The main output of the project is the Regions 202020 Inspiration Guide, based on experiences from the ENNEREG Pioneer Sustainable Energy Regions. The guide aims to provide all the information that the regions need in order to become a Sustainable Energy Region. The Inspiration Guide provides examples of other activities that may be replicated.

3.1.1.2 CONURBANT

Objective:

CONURBANT starts from the consideration that EU small towns face strong difficulties in **energy management** and planning because of their lack of skills and resources, while medium and large cities have higher responsibility, due to their higher density of human activities. They also face more complicated issues concerning sustainable land using, planning and mobility.

The CONURBANT project aims at helping medium-large cities as well as the smaller towns in their urban area, through capacity building, using peer-to-peer support and training between less and more experienced municipalities, in the framework of the CoM.

Results:

The main result of the project is the “Toolbox of Methodologies on Climate and Energy”, which can be used by local governments across Europe within their commitment in sustainable energy planning and actions. The toolbox provided guidance and advice to develop or to further improve Sustainable Energy Action Plans (SEAPs).

3.1.2 ENERGY MANAGEMENT

3.1.2.1 COME

Objective:

The aim of the project was the creation of simple tools that communities can use to rate their "de-fact" situation and to use it to implement measures on energy savings.

Results:

The main output of the project is a catalogue that all municipalities can use in order to define their starting point in their path of efficiency, as well as a list of measures that they can realize in order to achieve their goals.

3.1.3 PUBLIC LIGHTING

3.1.3.1 ENERCLOUD

Objective:

ENERCLOUD was a project aimed to monitor the energy consumption in buildings and public lighting systems by reading the bills. Indeed, the lack of a structured system of energy accounting used by the public administration is a critical element that results in excess energy consumption and economic costs.

Results:

The proposed solution can inspire other regions to develop similar instruments in order to register the energy consumption for a municipality using their bills. The tool could help LAs to identify potentially abnormal situations.

3.1.4 AWARENESS CAMPAIGNS / ADAPTATION TO CLIMATE CHANGE

3.1.4.1 Cities on Power

Objective:

“Cities on Power” promoted the use of renewable energy in urban areas. The four participating cities and regions: Warsaw, Klagenfurt, Ravenna and Turin, prepared together local action plans to boost renewable energy.

Results:

In the project an interactive tool has been delivered to support citizens in the decision making, as far as concerns new ways of energy supply. In this way the citizens could become on site investors of the renewable energy field.

In order to involve more stakeholders, the tool developed is divided in 4 topics:

- A communication instrument, which is suitable to raise awareness and acceptance.
- An IT-Toolbox with digital maps like a solar cadastral in order to support the decision making of investments in renewable energies
- A financial instrument in order to gather together alternative ways to bundle resources (e.g. capital, knowledge).
- A participation model like energy cooperatives or public power plants. Thereby people get the chance to invest in renewable energy plants or infrastructure together.

The interactive maps can be used only by the citizens of the participating cities whereas all the other instruments can be used in the whole alpine space.

3.1.4.1 Energo Optimun

Objective:

The main purpose of the Energo Optimun was to establish a cross border partnership aiming to foster energy efficiency of the region (especially in private buildings); based on the following pilot actions: IR (Infrared) audits of the buildings, analysis of energy efficiency in the industry/business, presentation of possible solutions on the virtual building-model, establishment of the dissemination base, implementation of dissemination products and establishment of interactive advisory centers.

Results:

The main results of the projects can be re-used in awareness campaigns. The project partners have created a set of education programs and e-materials for households, public and economy sectors, a mobile exhibition on topics concerning energy efficiency as well as a children education camp, with the construction of the model house E-plus. The project has finally established a cross border advisory center with an interactive advisor and two energy offices as well as a printed coloring book about energy savings.

3.1.4.1 Mountee

Objective:

The project «MountEE – Energy-efficient and sustainable building in municipalities in European mountain regions» supported communities in Sweden, the Alps and the Pyrenees in order to help them to achieve their objectives and to transform them into front runners. In six regions, about 30 public building have been built or renovated in sustainable and energy efficient way. Also, innovative practices have been carried out in order to improve the way to reach efficiency."

Results:

The main results of the project can be reused in awareness campaigns at regional, national and local level in order to explain the advantages of sustainable buildings, i.e. why building sustainable buildings, and what and who is needed to construct such buildings.

