



Identification and mobilization of solar potentials via local strategies

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

Deliverable 4: ACTION PLANS OF POLIS CITIES

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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.

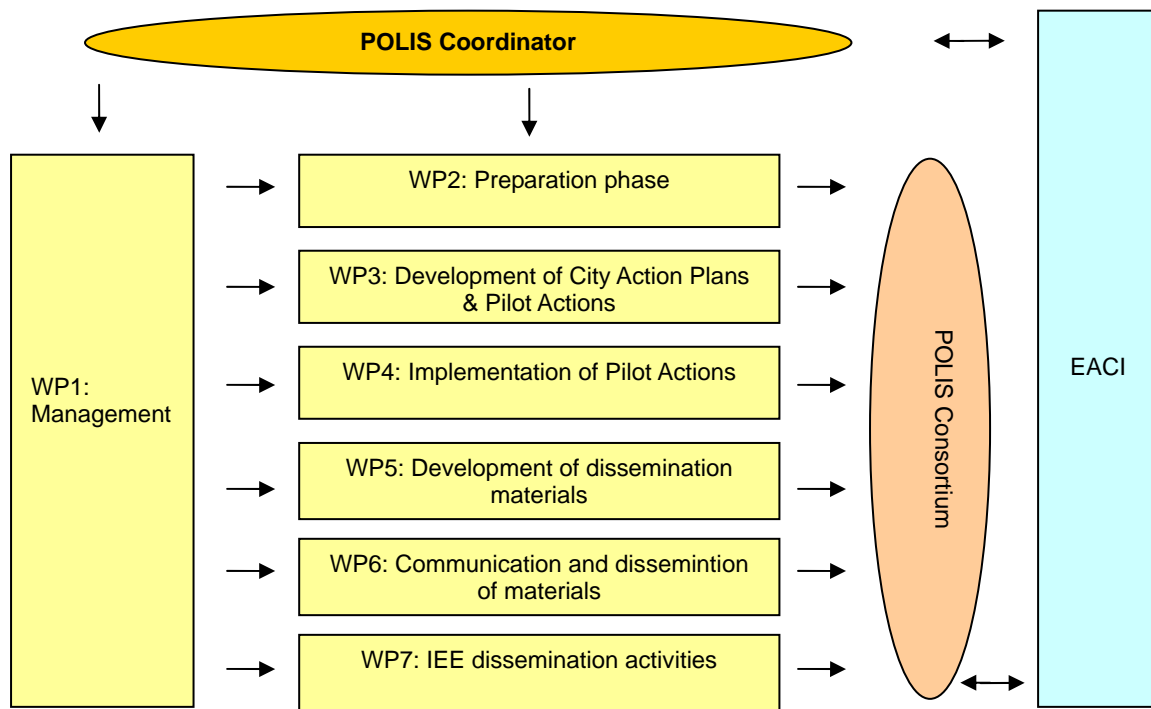
POLIS project brings together local authorities with different experiences and varying states of urban development from France, Germany, Portugal, Spain and Sweden, to share their knowledge on solar town planning and encourage further activities within the scope of an expert network for cities. Main 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 CO₂ 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.

In this report a compilation of the solar Action Plans of POLIS cities is presented. These Action Plans have been developed by Local Working Groups composed by municipalities and technical partners of POLIS project through a series of workshops and meetings, 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 regarding solar, etc. Each city has then defined long-term solar targets and 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. These measures have been classified in 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, cooperation 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, introduction of a solar ordinance for new or existing buildings).

Of all short-term measures, some of them have been identified by the municipalities as priority “Pilot Actions” that will be implemented within POLIS project. Overall, 61 short-term measures have been defined, of which almost 1/3 (19 measures) are priority “Pilot Actions” that cover the 4 defined categories.

Complementary information of the solar Action Plans can be found in other POLIS reports. Particularly, Deliverable 6 presents the local conditions of participating cities, Deliverable 7 gives an overview of their long-term solar targets and Deliverable 5 compiles the set of Pilot Actions that will be implemented within POLIS project. All these reports can be found at the project web-site (section: Publications).

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 CO₂ mitigation targets (related to national/regional requirements or voluntary commitments, for example, the Covenant of Mayors, signed by all POLIS participating cities) in solar Action Plans embeded in local planning.



Figure 1. POLIS participating cities

In this report a compilation of the solar Action Plans is presented. It must be pointed out that the participating cities are in different situations regarding solar energy, therefore, the strategies designed to upgrade the use of solar energy at urban level also vary. A common objective is however shared, namely, to steer the future development of solar energy with respect to urban planning by:

- Assessment of existing climate strategies and targets at city levels;
- Evaluation of solar potential in city areas;
- Development of solar targets;
- Creation and evaluation of possible measures in diverse planning areas;
- Connection to general renewable energy targets.

The Action Plans have been developed by the so-called “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.

In particular, the Action Plans have been developed through a series of workshops and meetings, using information about the existing local background in terms of energy supply situation, user behaviour, urban structures, building typologies, solar actions and measures and urban planning practices regarding solar energy. Each city has then developed long-term solar targets that are consistent with existing CO₂ mitigation 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. These measures have been classified in 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, introduction of a solar ordinance for new or existing buildings).

Of all short-term measures, some of them have been identified by the municipalities as priority “Pilot Actions”, to be implemented within POLIS project duration.

In order to ensure that the solar Action Plans have a high quality and reflect the findings of the POLIS project, before municipal validation a peer review process has been carried out within POLIS Consortium, so that each Action Plan has been reviewed by two different countries.

In the following section an overview of the different Action Plans is presented, followed by some concluding remarks (Section 3). Annex I includes the common template used for the Action Plans. Complementary information of the solar Action Plans can be found in other POLIS reports, particularly: Deliverable 6 presents the local conditions of participating cities, Deliverable 7 gives an overview of their long-term solar targets and Deliverable 5 compiles the set of Pilot Actions that will be implemented within POLIS project. All these reports are available on the project web-site¹.

2 Solar Action Plans of POLIS cities: overview

2.1 Rationale

The Intergovernmental Panel on Climate Change report proves the existence of climate change and the influence of mankind to this subject. Therefore countries, regions and also

¹ www.polis-solar.eu

cities have been asked to develop strategies to fight global warming.

In April 2007, the European Commission formally launched the Climate and Energy Package, which assumed reduction in greenhouse gas emissions targets for 2020 based on the European situation in 1990. The objectives aspire to 20% reduction in greenhouse gas emissions, increased by 20% the contribution of renewables in energy consumption and increased by 20% the European levels of energy efficiency.

European leaders have signed up to a binding EU-wide target to supply 20% of their energy needs from renewable energies, including biomass, hydro, wind and solar power, by 2020. To meet this target, EU leaders agreed a new directive on promoting renewable energies, which set individual targets for each member state.

Directive 2009/28/EC requires each Member State to adopt a national renewable energy action plan. These plans are to set out Member States' national targets for the share of energy from renewable sources consumed in transport, electricity and heating and cooling in 2020, taking into account the effects of other policy measures relating to energy efficiency on final consumption of energy, and adequate measures to be taken to achieve those national overall targets, including cooperation between local, regional and national authorities.

In addition, many municipalities have agreed to fix CO₂ mitigation targets until 2020 or 2050 voluntarily. For instance the Covenant of Mayors is a commitment by towns and cities to go beyond the objectives of EU energy policy in terms of reduction in CO₂ emissions through enhanced energy efficiency and cleaner energy production and use.

