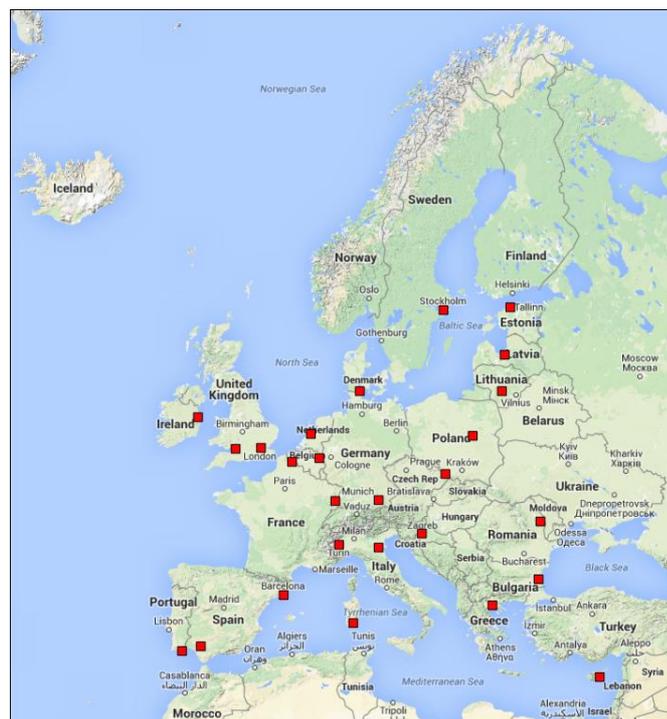


## JRC SCIENCE FOR POLICY REPORT

# The Covenant of Mayors: In-depth Analysis of Sustainable Energy Actions Plans

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**Abstract**

As part of the European Commission's Covenant of Mayors Initiative, the European Commission's Joint Research Centre has carried out an in-depth analysis of selected sustainable energy action plans (SEAPs). Based on a sample of 25 cities from different EU Member States, the study seeks to identify and extract the common and most important characteristics of how local authorities across Europe are developing and implementing this policy. The study examined the strategies used by different local authorities in their SEAPs, with specific analysis of methodology, policies, governance, external support and regional and national characteristics. This gives us a picture of the strengths and weaknesses of different cities in their attempts to reduce their total GHG emissions by 2020.

The study focuses on two types of Covenant signatory:

- cities already involved in climate, air quality, sustainability and energy plans who adapted their plans to the Covenant requirements
- cities for which the Covenant was the point of departure for developing strategies to decrease their total emissions.

Just as important are the conclusions drawn by the study, which cover areas such as:

- best practices
- circumstances favouring the adoption and implementation of local sustainable energy policies
- small municipalities' need for external support in developing their SEAP
- the result of signatories joining forces to develop their SEAPs
- the role of the covenant territorial coordinators (CTC) within the initiative.

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## Executive summary

The Covenant of Mayors brings together local and regional authorities across Europe, who gives a voluntary commitment to implement energy, climate mitigation and sustainability policies on their territories. The initiative, which currently involves more than 6 000 municipalities, was launched after the adoption in 2009 of the EU Climate and Energy Package. The Covenant's aim is to endorse and support the crucial role played by local authorities in mitigating the effects of climate change (80 % of energy consumption and CO<sub>2</sub> emissions worldwide are associated with urban activity).

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

Municipalities joining the initiative commit to developing and implementing a sustainable energy action plan (SEAP) containing measures to reduce their energy-related emissions by at least 20 % by 2020 compared with the emissions calculated or measured in a baseline year. The in-depth study of 25 selected SEAPs seeks to identify and extract the common and most important characteristics of how local authorities across Europe are developing and implementing this mitigation policy. One way of doing this was to examine the strategies used by different local authorities in their SEAPs, specifically methodology, policies deployed, governance, external support, regional and national characteristics. The in-depth report will also provide guidance and recommendations to cities that are currently developing or considering developing SEAPs, enabling them to base themselves on the best practice identified. The selected sample is diverse enough to cover as many scenarios as possible from among Covenant of Mayors signatories. This also makes the report a useful tool for encourage new signatories.

The conclusions may be used to draw up a proposal on how to improve the overall approach for SEAP development and implementation and how to expand the initiative. The Cities' 2015 Declaration includes local leaders' commitment to the Covenant of Mayors and a pledge to achieve the EU's new 40 % CO<sub>2</sub> reduction target. In his speech at the Summit of mayors of EU capitals and large cities in Paris on March 26<sup>th</sup> 2015<sup>1</sup>, EU Commissioner Miguel Arias Cañete outlined a three-point roadmap on how to 'get there together'. This involves:

- 1) consolidating cities' role within the 2030 framework: a 'New Covenant' is to be launched on 15 October 2015; cities will be invited to endorse a new post-2020 Covenant which:
  - features a new target of at least 40% reduction in CO<sub>2</sub> emissions by 2030;
  - includes both the mitigation and adaptation pillars through the integration of the Covenant of Mayors and Mayors Adapt;
  - reinforces the external dimension of the Covenant of Mayors.
- 2) streamlining all city-related initiatives;
- 3) exporting the European model.

This report has four main chapters and five annexes:

The **introduction** describes how, six years after the launch of the initiative and at the start of the monitoring phase, the Covenant is serving as a new tool for 'rethinking' the

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<sup>1</sup> SPEECH/15/4707.

city. The introduction also sets out the criteria used to select the city sample, which covers the full spectrum of the Covenant community in terms of city size, population covered, country, region, involvement in related energy and climate initiatives, etc. and the concrete objectives of the study.

## Concrete objectives of the study

1. Identify a selected sample of municipalities that have joined the Initiative, making sure that the study covers the full spectrum of the Covenant community
2. Understand signatories' main strengths and weaknesses in developing their SEAPs
3. Highlight the key differences between countries, regions and European areas or between larger and smaller cities
4. Study the interaction and synergies with other related initiatives
5. Extract best practices adopted by the selected signatories

Chapter 2 provides a summary of the **methodology** used in the city comparative study.

Chapter 3 '**Results**' presents the main findings of the study, covering the key points such as:

- the selected reduction target by 2020;
- the signatory's inclusion of longer and shorter term reduction targets;
- the relationship and synergies with other initiatives;
- the involvement of stakeholders;
- the development and implementation of the SEAP.

The chapter goes on to analyse the approach used to develop the SEAP, focusing on the baseline year selected, the emission reporting units and/or the emission inventories calculations. The focus of the report was on extracting and selecting *effective energy measures and best practices* for each sector that offered *innovation, replicability and measurability*. When proposed as part of city action plans, these best practices and success stories may inspire other cities to sign up to the initiative.

The main findings of the **conclusions** chapter were that city size and synergy with pre-existing energy- or climate-related initiatives are of **key importance**. Especially for small cities, or cities without a climate and energy planning background, the Covenant of Mayors is not only a structured means of contributing to meeting European and national energy and climate targets, but potentially also a way of 'rethinking' the city as part of the goal of achieving a more sustainable future.

For more advanced and ambitious communities, the Covenant serves as a medium-term instrument for achieving longer-term targets. The Covenant also enables signatories to be part of an EU-wide initiative that has strong support from the Commission. By bringing more experienced signatories and 'newcomers' together, the Covenant can also help cities to learn from each other.

All the plans we examined gave great importance to the involvement of civil society and the inclusion of energy savings and RES targets; these were some of their main **strengths**.

By contrast, the main **weaknesses** lay in how the plans were implemented and monitored and in the inconsistency of data. These aspects need to be improved and reformulated in the monitoring phase.

It is difficult to determine to what extent **national policies** contributed to the achievement of reductions in emissions. Nevertheless, we found that in most cases some of the actions proposed by Covenant signatories in their SEAPs were laid down in national policy, with the local authorities' role being to implement national policies at local level. Sometimes this fact means that the city can benefit from ambitious national targets for energy efficiency in buildings and transport and the use of RES, helping it to reach its targets quicker.

The Covenant initiative is now entering its crucial monitoring phase. This will require a useful set of **indicators** to enable cities and policy-makers to track the implementation of SEAPs towards their proposed emission reductions. Monitoring also involves a continuous **assessment** study of the real progress and impact of the mitigation policy, produced each year.

## General Conclusions

1. **The main strengths of the initiative are the great importance given to the involvement of civil society and the inclusion of energy savings and RES targets.**
2. **The main weaknesses are in the management of implementation and monitoring and in inconsistent data.**
3. **City size and interaction with other initiatives are key aspects of the plans.**
4. **Best practices are highlighted by sector for every city.**
5. **The in-depth report is a useful tool, helping signatories to design their own SEAPs based on successful plans.**
6. **For more advanced and ambitious communities, the Covenant can be a medium-term instrument for achieving long-term targets.**
7. **For 'newcomers' to climate and energy planning especially, the Covenant is not only a structured means of implementing European and national rules, but also a way of 'rethinking' the city so that it achieves a more sustainable future.**
8. **National policy has a significant contribution to achieving Covenant targets at local level, but this contribution is difficult to evaluate.**

## Chapter 1. Introduction

### The Covenant of Mayors initiative: a tool helping cities to reduce CO<sub>2</sub> emissions and rethink the city to make it more sustainable

The Covenant of Mayors initiative was launched in 2009. It is a voluntary 'bottom-up' initiative that brings together a diverse group of municipalities all over Europe and beyond,<sup>2</sup> with the aim of meeting and exceeding the EU emission reduction target of 20 % by 2020.

#### Local authorities' main commitments when signing up to the Covenant:<sup>3</sup>

- **'Go beyond the objectives set by the EU for 2020, reducing the CO<sub>2</sub> emissions in our respective territories by at least 20 %, through the implementation of a sustainable energy action plan for those areas of activity relevant to our mandates. The commitment and the action plan will be ratified through our respective procedures;**
- **Prepare a baseline emission inventory as a basis for the sustainable energy action plan;**
- **Submit the sustainable energy action plan within the year following each of us formally signing up to the Covenant of Mayors;**
- **Adapt city structures, including allocation of sufficient human resources, in order to undertake the necessary actions;**
- **Mobilise civil society in our geographical areas to take part in developing the action plan, outlining the policies and measures needed to implement and achieve the objectives of the plan.**
- **An action plan will be produced in each territory and submitted to the Covenant of Mayors Office within the year following signing up;**
- **Submit an implementation report at least every second year after submission of the action plan for evaluation, monitoring and verification purposes.'**

The initiative relies on municipalities committing themselves to developing and implementing a sustainable energy action plan (SEAP). Each plan contains measures to reduce the municipality's energy-related emissions by at least 20 % by 2020 compared with the emissions calculated or measured in a baseline year. 1990 was proposed as preferred baseline, but signatories may choose any other year, if that is the first one for which they can provide reliable data. SEAPs need to comply with the 10 key principles listed in Table 1.

*Table 1 Ten key principles of the Covenant of Mayors initiative. Own source*

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<sup>2</sup> \Eastern Partnership and Central Asian Cities in the Covenant of Mayors' and \Cleaner, Energy saving Mediterranean Cities' Initiatives

<sup>3</sup> Covenant core text, [http://www.covenantofmayors.eu/IMG/pdf/covenantofmayors\\_text\\_en.pdf](http://www.covenantofmayors.eu/IMG/pdf/covenantofmayors_text_en.pdf)

## SEAP PRINCIPLES

<b>SEAP approval by Municipal Council</b>	Strong political support is essential to ensure the success of the process.
<b>Commitment to GHG reduction</b>	The SEAP must state clearly the greenhouse gas reduction target (at least 20 % by 2020).
<b>BEI</b>	The SEAP must include the results of the BEI, based on sound knowledge of the local situation in terms of energy and greenhouse gas emissions and covering the entire geographical area of the municipality.
<b>Measures covering key sectors</b>	Buildings (municipal, residential, tertiary), Transport.
<b>Long and short-term actions</b>	Goals until 2020 and detailed measures for the next three to five years.
<b>Adaptation of municipal departments</b>	Priority: identify a person/team to take responsibility for the plan, such as an energy and climate department connected to the Mayor's office.
<b>Mobilisation of civil society</b>	Describe how civil society has been involved in drawing up the SEAP and how they will be involved in its implementation and follow-up.
<b>Financing</b>	The SEAP should identify the key resources for funding the implementation of the plan.
<b>Monitoring and reporting</b>	'Monitoring Report' every second year following submission of the SEAP.
<b>SEAP submission and filling the template</b>	Municipalities should submit this within one year of joining. Uploaded in national language (or in English) + online SEAP template in English.

One of the initiative's main characteristics is its open and flexible character. Although signatories need to ensure that their scientific approach is basically sound, they have a certain degree of flexibility on technical aspects, such as:

- the approach taken to develop the BEI (i.e. the IPCC or LCA approach)
- the methodology used to measure or calculate energy consumption data
- the emission reporting unit (CO<sub>2</sub>-equivalent or CO<sub>2</sub>)
- the sectors covered among the key sectors established
- the approach to monitoring.<sup>4</sup>

It is worth noting that the Covenant is seen by the signatories not only as an energy-related initiative, but also as a way of developing local sustainable measures that will enable their city to achieve better urban planning and socioeconomic development. Energy savings, emission reduction and climate change mitigation are achieved as a result of a new organisation of the local authority and to a deeper awareness among the public. SEAPs are also used in most of the participating municipalities as a tool in the design of the urban environment.

<sup>4</sup> Guidebook: How to develop a sustainable energy action plan (SEAP).

<http://iet.jrc.ec.europa.eu/energyefficiency/publication/guidebook-how-develop-sustainable-energy-action-plan, 2010>.

## Chapter 2. Methodology

### Basis of the analysis developed for the 25 selected signatories

#### 2.1 Objectives of the in-depth analysis

The aim of this study is to carry out an in-depth analysis of the SEAPs submitted by a selected number of cities and towns that have joined the Covenant of Mayors. The analysis comes six years after the launch of the Covenant and coincides with the start of the monitoring phase. The study can help identify the way cities in Europe are implementing energy measures to achieve their specific emission reduction target by 2020.

#### Concrete objectives of the study

- 1. Identify a selected sample of cities joining the initiative, making sure that the study covers the full spectrum of the Covenant community**
- 2. Understand cities' main strengths and weaknesses in developing their SEAPs**
- 3. Highlight the key differences between countries, regions and European areas or between larger and smaller cities**
- 4. Study the interaction and synergies with other related initiatives**
- 5. Extract several best practices adopted by the selected cities**

The conclusions may be used to draw up a proposal on how to improve the overall approach for SEAP development and implementation and how to expand the initiative. The proposal may refer to the method by which municipalities join, to improving online resources generated within the initiative, to providing more robust and comparable data, or to better identifying the monitoring requirements for new signatories.

#### 2.2 Compiling the in-depth analysis sample

The purpose of the sample selection was to select a number of signatories that would cover the full spectrum of the Covenant community and provide representative SEAPs for different city sizes, countries and levels of economic development. Nine main factors were considered, as shown in Table 2, in order of priority.

Table 2 *In-depth analysis sample criteria*

<b>SAMPLE CRITERIA</b>	
<b>1</b>	City size, using the cities 2012 classification <sup>5</sup>
<b>2</b>	Population covered by the plan, in terms of country population and Covenant community
<b>3</b>	Member states
<b>4</b>	Regions (socioeconomic aspects)
<b>5</b>	Participation in related initiatives
<b>6</b>	Support provided by a CTC or not
<b>7</b>	Individual SEAPs and joint SEAPs (developed by two or more municipalities together)
<b>8</b>	Limiting factors: language, objectives of the plan outside of the Covenant's scope, lack of adaptation of pre-existing plans
<b>9</b>	Year of submission

### **City size**

As most of the energy saving measures in key Covenant sectors such as local power generation and transport depend on city size, this is the main factor we considered when compiling the sample. According to assessment studies for the Covenant of Mayors (*Cerutti et al. 2013, Kona et al. 2015*),<sup>6</sup> 88 % of the municipalities joining the Covenant are small and medium-sized towns so it is important that they are represented in the sample.

### **Population covered**

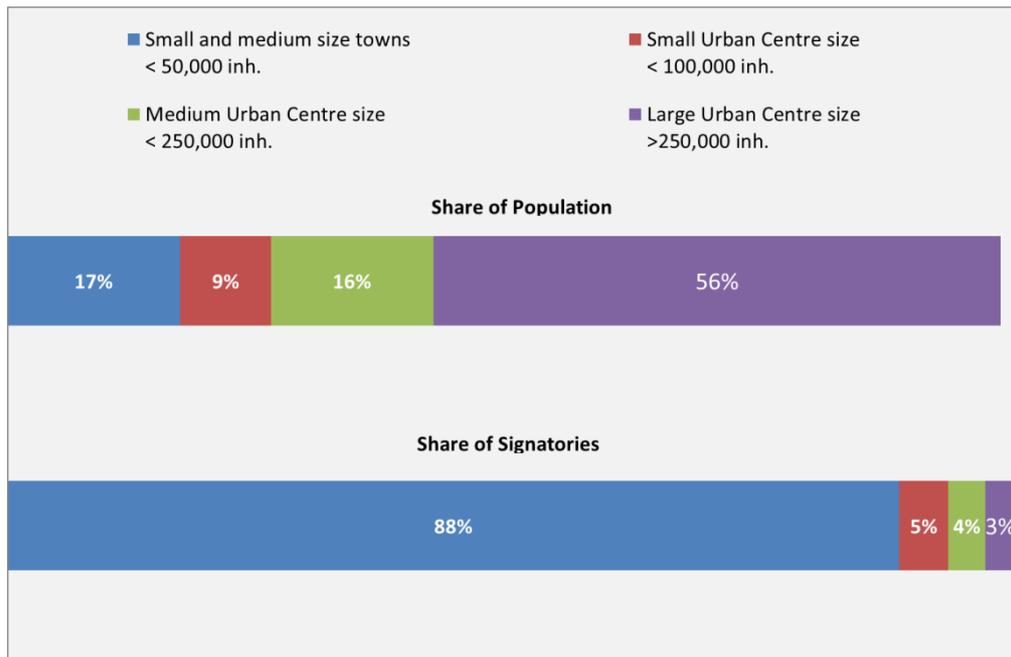
As the assessment studies mentioned above show, although large urban cities represent 3 % of the total number of signatories, they account for 56 % of the total Covenant population. This must be taken into account when compiling the sample.

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5 Cities in Europe. The new OECD-EC Definition. RF01/2012

[http://ec.europa.eu/regional\\_policy/sources/docgener/focus/2012\\_01\\_city.pdf](http://ec.europa.eu/regional_policy/sources/docgener/focus/2012_01_city.pdf).

6 Covenant dataset established in May 2014, as described in 'Covenant of Mayors: Performance Indicators – 6-Year Assessment' (Kona et al 2015).



**Figure 1. Shares of signatories' category and population, taken from the Covenant data set4 in 'The Covenant of Mayors in Figures and Performance Indicators: 6-year Assessment' (Kona et al. 2015)**

### Member states

The aim was to have the maximum number of EU member states represented in the sample, taking into account not only the number of signatories per country but also the population covered by the signatories, not only in terms of total population of the country, but also in terms of total Covenant population.

Annex 1 shows the geographical representativeness of the Covenant across Europe. This was taken into account when selecting the cities for the sample.

### Regions

'A country's regions often vary greatly in terms of their resources and GDP.. We often see more similarities between neighbouring regions from different countries than between different regions of the same country. Bearing this in mind, the report is intended to cover as many different realities as possible.

It is also necessary to include cities from all of Europe's different climate and /or economic areas. This is the only way to extract general conclusions and identify specific situations.

### Participation in related initiatives

It is often thought that cities that have already implemented a local climate and energy plan would not benefit much from taking part in the Covenant of Mayors, as they would simply end up reporting the same data again using a different template. One of the objectives of the study is to determine if a signatory's already having implemented a Covenant-related plan can generate mutual benefits for the city in question and for the Covenant movement as a whole. This study should identify ways of helping these cities to meet the Covenant's requirements without duplicating their work, as far as possible.

## Year of submission

Another assumption is that signatories that joined the initiative in its early years are generally less well prepared to join the Covenant. To assess that assumption, the sample includes signatories that submitted plans between 2009 and 2014.

## Special cases: joint SEAPs and SEAPs coordinated by a CTC

Different approaches were prepared during the initiative to take into account lessons learnt, such as the difficulties smaller towns working alone experienced in complying with the Covenant requirements. The response to these difficulties has been to set up joint SEAPs and SEAPs developed with the support of a covenant territorial coordinator (CTC<sup>7</sup>), a role officially recognised by the European Commission.

A joint SEAP<sup>8</sup> is a plan carried out collectively by a group of neighbouring local authorities. This means that the group builds a common vision, prepares an emission inventory and draws up a set of actions to be implemented both individually and jointly within the territory concerned. The purpose of a joint SEAP is to achieve institutional cooperation and joint approaches among local authorities in the same geographical area. This enables municipalities to deal with the problem of not having sufficient human and financial resources to meet the Covenant commitments. This puts them in a position to achieve better results when drawing up, implementing and monitoring their SEAP.

Covenant coordinators can be decentralised authorities, such as regions, provinces or groupings of local authorities, or national public bodies, such as national energy agencies. The coordinators play a decisive role in reaching out to local authorities in their territory. Authorities acting as CTCs commit to providing signatories with the technical, financial, administrative and political support necessary to fulfil their commitments. In fact, some CTCs have actually taken over from signatories the role of carrying out most of the technical work needed to draw up the SEAPs.

This study includes examples of both cases described above. For example, the Regional Government or 'Junta' of Andalucía (Spain), the Sardinia region (Italy) and the Province of Limburg (Belgium) all acted as CTCs, giving major support in the SEAP process, while the *Associazione Intercomunale Terre Estensi* provides an example of a joint SEAP.

## Limitations

We encountered some restrictions when selecting the sample. For example, we had to exclude some good SEAPs from the list, including some examples of interesting measures, because the cities did not follow some of the Covenant's key principles, e.g. they did not adapt their long-term target to 2020 or they rely on non-priority sectors like green areas and waste management for more than 10 % of their total reduction in greenhouse gases. Language was also a limiting factor when selecting cities from several

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<sup>7</sup> Quick Reference Guide — Grouped SEAP analysis  
[http://www.covenantofmayors.eu/IMG/pdf/Grouped\\_SEAP\\_analysis\\_guide.pdf](http://www.covenantofmayors.eu/IMG/pdf/Grouped_SEAP_analysis_guide.pdf).

<sup>8</sup> Quick Reference Guide — Joint sustainable energy action plan  
[http://www.covenantofmayors.eu/IMG/pdf/Joint\\_SEAP\\_guide-2.pdf](http://www.covenantofmayors.eu/IMG/pdf/Joint_SEAP_guide-2.pdf)

countries: this was because municipalities are allowed to submit all their documents in any official language of the European Union.

The 25 cities selected for the study based on the criteria described above are listed in Table 3 below.

**Table 3. In-depth analysis sample Own source. Note that the SEAPs selected are not meant to be considered the best SEAPs submitted, but rather as a representative group of SEAPs, selected based on the criteria described above.**

City Sample		
City	Country	Size
London	UK	Global city
Barcelona	Spain	XX Large
Lille Métropole	France	XX Large
Munich	Germany	XX Large
Warsaw	Poland	XX Large
Turin	Italy	X large
Stockholm	Sweden	X large
Zagreb	Croatia	X large
Dublin	Ireland	X large
Riga	Latvia	Large
Amsterdam	Netherlands	Large
Bristol	UK	Large
Ostrava	Czech Republic	Large
Tallinn	Estonia	Large
Burgas	Bulgaria	Medium urban centre
Faro	Portugal	Small urban centre

<b>Pylaia-Chortiatis</b>	Greece	Small urban centre
<b>Vaslui</b>	Romania	Small urban centre
<b>Larnaca</b>	Cyprus	Small urban centre
<b>Sonderborg</b>	Denmark	Small urban centre
<b>Colmar</b>	France	Small urban centre
<b>Comunita' di Ozieri Tula Erula (Sardinia Region)</b>	Italy	Under a CTC
<b>Maracena (Regional Government (<i>Junta</i>) of Andalucia)</b>	Spain	Under a CTC
<b>Lommel (Limburg Province)</b>	Belgium	Under a CTC
<b>Associazione intercomunale Terre Estensi</b>	Italy	Joint SEAP



Figure 2. Geographical sample distribution. Own source

## Chapter 3 RESULTS

The main results and general data gathered from the signatories, using the methodology described in chapter 2, are shown below.

### 3.1 Basic data

#### 3.1.1. 2020 Targets

The signatories' selected targets seem to correlate closely with their size and whether or not they had pre-existing plans and initiatives in place. The total greenhouse gas reduction targets range from standard targets of 20 % (e.g. Dublin and Tallinn) to more ambitious targets (e.g. 57 % per capita for Stockholm and 47 % for Munich).

50 % of the signatories in the sample selected a reduction target of between 20 and 30 %. The mean target selected by the cities analysed is 29.3 % and the median target is 25 %.

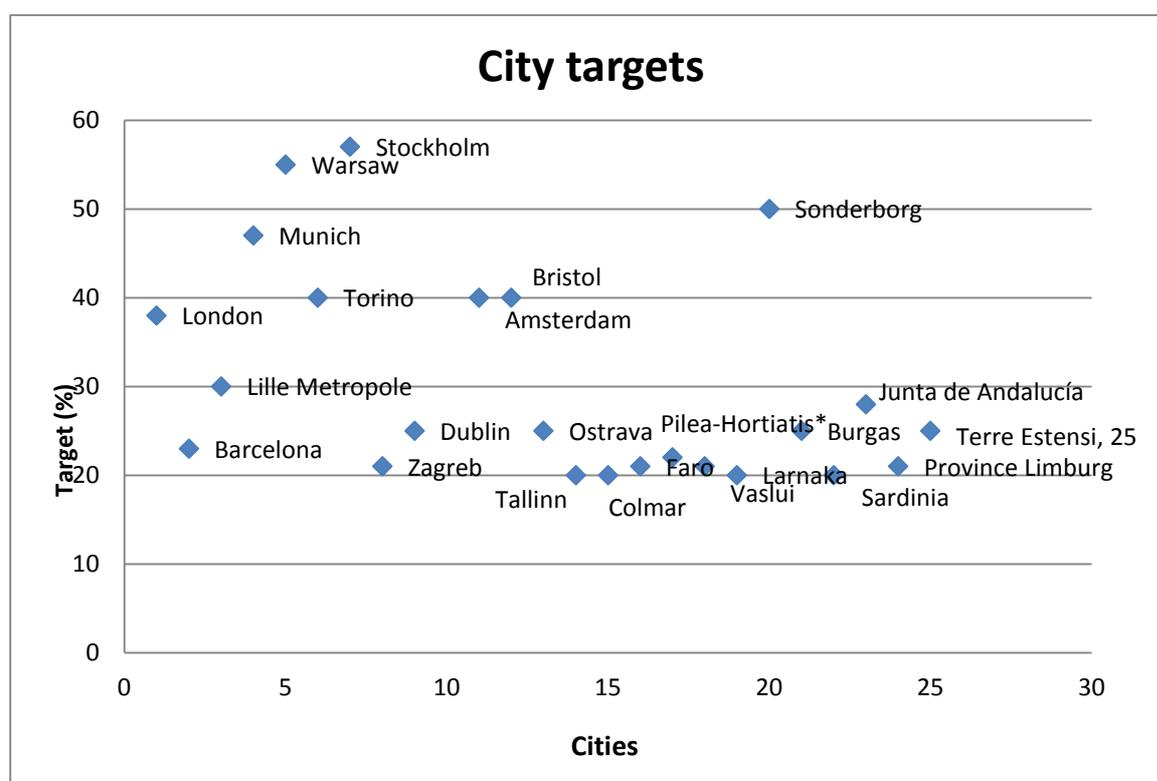


Figure 3. City CO<sub>2</sub> 2020 reduction targets

With its 50 % reduction target, Sonderborg is a special case. Although Sonderborg is a small urban centre, it is one of the signatories that is most committed to achieving a decarbonised future. By contrast, other cities, such as Barcelona, had much less ambitious 2020 reduction targets, even though they had previous initiatives in place and considerable resources at their disposal.

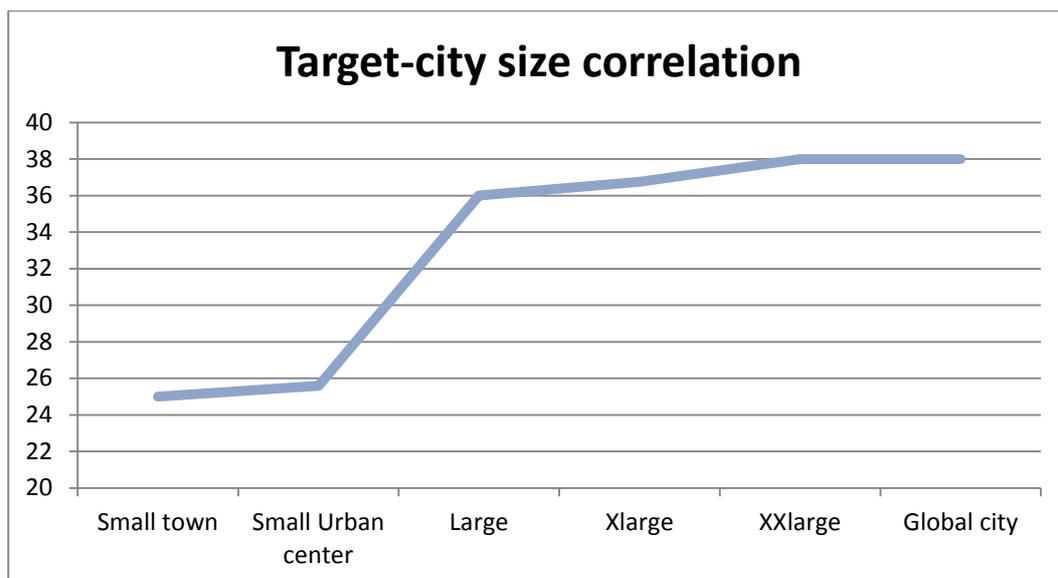


Figure 4. CO<sub>2</sub> correlation between reduction target and city size

Targets are mostly expressed in absolute terms. Only four of the signatories selected for the study (Stockholm, Barcelona, Colmar and Pilea-Hortiaris) set a per capita reduction target. One reason why some signatories selected a per capita target may have been that they had experienced a significant increase in population. This was the case for Stockholm and Pilea-Hortiaris. For example, the population of Pylaia-Chortiatis almost doubled between 1991 and 2011 because of its proximity to the Thessaloniki urban area and its touristic location.

There is some variety in the types of targets proposed in the plans: a total of 11 signatories, (44 % of the sample) included energy savings and/or renewable energy source targets in their SEAPs. Some cities, such as Barcelona, Munich and Ostrava, did not set a specific energy saving target by a given year, but rely instead on a continuous reduction in energy consumption. Stockholm and Junta de Andalucía's plans base themselves on regional or national requirements in terms of energy savings. The rest of the plans set a preferred target of a 30 % reduction in energy savings by 2020 and a RES share of 26 %.

Table 4. Sample energy efficiency (EE) and renewable energy (RES) targets

City	EE target	RES target
<b>Lille Métropole</b>	13 % by 2020	6 % by 2020
<b>Barcelona</b>	No specific target but committed to a continuous reduction in energy consumption	
<b>Munich</b>	No specific target but committed to a continuous reduction in energy consumption	
<b>Stockholm</b>	National objectives by 2021	
<b>Dublin</b>	33 % by 2020	33 % by 2020

<b>Amsterdam</b>		30 % by 2025
<b>Bristol</b>	30 % by 2020	
<b>Ostrava</b>	No specific target but committed to a continuous reduction in energy consumption	
<b>Larnaca</b>	No specific target but committed to a continuous reduction in energy consumption	
<b>Burgas</b>	26 % by 2020	26 % by 2020
<b>Junta de Andalucía</b>	Regional objectives by 2020	

### 3.1.2. The existence of long- and short-term targets

City size seems to also have a bearing on whether the signatory sets long-term targets. In total, eight of the selected signatories set a long-term target. These were London, Munich, Turin, Dublin, Amsterdam, Bristol, Sonderborg and Stockholm. The objectives vary from a 50 % reduction by 2030 for Munich to Stockholm's fossil fuel-free by 2040 scenario.

**Table 5. Long-term CO2 reduction targets**

<b>City</b>	<b>2030 target</b>	<b>2040 target</b>	<b>2050 target</b>
<b>London</b>			80 %
<b>Munich</b>	50 %		
<b>Turin</b>			80 %
<b>Stockholm</b>		100 %	
<b>Dublin</b>	50 %		
<b>Amsterdam</b>		75 %	
<b>Bristol</b>			80 %
<b>Sonderborg</b>		100 %	

### 3.1.3. Relation with other initiatives

In principle, cities that have already developed or implemented an energy, climate or environmental plan might be seen as being at an advantage when joining the Covenant initiative and complying with its requirements, but the reality shows that even in such cases, fulfilling the Covenant can be quite demanding.

Participation in other initiatives certainly gives cities the skills and resources to commit to the Covenant's goals. For example, Barcelona implemented the initiative through pre-existing municipal departments. However, sometimes the objectives and procedures are different, forcing the city to make a significant effort to reconcile them. The synergies between the participation in others initiatives and the Covenant success might not be obvious.

In total, 15 of the signatories included in the sample are involved in mitigation-related initiatives or in networks such as Eurocities and Climate Alliance.

The case of France is particularly noteworthy: Lille Métropole's SEAP was developed as part of the implementation of its 'PCET' or *plan climat énergie territorial* (territorial climate and energy plan), which under the 'Grenelle' law is mandatory in France since 2012 for all cities and urban communities with a population over 50 000 inhabitants. The PCET sets out the strategic objectives and actions a particular territory needs to carry out to mitigate and reduce emissions of greenhouse gases and adapt to climate change. The plan must be made public and reviewed within five years from when it was adopted and subsequently reviewed every three years. In this context, the signatory had to adapt its PCET to the Covenant of Mayors Initiative (see the city profile in ANNEX 5, pages 81 and 135).

In Germany there was a similar situation: German plans were drawn up on the basis of the urban climate protection goals set out in the integrated action programme for climate protection (the *Integriertes Handlungsprogramm Klimaschutz* or 'IHKM'). For example, the objectives of Munich's climate plan include reducing per capita CO<sub>2</sub> emissions by 10 % every five years, resulting in a 50 % reduction by 2030 compared with 1990. The feasibility of this goal is based on scientific studies by the *Öko-Institut* in Freiburg (2004) and by Siemens and the Wuppertal *Institut für Klima, Umwelt und Energie* (2008). The integrated action programme was finally published in 2010 and submitted to the Covenant of Mayors as the City of Munich's energy action plan in 2010. This means that Munich did not draw up a specific SEAP, but instead adapted its energy plan for the purposes of the Covenant initiative, as described in the city profile (see page 87).

To make the work of Covenant signatories in these countries easier, it might be useful to develop common guidelines showing them how to adapt plans developed within national frameworks so that they also meet all of the Covenant's requirements.

### 3.1.4. SEAP development and implementation: external-internal organisation

Thirteen signatories, i.e. more than the 50 % of the sample, received external support for the drafting and/or implementation of the SEAP. The kind of external support provided varies from one-off expert consultation to the total outsourcing of the work. Turin, Ostrava and Faro contracted out the drafting of the SEAP to external consultants. For Larnaca's SEAP, it was the National Energy Agency of Cyprus that took charge, while Barcelona and Colmar sought external support to calculate the BEI and prepare measures just in specific areas such as waste management (Barcelona) and transport (Colmar). In the rest of the cases, like Munich or Tallinn, the signatories asked for specific support on methodologies used to calculate the BEI.

The selected sample shows that the plans developed by external consultants exactly follow the Covenant requirements. However, we did not detect any correlation between the quality of the SEAP and its origin. The two towns supported by CTCs also used external consultants to develop the SEAP.

In no cases has the SEAP monitoring phase been outsourced to external contractors. This may guarantee that the monitoring measures are correctly implemented and follow an independent methodology.

### 3.1.5. Involvement of the public and other stakeholders

This is one of the strong points shared by the SEAPs in the sample: the substantial importance given to the involvement of civil society in the plan. The consultation process is an important part of the whole SEAP process in all cases, in addition to specific measures under the 'Other sectors' section regarding social mobilisation and awareness of citizens. Energy days, surveys, workshops and working groups are the main tools used by the signatories to involve not only the public but also the main stakeholders. In every city analysed, at least three of the interest groups listed in Table 5 appear as players involved in the SEAP preparation process.

