Identification and mobilization of solar potentials via local strategies

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Work Package 3: Development of City Action Plans & Pilot Actions

Deliverable 5: FACT SHEETS OF PILOT ACTIONS

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THE POLIS PROJECT

POLIS (*Identification and mobilization of solar potentials via local strategies*) is a European funded project under the Intelligent Energy – Europe Programme aiming at the implementation of strategic town planning and local policy measures to activate the solar ability of urban structures in European cities.

In recent years, diverse new technologies and legislative opportunities have been developed to undertake solar potential analyses and mobilize the solar potentials identified. The aim of POLIS project is to present and evaluate current developments and bring together key stakeholders of this process to improve planning and legislation practice towards a solar development, with the conviction that urban approaches are essential to enhance the integration of small-scale solar energy applications in the built environment.

With respect to the composition of buildings and urban structures the importance of solar energy is evident, since the shape of constructive structures and relevant surfaces are the basis for application of solar systems and also for receiving passive solar gains. Therefore, solar energy is more than other Renewable energy sources connected to the form, function and arrangement of buildings. To assure the ability of new structures fitting a solar energy supply, certain requirements need to be included in development planning and building legislation. In addition, also existing buildings need to be qualified for the application of solar systems: the knowledge of adequate building types and structures is therefore an essential requirement to improve strategic actions to mobilise the solar potential of existing built areas.
In this respect several instruments are available to prescribe solar targets like municipal agreements, private law commitments or national building codes. The POLIS project focuses on local options regarding municipal commitments to elevated solar requirements to improve the solar qualification of new as well as of existing buildings and urban structures.

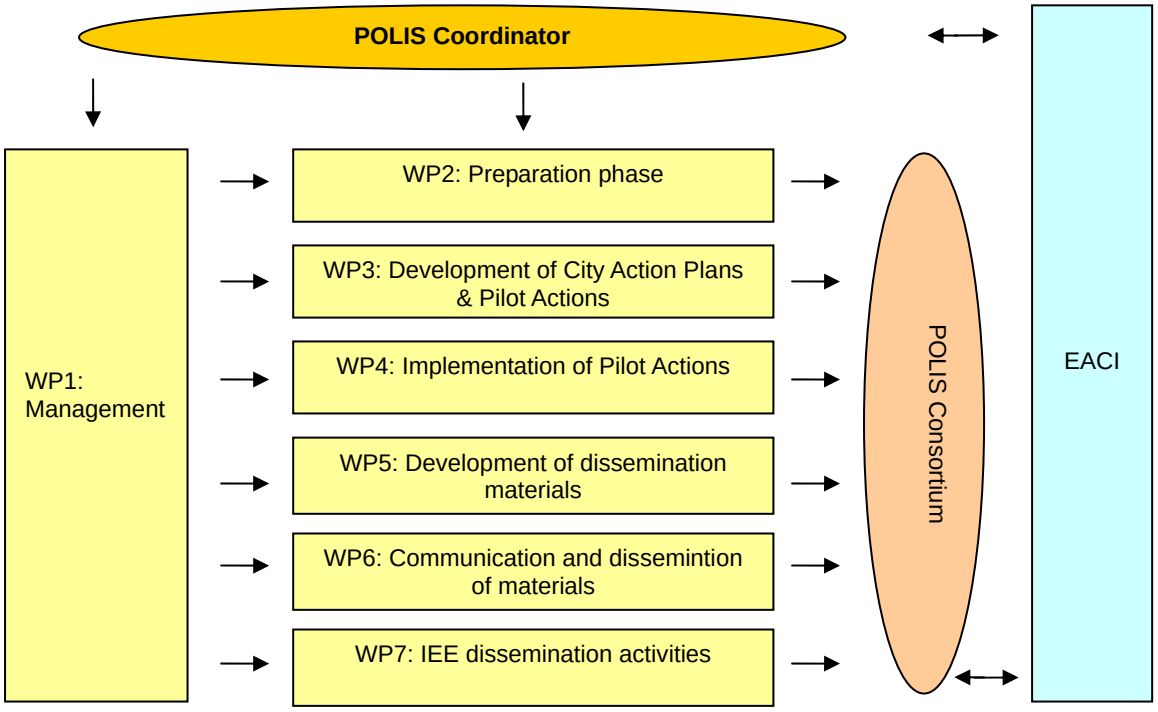
POLIS project brings together local authorities with different experiences and varying states of urban development from France, Germany, Portugal, Spain and Sweden, to share their knowledge on solar town planning and encourage further activities within the scope of an expert network for cities. Main results of the project will be:

- **Action Plans:** long-term strategic action plans to integrate solar energy at urban level embeded in overall planning strategies of POLIS participating cities: Lyon, Paris, Munich, Lisbon, Vitoria-Gasteiz and Malmö.
- **Pilot Actions:** short-term priorities to be developed in the participating cities within the project lifetime, such as identification of solar potentials, accomplishment of activities to mobilize identified potentials, development and implementation of town planning measures, financial and/or legislative measures.
- **Transfer of POLIS approach to other cities:** lessons learned and experiences from POLIS project will be described and evaluated as background for the development of planning references and legal guidelines. Together with the provision of a catalogue to promote urban planning instruments and best practices project the guidelines represent a major outcome of the project. The dissemination not only targets at the participating countries: workshops will address also other European cities, which will be supported through communication via a network for urban planners and municipal executives

The outcome of the POLIS project are expected to provide excellent circumstances for the implementation of small-scale RES in the participating cities with a roadmap for further activities in the framework of solar developments. This will help to implement EU and national

targets for renewable energies in 2020, as well as provide interested cities of all EU member states a pool of successful examples, strategies and instruments.

The structure of the project is summarised in the following diagram.



The composition of POLIS consortium guarantees an interdisciplinary approach to the work planned. Participation of local energy agencies, universities, consultancies, urban planning agencies and municipal planning departments provides a broad background of knowledge from the diverse fields of specialisation, as well as different perspectives and ways to approach the planned activities.

POLIS Consortium
Ecofys GmbH (Germany) – Project Coordinator
Climate Alliance – Klima-Bündnis (Germany) – Leader of WP5
Universidad Politécnica de Madrid (Spain) – Leader of WP3
Agence Locale de l'Energie de l'agglomération lyonnaise (France)
Agência Municipal de Energia e Ambiente de Lisboa (Portugal) – Leader of WP2
Lund University (Sweden) – Leader of WP4
City of Munich (Germany)
City of Vitoria-Gasteiz (Spain)
Atelier Parisien d'Urbanisme (France)
City of Paris (France)
Skåne Energy Agency - Solar City Malmö (Sweden)
Hespul (France)

POLIS project started in September 2009 and will run until August 2012. More information about the project can be found at: www.polis-solar.eu

EXECUTIVE SUMMARY

Within the framework of POLIS project, six European cities (Lyon and Paris in France, Munich in Germany, Lisbon in Portugal, Malmö in Sweden and Vitoria-Gasteiz in Spain) have committed on long-term strategies to integrate solar energy at urban level that are consistent with existing CO_2 mitigation targets in solar Action Plans embeded in local planning.