Hence, the intention of POLIS solar Action Plans is to steer the future development of solar energy with respect to urban planning by:

- Assessment of existing climate strategies and targets at city level.
- Evaluation of solar potential in the city areas.
- Development of solar targets.
- Creation and evaluation of possible measures in diverse planning areas.
- Connection to general renewable energy targets.

2.2 Lyon

In December 2007, Grand Lyon councillors unanimously voted a Climate Action Plan through which Grand Lyon has adopted European Union goals on a local level, fixing targets for greenhouse gas reductions, reduction in energy consumption and an increase in the share of renewable energies. The Climate Action Plan specifies:

- A reduction in greenhouse gas emissions of 20% and an increase to 20% share of renewable energies within the Grand Lyon council area and own organisations by 2020 (compared to 2000).
- A reduction of 75% (= national French engagement of “Factor 4”²) in greenhouse gas emissions within the Grand Lyon council area and own organisations by 2050 (compared to 2000).

The Climate Action Plan is one of the main vectors for the Agenda 21. Local authorities have requested that the Action Plan be developed further to put the Grand Lyon on the track towards a “Factor 4” scenario in 2050. To reach these targets, Grand Lyon has created the

² French National scenario willing to divide by 4 the global energy consumption of the country by 2050.

Climate Action Plan Project Committee.

The specific target of 20% share of renewable energies by 2020 implies very concrete goals for solar technologies equivalent to: 560 000 m² of photovoltaics modules per year, and 67 000 m² of solar thermal collectors per year.

A series of guidelines have been put in place that must be met before the Grand Lyon will contribute financially to a specific project (subsidy or other financial assistance):

- New housing guidelines: Grand Lyon New Housing Guideline.
Based on 5 major themes, with a particular emphasis on flux energy management (heat, cold, electricity...). Renewable and passive solar targets (mainly solar PV and thermal installations): 20% to 40% of the building consumption to be met by renewable energies and passive solar.
- New tertiary building guidelines: Grand Lyon New Tertiary Building Guideline.
Based on 5 major themes, with a particular emphasis on flux management (heat, cold, electricity...). Solar targets: 0.03 m² of solar photovoltaic modules per m² SHON (Normative French unit used for the calculation of a building surface), with a minimum system size of 2kWp.

Programmes and studies have been undertaken to estimate opportunities and install solar energy facilities:

- Renewable Energy potential in the Grand Lyon area. A study has defined the development goals for different renewable energies so as to reach the 20% target in 2020. The Solar Potential study has provided realistic knowledge about how much of the built environment is reasonably available for installing solar technologies.
- CONCERTO European Programme "Lyon Confluence": development of brownfield sites with ambitious targets for building energy consumption and high performance heating systems. Solar targets: 80% of energy needs to be met by renewable energies, including solar thermal and photovoltaics.

Other public and private organisations have created tools or programmes that are inline with the Climate Action Plan, including:

- SERL Energie: a public/ private company that facilitates investments in renewable energies.
- SOLIRA: a private company developing citizen investments in photovoltaics (direct result of the European-funded project DeSolaSol).
- SOLPOOL: European programme working to provide solar energy to pools. 5% of the Grand Lyon pools now have some form of solar energy as a result of this programme.

Within Lyon solar Action Plan the following long-term targets have been defined:

- Passive solar share of the heating demand reaches at least 20% in all new development areas > 100 units (residential) from 2012. A requirement already exists for buildings on ground owned by the Grand Lyon municipality. An objective for solar passive share of residential buildings built on ground not owned by the municipality (minimum 20%, precise target to be defined) will be introduced in the new Urban Local Plan, which will imply a specific rate between height and distance between buildings.
- Through POLIS measures PV and solar thermal capacities will have increased by factor 4 and 3 in 2020. In order to reach the targets of the Grand Lyon Climate Action Plan the following yearly increases of capacity installed will be necessary: 50% per year for PV installations and 40% per year for solar thermal installations.

Main areas of intervention identified to promote the uptake of solar urban planning are new urban, urban renewal and existing residential areas. These are predominantly residential

areas with a portion of tertiary (services and commercial premises) activities.

Relevant stakeholders of concern for the implementation of solar energy in connection with urban approaches in Lyon are:

- Building owners (single owners or co-ownership bodies) are considered a primary target as they can mobilise investments in diffuse solar thermal and photovoltaic systems;
- Building owners of industrial or tertiary buildings, which today are often confused by many investment possibilities available, or reluctant to invest without an adequate financial return;
- The Grand Lyon municipality, as an important building owner in the Grand Lyon area;
- Other local government authorities;
- Urban planners;
- Citizens and private bodies such as companies and non-profit organisations.

The Lyon solar Action Plan comprises four major categories of short-term measures: facilitating citizen investments in solar energies, facilitating solar investments for businesses, incorporating solar considerations into urban planning documents and guidelines, and encouragement of local government investment in solar energies. Each category incorporates a number of specific measures, some of which are identified as priority “Pilot Actions”, to be developed within POLIS project:

- Facilitating citizen investments in solar energies:
 1. (Pilot Action) Interactive website with detailed solar potential for inhabitants of Sainte Blandine district: design and implementation of an interactive website to allow residents and building owners to visualise the solar potential and constraints of the building stock (2009-2011).
 2. Interactive website with estimated solar potential for all buildings of Grand Lyon: building on the expertise and results of the Sainte Blandine interactive web site, an additional web site will be developed giving all building owners and residents of Grand Lyon access to an estimation of the solar potential of their buildings (2011).
 3. (Pilot Action) Citizen jointly owned PV systems: development of communication instruments (conferences, workshops, promotional events) to inform citizens of the possibility of investing in jointly owned PV systems on specific appropriate roofs, based on the methodology developed by the European-funded project DeSolaSol (2010-2011).
- Facilitating solar investments for businesses:
 4. Development of a Guideline for businesses to facilitate investments in solar facilities, where different alternatives will be considered (investment in companies own buildings, roof rental, co-financing of facilities located in other buildings, cooperative investments, etc.) (2012).
 5. Development of a Guideline for owners to facilitate investments in solar facilities, where different alternatives will be considered (2011).
 6. Feasibility study on the possibilities of establishing “group buys” by industrial and tertiary building owners to obtain lower investment prices in solar equipment (2015).
- Incorporating solar considerations into urban planning documents and guidelines:
 7. (Pilot Action) Solar Urban Planning scenario for a new development area: development of criteria to incorporate solar requirements the local urban planning

- documents of a trial area within the Grand Lyon, with the objective of demonstrating viable planning practices that take into consideration solar energy constraints (2010-2011).
8. Integrating Solar into Urban Planning documents of new development areas: development of urban planning guidelines with solar requirements and modification of Grand Lyon New Housing Guidelines to incorporate mandatory solar targets (2012).
 9. Integrating Solar into Urban Planning documents of rehabilitation areas: development of criteria to incorporate solar requirements.
 10. Training urban planning actors: information and training to urban planners working in the private or public sectors, so that they can appropriate the requirements and constraints of solar planning and integrate them into their daily work (2012-2013).
 11. Compulsory objectives for renewable energies (Greater Lyon referential) for instruction of building permits.
- Encouraging local government investment in solar energies:
 12. Promote local government investments in solar facilities: promotion of existing financial mechanisms and tools to local government, specifically on how to invest and the possibilities of public-private partnerships (2015).
 13. Grand Lyon Solar Plan: development of a Solar Plan for integrating PV and solar thermal installations into buildings owned by Grand Lyon, to demonstrate the importance of solar energies and their place in the Grand Lyon Climate Action Plan (2015).