**Table 6. Involvement of stakeholders** *Figures are in blue for cities with more than 10 stakeholders involved, in red for cities with more than 15, and in black for cities with less than 10 stakeholders)*

Stakeholder	Number of cities involving the stakeholder
Local energy suppliers	15
Local transport companies	14
Private companies in general	12
Citizenship/consumers associations	17
Cities networks or other cities	6
Universities	7
Representatives of private companies active in EE and RES'	4
Representatives of civil servants	2
Trade unions	1
Regional government	11
National government	9

Local and/or regional energy agencies	12
Financial partners such as banks, funds or energy service companies (ESCOs)	6
Media	5
Environmental associations	7
Other local bodies	9
Industry/employers federations	5

SEAPs from northern Europe are somewhat different to SEAPs from southern Europe in terms of how they go about encouraging successful participation.

Stockholm's SEAP puts a lot of emphasis on the process of building support from stakeholders, which is a key success of its SEAP.

For Dublin, the consultation phase is an important part of the whole SEAP process.

The Belgian Province of Limburg involved public and private players by creating thematic working groups with the participation of several government, civil society, industry and research organisations.

The case of Sonderborg is especially instructive. The Sonderborg project involved more than 100 stakeholders from different sectors, who participated to create a concept which will drive the entire decarbonisation process. It is an outstanding example of how a local authority can take the lead in mobilising different stakeholders to find mutually advantageous solutions and transform the need to reduce greenhouse gas emissions into a growth opportunity for the community.

By contrast, the Andalusia Region and Faro need to do more to mobilise civil society. In addition, their plans do not describe how they intend to gain support from stakeholders and adapt municipal departments. For Turin, the roles of city departments and city-owned companies (e.g. transport, energy supplier) in implementing the measures are well defined, but no mention is made of work with other stakeholders.

### **3.1.6. Adapting municipal departments and allocating sufficient resources**

This is the most divergent point of all the SEAPS evaluated. Among the 21 SEAPs that were developed without any outsourcing we can distinguish three main cases:

1. cities that due to their size already had specific units or teams assigned to the task of developing and implementing the SEAP. This is the case for Barcelona, and also Munich, where a specific agency is in charge of developing and implementing the plans;

2. cities that created a specific unit, body or agency to this end. For example, Pylaia-Chortiatis and Larnaca set up an energy office within their public administration to take care of SEAP implementation;

3. cities that organised the work within pre-existing structures not specifically appointed for this purpose. This was the case in Ostrava, which put in place a specific work pattern involving several municipal departments. This was the approach most cities followed when implementing their SEAPs.

### **3.1.7. Encouraging other cities to join**

The SEAPs in the sample did not give much attention to this aspect. One of the commitments in the initiative is that participating cities must encourage others to join. In fact, Munich was the only city addressing this issue in its SEAP documents, planning to pass on its knowledge and experience in conferences and workshops in order to attract new signatories.

Special mention should be made here of Barcelona and Lille Métropole and of Bristol's joint transport plan. These cities included measures covering not only the city centre but also its entire hinterland. In those cases, neighbouring cities are involved in the Covenant and indirectly encouraged to join.

## **3.2 Baseline emission inventories (BEI)**

Important information about the data collection, municipal level and accounting methodologies for BEIs is provided in the specific city information in Annex 4. This may be useful, especially for giving guidance to new signatories on how to define the BEI.

### **3.2.1. Baseline year**

The Covenant guidebook specifically recommends using 1990 as the reference year for calculating the emission reduction by 2020. Nevertheless, just 19.4 % of the total signatories of the Covenant were able to gather reliable data for that year, while four sample cities (Munich, Stockholm, Riga and Torino) provided a complete 1990 inventory. In general, cities with a longer tradition of dealing with energy and environmental matters could be expected to provide to provide earlier robust data.

The most frequently chosen reference year was 2007 (40 % of the sample), followed by 2005 and 2008. The results match those gathered from the six-year assessment study.

### **3.2.2. Emission inventory calculation**

The methodology used in the Covenant to calculate emission inventories allows participants to choose between the IPCC (Intergovernmental Panel on Climate Change) guidelines and the LCA (Life cycle assessment) approach. In order to make sure that the data produced under the Covenant were comparable, a conversion was proposed in 2013 using a unique conversion coefficient (0.885) considered to be representative for the direct emissions in LCA inventories.<sup>9</sup>

88 % of the sample used the IPCC approach to calculate the BEI data, while Munich, Stockholm and Tallinn used the LCA approach. Even if the LCA in principle is a more complete methodology, it takes considerable time and specialisation, which is not always affordable for small municipalities developing their SEAP in-house. For cities like Munich, which already had climate and energy plans, most of the information needed for the calculations was already available in their records.

### **3.2.3. Emission reporting units**

As illustrated above, the Covenant initiative guidelines' intended reporting units for city emissions are either the total CO<sub>2</sub> or the total CO<sub>2</sub>-equivalent, which is a metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential over a 100-year timescale (IPCC, AR4, 2007). Carbon dioxide

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<sup>9</sup> Five-year assessment report. Covenant of Mayors.

equivalents are commonly expressed as 'million metric tonnes of carbon dioxide equivalents' (MMTCO<sub>2</sub>Eq). The carbon dioxide equivalent for a gas is derived by multiplying the tonnes of the gas by its associated global warming potential.

Only 35 % of the cities included in the sample selected CO<sub>2</sub>-equivalents as their reporting units. As with the previous Covenant reports, the CO<sub>2</sub> unit was expected to be selected more often for reporting due to the higher feasibility of the data collection.

### 3.2.4. Sectors covered and sectors missing in the BEI – problems faced

Among all the emitting sectors in the urban environment, the following sectors are strongly recommended to be included when calculating the BEI:

1. municipal buildings, equipment and facilities and municipal public lighting;
2. tertiary (non-municipal) buildings, equipment and facilities;
3. residential buildings;
4. urban road transport (including the municipal fleet, public transport, private transport).

As not all signatories have detailed data for all sectors and energy carriers, a certain degree of flexibility is allowed in the online template for data collection.

Figure 5. BEI template. Munich

Sector	Final energy consumption [MWh]														Total		
	Electricity	Heat/Cold	Fossil fuel							Renewable energy							
			Natural gas	Liquid gas	Heating oil	Diesel	Gasoline	Lignite	Coal	Other fossil fuel	Plant oil	Biofuel	Other biomass	Solar thermal		Geo thermal	
<b>Buildings, equipment facilities and industries</b>																	
Municipal buildings, equipment/facilities	115757.4	316749.2	359247.8	0	24850.5	0	0	0	0	0	0	0	0	0	0	0	816804.9
Tertiary (non municipal) buildings, equipment/facilities	1407822.9	1343748.3	1248113.6	22815.9	2171923.8	0	0	165094.4	41301.0	0	0	0	0	1287.8	11764.1	0	6413771.8
Residential buildings	1345951.2	1170250.5	1999910.8	131665.1	3085105.1	0	0	1354944.8	158424.3	18910.9	0	0	160200.3	762.6	10374.6	0	9435500.1
Public lighting	41326.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41326.8
Industry Non-ETS	2897583.0	749725.8	4551086.9	189992.9	2577296.5	0	0	2333354.1	2467282.3	9052.2	0	0	0	1.6	14.9	0	15084964.3
Not attributed to sectors	-0.3	-0.8	-0.2	-0.9	-0.9	0	0	-0.3	-0.6	-0.1	0	0	-0.3	0	-0.6	0	0.1
<b>Subtotal</b>	<b>5896541</b>	<b>3580473</b>	<b>8157659</b>	<b>344243</b>	<b>7859175</b>	<b>0</b>	<b>0</b>	<b>3853393</b>	<b>2667007</b>	<b>27963</b>	<b>0</b>	<b>0</b>	<b>160200</b>	<b>2052</b>	<b>22153</b>	<b>0</b>	<b>32652168.0</b>
<b>Transport</b>																	
Municipal fleet	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Public transport	202477.8	0	0	0	0	92154.7	0	0	0	0	0	0	0	0	0	0	294632.6
Private and commercial transport	58329.2	0	0	0	0	1199070.1	4342465.2	0	0	0	0	0	0	0	0	0	5598984.5
Not attributed to sectors	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0
<b>Subtotal</b>	<b>260807</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>1291224</b>	<b>4342465</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5384497.0</b>
<b>Total</b>	<b>6158348</b>	<b>3580473</b>	<b>8157659</b>	<b>344243</b>	<b>7859180</b>	<b>1291224</b>	<b>4342465</b>	<b>3853393</b>	<b>2667007</b>	<b>27963</b>	<b>0</b>	<b>0</b>	<b>160200</b>	<b>2052</b>	<b>22153</b>	<b>0</b>	<b>38486665.1</b>

The main aim is not to exclude signatories which, for various reasons (such as data confidentiality or the format of their national statistics), may not have detailed data. Figure 5 shows an example of energy consumption data by sector. The 'Buildings, equipment facilities and industries' sector has as its subsectors municipal buildings, tertiary buildings, residential buildings, public lighting and industry non- ETS (i.e. not covered by the emissions trading system), while the 'Transport' sector has as its subsectors municipal fleet, public transport and private transport. (Green cells are mandatory, white cells are optional). As a consequence, the quality of the data provided varies significantly.

Twelve of the cities analysed provided a properly completed BEI. Five common situations were identified:

1. cities not providing data for a particular sector. Most commonly, non-ETS industry data were missing, as in Ostrava, the Province of Limburg and Pylaia-Chortiatis;
2. cities not providing data by subsector, but only by sector. This was the case for Junta de Andalucía (CTC), Tallinn and Faro (transport);
3. cities providing subtotal data but not split by carrier, as in the case of Warsaw;

4. cities including the municipal sector within the total for the related sector (i.e. buildings or transport). This was the case for Amsterdam, while Burgas did the same for the tertiary sector;
5. the BEI includes data from sectors not considered to be covered by the Covenant, such as agriculture, airports (not recommended) or waste and water management (optional). Barcelona, Lille Métropole, Sonderborg and Dublin included optional and non-recommended sectors.

In most cases, the energy consumption data not provided for one or more sectors were included in one or more different sectors, while data from 'no Covenant sectors' were included in the general total. Due to the lack of an exhaustive explanation of the methodology provided, it is not clear when and how are these data included.

In certain cases, confidentiality issues or the use of national statistics which follow data structures different to the one proposed by the Covenant prevented the signatories from providing a complete and coherent BEI.

The case of Munich provides an example of all the Covenant key sectors being adequately covered: the plan covers the total amount of CO<sub>2</sub> emissions resulting from electricity, heating/cooling, fossil fuels and renewable energy for all building and industry subsectors. The BEI comprises the CO<sub>2</sub> emissions for the transport sector with respect to electricity and fossil fuels, but it lacks details on the municipal fleet. Stockholm, Bristol and the Province of Limburg are also good examples of BEIs with full reporting.

### **3.3 Sustainable energy action plans (SEAPs)**

#### **3.3.1. Preferred sectors in terms of CO<sub>2</sub> reduction. Lack of data**

As described in the BEI chapter, the requirements and data the signatories must provide or include in their SEAPs are quite flexible. This generates very diverse data.

This chapter aims to analyse the real weighting of the different sectors in the CO<sub>2</sub> reduction the signatories plan to achieve by 2020. However, as described before, the data provided by the cities in the online templates vary considerably.

The first task was to study the figures given by the signatories in the SEAP document regarding the main sector and subsectors described in the guidebook and followed in the BEI chapter. The aim was to identify the preferred sector and subsector which signatories rely on to achieve the reduction target.

The results obtained were neither robust nor significant enough. Due to the voluntary nature of the initiative and its flexible approach, signatories are obliged to compile only a limited number of fields. This results in a very diverse body of information. Some cities provide sufficiently detailed information on the estimated energy savings, CO<sub>2</sub> reduction, financial information and implementation of every measure in their SEAP, while other cities just give a short description of generic measures. In addition, the problem of data uncertainty needs to be considered. The absence of data does not necessarily mean that the data have not been measured or estimated by the signatory, but only that the signatory did not provide it in the proper way in its SEAP.

As the only mandatory data that a signatory must communicate to the Commission is the CO<sub>2</sub> reduction target for the main five sectors: buildings, transport, electricity production, heating and cooling and others, we decided to consider these mandatory fields only in this report.

Annex 2 shows, for each signatory, the total CO<sub>2</sub> reduction presumably for the entire key sector, both in absolute and per capita terms (based on the total number of inhabitants declared in the BEI year). When gathering the data, we also discovered further issues:

a) Inconsistencies when classifying the measures. Each signatory is in charge of classifying the different measures under a specific sector. When we looked at how the 25

signatories in the sample filled out the SEAP template, we found that they tended to classify the same measure under two different areas (i.e. depending on which sector the measure addressed or the type of instrument adopted). This may distort the figures that indicated what kind of measures the signatory tended to use. For example, Maracena (a municipality in Andalusia whose SEAP has the Junta de Andalucía as its CTC) classified all its measures to reduce transport emissions under 'others' (which included 'land use planning'), instead of under 'transport'. As a result, no measures appeared listed under the transport sector. The same happened with Colmar, which reported 65 % (42 % after hand correction) of its total emission reduction under 'others'. To solve this problem at least partially, during the in-depth analysis we ran a manual check was ran to determine whether the correct sector had been selected. For Barcelona, several measures included under 'others' actually related to heating and cooling systems or even planning applications for buildings.

The online SEAP template has been changed. One of the reasons for doing this was to make it clearer for signatories how they should classify measures.

b) Uncertainty in the accuracy of total data provided per sector. Although some signatories provided data for total CO<sub>2</sub> reduction calculated for the five mandatory sectors in the SEAP document and the online templates they filled in, some measures were described without CO<sub>2</sub> reduction data. This was the case for Ostrava, (awareness of citizens), Pilea Hortiaris (others) and Vaslui, which provided CO<sub>2</sub> reduction data for the building sector only. There is no certain way to determine if the total CO<sub>2</sub> reduction provided by the signatory includes the reduction resulting from all measures or just for the measures where specific figures are included.

For the purpose of this study we will assume that the allocation of measures within sectors does not cause any significant deviation and that the total CO<sub>2</sub> reduction provided by sector includes all measures planned (with or without specific data).

Annex 2 provides the estimated reduction per sector for every signatory included in the analysis. This resulted in the following classification of the signatories' preferred sector for achieving the absolute CO<sub>2</sub> total emission reduction:

1. **Buildings:** London, Turin, Zagreb, Dublin, Riga, Bristol, Ostrava, Tallinn, Faro, Burgas, Limburg, Pilea Hortiaris, Vaslui (tied with transport in terms of importance) and Sonderborg. Fourteen signatories (almost the 60 % of the sample) aimed for a higher reduction in the building sector.
2. **Transport:** Barcelona, Lille, Junta de Andalucía and Larnaca. The four signatories that prioritised transport accounted for 16 % of the sample. Most of these were Mediterranean cities.
3. **Electricity production:** Munich, Warsaw and Sardinia.
4. **Heating and cooling systems:** Stockholm, Colmar and the *Associazione Intercomunale Terre Estensi*.
5. **Others:** Colmar was the only city in the sample for which 'Others' was the preferred sector for its reduction target. The 42 % expected total emission reduction corresponds to a decrease in waste per capita due to better waste management (collection of organic and recyclable waste).

Sectors for which the signatories analysed did not provide any data (all signatories provided data for the **buildings and transport sectors**):

1. **Electricity production:** Nine signatories in the sample (i.e. 40 % of the sample) did not include measures for electricity production. These were: Lille, Stockholm, Zagreb, Riga, Ostrava, Tallinn, Faro, Junta de Andalucía and Vaslui.

2. **Heating and cooling:** Twelve signatories (i.e presumably 50 % of the sample) did not include heating and cooling measures in their plans. These were: London, Lille, Turin, Zagreb, Ostrava, Faro, Sardinia, Junta de Andalucía, Limburg, Larnaca, Pilea Hortiaris and Vaslui.

3. **Others:** again presumably 50 % of the signatories did not include data for this mandatory sector: London, Warsaw, Turin, Stockholm, Riga, Bristol, Burgas, Limburg, Pilea Hortiaris and Vaslui.

Only seven signatories in the sample covered all sectors and planned measures for all of them (Barcelona, Munich, Dublin, Bristol, Colmar, Sonderborg and the Italian joint SEAP).

The building sector is **the preferred sector** for the signatories' estimated **CO<sub>2</sub>** reduction by 2020. **The** sector includes the following subsectors:

- municipal buildings, equipment and facilities and municipal public lighting;
- tertiary buildings (no municipal buildings, equipment or facilities);
- residential buildings.

All signatories plan to carry out measures in this sector. This is in line with European and national policies (the energy performance of buildings directive and the energy efficiency directive) and with the results of the six-year assessment report, which found that 44 % of the estimated total reduction relies on the building sector.

The second most popular sector by number of signatories was transport, closely followed by electricity production and heating and cooling, which were covered by three cities. However, by looking at the results in terms of population, as shown in Table 5, we find that transport and electricity production sector account for the same percentage. A more in-depth analysis we plan to develop to evaluate the deviation caused by signatories assigning measures to the 'wrong' sector or to a different sector.

**Table 7. Preferred sector by population (\*Amsterdam excluded from the calculation)**

<b>Sector preferred</b>	<b>Population</b>	<b>Percentage</b>
<b>Buildings</b>	12 181 141	<b>64.1</b>
<b>Transport</b>	2 766 121	14.5
<b>Electricity production</b>	2 971 106	15.6
<b>Heating/Cooling</b>	1 022 908	5.5
<b>Others</b>	69 500	0.3
<b>TOTAL</b>	19 010 776	

The signatories in the sample took very diverse approaches on how to achieve the emission reduction. In most cases, signatories had one preferred sector that accounted for a high percentage of the reduction. By contrast, Warsaw, Vaslui and Junta de Andalucía achieved a balance between different sectors. For Junta de Andalucía, buildings and transport account for almost the same percentage. For Vaslui, the total data cover only two sectors, most probably because the emission reduction from heating and cooling was already accounted for under buildings. As stated above, just 2 % of the sample gives measures for the five basic sectors.

Munich's SEAP bases 80 % of its total emission reduction on electricity production measures, while almost 85 % of Stockholm's overall target comes from district heating and cooling measures.

Colmar was the only instance where the 'Others' sector (42 %) had the main contribution to its SEAP.

### 3.3.2. Examples of policy-related practices. Approaches taken by specific signatories.

Local authorities are implementing the EU 2020 target on climate and energy. This section of the report gives examples of policies, measures and good practices from a selected sample of signatories. The analysis divides policies and measures into main sectors such as buildings, city policy support, local energy production and transport. Nevertheless, there are cross-cutting policies and measures that cover different sectors.

We paid special attention to measures and policies that were based on criteria of innovation, replicability and measurability:

**Innovation:** The whole Sønderborg area strongly demonstrates commitment to new energy and climate solutions through technology, financing involvement and learning platforms. Sønderborg uses its SEAP as a means of becoming a 'sustainable city', using smart energy and financing in city development.

**Replicability:** Covenant signatories regional standards to impose more stringent energy performance requirements than those applicable at national level. For example, cities like Amsterdam, Turin and Copenhagen have in place examples of city policy support that go beyond the requirements of national building codes not only for public buildings, but also for residential buildings.

**Measurability:** The energy saving concept ('ESK 2000') in Munich's plan involved systematically examining 50 % of the entire Munich municipal building stock over two years to identify potential for energy savings. The energy benchmarking helped to indicate an efficient course of action when carrying out the subsequent project phases.

### Building sector

Buildings are responsible for more than half of total energy use in Covenant signatories, with 37 % from residential buildings and 15 % from tertiary buildings. Therefore, devising efficient policies to reduce energy consumption and CO<sub>2</sub> emissions in this sector is crucial. The policies and measures to promote energy efficiency in buildings depend on the type of buildings, their usage, age, location, etc. This section contains examples of good policies and measures in the building sector gathered from the in-depth analysis of a selected sample of signatories.

## Building codes

Covenant signatories use regional standards to impose more stringent energy performance requirements than those applicable at national level.

### Amsterdam

All municipal buildings to be climate neutral; from 2015 to 2025 only climate neutral buildings to be constructed in the city, and from 2025 to 2040, existing buildings must be energetically class B

### Stockholm

The city has a long tradition of fight against climate change: the first emission inventory was initiated in 1995 and the first climate plan was adopted in 1998. The city has stricter energy performance requirements than national ones for new constructions. The measure enables the city authorities to introduce requirements with regard to land allocation agreements to make sure that new property developments are more energy efficient than the current level laid down in building standards. A total of 1 400 000 m<sup>2</sup> of new multi-family housing and premises will be built (in addition to the new Royal Seaport district of the city). 80 % of these are covered by more demanding land allocation requirements corresponding to 80 kWh/m<sup>2</sup> for residential buildings and 70 kWh/m<sup>2</sup> for non-residential buildings.



Figure 6. *Smart construction of IJburg — Information extracted from Amsterdam SEAP.*

## Energy audit management

Some Covenant signatories use an energy management system as an important component of their energy efficiency policies; as such systems make it possible to identify the best ways of reducing energy consumption

The energy saving concept (ESK 2000) in Munich's plan involved systematically examining 50 % of the city's entire municipal building stock within two years to identify potential for energy savings. The *energy benchmarking* helped to indicate an efficient course of action when carrying out the subsequent project phases. Properties depicted as a triangle in the first quadrant, referred to as 'large + bad', should be examined with the highest priority. These buildings are assumed to have not only a high relative saving potential, but also — because of their high actual consumption — a high absolute saving potential. Smaller buildings and buildings that are already 'good' (see figure 3) are a lower priority

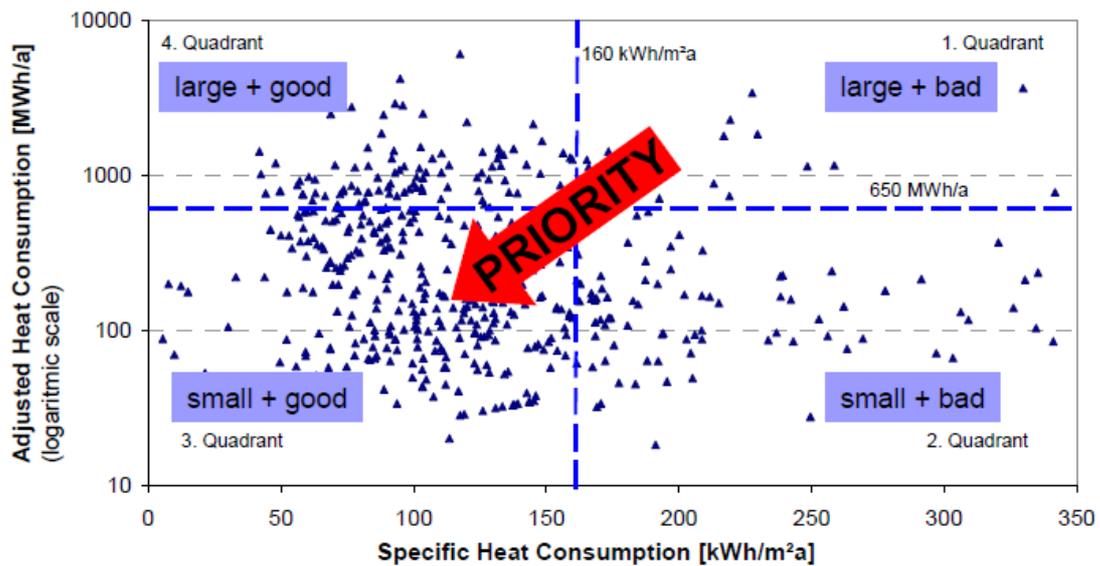
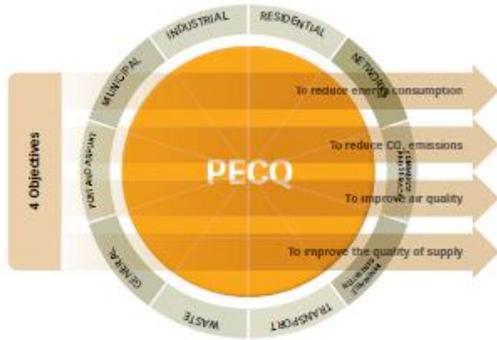


Figure 7 Munich energy saving concept<sup>10</sup>

<sup>10</sup> Proceedings of the International Conference for Enhanced Building Operations (ICEBO) 2006, Shenzhen, China.

## Barcelona

FIGURE 5 | STRUCTURE, CONTENTS AND OBJECTIVES IN THE FRAMEWORK OF THE PECQ



Barcelona's SEAP, entitled 'PECQ' (Energy, Climate Change and Air Quality Plan of Barcelona - Figure 4) is well structured and fully compliant with the Covenant's requirements. It involves implementation of monitoring systems in municipal buildings and of energy efficiency management systems. Under the plan, a project will be carried out to encourage these management systems, provided they are associated with specific energy reduction objectives and with the strategic plan itself.

Figure 8 Structure, content and objectives of the PECQ — Information extracted from SEAP of Barcelona

## Renovation of buildings/social buildings

This is one of the main areas where the Covenant signatories tend to focus on when developing efficiency measures to decrease energy consumption

Riga: most of the city's multi-apartment buildings urgently need renovation, especially the 6 000 buildings with a total area of about 12 million m<sup>2</sup> built during the post-war period and subsequently privatised. By 2013 56 buildings with a total area of 145 043.8 m<sup>2</sup>, accounting for 1.2 % of the total housing stock, had been comprehensively renovated. In 2013 the City Council additionally concluded about 40 agreements with the Latvian Investment and Development Agency on involving EU structural funds in co-financing housing renovation. Most of the renovation work has to be completed in 2014. The housing renovation data, including the addresses of the renovation sites, is available on the website of the REA municipal agency [www.rea.riga.lv](http://www.rea.riga.lv) in the 'Energy efficiency' section under 'Renovation of residential housing' (see figure 9).



Figure 9.33 – 9.35. Renovated multi-apartment buildings in Riga

Figure 9 Renovated multi-apartments buildings in Riga — Information extracted from the SEAP of Riga

Zagreb: Thermal insulation for all buildings in the Gornji Grad district of the city and for primary schools and kindergartens in the city.

Lille Métropole:

Renovation of private and social housing (part of the '100 000 logements' regional agreement) and improvement of the quality of new buildings.

Examples of action: 'Energy housing rehabilitation: 13 700 social housing units and 14 500 private dwellings (2012-2014)'. Housing was renovated on the basis of the 'BBC+ referential' program, which laid down four quality and heating criteria for new buildings. The criteria were established in 2009 by the city together with social housing stakeholders.

## Demonstration buildings

The purpose of demonstration buildings is to show that it is feasible to build energy efficient buildings or renovate existing buildings to high energy performance standards.

*What must the Sonderborg area have achieved in 2020?*

In 2020, the whole Sonderborg area is one big demonstratorium for new energy and climate solutions, related technologies, financing, involvement and learning platforms focusing on the big transition to “sustainable cities”. Next step merges sustainable city development with Smart Energy and financing (ESCO).

The new mindset interacts positively with innovation, research and business and city development. Sonderborg is a showroom for EU’s NZEB (Nearly Zero Energy Building) standard that creates new solutions in the intersection between energy efficiency and green energy supply of homes, buildings and transport in both cities and rural areas.

Sonderborg is an active stakeholder in the sub-region Southern Jutland, cross-border cooperation, in Region South Denmark and in Denmark with the aim of contributing with solutions and mindset for the great transition all over Denmark. With greater “volume”, the solutions’ scalability is documented at the same time.

The ZEROcity concept will act as a magnet attracting interested cities, solutions, manufacturers, authorities, etc. from all over the world. The ZEROcity concept attracts a variety of stakeholders who want to be inspired in terms of sustainable city development and participate in Sonderborg’s great transition.

### Turin

Energy centre test site: implementation of settlements and technological services and research for the local energy industry, including the establishment of two structures.

Test site: research into renewable energy technology transfer activities and applied research.

### London

The Centre for Efficient and Renewable Energy in Buildings (CEREB) is a unique teaching, research and demonstration resource for the built environment. Located at roof level of the London South Bank University K2 teaching facility, CEREB brings together innovative technologies built into the centre itself. It has the ability to showcase developing technologies and to trial new products in a real life setting where the results can be closely monitored.



Teaching room at CEREB

Figure 10. CEREB — Information Extracted from the SEAP of London

## Open data — smart city

The start of any medium- or large-scale decentralised energy project involves the identification and assembly of suitable local energy demands. This includes assessing energy demand density, diversity of user types, suitable land for energy generation, appropriate corridors for distribution infrastructure and catalysing factors such as new developments or large public sector heat loads. High density of heat demand is imperative for large-scale decentralised energy projects because it minimises the amount of piping required, which can be the main cost for a decentralised energy project.

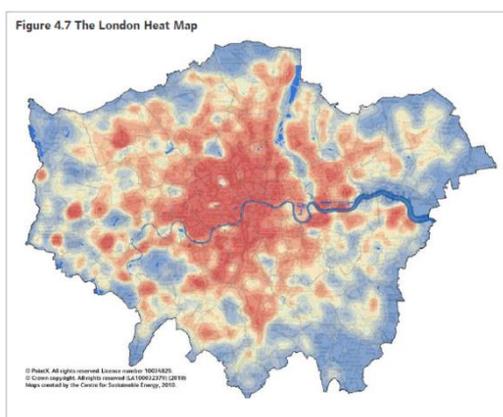


Figure 11. London Heat Map — Information Extracted from the SEAP of London

**London:** To provide this information, the **London Heat Map** was developed. This is an online interactive tool that provides spatial intelligence on decentralised energy, allowing users to identify opportunities for decentralised energy projects in London. Data on a range of factors are available, including major energy consumers, fuel consumption, CO<sub>2</sub> emissions, energy supply plants, community heating networks and energy demand density. It is accessible at [www.londonheatmap.org.uk](http://www.londonheatmap.org.uk). The map allows users to upload and share energy data.

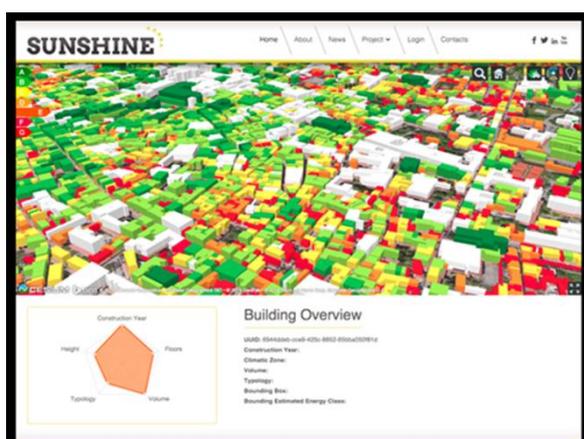


Figure 12 Ferrara Ecomap- Information extracted from the sunshine project

**Ferrara:** Energy assessment of urban buildings for the creation of 'ecomaps' and their energy pre-certification under the Sunshine project: <http://www.sunshineproject.eu/>.

'Sunshine' delivers an open-ended toolkit featuring three smart services:

- energy assessment of urban buildings for the creation of 'ecomaps' and their energy pre-certification;
- optimisation of energy consumption of heating/cooling systems based on localised weather forecasts and energy modelling of buildings;
- optimisation of power consumption through remote control of public lighting

Sonderborg: An Atlas containing detailed information on energy consumption in

buildings. The Atlas contains detailed information on the city's buildings, with different layers of detail to be used by different stakeholders, ranging from the city authorities (who can use the Atlas to decide on issues like district heating planning), to market stakeholders (who can use the Atlas to develop package deals for energy supply, produce offers for bulk discounts, etc.).

## City policy support

### Subsidy schemes and funds

**London:** In order to fund this strategy the Mayor of London is using existing public sector support to unlock private sector investment. The London Green Fund aims to leverage further funding from other government sources, development banks, sovereign funds and infrastructure funds to reach £500 million. The Mayor has supported the establishment of the Green Investment Bank so that it can complement the activities of the London Green Fund. The Mayor also intends to work with the public and private sectors to explore opportunities for securing additional sources of funding such as European funds for businesses to develop low carbon innovation, research and business activity. The programme has already retrofitted 42 group buildings and is now being expanded to provide support to all of London's public sector buildings.

**Amsterdam:** The city has created an SME energy fund and service to help small- and medium-sized enterprises to reduce their energy consumption.

**Zagreb** The Environmental Protection and Energy Efficiency fund (FZOIEU) is a revolving fund set up in 2009 by the national government: under its general granting criteria, the city of Zagreb has the right to award up to 40 % of the planned investment resources.

Subsidies for solar thermal collectors for 3 000 residential houses/apartments in Zagreb.

**Limburg** Energy renovation of buildings with the Infrac energy service company.

**Larnaca** Subsidies for the installation of geothermal heat pumps.

**Bristol** Pursuit of 'Green Deal' opportunities for energy efficiency in social and private housing.

Increasing the energy efficiency of municipal buildings using the 'Salix Fund'.

### Public procurement

Stockholm: For 2012-2015, the SEAP sets an interim target to reduce energy use in municipal operations by at least 10 %. To reach and possibly exceed this target, the city's five property companies are proposing an energy efficiency programme for that would run up to 2015. The programme encourages the companies to carry out investments in energy efficiency by reducing the pressure on them to achieve a financial return compared with costs. Another promising area for action is the procurement of energy efficient goods and services: the City Executive Office has been asked to produce guidelines for use in procurements.

## Local energy production

The energy efficiency directive requires EU countries to support the production of electricity from high-efficiency cogeneration and to use waste heat effectively to achieve primary energy savings. Some SEAPs features energy efficiency measures for combined heat and power plants and district heating networks, reported by utility companies working closely with local governments on sustainable energy systems.

Riga: Riga has a well-developed district heating system that covers about 76 % of total heat energy consumption. To ensure smart and efficient regulation of heat supply and consumption, ICT solutions using a remote data transmission system have been introduced for Riga's heating system. Consumers' heating installations have been automated to set and maintain temperature regimes for space heating and hot water, as required by each site. In 2012 smart meters were introduced so that data on consumption of district heating can be read remotely and automatically from a single dispatch centre. The overall scheme of data collection and transfer is shown in the flow chart below. Furthermore, 'Rīgas siltums', Riga's main heat supplier, plans to bring in more ICT solutions with remote data transmission not only for heat consumed and produced, but also for other data types, such as data on gas, water and electrical power consumption.

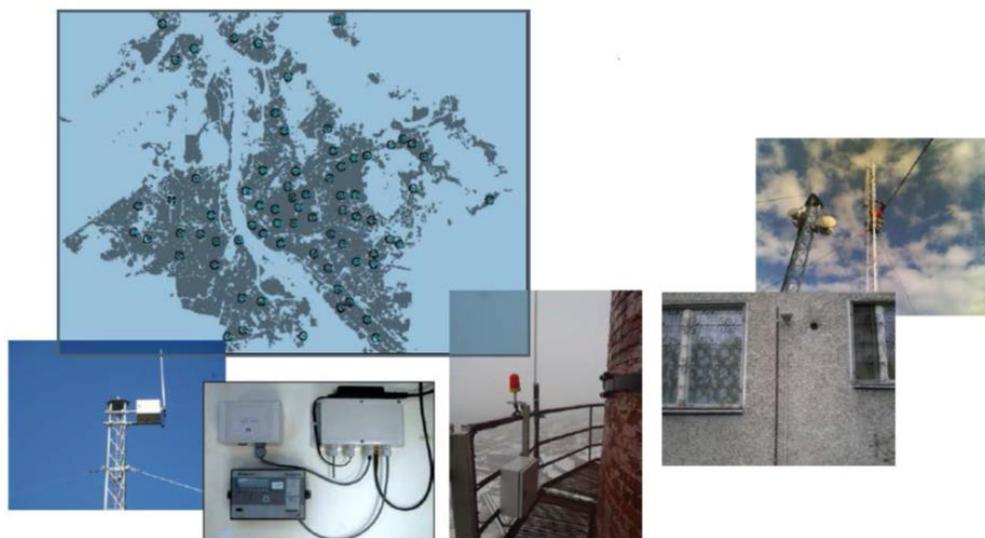


Figure 13. Source: 'Rīgas siltums'. E-catalogue 'Best practice projects for a smart city'

Munich: District heating grid: change-over from steam to high temperature water

Amsterdam: to cool offices and datacentres, various lakes around Amsterdam are being used for district cooling. Local authorities are playing a crucial role in making efficient use of these lakes.