Although the cities are in different situations regarding solar energy so that their strategies are also different, a common objective is shared, namely, to steer the future development of solar energy with respect to urban planning by: the assessment of existing climate strategies and targets at city levels, the evaluation of solar potential in city areas, the development of solar targets and the definition of possible measures in diverse planning areas connected to general renewable energy targets.

The solar Action Plans, developed by Local Working Groups composed by municipalities and technical partners of the project, have been developed using information about the existing local background. Each city has developed long-term solar targets, as well as identified main areas of interest (focus areas), relevant stakeholders for the implementation of solar energy in connection with urban approaches (target groups) and short-term measures to support the upgrade of solar energy and reach the proposed targets. An overview of the solar Action Plans has been described in the report “Deliverable 4: Action Plans in POLIS cities”, available on the project web-site[1].

Of the 61 short-term measures identified, 19 are considered priority “Pilot Actions” to be implemented within POLIS project, covering the following categories[2]:

1. Large-scale identification of solar potential and definition of priorities (planning instruments): 8 measures.
2. Accomplishment of activities to mobilize solar potentials (campaigns, subsidy programs, local policies, information workshops, cooperations with existing programs, etc): 6 measures.
3. Development and realization of solar urban planning measures (in new developments or existing areas): 6 measures.
4. Development and realization of political or legislative measures (legislative revisions to introduce solar energy use for new or existing buildings): 1 measure.

In this report a compilation and overview of POLIS cities Pilot Actions is presented.

[1] www.polis-solar.eu (Section: Publications)

[2] Note: the sum of measures distributed in the four previous categories is 21, not 19, because 2 Pilot Actions in Lisbon municipality address 2 different categories.

1 Introduction

Within the POLIS project, Work Package 3 deals with strategic measures of urban planning and local policies, with the aim of integrating solar energy at urban level in new and existing developments.

Particularly, each of the 6 participating cities of POLIS project (see Figure 1, Lyon and Paris in France, Munich in Germany, Lisbon in Portugal, Malmö in Sweden and Vitoria-Gasteiz in Spain) have committed on long-term strategies to integrate solar energy at urban level that are consistent with existing CO_2 mitigation targets in solar Action Plans embeded in local planning.

These strategies have been developed by Local Working Groups composed by municipalities (local urban planning departments and other departments) and technical partners (universities, consultancies, NGOs and local energy agencies) of POLIS project:

- Lyon (France): Grand Lyon Urbanism agency, Grand Lyon technical services, Agence Locale de l'Energie de l'agglomération lyonnaise (ALE) and HESPUL.
- Paris (France) : City of Paris (Urban Ecology Department, Urban Planning Headquarter, Social Housing Headquarter, Public Works Headquarter) and the APUR (urban planning agency of the city of Paris).
- Munich (Germany): City of Munich (Urban Planning and Building Regulation Department) and Ecofys Germany.
- Lisbon (Portugal): Lisbon municipality, Agência Municipal de Energia e Ambiente de Lisboa and Wee Solutions.
- Malmö (Sweden): City of Malmö (Environment Department, Real Estate Office, Urban Planning Department and Department of Internal Services), Skåne Energy Agency and Lund University.
- Vitoria-Gasteiz (Spain): City of Vitoria-Gasteiz (Urban Planning Department, Environment and Sustainability Department and Energy Agency of Vitoria-Gasteiz) and Universidad Politécnica de Madrid.

Figure 1. POLIS participating cities

The solar Action Plans have been developed using information about the existing local background in terms of energy supply, user behaviour, urban structures, building typologies, solar actions and measures, urban planning practices with solar requirements, etc. Each city

has defined long-term solar targets, as well as identified main areas of interest (focus areas), relevant stakeholders for the implementation of solar energy in connection with urban approaches (target groups) and short-term measures to support the upgrade of solar energy and reach the proposed targets. An overview of the solar Action Plans has been described in the report "Deliverable 4: Action Plans in POLIS cities", available on the project web-site[3].

Of all the short-term measures identified, some are considerd priority "Pilot Actions" to be implemented within POLIS project. They cover the following categories:

1. Large-scale identification of solar potential and definition of priorities (planning instruments);
2. Accomplishment of activities to mobilize solar potentials (campaigns, subsidy programs, local policies, information workshops, cooperations with existing programs, etc);
3. Development and realization of solar urban planning measures (in new developments or existing areas);
4. Development and realization of political or legislative measures (for example, legislative revisions to introduce solar energy use for new or existing buildings).

In order to ensure the quality of the Pilot Actions, a peer review process has been carried out within POLIS Consortium, so that each Pilot Action has been reviewed by two different countries. With the exception of Lyon, all Pilot Actions have been validated by municipal authorities. In the case of Lyon validation is expected in July 2010, in order to guarantee coherence between the Pilot Actions and the "Plan Climat" of Grand Lyon that is currently under discussion. In this sense, a specific working group on renewable energies will take place on the first week of July, where the solar Action Plan and priority Pilot Actions described in this report will be presented. Validation of these documents is expected for July the 12th.

In this report a compilation of POLIS cities Pilot Actions identified is presented. In the following section an overview is provided in terms of municipal background (reasons for selecting the Pilot Action), summary description, time-frame and expected contribution to the long-term solar Action Plan. Section 3 presents some concluding remarks.

2 Pilot Actions of POLIS cities: overview

2.1 Lyon

Within Lyon solar Action Plan, 13 short-term measures have been defined, covering four major categories:

- Facilitating citizen investments in solar energies: 3 measures.
- Facilitating solar investments for businesses: 3 measures.
- Incorporating solar considerations into urban planning documents and guidelines: 5 measures; and
- Encouraging local government investment in solar energies: 2 measures.

Of these short-term measurements, 3 Pilot Actions have been identified as priorities and will be developed within POLIS project:

[3] www.polis-solar.eu (Section: Publications)

- **Pilot Action 1: Interactive website with detailed real solar potential for Sainte Blandine district.**

  Pilot Action Category: 1-Large-scale identification of solar potential and definition of priorities

  Background: The city centre of Lyon is concerned by a large urban regeneration project called Lyon Confluence (150 hectares) that will extend the city centre by means of high-quality development projects that meet stringent quality criteria in terms of urban planning, architecture, environmental impact and landscaping. In 2004 a EU-funded Concerto program called "Lyon Confluence" was set up on this area with the aim of introducing energy considerations (consumption and renewable production) in the first phases of the urban planning. This initiative has recently enhanced an urban rehabilitation of an area called Ste Blandine, nearby the confluence area, where the Pilot Action will be carried out.