3.1.5 ENERGY RETROFITS FOR PUBLIC AND PRIVATE BUILDINGS

3.1.5.1 CASCADE

Objective:

CASCADE was a three-year project (2011-2014) of networking and peer-to-peer learning on local energy leadership. It supported cities in delivering the Europe 2020 targets for energy and climate change. The project focused on three thematic areas: **energy efficiency in buildings & districts; renewable energy sources & distributed energy generation; energy in urban transport.**

Results:

The main output of the project is the toolkit available on the website. This toolkit aimed to offer inspiration and guidance to city experts and decision makers on how to improve the implementation of climate change and energy policies in their cities. It consists of two sections: a library of peer-to-peer learning tools and a collection of good practices. In the first case, the library presents the four peer-to-peer learning methods tested in the project: peer review, mentoring, work shadowing and study visits. The collection presents the experience and the knowledge shared between the cities which participated in CASCADE peer-to-peer learning and networking activities.

3.1.5.2 2020Together**Objective:**

The project aimed to implement strategies and territorial plans to support the energy efficiency of public buildings and lighting lines, as well as the energy production from renewable sources, through the design and the implementation of new financial support to the implementation of investment strategies.

The main actions envisaged were:

- energy audits to identify which public buildings were the more suitable candidates to be refurbished.
- involvement of small and medium enterprises and their incentive to set up business groups to participate in large contracts;
- research and promotion of new contractual arrangements, in line with the guidelines of the Energy Performance Contracting, as well as finding new opportunities for financial support through the search for private investors;

Results:

The most important result of the project, likely to be reused in the alpine space, is the research on contractual arrangements and the definition of new opportunities for financial support in order to finance the measures described in SEAPs.

3.1.5.1 CABEE

Objective:

CABEE is a transnational Alpine project aimed to create and to implement an Alpine-wide guideline for definition, procurement, production, assessment, promotion and learning about new and refurbished Nearly-Zero-Emission-Buildings (NZEB) and their neighborhoods.

Results

The common output is the establishment of an internet-based open-source support which sums up the results of on-going studies and experiences in EU-projects. The Alpine-wide Guideline ([CESBA](#)) is a basis for the hub.

3.1.6 PROMOTION OF RES

3.1.6.1 ENSURE

Objective:

It develops innovative approaches to raise energy efficiency through urban development and rehabilitation of the building stock.

Results:

The main results of the project were:

- Contracting models that offer recommendations on central topics. Those should be taken into account for structuring a transnational contracting model to boost investments in energy efficiency and renewable energy projects.
- Guidelines of innovative financial schemes, in order to support the dissemination of Renewable Energy Sources (RES) and Energy Efficiency (EE) technologies
- Guidance for Energy Smart Buildings
- Policy recommendations, which summarize the political actions and recommendations promoting an energy efficient urban development.

4 Financing Tools

Due to the extremely large impact of climate change and to the shared need of European countries to take concrete measures on this matter, the European Union makes available several support plans which aim to finance energy related programs and to help coordinating joint actions, by coupling research and innovation.

Below, there is a short description of the main European funds available in the area of energy efficiency, as well as their main areas of investment and their funding criteria.

4.1.1 EEEF (European Energy Efficiency Fund)

EEEF is an innovative public-private partnership dedicated to mitigate climate change through energy efficiency measures and the use of renewable energy in the member states of the European Union. It focuses on financing energy efficiency, small-scale renewable energy, and clean urban transport projects (at market rates) targeting municipal, local and regional authorities and public and private entities acting on behalf of those authorities.

EEEF's areas of intervention are: energy saving, energy efficiency, renewable energy sources and clean urban transport.

The final beneficiaries of EEEF are municipal, local and regional authorities as well as public and private entities acting on behalf of those authorities such as utilities, public transportation providers, social housing associations, energy service companies etc.

Investments can be made in Euro, or local currencies, however the latter is restricted to a certain percentage. To reach its final beneficiaries, EEEF can pursue direct investments or investments into financial institutions.

4.1.2 JESSICA – Joint European Support for Sustainable Investment in City Areas

JESSICA supports sustainable urban development and regeneration through financial engineering mechanisms. EU countries can choose to invest some of their EU structural fund allocations in revolving funds to help recycle financial resources to accelerate investment in Europe's urban areas.

Jessica's areas of intervention are urban infrastructure, heritage of cultural sites, redevelopment of brownfield sites, creation of new commercial floor space, university buildings and energy efficiency improvements.

Contributions from the European Regional Development Fund (ERDF) are allocated to Urban Development Funds (UDFs), which invest them in public-private partnerships or other projects included in an integrated plan for sustainable urban development. These investments can take the form of equity, loans and/or guarantees.

Alternatively, managing authorities can decide to channel funds to UDFs using Holding Funds (HFs), which are set up to invest in several UDFs. This is not compulsory, but does offer the advantage of enabling managing authorities to delegate some of the tasks required to implement JESSICA to expert professionals.

Owing to the revolving nature of the instruments, returns from investments are reinvested in new urban development projects, thereby recycling public funds and promoting the sustainability and impact of EU and national public money.