Tallinn: Tallinn aims to continue developing district heating systems by building new district heating connections and improving operational conditions for existing district heating. Tallinn's city authorities plan to connect the heating networks of the city's eastern and western districts. On existing district heating, measures have been already introduced to reduce heat losses from district heating networks and to use renewable energy (wood chips) for heat production. Reducing **heat** losses from district heating

networks involves replacing outdated, poorly insulated pipelines (with a current average age of more than 23 years) by pre-insulated pipes. The district heating pipelines of Tallinn's heating supplier, Tallinna Küte, are 420 kilometres long, but only 25 % (i.e. 106 km) have pre-insulated pipes. Each year, 2-3 kilometres of heating pipeline networks are replaced with new ones. In order to keep Tallinn's heating network in a good technical state and decrease heat losses, at least 10-12 kilometres of pipelines will need to be renovated annually, which is 3-4 times more than the current average volume of work. Investment in the renovation of heating networks costs about 7-9 million euros per year. These measures have a significant contribution to overall system performance, but also needed are measures to reduce the energy demand of buildings (such measures have been introduced in Tallinn's sustainable action plan).

Turin: Expansion of district heating for residential buildings, connecting a total volume of 58 579 000 m<sup>3</sup> to general district heating by 2020.

## Renewable energy

Stockholm: To reach the SEAP target of reducing emissions from district heating by 50 %, the city is striving to ensure that the plans for district heating conversion and extension are implemented by energy company Fortum Värme on schedule.

Sonderborg: Various solutions to include RES in the district heating system and increase the system's efficiency. 10 MW solar cells have been mounted on suitable roofs/surfaces in the municipality.

Amsterdam: 67 MW wind power plant facilities have been installed in Amsterdam to date. In time, wind power capacity could be expanded to 200 MW.

Barcelona: Solar cooling pilot system

The shape of the demand curves for cooling and solar thermal energy production seek a perfect combination between the needs and availability of solar resources when associated with a thermally activated cooling machine.



Figure 14. Waste collection system— Source Stockholm SEAP

## Measures and policies for the transport sector

For the transport sector to be fully energy efficient, the entire transport system will need to undergo gradual transformation. This will involve greater integration between transport modes, innovation and deployment of alternative fuels, and improved management of traffic flows through intelligent transport systems.

### Urban transport plans

London: Low carbon strategy for the transport sector:

- introducing automatic train control across the tube network;
- training drivers on non-automatic railways and London's bus drivers in energy efficient driving styles;
- reaching the milestone of 100 000 electric vehicles on London's roads by 2020 or earlier if possible;
- introducing 1 000 electric vehicles into the municipal fleet by 2015, encouraging London boroughs and private fleet operators to do the same;
- delivering 25 000 electric vehicle charging points by 2015 and 100 000 points by 2020;
- supporting the hydrogen market through support for transport and stationary fuel cell applications;
- from 2012 all new buses added to the London bus fleet to be hybrid vehicles.

FIGURE 40 | RSD SYSTEM OPERATING SYSTEM

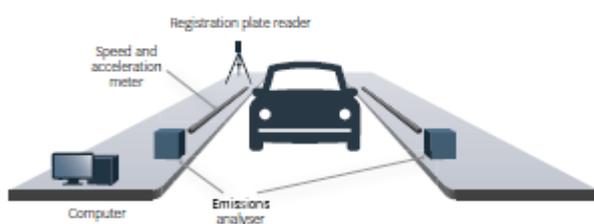


Figure 15 How the RSD System works - Source SEAP Barcelona

Barcelona: The inventory of the real vehicle emissions in Barcelona was carried out via a study made at 16 points throughout the city over 32 days in May and June 2009. Based on a reading of the registration plates of some 42 000 vehicles, the real vehicle population and their polluting emissions **were determined** with great accuracy, as the registration data reveal the type of vehicle, its technical characteristics and the

municipality of residence of its user. The study also used a detection system for exhaust pipe emissions called RSD (remote sensing device). Unlike other on-board emissions detection systems, RSD is not intrusive, as it records data without altering the speed or acceleration of the vehicles. The RSD system subjects the vehicle to infrared and ultraviolet light to detect the vehicle's emissions instantly. In this way thousands of recordings can be taken in just a few hours. RSD was created in the USA and has been widely used since the 1990s in countries such as Austria, Japan, the United Kingdom and Singapore. The system has been verified and certified by the Automotive Research Bureau, California.



Figure 16. Urban Rapid Rail — Source Warsaw SEAP

Warsaw: Warsaw is aiming to attract more of its residents to choose public transport by replacing rolling stock, developing its metro, 'park & ride' systems and related transport hubs and by offering a joint single ticket that can be used on all types of public transport. However, in order to reduce CO<sub>2</sub> emissions, more action is needed. The improvement in the integrated traffic management system and associated road investments, training in ecodriving for professional drivers and private car users and the spread of alternative fuels will all to improve the implementation of the SEAP.

Tallinn: The development of public transport in Tallinn is based around the following schemes:

- i) establishing an more efficient public transport scheme;
- ii) increasing the proportion of vehicles running on biofuel to up to 10 % (this also includes the private sector);
- iii) replacing old cars with new fuel efficient ones;
- iv) building a tram line to the Lasnamäe district of the city. This will ensure that the district is better connected to the rest of the city and reduce emissions from using fossil fuels in transport.



Figure 17 Multi section Trams — source SEAP Riga

Riga: Modern low-floor multi-section trams are being introduced into the city's public transport network along with measures to improve vehicle accessibility for people with special needs and passengers with young children. The new trams have high passenger capacity and connect the main neighbourhoods and sites of the city. The intention is to gradually extend new routes and develop parking facilities. Electrified railway lines have also been included in the city's public transport network. Furthermore, solutions are being developed to provide free wireless internet access on some public

transport lines and at centrally located stops along transport routes. Timetables are regularly improved and a single e-token (e-ticket, e-card) has been introduced to provide single access for all means of public transport. Timetable information can be checked in real time' using mobile phones and is available on the internet.

Stockholm: The city aims to maintain and increase the proportion of passengers who choose public transport: large projects are under way to increase the capacity of rail public transport. 90 % of buses will be powered by renewable fuels before the end of 2020 and the bus fleet will be fossil fuel-free by 2025. 100 % of newly registered private cars should be independent of fossil fuels by 2020 at the latest to meet the national target of a fossil fuel-free vehicle fleet by 2030.

### 3.4 Implementation and monitoring

One of the key principles of the Covenant of Mayors initiative is the need to track how the measures in the SEAP are being implemented. A qualitative report is sent every second year to the European Commission and a quantitative report is due every four years. The 25 SEAPs analysed in this report were submitted at a time when the Covenant of Mayors was not yet providing guidance on how to report on SEAP implementation.

Therefore, the planning of an effective implementation with real monitoring plan seems to be a weak point. Twelve cities, i.e. less than 50 % of the sample, included a specific monitoring chapter. Similarly, less than half of those that provided a specific monitoring chapter included as part of it a real implementation or monitoring plan stating the methodology to be followed, players, timeline, etc. In most cases, we found just a vague indication about the mandatory reports provided for by the initiative (Lille Métropole, Turin, Tallinn).

Five cities in the in-depth study (London, Sonderborg, Barcelona, Bristol and Munich) have genuinely well-defined implementation and monitoring systems. Barcelona and Munich are especially interesting in this respect.

The Barcelona authorities' monitoring plan is based on annual energy balances prepared by the Barcelona Energy Agency's Energy Observatory, using two main kinds of indicators:

- **action indicators**, directly linked to the actions carried out by the body responsible for executing the SEAP and assessing the degree of compliance with the actions set out in the strategic action plan;
- **reaction indicators**, showing trends in macro data about Barcelona from an energy and environmental perspective (climate parameters related).

The purpose of using two kinds of monitoring indicators is two-fold:

1. to monitor the implementation of the specific projects under the 'PECQ' (the official name for Barcelona's SEAP);
2. to monitor their impact on the city and the city's big data in order to assess the real impact and overall reach of the SEAP on an ongoing and comprehensive basis.

Each project has an implementation timetable for the next few years and states the units of measurement used. This will make it possible to evaluate the degree to which each project has been implemented.

Munich has developed a dynamic indicator to monitor its SEAP. CO<sub>2</sub> savings are determined by type of energy carrier used for heat or electricity. For gas and oil, CO<sub>2</sub> factors from the GEMIS 4.5 database are used. The CO<sub>2</sub> factors for electricity and district heating are calculated using specifications provided by the *Stadtwerke München* public utilities company on the basis of a 'Munich mix'. This dynamic indicator gives a clear reflection of the amount of energy for Munich generated by RES and cogeneration. The 'Munich Mix' is a dynamic factor which is regularly updated by an independent expert.

Ostrava has come up with a promising approach in the form of a web-based support site where the public and users can check online the progress of all the measures in the SEAP.

## Chapter 4: Conclusions

The number of people in Europe covered by the Covenant of Mayors makes it one of Europe's largest initiatives at local level. The initiative was launched after the adoption of the EU Climate and Energy Package to endorse and support the crucial role played by local authorities in mitigating the effects of climate change (80 % of energy consumption and CO<sub>2</sub> emissions are associated with urban activity).

25 SEAPs were analysed in-depth to gain a good understanding on how local authorities across Europe develop and implement this mitigation policy, to identify best practices and bottlenecks and finally to draw conclusions and recommendations on how to improve the process.

### **Policy contribution**

This analysis of the 25 selected SEAPs assesses the contribution of local governments to achieving each SEAP's 2020 target. Although the contribution of national and European policies is not specifically acknowledged in most of the plans included in the study, on this point we can draw the following conclusions:

For most of the signatories, the Covenant of Mayors initiative is a structured way of implementing national regulations. The municipalities' policies benefit from the leverage of the European directives on the energy performance of buildings, energy services, energy efficiency and renewable energy sources. In response to these directives, EU countries drew up policy guidelines on energy efficiency in buildings and the end-use by consumers and it is normal that municipalities follow national strategies on these subjects. It was not uncommon to find similarities between the measures in the SEAPs analysed and those in national energy efficiency action plans. The signatories present the measures to achieve the target in a cross-sectoral way; most of the measures originate from European or national policies, with few innovative measures being presented. For example, Faro presented a package of solar power measures as its most important contribution towards energy savings; these measures are mostly based on transposed European directives. Turin put the emphasis on measures for photovoltaic electricity production, following the introduction in the Energy Bill of the payment of an incentive rate per unit of energy produced by photovoltaic systems connected to the grid; this was also the result of a national funding scheme. By contrast, in the absence of strong national policies for transport, signatories were much more diligent in developing their own measures for that sector.

The larger cities tend to include promising measures in their SEAPs that represent a step up from the basic regulations. Larnaca provides a very good example of how to scale down national policies and tendencies to adapt them to the local level. Its plan was developed with strong support from the national energy agency.

### **Overall considerations**

As described in previous chapters, the in-depth analysis aims to identify how cities in Europe are tackling the challenge of achieving their specific emission reduction target by 2020. The selected sample, as shown in the city profiles included in Annex 4, is diverse enough to cover as many scenarios as possible from among the Covenant of Mayors signatories. This makes the report a **useful tool for inspiring new signatories**.

One of the main focuses of the study was to understand and highlight the main and most common **strengths and weaknesses** in the SEAPs **and suggest solutions on how to overcome the shortcomings**.

**Strengths:**

1. Many signatories include energy savings and RES targets in their plans, in addition to the Covenant requirement to set an emission reduction target. This shows that municipalities are in line with national and European policies. Also, setting partial targets makes it easier to monitor results in different areas of intervention.
2. Some signatories set a longer-term target, even going beyond the timescale of the Covenant of Mayors (e.g. to 2030 or even to 2050). This is considered a key success factor as it clearly shows the local authority's political commitment and gives a clear message to the public and local stakeholders on how the local authority wants to develop in the future, paving the way for more substantial investment in sustainable infrastructure.
3. The substantial importance given to involving civil society in the drafting of the plan is one of the strong points shared by the evaluated SEAPs. A very good example is that of Sonderborg, which involved more than 100 stakeholders from various sectors in drafting the city's 2029 strategy. Another interesting example comes from Dublin: 50 pre-draft consultations with different organisations went into the development of its SEAP.
4. Signatories use the SEAP not only as an energy planning instrument, but also as the basis for an all-encompassing approach to urban planning. The city profiles in Annex 2 mention some of the common objectives in their SEAPs: a healthier environment, better quality of life, the creation of skilled and stable jobs that are not at risk of moving elsewhere; greater economic competitiveness and reducing energy dependence.
5. Covenant territorial coordinators (CTCs) are also playing an important role in helping cities and towns of different sizes to implement sustainable energy policies. The experience of multi-level governance, in the form of SEAPs coordinated by a CTC and joint SEAPs for groups of municipalities, has shown that small and medium-sized municipalities are able to communicate and work with stakeholders and calculate emission inventories more successfully at a broader regional level than at the local one.

**Weaknesses:**

1. Monitoring. The fact that municipalities have to be accountable and illustrate their progress makes the Covenant much more than a political statement; it is also a technical tool to improve energy performance. With the exception of London, Munich and Barcelona, most of the SEAPs analysed failed to document the implementation and monitoring phase in their plans (London continues to be one of the world's leading cities in measuring and reporting its direct and indirect CO<sub>2</sub> emission and assessing the progress of the Mayor's climate change and mitigation programmes on a yearly basis). However, one of the reasons why signatories failed to document the implementation and monitoring phrase may be because before May 2014 the Covenant of Mayors did not provide any specific monitoring guidelines.
2. Data inconsistency. In some cases, we found significant differences between the exhaustive and detailed information reported in the SEAP document and the poor information included in the SEAP template. This is especially true for cities that developed their plan under a different context to that of the Covenant (e.g. London, Amsterdam, Munich and Lille). The Covenant of Mayors needs to provide more guidance so that the Covenant is more compatible with existing initiatives, limiting duplication of work.

3. In most cases, local authorities count heavily on a favourable national or regional context for energy efficiency and renewable energy policies (e.g. availability of national incentives for building renovation, etc.). We have found that a significant proportion of signatories' estimated 2020 emission reductions are associated with measures decided at national and/or regional level, such as in the case of Turin and the Junta de Andalucía, or rely on funds allocated by the national government. For example, Dublin's SEAP refers to the 'Transport 21' national capital investment framework to improve transport infrastructure. In fact, Dublin's city council is involved in the 'Transport 21' planning process. In addition, the limits set by the Stability Pact often make it hard for local authorities to carry out major investments on their own property or on sustainable infrastructure (such as district heating networks, sustainable means of transport, etc.). To overcome this, municipalities need to identify possible financing schemes that could encourage private players to participate in public investments. Many municipalities need private sector investment in order to fund local sustainable energy strategies and programmes. Strengthening the relationship between the public and private sectors could also create new opportunities for securing additional sources of funding, such as European funds.

### **Comparative analysis**

The signatory's size plays an important role in the approach it takes to its SEAP:

- The selected emission reduction target seems to be correlated with city size and the existence of previous plans and initiatives. Usually larger cities have larger targets, most likely because they are better placed to interact with big energy players and have more resources to plan major investments on sustainable infrastructure (see London, Stockholm, Dublin and Turin). In addition, the earlier a city committed to developing a climate and energy plan (e.g. Stockholm), the more ambitious its target for 2020.

The example of Sonderborg, a medium-sized municipality with a very ambitious target, offers an alternative approach for similar municipalities on how to tackle the potential lack of resources by increasing synergies between stakeholders.

- Only the 'big cities' (i.e. global and large cities) have long-term targets for beyond 2020. However, smaller cities could also benefit from this approach, as it would give a clear indication of the city's vision in the longer term and possibly attract private investors.

- Plans developed after the launch of the Covenant and the publication of the guidebook generally do not have difficulties in complying with the requirements. This means that the guidelines are generally well understood and applied by the signatories and provide good guidance material on local energy planning, especially for newcomer cities.

- In principle, the emission calculation approach, i.e. selection of the emission reporting units and of the BEI (baseline emission inventory) year do not have a significant impact on the results of the SEAP. The selected areas of intervention have much more of an impact. We did not identify any patterns on this issue in the sample data regarding nationalities/regional reality, city size or economic or social characteristics. As shown in the 'Results' chapter, 40 % of the signatories in the sample prefer 2007 as the reference year, with the next most popular years being 2005 and 2008. When calculating the BEI data, 88 % of the sample followed the IPPC approach and 65 % selected CO<sub>2</sub> as their reporting units. These results match those gathered from the six-year assessment study<sup>4</sup>.

Once we have received a significant number of monitoring reports, we will be able to investigate these aspects further, to determine whether aspects like a city's regional and economic realities have a clear influence on the plan's success.

- The preferred sector in which the CO<sub>2</sub> reduction is to be achieved, confirming the results of the six-year assessment study,<sup>4</sup> is the buildings sector (64 %), followed by transport and electricity production (15 and 14 % respectively in per capita units). This is in line with European and national policies (the energy performance of buildings directive and the energy efficiency directive). In all cases where transport was the preferred sector, the city concerned was a global or large city.

- City size versus quality. Even if global and large cities have more developed and ambitious SEAPs supported by higher budgets and more diversified financial resources, the real effectiveness of plans may not be related to city size. Small municipalities present a more accurate evaluation of the reality of the city and may therefore produce more efficient measures. Small municipalities may also benefit from more direct contact with the public and stakeholders and run more successful awareness raising campaigns. City size has a strong impact on the characteristics of the SEAP.

- By contrast, we have found only minor national and regional differences, although the sample includes SEAPs from different geographical areas in Europe. There are, however, some differences in terms of the processes for SEAP development: SEAPs from northern and central Europe seem to count on greater cooperation by the municipal departments involved and on a collaborative or participative process with stakeholders. These aspects are generally less developed in SEAPs from southern Europe (e.g. Turin, Maracena (Junta de Andalucía), Faro). Future studies could look more closely at the differences between local energy plans across Europe, for example based on the national energy policy context (e.g. regulations and incentives) and the amount of decentralisation of powers on energy issues.

### ***Interaction and synergies with other related initiatives***

As shown in previous chapters, signatories that have already developed or implemented energy, climate or environmental plans could be at an advantage when joining the Covenant of Mayors initiative. A signatory's participation in other initiatives gives it the skills and resources to commit to the Covenant's goals (e.g. Barcelona, which used existing municipal departments to implement the initiative). However, sometimes the objectives and procedures of the Covenant and pre-existing initiatives are different, forcing the city to make a significant adaptation effort to reconcile the two. Moreover, in some cases the synergies between initiatives may not be obvious.

We have already highlighted the cases of France and Germany, where a huge adaptation effort is needed. The most useful response to such situations would be to develop a common approach to adapting local plans from those countries so that they also meet all the Covenant's requirements.

### **Recommendations**

The conclusions of this report may serve as a basis for a proposal on how to improve the overall approach to drawing up and implementing SEAPs and on possibly expanding the initiative. Such a proposal would need to look at the following:

- the methodological process and the path to joining the initiative;
- the strengthening of structures and platforms generated as part of the initiative;
- ensuring more robust and more comparable data;
- better monitoring requirements for new signatories.

- Interoperability with initiatives that are similar to the Covenant: We have already highlighted the cases of France and Germany, where a huge adaptation effort is needed. The most useful response to such situations would be to develop a common approach to adapting local plans from those countries so that they also meet all the Covenant's requirements.

- Key principles review. With the possibility of the Covenant being extended beyond 2020, a revision of the 10 key principles 'may be worth considering. This would need to ensure that the principles are relevant to a wider and more diverse Covenant community comprising a large number of small and medium-sized towns, where new models of multi-level governance are being tested with the involvement of covenant territorial coordinators.

## General Conclusions

- 1. The main strengths of the initiative are the great importance given to the involvement of civil society and the inclusion of energy savings and RES targets.**
- 2. The main weaknesses are the management of implementation and monitoring and inconsistent data.**
- 3. City size and interaction with other initiatives are key aspects.**
- 4. Best practices are highlighted by sector for every city.**
- 5. The in-depth report is a useful tool, helping signatories to design their own SEAPs based on successful existing plans.**
- 6. For more advanced and ambitious communities, the Covenant can be a medium-term instrument for achieving long-term targets.**
- 7. For 'newcomers' to climate & energy planning especially, the Covenant is not only a structured way of implementing European and national rules, but also a way of 'rethinking' the city so that it achieves a more sustainable future.**
- 8. National policy has a significant contribution to achieving Covenant targets at local level, but this contribution is difficult to evaluate.**

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## List of abbreviations and definitions

**BEI** baseline emission inventory

**CEREB** Centre for Efficient and Renewable Energy in buildings

**CO** carbon monoxide

**CO<sub>2</sub>** carbon dioxide

**CO<sub>2</sub>-eq** carbon dioxide equivalents

**CoM** Covenant of Mayors

**CTC** covenant territorial coordinators

**EDGAR** emissions database for global atmospheric research

**ETS** emissions trading system

**EU** European Union

**EE** Energy Efficiency

**GHG** greenhouse gases

**ICLEI** Local Governments for Sustainability

**IEA** International Energy Agency

**IPCC** Intergovernmental Panel on Climate Change

**LCA** life cycle assessment

**MEI** monitoring emissions inventories

**MS** member states

**PV** photovoltaic

**PECQ** energy, climate change and air quality plan of Barcelona

**PETC** territorial climate energy plan of Lille Metropole

**RES** renewable energy source

**RSD** remote sensing device

**SEAP** sustainable energy action plan

**UNFCCC** United Nations Framework Convention on Climate Change

**UNDP** United Nations Development Programme

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Region	Country	N SEAPS	%no SEAPS	CoM population by country	% EU28 CoM population	% Tot CoM population
EU-28	Italy	2690	53.46%	33,082,527	21.02%	18.35%
	Spain	1459	28.99%	25,343,427	16.10%	14.06%
	France	116	2.31%	15,596,553	9.91%	8.65%
	Greece	88	1.75%	3,226,964	2.05%	1.79%
	Portugal	76	1.51%	4,372,973	2.78%	2.43%
	Belgium	70	1.39%	3,591,694	2.28%	1.99%
	Croatia	58	1.15%	1,870,307	1.19%	1.04%
	Romania	56	1.11%	6,156,555	3.91%	3.42%
	Germany	53	1.05%	17,053,423	10.84%	9.46%
	Sweden	50	0.99%	4,082,547	2.59%	2.26%
	Poland	36	0.72%	3,592,912	2.28%	1.99%
	Denmark	36	0.72%	2,786,309	1.77%	1.55%
	Bulgaria	34	0.68%	2,624,367	1.67%	1.46%
	United Kingdom	33	0.66%	17,674,092	11.23%	9.80%
	Malta	25	0.50%	117,048	0.07%	0.06%
	Hungary	22	0.44%	2,472,475	1.57%	1.37%
	Cyprus	21	0.42%	452,906	0.29%	0.25%
Slovenia	19	0.38%	562,172	0.36%	0.31%	
Netherlands	18	0.36%	3,804,493	2.42%	2.11%	

	Latvia	17	0.26%	1,071,504	0.68%	0.59%
	Lithuania	14	0.28%	1,379,419	0.88%	0.77%
	Austria	12	0.24%	1,912,864	1.22%	1.06%
	Finland	7	0.14%	1,716,986	1.09%	0.95%
	Ireland	6	0.66%	1,404,659	0.89%	0.78%
	Czech Republic	6	0.12%	331,841	0.21%	0.18%
	Slovakia	5	0.10%	569,113	0.36%	0.32%
	Estonia	3	0.06%	432,860	0.28%	0.24%
	Luxembourg	2	0.04%	102,229	0.06%	0.06%
<b>TOTAL</b>	EU 28	5032	100%	157,385,219	100%	87.30%

## ANNEX 2 CO2 estimation reductions per sector

<i>London</i>			
Sector	tCO <sub>2</sub> reduction	Per capita	%
Buildings	6,830,000	0.89	<b>52.6</b>
Transport	1,350,000	0.18	10.4
Electricity production	4,800,000	0.63	37.0
Heat/Cold production			
Others			
TOTAL	12,980,000		

<i>Barcelona</i>			
Sector	tCO <sub>2</sub> reduction	Per capita	%
Buildings	25,042	0.01	3,5
Transport	417,142	0.29	<b>58</b>
Electricity production	5,718	0.003	0,8
Heat/Cold production	15,022	0.01	2,1
Others	249,327	0.15	35
TOTAL	712,251		

<i>Lille Métropole</i>			
Sector	tCO <sub>2</sub> reduction	Per capita	%
Buildings	297000	0.28	42
Transport	400000	0.37	<b>57</b>
Electricity production			
Heat/Cold production			
Others	10160		1
TOTAL	707160		

<i>Munich</i>			
Sector	tCO <sub>2</sub> reduction	Per capita	%
Buildings	32,499	0.025	5.6
Transport	7,230	0.005	1.2
Electricity production	456,000	0.35	<b>78.7</b>
Heat/Cold production	69,500	0.05	12

Others	14,040	0.01	2.4
<b>TOTAL</b>	<b>579,269</b>		

<i>Warsaw</i>			
Sector	tCO <sub>2</sub> reduction	Per capita	%
Buildings	1,646,602	0.96	27
Transport	843,342	0.13	14
Electricity production	2,321,276	1.38	<b>38</b>
Heat/Cold production	1,307,775	0.77	21
Others			
<b>TOTAL</b>	<b>6,118,995</b>		

<i>Turin</i>			
Sector	tCO <sub>2</sub> reduction	Per capita	%
Buildings	1,025,168	1.13	<b>70</b>
Transport	261,679	0.29	12
Electricity production	70,312	0.19	18
Heat/Cold production			
Others			
<b>TOTAL</b>	<b>1,457,159</b>		

<i>Stockholm</i>			
Sector	tCO <sub>2</sub> reduction	Per capita	%
Buildings	34,300	0.04	12
Transport	11,000	0.01	3.8
Electricity production			
Heat/Cold production	241,700	0.27	<b>84.2</b>
Others			
<b>TOTAL</b>	<b>287,000</b>		

<i>Zagreb</i>			
Sector	tCO <sub>2</sub> reduction	Per capita	%
Buildings	396,808	0.5	<b>49</b>
Transport	174,606	0.22	21

Electricity production			
Heat/Cold production			
Others	244,011	0.31	3
TOTAL			

<i>Dublin</i>			
Sector	tCO <sub>2</sub> reduction	Per capita	%
Buildings	616,000	1.22	<b>51.8</b>
Transport	369,000	0.73	31.0
Electricity production	1,000	0.002	0.1
Heat/Cold production	47,000	0.09	4.0
Others	156,000	0.31	13.1
TOTAL	1,189,000		

<i>Riga</i>			
Sector	tCO <sub>2</sub> reduction	Per capita	%
Buildings	89,813	0.14	<b>42.8</b>
Transport	41,861	0.06	19.9
Electricity production			
Heat/Cold production	78,342	0.12	37.3
Others			
TOTAL	210,016		

<i>Bristol</i>			
Sector	tCO <sub>2</sub> reduction	Per capita	%
Buildings	1154492	2.67	<b>78.7</b>
Transport	276438	0.64	18.8
Electricity production	6600	0.02	0.4
Heat/Cold production	27500	0.06	1.9
Others	2150		0.1
TOTAL	1467180		

*Ostrava*

Sector	tCO <sub>2</sub> reduction	Per capita	%
Buildings	68,289	0,23	<b>88,5</b>
Transport	8,028	0,027	10,4
Electricity production			
Heat/Cold production			
Others	906	0,003	1,1
TOTAL	77,223		

*Tallinn*

Sector	tCO <sub>2</sub> reduction	Per capita	%
Buildings	614,938	0,62	<b>61</b>
Transport	138,703	0,14	14
Electricity production			
Heat/Cold production	232,676	0,23	23
Others	10,950	0,01	2
TOTAL	997,267		

*Colmar*

Sector	tCO <sub>2</sub> reduction	Per capita	%
Buildings	29,319	0.42	24
Transport	28045	0.40	23
Electricity production	20	0.00	
Heat/Cold production	11,935	0.17	10
Others	50529	0.73	<b>42</b>
TOTAL	119848		

*Faro*

Sector	tCO <sub>2</sub> reduction	Per capita	%
Buildings	30,712	0.49	<b>54,7</b>
Transport	23,068	0.36	41,1
Electricity production			
Heat/Cold production			
Others	2,414	0.04	4,3
TOTAL	23,068		

### *Pilea-Hortiaris*

Sector	tCO <sub>2</sub> reduction	Per capita	%
Buildings	75,357	1.07	<b>85</b>
Transport	4,356	0.06	5
Electricity production	8,611	0.12	10
Heat/Cold production			
Others			
TOTAL	80,555		

### *Vaslui*

Sector	tCO <sub>2</sub> reduction	Per capita	%
Buildings	5,382	0.08	0.18
Transport (according to BAU)*	8,392 (increase)	0.12 (increase)	-0.28
Electricity production	933	0.01	0.03
Heat/Cold production	31,886	0.45	<b>1.07</b>
Others			
TOTAL	29,809		

\*they estimate an increase of the transport sector even with the SEAP measures implemented, increase that they try to compensate with the measures on the HEAT/COLD production

### *Larnaka*

Sector	tCO <sub>2</sub> reduction	Per capita	%
Buildings	27,529	0.44	26.1
Transport	58,725	0.93	<b>53.5</b>
Electricity production	355	0.005	3.3
Heat/Cold production			
Others	19,084	0.3	18
TOTAL	62,890		

### *Sonderborg*

Sector	tCO <sub>2</sub> reduction	Per capita	%
Buildings	182,007	2.37	<b>50</b>
Transport	38684	0.5	11

Electricity production	67387	0.88	19
Heat/Cold production	42666	0.56	12
Others	30541	0.40	8
TOTAL	361285		

### *Burgas*

Sector	tCO <sub>2</sub> reduction	Per capita	%
Buildings	237,136	1.1	<b>60,3</b>
Transport	2,906	0.01	7,3
Electricity production	136,215	0.63	34,5
Heat/Cold production	17,472	0.08	4,45
Others			
TOTAL	393,729		

### *Sardinia*

Sector	tCO <sub>2</sub> reduction	Per capita	%
Buildings	871	0.06	7.5
Transport	10		0.1
Electricity production	10375	0.77	<b>89.4</b>
Heat/Cold production			
Others	346	0.02	3
TOTAL	11602		

### *Junta de Andalucía*

Sector	tCO <sub>2</sub> reduction	Per capita	%
Buildings	9,933	0.5	<b>42.5</b>
Transport	10,083	0.5	<b>43.1</b>
Electricity production			
Heat/Cold production			
Others	3,379	0.17	14.4
TOTAL	23,395		

*Province of Limburg*

Sector	tCO <sub>2</sub> reduction	Per capita	%
Buildings	22,456	0.69	<b>73.1</b>
Transport	4,082	0.13	13.3
Electricity production	4,186	0.13	13.6
Heat/Cold production			
Others			
TOTAL	30,724		

*Associazione Intercomunale Terre Estensi*

Sector	tCO <sub>2</sub> reduction	Per capita	%
Buildings	49,467	0.35	15
Transport	28,225	0.20	7
Electricity production	126,818	0.89	16
Heat/Cold production	64,343	0.32	<b>33</b>
Others	122,600	0.31	26
TOTAL	391,454		

## ANNEX 3 Best practices and measures highlighted by sector

Municipal buildings, equipment and facilities and municipal public lighting	
City	Measure
<b>London</b>	<p>1. RE: FIT - This programme uses an innovative commercial model to support the public sector to retrofit buildings with energy efficiency measures. The programme has already retrofitted 42 GLA group buildings and is now being expanded to provide support to all of London's public sector buildings.</p> <p>The Mayor will make RE: FIT available to all public sector organisations in London, which will guarantee energy efficiency savings to all those organisations that sign up to the programme.</p> <p>2.-Replacement of London's traffic signals to Light Emitting Diode (LED) technology, starting with signals at 300 junctions across London.</p>
<b>Barcelona</b>	<p>1.Promote the installation of solar thermal systems in sports centre</p> <p>2.Apply the national government measure related to efficiency and energy savings in municipal buildings</p> <p>3. Implantation of monitoring systems in municipal buildings. Energy managing systems.</p> <p>4. Improvement of public lighting system. Decontamination systems</p>
<b>Lille Métropole</b>	<p>1. Pooling of the commons' approach on energy ":A specific working group - with people of the different cities of the urban community - has in charge to define measures and tools in order to improve the energy efficiency (energy supply, use of the buildings, monitoring of the energy consumption) and promote the renovating (support, financing)of the public buildings</p> <p>2. Decrease greenhouse gases emissions from the centre of energy recovery.</p>
<b>Munich</b>	<p>1.Energy saving concept (ESK 2000)</p> <p>The50 % of the entire Munich municipal building stock – have been examined closely and systematically within two years to identify potentials for energy savings.</p> <p>The whole project has been subdivided methodically into three phases:</p> <p>Phase 1 – Energy Benchmarking: The objective was a preliminary energy evaluation of every single property, based on measured and billed energy consumption.</p> <p>Phase 2 – Basic Concept: The objective was the identification of measures to save heat, electricity, water, costs and emissions by means of on-site inspections and, subsequently, their qualitative description.</p>

	<p>Phase 3 – Detailed Concept: The objective was the quantitative determination of energy savings and the necessary investments, what then led to a cost-benefit evaluation of every single measure.</p> <p>The results of the study have been implemented.</p> <p>2.- Special program „saving electrical power“; core area redevelopment lighting</p>
<b>Turin</b>	<p>1. Energy action plan for municipal building stock. Development of a base-line energy consumption inventory and planning of retrofit of the building stock</p> <p>2. Replacing oil boilers with gas boilers Complete replacement of residual oil boilers that power the municipal heritage with gas boilers. Replacement scheduled for the total residual volume (2.6% of the heated volume)</p> <p>3. Conversion to district-heating. Municipal buildings that will be connected to district heating amount to a total volume of 7.932.800 m3 by the year 2020.</p>
<b>Amsterdam</b>	<p>1.All municipal buildings to be climate neutral by 2015</p> <p>2.Introduction of intelligent light measuring and more efficient lamps and materials</p>
<b>Bristol</b>	<p>1. To reduce emissions from the council’s building &amp; operations by 40% by 2020 including schools from 2005.</p> <p>2. Increase the energy efficiency of Municipal buildings using the Salix fund</p> <p>3. Plan and deliver an energy efficiency retrofit programme to ensure all council housing stock is low carbon by 2020.</p>
<b>Ostrava</b>	<p>1. OP the environment 2014. The measures proposed for application in 21 public buildings include:</p> <ul style="list-style-type: none"> <li>_ Additional thermal insulation of the building shell;</li> <li>_ Replacement of windows, or its completion;</li> <li>_ Thermal insulation of ceilings;</li> <li>_ Modernisation of the boiler or the heat exchanger plant, as appropriate;</li> <li>_ Heating control (incl. the use of IRC - Individual Room Control).</li> </ul> <p>2. Energy Performance Contracting for yearly mandatory energy audit in all municipal buildings</p>
<b>Tallin</b>	<p>1. Consuming Green - Renovation 48 kindergarten.</p> <p>2. Installation the new efficient lights and their control in the public lightning net</p>
<b>Colmar</b>	<p>1. New building with a high energetic performance (BBC Label)" = social and cultural centre for a cost of 8 350 000 € including 5 500 000 € from the municipality</p>

	2.« Lighting Plan » which includes a diagnosis of public lighting : - 5-years-program started 2009 to reduce energetic needs for public lighting - elimination of all Fluor Lamps - multiannual program to eliminate Mercury Lamps
<b>Faro</b>	1. Efficient lighting and Solar energy contribute with the highest energy savings and CO2 reduction in the municipal sector. The Voluntary carbon reduction programme allows small projects may be eligible to enter in the voluntary carbon market. 2. Efficient lighting. LED and innovative lighting systems
<b>Pilea Hortiatis</b>	1.-Public Lighting Studies and gradual replacing of lighting devices 2.- Promotion of green procurements
<b>Larnaka</b>	A wide range of measures which complement themselves in saving energy and reducing CO2: thermal insulation of buildings, lamp replacement with high efficiency ones, voltage rectifier, maintenance of air conditioning systems, installation of solar panels
<b>Sonderborg</b>	1. Various programs and concepts for: Energy renovation of public buildings, purchase of energy efficient appliances and equipment, energy efficient lighting and energy training of employees. 2.ZEROCITY Demonstrarium
<b>Burgas</b>	1.- reconstruction and renovation of municipal social, cultural, administrative infrastructure and introduction of energy efficiency measures  2.- Energy monitoring of buildings municipal properties
<b>Junta de Andalucia</b>	Municipal buildings PV Roof
<b>Province of Limburg</b>	1.-Energy renovation (specific actions discussed with ESCO Infrac)  2.-Reduction of electricity consumption in the municipal buildings (incl. public procurement, awareness raising)  3.- EE in public lighting with Infrac