  Description: Within the rehabilitation program of the old city district of Sainte Blandine, energy aspects and experimentation on the rehabilitation of an historical area are two aspects of outmost interest for the municipality of Lyon. Within this framework a solar potential study has been undertaken by Lyon Urban Agency to evaluate the PV solar potential for residential and local government buildings in the area. The main objective of this Pilot Action is to set up a communication campaign to inform district inhabitants about the development potential of PV technology on their roofs by:
  - A solar cadastre website: internet website presenting the solar potential study to mobilise the potential and promote the investment in PV facilities.
  - Mailing sent to all inhabitants to promote the set up of PV on their roof and present the results of the solar potential study.

  The information needed for developing this Pilot Action are 3D schemes of the district and land registry data. Software tools like GIS, Sketch-up and PV-syst will be also used.

  Timeframe: July 2010 – June 2011

  Expected contribution to long-term Action Plan: The internet website and the information campaign will foster the development of PV systems on the roofs of the district of Sainte-Blandine, facilitating citizen investments in solar energies.

- **Pilot Action 2: Citizen jointly owned PV system at Lyon**

  Pilot Action Category: 2-Accomplishment of activities to mobilize solar potentials

  Background: Until very recently, electricity production has been centralised in a few plants in each European country. With the development of renewable energies and the process of decentralisation of electricity production, a new opportunity is offered to all consumers: they can now produce their own electricity. With its relative easy operation and the possibility to install small systems on roofs of consumers in urban environments photovoltaic energy is one of the most accessible production technologies. In France, the framework is being developed to facilitate the introduction of grid-connected community PV installations. However, it is still complicated for individuals to have access to these installations as investors because of the legal, administrative and, above all, cultural barriers. A structure named SOLIRA has been set up with the purpose of introducing an easier involvement of energy users in electricity

production.

Description: The aim of this Pilot Action is to mobilize local investments in PV systems and offer the possibility to local citizens to participate to the development and production of renewable electricity by means of:

- Identification of potential sites for citizens jointly owned PV systems in the Grand Lyon area and selection of an appropriate roof (at least 300 m^2) for a PV facility to be installed.
- Organisation of 2 information sessions for citizens and 4 workshops for interested investors and other stakeholders to set up the project.
- Development of a Guide for the city of Lyon with specific recommendations for citizens investment in jointly owned PV systems.

The information needed for developing this Pilot Action is an adequate roof, in terms of orientation, slope and structure.

Timeframe: July 2010 – June 2011

Expected contribution to long-term Action Plan: This Pilot Action will help to develop the implication of citizens in PV production in an urban area. Most of the city inhabitants cannot use their own private roofs to set up PV systems as they generally live in relatively high buildings: therefore, the set up of jointly owned PV systems is one of the only existing alternatives.

- **Pilot Action 3: Solar planning scenario for a new development area**

Pilot Action Category: 3-Development and realization of solar urban planning measures

Background: The development of the "Lyon Confluence" project (supported by EU-funded Concerto programme) has made urban developers think differently about energy aspects related to the urban design. However, many aspects need to be improved in the Confluence project: energy considerations haven't been introduced early enough and the urban planning can still be more appropriate.

Description: This Pilot Action is a follow-up to the experience of the Lyon Confluence project by giving more importance to energy aspects in the very beginning of the urban planning process. The main objective is to experiment urban planning methodologies that take into account solar radiation as the main criteria for planning, by proposing 2 different scenarios for an urban planning area in Lyon to be restructured (to be identified by Lyon Urban Agency):

- The first scenario represents the usual one used by urban planners (not taking into account solar energy);
- The second one places the optimisation of energy inputs as main criteria.

The results obtained in both scenarios will be presented to the city of Lyon through the Urban manager of the area to give an alternative study of the area development.
Necessary information for this Pilot Action are plans of the selected urban area and specifications of the urban developer in terms of building use. Special urban design software will be also used.

Timeframe: September 2010 – September 2011

Expected contribution to long-term Action Plan: This Pilot Action will serve as an

example of methodology to include solar inputs as a major issue in urban planning for new development areas.

2.2 Paris

In the city of Paris the solar Action Plan defines 12 short-term measures to think about that cover the following categories:

- Identification: 2 measures.
- Mobilization of solar potential: 9 measures.
- Communication: 1measure.

Of these short-term measurements, 3 Pilot Actions have been identified as priorities to be executed within POLIS project:

- **Pilot Action 1: Precise identification of solar potential and modelling tool**

  Pilot Action Category: 1-Actions to identify solar potentials and definition of priorities

  Background: The limited development of solar facilities in Paris is partly due to the lack of information about the solar potential of Parisian buildings. It is also necessary to identify the technical solar potential of Parisian buildings roofs, considering parameters like geometry, orientation, tilt angle and shadows incidence.

  Description: A modelling tool will be developed for the identification of the solar potential (PV or solar thermal) of the roofs of Paris complete building stock, by improving an existing model developed by APUR.
  The potential will be calculated by considering building parameters (geometry, orientation and tilt angle of roofs, shadows incidence) and the results will constitute a "solar land registry" followed by a reflection of Paris municipality about the use of roofs for solar energy and/or green roof. It will be shown in an interactive internet-based map that will be initially available for professionals and later on for all Parisian citizens.
  A further study will be implemented on the social housing stock to define and set priorities for the installation of solar thermal systems where the opportunity for such systems has been demonstrated.
  The information needed for this Pilot Action are detailed data about Parisian elevation (Digital Terrain and Digital Elevation Models), as well as Geocoded files of social landlords. Several software tools will be also used, such as Solarin (Shading simulation), PHPP (Passive house planning tool), Dämmwerk (EnEV 2009), T-Sol and PV-Sol.

  Timeframe: September 2010 – September 2012

  Expected contribution to long-term Action Plan: The "solar land registry" will allow the identification of zones with interesting solar potential with legislative translation in terms of biodiversity, solar energy and green weft. It will help communicating professionals and citizens about solar energy and Paris Climate Plan commitments.

- **Pilot Action 2: Monitoring tool**

  Pilot Action Category: 2-Accomplishment of activities to mobilize solar potentials

Background: Currently it is dificult to obtain precise information about the number of solar facilities and their location, due to the fact that the information can be disseminated in several organisms. A tool collecting existing information is considered very useful to collect and monitor solar facilities and adapt future actions in favour of solar development.