The following table provides an overview of the priorities and measures in Lyon.

Name and reference of the measure	Type of measure *	Expected result **	Target group ***	Planned activities	Start and end dates of the measure	Responsible party/ department to implement the measure
<i>* Facilitating citizen investments in solar energies</i>						
1. Interactive website with detailed real solar potential for Sainte Blandine district	1 (Pilot Action)	Installed capacity	Investors and end users	Solar potential study Interactive internet map with solar potential for buildings in the Ste Blandine area	July 2010- June 2011	Grand Lyon Direction Générale de Développement Urbain DGDU Manager of housing environment construction and eco-zones of activity
2. Interactive website with estimated solar potential for all buildings in Grand Lyon	1	Installed capacity	Investors and end users	Interactive internet map with estimated solar potential for buildings in the Grand Lyon area	2011	Grand Lyon Direction Générale de Développement Urbain DGDU Project manager of Climate Plan
3. Citizen Jointly owned PV systems	2 (Pilot Action)	Installed capacity	Investors and end users	List of potential sites for citizen jointly owned PV systems in the Grand Lyon Area Two Information session on citizen investment in jointly owned PV systems Four workshops with interested parties Guide to citizen investment in jointly owned PV systems	July 2010 - June 2011	Grand Lyon Direction Générale de Développement Urbain DGDU Manager of housing environment construction and eco-zones of activity
<i>* Facilitating solar investments for businesses</i>						
4. Guideline for businesses to invest in solar facilities	2	Installed capacity	Investors and end users	Guide to different mechanisms for incorporating solar energies in businesses	2012	Grand Lyon Direction Générale de Développement Urbain DGDU Project manager of Climate Plan
5. Business ; a Guide to investing in solar energies	2	Installed capacity	Investors and end users	Guide to different mechanisms for incorporating solar energies in businesses	2012	Grand Lyon Direction Générale de Développement Urbain DGDU Project manager of Climate Plan
6. Group buys	2	Installed capacity	Investors and end users	Report on the feasibility of Group Buys for local building owners and solar	2015	Grand Lyon Direction Générale de Développement

Name and reference of the measure	Type of measure *	Expected result **	Target group ***	Planned activities	Start and end dates of the measure	Responsible party/ department to implement the measure
				investors.		Urbain DGDU Project manager of Climate Plan
<i>* Facilitating solar investments for businesses</i>						
7. Solar planning scenario for a new development area	3 (Pilot Action)	legislative revision	public administration, planners, architects	Incorporate solar requirement in urban planning of a new development area	September 2010 - September 2011	Grand Lyon Direction Générale de Développement Urbain DGDU Manager of housing environment construction and eco-zones of activity
8. Integrating Solar into Urban Planning documents in new development areas	3	legislative revision	public administration, planners, architects	Guideline for incorporating solar constraints in urban planning documents (new development areas) Modified Grand Lyon New Housing Guideline incorporating mandatory solar targets	2012	Grand Lyon Direction Générale de Développement Urbain DGDU Manager of housing environment construction and eco-zones of activity
9. Integrating Solar into Urban Planning documents of rehabilitation areas	3	legislative revision	public administration, planners, architects	Incorporate solar requirement in urban planning of rehabilitation areas		Grand Lyon Direction Générale de Développement Urbain DGDU Manager of housing environment construction and eco-zones of activity
10. Training urban planning actors	2	behavioural change	planners, architects	One training session for actors involved in urban planning	2012-2013	Grand Lyon Direction Générale de Développement Urbain DGDU Manager of housing environment construction and eco-zones of activity
11. Compulsory objectives for	4	legislative revision	investors	referential	2011	Grand Lyon Direction Générale de

Name and reference of the measure	Type of measure *	Expected result **	Target group ***	Planned activities	Start and end dates of the measure	Responsible party/ department to implement the measure
renewable energies (Greater Lyon referential) for instruction of building permits						Développement Urbain DGDU Project manager of Climate Plan
<i>* Encouraging local government investment in solar energies</i>						
12. Promote local government investments	2	Installed capacity	public administration	Guide to investing in solar energies for local authorities	2015	Grand Lyon Direction Générale de Développement Urbain DGDU Project manager of Climate Plan
13. Grand Lyon Solar Plan	4	legislative revision	public administration	Grand Lyon Solar Plan	2015	Grand Lyon Direction Générale de Développement Urbain DGDU Project manager of Climate Plan
<p><i>* Indicate the category of each measure (1-Large-scale identification of solar potential and definition of priorities; 2-Accomplishment of activities to mobilize solar potentials; 3-Development and realization of solar urban planning measures; 4-Development and realization of political or legislative measures).</i></p> <p><i>**Is the expected result behavioural change, installed capacity (MW/year), legislative revision?</i></p> <p><i>***Who are the targeted persons: investors, end users, public administration, planners, architects?</i></p>						

Table 1. Overview of priorities and measures of Lyon solar Action Plan

2.3 Paris

In 2007 the City of Paris voted a plan to combat greenhouse gas emissions generated by various activities in Paris: the Paris Climate Protection Plan. This strong commitment is based on a “factor 4” approach and aims to result in 75% less greenhouse gas emissions from its own activities and those of parisian territory by 2050 compared to 2004. Targets set for Paris in 2020 are more ambitious than EU objectives, namely:

- 25% less greenhouse gas emissions;
- 25% less energy consumption;
- 25% of Paris’s energy consumption to come from renewable energy sources.

Thus the development of renewable energy is a major strand of the Climate Plan of Paris to reduce the carbon footprint of the territory.

To reach these objectives, the City of Paris has launched a major refurbishment plan of the municipal park to reach these objectives, including, the objective of 55 000 refurbished social dwellings, or 25% of the park by 2020. These renovated homes aim for a performance of 80 kWh per square metre of net floor area per year instead of 270 on current average. To achieve this goal the use of renewable energies will be essential and the sun will probably be

the first option considered. The other major objective is the refurbishment of 600 schools by 2016 to reach a reduction of 30% of energy consumption for each building.

It must be pointed out that 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. Instead, he can impose urban rules for constructions (energy efficiency) applicable to projects in which the State is involved (buildings on the sessions of public land or on ZAC —urban development zones—, public housing); private operations are not required to apply those rules. Within the Climate Action Plan, Paris imposes an energy performance of 50 kWh/m².year for new construction and 80 kWh/m².year for important refurbishments (more ambitious than the existing “Effnergie building” limits for very low energy housing: 65 and 104 kWh/m².year respectively). Therefore, to achieve these energy performance levels required by the Climate Plan of Paris, building constructors can make use of renewable energies such as solar.

It is expected that the new National Environment Law adopted in May 2010 will facilitate in the future that municipalities can incorporate solar requirements in local urban planning legal documents.

Several initiatives are ongoing in Paris, related to the Climate Protection Plan and related to urban planning practices and solar energy:

- In relation to the target of 25% of energy consumption across Paris coming from renewables in 2020. This disposition is encouraged to private operators in terms of environmental recommendations annexed to the PLU (Local Urban Planning Plan). Thus this set of recommendations, aimed at players of the construction and management is a binding agreement for projects in which the town takes part, and is an encouragement for private operators.
- In collaboration with the Parisian Architecture Urbanism and Environment council (CAUE), the City of Paris has realised several thematic sheets. One is specific to solar panels, it explains the influence of orientation and slope on performance, urban rules to respect, the principle of landscape integration, and the existing administrative process and financial aids.
- For new social dwellings, projects must use a solar production of hot water with a coverage rate of 30% minimum required, except in cases of major architectural constraints.