<b>Tertiary (non municipal buildings, equipment and facilities)</b>	
<b>City</b>	<b>Measure</b>
<b>Barcelona</b>	1. Sustainable criteria for new infrastructure in TMB -public transport operator. Adopt green procurement policies.  2. Energy consultant for citizens in small business
<b>Lille Métropole</b>	Improving the energy efficiency and renovating the tertiary buildings: "promote a quality offer for tertiary buildings".
<b>Munich</b>	Climate protection measures of building societies GWG and GEWOFAG
<b>Turin</b>	1.Application of the Law on Regional sustainable energy project Regional Law Enforcement, which provides for new buildings and existing buildings subject to renovation

	2. Implementation of the Energy Annex of the Building Regulation. Implementing energy measures under the Environmental and Energy Annex of the Building Regulation approved by the City of Turin
<b>Amsterdam</b>	Boost of PV technology in the city for commercial and residential buildings
<b>Bristol</b>	1. Support solid wall insulation and PV sectors through the SDEEMS project  2. Grant fund LCSW to enhance Bristol's environmental & low carbon technologies & services sector
<b>Ostrava</b>	Replacement of local coal boilers for more efficient, plus some fuel exchange - from coal to gas or biomass(I + II)
<b>Colmar</b>	1. A strong emphasis on energy efficiency improvement. Example of action: "New building with a high energetic performance (BBC Label)" = social and cultural centre for a cost of 8 350 000 € including 5 500 000 € from the municipality  2. New building on university campus for the « Génie Thermique et Energie » Department. It will have a high energetic performance (BBC Label). Cost: 4 200 000 € including 1 400 000 € from the municipality
<b>Pilea Hortitis</b>	Improving the energy behaviour of users tertiary sector
<b>Sonderborg</b>	1. -The ZEROcompany and ZEROshop programs provide companies of all sizes and industries in the Sonderborg area access to knowledge about applications and solutions as well as courses that make it easy to implement energy reductions in the company. They have been developed based on a segment-oriented approach and they are adapted to the needs of the company so that the company can easily obtain energy savings within a relatively short time frame and financial savings with an affordable investment. Furthermore, the concept gives the companies, who are already part of the program, the possibility of further development and provides tools to realize further reductions.  An important part of the concept is a market place (an online portal) for companies interested in providing energy consulting services and selling energy reducing products.  2.- The business concept ZERO-GI, Smart Energy and Smart Grid solutions, for a significantly increased integration of the energy systems with energy savings realized by intelligent utilization of surplus heat. The financing of the concept (for the customer) takes place through an ESCO model where the aggregator makes the investment and gains this investment quickly back through the energy savings.
<b>Burgas</b>	1. Installation of PV modules on private buildings  2. Development of standards for energy efficiency in the field of building and maintenance
<b>Junta de Andalucía</b>	Plan de Optimización Energética. General plan following the national regulations.
<b>Province of Limburg</b>	Make city Logistics climate friendly

<b>Residential buildings</b>	
<b>City</b>	<b>Measure</b>
<b>Barcelona</b>	<p>1. Mechanisms for monitoring the implementation of comprehensive energy efficiency measures in housing sector</p> <p>2. Energy efficiency improvement in housing refurbishment</p> <p>3. Promote use of DHC systems in housing.</p>
<b>Lille Métropole</b>	<p>1. Measures to Renovate private (improve advice and support for individuals to engage decision, improve the financing of the renovation) and social (as part of the Regional convention "100.000 lodgements") housing and to improve the quality of new buildings. Examples of Action: "Energy housing rehabilitation: 13700 social housing units and 14500 private dwellings (2012-2014)".</p> <p>2. .- Energy efficiency improvement :S In 2009, Lille Métropole built, together with the social housing stakeholders, the "BBC+ referentiel", which defines four quality and thermic criteria for new buildings (The french so-called "RT 2012", new code from the "Grenelle 1" law has further strengthened the requirements for energy efficiency of the new buildings since the 1<sup>st</sup> of January 2013).</p>
<b>Munich</b>	<p>1. District heating grid: change over from steam to high temperature water</p> <p>2. Update of the energy standard for both old and new buildings</p>
<b>Turin</b>	<p>1. Incentives to integrate solar photovoltaics in residential buildings</p> <p>2. Re-qualification project of Arquata district, comprising of 30 residential houses owned by the Agenzia Territoriale per la Casa</p> <p>3. Expansion of the district heating residential buildings that will be connected to district heating amount to a total volume of 58.579.000 m<sup>3</sup> by the year 2020</p> <p>4. Deduction of tax charges for upgrading the energy efficiency of existing buildings The Italian Law provides for deductions of 55% in 3 years for the costs of upgrading the energy efficiency of existing buildings</p>
<b>Stockholm</b>	<p>1. Optimization of heating and ventilation systems, conversion to district heating heat pumps and biomass, added insulation (facades and windows), refurbishment of real estate built in the 50's and 60's.</p>
<b>Amsterdam</b>	<p>1. From 2015 to 2025 only climate neutral buildings to be constructed in AMS</p> <p>2. From 2025 to 2040, existing buildings must be class B</p>
<b>Bristol</b>	<p>1. Pursue Green Deal opportunities for energy efficiency of social &amp; private housing</p> <p>2. Deliver innovative ICT solutions (incl. smart metering) in social housing to save energy, shift consumption to off-peak &amp; reduce carbon</p>
<b>Ostrava</b>	<p>1. The programme "New Green Light for Savings" support additional</p>

	<p>thermal insulation, replacement of windows (improvement of building energy performance) the use of solar thermal panels for hot water preparation in family houses, the use of heat pumps and solar panels in new</p> <p>2. Support to new housing designed for target groups of inhabitants (pensioners, people in poverty, youth leaving youth/children homes, socially weaker youth families, adult children gaining independence) completed at a low-energy standard</p>
<b>Tallin</b>	Renovation the dwellings buildings and increasing efficiency of the equipment
<b>Pilea Hortiatis</b>	1.Promotion of solar heating systems PVs on the private buildings roofs (National Development subvention program)
<b>Sonderborg</b>	1.Various solutions meant to include RES into the district heating system and to increase efficiency of the system 2.10 MW solar cells are mounted on suitable roofs / surfaces in the area.
<b>Burgas</b>	1.Use of biomass for heating of private buildings
<b>Junta de Andalucía</b>	Increase the area of solar thermal in the municipality. Target: install solar heating in 500 homes already built
<b>Province of Limburg</b>	1.Giving discounts for sustainable construction advice (Dubolimborg) 2. "Flemish energy loan" promoted by the Flemish Ministry and managed by Duwolim: anyone can borrow at an interest rate of 2%. For specific groups borrowing at 0% is possible. One of the conditions: the dwelling must be inhabited within 2 years after entering into the Duwolim loan.

### Urban road transportation (including municipal fleet, public transport, private transport)

<b>City</b>	<b>Measure</b>
<b>London</b>	<p>Low Carbon strategy for the transport sector:</p> <ol style="list-style-type: none"> <li>1. Introducing automatic train control across the tube network.</li> <li>2. Providing training on energy efficient driving styles to drivers of non-automatic railways and to London's bus drivers.</li> <li>3. Reaching the milestone of 100,000 electric vehicles on London's roads by 2020 or earlier if possible.</li> <li>4. Introducing 1,000 electric vehicles into the municipal group fleet by 2015, encouraging London boroughs and private fleet operators to do the same.</li> <li>5. Delivering 25,000 electric vehicle charging points by 2015 and another one of 100,000 point by 2020.</li> <li>6. Supporting the hydrogen market through the support for transport and stationary fuel cell applications</li> <li>7. All new buses introduced to the London bus fleet to be hybrid vehicles from 2012.</li> </ol>
<b>Barcelona</b>	<ol style="list-style-type: none"> <li>1. New bus network with improved efficiency</li> <li>2. Reduction of the circulation of empty taxis</li> <li>3. Green Label for less polluting cars</li> <li>4. Implementation of Barcelona Urban Mobility Plan projects</li> </ol>
<b>Lille Métropole</b>	<ol style="list-style-type: none"> <li>1. Facilitate access to public transportation (Metro, Bus, Tram ). Example of Actions "Doubling metro trains", "Increasing metro frequency". "Development of use waterways and railways", "Optimize the use of the</li> </ol>

	<p>road freight".</p> <p>2. Improve intermodal transport and promote the practice. Example of action "Develop a noncontact intermodal ticketing" (single Ticket "Carte Pass Pass" for all the public transport modes).</p> <p>3. Developing alternative to motorized individual vehicles: Facilitate access to public transportation and Improve intermodal transport (see Public Transport) . Examples of action "Develop the cycle network, parking and offer self-service bicycle" (the target is an increase from 2% to 10% of the use of bicycle).</p> <p>4. Accompanying the change of use of the car and the space dedicated. Example of actions: "implement policy carpooling (internet website, parking)", "Development of car sharing".</p>
<b>Munich</b>	<p>1. Bus and Tram development</p> <p>2. Use of economical drive technologies in cars</p>
<b>Turin</b>	<p>1. Completion of the subway line no.1 and construction of line no.2</p> <p>2. Modernization of the public transport fleet: - renewal of the fleet of the Local Public Transport: purchase of 508 new buses, including 100 CNG, 395 EEV diesel, the new buses will replace those Euro 0 and Euro 1.</p> <p>3. Rationalization of private transports Replacement of private vehicles with clean and efficient vehicles: - promote the transformation of private vehicles with LPG fuel: 16,199 substitution with LPG, and 1120 with Natural Gas, from 2005 to 2009. - installation of a network of battery recharging</p> <p>4. Increase of cycling: - Development of road cycling: the construction of new runways and improvement of existing runways - Supply of bike parking's at train and subway stations - Start-up of bike-sharing</p>
<b>Stockholm</b>	100% clean vehicles for business travel in the city
<b>Bristol</b>	<p>1. Work to achieve the European Green Public Procurement Policy Core requirements for Vehicle Purchasing</p> <p>2. Deliver Local Sustainable Transport Fund projects</p> <p>3. Deliver 'Source Bristol' electric vehicle infrastructure projects</p>
<b>Tallin</b>	Supplying 85 new more efficient busses
<b>Colmar</b>	New urban mobility plan
<b>Larnaka</b>	<p>1.- Bike Renting system during high touristic season(privatetrans)</p> <p>2.- Free parking for eco cars (hybrid and electric)</p>
<b>Sonderborg</b>	<p>1.-Fleet optimization, purchase of energy efficient vehicles, use of alternative fuel sources, Electric bikes</p> <p>2.- Creation of the Green Transportation Center in order to "create a service and logistics center for professional transportation (cargo, business traffic and public traffic) that will yield synergies in the form of coordination of different types of transportation resulting in a large capacity at lower cost." The center will act as the gate of the city and it will filter and minimize the transportation needs towards the city.</p>
<b>Burgas</b>	<p>1. Optimize the mileage of busses of the public transport</p> <p>2. Building of bicycle lines; Establishment of system for bike renting</p>
<b>Junta de Andalucía</b>	Development of a Plan de Movilidad Urbana Sostenible
<b>Province of Limburg</b>	Eliminating barriers to introduction of hybrid and plug-in electric battery vehicles

<b>Others</b>	
<b>City</b>	<b>Measure</b>
<b>Barcelona</b>	<ol style="list-style-type: none"> <li>1. Agreement between Barcelona City Council and other entities to promote energy efficiency in industrial sector</li> <li>2. Sludge drying for energy recovery</li> <li>3. Educative program for energy consumption schools data</li> <li>4. User-friendly energy-meters in household</li> </ol>
<b>Lille Métropole</b>	<ol style="list-style-type: none"> <li>1. Develop economic sector of eco-construction and eco-renovation ("Plan Métropolitain de Développement économique"). Example of action : "Train professionals and develop labeled companies (continuation of Vertuoze program)"</li> <li>2. Action "Financially support businesses promoting renewable energy"</li> <li>3. Control of urban sprawl: Control of the average rate of soil sealing, higher building density targets, focus on functional diversity (space of homes, shops, services ...) to create an area of "short distances" and favor urban development in connection with urban transport, activities and services.</li> </ol>
<b>Munich</b>	<ol style="list-style-type: none"> <li>1. Programs for energy efficient behaviour</li> <li>2. Friendly driving</li> </ol>
<b>Turin</b>	<ol style="list-style-type: none"> <li>1. Incentives for Increasing energy efficiency in production processes - regional incentives for the installation of high-efficiency electrical devices, for improved process technologies and the introduction of plants fueled by renewable source</li> <li>2. Energy Center and Test Site Implementation of settlements and technological services and research for the local energy industry</li> <li>3. Energy Projects The project involves the start-up of an info-point and decentralized branches, located in all 10 districts of Turin, to offer citizens, businesses and professionals information on regulations and technologies for energy efficiency and use</li> <li>4. Advisory service and training for businesses and public bodies on green building provided by Environment Park</li> <li>5. Training courses for citizens, municipal employees etc..</li> </ol>
<b>Stockholm</b>	Climate Smart Stockholmers (information efforts on sustainable transport and EE in buildings)
<b>Dublin</b>	<ol style="list-style-type: none"> <li>1. Mobility manager &amp; eco driving campaign</li> <li>2. "Workplace travel plan"</li> </ol>
<b>Amsterdam</b>	<ol style="list-style-type: none"> <li>1. EE fund</li> <li>2. Efficient ICT</li> </ol>
<b>Bristol</b>	Deliver the 'Green Finger' schools project & 'Smart Spaces'
<b>Tallin</b>	<ol style="list-style-type: none"> <li>1. Strategic urban planning the Districts of kristiine, Põhja-Tallinn, Nõmme and kesklinn</li> <li>2. Working with citizens and stakeholders Advices for the renovation of the residential, tertiary buildings, includes additional thermal insulation and heat and ventilations systems</li> </ol>
<b>Colmar</b>	<ol style="list-style-type: none"> <li>1. Actions on energetic efficiency saving and improvement e.g. "Support to social lessors for energetic renovation of their buildings" action: a new social residential development is planned.</li> </ol>

	2. Initiative and awareness actions: many grants, animations, guidebook, Info Energy Office, .. )
<b>Pilea Hortiatis</b>	1.Pilot demonstrative project on Energy efficiency Measures and RES technologies at a Municipal School 2.Supply of information and advisory services through the Citizens Services Centres AND the Municipal Energy Agency 3. Preschool / school aged children awareness raising
<b>Larnaka</b>	1.No lighting day (awareness) 2.Bicycle motion day (once a year)
<b>Sonderborg</b>	1. developing an atlas with detailed information about the buildings of the city, with different layers of details which would be used by different stakeholders from city authorities, for deciding on issues like district heating planning, to market stakeholders, for the development of package deals, offers for bulk discount etc.  2. a network of energy advisors from the construction industry which would spread information about the benefits of the energy renovation through marketing methods which involve direct contact with the homeowner such as: "tupperware" method (small/medium gatherings organized for example in a private home involving the neighbors ) and consultancy caravan.
<b>Burgas</b>	1. Energy efficiency in sector Industry 2.Behavioural change for use of private cars; Expanding of parking "blue zone"; Traffic lights "green wave"; 3.Development of ESCO for funding; Development of a system for work with NGOs for projects on the territory of Burgas Municipality
<b>Province of Limburg</b>	1.Several initiatives of awareness raising and advisory services to citizens 2.Climate friendly entrepreneurship as a selection criterion for use on industrial sites (Climate Neutrality Kris talpark III)

<b>RES</b>	
<b>City</b>	<b>Measure</b>
<b>Barcelona</b>	1. Proposal to simplify the legalization of small renewable energy systems 2. Feasibility study of third-party operation of solar thermal installations 3.- Promote medium and large PV systems with public participative systems 4.- Solar cooling pilot system
<b>Lille Métropole</b>	1.Action "Production of electricity at the purification plant" (1999-2020) 2.Action "Recovery biogas from the purification plant" (2014-2020) 3.Action "Recovery biogas-fuel from organic waste (household biowaste) at organic recovery center" (2011-2020)
<b>Munich</b>	1.-Additional financial resources for renewable energy 2.- use of geothermal energy/ feed in public power supply of district heat by SWM

<b>Turin</b>	<p>1. Diffusion of Solar Thermal for water heating in compliance with health and hygiene requirements of the LR 13/2007 Interest-rate subsidy for upgrading the energy efficiency of buildings</p> <p>2. Production of electricity from urban solid wastes: -Recovery of landfill biogas at Basse di Stura allows the production of electricity fed into the public grid</p>
<b>Stockholm</b>	50% of coal converted to renewable fuels
<b>Amsterdam</b>	Development of wind power in the port area
<b>Bristol</b>	<p>1. Install 10 biomass boilers in Council buildings</p> <p>2. Install 35 Solar PV systems in schools</p> <p>3. Promote solar PV uptake through an online rooftop solar resource map</p> <p>4. Procure the construction of 2 large wind turbines at Avonmouth</p>
<b>Tallin</b>	<p>1. Building waste burning CHP Plant</p> <p>2. Building wood chips burning CHP Plant</p>
<b>Colmar</b>	"Building of a new heating system" which will use more than 75% of renewable energy (biomass) and deserve 16000 accommodations (note that the reported 1999 end time in the template is wrong). Estimated CO2 emission reduction is 7000 tCO2/y
<b>Faro</b>	Waste management cogeneration
<b>Larnaka</b>	Free of charge provided services to the citizens (about RES etc)( advisory services)
<b>Sonderborg</b>	<p>1.- Biogas for heat, process and transport. Biogas production facilities will be constructed in one or more suitable locations for the utilization of the black biomass with added booster to produce biogas that will be upgraded to the natural gas network, for direct supply to companies and/or for use in the conversion of heavy transportation (busses).</p> <p>2.- Coastal-near offshore wind turbines. The construction of a coastal-near offshore wind park of 80+ MW is not included in the 2020 goal, however if it is constructed it will contribute to an enormous additional reduction of the Sonderborg area's CO2 emission and great</p>
<b>Burgas</b>	<p>1. Introduction of requirements for use of energy of RES in public procurements</p> <p>2. Increase the qualification of the municipal employees; Training of directors and managers of municipal buildings for energy management; Introduction of EE and RES in the educational system through development of projects</p>
<b>Limburg</b>	Giving a premium for solar water heaters

## ANNEX 4 City profiles

### LONDON (UK)

#### **1. - City description.**

London is the UK capital city with 8.6 million inhabitants (2015). Its urban area covers 1,572 sq km and it represents the largest metropolis that joined the CoM initiative up to now and part of the C40 initiative. Since 1990 London's population has increased steadily and thanks to the steady growth in economic activity (mainly in the Workplaces sector), between 1990 and 2000, CO<sub>2</sub> emissions have also increased by 12.3% to 50.31MtCO<sub>2</sub>. Nevertheless, despite the continued economic and population increase, from 2000 to 2008 London's emissions have dropped by 11% to 44.71 MtCO<sub>2</sub>.<sup>[1]</sup> This represents 8.5% when compared to the total UK CO<sub>2</sub> emissions .

The primary source of CO<sub>2</sub> emissions in London are associated to the use of electricity and other fossil fuels in the buildings' sectors (42% Workplaces and 36% Homes) followed by Transport (22%).

As a world city, London has a crucial role to play in reducing emissions and moving towards new sustainable energy generation and consumption. For this reason Government's 2009 UK Low Transition Plan was adapted by the Mayor's climate change and mitigation programme. The focus of this strategy is based on the commitment of the local government action as a starting point to reduce CO<sub>2</sub> emissions in London ensuring a better quality of life for Londoners and visitors as well as delivering environmental benefits such as saving energy, reducing waste and conserving water.

#### **2.- The city joining the CoM**

London has a strong political commitment to exceed the EU 2020 target. They committed to a 60% reduction of CO<sub>2</sub> emissions by 2025 (compared to 1990 baseline) and at least meeting the UK target of 80% reduction by 2050. Also two interim targets to reduce CO<sub>2</sub> emissions by 20% by 2015 and 40% by 2020 were set up. Approved by Greater London Authority and submitted in 2011, the SEAP structure does not entirely follow the CoM Guidebook "How to develop a Sustainable Energy Action Plan" nevertheless, the

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<sup>[1]</sup> This is mainly due to a number of factors, e.g. the lower carbon intensity of the national electricity supply over that period and the growing proportion of London's economy accounted for by the service industry.

Mayor's Climate Change and Mitigation Strategy clearly describes a set of actions and policies to tackle CO2 emissions making the city more sustainable and more energy efficient.

A baseline Emissions Inventory (2008) at local level has been performed by The London Energy and Greenhouse Gas Inventory (LEGGI) in three main sectors: work places<sup>[2]</sup>, homes and transport. Energy consumption is divided by energy carrier, sectors and energy use (space heating, water heating, computing, lighting, cooking&catering, cooling&ventilation) and from the Climate Change Mitigation and Energy Strategy document is clear that the main priority areas are on energy efficiency in homes and workplaces.

A particular strength related to the elaboration of the BEI is attributed to the three different scopes developed. Namely Scope 1 (Geographical scope) focussing on CO2 emissions derived by the use of energy in : buildings, infrastructure and transport that occur within Greater London. Scope 2 (Source of emissions) associated to the London's consumption of purchased electricity – irrespective of whether this is generated inside or outside the Greater London's area. Scope 3 (emissions not included) which refer to all other indirect emissions not covered by scope 2.<sup>[3]</sup> Also 3 different scenarios have been developed to project CO2 emissions' reduction: a BaU scenario; one scenario based on the Committed Government intervention and one based on Committed Mayoral action which, once again, shows the strong political commitment. In addition to this, a cost evaluation analysis<sup>[4]</sup> has been performed on the economic developments that will deliver reductions in carbon intensity which should drive London to the low global carbon economy.

### **3. - SEAP**

The Climate Change Mitigation and Energy Strategy sets out policies and actions to make London a cleaner and greener capital city . The Mayor's vision within this strategy is to move towards a more sustainable, lower carbon foot print and improving the quality of life for Londoners by implementing an action plan based on three main pillars:

- Retrofitting London existing building by reducing CO2 emissions, energy and water

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<sup>[2]</sup> London's workplaces sector is very diverse and includes a wide range of organisations from the public, private and service sectors. These include banks, retailers, manufacturers, government, charities, schools and hospitals.

<sup>[3]</sup> Scope 3 example are emissions associated with London's consumption of good & services production of waste and travelling to and from the capital

<sup>[4]</sup> In 2011 a Low carbon Market Snapshot was commissioned by the Mayor of London to assess the position of London in the global markets for low carbon and environmental goods and services and to identify the value of London's share of this.

consumption creating new jobs and most importantly saving London business and homes money on energy bills;

- Greening London through the RE:LEAF ( a partnership campaign to protect London trees and encourage individual Londoners, businesses and organisations to plant more trees)and the London Green Grid increasing tree cover by 5% by 2025<sup>[5]</sup> and improving the network of inter-linked high quality open and green spaces
- Cleaner Air for London. This programme focuses on the introduction of tougher standards for the Low emissions zones, phasing out old and high polluting black cabs, introduction of hybrid and hydrogen buses as well as fitting older buses with filters to curb pollution. In addition to this, London has introduced the UK first city wide electric vehicle charging network and membership scheme. Also a wide spread bike sharing system has been successfully implemented. Further steps have being taken to tackle emissions in some of the busiest streets in London (e.g. dust suppressant that prevents PM10 from re-circulating in the atmosphere and the installation of trap pollutants).

Although the above pillars highlight the main programmes for London's strategy to reduce CO2 emissions, it should be noted that 2 out of 3 are outside the scope of the CoM. Nevertheless, in order to ensure the objective of this strategy is met, the contribution of national policies is crucial. It is also envisaged that private sector investment will contribute to finance the implementation of activities required to tackle CO2 emissions and implement EE measures.

The Action Plan is divided into 9 main chapters each of them focussing on a particular aspect of the London's climate strategy and some annexes listing all the policies and measures with their estimated CO2 emissions reduction. Securing a Low carbon energy supply for London, London's Homes (Buildings), Cutting costs and CO2 in London's Workplaces (Services), Building towards a zero carbon London, Moving towards zero emission Transport in London, Setting an example through the GLA group (exemplary role of the public sector), Evaluating and monitoring the success of the strategy.

Concerning the energy supply, the Mayor's goal is to supply buildings, businesses and infrastructure with efficient, affordable and secure low energy carbon energy by 2025. The section includes a comprehensive snapshot of current CO2 emission in the energy supply in 2008 (baseline), by sector and source, as well as an estimation of CO2 emissions reduction for the different scenarios: BAU, committed government action,

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<sup>[5]</sup> One tree for every Londoner

committed mayoral action, further government action.

The buildings chapter broadly explains the major policies that will contribute towards the strategy namely: 1) retrofitting existing homes with EE measures, water efficiency measures and low and zero carbon microgeneration technologies 2) Tackling and eradicate fuel poverty by 2016.

The main measures addressing the building sector are:

- *RE:NEW* programme for increasing the use of energy efficiency measures to London's homes and providing advice on easy to install measures to 1.2million homes;
- *RE:CONNECT* programme which focuses on cutting CO2 emissions in local communities located in ten Low carbon zones by 20.12% by 2012 and by 60% by 2025 (based on 1990 levels);

The government's support to reduce fuel poverty is represented by the Green Deal[6] and by ECO (Energy Company Obligation)[7].

Despite, the significant number of measures and government support to improve insulation in London's building stock, due to the structure of the buildings (50% of London's home are flats where microgeneration technologies are more difficult to be installed), 70% of London's homes are considered hard to treat.

The SEAP also includes successful Case studies related to RE:NEW and RE:CONNECT demonstration projects. The Government has a range of initiatives using energy efficiency as one of the ways of addressing fuel poverty. Furthermore London committed to have, by 2025, all new buildings to be zero carbon and built with high energy efficiency standards, supplied partially by low and zero decentralised energy.

The Workplaces section clearly elaborates how the city of London will roll out the retrofitting workplaces programme by implementing energy efficiency measures as well as low and zero carbon microgeneration technologies. The main measure and the success of the above policy will depend on whether the RE:FIT programme will be rolled out to the commercial sector and whether the RE-NEW programme<sup>[8]</sup> will be extended to SMEs. If so, emissions from the workplaces sector will reduce by an additional 2.44 MtCo2 in 2025 in addition to the BAU scenario estimates of 17.60MtCO2.<sup>[9]</sup>

The RE:FIT programme applies an innovative commercial model to support the

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[6] This scheme provides final energy users upfront finance to pay for energy efficiency measure. The finance will be paid back through the bills by the energy savings that will be generated.

[7] Replacing CERT and CESP and the WARM Front Scheme this energy suppliers and generators' obligation will continue to provide heating improvements to those who are struggling to keep warm affordably.

[8] Although the adaptation of the RE:NEW programme to support SMEs would require significant investment to expand

[9] Compared to 2008 baseline of 18.88 MtCO2

retrofitting of public sector buildings with energy efficiency measures. The programme has already retrofitted 42 GLA group buildings and is now being expanded to provide support to all of London's public sector buildings. Chapter 9 illustrates how the Mayor intends to reduce emissions and energy consumption levels in the Transport sector by 2025. London considered itself as a leader in low carbon transport vehicles and fuels and will continue to move away from private car use to public transport and cycling also thanks to the successful Barclays bike sharing scheme. With the support provided by TfL (Transport for London) the Mayor further improved the public transport by extending and upgrading the London Underground as part of the 2012 Olympic Games transport infrastructure improvements. Successful scheme like Car2go and new hydrogen and hybrid buses have been introduced with the latest expected to have fuel consumption 40% better than the traditional buses. Although the achievement of CO2 emissions reduction derived by Mayoral actions is very challenging,<sup>[10]</sup> the Mayor's target remains 60% reductions by 2025 (compared to 1990 baseline) and it may need some adjustments. Finally the SEAPs underlines the exemplary role of the public sector which continue to lead on reducing GHGs, minimising emissions from energy supply in existing and new buildings and through sustainable public procurements choices.

#### **4.- Implementation and monitoring**

The Mayor has adopted a number of programmes to tackle CO2 emission and he is very committed to monitor on a yearly basis the results of the measures to be implemented in the city of London amongst three main sectors (work places, homes and transport). Annex B provides a detailed section on the implementation plan London will adopt to ensure the policies and action described in the strategy are followed up. All the actions are linked to a specific policy and are sufficiently described. They include a lead organization, the partners involved and a time scale. It is foreseen that by 2025 London continues to be one of the world's leading cities to measure and report its direct and indirect CO2 emission and for assessing the progress of the Mayor's climate change and mitigation programmes on a yearly basis as well as assessing the potentials for future programmes. A peculiarity of the strategy is that includes the assessment of Scope 3 (Other indirect emission) which occur at sources that are not owned or controlled by the consumer, e.g. those associated with the production and disposal of material goods . This can be considered an added value when compared to other SEAPs.

#### **5.- Overall conclusions**

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<sup>[10]</sup> Please note around 80% of transport emissions in London are linked to aviation, road and freight cars therefore the most efficient actors able to reduce emissions are represented by national and international bodies that can implement vehicle emission standards and taxation.

A clear distinction should be made between the exhaustive and detailed information reported in the SEAP document "Delivery London's Energy Future" and the poor information included in the SEAP template. However, even though not all the measures and figures are reported on the CoM online template it should be acknowledged London has developed a comprehensive plan. The Mayor's approach to tackle CO2 emissions reduction is very ambitious (60% reduction by 2025 and 80% reduction by 2050). In addition to this, London committed to a reduction of CO2 emissions from energy supply including provision of 25% of London's energy from decentralised sources by 2025. The strategy presented in the SEAP carefully outlines the guidelines for the climate change mitigation and energy plan that have been undertaken in London. The policy and measures described in the document cover all the main sectors recommended by the Covenant, even if they are differently aggregated: Homes (Residential buildings in Covenant), Workplaces (covering three Covenant sectors: Municipal, Tertiary and Industry ( non ETS) ) , Transport as well as energy supply. The exemplary role of the public sector is illustrated in the document by the continuous effort made by the GLA group (Great London Authority) to minimise the emissions from energy supply in existing and new buildings as well as from the transport sector. <sup>[11]</sup>

The financial aspect is also extensively discussed. In order to fund the strategy the Mayor of London is using existing public sector to unlock private sector investment. The London Green Fund aims to leverage further funding from other government sources, development banks, sovereign funds and infrastructure funds to reach £500 million. He has supported the establishment of the Green Investment Bank so that it can complement the activities of the London Green Fund and he intends to work with the public and private sector to explore opportunities for securing additional sources of funding, such as European funds, for businesses to develop low carbon innovation, research and business activity. Despite the economic crisis London seems to be well placed to capitalize on this economic opportunity from the transition to a low carbon capital. The involvement of community and national stakeholders is also described in some of the programmes and measures that have been implemented.

Overall, although the 60 % London target by 2025 was and remains more ambitious than that the one set for the UK as a whole (50% reduction by 2023-2027), recent analyses estimate that due to the rapid increased of its population (expected to reach 8.8 million by 2017 and 10 million by 2031) London has to do an effort in order to meet the overall carbon reduction target. Having said that, the policies and measures

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<sup>[11]</sup> Measuring and publicly reporting CO2 emissions, sharing best practices on procurement and using the most carbon efficient mode of transport.

described in the plan complemented by the government and mayoral financial support to reduce CO2 emissions reduction, to mitigate climate change and to make London a low carbon capital city in the world seems to be realistic .

## BARCELONA (ES)

### **1. - City description.**

Barcelona is the capital city of the autonomous community of Catalonia in Spain and the country's second largest city, with a population of 1.6 million within its administrative limits. Its urban area extends beyond the administrative city limits with a population of around 4.5 million people, being the sixth-most populous urban area in the European Union after Paris, London, Madrid, the Ruhr area and Milan. It is the largest metropolis on the Mediterranean Sea, located on the coast between the mouths of the rivers Llobregat and Besòs, and bounded to the west by the Serra de Collserola mountain range, the tallest peak of which is 512 metres (1,680 ft) high.

Besieged several times during its history, Barcelona has a rich cultural heritage and is today an important cultural centre and a major tourist destination. Particularly renowned are the architectural works of Antoni Gaudí and Lluís Domènech i Montaner, which have been designated UNESCO World Heritage Sites. The headquarters of the Union for the Mediterranean is located in Barcelona. The city is known for hosting the 1992 Summer Olympics as well as world-class conferences and expositions and also many international sport tournaments.

Barcelona is one of the world's leading tourist, economic, trade fair and cultural centres, and its influence in commerce, education, entertainment, media, fashion, science, and the arts all contribute to its status as one of the world's major global cities.

### **2.- The city joining the CoM**

Barcelona joined the Covenant of Mayors in 2009 and its Energy Agency was assigned by the City Council to lead the drafting of the PECQ Energy PlanSEAP. Committing to a 23% reduction target following the IPCC approach and reporting in CO<sub>2</sub><sub>equiv</sub> units.

Three fully-dedicated staff from Barcelona Energy Agency work on the PECQ Energy Plan writing and coordination. This includes calculating and writing tasks, coordinating research studies by third parties, and bringing together all other energetic improvement strategies of the different City Council areas. If third parties working for the PECQ Energy Plan are included, it can be said that a staff of up to 30 persons are in one way

or another participating in the Plan's drafting.

A consultation process was established for the PECQ Energy Plan conceptualization. Five groups including different stakeholders were created in order to set the PECQ Energy Plan targets. These same groups will be consulted during the writing process, as well as before the Plan's delivery, including the Agenda 21 groups, both industrial, technical and social specialists and interest groups, and municipal and regional powers.

PECQ Energy Plan drafting is financed with public funding by the City Council, while the resulting projects financing may be from both public and private sources.

A report with the project status monitoring will be delivered annually

### **3. - SEAP**

Barcelona's SEAP, called PECQ (Energy, Climate Change and Air Quality Plan of Barcelona) is a good structured document and fully compliant with the CoM requirements. An extensive process of participation has been carried out with citizens and groups of interest in the drafting of the plan, which has gathered more than 250 participants: experts and organizations or associations representatives, firms, professional associations, trade unions, guilds, political parties, universities and research centres, as well as administrations and public companies. At the end of this process, over nine hundred contributions have been collected.

It is structured following a specific structure:

The City Programme (85 projects) refers to the entire general aspects of the city, except those that are the direct competence of the Municipal Authority. It includes the following sectors: domestic, commercial, industrial, road mobility (excluding municipal vehicles), public transport, energy generation, waste management, etc.

The Municipal Programme (23 projects) is an action plan that encompasses only direct municipal competences. It includes municipal buildings, lighting, public services, green spaces, municipal vehicle sand waste collection, etc.

As Barcelona forms part of a wider territory, not only from an administrative and functional point of view (metropolitan area) but also from the perspective of the ecosystem, issues relating to energy management systems, air quality and climate change must extend to, at least, the metropolitan area and cannot be limited to municipal boundaries.

The plan define several groups of actions:

1.-Residential scope RES from RES1 to 4, including actions in residential buildings and

also included under "Others" sector, like behavioural campaign about domestic use of elects.

2.-Industrial sector IND1-IND9. Including PV measures that could match in production fields, non-industrial related

3.-Network sector XAR from 1 to 7. Smart grids related

4.- Commercial and services sector COM1 to 6

5.- Renewable Generation and special regime ER1 to ER14

6.- Transport sector, until TR18

7.- Waste management . RSU 1 to 3 8 out of scope)

8 .General sector GEO to 14

9.- Port / Airport measures : AE 01 to AE 03 and PO01 to PO07

10.- Public buildings until PU13

11. -Public services SP until 3

12.- Public lighting EN 1 and 2

13.- Public Fleet until 5

The municipal Programme's set of projects will be implemented through the PECQ's ten year scope, and divided into three successive action plans: 2010-2011, 2012-2015 and 2016-2020- so they cover short medium and long term.

#### **4. - Implementation and monitoring**

The PECQ also plans to monitor future changes in energy consumption and emissions in the city as well as the degree of implementation of each of the projects it contains. This monitoring will, essentially, be based on annual energy balances prepared by the Energy Observatory, managed by the Barcelona Energy Agency, and also by means of a battery of indicators. With regard to the indicators, two review methods have been defined based on two kinds of indicators:

- **ACTION INDICATORS:** those that are directly linked to the actions carried out by the body responsible for executing the Plan. They make it possible, therefore, to assess the degree of compliance with the actions set out in the Strategic Action Plan, irrespective of whether the responsibility for carrying them out is the Council's or that of the public and private bodies involved. The action indicators are objective in that their assessment is based on measurable data. For example, an action indicator could be to increase installed photovoltaic power in the City by means of the PECQ's projects in terms of the

total power that the PECQ sets as a target.