Description: Development of a monitoring tool of solar facilities in order to improve the existing knowledge, follow the implementation of new installations and adapt future actions oriented to promote solar developments. The future Parisian Climate Protection Agency will use the tool, collect and monitor the information about solar facilities.
The information needed for developing this Pilot Action are existing tools with information about solar facilities already in operation (building permits, statements to exploit PV systems, certificates for electricity production, grid-connection contracts, purchase agreements, etc.)

Timeframe: September 2010 – December 2011

Expected contribution to long-term Action Plan: By kwnowing the real number of solar installations settled in Paris every year a better control of the progress of Paris municipality objectives related to solar active technologies will be achieved.

- **Pilot Action 3: Setting of requirements in local plans**

Pilot Action Category: 3-Development and realization of solar urban planning measures

Background: At present, local authorities in France are not empowered to make dispositions on their territory with legal binding ahead of national regulations: that's why in France, a mayor has no authority to impose a solar code or plan. It is expected that under the framework of the new Environment Law adopted in May 2010 municipalities will have the opportunity to incorporate solar requirements in local urban planning legal documents.

Description: Main objective of this action is to try to create a kind of "solar ordinance". To develop the use of solar energy in the processes of urban planning and urban development it is necessary to work on local documents, adapting them to incorporate special requirements such as solar. To anticipate the possibility of including solar requirements in urban planning documents a survey will be done to identify the changes and adaptations needed on the Local Urban Planning Plan (PLU) in order to incorporate solar requirements and therefore facilitate solar systems implementation.
The information needed for developing this Pilot Action is the content of the expected National Decree (end of 2010) that will oblige local urban planning plans to be in accordance with the future Paris Climate Protection Plan.

Timeframe: January 2011 – December 2012

Expected contribution to long-term Action Plan: By including solar requirements in the Local Urban Planning Plan the development of solar facilities can be very much accelerated, both in new as well as in existing built areas.

2.3 Munich

In Munich the solar Action Plan has identified 20 short-term measures that cover 4 major categories:

- Proactive public relations: 2 measures.
- Increase of expertise: 2 measures.
- Planning process: 7 measures;
- Implementation: 5 measures;
- Municipal approval process: 2 measures;
- Subsidy schemes: 1 measure; and
- Basic conditions: 1 measure.

Of these short-term measurements, 2 Pilot Actions have been identified as priorities to be developed within POLIS project:

- **Pilot Action 1: Development of a POLIS "Solar Guideline for Urban Planning"**

  Pilot Action Category: 2-Accomplishment of activities to mobilize solar potentials

  Background: The City of Munich has committed to meet climate protection targets as agreed in various national and international initiatives. Through the POLIS solar Action Plan the Urban Planning Department of Munich has set measurable targets for solar energy (photovoltaics, solar thermal heat and passive solar applications). A successful implementation of the POLIS solar Action Plan as well as other existing initiatives (AdC, SWM, SIM, CoM) requires that actors of urban development and planning get involved in solar energy issues. In this sense, knowledge about possible instruments and methods to integrate relevant aspects of solar energy into planning practise are needed.

  Description: The development of a solar guideline for urban planning aims to facilitate a criteria-based assessment of planning documents and projects. A guideline with concrete standards, indicators, and measures makes it possible for those involved in planning procedures to identify opportunities for the realization of solar urban development. It creates a common basis for communication with other departments, stakeholders and decision-makers. Moreover, by using indicators the degree of solar energy use can be measured and targets for solar optimized planning can be agreed. Specific topics to be covered in the guidelines are:
  - Urban competitions for new development areas: definition of criteria and instruments to include solar requirements in tendering, assisting jury members in their assessment of solar aspects of projects and providing know-how for the drafting of council resolutions for the implementation of solar planning.
  - Planning instruments: compilation, analysis and improvement of instruments to facilitate the aims of the solar Action Plan.
  - Criteria for the sale of municipal real estate to implement solar architecture: the existing Catalogue of Ecological criteria will be extended to include aspects of solar energy use, so that the improved regulation can become part of urban contracts and other binding agreements.
  - Urban regeneration and refurbishment: mobilisation of solar thermal energy use in existing buildings.

  The information needed for developing this Pilot Action are existing and planned instruments of urban planning with regard to the use of renewable energy (guidelines, expertises, manuals), information about planning procedures and links to already used

instruments and fields of activities. Several software tools will be also used, such as Solarin (Shading simulation), PHPP (Passive house planning tool), Dämmwerk (EnEV 2009), T-Sol and PV-Sol.

Timeframe: July 2010 – March 2011

Expected contribution to long-term Action Plan: With the proposed guideline, requirements and necessary conditions to implement strategic objectives regarding solar into urban planning and design will be effectively embedded in daily practice. The effectiveness of existing and new solar optimization tools will be also enhanced.

- **Pilot Action 2: Implementation of POLIS "Solar Guideline for Urban planning" findings within a new development area**

  Pilot Action Category: 3-Development and realization of solar urban planning measures

  Background: The City of Munich has committed to meet climate protection targets as agreed in various national and international initiatives. Through the POLIS solar Action Plan the Urban Planning department of Munich has set measurable targets for solar energy (photovoltaics, solar thermal heat and passive solar applications). A successful implementation of the POLIS solar Action Plan as well as other existing initiatives (AdC, SWM, SIM, CoM) requires that actors of urban development and planning get involved in solar energy issues. A concrete implementation project increases the knowledge of all participants of the planning process and creates experience within the Urban Planning department, which represents the basis for future projects.

  Description: Following the development of a "Solar Guideline for Urban planning" a pilot project will be implemented where the diverse instruments of the Guideline will be applied within the framework of an urban development project "Bayern Kaserne" (new residential area). The basics for solar urban planning will therefore be put into practice by:
  - Analysis of development areas in order to identify whether they are qualified for the integration of solar aspects;
  - Analysis of the urban planning, proposals for the optimization of the urban structure and development of recommendations for legal binding commitments and specific incentives;
  - Support of the urban planning competition;
  - Implementation of a solar optimization for the urban structure including recommendations for the integration of the results;
  - Development of targets and requirements for the development area.

  The information needed for developing this Pilot Action are data of the pilot area and related decisions and resolutions on municipal level. Several software tools will be also used, such as Solarin (Shading simulation), PHPP (Passive house planning tool), Dämmwerk (EnEV 2009), T-Sol and PV-Sol.

  Timeframe: March 2011 – June 2012

  Expected contribution to long-term Action Plan: By assessing if the findings of the "Solar Guideline for Urban planning" are suited for practice the effectiveness of existing and new solar optimization tools will be enhanced, thus contributing to the strategic objectives for solar energy integration in urban planning.