The urban regulation documents are currently being amended to facilitate the accomplishment of the commitments of the Climate Protection Plan. For example, the modification of the PLU approved by the City council on 29 and September 30, 2009 indicates that the installation of renewable energies is no more restrained by outlines of buildings, as well as insulating the exterior facades may intrude on the public domain up to 20cm.

Within Paris solar Action Plan the following long-term targets have been defined:

- Detailed assessment of the solar thermal and PV potential of the whole city building stock by 2012, combining the results of ongoing studies about renewable energies potential and feasibility studies regarding solar energy on municipal public and private properties in an interactive map for professionals and citizens.
- Installation of 200 000 m² of solar panels in Paris by 2014 to reduce the Parisian carbon footprint
- Definition of realistic targets for 2020 for solar technologies (solar thermal and photovoltaic) in the whole city area by 2012, based on the feasibility studies about

renewables and specifically solar technologies and the assessment of solar potential of the city building stock.

- Set of requirements for solar energy is integrated in the local Urban Planning Plan by 2013, thus anticipating the opportunity opened by the new Environmental Law.

Main areas of intervention identified to promote the uptake of solar urban planning are: municipal public facilities (3000 municipal buildings), private properties (local housing owners and private housing stock owners), urban renewable areas (ZAC – urban development zones and eco-friendly neighbourhoods) and the social housing park (220 000 flats).

Relevant stakeholders of concern for the implementation of solar energy in connection with urban approaches are:

- Public and private buildings owners;
- Public Works, Urban planning and Social housing Headquarters;
- Politicians;
- Public-private joint ventures dedicated to the renewable energies development (e.g., SEM energies);
- ADEME (French National Agency for Energy savings and Environment);
- ARENE Ile-de-France (Regional Agency for the Environment and New Energies);
- The Caisse des Dépôts group (public group serving general interest and economic development);
- Investors and banks;
- Architects and urban planners.

The Paris solar Action Plan comprises three main stages, diagnosis, mobilization of solar potential and communication, according to a dynamic approach where revisions and annual updates are expected. Several short-term measures have been already identified, including 3 specific priorities to be implemented as “Pilot Actions” within POLIS:

- Identification:
 1. (Pilot Action) Precise identification of solar potential and modelling tool (2010-2012). A modelling tool will be developed to identify the technical solar potential (PV + thermal) of the city’s complete building stock; an interactive internet-based map will be realized with the results, initially for professional stakeholders and later on for all Parisian citizens.
 2. (Pilot Action) Development of a monitoring tool to improve knowledge about the existing solar equipments (PV + thermal) and follow the installation of new ones on territory (2010-2011). The tool will be used by the future Parisian Climate Protection Agency to collect and monitor solar facilities and adapt future actions in favour of solar development.
- Mobilization of solar potential:
 3. (Pilot Action) Setting of requirements in local plans (2010-2012), aiming at removing current barriers for the realisation of solar developments in the city of Paris and identifying possibilities of including solar requirements in urban planning documents.
 4. Urban renewal and restructuring: assessment of existing buildings (for example, warehouses) in order to incorporate solar PV facilities while preserving as much as possible their architectural characteristics.
 5. Creation of a public-private joint venture dedicated to the renewable energies development, SEM énergie, aiming at facilitating the realisation of solar facilities (including cost reductions) and developing “energy services” activities related to

energy efficiency improvements of buildings (energy performance contracts in schools, co-properties, social housing, service sector, etc).

6. Public participation models for PV installations: establishment of a citizens investment fund por private persons willing to generate PV electricity that would buy shares in a collective facility or invest in a fund specifically dedicated to PV.
 7. Development aid for professionals of the solar energy sector in Paris, integrated in the activities carried out by the Paris Development (economic development agency created at the initiative of the City of Paris and the Chamber of Commerce and Industry of Paris) in order to share expertise with companies having implementation projects in Paris and/or holders of innovative projects.
 8. Mobilisation of PV potential on best suited roofs according to the results of previous short-term measures (Precise identification of solar potential of Paris building stock): feasibility studies and implementation plan (2010).
 9. Solar thermal systems for heating swimming pools: feasibility study to assess the possibility of installing solar thermal systems for the 38 existing swimming pools in Paris.
 10. Integration of solar energy in historical districts. Paris has almost 6000 buildings falling under some kind of protection (as monuments or as interesting buildings), as well as "Enhance and Protection Plans" that require the opinion of the National Architects Order for any type of work. Current revision of the applicable regulations for those plans and the development of specific guidelines for historic districts and protected buildings could help erase difficulties in integrating solar facilities in those locations.
 11. Experimentation with innovative roofs combining green elements with solar technologies, demonstrating the compatibility of vegetation and solar facilities.
- Communication:
 12. Implementation of solar campaigns to inform citizens about integration of solar technologies at urban level: building permits, guidelines, eligible solar equipment and installers, available aids, procedures, etc. Also, organisation of awareness-raising events such as conferences, public information evenings or any other type of events on solar energy.

The following table provides an overview of the priorities and measures in Paris.

Name and reference of the measure	Type of measure*	Expected result**	Target group***	Planned activities	Start and end dates of the measure	Responsible party/department to implement the measure
<i>* Identification</i>						
1. Precise identification of solar potential and modelling tool	1 (Pilot Action)	Solar potential (PV or thermal) roof by roof on the city's complete building stock. Solar thermal priorities set for social housing stock	Urban planning, Social Housing & Public works Headquarter Urban Ecology Department, Parisian owners	Development of a modeling tool and interactive web-site map. Study on social housing stock priorities	September 2010 - September 2012	APUR Urban Ecology Department
2. Monitoring tool	1 (Pilot Action)	Collecting and monitoring information about solar facilities.	Municipality headquarters, Future Parisian Climate	Constitution of a work team Identification of existing tools	September 2010 - June 2011	City of Paris Urban planning Headquarter

Name and reference of the measure	Type of measure*	Expected result**	Target group***	Planned activities	Start and end dates of the measure	Responsible party/department to implement the measure
			Protection Agency	Development of a new monitoring tool		
<i>* Mobilization of solar potential</i>						
3. Setting of requirements in local plans	3 (Pilot Action)	Think tank, solar expert group Solar requirements	Architects Planners		End of 2010 - End of 2012	Urban planning Headquarter
4. Urban renewal and restructuring	3	Specific requirements in ZAC	Architects Planners		subject to think about	Urban planning Headquarter
5. Public-private joint venture to settle solar systems and RES	2	Reference renewable energies & energy efficiency operator that facilitates the realisation of projects	Investors (public and private) and end users	Information provision (technological, economical) to investors and building owners. Establishment of partnerships for projects funding and implementation	subject to think about	City of Paris Financial Headquarter Urban planning Headquarter
6. Public participation models (PV)	2	Solar citizen fund	End users		subject to think about	
7. Development aid for solar professionals	2		Professionals of solar sector		subject to think about	
8. Mobilisation of solar potential	2	Implementation of PV systems on best suited roofs (according to the feasibility study on major Parisian roofs)	Parisian major owners	For interesting sites, proposition to the building manager to conduct a feasibility study for installing solar panels (financed by the city). Proposition for a plan of implementation	March 2010 – October 2010	Urban Ecology Department and TECSOL (engineering consulting firm)
9. Solar thermal system for heating swimming pools	2				subject to think about	
10. Integrate solar energy in historic district	2				subject to think about	
11. Experimentation/innovation	2				subject to think about	
<i>* Communication</i>						
12. Urban renewal and restructuring	3	Specific requirements in ZAC	Architects Planners		subject to think about	Urban planning Headquarter