- **REACTION INDICATORS:** those that aim to show trends in macro data about Barcelona from an energy and environmental perspective. Reaction indicators are more complex than action indicators in that they are influenced by other factors that are exogenous to the execution of the PECQ (the energy situation and economic climate in the city, climatic effects that may cause changes in energy consumption or generation, any changes in the electricity mix, and, even, how close to reality the baseline scenario defined in the PECQ is, amongst other factors). For example, a reaction indicator related to a previous action could be the percentage of renewable energy generated in the city compared with total energy consumed in the city.

The aim of these two kinds of monitoring indicators is, on the one hand to follow up accurately the implementation of the PECQ's projects, and, on the other hand, to monitor their impact on the city and on the city's macro data in order to assess the real impact and overall reach of the Plan on an ongoing and comprehensive basis.

Each of the projects defines an implementation timetable for the next few years along with the units of measurement that will make it possible to evaluate the degree to which each project has been implemented – and for the projects as a whole - and to follow up the implementation of the PECQ in accordance with the action indicators. These units of measurement are: "kW of installed power", "m2 of panels", "vehicles", "housing", "survey", "lighting fittings", "buses", and "project", amongst others.

### **5.- Overall conclusions**

Barcelona's PECQ (Energy, Climate Change and Air Quality Plan of Barcelona) is a plan hosted by Barcelona's City Council aiming to provide Public Administration with strategic tools in order to improve citizens' health, as well as to improve Planet health by increasing energy efficiency and reducing greenhouse gas emissions together with other local effect pollutants. This is a clear example of adaptation of an existent program to theCoM

## LILLE METROPOLE (FR)

### **1. City description**

The population and socio-economic characteristics of the Lille Metropolitan Urban Community, as described in Lille Métropole's Action Plan for the year 2007 are summarized hereafter:

- 1,1 millions of inhabitants (4<sup>th</sup> national rank in terms of population and 2<sup>nd</sup> national rank in term of population density), in 85 municipalities.
- Regional capital with about 1/3 of the entire regional population and employment
- Multi-polar and heterogeneous agglomeration with a strong urban sprawl
- Strategic position, at the crossroads of European exchanges
- Many economic activities generating significant flow of goods
- Almost 50% of agricultural land, as well as various natural areas
- Significant loss of industrial activity since 1990 and high conversion to the tertiary sector
- High unemployment and large number of inhabitants receiving minimum social benefits
- Significant proportion of degraded habitat

### **2. The city joining the CoM**

#### 2.1. Organisation and political commitment

The SEAP of Lille Métropole was developed as part of the implementation of the "Territorial Sustainable Development Plan" (Plan Climat Energie Territorial - PCET), which is mandatory in France since 2012, for all cities and urban communities above 50.000 inhabitants ("Grenelle" laws). The PCET defines the strategic objectives and actions in order to mitigate and reduce emissions of greenhouse gases and to adapt the territory to climate change. It must be made public and reviewed within 5 years from the date of its adoption, and be then reviewed every 3 years.

The PCET of Lille Métropole is part of its overall sustainable development policy and is not its first commitment to Climate-Energy initiatives:

- 2006: Adhesion to "Agenda 21".

- 2011: Adhesion to CoM
- 2011-2012: Contribution to the definition of the Regional plan on Climate, Air and Energy (SRCAE, in French). The SRCAE, which also comes from the "Grenelle" national laws, establishes the guidelines for mitigating the effects of climate change by 2020. It builds and adapts measures at regional level in accordance with the national plan and EU targets. The SRCAE of the Nord-Pas-de Calais region was approved on 24/10/2012.
- 2013: Adoption of the action plan "Plan Climat-Energie Territorial de Lille Métropole" and its submission to CoM.
- 2014: Acceptation of the action plan by CoM

## 2.2. BEI description

The Action plan of Lille Métropole metropolitan urban community reports:

- 1990 CO<sub>2</sub> emissions of 8.2 million tonnes (in CO<sub>2</sub> equivalent).
- 21% decrease in CO<sub>2</sub> emissions from 1990 to 2007, mainly due to the de-industrialization (decrease by 75,6% of industry emissions), which hides significant emission increases in the residential (+ 20%) and transport (+ 28%) sectors.
- 2007 emissions of about 6.7 million tonnes of CO<sub>2</sub> equivalent, about 46% and 39% of which was due to emissions from transport and buildings, respectively. The municipal facilities/activities were estimated to be responsible for only 3.5% of the total emissions.

The 1990 and 2007 inventories were elaborated in the frame of the city's commitment to the French PCET action plan. Since the inventories developed for the PCET follow a methodology different to the one of the Covenant, the emission data and the trends and forecasts patterns are reported for sectors (Agriculture, Industry, Residential, Tertiary and Transport) that cannot be compared in a straightforward manner to Covenant sectors. Details on the emissions and on the inventory methodology that would allow to check the redistribution of the data according to the Covenant framework are missing., However, we note that an effort was made to redistribute the emissions into the 3 mandatory sectors (Buildings, Transport and Other), even if the matching is not fully met ( the "Municipal buildings and equipment/facilities" key sector is missing). While integrating emissions from industries – notably for industries part of EU Emission trading scheme (ETS) - is usually not recommended, they are included in the Lille Métropole BEI and action plan, as they are essential for the city to reach its reduction target.

## **3. The SEAP**

The Action Plan provides a detailed analysis of the current framework in terms of energy consumption/production, CO<sub>2</sub> emissions, as well as legal, economic and social points of view. A consistent and comprehensive Action Plan has been built to reduce energy consumption in the residential and transport most emitting sectors, through a collective approach, involving a large number of other voluntary public and private actors. It includes 86 actions (only 20 of which being "new actions" specifically set for the PCET Territorial Action Plan) carried out by 5 voluntary municipalities (34 actions) and 28 (52 actions) stakeholders, within 9 main strategic axes, which are:

1. Initiating the energy transition
2. Establishing a strategy for adapting the territory to climate change
3. Establishing a roadmap to preserve and restore the air quality
4. Adapting the city times
5. Strengthening the integration of climate-air-energy issues in the territory sustainable development
6. Enhancing the sustainable mobility policy
7. Generalizing sustainable construction and rehabilitation of buildings
8. Promote sustainable production and consumption and the competitiveness of economic activities in the territory
9. Mobilising actors involved in climate – energy issues

The 2020 targets are i) a 30% reduction of CO<sub>2</sub> emissions compared to 1990, i.e., 9% more than the 21% already reached in 2007; ii) a local production of renewable energy of 2 820000 MWh/y; iii) 6% of energy saving compared to 2007. A quantification of the contribution of the PCTE to the Regional plan's targets in these fields is also provided (11%, 19% and 8%, respectively).

Despite a different sector categorization (see 2.2), effort has been made to redistribute the actions into the CoM main sectors: a total of 55 key actions are explicitly listed, together with the information on the responsible body and the implementation times. On the other hand, very little quantitative information is provided on individual actions about the cost (for 2 actions only), energy savings (1 action) and CO<sub>2</sub> emission reductions (for 3 actions only). The emission forecasts by sector are consistent with the 2020 targets of the urban community.

#### **4. Implementation and monitoring**

No information on the budget is provided. The monitoring process is described in general terms as follows: the implementation, monitoring and evaluation will be done in partnership with all actors involved. Each action sheet will be updated by the action's

holders, whereas the tools (e.g., indicators) and working methods will be defined in partnership with the stakeholders.

### **5.- Conclusions**

The Action Plan of Lille Métropole was elaborated as part of the French legislation. It thoroughly describes how it intends to reach 30% of CO2 emission reduction by 2020 compared to 1990. It defines the strategic axes and measures to achieve the targets, together with time frames and assigned responsibilities. However, the methodology basis is not fully compliant with the CoM requirements. Additional guidance should be provided by the Covenant to facilitate the exercise of reporting national plans within the Covenant framework and ensure that cities' efforts can be evaluated consistently.

## MUNICH (DE)

### **1. - City description.**

With more than 1.4 million inhabitants Munich is the third largest city in Germany (Dec 2013). The European Metropolitan Region Munich is home to 5.6 million people (Dec 2013). Munich is one of the economically most successful, prosperous and fastest growing cities in Germany. It is home to many national and international authorities, companies, major universities, major museums and theatres and attracts considerable tourism. Despite being the municipality with the highest population density (4530 inh. per km<sup>2</sup>, Dec 2013) in Germany, it is a top-ranked destination for migration and expatriate location. In the frequently quoted Mercer liveability rankings Munich achieved second place for infrastructure and rank two for quality of life (2014).

Munich is a traffic hub with excellent international and local connections, running a fast and reliable public transport system. However, the city suffers from severe road traffic. Since 2010 Munich calls itself "Bicycle Capital".

Stadtwerke München GmbH (SWM) is one of the largest energy companies in Germany (sole shareholder city of Munich). By 2025, as the first megacity, SWM want to produce as much green electricity in their facilities, as all of Munich consumes.

### **2.- The city joining the CoM**

#### 2.1.- Basic data about the organisation and political commitment .

By order of the city council, Munich joined the Covenant of Mayors initiative in 2008. The basic document is the Energieaktionsplan der Landeshauptstadt München (Energy Action Plan of the City of Munich) (2010) with a per-capita reduction target of 47% by 2020. A Steering Committee to monitor the SEAP implementation has been established. It is led by the Third Mayor. The SEAP process is lead-managed by the Health and Environment Department (HED), which is heading the project group, co-ordinates the process, reports to the steering committee and meets regularly.

The city has a long tradition of fight against climate change; since 1990, the HED has reported regularly to the City Council on the development of the CO<sub>2</sub> emissions of Munich.

In 2008 the City Council established ambitious urban climate protection goals by the

Integrated Action Programme for Climate Protection (IHKM, Integriertes Handlungsprogramm Klimaschutz in München). According to the objectives of the Climate Alliance, Munich wants to reduce the per capita CO<sub>2</sub> emissions by 10% every 5 years, resulting in a 50% reduction in 2030 compared to 1990. The feasibility of this goal is based on scientific studies by the Öko-Institut Freiburg (2004) and Siemens and the Wuppertal Institut für Klima, Umwelt und Energie (2008).

The IHKM was finally published in 2010 and submitted to the Covenant of Mayors as Energy Action Plan of the City of Munich in 2010. This also means no specific SEAP has been elaborated or submitted. The target years differ (2020 versus 2030).

For the development of the actions and measures an interdepartmental working structure consisting of seven working groups following seven priority areas, a project group and a steering committee headed by the Third Mayor was established. In 2009 about 200 individual measures were developed and presented. The project group and the working groups were assisted in the development of mitigation measures by the Research Institute for Energy Economics (FfE GmbH), which took over the scientific monitoring of IHKM process.

The high commitment of Munich in the COM initiative is evident in their role in drafting templates for the monitoring phase and in encouraging new cities by the presentation and discussion of measures and plans of signatories e.g. at the sustainable energy week in Brussels (2010). Munich is also connected to EUROCITIES and Energy Cities.

## 2.2.- BEI description

The BEI is reported for 1990 and is calculated based on an LCA approach, with CO<sub>2</sub> as emission reporting units. All the Covenant key sectors are adequately covered: the plan encompasses the total amount of CO<sub>2</sub> emissions resulting from electricity, heat/cold, fossil fuels and renewable energy of all building and industry subsectors. The BEI comprises the CO<sub>2</sub> emissions for the transport sector with respect to electricity and fossil fuels, however it lacks details on the municipal fleet. The highest emissions of a Covenant key sector result from residential buildings (24%), in particular from heating oil (988 Mt/a).

However, the Energy Action Plan of the City of Munich itself does not contain a detailed baseline emission inventory. Only a global figure is provided (7 tons per capita on page 50/52). The methodology of the CO<sub>2</sub> emission inventory was developed by the FfE and HED.

## **3. - SEAP**

The Energy Action Plan of the City of Munich) (2010) aims at a per-capita CO<sub>2</sub> reduction

target of 47% by 2020. The Action Plan summarizes the efforts from 2010 to 2012. In the process of the action plan development, seven priority areas have been identified that have a high potential for CO<sub>2</sub> reduction.

Following these areas of priority, about 200 individual measures were developed as described above. In general, the level of detail per measure is very high complying with the CoM criteria. Due to a strong scientific background further details are given like the total and yearly CO<sub>2</sub> effect of the measure where possible, the cost-benefit effect in €/tCO<sub>2</sub>, cost savings and also a comment about the impact. There is a strong involvement of citizens via the alliance "München für Klimaschutz" (Munich for Climate protection) ([www.muenchenfuerklimaschutz.de](http://www.muenchenfuerklimaschutz.de)) and stakeholders like the municipal technical departments incl. the finance department, the Munich utilities, the municipal housing companies and involvement of the city-owned companies (waste company, forest management, horticulture management). The costs, investment and the cost savings are detailed where possible.

The measures are distinguished between strategic and operative measures. The operative measures are grouped into the following climate protection bundles:

- Funding energy saving (FES)
- Increase energy efficiency in municipal buildings
- Municipal housing corporations
- Climate protection strategies Stadtwerke München GmbH
- Increased use of renewable energies in municipal buildings
- Incentives, training and environmental education for energy efficient user behavior
- Installation of energy concepts
- Sustainable forestry and promotion of wood construction
- Procurement energy efficient vehicles in urban fleet
- Acceleration of buses and trams and expanding the tram infrastructure
- Implementation of bicycle concept
- Power-saving appliances, IT and Lighting in city departments
- Power-saving street lighting and signaling
- Structural and technical measures of various urban affiliates

The highest impact in terms of CO<sub>2</sub> reduction lies within the strategy of the local energy supplier Stadtwerke München GmbH. SWM operate twelve hydropower plants, several plants that generate electricity from renewable energy and the three thermal power stations that produce about 70 % of its electricity by combined heat and power. In a specific measure in the SEAP they focus on electric power and district heating from RES

with an expected CO<sub>2</sub> reduction of 456000 tCO<sub>2</sub>/a. This measure is followed by significant CO<sub>2</sub> reduction estimates by a changeover of the district heating grid from steam to high temperature water (37500 tCO<sub>2</sub>/a) and the use of geothermal energy in public power supply (32000 tCO<sub>2</sub>/a). A CO<sub>2</sub> reduction of 21000 tCO<sub>2</sub>/a is expected from the CO<sub>2</sub>-neutral growth of the Munich Airport.

In terms of cost and investment the budget increase for the subsidy program on energy saving (FES) is the largest measure. It focusses on residential buildings and energy-efficient construction in existing and new buildings. The FES is a proven and by the urban population highly demanded measure / action with a huge potential for reducing CO<sub>2</sub> (13500 tCO<sub>2</sub>/a). It also contributes to urban economic stimulus (1 € promotion solves some 10 € expenditures (see FES Statistics 2006). The current budget is approx. € 10 million per year. The increase in the budget meets the demand of applications. The cost-benefit effect is very high (36€/tCO<sub>2</sub>).

High levels of investment show the actions to improve the energy efficiency in municipal buildings and infrastructure (approx. 6 Mio € from 2010 to 2012). This was the first step to speed-up the energy-saving process for municipal buildings. According to urban buildings, in this segment lies the greatest potential for reducing CO<sub>2</sub> emissions. In the decision "Sofortprogramm Hochbau" (2009) the Building Department was instructed to refine urban standards for energy-efficient construction. On the basis of a scientific study by IB Prof. Hausladen the energetic package shall be implemented for future development and existing measures. The action has a high impact and the total CO<sub>2</sub> savings are estimated to 25200 tCO<sub>2</sub>. In this context the link to the Deutsche Gesellschaft für Nachhaltiges Bauen (German Association for Sustainable Building) has been intensified. The objective is to optimally use the network and the pool of knowledge for the city of Munich.

With respect to tertiary buildings and residential buildings climate protection measures of the public building societies GWG and GEWOFAG have been implemented. These result in an CO<sub>2</sub> reduction of 5830 tCO<sub>2</sub>/a. The cost-benefit effect is quantified to 1€/tCO<sub>2</sub> !

In the transport sector the highest CO<sub>2</sub> reduction of 5000 tCo<sub>2</sub>/an is expected by promoting bicycle traffic. The aim is, by 2015 to increase the share of bike traffic in the modal split from the current 14% by 3 percentage points. This shall be realized by an increased number and better bicycle parking facilities, the quality initiative infrastructure, an improved Bike & Ride concept and marketing and information. Munich also strives to develop the tram and metro lines.

#### **4.- Implementation and monitoring**

The SEAP will be revised and updated every second year until 2030. The evaluation of the effects of the single measures will be carried out by the HED via the bi-annual CO2 balance and in the frame of the reporting of the CoM. The first implementation and evaluation phase of the SEAP started in 2010. First measures were implemented from 2010 – 2012. The HED accompanies the implementation with the help of a controlling process. The defined process structure, consisting of steering committee, project group and working groups will be maintained.

They use a dynamic indicator to monitor the SEAP.

The savings in CO2 are determined by the type of energy carrier, which is used for heat or electricity. For gas and oil, CO2 factors from the database GEMIS 4.5 are adopted. The CO2 factors for electricity and district heating are calculated according to the specifications of the SWM GmbH as a so-called "Munich mix" (M-Mix). This dynamic indicator reflects the amount of energy, generated by RES and from cogeneration, for Munich most clearly. The M-Mix is a dynamic factor which is regularly calculated by an independent expert and thus updated

#### **5.- Overall conclusions**

A little summary highlighting the weak and strong points of the SEAP. Strengths:

- About 200 single measures covering all key sectors are implemented
- The measures are described in detail including cost-benefit analysis and impact.
- Strong commitment to CoM initiative (7 fulltime equivalent staff plus steering by the Third Mayor)
- Active participation via development of monitoring templates, encouragement of other cities by presenting measures and the COM

Weaknesses:

- No specific SEAP, adopted from Integrated Action Programme for Climate Protection (IHKM)
- Target years differ (2020 versus 2030)
- BEI not included in the SEAP document

Measures for time period 2010 – 2012 only, no implicit midterm or long-term measures

## WARSAW (PL)

### **1. - City description.**

Warsaw is the capital and largest city of Poland. It is located on the Vistula River, in east-central Poland. Its population is estimated at 1.729 million residents within a greater metropolitan area of 2.666 million residents as of 31 December 2008, which makes Warsaw the 9th most populous capital city in the European Union, with an area of 517 km<sup>2</sup>.

Warsaw is a major international tourist destination and a significant cultural, political and economic hub. Warsaw's economy, by a wide variety of industries, is characterized by Fast-moving consumer goods manufacturing, metal processing, steel and electronic manufacturing and food processing. A unique feature of Warsaw is its number of skyscrapers and high-rise buildings in the city center which form the skyline.

### **2.- The city joining the CoM**

The City of Warsaw joined the "Covenant of Mayors" in 20011. The document in the form of "Sustainable Energy Action Plan for Warsaw in the perspective of 2020" has been drawn up on the basis of an expert study prepared in 2010-2011 by a consortium of companies: the Polish National Energy Conservation Agency and the National Energy Conservation Agency, on behalf of the City of Warsaw. Determining the value of the objective of the plan for the improvement in energy efficiency and reduction in greenhouse gas emissions, the base year 2007 has been adopted as the basis for the Action Plan.

Priority areas of action and main trends leading to achieving SEAP's goals: public transport modernization – implementation of the Warsaw's transportation strategy: "Strategy for Sustainable Development of the Warsaw Transportation System to the year 2015 and beyond"; complex thermal retrofits of buildings in both housing, public and service sectors; implementation of RES in production of electricity and heat, including implementation of waste-to-energy solutions; reduction in electricity consumption due to both introducing new technologies and conducting appropriate pro-environmental promotional campaigns.

The success of the Sustainable Energy Action Plan for Warsaw in the perspective of 2020 will depend on the appropriate stimulation of investments through informational

campaigns and the financial commitment of the City budget in such a way as to be able to launch these investments, which will result in budget savings to be used in subsequent stages of the programme. Therefore, special attention is paid to the activities of the City in the area of the mobilisation of potential in fields of transport and construction.

## 2.2.- BEI description

All the key Covenant sectors are adequately covered: the plan encompasses the total amount of GHG emissions resulting from heating and cooling of all buildings, all road traffic work within City boundaries, and all gas and electricity use (BEI reference year 2007).

The methodological approach and data sources for the calculation of the BEI are well described in details in the document ""Strategy for Sustainable Development of the Warsaw Transportation System to the year 2015 and beyond" (polish version)

The data of energy consumption and emissions for 2007 are given with a very detailed description on buildings (year, typology of construction, number of dwellings..etc) as well as in the transport sector.

The housing sector is very important from the standpoint of the Plan. According to Central Statistical

Office data at the end of 2008 the housing resources of Warsaw are almost 800 thousand apartments. They are largely responsible for CO<sub>2</sub> emissions from the City, inter alia, due to a high demand of this sector for heat and electricity. Expenditures associated with the maintenance of buildings in Poland are much higher than in most European Union countries. This results not only from the rising prices of electricity and heat, but also from the fact that a large part of housing resources in Warsaw are buildings constructed in inefficient technologies, in particular panel buildings constructed of prefabricated concrete, built at a time when energy costs were not so high, so nobody paid attention to the use of solutions that would result in the more efficient use of energy.

## **3. - SEAP**

In the Sustainable Energy Action Plan for Warsaw in the perspective of 2020, was estimated at 20% of CO<sub>2</sub> emissions reductions in comparison to base year 2007. Additionally the city adopted auxiliary indicative objective of 20% of energy savings in comparison to 2007, it means that the maximum energy consumption in 2020 should not exceed 22 TWh/year.

Given the above facts on the Building stock, it can be concluded that there is a significant potential for reducing CO2 emissions in the housing sector which can be utilized through complex thermal retrofitting activities, replacement of indoor lighting, and also replacement of equipment used at home with more energy efficient units. These activities, in addition to the fulfilment of the assumptions of the Action Plan, will give direct benefits to the residents of Warsaw in the form of lower bills for energy. It should be noted that to obtain the desired effect, the most important activity in this sector, which is the thermal retrofit of buildings, should be carried out comprehensively, so it will involve not only the insulation of walls, roofs, floors, foundations, etc., but also the improvement of the ventilation system, the replacement of external doors, windows, the modernisation of the heating system and, where possible, the use of equipment using energy from RES. Furthermore, due to the continuous influx of people who want to live and work in Warsaw, the construction sector is one of the fastest-growing areas in the City. Construction investments are currently carried out in better technologies. All advances in technology should be used to enrich construction sector, among others: passive houses, low-energy houses, energy-efficient houses.

Transport is a key sector in terms of the Action Plan. Reducing CO2 emissions in this sector requires the involvement of the City authorities, business and the residents of Warsaw. The implementation of part of the tasks listed in the Strategy for Sustainable Development of the Warsaw Transportation System to the year 2015 and beyond is an important venture that will contribute to the fulfilment of the objectives of the Action Plan. The City attaches great importance to the leading role of the public transport in the lives of the residents of Warsaw. The awareness of the authorities that safe, fast and convenient public transport will be the biggest incentive for the residents of Warsaw to move from their own cars to buses, metro or trams and therefore reduce the harmful effect on environmental and living conditions is the impulse to the implementation of many transport investments.

The exchange of rolling stock, the development of the metro, "Park & Ride" car parks and the related transport nodes, joint single ticket for all means of public transport are activities that persuade the residents of Warsaw to choose public transport. However, in order to reduce CO2 emissions, one step further should be made. The improvement in the Integrated Traffic Management System and road investments associated with it, the training of professional drivers and users of private cars in eco-driving and the dissemination of alternative fuels are all measures that will enhance the implementation of the Action Plan.

Energy production in Poland is still largely based on the use of traditional energy

sources, such as hard coal and brown coal, with a small percentage of electricity generated by hydropower plants. Renewable energy is just beginning to be applied on a larger scale. In recent years the awareness of the environmental damages caused by conventional energy has significantly increased, so striving for the following improvements is conscious: the reduction in electricity and heat consumption due to, among others, utilization of new technologies; the use of RES for generation of electricity and heat; the modernisation of the heating network.

All municipal institutions, regardless of the degree of involvement in the implementation of the Sustainable Energy Action Plan for Warsaw in the perspective of 2020, are being guided by the following principles such as utilization of green public procurement procedures in the purchase of equipment, vehicles and services; implementation of energy management systems in the institutions' buildings ; carrying out informational activities among the employees and visitors to the institutions through the deployment of instructions and posters on energy conservation in public places, etc.

The Plan describes very clearly the strategy/measures under the direct control of the municipality. For the measures aiming at reducing the emissions in the territory of the local authority, the involvement of stakeholders and citizens is a key success factor.

#### **4.- Implementation and monitoring**

The monitoring process is described in details, but the city is not regularly (every second year) submitting implementation reports to the Covenant of Mayors.

#### **5.- Overall conclusions**

The Plan is good in analysing the data, the urban development is planned with the aim to connect the metropolitan area and to make use of existing public transport, infrastructure and services. Nevertheless, there is inconsistency between the SEAP document (in Polish), and the data in the template.

The city can benefit from the national context (which is not reported clearly), to accelerate the transition of Warsaw towards their targets.

The involvement of local stakeholders such as local energy suppliers, local transport companies, private companies (manufacturers and distributors of renewable fuels and green cars, as well as actors with large car fleets) is considered a key ingredient of success of the Plan of the city.

## TORINO (IT)

### **1. - City description.**

Torino is a city of ca. 910 504 inhabitants (figure from the form of adhesion to the Covenant of Mayors, 2010), covering an area of 130 km<sup>2</sup>. The population in 1991 was 979, 839 and decreased continuously till 2002, with immigration in the metropolitan area of the city. In 2009, the overall population is 910,504 (foreigners 124,200).

Always identified as the capital of the automotive industry, Turin, the last thirty years, has been under a major transformation process from the economic urban and cultural point of view. Urban renewal, begun in the 90s, involved deeply the system infrastructure, rail transport, the conversion of large abandoned industrial basins with a significant involvement of the inhabitants. The Winter Olympics held in Turin in 2006 have left a legacy that is not just about material aspects, such as large sports infrastructure, the recovery and redevelopment of the rich cultural and historical heritage that Turin has, but also other equally important aspects of the visibility on the international scene of the city with a tourist vocation and able to host major international events.

### **2.- The city joining the CoM**

The city joined the "Covenant of Mayors" in 2010. The priority areas of implementation of the TAPE(Turin Action Plan for Energy) are the public and private buildings and the mobility and transport sectors, in which were initiated major structural investments, with effects in the short and medium term. The signatory expects a gradual reduction of CO2 emissions, which are estimated to exceed 40% by 2020 compared to the level of 1991. The city intends to pursue the CO2 emission reduction towards the ambitious goal of - 80% by 2050. The SEAP, which refers to the commitments to reduce 40% GHG emission by 2020 includes a BEI (1991) and MEI (2005) inventories that include the industry sector. By excluding the industry sector, the overall goal of CO2 reduction by 2020 is 52%.

To achieve these targets the city plan to improve the economic competitiveness of energy solutions, but also to ensure the irreversibility of the process, operating continuously, for a number of decades.

To achieve these results will be essential to improve the economic competitiveness of energy solutions, but we must also ensure the irreversibility of the process, operating

continuously, for a number of decades.

The present analysis is based on the document TAPE, submitted by the city to the European Commission in 2010, consisting of more than 50 actions in all economic sectors of the city. The plan is based on an important cooperation with the main stakeholders. Priority areas are transport, heating and cooling, electricity and gas use.

## 2.2.- BEI description

The BEI is calculated based on an LCA approach, with CO2 equivalents as emission reporting unit.

All the key Covenant sectors are adequately covered: the plan encompasses the total amount of GHG emissions resulting from heating and cooling of all buildings, all road traffic work within City boundaries, and all gas and electricity use.

The methodological approach and data sources for the calculation of the BEI are well described in details in the TAPE document. It is a common practice of the city to set interim targets, therefore throughout the document, the expected intermediate results are reported for each sector of activity

The data of energy consumption and emissions for 1991 are too far along to be used to design a new Action Plan accounting for the profound social and economic changes that have affected Turin in the last 20 years. For this reason, the city has prepared an additional inventory of CO2 emissions for the year 2005 using same methodology for estimating energy consumption than for the 1991 BEI. The results of the two inventories (1991-2005) formed the basis to define the objectives of reducing CO2 emissions to 2020 on the urban territory.

## **3. - SEAP**

The Action Plan first summarises the efforts made by the city from 1990 to 2005. The data show that the most CO2 emitted sector has been the residential buildings (40%) and that the contribution of renewable energy was not significant enough in 1991 to be considered.

The comparison between 1991 and 2005 shows a major reduction in final energy consumption in the building sector (by 38% for the municipal properties and by 18% for the residential buildings) and greater reductions in related CO2 emissions. This difference is due both i) to the connection, in the period 1991-2005, of a significant volume (approximately 43% of the municipal assets) of the buildings to the district heating network powered by cogeneration plants, and ii) to the decrease in energy demand from an average consumption of 68 MWh / m<sup>3</sup> in 1991 to 41 MWh / m<sup>3</sup> in

2005.

Furthermore, from the comparison of the inventories of the years 1991-2005 show a decrease in energy consumption and CO<sub>2</sub> emissions in the transport sector by about 15%. Among the many factors that contributed to this result, in addition to the reduction of the urban population of about 8%, must be considered the increasing of the efficiency of public and private vehicles and the many actions taken by the City in the field of mobility such as the strengthening of public transport, the extension and control of restricted traffic areas, the creation of Zone 30, the start to the construction of new road infrastructure for the rationalization of traffic, the expansion of bicycle paths.

The measures planned by the city to reach the SEAP target by 2020 are summarized hereafter on the basis of the information reported in the "TAPE" SEAP document, which was submitted to the European Commission in 2010. They consist of more than 50 actions in all economic sectors of the city. The plan is based on an important cooperation with the main stakeholders. The priority areas are the transport sector, the district heating/cooling network, as well as various actions on electricity and gas production/consumption.

To reach the SEAP target the city regards the District Heating Network as having an important role for the reduction of CO<sub>2</sub> emission. The expansion of the district heating already made the city of Turin owning the largest system at the national level, with a served total volume of 39 million m<sup>3</sup>. The share of municipal buildings connected to the district network is planned to increase to more than 70% by 2020.

The second key sector of action is the transport sector, which emissions are to be reduced by 46% by 2020. The Traffic Management Administration is developing traffic strategies in order to increase the possibility of walking, biking and travelling by public transport (The Sustainable Urban Mobility Plan of the City of Turin - PUMS in collaboration GTT - Agenzia Mobilità Metropolitana Torino).

Here below are presented some further strategies and/or interim targets

- Implementation of the Energy Annex of the Building Regulation, with stricter energy performance requirements than national ones for new construction.
- Electricity production from renewable sources, such as solar photovoltaic - 10,000 photovoltaic roofs - PV Piedmont - Municipal incentive to install photovoltaic solar panels
- Granting of loans through a revolving fund for the construction of small photovoltaic systems (1 to 5 kWp) connected to the grid.
- Production of electricity from urban solid wastes: Recovery of landfill biogas at Basse di Stura allows the production of electricity fed into the public grid and Waste incinerator

power plant.

The Plan describes very clearly the strategy/measures under the direct control of the municipality. For the measures aiming at reducing the emissions in the territory of the local authority, the involvement of stakeholders and citizens is a key success factor. Nevertheless, the description of some actions could be further improved, by including estimated budget, financing sources/mechanisms.

#### **4.- Implementation and monitoring**

The monitoring process is not described in details, but the city is regularly (every second year) submitting implementation reports to the Covenant of Mayors.

#### **5.- Overall conclusions**

The Plan is good in analysing the trends (growing population with an increased demand for housing and transportation) and balancing them: the urban development is planned with the aim to connect the metropolitan area and to make use of existing public transport, infrastructure and services. Nevertheless, there is inconstancy between SEAP, the executive summary declaring that industry has been excluded from BEI and SEAP. The overall goal of CO<sub>2</sub> reduction by 2020 is 52% (by excluding the industry).

The city also benefits from a favourable national context, characterized by ambitious targets on energy efficiency in buildings and transport as well as on the use of RES, which is expected to accelerate the achievement of their targets.

The involvement of local stakeholders such as local energy suppliers, local transport companies, private companies (manufacturers and distributors of renewable fuels and green cars, as well as actors with large car fleets) is considered.

## STOCKHOLM (SE)

### **1. - City description.**

Stockholm is a city of ca. 830 000 inhabitants (figure from the form of adhesion to the Covenant of Mayors, 2009), covering an area of 209 km<sup>2</sup>.

Despite the rapid increase in population (+11% compared to the 750 000 inhabitants of 2000), per capita energy use and emissions have decreased. This has been made possible thanks to an efficient social planning, where the increased demand for housing and transportation has been anticipated and infrastructure has been used more efficiently.

The city has a long tradition of fight against climate change: the first emission inventory was initiated in 1995, the first climate plan was adopted in 1998. The Stockholm Environment Programme (SEP) includes climate and energy targets and is intimately connected to the Action Plan for Climate and Energy.

### **2.- The city joining the CoM**

The City has a target to become fossil fuel free by 2050, with an interim target to reduce emissions up to a level of 3 tons CO<sub>2</sub> eq/capita by 2015: this corresponds to a 43% per capita reduction compared to the levels in 1990. More recently, the target to become fossil fuel free has been anticipated to 2040.

It is worth mentioning some national overarching goals that represent the basis for setting the City's objectives:

- Parliament has decided that energy use in the property stock shall be reduced by half by 2050, measured from 1996 levels.
- The vehicle fleet shall be fossil fuel independent by 2030.

The present analysis is based on the document "Stockholm Action Plan for Climate and Energy 2012-2015 with an outlook to 2030", submitted by the city to the European Commission in 2013. This document follows the "Stockholm action plan for climate and energy 2010-2020" submitted in 2010.

The plan is based on an important cooperation with the main stakeholders. Priority areas are transport, heating and cooling, electricity and gas use.

The BEI is calculated based on an LCA approach, with CO<sub>2</sub> equivalents as emission reporting units. All the key Covenant sectors are adequately covered: the plan encompasses the total amount of GHG emissions resulting from heating and cooling of

all buildings, all road traffic work within City boundaries, and all gas and electricity use. Despite the fact that it is not a recommended sector within the Covenant of Mayors, it is remarkable that the figures for the transport sector include flights from Bromma airport up to an altitude of 915 meters, even if no actions are tackling these emissions.

The methodological approach and data sources for the calculation of the BEI are not described in details in the document "Stockholm Action Plan for Climate and Energy 2012-2015 with an outlook to 2030". The lack of a clear description of the approach makes it difficult to compare with the CoM framework.

It is a common practice of the city to set interim targets, therefore throughout the document the current framework is regularly evaluated for each sector of activity and intermediary results are reported.

### **3. - SEAP**

The Action Plan summarises the efforts made by the city from 1990 to 2010. Firstly, a significant emission reduction has been achieved by a conversion from oil heating to district heating (DH) using biofuels, and from oil heating to heat pumps. Secondly, replacing fossil fuel-powered vehicles with green cars and diesel buses in public transport with ones powered by RES has also contributed to reducing the emissions. This has been possible thanks to a close cooperation with Stockholm Transport (SL), with manufacturers and distributors of renewable fuels and green cars, as well as actors with large car fleets.

For 2012-2015, the SEP sets an interim target to reduce energy use in municipal operations by at least 10%. To reach and possibly exceed this target, The City's five property companies suggest a programme for energy efficiency up to 2015. Investments are made possible by reducing the demands on financial return from the companies in relation to their costs for investments in energy efficiency. Another interesting area for action is the procurement of energy efficient goods and services: the City Executive Office is requested to produce a guideline for the City to be used for procurements.

To reach the SEP target to reduce by 50% the emissions from DH, the City strives to ensure that the plans for conversion and extension are implemented by Fortum Värme according to schedule.

Another partial target concerns the transport sector, i.e. to reduce emissions from transport by 15% by 2015. The Traffic and Waste Management Administration is developing traffic strategies in order to increase the possibility of walking, biking and travelling by public transport (in collaboration with Stockholm Transport, SL). Road traffic is expected to increase also because of a higher demand of goods to supply the

growing city. Further contribution to the achievement of the target comes from measures aiming at stimulating the sales of green cars, by increasing the cooperation among producers, distributors and users.