An alternative to Pilot Action 2 has been identified:

- **Pilot Action 2b (alternative): Implementation of "POLIS Guideline for solar urban planning" into a pilot project within the building stock of an existing area**

  Pilot Action Category: 3-Development and realization of solar urban planning measures

  Description: Following the development of a "Solar Guideline for Urban planning" a pilot project will be implemented where the diverse instruments of the Guideline will be applied within the framework of the urban refurbishment project of Neuaubing

  Timeframe: January 2011 – July 2012

2.4 Lisbon

In the city of Lisbon the solar Action Plan has defined 5 short-term measures, all of them identified as priority Pilot Actions that will be implemented within POLIS project:

- **Pilot Action 1: Evaluation of solar potential in Lisbon at parish level**

  Pilot Action Category: 1- Large-scale identification of solar potential and definition of priorities

  Background: Although an initial assessment has been done to extrapolate national targets for micro-production and solar thermal systems to the city of Lisbon, the definition of more specific targets for the adoption of solar technologies has to take into account the actual urban potential based on existing conditions, which is unknown yet.

  Description: Realistic assessment of the solar potential of Lisbon built environment, based on estimates of the net available roof area and solar technologies implementation ratios (e.g. solar thermal vs. PV). Geographical disaggregation will go down to the parish level, to which pertain well defined boundaries within the city. A top down approach will be followed (from technical to market potential) for both solar technologies, considered independently. Scenarios of different mixes between solar thermal and solar photovoltaic technologies will be then constructed based on the individual potentials and on policy considerations.
  - For existing buildings the solar potential will be estimated in terms of technical potential (net available area for hosting solar facilities), technological potential (estimate of installable capacity and annual energy yield according to different technology implementation scenarios), economic potential (obtained from applying scenarios of willingness to pay to the technological potential estimates) and market potential (obtained from applying scenarios of affordability to the economic potential estimates).
  - For new buildings, potential estimation departs from existing urban planning instruments for estimating technical potential, while applying the same methodology and scenarios as described for existing buildings when determining technological, economic and market potentials. Scenarios will be further exploited by introducing potential modifications to existing urban planning instruments.

Special attention will be given to the instruments that are currently under revision. The information needed for developing this Pilot Action are data on existing building stock, meteorological data and 3D city models.

Timeframe: October 2010 – March 2011

Expected contribution to long-term Action Plan: Estimation of potentials under distinct scenarios will provide the basis for the establishment of goals for solar technologies adoption in the city of Lisbon, while assisting the implied policy-decision process.

- **Pilot Action 2: Definition of goals for solar technologies adoption (thermal & photovoltaic)**

  Pilot Action Category: 2- Accomplishment of activities to mobilize solar potentials;

  Background: Although an initial assessment has been done to extrapolate national targets for micro-production and solar thermal systems to the city of Lisbon, the definition of more specific targets for the adoption of solar technologies has to take into account the actual urban potential based on existing conditions. The detailed assessment of the solar potential carried out within POLIS project will allow defining coherent targets, considering not only the technical, but also the technological, economical and market potential. The targets are to be set within the National Action Plan for Energy Efficiency and at the local level within the Energy-Environment Strategy and the Covenant of Mayors

  Description: Based on the evaluation of solar potential in Lisbon at parish level (Pilot Action 1), the policy decision-making process will be assisted so to establish targets for the adoption of solar technologies in Lisbon. Potentials will be estimated according to different policy scenarios, where municipal-level intervention scenarios determine the policy options available. A comparative assessment of these scenarios will be provided to municipal decision-makers following the methodology and indicators system developed by Rodrigues (2009), adapted to the implied regional conditions. The final targets will be established based on the policy scenario selected by the municipality, in accordance with the National Action Plan for Energy Efficiency and (at the local level) within the Energy-Environment Strategy and the Covenant of Mayors.
  Another result of the comparative assessment of the different policy scenarios will be an Observation System for Solar Energy Policy in Lisbon.
  The information needed for developing this Pilot Action are the results of Pilot Action 1.

  Timeframe: April – May 2011

  Expected contribution to long-term Action Plan: Implementation trajectories and targets for solar technologies adoption in Lisbon will be established.

- **Pilot Action 3: Evaluation of potential to integrate solar technologies in Boavista neighbourhood**

  Pilot Action Category: 2- Accomplishment of activities to mobilize solar potentials;
  3- Development and realization of solar urban planning measures

  Background: The Boavista Neighbourhood is a social housing area that is presently

conducting an operation to refurbish and revitalize the area within an Eco Neighbourhood programme, financed by a national funding programme. Within this programme it is foreseen the adoption of solar technologies in the neighbourhood. This Pilot Action allows to identify the best urban design for the area and the preference location for the solar systems.

Description: Analysis of the existing urban rehabilitation plan for the Boavista neighbourhood regarding its solar integration potential. Optimisation of the existing urban plan so to maximise the potential for solar integration. Determination of preferential integration sites. The analysis of potentials will follow a building-based approach:

- Potentials will be estimated by detailed simulation according to the existing urban plans and other specific implementation conditions (e.g. dedicated public funding).
- Urban design barriers will be identified and corrective measures proposed, after which new calculations of solar potentials will be conducted.

The information needed for developing this Pilot Action are urban rehabilitation plans detailed at building level.

Timeframe: June 2010 – August 2012

Expected contribution to long-term Action Plan: Implementation and testing of urban planning measures in a demonstration case will provide relevant information for the development of practical solar urban planning in rehabilitation areas.

- **Pilot Action 4: Identification of the solar potential of the built heritage of the Lisbon Municipality at the level of the service buildings supplied with medium voltage**

  Pilot Action Category: 1- Large-scale identification of solar potential and definition of priorities

  Background: Within the micro-generation framework the Lisbon Municipality has already installed more then 20 PV systems in schools and social housing buildings. Once the targets for solar technologies adoption are set, the municipality should be able to set the example and adopt solar technologies in the built patrimony, considering the installation at the most advantageous sites.

  Description: Analysis of the solar economic potential of the built heritage of the Lisbon Municipality at the level of the service buildings supplied with medium voltage. The analysis will follow a building-based approach based on an inventory of relevant buildings:

  - Technical and technological potentials will be estimated by detailed simulation according to the existing urban implantation and other specific implementation conditions (e.g. historical area constraints).
  - Economic potential will be determined taking into consideration existing and foreseen public promotion instruments (national level).

  The information needed for developing this Pilot Action are inventory and implantation details of relevant buildings, domestic heating water consumption profile and HVAC system. Software simulation tools will be used for establishing the yearly yield of installable capacity: PVSyst 5.0 for PV technologies and SOLTERM for solar thermal technologies.

Timeframe: June 2010 – August 2012

Expected contribution to long-term Action Plan: Detailed solar potential in specific building typologies (service buildings) and city locations will be obtained.