Name and reference of the measure	Type of measure*	Expected result**	Target group***	Planned activities	Start and end dates of the measure	Responsible party/department to implement the measure
<p>* Measures categories: 1-Large-scale identification of solar potential and definition of priorities; 2-Accomplishment of activities to mobilize solar potentials; 3-Development and realization of solar urban planning measures; 4-Development and realization of political or legislative measures.</p> <p>**Is the expected result behavioural change, installed capacity (MW/year), legislative revision?</p> <p>***Who are the targeted persons: investors, end users, public administration, planners, architects?</p>						

Table II. Overview of priorities and measures of Paris solar Action Plan

2.4 Munich

The City of Munich is one of the pioneer German cities in relation to sustainability concepts of energy supply. As owner of the the Munich City Utilities (Stadtwerke München, SWM), it is responsible of relevant initiatives, such as the use of district heating (with about 600 km, Munich has is one of the largest district heating grids in Europe), geothermal energy, production and commercialisation of green electricity (“M-Natur” concept), a subsidy programme on energy saving (“Förderprogramm Energieeinsparung”, FES) and the informal activities of the Munich Construction Center (“Bauzentrum”).

Munich has also proven to be a marketing pioneer in terms of energy-related aspects of building construction, by developing a heating index for private residential buildings back in the 1990s. At present, in addition to the instruments introduced at national level (Energy Certificate according to the German Energy Savings Regulation), the requirements according to the German Renewable Energies Heat Act (“EEWärmeG”) or the certificate issued by the German Society for Sustainable Building Construction (DGNB), Munich has introduced specific requirements for residential buildings in the Munich Quality Standard for Renovation and Building Construction in early 2009, which are linked to the allocation of subsidies by the FES. Another relevant obligation set by the City of Munich is a list of ecological criteria defining the requirements for an allocation of municipal property, including an explicit mention to the objective of building of solar power plants and photovoltaic arrays for power generation from renewable energies. In this sense, the City of Munich supports public participation projects with free usage rights for roofs of public buildings.

In addition to the building requirements for city-owned premises, there are two relevant pillars for solar planning in Munich:

- The project “Solar-powered local heating on Ackermannbogen” (SNAB, 2007), focusing on seasonal storage of the heat collected with solar collectors to supply 319 apartments with heat and hot water.
- Solar optimization of urban land-use planning in the project on Domagkstraße (SolEnOp), where all urban plans in the competition for restructuring the former Funkkaserne were optimized from a solar point of view, after the Department of Urban Planning included a standardized text on a regular solar optimization of all planning areas with 500 or more apartments in the calls for tenders for all integrated urban and landscape planning projects.

Several initiatives are ongoing in the City of Munich, related to the climate protection and promotion of renewables. General long-term targets are the following:

- Continuous – Climate Alliance agreement: 10% CO₂ mitigation every 5 years.
- 2015: Munich Solar Initiative aims to cover 10% of electricity demand through local

power production by photovoltaics (SIM Solar Initiative Munich). After a feasibility study carried out, the limit has been reduced to 3.5%.

- 2015: Stadtwerke München aims to generate electricity by renewable energy systems to supply all private households in Munich (100% RES for Munich).
- 2020: Covenant of Mayors agreement to reduce CO₂ emissions by more than 20% in 2020.
- 2025: Stadtwerke München aims to produce so much green electricity to cover the whole energy demand in Munich (100% RES for Munich)
- 2030: Climate Alliance agreement targets to reduce at least 50% of the total CO₂ emissions in Munich (Munich for Climate Protection).

Within Munich solar Action Plan the following long-term targets have been defined:

- Support and mobilization of a PV potential of 3.5% of Munich's power demand addressed through the "Solar Initiative Munich (SIM)" by 2015.
- Photovoltaics: Increase of the total share of electric power demand in Munich to additional 3.5% in 2030.
- Solar thermal: increase of the total share of heat demand in Munich to 3% in 2030.
- Passive solar energy: Guarantee to reach a high share of passive solar gains (25%) of the overall heating demand in all new areas > 100 units from 2012.

Main areas of intervention identified are: residential areas and areas of diverse use (e.g. re-use of barracks), urban renewal areas, specific quarters (to be identified according to their building structure, energy supply and planning intentions), existing and new commerce and industry areas, areas of infrastructure and new buildings in existing areas.

The solar Action Plan in Munich focuses on the internal planning process and therefore aims at the integration of all relevant municipal stakeholders Relevant stakeholders of concern are:

- Municipal Urban Planning department;
- Other departments: Department of health and environment, Department of labor and economic development, Department of building construction;
- Centre of construction ("Bauzentrum");
- Politicians (local, federal state, national, EU);
- Urbanistic building society;
- Housing developers;
- Private house builders;
- Participants of "SIM" society;
- Architects and planners;
- Investors and banking houses.

The Munich solar Action Plan comprises different approaches: proactive public relation, increase of expertise, planning process, implementation, municipal approval process, subsidy schemes and basic conditions. Several short-term measures have been identified, including 2 specific priorities to be implemented as "Pilot Actions" within POLIS:

- Proactive public relations:
 1. Pro-actively information through different media to public and expert audience about solar energy aspects and potentials (Continuous from 2011).
 2. Competition „München_ganz schön solar - solar planning and building“, with yearly changing focus (building elements, buildings, refurbishment, new buildings, protection of historical monuments) and embedded into the information campaign described in the previous measure (Continuous from 2011).

- Increase of expertise:
 3. Establishment of an internal expert team consisting of relevant staff member of the various (main) departments of Munich municipality in order to improve internal cooperation in relation to solar urban planning (Continuous from 2011).
 4. Improvement of internal knowledge and expertise in Munich municipality through knowledge transfer (individual and IT-based procedures) by means of internal events (workshops), external events and advanced training (Continuous from 2011).

- Planning process:
 5. Integration of Geographic Information Systems (GIS) of energy aspects to provide answers related to urban development and solar urban planning, including eligibility of areas to mobilize the existing solar potential (Continuous).
 6. (Pilot Action) Development of “POLIS Guideline for solar urban planning” to facilitate a criteria based assessment of planning documents and projects: development of indicators and criteria, guideline of activities in development areas (competition and promotional grants), building stock (advancement of refurbishment), catalogue of ecological criteria, urbanistic agreements and grant programmes (2010-2011).
 7. Development of parameters for the use of passive solar energy in new development areas.
 8. Development of instruments & parameters for the use of active solar energy, and analysis of prospects to support active solar energy through permission process.
 9. Development and synopsis of basics. Survey of best practice and Research & Development projects referring to realistic target values to use solar energy in the city.
 10. Revision and new version of the “POLIS Guideline for solar urban planning” with experiences on the POLIS pilot implementation (2012-2013).
 11. Analysis and designation of suitable areas for solar energy in accordance with the targets of the IHPKM (Integrated Action Program Climate Protection).
 12. Integration of solar aspects in the frame of large-scale urban development areas by using solar specific criteria in the early planning phase.