Here below some further strategies and/or interim targets are presented:

- Stricter energy performance requirements than national ones for new construction.
- Maintain and increase the proportion of passengers who choose public transport: large projects are underway to increase the capacity of rail public transport.
- 90% of buses shall be powered by renewable fuels before the end of 2020 and the bus fleet shall be free of fossil fuels in 2025.
- 100% of the newly registered private cars should be independent of fossil fuels by 2020 at the latest, to meet the national target of a fossil-fuel-free vehicle fleet in 2030.
- Organize more efficiently the delivery of goods and services (improve efficiency and coordination of deliveries).

The Action Plan includes finally a catalogue of measures from which City committees and companies can be inspired. However, it is not clear which of these measures have already been adopted by the city.

The Plan describes very clearly the strategy/measures under the direct control of the municipality. For the measures aiming at reducing the emissions in the territory of the local authority, the involvement of stakeholders and citizens is a key success factor. Nonetheless, the description of the actions could be further improved, by including estimated budget, financing sources/mechanisms.

#### **4.- Implementation and monitoring**

The monitoring process is not described in details, but the city is regularly (every second year) submitting implementation reports to the Covenant of Mayors.

#### **5.- Overall conclusions**

The Plan is very good in analysing the trends (growing population with an increased demand for housing and transportation) and balancing them: the urban development is planned with the aim to increase density and to make use of existing public transport, infrastructure and services. A good practice is identified in the choice to set interim/partial targets, which allow a continuous monitoring of the progress made towards the overarching target.

The city can also benefit from a favourable national context, characterized by ambitious targets on energy efficiency in buildings and transport as well as on the use of RES,

which is expected to accelerate the transition of Stockholm towards a fossil fuel free city. The involvement of local stakeholders such as local energy suppliers, local transport companies, private companies (manufacturers and distributors of renewable fuels and green cars, as well as actors with large car fleets) is considered a key ingredient of success of the Plan of the city.

## ZAGREB (HR)

### **1. - City description.**

Zagreb is the capital and the largest city of the Republic of Croatia. It is located in the northwest of the country, along the Sava river. The population in 2008 of the city was 788,850. The wider Zagreb metropolitan area includes the City of Zagreb and the separate Zagreb County bringing the total metropolitan area population up to 1,110,517. Zagreb is an international trade and business centre, and an essential transport hub placed at the crossroads of Central Europe, the Mediterranean and the Balkans. Most important branches of industry are: production of electric machines and devices, chemical, pharmaceutical, textile, food and drink processing.

The city of Zagreb is the leading partner of the project called the Development of the System for Energy Management in Cities, financed by GIZ funds (GIZ- Open Regional Fund for South East). With the implementation of the SEAP, the city of Zagreb transfers expertise to its partners in Sarajevo, Podgorica and Skopje.

### **2.- The city joining the CoM**

Long term vision of the City of Zagreb is to reduce CO<sub>2</sub> emissions by the year 2020 by 21%. According to projections of population and energy consumption growth, without implementation of defined EE measures, CO<sub>2</sub> emission in 2020, in comparison with 2008 base year, will increase with 7,59%.

Implementation of all defined measures within Zagreb SEAP by 2020 will result in decrease of CO<sub>2</sub> emissions by 25 % compared to the base year. The most important reduction measures are planned for the residential buildings (e.g. refurbishment of thermal insulation, behavioural change campaign and others) and for the increased usage of public transport instead of private individual transport in City of Zagreb.

Different stakeholders (city offices, local government, city enterprises, Croatian Chamber of Trade and Craft – Chamber Zagreb, City of Zagreb Craftsman Association, Croatian Chamber of Economy, Croatian Association of Employers, Croatian Automobile Club, University of Zagreb and higher education institution, Other education and science institutions, NGOs, consumer associations) have been involved in the process of SEAP implementation.

#### 2.2.- BEI description

All the key Covenant sectors are adequately covered: the plan encompasses the total amount of GHG emissions resulting from heating and cooling of all buildings, all road

traffic work within City boundaries, and all gas and electricity use.

Of the total 2008 CO<sub>2</sub> emissions the building sector accounts for 63 %, the transport sector for 36 % and public lightning sector for 1%. Therefore, most important measures that can significantly contribute to CO<sub>2</sub> emission reduction are measures defined for building and transport sectors. The housing sector has a share of 68% in the entire energy consumptions of the building sector, with an average of 179 kWh/m<sup>2</sup>.

The methodological approach and data sources for the calculation of the BEI are well described in details in the document. Depending on the reliability, the collected data are divided into three categories: completely reliable data (90% of the data derived from invoices), reliable data (data derived on the basis of a certain % of representative invoices) and estimated data based on statistical indicators. The emissions in the Transport sector are derived from running a programme package COPERT III (EEA), the EMEP/CORINAR methodology on fuel combustion and evaporation in transportation.

### **3. - SEAP**

The Action Plan summarise the measures in terms of main programs for energy efficiency and deployment of Renewable sources. Firstly, a significant emission reduction are expected to be achieved by energy efficiency measures in public and residential buildings (thermal insulation, renewal of openings, energy savings lamps, etc); Incentives scheme for RES usage in existing and new buildings; Solar thermal collectors for health and social municipal institution.

Here below further strategies for transportation are presented:

- Sustainable energy management in municipal fleet and in public transport: "Adopting priority traffic lane for public transport", "Green Public Procurement for public transport vehicle", "Development and improvement of city public transport, suburban railways", " Replacement existing amortized busses with hybrid and alternative (ecologically acceptable) fuel", " Constructing new fast city railway system (above and underground, light rail and metro)";
- Monitoring and traffic management system implementation (automatic traffic routing and regulation); Implementation of congestion pricing charging fee for driving private vehicle in Zagreb town centre.
- Setting up bicycle net for renting, equipped with IT device protection from stealing; Car sharing model for employee city owned companies or city administrative ;
- Biodiesel production from waste vegetable oil; Subsidies for alternative fuel vehicle purchasing;

The description of the actions includes detailed information on estimated budget, financing sources/mechanisms. For example, the Environmental Protection and Energy Efficiency fund (FZOIEU) is a revolving fund set up in 2009 by the national government: according to the general criteria to grant resources of the fund, the city of Zagreb has the right to award up to 40% of the planned investments resources.

#### **4.- Implementation and monitoring**

The monitoring process is described in details, and the city has submitted the first implementation reports to the Covenant of Mayors.

#### **5.- Overall conclusions**

The Plan is very good in analysing the data on energy consumption and CO2 emission in the macro sectors.

The regulatory framework is well described. The city can also benefit from a favourable national context, characterized by ambitious targets on energy efficiency in buildings and transport as well as on the use of RES, which is expected to accelerate the achievement of the targets.

The description of the actions includes detailed information on estimated budget, financing sources/mechanisms.

## DUBLIN (IE)

### **1. - City description.**

Dublin has ca. 506 000 inhabitants (figure from the form of adhesion to the Covenant of Mayors, 2009) and covers an area of 115 km<sup>2</sup>.

Being the capital city, Dublin represents a high proportion of Irish population and economic activity. Its economy is driven by the financial services sector. Since Dublin is highly dependent upon imported energy, security of supply is one of the key issues that the SEAP aims at addressing, first through improved energy efficiency and second through new and innovative sources of renewable energy that are appropriate to the urban context. The city is also concerned about the risk of fuel poverty among its residents and has taken steps to eradicate it from the '90s.

### **2.- The city joining the CoM**

#### 2.1.- Basic data about the organisation and political commitment

Within the Covenant of Mayors, the city aims at reducing its CO<sub>2</sub> emissions by 20% by 2020. Its long term vision is to become an energy-smart city by 2030 and reducing its emissions by 50% by that year. The SEAP, jointly developed by Dublin City Council (DCC) and CODEMA (Dublin's Energy Agency), prioritises and organises actions coming from 'A Climate Change Strategy for Dublin City' for the years 2008-2020. A specific energy saving target of 33% by 2020 is set for City council's own properties.

To follow-up the SEAP process, a steering committee has been set up, involving 9 representatives from different government's departments.

An important part of the whole SEAP process is the consultation phase. At the start of the process, pre-draft consultations with 50 organisations have been carried out, including Dublin City Council Departments, Government Departments & agencies, engineering consultants, Education and Research Institutions, Residents' Associations, and Youth organisation. The SEAP has undergone the full Strategic Environmental Assessment process: an environmental report has been compiled and has been put on public display for 6 weeks.

#### 2.2.- BEI description

Dublin's Energy Agency played a major role in the SEAP development, especially for the assessment of the current framework. A very detailed BEI and assessment of the current situation is reported in a separate document called "Baseline Emission Inventory for

Dublin City SEAP 2010-2020", hereinafter referred to as "BEI report": it encompasses an analysis by sector in terms of current energy use, identified potential, targets. The document evaluates for each sector a range of possible actions in terms of capital cost, energy savings and reduction of CO2 emissions. This document constitutes a comprehensive starting point for the debate among policymakers, stakeholders and citizens on Dublin's future energy strategy.

A detailed analysis of the existing housing stock has been performed, by built form, age profile, floor area and building fabric. Fuel mix was estimated, as detailed information on the breakdown was not available for Dublin City. Rates of construction of new dwellings and demolition of older dwellings were also examined, even if estimating the rate of demolition was a difficult task. This information was then used to create a model of Dublin City Housing for the period 2006 to 2020. Based on the DEAP (Dwelling Energy Assessment Procedure), this model was used to estimate the effects of future actions in the residential sector.

An analysis of the service sector and of the manufacturing sector has also been carried out; however it is mainly based on national data (no. of persons at work in each activity, data on primary energy consumption and CO2 emissions per employee in each activity)

For the transport sector, a detailed analysis has been completed, based on an impressive amount of data (Traffic Statistics in Dublin City and County, Personal Travel Patterns) coming from several sources. Several possibilities for sustainable and renewable energy are then explored.

Based on the results of the assessment, three scenarios to 2020 have been built for each sector: a Business as usual scenario and two scenarios with additional actions: one with a lower cost, the other with a higher cost, aiming at delivering higher energy savings and emission reduction.

An Environmental report has also been produced, as foreseen by the Strategic Environment Assessment procedure.

### **3. - SEAP**

Two Scenarios are presented:

- Scenario 1, with limited investments, aims at reversing the current upward trend in emissions. This scenario includes measures often referred to as "low-hanging fruits", i.e. measures related to behavioural changes and to the use of new technologies that do not require major investments (e.g. low energy lighting systems).
- Scenario 2, requiring significant investments, aims at building sustainable

infrastructure to be used over a longer time-span. This encompasses major refurbishments of existing houses, development of district heating, infrastructure for electric vehicles, etc.

For each measure, the net abatement cost is highlighted.

To achieve savings in its own activities, DCC implements behavioural measures such as:

- "Switch-Off Campaign", to encourage employees to switch-off everyday appliances;
- "Sustainable Office", to improve sustainability in all the office activities (e.g. procurement, paper use, travel); this includes a process of benchmarking, actions and review.
- "Minus 3%", to reduce energy consumption in heating and lighting of buildings, street lighting, water and wastewater services, municipal fleet.

Looking for technological measures, it is worth mentioning the construction of new low-energy apartments in York Street, following the principles of sustainability in building design.

For the residential sector, two interesting measure should be highlighted:

- "Energy Smart Community": by joining together, homeowners can improve EE in their houses at a lower cost. Once the community cluster is formed and the full specification of works developed, contractors will be invited to tender for the works. CODEMA acts as a facilitator between homeowner & contractor.
- "DCC's Housing energy Action Plan": 1 out of 7 dwellings in Dublin is owned by DCC. The Plan aims at providing a framework for the implementation of the Climate change Strategy and reducing emissions from the housing stock by 33% by 2020.

In the transport sector:

- "Workplace travel plan" is an interesting measure initially foreseen for DCC, to promote more sustainable commuting within the organization. This measure can be replicated by other offices which employ at least 100 staff members. The plan was developed by CODEMA in collaboration with transport demand management specialists, as part of the IEE ASTUTE<sup>11</sup> project.

Other measures aiming at improving public transport sector are funded under a national capital investment framework (TRANSPORT 21). The role of DCC is mainly in the planning process.

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<sup>11</sup> <http://www.astute-eu.org/>

The SEAP also proposes the creation of a new district heating scheme for Dublin and setting up a new Dublin District Heating Company (DDHC), whose mission should be *"procure sources of waste heat produced within Dublin and re-use that heat to provide sustainable commercial district heating services to Dublin on a profitable basis"*.

An analysis of:

- possible savings,
- capital cost,
- cost savings

has been made for all the proposed actions (in the BEI report).

The SEAP includes a carbon abatement cost curve, obtained as a combination of the CO<sub>2</sub> abatement potential with the net abatement cost. The calculation of the net abatement cost is done in a simple way, based on the simple pay back, not taking into account the cost of finance and future changes in the prices of energy. Nevertheless it is a user-friendly tool to evaluate which measures are the most economically attractive.

Figures on estimated energy savings are generally not indicated in the online template. Some data are reported in the SEAP document and in the BEI report, but it is generally not possible to assess the correspondence with the data of the SEAP document.

#### **4.- Implementation and monitoring**

An overall monitoring process of the SEAP has been set up, as part of the Strategic environmental assessment process. However it is not well specified how the implementation of each measure will be monitored and followed up. Also, some indicators described in "Strategic Environmental Assessment Statement for Dublin City SEAP" but not (yet) specific by measure. The identification of responsible persons/departments for each measure is a good starting point.

#### **5.- Overall conclusions**

Strength of the SEAP of Dublin can be identified in the consultation process implemented for the definition of objectives and actions. The detailed study conducted by the energy agency, included in the BEI report and used as a basis for discussion by decision makers and stakeholders, is a good practice that should be recommended to all signatories.

The choice to carry out a simplified analysis of the net abatement cost of potential measures is also a good instrument for policy makers to identify how to prioritise the actions. The identification of two scenarios (one to be implemented in the short term, with no major investments, the other requiring major investments to build sustainable infrastructure) allows the administration to start immediately the implementation of

some energy-saving measures, while giving more time to assess plan major investments.

Also, the Strategic environmental assessment procedure is a useful tool to ensure that the SEAP is consistent with all existing plans and programmes related to environment. It also establishes some procedures to monitor the effects of the implementation of the Plan, to compare predicted and actual effects, thus providing information for improvement.

The SEAP monitoring process could however be described in greater details and a risk analysis could also be included, together with a description of actions to mitigate possible risks.

## RIGA (LV)

### **1. - City description.**

Riga is the largest city in the Baltic States and one of the largest metropolis in Northern Europe with ca. 649 800 inhabitants (2012), being also an important transit point with a well-developed airport, port and railway network system. Riga is rich in water resources; it is a green city with many parks and recreational areas, as well as an adjacent expanse of woodland which ensure appropriate life quality to its citizens. Riga's share in the Latvian industry persistently remains above 50 %. One of the largest manufacturing sectors in Riga is food industry. Manufacturing of furniture also holds a prominent place. There is a significant volume of construction work taking place.

After Latvia regained independence in 1991, Riga has been assessing its inherited problems:

- rapidly shrinking industry;
- poorly maintained public buildings, and approximately 6,000 apartment buildings with average energy consumption of 232 kWh/year;
- inefficient infrastructure;
- high poverty; and
- low awareness amongst inhabitants and business owners about energy saving, new technologies and excessive use of private transport in the city.

### **2.- The city joining the CoM**

Riga was the first EU capital to sign the Covenant of Mayors. Its initial SEAP was developed in 2010, working together with Stockholm, Helsinki and Tallinn, and yearly monitoring reports have helped to improve the policies and actions. The new enhanced SEAP, which sets out to develop Riga as a Smart City, has become an integral part of the city's planning and includes the Riga 2030 long-term development strategy.

As has been shown during the implementation of the SEAP and by the Progress Reports of 2011 and 2012 on the implementation of the SEAP, the CO<sub>2</sub> emissions' reduction plan for 2020 has already been exceeded, with a reduction of 50.69 % achieved by 2011.

In view of the city's potential in the field of energy efficiency improvements and use of renewables, there is a need for new and more ambitious goals in line with the actual situation. Thus, given the new initiative of the European Commission (EC) on the European Innovation Partnership on Smart Cities and Communities, we have set our goal to bring the city closer to achieving the status of a smart city by integrating innovative

information and communication technologies (ICT) into energy and transportation. For these purposes we have redeveloped the SEAP through transforming it into the Riga smart city SEAP 2014 – 2020. The smart city SEAP is based on the data for 2012; therefore, there is going to be no separate Progress Report for the smart city SEAP implementation.

The Riga smart city SEAP for 2014 – 2020 has been drafted under the guidance of the Riga Energy Agency (municipal agency REA) in collaboration with the members of the SEAP Interinstitutional Working Group and other energy supply bodies, institutions of the Riga City Council (RCC), service companies and experts.

## 2.2.- BEI description

Riga is located in the cold climatic zone of Europe with heating being a particularly important field of the energy sector, since over 60 % of the energy resources consumed in the country are used as heat energy. The main type of heating in Riga is district heating which covers 76 % of the consumed volume of heat with natural gas and wood-chips used as fuel. Public transport in Riga is provided by a single municipal company Ltd "Rīgas satiksme" which operates trams, trolley busses and busses for public use. Urban traffic is mostly organized with the help of electric power driven vehicles, which handle more than 54 % of the passenger flow.

Two of the largest cogeneration (CHP) plants are located in Riga, i.e. Riga TEC-1 and Riga TEC-2. They are able to produce around 20% of the total energy consumed in the whole of country.

Consumption of all types of energy and fuel in a given year in the territory of Riga city irrespectively of the location where it was produced has been taken as the basis for calculating the volume of carbon dioxide (CO<sub>2</sub>) emissions. CO<sub>2</sub> emissions have been calculated separately from power consumption, heat consumption in the district heating system, fuel consumption in the transport sector, and energy end-use in households, industry, government and municipal institutions and the service sector. From the totality of greenhouse gas emissions, notably, only CO<sub>2</sub> emissions have been calculated. Standard methodology and parameters based on the guidelines drafted by the Intergovernmental Panel on Climate Change (IPCC) have been used to calculate emissions. The *COPERT IV* (Computer Program to calculate Emissions from Road Transport) model extensively applied in EU Member States has been used for calculating motor vehicle related emissions. In the present paper it has been applied for calculating emissions in the Riga city.

In 2012 as compared to the base year (1990) the total CO<sub>2</sub> emissions in the city of Riga

have decreased by 51.85% .All the key Covenant sectors are adequately covered: the plan encompasses the total amount of GHG emissions resulting from heating and cooling of all buildings, all road traffic work within City boundaries, and all gas and electricity use.

### **3. - SEAP**

The smart city SEAP includes an initial review of CO<sub>2</sub> emissions for 1990 – 2012 and projections for 2020, measures for reducing energy consumption and capturing renewable energy sources in the administrative territory of the Riga city, as well as criteria for assessing progress towards the goals of the smart city SEAP. The smart city SEAP states the main development lines towards reaching sustainability of energy supplies and an emission free transportation system, alongside with providing smart ICT for planning and implementing measures with the aim of improving energy supply, upgrading energy supply systems, including energy sources, improving service quality, drafting and implementing energy saving plans, use of renewable resources in municipal energy supply and implementing emission-free mobility.

Riga aims for 55% reduction of CO<sub>2</sub> emissions by 2020 (1990 baseline)

In the shorter term to 2018, the main targeted development areas lie on both banks of the river Daugava – including the territory of the Riga Freeport, Kipsala and Krievsala. The affected neighbourhoods share the challenge to integrate renovation and new contracts for new business developments and dwellings into the city's transport scheme, and to provide efficient lighting and other necessary utilities using the most environmentally friendly and smart technologies.

Riga is developing a project in Kipsala, an island in the middle of the city, where Riga Technical University campus is situated with diverse test beds for energy - public lighting, electricity supply, renewable heat, electric transport - along with Swedbank headquarters. It will serve as a role model for energy efficiency, collaborating with diverse private and public stakeholders in order to create a demonstration site for a smart district engaging inhabitants, SMEs, students and industry in managing their energy demand and using the most advanced integrated technologies for sustainable living.

For Riga's SEAP actions most of the required resources are expected to be found by stakeholders and outside of the City's budget, in EU structural funds, EU programmes, and in national and bilateral instruments aimed at reducing CO<sub>2</sub> emissions and making the communities of the European Union more sustainable. Public-private partnerships are also considered, and initiatives started by industry are also supported by the City.

Riga's SEAP contains an analysis of the resources and tools required for implementation of the actions, and the actions are prioritised based on the maturity of the partnership and availability of funding. Actions are monitored on a yearly basis, and the priority of actions is adjusted accordingly. Riga also cooperates with Government and Parliament in order to ensure that energy efficiency and renewable energy are high on the agenda.

Within STEP UP Riga has focused on integrating the new smart city plan with the energy plan that has been built on yearly progress monitoring and committed work to improve national legislation, policies and programmes. Riga's approach involves extensive stakeholder engagement where organisations and citizens can contribute to the city planning process and implementation of activities, whilst considering energy, ICT and transport in an integrated approach.

In order to identify the high energy usage in a city on which to target energy savings, municipalities need higher granularity, specifically at the building and property level, expressed in units of kWh/m<sup>2</sup>, i.e. Energy Density Maps. There are available on line the annual heat consumptions of over 2,500 buildings connected to District Heating network in Riga. Therefore the measures related to renovation of buildings connected to DH networks are well planned and localised.

Furthermore, the SEAP contains measures related to improvement of energy efficiency in street lighting by LED technology. Energy efficiency measures are also planned in the supply side, especially in the district heating power stations, such as:

Installation of absorption type heat pumps in CHP;

Installation of condensing economizers in heat boilers

Biomass utilisation in CHP and heat boilers

Regarding the use of Renewable sources, measures related to installation of heat pumps, of solar collectors and heat boilers using pellets are also reported with details.

The Plan describes very clearly the strategy/measures under the direct control of the municipality. For the measures aiming at reducing the emissions in the territory of the local authority, the involvement of stakeholders and citizens is a key success factor. Furthermore the financial mechanism as Rotation Fund, Support schemes for energy efficiency are very well described.

#### **4.- Implementation and monitoring**

The monitoring process is described in details, but the city has not submitted an implementation reports to the Covenant of Mayors.

## **5.- Overall conclusions**

The Plan is good in analysing the data on energy consumptions and emissions occurring in the territory. The involvement of local stakeholders such as local energy suppliers, local transport companies is considered a key ingredient of success of the Plan of the city. The main reduction of the CO<sub>2</sub> emissions are already achieved by energy efficiency measures in the District heating network. An additional 5% of CO<sub>2</sub> emission reduction are planned to take place from 2014-2020, which is quite low as ambition in comparison to the results already achieved from 1990 to 2014. Despite this peculiarity, the measures in the Enhanced SEAP of Riga are well planned with very detailed information about cost and implementation timeframe.

## AMSTERDAM (NL)

### **1. - City description.**

Located in the Netherlands and its most populated city with around 750000 inhabitants, Amsterdam presents itself as a reference in terms of thinking-forward on climate and energy policies. In the recent decades, the city has been pushing towards a more sustainable way of living even if energy consumption has been significantly increasing since 1990.

Being both an economic hub and a touristic city, in order to reduce the associated emissions of the different stakeholders operating and living the city, Amsterdam has presented an ambitious vision for its coming years, in order to become less dependent on imported fossil fuels and become more and more climate neutral.

### **2.- The city joining the CoM**

The plan presented by Amsterdam to join the Covenant of Mayors initiative has not met all the formal requirements set by the initiative. Nevertheless, the exemplary role of the measures outlined in the documentation presented for the adhesion of the Covenant of Mayors, make Amsterdam a case-study for other cities willing to adhere or improve their own strategies. Amsterdam is a member of the EUROCITIES network and it was under the coordination of this initiative that it has joined the Covenant of Mayors initiative.

In the "Amsterdam: A different energy, 2040 Energy Strategy" document, the city of Amsterdam presented a three-stage timeline for implementing the measures and achieving its targets. Policies to be implemented up to 2015 and estimated targets for 2025 and 2040.

Approved by the municipal board (mayor and aldermen), the adhesion to the CoM outlines the general guidelines of the municipality into the achievement of a 40% CO<sub>2</sub> absolute emission target by 2020, noting that the timeline of the SEAP strategy document (40% by 2025 with a baseline year of 1990) differ to the value stated in the Overall strategy (40% by 2020 with a baseline year of 2008), these are nevertheless ambitious and noteworthy objectives.

Amsterdam municipality is leading by example with a clear objective to be climate neutral by 2015 in all municipal buildings, existing or new. Amsterdam acknowledges the importance of stakeholders and the involvement of the different interested parties is very evident in the documents presenting the city's climate compromise.

The municipality has approximately 30 people throughout the municipal organisation working on the implementation of the Energy Strategy and has created a specific

Climate Office to coordinate the climate strategy.

The document presented as the SEAP (2040 Energy Strategy) refers to a commitment of a reduction of 25% by 2025 and 75% by 2040, considering the baseline year of 1990.

The BEI presented by Amsterdam, is based on the Standard emission factors, with tons of CO<sub>2</sub> as emission reporting unit. The BEI presents a general coverage of the city's emissions, though missing key sectors, especially in the municipal sector, like municipal buildings, public lighting or municipal fleet. Also, the CO<sub>2</sub> reduction estimations per sector are missing. The absence of these indicators has led to a non-eligibility status of Amsterdam's adhesion to the CoM initiative.

The description of the data sources and methodological approach are missing, making it hard to evaluate. Incongruence in the reporting of the emissions is the fact that while in the SEAP document, the baseline year considered is 1990, in the BEI template the reference year is 2008.

### **3. - SEAP**

The Amsterdam Climate Programme is being developed according to the principle of Trias Energetica, with three pathways being pursued simultaneously: 1. Energy savings 2. Maximum use of sustainable energy 3. Increase the sustainability and efficient use of fossil energy.

The SEAP document is divided in 4 clear sections that are the main axis for the implementation of the city's climate strategy: Buildings, Clean Transport, Port and Industry and Sustainable Energy. These sections are then sub-divided by a three-stage timeline encompassing measures to be implemented up to 2015, from 2015 to 2025 and from 2025 to 2040.

On the Buildings section, Amsterdam declares an intention of turning all municipal buildings, existing and new to be climate neutral by 2015. Actions on the improvement of energy efficiency and indoor climate conditions in schools are also mentioned. From 2015 to 2025, the aim is to have only climate neutral new buildings and refurbish existing ones by improvements on insulation, glazing and with the use of solar energy. The extension of the district heating network and the introduction of heat and cold storage are also foreseen. For the period 2025 to 2040 the objective is to achieve a 75% reduction in CO<sub>2</sub> by 2040, with all existing buildings having to achieve a minimum level of energy efficiency of certificate B. It is foreseen also that approximately 200,000 houses will be supplied with heat from the district heating network.

For the Transport sector, up to 2015 Amsterdam aims to install charging stations for 10,000 electric cars (including 5,000 plug-in hybrids) for the general city users and also

the objective to encourage green public transport. Regarding municipal fleet, the objective is to have part of it constituted by electric vehicles. Also, pilot projects are being developed in order to investigate a hydrogen roadmap for heavy traffic outside of the city centre. From 2015 to 2025, the objective is to have charging stations for 40,000 electric vehicles, while introducing more Park and Ride locations for car sharing solutions and reducing emissions originated by the tighter EU standards on CO<sub>2</sub> emissions for vehicles. For the 2025-2040 timeline Amsterdam is aiming for 200,000 electric cars (half of these plug-in hybrids) and only electric boats will be allowed to circulate in the city's canals.

Port and Industry are another of the sectors described in the plan. ICT is an important sector of activity and the plan is to improve energy efficiency of existing data centres up to 2015. Also the Port of Amsterdam is transitioning towards a "Green Energy Port" and committed to a reduction of -40% of CO<sub>2</sub> emissions by 2025. In order to achieve such target, the port is starting with the replacement of old wind turbines for more efficient ones and the installation of new turbines in the upcoming years. It is foreseen for the timeframe of 2015-2025 the installation of more PV panels in the port area as this technology becomes more cost-effective. For the 2025-2040 timeframe, the objective is for the Port of Amsterdam to be one of the most sustainable ports in Europe with the vision that all roofs have PV panels and that wind energy has been optimized in the Port area.

Sustainable Energy is the last of the 4 climate strategy pillars. By the time of the redaction of the climate strategy document, 45,000 houses were already connected to the district heating network and the plan is clearly to increase this value. By 2015, the city plans to install up to 70% of the wind energy generation potential, mainly in the Port area and is promoting a large-scale introduction of solar panels in the city with the support of national subsidy schemes for sustainable energy. From 2015 up to 2025 it is foreseen that 25% of the electricity of the city will be generated in a sustainable manner and is expected a great expansion of the solar panels installation due to its expected cost-effectiveness. Also the heat and cold storage and the expansion of the district heating network are foreseen. For the 2025-2040 period 50% of Amsterdam's electricity needs should be from sustainable sources within the city boundaries.

The document "New Amsterdam Climate" also uploaded in the Amsterdam restricted area on the Covenant website outlines many other initiatives of relevant importance that may also serve as a good example for other cities. In this document, the city of Amsterdam outlines the different actions rolling or planned regarding climate change with the description of stakeholders involved. One of the actions outlined is the

monitoring of the city's CO2 emissions every year. For this, a model is being used to monitor the built environment, traffic and transport, business and the city organization itself. Communication is another subject that is seen to be as transversal to all measures. The climate office is directing its communication efforts in a multi-platform way, from normal press contacts, to online means like a digital climate journal or a digital map of Amsterdam showing "who is doing what" in terms of CO2 reduction and sustainability. In terms of financing, the city of Amsterdam has created the Amsterdam Climate & Energy Fund (AKEF) with the objective to contributing to projects focusing on energy savings, sustainable energy and energy efficiency. The fund provides capital in terms of loans up to €5 million per project.

Besides the general targets and actions outlined in the above section from the SEAP document, the "New Amsterdam Climate" also delivers more specific actions to be taken in the different sectors. For instance, in the Municipal Organization sector, besides the objective of becoming climate neutral regarding its own buildings, whenever the city is in the tenant position, only rents buildings where the landlord is prepared to invest in the energy efficiency of the building during renovation. Also, in the municipal organization sector, an energy team for municipal buildings has been established in order to advise and assist the neighbourhoods during new construction and renovation of buildings. The division of the city in Districts allows an integrated action among the stakeholders living or doing business in them that share common characteristics by its localization. For example, OSDORP district is implementing a groundwater system with decentralized heat pumps and taking advantage of a subsidy scheme for the installation of 10,000 m<sup>2</sup> of solar panels in order to achieve a 40% energy reduction and 10% of sustainable energy generation. In the Centrum district the replacement of air curtains in shops is taking place by curtains 50% more efficient. The Zuideramstel district has a project named "Sustainable City District office" that has implemented a number of measures like green roof systems, underground thermal storage or the application of all fixed measures and more than 30% of the variable measures from the National Sustainable Building Scheme, thus achieving an Energy Performance Coefficient of 33% better than the legal requirements.

The involvement of stakeholders is a constant in Amsterdam's climate policies. From the Dutch Green Building Council, housing associations, City Districts offices, utilities, Port of Amsterdam, consulting companies, financial institutions or business associations are involved in a way or another in the city's climate policies that are coordinated by the climate office which has around 30 people from all municipal governmental organizations.

## BENCHMARKS:

Amsterdam has uploaded three benchmark cases:

1. "Amsterdam is working on the future of its children": This action regards tackling the findings that 80% of the city's schools had insufficient score on internal air quality. The decision was to refurbish schools by the placing of efficient windows, insulation of facades, energy efficiency improvement of lighting and heating systems. These measures are expected to reduce CO2 emissions by 30-40%.
2. "Amsterdam Electric": Construction of electric vehicles charging stations. By 2015 it is expected to have 10,000 e-vehicles in the roads, while by 2040 it is foreseen that almost all kilometres driven within the city will be made by electric vehicles, powered by wind, solar and biomass. Also the boats in the canals will be electric and cargo transport will be made by electric water and road transport.
3. "Amsterdam Smart City": A collaborative initiative joining government, business and research institutes, aimed at showing how it is possible to save energy now and onwards. The goal of Amsterdam Smart City is to reduce CO2 emissions. Actions like behaviour change and the introduction of small-scale pilots are being developed in order to test new technologies. The main objectives of Amsterdam Smart City are: Create collaboration, public-private partnerships; Knowledge dissemination, Gain knowledge in behavioural change and Stimulate technical innovations regarding energy saving.

The documents present several energy savings and sustainable energy production estimates associated with the projects and measures proposed. In the New Amsterdam Climate document it is presented a value of 30% of sustainable energy production by 2025.

Actions aimed at involving civil society in elaborating the SEAP have been undertaken: not specifically for the SEAP elaboration but there are numerous references of the involvement of different stakeholders as tenants associations, housing and residents associations, SME associations, Chamber of Commerce, ICT companies, District associations, Port of Amsterdam, schools, etc.

### **4.- Implementation and monitoring**

The monitoring process is not described in detail in the documents provided. However, as mentioned above, in the "New Amsterdam Climate" document there is a reference to a monitoring model that will be fed with energy data from the following sectors: built environment, traffic and transport, business sector and the city organisation itself.

## **5.- Overall conclusions**

The Amsterdam Climate Plan is a very ambitious and forward-thinking document and outlines the main guidelines of the city's climate policy for the next decades. Although Amsterdam did not qualify as eligible for the Covenant of Mayors due to the lack of information in some of the checks made for the approval, the city tackles the most important sectors, giving objective targets to each of them supported by up-to-date data and a proper adaptation of municipal structures.

The target of becoming climate neutral by 2015 for all municipal buildings is a point that cannot be ignored, showing that the city of Amsterdam is aiming to lead by example. The efforts regarding the roll-out of electric mobility and sustainable energy production are also to be highlighted.

The involvement of local and national stakeholders is noticeable by the way that not only the municipal government is putting into place measures for reducing its carbon footprint, but also in the way that the community recognizes the importance to become more energy efficient.

## BRISTOL (UK)

### **1. - City description.**

Bristol is a city in the South West of the United Kingdom, with 441.300 inhabitants. Bristol is a port city that has submitted its SEAP in 2012 and has counted with the support of the Energy Saving Trust, EUROCITIES and ICLEI for the development of its strategy. Bristol's municipality used the year of 2009 as an inventory year with an overall objective of reducing its emissions by 40% by 2020.

### **2. - The city joining the CoM**

2.1.- Basic data about the organisation and political commitment ( policies already apply, connection with other initiatives, CTC, join seap etc...following the second sheet of the template)

Bristol's strategy was developed under municipal council high-level officer group coordination, with the Sustainable City Group in Bristol Futures having the overall responsibility for coordinating Bristol's climate change work, expertise and the Covenant of Mayors. As reporting authority, Bristol is also involved in the United Kingdom's Climate Change Act of 2008. The Climate Change and Energy Security Framework presented by Bristol introduces a table with the different contribution that

Many partners are involved in the Bristol's Partnership 2020 plan: Energy Saving Trust, homes and Communities Agency, Government Office for the South of Wales, Bristol Environmental Technology and Services Sector Partnership, Carbon Trust, Waste Contractors, Cultural organizations.

The fact that Bristol is a member of EUROCITIES and the Energy Saving Trust also denotes that the municipality is thoroughly involved in developing policies that go towards the reduction of its carbon footprint. Up to this point, Bristol has invested £20 million in carbon reduction and is planning to invest approximately £450m, mainly for transport and energy infrastructure.

Regarding stakeholders involved in Bristol's 2020 strategy, these include the Energy Saving Trust, Homes and Communities Agency, Government Office for the South of Wales, Bristol Environmental Technology and Services Sector Partnership, Carbon Trust, Waste Contractors and Cultural organizations.

2.2.- BEI description ( target, approach, year, main data included in sheet 3 ...)

Covering the peculiarities and good practises of the BEI development

Bristol has presented a very detailed BEI and has reported its current situation in a

separate document. The year chosen by Bristol for its BEI was the year 2009 with the Standard emission factors in line with the IPCC principles and CO2 as reporting units being chosen.

Regarding targets, Bristol has presented a table with the achieved savings up to 2007, decurrently of already implemented policies and with expected savings for 2020. In this table, Bristol expects to save up to 40% in organizations, homes and local road transport. From these savings 15% arise from local actions while 25% are from national measures. Besides the mandatory elements to be presented in the BEI, Bristol has also discriminated the energy consumptions for the different type of fuels.