- **Pilot Action 5: Training workshops for professionals on solar technologies and solar concepts of urban planning**

  Pilot Action Category: 2- Accomplishment of activities to mobilize solar potentials

  Background: The effective adoption of solar technologies at the municipal level actively depends on its technicians availability to perceive the added value of the technologies and be able to integrate these in the most profitable way. Such a step comprehends a first approach to the technologies basics, the adoption process, the integration possibilities, etc. This will enable Municipality technicians and private professionals to achieve competences in these areas and actively promote Lisbon Solar Action Plan deployment.

  Description: Two training workshops on solar technologies and its integration in the architectural and urban design processes targeted at Lisbon Municipality technicians dedicated to architecture, engineering and urban planning activities.

  Timeframe: October 2011 – May 2012

  Expected contribution to long-term Action Plan: By proving training workshops to municipal technicians of the Urban Planning Department, the Urban Management Department and the Projects and Works Department, knowledge and competence building on solar technologies by municipal professionals will be increased, benefitting the development of Lisbon Solar Action Plan.

2.5 Malmö

In Malmö the solar Action Plan includes 8 short-term measures, 3 of them identified as priority Pilot Actions to be implemented within POLIS project:

- **Pilot Action 1: Urban planning in Sege Park**

  Pilot Action Category: 3-Development and realization of solar urban planning measures

  Background: Sege Park is an area undergoing retrofitting measures and new developments with a green profile, including plans and possibilities for solar energy as well as other renewable energy sources. Malmö municipality has the interest to introduce solar requirements that enable the installation of solar energy facilities.

  Description: Introduction of solar energy requirements in the local Urban Plan of Sege Park. The City Planning Office in collaboration with POLIS Swedish technical partners will draft the new local plan in a way that future solar installations are facilitated, including orientation of houses and specification of where and in what way solar energy plants can be installed. This is the first time for this concept to be used in

Malmö. Implementation of the plan will be started after approval; consequently, construction of new buildings (with solar energy installations) will probably be started within the POLIS project duration.
The information needed for developing this Pilot Action is the local Urban Plan of the area.

Timeframe: January 2010 – December 2011

Expected contribution to long-term Action Plan: The Pilot Action will constitute a model plan for future uban planning in Malmö as well as in other municipalities (possibly also in other countries with similar legislation). If an exploitation or purchase agreement is signed within the area, solar energy will be introduced according to the local Urban Plan.

- **Pilot Action 2: Solar energy requirements in exploitation and purchase agreements**

  Pilot Action Category: 4-Development and implementation of political or legislative measures

  Background: Municipalities in Sweden are allowed to set their own requirements within exploitation and purchase agreements when developers are building on city-owned land. Such an agreement could contain requirements like, for example, orientation and shape of buildings to facilitate future solar energy installations, or a certain maximum energy demand, which is also in accordance with the new "Environmental Building Program South". The possibility of setting requirements regarding solar energy installations within exploitation and purchase agreements has not yet been applied.

  Description: In this Pilot Action an exploitation or purchase agreement with solar energy requirements will be developed. The first steps include development and preparation of a program of training and workshops for planners and architects, followed by execution of the program. The implementation includes introduction of solar energy requirements in exploitation and purchase agreements by connecting solar targets to existing initiatives recently approved (2009) by Malmö City Council related with climate protection objectives: "Environmental Building Program South" (guideline to support sustainable development), "Energy Strategy" and "Environmental Program".
  The information needed for developing this Pilot Action is the Swedish legislation regarding exploitation and purchase agreements.

  Timeframe: January 2011 – July 2012

  Expected contribution to long-term Action Plan: The result from this Pilot Action and the agreement stipulation will be a legislative revision facilitating the integration of solar energy in urban planning, as well as increased installed capacity. It will also serve as an example and give experience for future agreements in Malmö, as well as for other municipalities in Sweden (and possibly in other countries with similar legislation).

- **Pilot Action 3: Potential Study in Sege Park**

  Pilot Action Category: 1- Large-scale identification of solar potential and definition of priorities

Background: Sege Park is an area undergoing retrofitting measures and new developments with a green profile, including plans and possibilities for solar energy as well as other renewable energy sources. Malmö municipality has the interest to promote the integration of solar energy at urban level; however, a specific method for solar potential assessment does not exist up to now.

Description: This Pilot Action consists of developing a methodology for assessing the detailed solar potential of buildings in Malmö that can be used by the public (access available on-line) and possibly by other cities/countries with similar legislation. Today, all buildings in Malmö can be analysed with the program ESPA Systems, which is based on laserscanning with an accuracy under 10 cm. A digital terrain model as well as a surface model can be used together with several other programs like AutoCad and ScetchUp to analyse building surfaces. The tool will be first used and validated with the analysis of Sege Park area. As a result, a 3-D analysis of the buildings will be conducted and the potential for solar energy will be calculated, including reduction for obstacles and shadings. As this is the first area where a solar potential study will be done in Malmö, the methodology will be developed in order to be able to continue with more city areas.
The information needed for this Pilot Action are data from the Geographical Information System-centre in Malmö City Planning Office (aerial photos, GIS-databases and user interface). Software tools to be used are ESPA systems and the applications that are fitted with this program.

Timeframe: January 2010 – December 2011

Expected contribution to long-term Action Plan: The methodology will function as a model for future solar potential studies in the city of Malmö and in the region.

2.6 Vitoria-Gasteiz

In the city of Vitoria-Gasteiz the solar Action Plan has defined 5 short-term measures, all of them identified as priority Pilot Actions that will be implemented within POLIS project:

- **Pilot Action 1: Methodology and Assessment of the Detailed Solar Potential of Lakua district**

  Pilot Action Category: 1- Large-scale identification of solar potential and definition of priorities

  Background: Vitoria-Gasteiz has signed several commitments related to energy and sustainability. In addition, due to the signing of the “Covenant of Mayors” document in 2009, the city has to adapt its targets to the new commitment of going beyond the 20% CO_2 emission reduction and the promotion of renewable energies. For this reason, Vitoria-Gasteiz is currently working on a new “Fight against Climate Change Plan”, a “Climate Change Adaptation Strategy” and an “Energetic Ordinance” where new targets and actions will be set to reduce CO_2 emission and promote renewable energies. A detailed study to quantify the urban solar potential is considered of highest priority within the solar Action Plan in order to identify the realistic possibilities of solar energy use in Vitoria-Gasteiz.
  Besides local requirements related to solar passive and active technologies, national

requirements (Technical Building Code) must be considered also in the solar potential assessment. A methodology combining both type of requirements does not exist yet. The district of Lakua (north of the city, area of 376 Has.) is one of the priority areas defined in the solar Action Plan; the results of the Solar masterplan will be used to identify the best buildings where PV can be installed.