4.1.3 Horizon 2020

Horizon 2020 is the biggest EU Research and Innovation program ever with nearly €80 billion of funding available over 7 years (2014 to 2020) – in addition to the private investment that this money will attract.

Europe's leaders and the Members of the European Parliament agreed that research is an investment in our future and so put it at the heart of the EU's blueprint for smart, sustainable and inclusive growth and jobs. By coupling research and innovation, Horizon's goal is to ensure Europe produces world-class science, removes barriers to innovation and makes it easier for the public and private sectors to work together in delivering innovation.

Horizon's areas of intervention are excellent science, industrial leadership, societal challenges, spreading excellence and widening participation, science with and for society, cross cutting activities, fast track to innovation pilot, European Institute for Innovation and Technology (EIT), Euratom and smart cyber-physical systems.

Funding opportunities under Horizon 2020 are set out in multiannual work programs, which cover the large majority of support available. The current main Horizon 2020 work program comprises an introduction, 18 thematic sections and the general annexes describing general rules such as standard admissibility conditions and eligibility criteria, types of action, selection and award criteria, etc. Each thematic section is self-contained, and describes the overall objectives, the respective calls for proposals, and the topics within each call.

4.1.4 ELENA (European Local Energy Assistance)

ELENA is part of the EIB's (European Investment Bank) broader effort to support the EU's climate and energy policy objectives. This joint EIB-European Commission initiative helps local and regional authorities to prepare energy efficiency or renewable energy projects. It is on track to mobilize more than EUR 1.6bn in investments over the next few years.

ELENA's area of intervention are retrofitting of public and private buildings, sustainable building, energy-efficient district heating and cooling networks, environmentally-friendly transport etc.

Technical assistance supported by the ELENA facility can be provided to a local or regional authority or other public body or a grouping of such bodies.

ELENA covers up to 90% of the technical support costs needed to prepare, implement and finance the investment program. This could include feasibility and market studies, program structuring, energy audits and tendering procedure preparation. With solid business and technical plans in place, this will also help attract funding from private banks and other sources, including the EIB.

ELENA assistance may facilitate access to EIB finance or finance from another bank. It is possible to make the first contact by telephone, fax, e-mail or letter. First contact includes a brief description of the planned investment (e.g. type of investment, approach to implementation), the expected investment cost and time schedule for the program, plus the amount, scope and main needs to be addressed by the requested technical assistance.

5 Categorization of LAs

In order to make useable the results of the desk research in the whole alpine area, it is important to categorize the municipalities. According to the findings of the desk research, the municipalities can be categorized in three main categories. The indicators are: the number of inhabitants, the climate stiffness and altitude, of course the altitude and climate harshness are strongly related.

- 1. Categorization
 - Small: inhabitants < 15.000
 - Medium: 15.000 < inhabitants < 50.000
 - Big: inhabitants > 50.000
- 2. Categorization
 - Harsh climate: degree Day > 3.200
 - Mild climate: degree Day < 3.200
- 3. Categorization
 - Harsh climate: altitude > 450 m asl
 - Mild climate: altitude < 450 m asl

6 Conclusion

The desk research had the objective to identify and define, through a bottom up approach, the basic needs of the municipalities of the project participants in the Alpine regions in achieving the objectives of reducing CO₂ emissions.

The results of the desk research show in which action fields the municipalities have prioritized their needs and where they have decided to focus their attention in order to reduce their CO₂ emissions. The action fields identified by the desk research and in line with the purposes of the project are: energy management, public lighting, awareness campaigns/adaptation to climate change, energy retrofits for public buildings. For each action field the most commonly planned measures have been identified (see figure 15) by the municipalities, which can therefore be considered as primary requirements to meet the CO₂ reduction targets. The most chosen measures are listed below:

- Intervention in the public lighting sector
- Replacing public lighting with LED
- Flow regulators for public lighting
- To adopt a software for energy accountancy
- To appoint an energy manager
- Carrying out a municipal energy balance or implement the SEAP
- To be involved in the EEA program or similar
- Using "ISO 5001/14001" as an energy management system
- Informative campaigns for climate and environmental issues (CO₂ reduction etc.)
- Environment, climate and energy education in schools
- Informative campaigns about climate change (webpages, articles, flyers)
- Promotion of green purchases
- Energy consulting
- Energy refurbishment plan for public buildings
- Energy audits for municipal buildings/energy certification
- To adopt measure in urban development planning and in land-use planning
- Replacement of the lighting in public buildings
- Energy efficiency incentives

Those measures have to be considered such as a list of the compressive needs of the LAs and will be taken into consideration in the implementation phase (WP4/WPT3) by the different PPs.