There are also presented targets regarding energy efficiency, with the presentation of targets for 2020, with the expectation of savings of 30% in organizations and Homes and 35% for local road transport. While in the carbon footprint targets, the contribution of national measures was bigger than the local measures; in the case of energy use is the opposite with 25% of expected savings from local action and 5% from national measures.

The reduction objective that Bristol has presented is of 40% by 2020, and presents also a longer objective for 2050 of 80%.

### **3. - SEAP**

This should be the "big part", focusing on the main characteristics (main sector, lack of info, feasibility of the measures, long-short term, financing, involvement stakeholders etetc etc etc)

The Sustainable Energy Action Plan document itself does not give a great amount of information besides a brief description of the 19 strategic activities that are being implemented or planned in order to achieve the targets proposed. Within these 19 strategic activities, Bristol proposes 65 actions which are allocated to different city partners and have a clear definition of the people responsible for them in the Bristol City Council, timescale, metrics and budget allocation.

In the SEAP template these actions are distributed in the different sectors, with a great number of actions with an budget and CO2 reduction estimates.

Some of the measures presented are noteworthy namely in the municipal sector with measures such as the reduction of emissions from the council's building & operations by 40% by 2020 and the increase the energy efficiency of Municipal buildings. The instalment of biomass boilers in Council buildings and 35 Solar PV systems in schools are also measures to be taken into consideration.

In what concerns tertiary buildings, Bristol intends to promote solar PV update through an online rooftop solar resource map. In residential buildings, the 6M investment in homes has been focusing on the most vulnerable households, with Bristol intending to pursue Green Deal opportunities for energy efficiency of social & private housing. Also the deployment of smart metering and the delivering of innovative ICT solutions in social housing to save energy, shift consumption to off-peak & reduce carbon emissions and plan and deliver an energy efficiency retrofit programme to ensure all council housing stock is low carbon by 2020.

For the Transport sector, Bristol has a 300M budget for investment in sustainable transport. The Transport and Digital Connectivity the Bristol Partnership aims to cut the energy use and carbon emissions of the city through integrated public transport, prioritising cycling and walking and a travel to work strategy. The Bristol council is working to achieve the European Green Public Procurement Policy Core requirements for Vehicle Purchasing, to deliver a Local Sustainable Transport Fund projects and to deliver 'Source Bristol' which are electric vehicle infrastructure projects.

On Renewable Energy production besides the PV measures above mentioned, Bristol is also to procure the construction of 2 large wind turbines and to develop a Hydrogen Action Plan. Another measure relates to plan and deliver a micro district heating investment programme.

#### **4.- Implementation and monitoring**

The implementation and monitoring phases are not very well described in the documentation provided by the municipality of Bristol. However, by the presentation of the different actors responsible for the implementation and control of the measures proposed it is possible to realize that the mechanisms for monitoring Bristol's actions to minimize its carbon emissions may be already in place. Bristol is a municipality with a significative tradition on climate subjects and its structures are already in place in order to ease the implementation of local climate policies. Training is considered in the SEAP and Bristol is aiming to co-ordinate with the South West Sustainable Procurement Network to provide information, training and support to public sector bodies.

Bristol intends to check the 20 strategic activities and review them annually - refining the plans and planning new specific activity. All Framework activities & specific actions have been or will be subject to their own Eco-Impact Assessment (Eco IA) to identify the environmental impacts arising from each & identify mitigation measures required to reduce any impacts arising on a project by project basis. The framework proposes the extension and strengthening of the Eco IA process.

## **5.- Overall conclusions**

A little summary highlighting the weak and strong points of the SEAP.

Aiming for an ambitious 40% in 2020 target, Bristol continues the work that has been doing in the climate change areas by presenting a 20 strategic activities plan tackling the different parts of the climate policies. Despite that the Bristol SEAP is not a very solid and thorough document with the measures being proposed, not being presented with great detail, it is still easily seen by the way that responsibilities are being allocated in the different municipal structures that this municipality is well prepared to face the challenges of achieving such a significant reduction. The budget allocation and the access of different types of funding to be used in the implementation of the measures is something to be noted. Also the involvement of other stakeholders in the implementation of the proposed measures is also impressive, helped by the fact that Bristol has been participating in numerous other projects that make this city a very well prepared one in order to achieve the challenges of reducing its carbon emissions and increasing its energy efficiency.

## The Statutory City of OSTRAVA (CZ)

### **1. - City description.**

Ostrava is a good example of large European city (318749 inhabitants) with an important industrial character. It is the third largest city in the Czech Republic and the second largest urban agglomeration after Prague. Located close to the Polish border, it is also the administrative center of the Moravian-Silesian Region and of Ostrava-City District. It is part of the binational Upper Silesian metropolitan area.

Ostrava is located at the confluence of the Ostravice, Oder, Lučina and Opava rivers. Its history and growth have been largely affected by exploitation and further use of the high quality black coal deposits discovered in the locality, giving the town the look of an industrial city and the nickname of the "steel heart of the republic" (Czech: ocelové srdce republiky) during the communist era of Czechoslovakia. Many of the heavy industry companies are being closed down or transformed, yet the city remains one of the most polluted in the European Union.

Within the sample of 25 cities analysed in this report, we may say that Ostrava is the main example of industrial city with an important commitment of emission reduction starting in the frame of the CoM Initiative

### **2.- The city joining the CoM**

The city of Ostrava joined the initiative in 2012. Due to its huge industrial reality, the city already joined others initiatives in the past, such as "Smart Cities", and had already developed sustainable and environmental plans (e.g., City Strategic plan; Integrated City development Plan; City Planning Scheme, and an interesting Programme for Air Quality improvement) before to join the Covenant of Mayors initiative. Nevertheless, the city followed all the principles of guidance provided by the initiative when calculating and developing the BEI and SEAP, which are totally compliant with the CoM requirements.

The year of 2000 is defined as the baseline year, which the reduction of emissions is to be compared to. The Municipality attempted to determine the emission inventory for 1995, but the efforts to establish relevant reliable and complete data on the consumption of fuel, heat and electric power for included sectors in required structure were unsuccessful. The inventory of fuel and energy consumption had been first prepared for the city as a whole and subsequently, in compliance with the methodology of the CoM, it was narrowed to include only those sectors (so called "included sectors") that the Municipality could influence by its activities. The final consumption of those

included sectors amounts to almost 20 % of the total consumption of fuels occurring on the Territory of the city. They provide an absolute reduction following the IPCC principles and total CO<sub>2</sub> as emission reporting units.

The study was made by an external consultant "ENVIROS", with an important political commitment and support. A steering committee and working groups within the municipality authorities were created to support the initiative. The plan, which target is defined as an absolute reduction of CO<sub>2</sub> emission (in t CO<sub>2</sub>), follows the IPCC principles. The emission inventory and SEAP methodologies are well described in the document. It is also worth noting that trends (every 5 years) are provided from 1995 to 2020.

### **3. - SEAP**

The SEAP document was created in the integration and harmony with the strategic and development objectives of the Statutory City of Ostrava ("SMO") as well as in compliance with the principles of protection of other components of the environment, air protection in particular. The following documents and initiatives are deemed essential in this respect:

a) *City Strategic Plan* (its update), as a principal document establishing the development of the Statutory City of Ostrava, comprises strategic objectives of city development in sectors included in SEAP (housing, public services And other tertiary sphere, transport) and projects approved within the framework, respected in SEAP and whose impact on CO<sub>2</sub> emissions is taken into consideration in SEAP up to 2020.

b) *Integrated City Development Plan: OSTRAVA – MAGNET OF THE REGION – Energy requirements of development projects are taken into account in the calculation of CO<sub>2</sub> emissions as of 2020.*

c) *City Planning Scheme*: SEAP maps the assumed development of the city including the development in housing and civil amenities, taking into account of compliance with the so-called "Real Estate Report", delimitation of the space for development and the character of particular development areas as well. As part of its marketing support activities, the City of Ostrava has produced a database of projects with the aim of attracting new investors. The database contains details on projects currently at the implementation or planning stages. It is targeted at investors, businesses, and the general public. The projects can be filtered according to clearly defined criteria. The database lists large multifunctional projects, office building projects, hotels, apartments and houses, shopping centres, logistics centres, industrial zones and other types of development.

d) *Programme for Air Quality Improvement in the Moravian-Silesian Region – Ostrava City* is frequently exposed to air pollution. Certain locations in particular experience too many days of exceedance of air quality limit values. The city of Ostrava already owns its own Action Plan for Air Quality Improvement. In order to improve the situation the

Programme contains measures aiming at establishing a program for the whole Ostrava – Karviná – Frýdek-Místek agglomeration by 2014.. The program which also integrates objectives in climate protection searches for mutual synergies and support of activities for the protection of both the climate (CO2 emissions abatement) and the air quality.

e) EU Initiative Smart Cities – The city of Ostrava is involved in the EU initiative “Smart Cities and Communities”, whose aim consists in the promotion and support of energy savings and use of RESs and, primarily, new and smart solutions in the fields of building, transport and ITC uses.

The most important sectors of the SEAP are the residential and municipal buildings, representing 70% of the expected CO2 reduction. Especially important is the “*Ekotermo*” pack of measures regarding the total reconstruction of the municipal part of residential buildings in the city. The use of municipal services (drinking water purification, waste water treatment, waste disposal, public transport) and the improvement of the municipal management in the field of fuel/energy consumption are also key sectors of action.. In the transport sector we can notably mention the introduction of the electrical buses in the municipal fleet.

#### **4.- Implementation and monitoring**

The implementation and monitoring of the plan is well documented. The activities assumed to occur within the measures may take various range of implementation; SEAP monitoring is deemed suitable, at least, and the activities should include: Collection of data on fuel and energy consumption and related costs at a single central point, preparation of an appropriate system interconnected with other data of the facilities; Implementation of a monitoring and purposeful energy control system; Monitoring of fluctuations in consumption, analyses taking account of climate dependent factors of consumption, evaluation of achieved fuel and energy savings, particularly in the buildings/facilities, where investments were made in energy savings; Identification of additional suitable measures to reduce consumption; Continue (from 2014 on) in the selection of facilities eligible to funding through the Operational Programme; the facilities should make use of the potential of savings in compliance with programme conditions and criteria for the evaluation of applications. System Provision of the integration of efficient use of energy in the design and planning of all processes, buildings and equipment; Provision of professional energy education/training for meeting identified needs; Running of promotional and advertising campaigns; Observation and evaluation of implementation of the recommendations of energy audits and their possible updates; and provision of continuous compliance with legal requirements resulting from Act no.458/2000 Sb., as last amended, for the buildings and installations owned by the

Municipality.

## **5. - Overall conclusions**

The proposed plan by Ostrava is an equilibrate and adequate plan for a medium term city where projects and strategies included in SEAP relate particularly to the areas, which the Municipality is able to influence by its activities – such as residential, municipal and, possibly, other buildings and public lighting. The measures are well identify and included financial information. The use of other municipal services (drinking water purification, waste water treatment, waste disposal, public transport, improvement of municipal management in the field of fuel / energy consumption – by supporting information activities, making use of cooperation with the Smart Cities initiative and promoting activities and information in the household sector are also foreseen.

Finally is important to mention that the plan gives attention to the monitoring face, which indeed is the stage that will make the difference.

## TALLINN(EE)

### **1. - City description.**

Tallinn is a capital of Estonia and a city of ca. 413 727 inhabitants (figure from the form of adhesion to the Covenant of Mayors, 2009), covering an area of 159 km<sup>2</sup>. The city has strong interest to increase energy security by reducing dependence on fossil fuels (which are mainly pursued from abroad). This is based on two approaches that include reducing energy consumption in main sectors (i.e., buildings and transport), and increasing the share of renewable fuel in energy production sector. In addition to the budgetary means of the city and investors, energy saving measures are carried out with the aid of financial support funds, such as the European Regional Development Fund measures "The wider use of renewable sources of energy to generate energy" and "Improvement of Environmental Infrastructure."

### **2.- The city joining the CoM**

#### 2.1- Basic data about the organisation and political commitment

In February 2009, Tallinn joined the Covenant of Mayors, the international co-operation of communities. Tallinn aims reduce its CO<sub>2</sub> emissions by 20% by 2020 as a result of a 20% improvement in energy efficiency and a 20% share of renewable energy sources in the energy mix. The plan emphasizes and describes the city role not only in financing energy saving measures but also promoting of an energy saving lifestyle and playing organizational role (i.e., organisation of energy efficient days, training for entrepreneurs, indication of energy efficiency measures in every development programme, improvement of co-operation between departments, appointment of posts and officers responsible for the implementation of energy efficiency measures).

#### 2.2- BEI description

The Action Plan provides a detailed analysis of energy consumption in Tallinn for the year 2007. The BEI is calculated based on an IPCC approach, with CO<sub>2</sub> as emission reporting units. In the SEAP document, energy consumption is presented for the key Covenants sectors and beyond. However, it seems that not all of them are included in the BEI results table (for examples lighting) presented in Annex 1 and 4. In addition, in the BEI table is reporting data for the sectors that are defined differently from the Covenant sectors, such as i) Industry and construction sector, ii) business and service sector iii) household iv) transport. Furthermore, plan gives a detailed description of energy resources in the city, including DH, heating plans, and boiler houses. Water supply and waste management sectors are also addressed in the plan, including the

composition of household waste (not included in online SEAP template). The analysis of the current situation has been made by using publicly available data, statistical results, and data from large-scale power stations. Data on Tallinn's fuel consumption have been obtained from the Department of Statistics, Information technology centre of the Ministry of Environment], collected volume "Tallinn in numbers," and from various enterprises. It is stated in the plan that these sources provide different data due to the different principles used for the preparation of reports that makes sometime difficult to harmonize the data.

### **3. - SEAP**

Action Plan indicates possibility to save a significant amount of energy. In the housing services sector, it is possible to save 20-25% of the consumed heat and 10-15% of electricity. At least 50% of heat consumption in Tallinn can be covered by renewable fuel, using which 16% of consumed electricity is generated in Tallinn's power and heating plants. Considering the total amount of energy consumption, including purchased electricity, it is possible to cover more than 28% by using renewable energy. The Plan includes a section on concepts and strategies developed in different activity sectors, for some of which the concrete measures are also presented. However, it is not clear which of these measures have already been adopted by the city. Here below some further strategies of the city are presented:

- The Action Plan provides a range of opportunities for the accomplishment of the set energy-saving tasks, i.e., how to enhance energy-efficient consumption, increase the share of renewable fuel in energy supply process, and reduce the amount of CO<sub>2</sub> emissions into the atmosphere.
- It is important to change the urban energy consumption structure. It is necessary to involve new cogeneration technologies, the use of renewable fuel, and waste and waste residual heat in the energy economy processes, especially in energy supply to the city.
- To ensure a continuous improvement of the urban district heating and its networks as environmentally friendly modes of production.
- The most significant energy-saving opportunity includes the reduction of the demand for heating buildings. The insulation of buildings will enable the reduction of costs for their heating by up to 30%.
- As for the transport sector, special attention is be paid to the development of the urban transport systems, and an increase in the share of biofuel by at least 10% in both public and private transport.

- Plan envisages to raise awareness of all residents in regard to energy-efficient opportunities through the organisation of energy efficient days and advertising campaigns.
- All entrepreneurs must be informed about the set energy-saving tasks, and it is necessary to ensure that each and every entrepreneur works diligently at the implementation of energy-efficient measures in every enterprise.
- The City Government and the city Departments are planning to have an essential role in the organisation of energy saving measures and the monitoring of their implementation.

The Action Plan also summarises the role of the city for the activities planned between 2011 and 2020. First, the city will control and monitor the implementation of energy savings measures detailed in the SEAP, dedicating 20 million kroons. Second, city will ensure renovation programmes of the city-owned buildings to save energy, support of energy audits for dwellings in the private sector (housing associations) and energy performance certificates. As to the renovation of schools and kindergartens special attention is to be paid to the insulation of buildings and the improvement of their internal conditions. Third, Tallinn Municipal Services Department will further development of Tallinn's outdoor lighting system (in cooperation with electrical engineering company KH Energia-Konsult Ltd). City plans to spend of 20% current electricity expenditures on the further development of city's illumination systems to reduce electricity consumption. The city maintains the development of public transport and financing of several trends, which are as follows: i) the establishment of optimal public transport layout; ii) use of biofuel in the public transport sector; iii) the construction of the tram line in the Lasnamäe district to save energy and enhance traffic; (the investment cost of 3.8 billion kroons) iv) the use of fuel-efficient official cars

The Action Plan also details risks related to the accomplishment of the set objectives, including financial, administrative, political and social risks. It also addresses the risks related to the communication means, risks coming from motivation, risks related to the qualification and economic crisis. The Plan describes very clearly the role of the city in SEAP development and the role of the private sector and enterprises.

#### **4.- Implementation and monitoring**

According to the structure of the city government, the fulfilment of energy efficiency tasks has been divided between the city government, the district governments, and six departments, i.e., the Environmental Department, the Municipal Services Department, the Enterprise Department, the City Planning Department, the City Property Department,

and the Transport Department. It is recommended to establish a committee among the departments to monitor and control the execution of the saving energy economy action plan. A committee shall consist of representatives of all concerned departments, as well as independent experts. Apart from this, the monitoring process is not described in details, but the city is regularly (every second year) submitting implementation reports to the Covenant of Mayors.

### **5.- Overall conclusions**

The Plan is very good in analysing the current energy consumption trends and recourses, and balancing them via developing concepts and strategies: reducing the energy consumption of household sector, developing the urban transport systems, and increasing the share of renewable fuels. City has a clear vision on role of the municipality in the sustainable energy development, and how to organize work on SEAP implementation and monitoring.

The city can also benefit from a favourable national context, characterized by strong interest to achieve energy consumption reduction, reduce dependency on fossil fuels (mainly pursued from abroad) and increase energy security.

Organizational and co-operational measures are considered a key ingredient of success of the Plan of the city, and include organisation of energy efficient days, training for entrepreneurs, indication of energy efficiency measures in city development programmes, as well as improvement of co-operation between departments of local and national authorities.

## COLMAR (FR)

### 1. City description.

Colmar is located in the heart of the Alsace region, i.e. at the junction between big urban centers and Vosges Mountains.

- Its population increased by 4.8% from 1990 to 2007 (63498 to 66560 inhabitants)
- The city offers a diversified transport network with an excellent train frequency and a good bicycle path network. The main trouble is in the dominance of individual cars with a constant increase of traffic
- Other challenges are about developing cleaner transport (moving plan, electric vehicles, bicycles...), improving energetic efficiency of buildings (municipal and private), and enhancing the use of renewable energy.

### 2. The city joining the CoM

#### 2.1 Organisation and political commitment

The Action Plan document has been elaborated in the frame of the commitment of the city to both the regional action plan (22/03/2010, mandatory by law) and the CoM initiative (signed 17/05/2010). The political representatives, management team and the elaboration methodology are only briefly described in the SEAP template (My Overall strategy). It mentions one responsible of the Action Plan and two political representatives actively involved in the process: the director of the "Grand Pays de Colmar" and the director of the Transport department of the "Communauté d'Agglomération de Colmar" (CCA) public body. A Project Team, supporting by technical working groups is in charge of preparing propositions of actions for submission to the Steering Committee. The responsible body and others actors are defined for each individual action.

A large consultation, which obtained more than 200 propositions, was conducted with (i) inhabitants of Colmar (questionnaire), ii) members of the 3 Conseils de Quartier of Colmar, iii) social and environment associations (meetings) and iv) civil representatives (Economic, Social and Environmental Council).

#### 2.2 BEI/MEI description

The BEI and MEI inventories, which were probably elaborated previously as part of the city's commitment to the regional action plan (see 2.1), are not provided in the action plan. Moreover, the 1990 and 2007 total CO<sub>2</sub> emissions reported in the BEI summary table (p.2) are not consistent with the ones in the SEAP template, which are respectively 32% and 19% lower. Consequently, the 1990-2020 CO<sub>2</sub> emission reduction per capita that is required to fulfil the city target differs (0.8 Teq and 1.2 Teq, respectively). The inventory methodology is not described in the Action Plan, preventing us from a checking of the two emission datasets. But in any case, the commitment of the city has to be evaluated with reference to the Action plan official document.

### **3. SEAP**

The target of the Colmar city is a 20% 1990-2020 reduction of the CO<sub>2</sub> emissions per capita. The sustainable Action Plan includes 27 action sheets (13 of which were defined in the frame of the city's commitment to CoM and/or to the regional action plan). They concern:

- Actions focusing on municipal buildings, through a 4-yrs rehabilitation program, but also on residential buildings, via a grant system for better energetic efficiency.
- Actions on the use of electric vehicles in municipal departments, but also for individuals.
- Municipal initiatives to enhance energy efficiency, e.g. in the public lighting and heating (new biomass heating system) sectors.
- A new Urban Moving Plan that should allow reducing considerably the use of car to the advantage of soft and public transport.
- A better waste management
- A large number of measures about public awareness raising, encouragement and education.

The (new) action sheets are well documented, in terms of responsible body, diagnosis and objectives (as well as targeted population and implementation). The actions have been split/redistributed according to the CoM categorization within 39 measures, most of which (21) with end time 2015. The emission reduction per capita, which takes into account a potential population increase by 2020, is consistent with the city target.

No measure about the local electricity production is proposed. Information on the articulation between the local and regional action plans (e.g., which actions are shared? what is the contribution of the city to the Regional plan?) would also be useful.

#### **4 Implementation and monitoring**

The City departments are responsible or co-responsible for the implementation of 20 out of the 27 actions. The other actions are implemented at regional level by "Grand Pays de Colmar" network and the CCA. Others actors/partners, together with methods, expected results, (time steps, milestones, qualitative/quantitative indicators of progress/evaluation) are reported for each (new) action. 8 out of the 27 action sheets also explicitly mention financing resources.

The financing mainly comes from the Colmar city (21 338 000 €), the CCA (4 478 000 €), and 3 semi-public local partners (69 500 000 €). Other financial partners are the French Republic, the Alsace region (grants), ADEME (energy agency), the European Union, the Département du Haut-Rhin (sub-regional government) and specialized societies (energy retailer, cars manufactures). The total implementation cost (but not the financing plan) is reported for 27 out of the 39 actions. It is worth to mention that the implementation report has not yet been delivered, when it should (SEAP delivered on 17/05/2011) and that, meanwhile (2012), the "Grand Pays de Colmar" has elaborated a territorial sustainable action plan (Plan Climat Energie Territorial, PCET) as imposed since 2012 by the french "Grenelle" law. It is not clear for now if/how the city commitment to the CoM initiative will be updated or replaced by the PCET.

#### **5. Overall conclusions**

The Action Plan has been elaborated in the frame of the city's commitment both to the voluntary based CoM initiative and the mandatory regional action plan (Grenelle law). The BEI, MEI and inventory methodology are not provided in the Action Plan. The 1990 and 2007 CO2 emissions reported in the document are not consistent with the ones given in the SEAP templates. The political commitment, general framework, vision and implementation process are not described in the Action plan (only briefly in the template).

On the other hand, the actions to be implemented are generally well documented, in terms of responsible body, diagnosis, objectives, targeted population, method, time steps, staff, expected results and qualitative/quantitative indicators. They put an emphasis on municipal actions and the involvement of the citizens and are consistent with the vision/target of the city, as well as with the CoM main principles

## FARO (PT)

### **1. - City description.**

Faro is the capital of the Algarve region in the south of Portugal. With a population of 63258 as of 2009, Faro has a strong presence of the tertiary sector and hosts all the public sector services. Tourism is the main economic activity of the region and the location of the Airport in its boundaries. Agriculture and fisheries are also relevant activities but with decreasing importance in the latest years.

### **2.- The city joining the CoM**

The plan presented by Faro municipality to join the Covenant of Mayors that was approved by the municipal council. The only political agent mentioned in all documentation was the mayor himself and no other political agent/local authority has been mentioned regarding the development of the plan. The plan was developed by external consultants and while in the SEAP document there is a reference of the Regional Energy Agency, it is not clear what kind of involvement this agency has had in the development of the climate strategy.

Overall, the policies outlined by Faro municipality follow the European and National Energy Efficiency Policies, namely the National Energy Strategy (ENE 2020), the National Plan for Climate Change and the policies gathered in the National Energy Efficiency Action Plan.

Regarding the adaptation of the administrative structures and the involvement of the city's stakeholders, there is no mention that any actions have been taken.

The BEI presented by Faro gives a general overview of the energy consumption in the municipality, depending on general data from national sources. The SEAP presents a model with the energy consumption divided by sectors like residential, industry, services, agriculture, tourism and transport, and divides these consumptions by electricity, gas and oil based fuels. While in the buildings section of the BEI template, there is a breakdown of all the categories with the consumptions per type of fuel, in the transport section, only the subtotal is indicated with no data being presented for the public or private sectors.

The model that was developed for the SEAP also predicts the energy consumption up to 2030, although with no clear indication of the premises used for the calculations.

Faro has determined a 21% reduction objective by 2020 as compared to 2009, using the IPCC methodology with tons of CO<sub>2</sub> as the emission reporting units. The model that was developed for the SEAP also predicts the energy consumption up to 2030, although with

no clear indication of the premise used for the calculations.

The values presented in the SEAP document do not exactly match the ones reported online in the BEI. This is due to the different sectors' breakdown. In the SEAP there is presented a breakdown of energy consumption with the same sectors as in the BEI but for a different year (2010 vs 2009). However, the values are of similar magnitude.

### **3. - SEAP**

The Action Plan presented by Faro Municipality describes in general terms the main climate policies to be developed in the following years, in order to achieve the reduction target of 21% until 2020. The measures to achieve the target are presented in a cross-sectorial way and in its majority originate from European or National policies with no great amount of innovative measures being presented. There are two measures that present some interest, even if their contribution to the overall savings is not of great importance, which are the Voluntary Carbon Reduction and Active monitoring. The voluntary carbon reduction is interesting due to the fact that may allow for small projects to enter in this market, where normally they would be excluded in the ETS, while Active monitoring is a first step for the roll-out of smart meters in a municipal context.

Regarding the expected impact of measures, efficient lighting and solar energy contribute with the highest energy savings and CO2 reduction in the municipal sector while building certification (from the transposition of the EPBD) and efficient lighting and Solar energy contribute with the highest energy savings and CO2 reduction in the tertiary sector.

Portugal has had a considerable deployment of the electric mobility network and Faro enjoys this boost. The measures proposed in the transport sector continue this path along with the measures that enjoy the transposition of European directives such as the efficiency of cars. No sectorial breakdown has been presented for Transports.

The measures outlined in Faro's SEAP imply that somehow other stakeholders have to be involved in its implementation. However, from the analysis of the SEAP it is not possible what kind of mechanisms will be used towards the engagement of the different parties. The same applies for the municipal structures. In order to implement the measures regarding the municipality climate policies, the municipality should also have to perform internal changes, which from the SEAP document are not entirely clear besides the ones presented in the next section.

Overall, the measures presented are long-term measures starting in 2009 and ending in 2020 and no budget, financing source or partial objectives are outlined.

#### **4.- Implementation and monitoring**

Overall, the measures presented are long-term measures starting in 2009 and ending in 2020 and no budget, financing source or partial objectives are outlined. The implementation and monitoring phases are not fully described in the SEAP document either.

While we believe that the implementation of the planned measures imply would require the involvement of several local stakeholders (and not only the mayor) no information is provided about the engagement of the different parties. The same applies for the municipal structures. In order to implement the measures regarding the municipality climate policies, the municipality might also have to perform internal changes. However, no municipal structures adaptation has been mentioned in the SEAP document besides the creation of a "Local Support Group" for its implementation.

Nevertheless, several instruments are defined for the implementation of the measures, which are: The creation of an Energy Sustainability Observatory that will serve as an instrument for the support of decision making regarding energy sustainability, the creation of an Energy and Carbon Statistical Inventory that will aggregate all energy consumption indicators and register the replication opportunities, the creation of a Web platform in which are presented the energy indicators, allowing partners to access the data and use it for the development of their programmes, a web Infographics with the presentation of municipal data and the comparison with regional, national, Iberian and European datasets and an Energy Sustainability Guidebook that is described as being "a map of opportunities for the implementation of energy sustainability measures, specifically oriented towards the private and social sectors".

#### **5.- Overall conclusions**

Aiming for a 21% reduction target, the municipality of Faro has provided a first good tool establishing its climate priorities. The measures presented by the city have a clear connection to the national and European policies on energy savings, with measures arising from such policies. The involvement of the city's stakeholders in the SEAP is not clear and an extra effort might be needed in order to engage the different actors in the implementation phase. The same applies for the municipal structures, which might need to be properly adjusted in order to implement the plan in the most effective way. The fact that Faro has developed a model estimating energy consumptions up to 2030, which can be adjusted as soon as new data arrives, should be very useful to the city to further define the SEAP implementation and monitoring activities in the future.

## PILEA\_HORTIATIS (GR)

### **1- City description.**

The Municipality of Pilea - Hortiatis is a suburban municipality, recently formed from the union of 3 smaller municipalities: Panorama, Pilea, Hortiatis. It is located at the eastern part of the City of Thessaloniki combining urban, country and waterfront landscapes. It has a varied geomorphology: a long coastline with lowland coastal areas and also with hills and mountains with an altitude up to 1200 m. The Municipality's population is of 70,110 inhabitants (2011 statistics). The population of the area almost doubled between 1991 and 2011. The total area is approximately 156.8 km<sup>2</sup>.

The main productive sector of the Municipality is services and commerce.

The climate in area belongs to the type of the Mediterranean hinterland, with mild and wet winters and very hot and dry summers. The dry season is mainly from the late May and goes until the end of September. The average monthly minimum temperature observed in January (1,3 ° C) and maximum July (31,5 ° C).

Transport characteristics: there is a very high commuting towards the urban area of Thessaloniki. Within the urban area, due to the urban development in almost all residential areas, the pedestrian movement even for very short distances very difficult.

### **2.- The city joining the CoM**

The Municipality of Pilea - Hortiatis participate actively in various other initiatives involving local communities. The European Network of Cities UTN, the European Network of Qualitative Cities (QCITIES), the European Pact for Local Sustainable Energy (EUM) and the European Network "City Sec".

The BEI year is 2010, the approach is IPCC and the reporting unit is tonnes of CO<sub>2</sub>.

The sectors are according to the Covenant methodology. The energy consumption data for the transport is calculated based on a complex model integrating the traffic flow information with questionnaires. The data for the municipal sector is measured, whilst the data for the building sector (residential and tertiary) is scaled down from national statistics.

The main characteristic of the BEI is the high share of the emissions from electricity (60%) in the building sector, despite the relative low share in consumption (24%).

### **3. - SEAP**

SEAP was developed under the Intelligent Energy Europe programme.

The role of the newly created energy office as the entity supervising the implementation of the SEAP is clearly defined.

For each action detailed estimates are provided, regarding the energy savings/ green production, CO2 emission reduction, budget, responsible body and, when appropriate, a list of progress indicators.

The SEAP is focused on electricity savings and production (46% of the total estimated emission reduction) as the electricity was found to be the major contributor to the CO2 emissions. Yet, even if the issue is the high emission factor for electricity, only 23% of the measures tackling the emissions from electricity address the production sector.

The strategy behind most of the actions, is to support and actively promote, through awareness campaigns, the national policies and programs and also the technological progress. Nevertheless, given the fact that the awareness raising is the most used instrument, a more detailed description would have been advisable.

#### **4.- Implementation and monitoring**

The monitoring of the implementation of the SEAP is going to be the responsibility of the newly created Energy Office within the municipality infrastructure.

Furthermore, when appropriate, a set of progress indicators per action are foreseen.

#### **5.- Overall conclusions**

The SEAP is developed according to the Covenant methodology. Detailed estimates are provided for each action including progress monitoring indicators, when appropriate.

The main strategy behind the actions is to support and actively promote, through awareness campaigns, the national policies and programs and also the technological progress.

As the awareness raising is the most used instrument, a more detailed description would have been advisable.

## VASLUI (RO)

### **1. City description.**

The city counts 71252 inhabitants and is the capital of the county. It has undergone a sharp demographic growth until 1990, followed by stagnancy then a slow decrease (10% in the last 10 years).

Climatic conditions: temperate-continental climate, the average annual temperature 9,4°C, sudden changes of temperature from the hot to the cold season, the characteristics of 2005 (baseline year) : the relative humidity (80%), HDD 20/12=3570 (18°C), the conventional duration of the heating season 208 days.

Topography: Total area of 6844ha, of which 68% agricultural land. The altitude varies between 90m city in the industrial area and 170 m in area, plateaus and terraces. River valleys separate the main city area from some suburban localities components.

Economy: The active population represents 55,65% and it is occupied in small industry and the tertiary sector. The current trend is characterized by economic stagnation, decrease in the number of jobs, increasing the share of the low income population.

Types of dwellings: 92% of the population lives in the urban area, in blocks of flats and individual houses, the remaining 8% living in the suburbs in 1789 individual homes. 90% of the residential buildings are represented by block of flats, hosting 90% of the city population.

### **2.- The city joining the CoM**

2.1. The city joined the Covenant, at the early stage of the initiative, on the 1st of September 2009, and sets a 21% absolute CO2 reduction target for 2020.

The SEAP is the development of the main lines of the Local Strategy for Sustainable Development in the fields of energy and climate.

#### **2.2.- The BEI**

The baseline year is 2005, the approach to calculate emissions follows the IPCC and the measurement unit is CO2.

The BEI was developed within the Covenant, therefore the sectors and the methodology follow very closely the recommendations of the CoM Guidelines.

Data regarding the buildings sector is obtained from the main suppliers and then subdivided per categories of use according to averages calculated based on the monitored consumption of several reference points.

Data for the municipal fleet and public transport is measured. Data for private and commercial transport is an estimation based on the number and characteristics of the vehicles registered in the territory (statistics) and the mileage by type of vehicle (interviews).

Given the fact that the quantity of fossil fuel sold in the territory represents twice as much (in terms of energy) than the one reported as consumption, it raises some questions:

- is the methodology for estimating the average distance per type of vehicle correct?
- how big is the share of the traffic coming from outside the city (commuting/ transit)?
- are there routes between the city and the neighbouring areas which could benefit from public transportation?

### **3. - SEAP**

The target is set taking into account the observed trends in the energy consumption at local level (monitoring inventory 2009) as well as forecasted trends at national level for 2020.

The plan is well balanced between the sectors in number of actions. In terms of estimated CO<sub>2</sub> emissions reduced, there is a very strong focus on the building sector, especially on promoting the refurbishment of the existent building park and the optimization of the district heating. Yet, we consider that the weight given to the refurbishment of the district heating (52% of the estimated emission reductions) does not reflect the share of emissions in BEI associated with heat consumption coming from that source (only 10% of the total emissions in the Building sector). Especially because the plan mentions only the intention of increasing the efficiency of the existing District Heating network, with no mention to extending it to further consumers nor to replace the fossil fuels used herein by renewable ones.

The municipal sector is very well represented in terms of measures planned, with a special accent on the measures related to the renovation of buildings of the public education institutions.

In the transport sector, the focus is on the improvement of public transport and traffic optimization through transport and mobility planning regulations and road network optimization. The public transport optimization is mainly related to the development of the trolley bus network. Despite their efforts in the transport sector, they estimate an increase of the energy consumption and emissions in this sector due to the economic development.

The sector which is underrepresented is tertiary sector.

The financial aspect of the measures and the designation of the responsible party could be improved.

They should make clear also from the actions summary table, what is the reference point for calculating the necessary reductions (BAU).

#### **4.- Implementation and monitoring**

The SEAP's goal is to ensure implementation on a short and medium term of the local policies formulated in the approved local sustainable socio-economic development strategy, by detailing the general objectives therein into specific actions for the energy and environmental protection sectors.

The monitoring of the progress of the actions and measures will be made primarily by citizens who will be regularly informed about the evolution of the SEAP and will be called, in public debate, to share their views. The quantitative monitoring of the progress of the SEAP is entrusted to the Local Energy and Environmental Agency, which will plan the periodicity of the monitoring and will make recommendations regarding the adaptation of the SEAP according to the obtained results.

#### **5.- Overall conclusions**

The plan is compliant with the main Covenant principles. More emphasis on involving the stakeholders into the process: not only consultation, but also participation in the realisation of the SEAP could be beneficial. The methodology for building emission inventory for the building sectors combines data obtained from the main suppliers of the city split per sector using data on actual consumption and also estimates. Some uncertainties are related to the estimates on the commercial and private transport. The plan is well balanced between the sectors in number of actions. In terms of estimated CO<sub>2</sub> emissions reduced, there is a very strong focus on the building sector, especially on promoting the refurbishment of the existent building park and the optimization of the existing district heating. The financing and the designation of the responsible department/person could be improved.