Description: Development of a methodology for the identification of the solar potential of urban areas of Vitoria-Gasteiz, which is compatible with local and national requirements ("Energy Ordinance of Vitoria-Gasteiz" draft and "Technical Building Code"). Application of the methodology to identify the detailed solar potential of the district of Lakua and integration of results in the Geographical Information System of the municipality. Specific tasks of this Pilot Action are:

- Methodology for the identification of the solar potential of urban areas in Vitoria-Gasteiz: analysis of local climate and identification of micro-climatic differences; analysis of the morphological characteristics of the city areas; determination of solar potential categories and assignment criteria.
- Identification of the detailed solar potential of Lakua district.
- Development of recommendations for the strategic mobilisation of the solar potential identified in Lakua district.

The information needed for developing this Pilot Action are the General Urban Distribution Plan (2007 edition) and meteorological data of Vitoria-Gasteiz. In addition, a tool previously developed by the technical partner (Universidad Politécnica de Madrid) to perform the solar potential analysis of buildings and non-building areas will be adapted to elaborate different solar maps. Complementary tools will be developed to estimate the output of solar photovoltaic and thermal installations leading to comply with local and national requirements.

Timeframe: October 2009 – October 2010

Expected contribution to long-term Action Plan: The methodology for the identification of the solar potential will provide a reference framework for the city strategies related to an extensive use of solar energy in Vitoria-Gasteiz.
The detailed solar potential of the Lakua district will enable the municipality of Vitoria-Gasteiz to focus subsequent strategies for CO_2 reduction based on the use of solar technologies in the buildings with the best potential and adequate constructive characteristics.

- **Pilot Action 2: Assessment of the Detailed Solar Potential of Jundiz industrial area**

Pilot Action Category: 1- Large-scale identification of solar potential and definition of priorities

Background: Vitoria-Gasteiz has signed several commitments related to energy and sustainability. In addition, due to the signing of the "Covenant of Mayors" document in 2009, the city has to adapt its targets to the new commitment of going beyond the 20% CO_2 emission reduction and the promotion of renewable energies. For this reason, Vitoria-Gasteiz is currently working on a new "Fight against Climate Change Plan", a "Climate Change Adaptation Strategy" and an "Energetic Ordinance" where new targets and actions will be set to reduce CO_2 emission and promote renewable energies. A detailed study to quantify the urban solar potential is considered of highest priority within the solar Action Plan in order to identify the realistic possibilities of solar energy

use in Vitoria-Gasteiz.
The industrial area of Jundiz (west of the city, area of 710 Has.) is one of the priority areas defined in the Action Plan, where the results of the Solar masterplan will be used to identify the best buildings where PV can be installed, thus promoting investments in solar PV facilities.

Description: Identification of the detailed solar potential of Jundiz industrial area, using the methodology developed in the previos Pilot Action that is compatible with local and national requirements ("Energy Ordinance of Vitoria-Gasteiz" draft and "National Technical Building Code"). Specific tasks of this Pilot Action are:

- Analysis of the building typologies existing in the industrial area of Jundiz.
- Identification of the detailed solar potential of Jundiz industrial area (solar passive and solar active PV).
- Development of recommendations for the strategic mobilisation of the solar potential identified (legal, constructive and management aspects).

The results will be integrated in the Geographical Information System of the municipality.
The information needed for developing this Pilot Action are the General Urban Distribution Plan (2007 edition) and meteorological data of Vitoria-Gasteiz.

Timeframe: January 2010 – January 2011

Expected contribution to long-term Action Plan: The detailed solar potential of Jundiz industrial area will enable the municipality of Vitoria-Gasteiz to focus on subsequent strategies for CO_2 reduction based on the use of solar technologies in the industrial buildings with the best potential and constructive characteristics.

- **Pilot Action 3: Assessment of the general Solar Potential of the city of Vitoria-Gasteiz**

Pilot Action Category: 1- Large-scale identification of solar potential and definition of priorities

Background: Vitoria-Gasteiz has signed several commitments related to energy and sustainability. In addition, due to the signing of the "Covenant of Mayors" document in 2009, the city has to adapt its targets to the new commitment of going beyond the 20% CO_2 emission reduction and the promotion of renewable energies. For this reason, Vitoria-Gasteiz is currently working on a new "Fight against Climate Change Plan", a "Climate Change Adaptation Strategy" and an "Energetic Ordinance" where new targets and actions will be set to reduce CO_2 emission and promote renewable energies. A detailed study to quantify the urban solar potential is considered of highest priority within the solar Action Plan in order to identify the realistic possibilities of solar energy use in Vitoria-Gasteiz.

Description: Identification of the solar potential of the complete city of Vitoria-Gasteiz, using the methodolgoy developed in Pilot Action 1 that is compatible with local and national requirements ("Energy Ordinance of Vitoria-Gasteiz" draft and "National Technical Building Code"). Specific tasks are:

- Analysis of the morphological and building characteristics of Vitoria-Gasteiz districts. Not only orientation, slope and shadows casted will be relevant for the identification of solar potential, but also historical and protected areas, surface available and structural conditions will be taken into account.

- Identification of the general solar potential of the different city districts, in terms of solar passive and solar active technologies.
- General recommendations for the strategic mobilisation of the solar potential identified.

The results will be integrated in the Geographical Information System of the municipality.
The information needed for developing this Pilot Action are the General Urban Distribution Plan (2007 edition) and meteorological data of Vitoria-Gasteiz.

Timeframe: January 2011 – December 2011

Expected contribution to long-term Action Plan: Knowledge of the solar potential of the complete city of Vitoria-Gasteiz will enable the municipality to focus on subsequent strategies for CO_2 reduction based on the use of solar technologies in the city districts with the best potential and constructive characteristics.

3 Concluding remarks

Within the POLIS project, the 6 participating cities (Lyon, Paris, Munich, Lisbon, Malmö and Vitoria-Gasteiz) have committed on long-term strategies to integrate solar energy at urban level that are consistent with existing CO_2 mitigation targets in solar Action Plans embeded in local planning. Although the participating cities are in different situations regarding solar energy so that their strategies are also different, a common objective is shared, namely, to steer the future development of solar energy with respect to urban planning.

The solar Action Plans, developed by Local Working Groups consisting of municipalities and technical partners of POLIS project, include long-term solar targets, main areas of interest for the implementation of solar energy in connection with urban approaches, relevant stakeholders and short-term measures to support the upgrade of solar energy and reach the proposed targets. Of all short-term measures, some have been identified by the municipalities as priority “Pilot Actions” to be implemented within POLIS project.