- Implementation:
 13. (Pilot Action) Implementation of “POLIS Guideline for solar urban planning” into a new development area (pilot project “Solar quarter Bayern Kaserne“), so that competitions and planning projects are tendered and assessed accordingly (2011-2012).
 14. Implementation of experiences of the pilot projects and the revised POLIS guideline in the planning process of the new development area: continuous exchange of experiences and control of success, with optimization of the implementation of SOLENOP project.
 15. (Pilot Action, alternative) Implementation of “POLIS Guideline for solar urban planning” into a pilot project within the building stock of the existing area Neuaußing (18 000-20 000 inhabitants) (2011-2012).
 16. Development of strategies and measures of implementation in the building stock based on experiences with the POLIS pilot project and if necessary of other projects: assessment of introducing incentive program, development of technical requirements of (solar) energetic optimization within the urban redevelopment / refurbishment.
 17. Adjustment of urbanistic contracts: adjustment of requirements in urbanistic contracts referring to the (solar) energetic objectives and applications, so that

demand on structural heat insulation including the utilization of solar energy will be regulated in agreements of the city (Continuous from 2010).

- Municipal approval process:
 18. Enforcement of national renewable heat law (EEWärmeG): enforcement through random inspection, enforcement deficiencies referring to EnEV & requirements EEWärmeG will be identified and overcome (Continuous from 2011).
 19. Tendering for property / allocation: ecologic criteria catalog of the City of Munich will be adjusted to legal requirements (EEWärmeG and EEG) (Continuous from 2010).
- Subsidy schemes:
 20. Increase share of solar energy in existing buildings: a realistic target value of the yearly enhancement of supported solar thermal will be evaluated and fixed; the requirement of the “Förderprogramm Energieeinsparung” (FES) will be adjusted to the new conditions (Continuous from 2010).
- Basic conditions
 21. Optimization of framework for the application of solar energy: lobbying to change the processes and the directive of subsidy to achieve the (solar) energetic targets faster.

The next table provides an overview of the measures and priorities for the City of Munich.

Targets	Measure	Target Group	Detailed Activities	Timeframe	Responsible
<i>1. Proactive Public Relation</i>					
Z 1.1 Information of public and expert audience All citizens and stakeholders of the building process are informed through PLAN about solar energy aspects and potentials	1 (M 1.1) Pro-actively information through different media	Public All stakeholders of the construction and planning process	Demonstration of activities of solar town planning (e.g. Thermal, PV, SNAB, SolEnOp, solar potentials, actors in Munich etc.) Internet performance Presentation of good examples Exhibition Press reports Handouts/ Newsletter , ...	PLAN continuous From 2011	Plan-Meeting Support: Operating department
Z 1.2	2 (M 1.2) Competition „München_ganz schön solar - solar planning and building“	Architects Planners Specific target groups	Yearly changing focus: Building element/ Buildings/ Area/ Refurbishment/ new building/ Protection of historical monuments Embedded into a holistic information campaign in accordance with M1.1 Touring exhibition (Expansion to the EMM)	PLAN from 2011 continuous	HA IV LBK Plan Meeting Legwork: Operating department
<i>2. Increase of expertise</i>					
Z 2.1 Improvement of Internal communication/cooperation The cooperation of the different departments with respect to solar urban planning is improved	3 (M 2.1) Build-up internal expert team Establish 'Jour Fixe'	PLAN	Compilation of a team of experts consisting of relevant staff member of the various (main) departments Quarterly „exchange meeting“ Development of input in M 2.2	PLAN continuous From 2011	PLAN
Z 2.2 Improvement of internal knowledge and expertise Municipal staff is aware of solar energy aspects in their field of activity	4 (M 2.2) Exchange of information Individual /personal and IT-based knowledge transfer	Staff member PLAN (Inclusion of RGU and BAU if necessary)	Internal Events <ul style="list-style-type: none"> - Workshops to provide multiplier effects - Workshops on projects and planning practise, legislation (EEWärmeG, EU-GRL...) as well as instruments, applications, ... 	POLIS from 11.2010 PLAN continuous	PLAN in cooperation with architectural association (ByAK) HWK

Targets	Measure	Target Group	Detailed Activities	Timeframe	Responsible
			External events and advanced training „Solar Wikipedia“ (possibly in cooperation with POLIS for all German municipalities)		Bauzentrum ('Centre of building')
<i>3. Planning process</i>					
Z 3.1 <i>Integration of geographic information systems (GIS)</i> The existing data are to be extended by energy aspects to give answers referring to urban development and planning	5 (M 3.1) Identification of demand – existing data to add the data base. Data with regard to the action plan are complemented respectively actualized	PLAN Other departments	Synopsis of area types: District heating, structure- & construction age classes, protection of historical monuments, etc. Eligibility of areas to mobilize solar applications...	POLIS Start 2010 PLAN continouse	PLAN under participation RGU (Environmental Atlas)
Z 3.2 <i>Instruments of solar urban planning process</i> The competence and knowledge was developed within POLIS and the information is available to all persons of concern	6 (M 3.2.1) (Pilot Action 1) Guideline solar urban planning The guideline concentrates instruments, recommendations and solutions from urban planning perspective	PLAN Architects External Planners Specialized experts (Jury) Project developer Housing industry	Recommendation of planning to support solar town planning – Development of indicators and criteria, guideline of activities in <ul style="list-style-type: none"> • Development areas: Competition and promotional grant • Building stock: Advancement of refurbishment • Catalogue of ecological criteria • Urbanistic agreements • Grant programmes 	POLIS 08.2010 – 03.2011	PLAN Ecofys
	7 (M 3.2.1.a) Parameters for the use of passive solar energy in urban development				
	8 (M 3.2.1.b) Instruments & parameters for the use of active solar energy. Identification of possibilities to support permission proceedings				
	9 (M 3.2.1.c)				

Targets	Measure	Target Group	Detailed Activities	Timeframe	Responsible
	Development and synopsis of basics. Survey of best practice and R&D referring to realistic target values to use solar energy in the city				
	10 (M 3.2.2) Revised version of the guideline based on experiences of the POLIS pilot implementation		2012-13		
Z 3.3 <i>Overview potential in focus areas Urbanistic basics are generated for an energy guideline for Munich.</i>	11 (M 3.3.1) Analysis and extradition of suitable areas for solar energy in accordance with the targets of the IHPKM (Integrated Action Program Climate Protection)	PLAN City administration Politics Municipal energy supplier	Determination of target of the analysis Interpretation of results First step: Analysis in selected (sub)areas	PLAN continuous	PLAN In accordance with RGU
	12 (M 3.3.2) Integration of solar aspects in the frame of large-scale urban development areas by using solar specific criteria in the early planning phase	PLAN City administration Politics Municipal energy supplier	Use of criteria and indicators of the POLIS Solar guideline for the development of exemplary settlement strategies in the frame of long-term structural planning	PLAN continuous	PLAN
<i>4. Implementation</i>					
Z 4.1 <i>New development areas: Realization of land-saving and energy adequate buildings and urban structures</i> Competitions and planning projects are tendered and assessed accordingly	13 (M 4.1.1) (Pilot Action 2a) Implementation of POLIS guideline into a new development area (pilot project "Solar quarter Bayern Kaserne")	City council Architects Planner Investors Publicity	Implementation test in new development areas	POLIS 01.2011- 07.2012	PLAN Ecofys
	14 (M 4.1.2) Implementation of experiences of the pilot projects and the revised POLIS guideline in the planning	Staff member PLAN External planners Specialized experts	Continuous exchange of experiences and control of success Optimization of the implementation of SOLENOP	PLAN continuous	PLAN