## LARNACA (CY)

### **1. - City description.**

Larnaca is a city on the southern coast of Cyprus and the capital of the district. It is the third largest city of the island, with a population of 62997 inhabitants according to the Census of 2001 (including Aradippou and Livadia Municipalities).

Part of a Local Plan regarding the development of a larger area than the city itself, which envisages to contribute to the formation of a radial road network converging towards the Central Business District and the gathering of most of the urban operations and activities in the Central Business District, contra-balancing some of the existing centrifugal tendencies. Other structural elements characteristic to the city are: the linear touristic development lengthwise the seafront, existence of the Port and the International Airport, existence of Governmental Housing Settlements and Self-Help Housing of Refugees in the city outskirts and the precinct.

### **2.- The city joining the CoM**

2.1. The city is participating in a number of the similar initiatives: the SEAP itself was developed under the Pact of Islands movement.

#### 2.2.- The BEI

The baseline year is 2009, approach IPCC, measurement unit CO<sub>2</sub>, total baseline inventory emissions: 6.71 tonnes/ per capita.

The sectors and the methodology follow very closely the recommendations of the CoM Guidelines.

The data in BEI are mostly measured data, although no clear method is explained, the sources for the data are provided. Although the electricity consumption for the municipal buildings is very detailed, the energy consumption of fossil fuels is missing. The heat and cold is declared to be zero

### **3. - SEAP**

A special entity was created in 2010, Larnaka Municipality Environmental Management Sector which should deal also with the environmental issues within the municipality.

The SEAP main focus is to assess the effect of the national activities in terms of energy savings and emissions at local level and to estimate the necessary extra effort required from the local authority in addition to the national initiatives in order to achieve the set target. Therefore the necessary reductions are very clearly structured including the BAU scenario (very detailed, per type of activity and per fuel) and the estimated effect of the

national regulations.

The target is not clearly specified, there are mentions to the minimum target and there are references to the fact that the estimated effect of the actions is more than the minimum required.

The details per actions are provided only for those originating at local level. For each of these actions, detailed information are provided including costs (implementation and indirect costs), energy savings, CO2 reduction, cost savings and other relevant information. The financial information is very detailed at action level.

One concern about the distribution of the actions on the sectors is related to the fact that the plan relies very much on the effect of the national regulations on the energy consumption/ emissions of the municipality (70% from the estimated reductions should come from that), while the local actions are planned only in the municipal sector (buildings, transport), in the transport sector (bicycle lanes etc.) and in soft actions (awareness raising and training and education).

#### **4.- Implementation and monitoring**

The implementation of the SEAP will be followed by the Larnaka Municipality Environmental Management Sector. There is a clear annual cash flow for all the period until 2020, for all the municipality measures.

No monitoring indicators or time-line are specifically described, yet, for some of the actions (e.g. awareness raising) the progress indicators are implicitly inserted in the methodology used to estimate the effects of the actions in terms of energy savings and emission reductions.

#### **5.- Overall conclusions**

The SEAP is a very good example on how to down scale the effect of existing national policies and tendencies at local level. A concern should be raised about the nature of the local actions, which are mostly actions for the municipal sector and soft actions such as awareness raising and training and education and about the fact that a significant part of the emission reductions are associated with the soft actions. As the effect of this type of actions is not easily quantifiable in terms of quantity and duration, often monitoring inventories are recommended in order to allow the municipality to plan additional actions if necessary. The description of the stakeholders' involvement and of the monitoring process could be improved.

## Sønderborg (DK)

### **1- City description.**

Sønderborg area has 76,800 citizens, with a population density of 154 citizens/ km<sup>2</sup>, formed by the unification of several former municipalities. 35% of the area's citizens live in the city of Sønderborg while approximately 12% live in the rural districts (towns smaller than 200 inhabitants). Population figure should remain constant until 2029, whilst approximately 1,400 new housings are expected to be established during the period 2009-2021.

The geographical location of the city is in the South of Denmark, on the coast (stretch of coast of approx. 200 kilometres), territory characterized by vast forests.

The Sønderborg area has a dynamic business environment within high technology, machinery and food industry, and it has many educational institutions. In 2003, the occupation in the businesses in the Sønderborg area was allocated as follows: 31% within industry (234 industrial businesses), 30% within public service, and 17% within trade and service while 3% were employed in agriculture (production is mainly based on pig production).

Today, the public energy supply of the Sønderborg area is mainly based on natural gas and waste cogeneration supplemented by a minor part of on-shore wind and electricity import across the municipal boundary. Totally, the district heating coverage of the area is 34% of the net heating demand which is relatively low compared to the national average. Industrial processes of production are mainly based on fossil fuel and electricity while transportation, is solely based on petrol and diesel oil. In Sønderborg, there is an unexploited potential for biomass and biogas utilization and waste heat from industrial processes. In addition to that solar heat and geothermal power could be utilized.

In terms of transport, the Sønderborg city is the center of gravity with Gråsten and Nordborg as the other urban anchor points. The access to the city is by road (connection to the highway network), by water (3 ferry routes) or airplane (Sønderborg Airport owned by Sønderborg Municipality). The Sønderborg area holds a large number of areas with bicycle tracks, and in the years to come focus will be on creating a bicycle network where the big bicycle and moped flow.

### **2.- The city joining the CoM**

The city started implementing a GHG emission reduction plan prior to the Covenant initiative. The document presented as a SEAP, is part of a local initiative, called ProjectZERO, aiming to achieve carbon neutrality by 2029 while boosting the local

economy. Intermediary targets are 2015 (25% reduction) and 2020 (50% reduction).

This project, where more than 100 stakeholders, from different sectors, participated to create a concept which will engine the entire decarbonisation process, is an outstanding example on how the local authority could play a catalytic role in mobilizing the different actors in finding mutually advantageous solutions and transforming the necessity for GHG mitigation into a growth opportunity for the community.

## 2.2.- The BEI

The baseline year is 2007; approach IPCC, measurement unit CO2.

The energy consumption/ GHG emission inventories are built with the aid of a locally developed tool annually updated with data on energy consumption from the main local energy providers.

There is no exact overlapping with the Covenant sectors: the inventories cover more sectors than the ones recommended by Covenant methodology (includes all industry and agriculture). Also the split per sectors is different than the one proposed by Covenant methodology: the tertiary sector is split into the trade and service sector and the public institutions sector (other than municipal); the industry and agriculture figures are presented aggregated within the same sector and the transport is not disaggregated by the sub-sectors of the Covenant (municipal, public and private and commercial). It is not clear if the sector called Municipality covers, besides the buildings, the municipal fleet as well. Also, although the data is probably available, the inventories do not contain figures disaggregated per key sector and per energy carrier (just subtotals are available). Also the categories chosen for the energy carriers are different than the ones of Covenant.

## 3. - SEAP

The strongest point of the SEAP is the holistic approach of the decarbonisation and the strong focus on boosting the economic growth within the process. For each area of activity an integrated concept is developed which contains various solutions (actions). The interrelations between concepts and between actions are analysed and described in view of the common goal, CO2 reduction while stimulating economic growth. The role of each stakeholder is analysed in terms of gains, barriers and expected participation.

The SEAP estimates the economic impact in terms of job creation which should result from the implementation of the SEAP, not only within the municipality, but also within the larger administrative levels (province, country).

The main sectors/concepts tackled are: municipality, citizens (residential sector), business (tertiary, industry, and agriculture), the public sector (other than the

municipality), intelligent energy, bioenergy and green transportation.

For each action, the robustness of the concept is evaluated (low, medium, high) as well as the role of the action in relation with the focus area's objectives (catalyst, accelerator, main concept). For each measure the potential financial sources are defined as well as the success criteria for 2020, milestones and, when appropriate, progress indicators. The role of each stakeholder is defined at various phases of the implementation of the action.

Many of actions proposed are innovative solutions mainly aiming to achieve a better use of the existing capacities, to increase the level of synergy between the various stakeholders to their mutual benefit and to raise awareness and increase the level of expertise in the field of energy efficiency and GHG mitigation at all levels. Many of the actions have been developed modularly, based on a segment oriented approach, so they could be more adapted to the needs of each stakeholder.

Nevertheless, the concrete estimates in terms of energy savings, emission reductions, and necessary investment are not presented per each action, but per sector of activity tackled.

Also on the down size, the data in the on-line template does not always reflect the one in the SEAP document, most of the times because of difficulties of overlapping the sectors.

#### **4.- Implementation and monitoring**

The monitoring inventories are developed annually with data from the main energy providers and using a locally developed monitoring and scenario tool. The main data from the inventories (2007-2011) are presented in the SEAP document.

In 2012 a pressure test was performed, in order to asses if the objective of 25% reduction for 2015 was achievable with the on-going actions. The stress test showed that the reduction objective for 2015 is most likely to be achieved.

In the ProjectZERO Master Plan 2029, a sensitivity analysis regarding the cost efficiency of the Master Plan compared with various scenarios assuming various tendencies of the price of the tonne of CO<sub>2</sub> and of the price of fuel was performed.

Almost all the actions are so developed that the role of the various stakeholders is well defined in terms of timing, responsibility, financing and advantages at various stages of the implementation.

#### **5.- Overall conclusions**

The SEAP is a very good example on how a municipality can play a catalytic role involving most of the stakeholders, from different sectors to participate to the GHG

mitigation process to their mutual benefit.

The main focus of the project is to propose to the local community a common ambitious goal, decarbonisation until 2029, while presenting the opportunities for economic growth which arise within the process. The main strategy for achieving the goal is to increase synergy between stakeholders. For this, the role and the benefits of each stakeholder are very well defined at various stages of the implementation of the actions.

## BURGAS (BG)

### 1. - City description.

The Municipality of Burgas is the largest municipality located in south-eastern Bulgaria, with an area of 514,362 hectares, representing 0.43% of the country. The municipality is bordered to east by the Black Sea, to the north by the Pomorie Municipality, to the west by Kameno Municipality and to the south by the Municipality of Sozopol. The Eastern boundary plays an essential economical role, i.e. for the development of port work, fishing, tourism, foreign trade, and for all the productions and industries that rely on imported materials.

The availability of natural resources such as nature reserves, protected areas and natural attractions

determines the wide biodiversity in the municipality of Burgas, which is an important factor and condition for development of tourism and other economic and non-profit activities, stimulating small and medium businesses and the labour market development.

The city of Burgas is an important industrial, commercial, transport, tourism and administrative center of the Municipality and South-East region of Bulgaria. The economy has a diverse character,

which makes the Municipality the economic leader and an important center for the development of

the region. The main branches of economic activity within the Municipality are:

- industry, which accounts for 13.4%;
- services - 23.2%;
- transport - 8.3%;
- trade - 51%;
- construction

The city is also one of the main logistical points of the Pan-European\_corridor\_VIII (Barry - Vlora - Tirana - Skopje - Gyueshevo - Sofia - Plovdiv - Burgas - Varna)., in which the ports of Burgas and Varna have a key position for border crossing as well as for road, rail and air national and international traffic.

### 2.- The city joining the CoM

The city of Burgas joined the initiative in 2009, being the first mitigation policy

taking place in the city, although it belongs to the Eurocities network. The development of the BEI and SEAP has been done by internal resources. We can mention that they perform a SWOT analysis for all the Covenant sectors in order to define the priorities within the measures to include in the plan.

The BEI is calculated based on an IPCC approach, with CO<sub>2</sub> equivalents as emission reporting units. The set target is 25% CO<sub>2</sub> reduction in absolute terms. There are also foreseen targets regarding energy Saving and the use of renewable sources: the reduction of the energy usage in Burgas Municipality at least 27% and at least the 26% of RES share in the energy mix of Burgas Municipality.

### **3. - SEAP**

The Swot analysis developed by sector describing the strengths and weaknesses of the measures implementation established the following priorities:

1- Building sector and sustainable infrastructures. It accounts for 41% of the expected reduction. Measures include ecoconstruction and renovation of municipal social, cultural, and administrative infrastructures, as well as the introduction of energy efficiency measures

2-Urban Mobility: Actually, the Municipality's road transport network and infrastructure is already well developed, consisting of a total of 202.105 km. of roads, 141,205 km of which are national routes. Over 90% of the public transport in the Municipality is served by the municipality-owned "Burgasbus" company. The "Burgasbus" fleet consists of 76 buses and 15 trolley buses serving passengers traffic within the city and 51 buses serving long-distance routes.

3- Use of renewables: The focus is on the use of solar energy (installing PV modules in the municipal and private sector), biogas (from WWTP and waste depots) and biomass for heating in private buildings.

4- Change Energy behaviour: Starting from the in-house training (increase of the qualification of the municipal employees; Training of directors and managers of municipal buildings for energy management; introduction of EE and RES concepts in the educational system through the development of projects), enhance the general awareness of citizens of the municipality ( create and promote "green" identity of Burgas Municipality)).

Of particular interest is the measure called "Development of ESCO for funding; Development of a system for work with NGOs for projects on the territory of Burgas Municipality", which is not a common type of action in medium size cities.

#### **4.- Implementation and monitoring**

Following the CoM principles, a monitoring programme is foreseen and described for each measure, including qualitative and quantitative indicators. Nevertheless, the implementation of the monitoring plan is not described in detail.

#### **5. - Overall conclusions**

In general, the Sustainable Action Plan of Burgas city is a "well thought" plan that suits the city reality, although not enough explained or detailed regarding who is in charge of the effective implementation of the actions and their monitoring. The Plan is good in analysing the data. The urban development is planned and the trends and possible scenarios are well defined.

The involvement of the local stakeholders (energy suppliers, transport companies, private manufacturers and distributors of renewable fuels and green cars, as well as private actors with large car fleets) is considered by the city as a key ingredient of success of the Plan.

## COMUNITA' DI OZIERI TULA E ERULA - SARDINIA (IT)

### 1. - City description.

The Region of Sardinia in the role of CTC has coordinated the activity of many communities. Amongst others, the community of Ozieri, Tula and Erula has been selected for the Smart City project developed within the Sardegna CO2 zero Program (a regional program). This in depth analysis refers to the methodological approach followed by the Region of Sardegna and one specific representative plan namely: community of Ozieri, Tula and Erula. The plan seems to be very ambitious setting a 45% CO2 emission reduction by 2020 based on 2006 levels.

### 2.- The city joining the CoM

The plan presented by the Region of Sardinia met all the necessary eligibility checks in order to be formally accepted as an eligible city or agglomeration of cities.

The representative plan of Comunità di Ozieri, Tula e Erula presented their SEAP in January 2013 and completed their online SEAP in October 2013. Although in terms of inhabitants this community represents a small group (13530 people), many measures outlined in the documentation make this representative plan a case-study for other group of cities willing to adhere or improve their own sustainable energy strategies.

The municipalities of Ozieri, Tula and Erula have already started a process of local sustainable development which aimed to diffuse concepts and culture related to the energy efficiency and to promote renewable sources. The next development foresees the application of the principle of diversification of energy sources based on the analysis of local resources.

### 2.2.- BEI description

The elaboration of the BEIs for the groups of municipalities coordinated by the CTC has been followed by 28 professionals coordinated by 2 scientific experts from SFIRS RAS and RS and it was carried out using ISTAT data, the BEN (Bilancio Energetico Nazionale), the Annual ENEA report, The Fifth National Communication under the UN Framework Convention on Climate Change (UNFCCC) for Italy 2009 as well as data already gathered for the ISLE of PACT's BEI and the Renewable Energies action plan. The data provided were subsequently complemented by data gathered from local energy suppliers, especially for electricity (ENEL) and LPG. The representative plan of Comunità di Ozieri, Tula e Erula has chosen to apply the IPCC approach with 2006 as BEI year. It covered all the CoM key sectors also including data related to public lighting and Industry Non-ETS (not mandatory).

### 3. - SEAP

An analysis of the local situation, with a special focus on the presence of green protected areas, has been made by the CTC, with the aim of identifying initiatives compatible with possible environmental constraints.

The priority areas for actions are Municipal Buildings, Tertiary (private or public), Residential, Public Lighting, Public and Private Transport, Renewable Energy Sources (RES), Green Public Procurement, Land use planning as well as Solid Waste Management (not key sector). Within these, greater relevance is given to actions in public buildings and residential buildings. The document highlighted in particular the use of Biomass and renewable energy installations in public buildings, Forestation and organic farming are also mentioned amongst the possible areas of intervention; nonetheless actions in these fields might not deliver specific emission reduction in the context of the Covenant, unless they are linked to energy consumption/production.

Concerning the involvement of citizens and other stakeholders is noticeable the effort made by the CTC to create a multidimensional index for the Social Impact (iMIS) in order to identify the impact of indirect actions on civil society aiming at reducing CO2 emissions. This can be seen as an added value since the mobilization of civil society is key to a successful implementation of the SEAP.

The Region, in its role of CTC, has identified together with its municipalities several possible funding sources for SEAP implementation through financial mechanisms offered by the EIB (European Investment Bank). Access to EU funding instrument such as Jessica resulted to the implementation of some projects.

Concerning the Representative plan hence the municipalities of Ozieri, Tula and Erula, great importance is given to the activity of involvement of citizens and stakeholders and to the training and education activities. The main objectives of the long-term vision are: the reduction of public and private energy consumption and the local energy production through the renewable energy resources exploitation.

Although it is clear that some actions are closely correlated with other measures, the general strategy is developed in 6 main action areas: Energy Efficiency; Energy production from RES; Sustainability culture, training and information activities; Sustainable Urban Planning methodologies; Green Procurement; Sustainable mobility.

**BENCHMARKS:**4 measures were identified as best practices and included in the BoE catalogue. An action related to the installation of solar thermal collectors, energy efficiency action in public lighting, an action related to photovoltaic plants and another one related to Biogas plant.

#### 4.- Implementation and monitoring

The monitoring process is specifically addressed in the methodological note. It seems that the role played by the Region of Sardinia as CTC is crucial to the successful implementation of the programmes planned in the area. The Region of Sardinia will support the municipalities (within the activities covered by Smart City – Comuni in classe A Program) and will provide scientific and technical assistance for the elaboration of the monitoring emissions inventory (MEI), as well as for reporting on the implementation of the SEAPs involved in this initiative.

Concerning the representative plan, for each action planned and included in the document, monitoring indicators were identified and described. Furthermore the “Matrix for Time, Cost, Energy saving and Emission reduction”, will be updated at every stage of the monitoring process, hence will be a useful and effective assessment tool available to the community.

#### 5.- Overall conclusions

The SEAP of the Comunita' di Ozieri Tula and Erula is a very ambitious realistic and forward-thinking document and outlines the main guidelines of the group of city's climate policy until 2020s.

The community coordinated by the Region of Sardinia has a strong strategy which focuses on promoting renewables energy and energy efficiency. Great importance is given to the activity of involvement of citizens and stakeholders and to training and education activities. Support offered by the Sardinia Region (the Covenant coordinator for the Community) has been crucially important for the planning and implementation of the measures. The identification of financial resources and the organizational structure of the CTC can be seen as strength for this plan. Also the effort from the CTC to create a multidimensional index for the Social Impact (iMIS) in order to identify the impact of indirect actions on civil society aiming at reducing CO2 emissions is appreciated. On the other side, the CTC and the representative plan, should make an extra effort to collect real energy data for sectors under their direct control (i.e. municipal buildings, public lighting, and municipal fleet) when establishing their Baseline Emissions Inventory and concerning the measures, they could also promote actions on the transport sector as this is one of the most emitting sectors in the urban environment.

## MARACENA - JUNTA DE ANDALUCIA (ES)

### 1. - City description.

Maracena is a town of almost 19 000 inhabitants (figure from the form of adhesion to the Covenant of Mayors, 2009) covering an area of 4.89 km<sup>2</sup>, in the metropolitan area of Granada. Its population has grown since the '80s as people tend to move from Granada city to the boroughs. However new problems have arisen, such as the access to capital and to goods and services, currently limiting further population growth.

### 2.- The city joining the CoM

#### 2.1.- Basic data about the organisation and political commitment

Maracena has joined the Covenant of Mayors thanks to the support offered by the Consejería de Medio Ambiente y Ordenación del Territorio - Junta de Andalucía and by the Province of Granada, which agreed to become Covenant Territorial Coordinators (CTCs). The CTCs have provided the necessary support to the municipality of Maracena in order to develop the Plan. This support has been also provided by a consulting firm. The implementation process will be addressed by the Environmental Department, which will also coordinate other Departments that are involved.

The SEAP includes an analysis of climate strategies at international, European, national and regional levels. The city seems really committed to sustainability and can benefit of a substantial support offered by the Andalucía Region. Indeed the regional level provides an excellent framework for local action, as it includes:

- Estrategia Andaluza ante el Cambio climático
- Plan Andaluz de Acción por el clima - Programa de Mitigación (PAAC)
- Programa Andaluz de Adaptación al Cambio Climático
- Plan de Sostenibilidad Energética 2007-2013
- Programa de Comunicación y Participación frente al Cambio climático

In order to ensure adequate information among citizens and stakeholders on the climate and energy issue, the city has implemented a communication strategy which includes:

- communication of the SEAP process
- raising awareness on energy saving and energy efficiency
- communicate the elaboration of the SEAP through the forum Agenda 21 + the possibility to create a working group for the monitoring.

## 2.2.- BEI description

The emission inventories have been calculated via a tool developed by the Regional Ministry of Environment of the Junta de Andalucía. The tool follows the IPCC approach and provides data at the municipal level for:

- electricity consumption,
- fuel consumption,
- road traffic,

whose inclusion is strongly recommended in the framework of the Covenant.

Other non-energy emissions are covered by the inventories:

- waste,
- wastewater,

whose inclusion is allowed if local authorities plan actions in those sectors. These emissions refer to indirect emissions (based on amount of waste and volumes of waste water generated within the territory), which is not fully in line with the CoM approach.

The data used to calculate the emission inventories appear to have been gathered via a top-down approach, starting from regional statistical data. This might make more difficult to monitor the impact of local actions at the municipal level, however collecting data for so many small municipalities via bottom-up method might be really challenging. On the other side, there is an added value of having official statistical data periodically reviewed, updated and comparable.

## 3. - SEAP

The CTC has provided all the municipalities with dedicated tools allowing them to calculate an estimate of potential emission savings achievable through actions in certain areas of intervention (energy efficient installations, transport/mobility planning, renewable energy production). By taking into account specific local circumstances, those tools are of great help to signatories in making a first estimate of the potential impact of their planned actions.

In the SEAP of Maracena, the set of actions is well balanced between EE and RES (ST and PV) and between buildings and transport, both for the public and the private sector. However, only energy savings are reported in the template, even when energy consumption should have been reported instead.

Some interesting measures tackling municipal buildings are:

- Implement actions described in the Plan de Optimización Energética
- Rooftop PV on public buildings: giving for rent roofs to enterprises that will install and operate PV plants. Produced electricity will be sold to the grid.

A good measure on residential buildings consists of establishing a fund to increase solar thermal, which may be shared by Energy Agency, Ministry of Environment and the City, aiming at installing solar heating in 500 homes.

For the transport sector, the SEAP foresees the development of a *Plan de Movilidad Urbana Sostenible* (PMUS), including its gradual implementation.

In the action fiches it is often mentioned that an energy agency is supporting actions' implementation. The description of how to finance the plan and individual actions is not enough detailed, especially for actions linked to the implementation of PUMS.

#### **4.- Implementation and monitoring**

Three people are responsible for SEAP implementation and for monitoring and following up the actions planned. Some training programmes are foreseen (eco-driving, energy savings in households, EE) supporting SEAP implementation. The review of the SEAP is not mentioned.

#### **5.- Overall conclusions**

The support offered by the two CTCs as well as the regional context is a key factor for the SEAP development. Some aspects linked to the engagement of citizens and stakeholders represent an area of possible improvement, ideally supported by the Province of Granada. Gaining support from stakeholders is not described in the document and it seems that the communication strategy has been implemented after the approval of the SEAP, whereas the SEAP might benefit of a pre-draft consultation process to ensure, since the start of the process, commitment of all the actors involved in the implementation.

The data collected to calculate the BEI should be complemented by real energy consumption data at least for municipal buildings, facilities and vehicles, to allow for a better monitoring of actions' implementation and communicate the results to citizens.

As far as the actions are concerned, they seem well balanced between EE and RES (ST and PV) and between buildings and transport, both for the public and the private sector. The SEAP relies to a significant extent on measures already completed or started at the moment of submission of the SEAP. Based on this, the SEAP might have included a longer term strategy, to ensure a commitment of all the stakeholders also beyond the CoM timeframe. Given Maracena's position and the fact that most of the trips are

towards Granada, a next step could consist of initiating a long-term process regarding land use and transport planning.

The description of how to finance the plan and individual actions should be detailed further, especially for actions linked to the implementation of PUMS, which might require investments by the local authority.

The monitoring process could be developed further, and the possibility to periodically review the SEAP and to identify corrective measures should be foreseen and described.

## LOMMEL - Province of Limburg (BE)

### 1. - City description.

Lommel is a town of almost 33 000 inhabitants (figure from the form of adhesion to the Covenant of Mayors, 2009) covering an area of 102 km<sup>2</sup>, in the Flemish Province of Limburg. Lommel is a commercial town and has many green areas, which make it very attractive for tourists who love hiking and cycling. In the last years, it has undergone a significant economic development.

### 2.- The city joining the CoM

#### 2.1.- Basic data about the organisation and political commitment

Lommel has joined the Covenant of Mayors thanks to the support offered by the Province of Limburg, which agreed to be a Covenant Territorial Coordinator (CTC). The Province has a target of "Making Limburg climate neutral" by 2020. To reach this target, the Province commissioned a scientific study to define the concept of climate neutrality, which was the basis for the approach applied to all the municipalities in its territory.<sup>12</sup> The SEAP is inserted in this framework, which has some features different to the CoM. The town has a target to reduce its CO<sub>2</sub> emissions by 21% by 2020.

The CTC has supported its municipalities in many steps of the SEAP process, especially on the calculation of the BEI and on the identification of the set of actions needed to reach the target.

The role of the Province is crucial to ensure an involvement of public and private stakeholders. One example is the creation of thematic do-tanks: several organizations from government, civil society, industry, research, etc. are brought together in thematic do-tanks (e.g. on sustainable building; renewable energy; biomass valorisation; mobility). Through these do-tanks concrete projects will be made possible.

The CTC has taken the lead to involve stakeholders. Some of the key stakeholders are Dubo Limburg (consultant), Bond Beter Leefmilieu (federation of Flemish environmental associations), Infrac (partnership among 5 grid operators), Hasselt University, research centres in general, the Limburg Development Agency (an instrument for the Provincial Authority of Limburg to carry out its socio-economic policy).

#### 2.2.- BEI description

The BEI is calculated based on an IPCC approach, with CO<sub>2</sub> equivalents as emission

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<sup>12</sup> The results of the research (TACO<sub>2</sub>-study) can be found at [www.limburgklimaatneutraal.be](http://www.limburgklimaatneutraal.be) under 'publications'.

reporting units. The base year is 2008 for all the Signatories supported by the Province of Limburg.

The Province has provided its municipalities with the needed data to compile their emission inventories, gathered from Belgian and Flemish databases. For electricity and natural gas, data were generally collected from local energy suppliers. Each municipality has collected real energy data for sectors under their direct control.

Inventories generally include the industrial sector, which is not mandatory in the Covenant. It seems however that data on industry also include industries covered by the Emission Trading Scheme. The inventories cover also Agriculture and Nature. Therefore, even if the Local authority decides to tackle Agriculture and Nature in its SEAP, in the context of the Covenant, the highest priority should be given to energy-consuming sectors.

### **3. - SEAP**

Tools were made available by the CTC to the municipalities, such as 'Sustainable building scan' providing information on the different measures that can be taken in the buildings sector or the 'Renewable energy scan' giving insight into the renewable energy potential and constraints in each municipality's territory. Furthermore, a 'model SEAP' was provided to municipalities as the basis for their own SEAP, which can be tailored by using the specific tools developed.

As regards the municipal own operation, some interesting actions planned by Lommel are:

- Energy renovation: specific actions are discussed with ESCO Infrac
- Reduction of electricity consumption in the municipal buildings (incl. public procurement, awareness raising)

A very interesting measure in the residential sector is the "Flemish energy loan" promoted by the Flemish Ministry and managed by Duwolim, a non-profit organisation in the Province of Limburg which provides an affordable loan, as well as expert advice: anyone can borrow at an interest rate of 2% to carry out energy efficiency improvements in buildings and/or integrate renewable energy . Specific groups can also borrow at 0%. One of the conditions to access this loan is that the dwelling must be occupied within 2 years after entering into the Duwolim loan.

Other measures on residential buildings are:

- Giving discounts for sustainable construction advice (Dubolimborg)

- Giving a premium for solar water heaters
- Joining the Database of eco-builders
- Several initiatives of awareness raising and advisory services to citizens

For the industrial sector, an interesting measure is the use of Climate friendly entrepreneurship as a selection criterion for use of industrial sites.

Another important sector is the mobility one, where we can find actions aiming at:

- Eliminating barriers to introduction of hybrid and plug-in electric battery vehicles
- Make city Logistics climate friendly

The city also set some standards for compactness and density, in order to limit the need for transportation.

Finally, the plan includes some actions on green areas, even though this is not a recommended sector for the Covenant of Mayors.

#### **4.- Implementation and monitoring**

The monitoring process is described very briefly: every two years, a progress report will be prepared. Where necessary the action plan for the following two years, will be adapted and supplemented (the province and the project partners will see how that can be addressed jointly). Annual inventories provided by Province and project partners.

#### **5.- Overall conclusions**

Lommel has benefited from the support offered by the CTC Province of Limburg throughout the main phases of the SEAP development. Based on this interesting example of multilevel governance we can draw some general conclusions: in case of small- and medium-sized municipalities, it can be concluded that activities such as communication and gaining support can be done in a more efficient way at a higher territorial level than the local one. However, also the municipality of Lommel has taken care of communicating and engaging different audiences and stakeholders in the implementation of its SEAP.

The support provided by the CTC in the calculation of emission inventories is also an asset: the BEI has a good level of details, following the CoM sectors and sub-sectors. Data have been gathered from local suppliers. Nonetheless, there are some differences in the approach compared to the CoM (e.g. for Agriculture, Industry and green electricity purchases), however it seems that the data reported in the SEAP template of Lommel are aligned with the CoM. For other municipalities under the same CTC, ETS industry is also included in the BEI (conversely to the CoM recommendations). A recommendation

for the Province is to try to gather directly from the owners information on energy consumption of ETS plants, so that it can be excluded from the Emission Inventories.

The assessment of the current framework is limited to the BEI calculation, based on the tool provided by the Province. A more in-depth analysis of each sector at the provincial level (e.g. similar to the study carried out by CODEMA for Dublin) could be beneficial for the choice of the most appropriate actions.

The strong support by the CTC is key in the implementation of some interesting actions (e.g. those related to the involvement of Infrax, DUBOLimburg, etc...). However also the municipality is playing an important role on its own properties, thorough its planning instruments, and through advisory services and awareness raising. While the SEAP distinguishes among short- medium- and long-term measures, it does not provide information on budget allocated, financing sources, or impact estimates for each action/field of action. The monitoring process is not addressed in details by the municipality; neither the CTC seems to provide specific support on this issue.

An area for improvement of the plan could be the description of the measures, including progress indicators, budget, financing sources as this would ease the implementation and monitoring phase.

### **1. - City description.**

Inter-Municipal Association "Terre Estensi" is composed by the cities of Ferrara, Voghiera and Masi Torello, covering an area of 468 km<sup>2</sup> in total. The population is ca. 141,667 inhabitants as of end-December 2011. Ad exclusion of the city of Ferrara, the main activity of this territory is agriculture. While in the city of Ferrara are mainly developed Tertiary services (66%), followed by the construction sector (12%).

In 2012 the three cities decided to sign CoM with a joint approach – option II, meaning a joint effort in reaching a unique target (at least 20% of CO<sub>2</sub> emission reduction) in the whole territory. This approach enhances the inter-institutional cooperation in the territory, with the aim to build a uniformed regulatory framework and optimize the economic and financial resources.

The city of Ferrara has a long tradition of fight against climate change by submitting the Aalborg paper in 1996 and developing the Environmental management systems (ISO 14001:2004) in 2010.

Among other initiative, is worth mentioning the participation of Ferrara in the LOWaste project (Local Waste Market for second life products), which the main objective is the reduction of local waste and development of a market for recyclable materials.

An interesting feature of the city of Ferrara, is the long tradition in using the bikes, 28% of the urban mobility is cycling.

### **2.- The city joining the CoM**

The Inter-Municipal Association Terre Estensi, has set itself the objective of reducing by 25% the CO<sub>2</sub> emissions of 2020 compared to 2007. To this end, three axes and seven sectors of intervention were identified, for a total of 98 actions, including those already implemented between 2008 and 2012, and those envisaged for 2020. These three Axes summarise the context in which the SEAP operates: economy, everyday life, and culture. Each objective identified is consistent with the vocations and potential of the territory and expresses our vision: a land richer in resources, work and initiatives, smarter in its use of resources, with a better quality of life, more cohesive and with shared objectives. 85% of CO<sub>2</sub> reductions can be attributed to everyday life activities. Actions primarily concern the residential sector (-46.4%), with measures for energy saving and efficiency, and expansion of district heating mainly fuelled by the Ferrara geothermal source. But they also concern public lighting networks and services, the management of water and

waste (-28%), transportation (-7.2%), reinforce cycling and pedestrian mobility and re-launching public transportation. Lastly, they concern "green areas" enhancement (-2.3%) and eco-management (-1%), such as "green" procurement and the sustainable management of the activities of the Association. The local production of energy contributes to 15% of the end objective, mainly through solar panels and biogas.

## 2.2.- BEI description

The key Covenant sectors are adequately covered. The plan encompasses the total amount of GHG emissions resulting from heating and cooling of all buildings, all road traffic work within City boundaries, and all gas and electricity use.

Of the total 2007 CO<sub>2</sub> emissions the residential and tertiary sectors cover 30%, the transport sector for 29 % and industry (non ETS) sector for 33%. Therefore, most important measures that can significantly contribute to CO<sub>2</sub> emission reduction are measures defined in the residential and tertiary sector. While for the industry sector more energy efficient processes and the use of renewable sources are promoted.

The methodological approach and data sources for the calculation of the BEI are well described in details in the document. Depending on the reliability, the collected data are divided into three categories: the municipal activity is very well mapped; data on local energy production from District heating and from RES are of a good quality, as they are provided by the utilities. Lastly the emissions are provided by the Regional Inventory (INEMAR) with a detailed modelling for the municipalities.

## **3. - SEAP**

The Action Plan summarises the efforts made by the city from 2007 to 2012. A significant emission reduction has been achieved by a conversion to district heating (DH) using waste, and from geothermal sources. Furthermore, in the actions for 2020, a significant increasing of buildings connected to the expansion of district heating networks is foreseen.

To reach and possibly exceed this target, municipal and public buildings (such as University of Ferrara, social housing buildings, hospital) will be involved in a programme for energy efficiency. The Energy Performance Contract will be widely used by public authorities in the program for energy efficiency.

Another interesting area for action is the Transport sector with specific measures such as: promotion of modal shift to access the Sant'Anna Hospital – Cona; Ferrara's Waterway project; walking bus; building new bike lane.

Further contribution to the achievement of the target comes from measures aiming to

increase the use of renewable sources and cogeneration power plants for generation of heat and electricity such as: use of biogas to generate electricity; Installing new photovoltaic and solar panels; Renewable energy hub; installation of cogeneration systems at the Sant'Anna Hospital;

The Plan describes very clearly the strategy/measures under the direct control of the municipality.

The plan includes a defined organisational structure composed of the Head of the SEAP management service, represented by the Director of Environmental Services of the Municipality of Ferrara, and a technical Committee. The Head of the SEAP management service drafts the operational plans for the functioning of the service and performs the functions of coordination and initiative in order to achieve operational uniformity.

Nonetheless, the description of the actions could be further improved, by including estimated budget, financing sources/mechanisms.

#### **4.- Implementation and monitoring**

The monitoring process is described in details, but the cities have not yet submitted the implementation reports to the Covenant of Mayors.

#### **5.- Overall conclusions**

The Plan is very good in analysing the data: the urban development is planned with the aim to increase the energy sustainability and to make use of existing public transport, infrastructure and services. A good practice is identified in the continuous monitoring of the progress made towards the overarching target.

The involvement of local stakeholders such as local energy suppliers, local transport companies, private companies is considered a key ingredient of success of the Plan of the city.

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