Overall, 19 Pilot Actions have been defined (almost 1/3 of the 61 short-term measures identified) covering the following categories[4]:

1. Large-scale identification of solar potential and definition of priorities (planning instruments): 8 measures.
2. Accomplishment of activities to mobilize solar potentials (campaigns, subsidy programs, local policies, information workshops, cooperation with existing programs, etc): 6 measures.
3. Development and realization of solar urban planning measures (in new developments or existing areas): 5 measures.
4. Development and realization of political or legislative measures: 1 measure.

All Pilot Actions have been validated by the corresponding municipal authorities.

The following table presents an overview of the 19 Pilot Actions that will be implemented within the framework of POLIS project between 2009 and 2012.

[4] Note: the sum of measures distributed in the four previous categories is 20, not 19, because 1 Pilot Action in Lisbon addresses 2 different categories.

Country/ City	Local Working Group and priority measures for long-term development of solar energy	
France/ Lyon	Grand Lyon Urbanism agency, Grand Lyon technical services, Agence Locale de l'Energie de l'agglomération lyonnaise and HESPUL (technical partner)	
	Pilot Actions	**Category [1]**
	1. Interactive website with detailed real solar potential for Sainte Blandine district *Interactive website and communication campaign to inform district inhabitants about the potential of PV technology on residential and local government buildings*	1
	2. Citizen jointly owned PV system at Lyon *Mobilization of local investments in PV systems by participating on the development and production of renewable electricity*	2
	3. Solar planning scenario for a new development area *Development of urban planning methodologies with solar energy aspects as main criteria, by proposing 2 scenarios for a new development area in Lyon*	3
France/ Paris	City of Paris (Urban Ecology Department, Urban Planning Headquarter, Social Housing Headquarter, Public Works Headquarter) and Urban Planning Agency of the City of Paris (technical partner)	
	Pilot Actions	**Category**
	1. Precise identification of solar potential of Paris building stock and modelling tool *Modelling tool and detailed identification of the solar potential (PV or solar thermal) of the roofs of Paris complete building stock. Dissemination in an interactive internet-basedmap*	1
	2. Monitoring tool *Development of a monitoring tool of solar facilities to improve the existing knowledge, follow the implementation of new ones and adapt future actions oriented to promote solar developments*	2
	3. Setting of requirements in local plans *Survey to identify changes and adaptations needed on the Local Urban Planning Plan in order to incorporate solar requirements and therefore facilitate solar systems implementation. To try to create a kind of "solar ordinance"*	3
Germany/ Munich	City of Munich (Urban Planning and Building Regulation Department) and Ecofys Germany (technical partner)	
	Pilot Actions	**Category**
	1. Development of a POLIS "Solar Guideline for Urban Planning" *Development of a solar guideline to facilitate a criteria-based assessment of urban planning documents and projects*	2
	2. Implementation of POLIS "Solar Guideline for Urban planning" findings within a new development area *Pilot project where the diverse instruments of the Guideline will be applied within the framework of the urban development project "Bayern Kaserne"*	3
	2 (alternative). Implementation of "POLIS Guideline for solar urban planning" into a pilot project within the building stock of an existing area *Pilot project where the diverse instruments of the Guideline will be applied within the framework of the urban refurbishment project of*	3

Country/ City	Local Working Group and priority measures for long-term development of solar energy	
	Neuaubing	
Portugal/ Lisbon	Lisbon municipality, Agência Municipal de Energia e Ambiente de Lisboa and Wee Solutions (technical partner)	
	Pilot Actions	**Category**
	1. Evaluation of solar potential in Lisbon at parish level *C Realistic assessment of the solar potential of Lisbon built environment using a top-down approach (from technical to market potential) for PV and solar thermal technologies*	1
	2. Definition of goals for solar technologies adoption (thermal & photovoltaic) *Based on the evaluation of solar potential in Lisbon at parish level (Pilot Action 1), the policy decision-making process will be assisted so to establish targets for the adoption of solar technologies in Lisbon, based on the policy scenario selected by the municipality, in accordance with national and local regulations*	2
	3. Evaluation of potential to integrate solar technologies in Boavista neighbourhood *Analysis of the existing urban rehabilitation regarding its solar integration potential; optimisation of the existing urban plan in order to maximise the potential for solar integration. Determination of preferential integration sites.*	2,3
	4**. Identification of the solar potential of Lisbon municipality built heritage – Service buildings with medium voltage electricity supply** *M Analysis of the solar economic potential of service buildings supplied with medium voltage, followwing a building-based approach based on an inventory of relevant buildings: identification of technical, technological and economic potentials*	1
	5. Training workshops for professionals on solar technologies and solar concepts of urban planning *D Realisation of 2 training workshops on solar technologies and its integration in the architectural and urban design processes targeted at Lisbon Municipality technicians dedicated to architecture, engineering and urban planning activities*	2
Sweden/ Malmö	City of Malmö (Environment Department, Real Estate Office, Urban Planning Department and Department of Internal Services), Skåne Energy Agency and Lund University (technical partner)	
	Pilot Actions	**Category**
	1. Urban planning in Sege Park *Introduction of solar energy requirements in the local Urban Plan of an existing area undergoing retrofitting measures*	3
	2. Solar energy requirements in exploitation and purchase agreements *Development and implementation of an exploitation or purchase agreement with solar energy requirements*	4
	3. Potential Study in Sege Park *Development of a methodology for assessing the detailed solar potential of buildings in Malmö that can be used by the public and possibly by other cities/countries with similar legislation*	1
Spain/ Vitoria-	City of Vitoria-Gasteiz (Urban Planning Department, Environment and Sustainability	

Country/ City	Local Working Group and priority measures for long-term development of solar energy	
Gasteiz	Department and Energy Agency of Vitoria-Gasteiz) and Universidad Politécnica de Madrid (technical partner	
	Pilot Actions	**Category**
	1. Methodology and Assessment of the detailed Solar potential of Lakua district *Development of a methodology for assessing the solar potential of urban areas of Vitoria-Gasteiz that is compatible with local and national requirements. Application to the residential district of Lakua and general recommendations for strategic mobilisation of the potential identified*	1
	2. Assessment of the detailed Solar potential of Jundiz industrial area *Identification of the detailed solar potential of Jundiz industrial area and general recommendations for the strategic mobilisation of the potential identified*	1
	3. Assessment of the general Solar potential of the city of Vitoria-Gasteiz *Identification of the solar potential of the complete city of Vitoria-Gasteiz and general recommendations for the strategic mobilisation of the potential identified*	1
Note: (1) Pilot Actions categories: 1. Large-scale identification of solar potential and definition of priorities (planning instruments); 2. Accomplishment of activities to mobilize solar potentials (campaigns, subsidy programs, local policies, information workshops, cooperations with existing programs, etc); 3. Development and realization of solar urban planning measures (new developments or existing areas); 4. Development and realization of political or legislative measures.		

Table I. Overview of priority Pilot Actions in POLIS participating cities