Targets	Measure	Target Group	Detailed Activities	Timeframe	Responsible
	process of the new development area.	(Jury)			
Z 4.2 <i>Existing areas: Optimization of existing urban structures</i> The potential and possible barriers of (solar)energetic redevelopment in the building stock are well-known. Long term targets of change in the building stock are energetically optimized. Measures of refurbishment are initiated.	15 (M 4.2.1) (Alternative: Pilot Action 2b) Implementation of POLIS guideline into a pilot project within the building stock	City council Architects Planner Investors Publicity	The solar pilot project is realized. An implementation in Neuauubing is proved. Identification of chances, options and amenity of the utilization of solar energy within the framework of refurbishment of historical building.	Preperation POLIS 01.2011 07.2012	PLAN Ecofys
	16 (M 4.2.2.) Development of strategies and measures of implementation in the building stock based on experiences with the POLIS pilot project and if necessary of other projects	PLAN External planners	Development on selected area types. Examination of introducing incentive program / Development of technical requirements of (solar)energetic optimization within the urban redevelopment / refurbishment	PLAN	PLAN SWM GmbH
Z 4.3 <i>Adjustment of urbanistic contracts</i> <i>The requirements for urbanistic contracts are revised.</i> In all urbanistic contracts (solar)energetic requirements are defined.	17 (M 4.3) Adjustment of requirements in urbanistic contracts referring to the (solar) energetic objectives and applications.	PLAN Private owners Project developer Investors Housing industry Supreme Building Authority	Demand on constructural heat insulation including the utilization of solar energy will be regulated in agreements of the city	Preperation POLIS 09.2010 – 12.2011 → Guideline Application PLAN continuous	PLAN (Ecofys)
<i>5. Municipal approval process</i>					
Z 5.1 <i>Enforcement of national renewable heat law (EEWärmeG)</i> The requirements of the renewable heat law are internalized (LBK)	18 (M 5.1) Enforcement through random inspection Enforcement deficiencies referring to EnEV & requirements	Private owners Project developer Investors Housing industry Supreme Building	LBK will be resourced for the requirements. Conceivable requirements on buildings activities will be pro actively communicated.	PLAN From 01.11 continuous	PLAN HA IV

Targets	Measure	Target Group	Detailed Activities	Timeframe	Responsible
	EEWärmeG will be identified and overcome	Authority	Solar aspect will be supported		
Z 5.2 <i>Tendering for property / allocation</i> Ecologic criteria catalog of the City of Munich is adjusted to legal requirements (EEWärmeG and EEG)	19 (M 5.2) Based on legal regulations site-specific requirements to the constructional heat insulation in combination with the utilization of solar energy are fixed.	Property vendee Private owners Project developers Housing industry	Updating the ecologic criteria catalog. Development of a supplement to cost effectiveness of measures of energy saving in building / the utilization of renewable energy sources	Preperation POLIS 09.2010 – 03.2011 ➤Guideline PLAN continuous	PLAN HA III PLAN HA I Ecofys
<i>6. Subsidy Schemes</i>					
Z 6.1 <i>Increase share of solar energy in existing buildings</i> The share of solar thermal is increased to a yearly amount of x%.	20 (M 6.1) A realistic target value of the yearly enhancement of supported solar thermal will be evaluated and fixed. The requirement of the “Förderprogramm Energieeinsparung” (FES) is adjusted to the new conditions. Examination of the application of technology of solar accumulator.	Private owner Investors Housing industry	Proposal for grants for building refurbishment (exchange of heating system) are only accepted, if a legal portion of solar technics is integrated. Verifications before start of construction and after accomplishment have to be presented to PLAN HA III within the deadline of minimum 5 years.	POLIS 09.2010 – 04.2011 ➤Guideline PLAN continuous In accordance to RGU	FES: RGU PLAN HA III
<i>7. Basic conditions</i>					
Z 7.2 <i>Optimized framework for the application of solar energy</i> Processes and the directive of subsidy and will be adjusted to achieve the (solar) energetic targets faster.	21 (M 7.2) Lobbying to change processes and the directive of subsidy through direct and indirect (German Conference of Cities) statement and conversation	(urban) community Federal Government Free State of Bavaria		PLAN	PLAN
Note: PLAN: Department of Urban Planning and Building Regulation; RGU: Department of health and environment; SWM: Munich Solar Initiative					

Table III. Overview of priorities and measures of Munich solar Action Plan

2.5 Lisbon

Following the context of European Directives 2009/28/CE and 2006/32/EC on energy end-use energy efficiency and energy services, in 2008 Portugal adopted the National Action Plan for Energy Efficiency (PNAEE), which defines at the level of the various sectors the measures and programmes to implement in order to achieve by 2015 an improvement on energy efficiency equivalent to 10% of final energy consumption. The programmes are set in various areas of activity, with the renewable energy sectors being addressed by the Program “Renewable on time”, which includes two measures, “Micro-production” (small-scale systems to be installed in residential systems) and “Solar Thermal” measures.

The City of Lisbon approved in December 2008 the Energy-Environment Strategy for Lisbon, setting targets for energy consumption reduction at the Municipality and the complete city level of 8.9% and 9.4% respectively, by the year 2013 (based on 2002 consumption levels). Focusing on this same baseline, the City of Lisbon also undertook the Covenant of Mayors compromise to reduce CO₂ emissions over 20% by 2020. The current local energy policies already focus the dimension of energy efficiency and renewable energies, especially at the micro-production level.

At the level of municipal regulations for building and urbanization the Lisbon Municipality has already narrowed more demanding requirements that, in compliance with current legislation in force³, promote a more efficient adoption of renewables. The Municipal Regulation of Urbanization and Construction of Lisbon (RMUEL) already requires the architectural integration of solar thermal collectors and, among others, demands the installation of a centralized solar thermal system for hot water supply in new buildings. RMUEL also defines incentives to foster innovative building projects using renewables (for example, reduction of urban taxes). In the City of Lisbon, the current focus of public policies now aims at urban requalification and building refurbishment, bringing together the best practices and adoption of new technologies with the built heritage.

For the city of Lisbon, an initial assessment has been done out to extrapolate national PNAEE targets for micro-production and solar thermal systems on residential buildings, giving a total amount of 2 MWp and 13,600 m² for PV and solar thermal technologies, respectively. 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. Therefore, a detailed study to quantify the urban solar potential of the city is considered of highest priority within the Action Plan. The adoption of public policies for the integration of solar urban planning guidance will derive also from the results of the assessment carried out at the local level.

Within the Lisbon Action Plan, the focus areas will be new developments, existing living developments and urban renewal areas. The implementation of the Solar Action Plan relies on the involvement of various relevant stakeholders at local level:

- Political stakeholders at the municipality level;
- Municipal technicians;
- Professionals from the fields of engineering, architecture and urban planning;
- Builders;
- Associations and housing cooperatives;
- Associations of the solar industry; and

³ Particularly with regard to the mandatory installation of solar thermal panels defined in Thermal Performance Building Regulation.

- The general public.

Main areas of intervention identified to address in promoting the uptake of solar urban planning are:

- Evaluation of the solar energy potential in the City of Lisbon and provision of information about the solar potential of Lisbon to the public.
- Setting targets for the adoption of solar technologies based on the potential identified at the level of the building stock.
- Consideration of guidelines for the development of practical solar urban planning at the review of the Municipal Plan and the Regulation Municipal Urbanization and Construction of Lisbon.
- Contextualizing the policy framework for the adoption of solar technologies in the municipal strategy for the upgrading and rehabilitating of the city's building stock.
- Identification of urban plans for the application of the guidelines, with the consequent revision of urban design in order to maximize the adoption of solar technologies.
- Identify the solar potential of the Lisbon Municipality's built heritage at the level of service buildings and buildings of municipal housing.
- Promote the training of professionals in the fields of urban planning, engineering and architecture on the concepts of passive and active solar technologies.

Within the Action Plan, 5 priorities have been defined and identified as "Pilot Actions", to be developed within POLIS project:

1. (Pilot Action) Evaluation of solar potential in Lisbon at the parish level, focusing on the local framework regarding housing refurbishment and providing the results obtained to the general public (2010-2011).
2. (Pilot Action) Definition of realistic targets for solar technologies adoption (thermal and photovoltaic) in the medium and short term for the city of Lisbon and for Lisbon Municipality (2011).
3. (Pilot Action) Evaluation of the potential to integrate solar technologies in the Neighbourhood Boavista Urban Plan, identifying opportunities for redefining the urban design in order to maximize the plan's potential for adopting solar technologies (2010-2012).
4. (Pilot Action) Identification of the solar potential of the built heritage of the Lisbon Municipality at the level of the service buildings supplied with medium voltage (2011).
5. (Pilot Action) Training workshops for professionals (planners, engineers and architects) on solar technologies and solar concepts of urban planning, focusing on municipal technicians of the Urban Planning Department, the Urban Management Department and the Projects and Works Department (2011-2012).

The following table provides an overview of the priorities and measures in Lisbon.

Name and reference of the measure	Type of measure*	Expected result**	Target group***	Planned activities	Start and end dates of the measure	Responsible party/department to implement the measure
1. Evaluation of solar potential in Lisbon at parish level	1 (Pilot Action)	Mapping Lisbon's solar potential	Politian's, Technicians and wide public	Assessment of Lisbon's solar potential at the parish level	October 2010 – March 2011	Wee Solutions supported by Lisboa E-Nova
2. Definition of goals for solar technologies adoption	2 (Pilot Action)	Lisbon's built patrimony technical capacity to	Politian's, Real State Promoters, Technicians	Definition of targets for the adoption of solar technologies	April 2011	Lisbon Municipality with the support of Lisboa E-Nova and Wee Solutions

Name and reference of the measure	Type of measure*	Expected result**	Target group***	Planned activities	Start and end dates of the measure	Responsible party/department to implement the measure
(thermal & photovoltaic)		install solar technologies	and wide public			
3. Evaluation of potential to integrate solar technologies in <i>Boavista</i> neighbourhood	2 & 3 (Pilot Action)	Evaluation and optimization of the urban design for the <i>Boavista</i> Neighbourhood	Politian's and technicians from the Lisbon Municipality	Evaluation of the <i>Boavista</i> Neighbourhood solar potential and integration of the solar urban design guidelines in the urban layout optimization	From June 2010 until the end of the project	Wee Solutions supported by the Lisbon Municipality and Lisboa E-Nova
4. Identify the solar potential of Lisbon municipality built heritage – Service buildings with medium voltage electricity supply	1 (Pilot Action)	Assessment of the solar potential of built heritage of the Lisbon Municipality at the level of the service buildings supplied with medium voltage	Politian's and technicians from the Lisbon Municipality	Evaluation of the potential to install solar technologies in the Lisbon Municipality services buildings supplied with medium voltage. Detail to the level of the technology, installed capacity, productivity, expected investment and pay back period.	September-December 2011	Wee Solutions supported by the Lisbon Municipality and Lisboa E-Nova
5. Training workshops for professionals on solar technologies and solar concepts of urban planning	2 (Pilot Action)	Knowledge and competence acquisition on solar technologies	Lisbon Municipality Technicians, in the areas architecture, engineering and urban planning	Organization of two workshops on solar technologies (active and passive) and urban planning guidelines	October 2011 May 2012	Lisboa E-Nova with the support of Wee Solutions
<p>* Measures categories: 1-Large-scale identification of solar potential and definition of priorities; 2-Accomplishment of activities to mobilize solar potentials; 3-Development and realization of solar urban planning measures; 4-Development and realization of political or legislative measures.</p> <p>**Is the expected result behavioural change, installed capacity (MW/year), legislative revision?</p> <p>***Who are the targeted persons: investors, end users, public administration, planners, architects?</p>						

Table IV. Overview of priorities and measures of Lisbon solar Action Plan

2.6 Malmö

In June 2006, the Swedish Parliament set the target that specific energy use in residential buildings and commercial premises should be reduced by one fifth by 2020, further reducing to half of present day levels by 2050. In addition, by 2020, the dependence of the built environment on fossil fuels for energy supplies should be broken.

The City of Malmö aims to be a world-leading climate city. Broad-based efforts to achieve such objective have been already identified covering traffic, energy and city planning, and also consumption, education and lifestyles. Several initiatives have been approved (2009) by the City Council of Malmö to contribute to the previous objectives:

- The “Energy Strategy”, which establishes switching to renewable energy sources as an important strategy for decreasing the environmental impact and securing a future energy provision (with solar energy being one of the solutions considered for electricity and heat production).
The long-term vision (2030) for Malmö is to rely only on renewable energy sources and to have an effective and safe energy use that contributes to the long-term sustainability of the city. In order to take important steps towards this vision, by the year 2020 the energy use should have decreased by at least 20 % per capita compared to the average annual use during the period of 2001 to 2005, with a share of renewable energies of at least 50 % of the total energy use. For Malmö municipality’s own operation, more ambitious goals have been set as a part of the public sector’s strive to serve as a role model and positive example to others: the energy use in the municipality’s departments and companies should during the same period have decreased by 30 % and consist of 100 % renewable energy.
- The “Environmental Program (2009-2020)”, which connects to the same renewable energy targets set in the Energy Strategy. In addition, the program has a target that by 2020, Malmö should be the world leader when it comes to sustainable urban development. Solar energy, wind power, hydropower and biogas will be phased in, and fossil fuels will be phased out.

In addition, the guideline “Environmental Building Program South” has been developed, which establishes a more restrictive maximum energy demand than the in the actual Swedish building regulation BBR (85 kWh/m².year). This document aims to be a guideline to support sustainable development and is being developed by cooperation between municipalities and construction companies (so far it is only mandatory for developers building on city-owned land within Malmö and Lund, the goal for the city is to encourage that the programme should be used also at non-city owned land).

Within Malmö solar Action Plan the following long-term targets have been set :

- Identification of measurable targets for active solar systems (PV and solar thermal) for the whole city area in 2012 for new and existing buildings.
- Introduction of solar energy requirements in the urban planning process in 2012 by using the new Environmental Program, Energy Strategy and Environmental Building Program South.
- Exploitation and purchase agreements are developed with respect to solar energy requirements and are used in special areas from 2011.

Main areas of intervention identified to promote the uptake of solar urban planning are new and existing areas in order to have an important impact on the number of installed solar energy plants in Malmö. Solar energy requirements need to be introduced early in the planning processes of these areas.

Relevant stakeholders of concern for the implementation of solar energy in connection with urban approaches are construction companies, municipal departments (including architects, planners and municipal building department), politicians and small as well as large scale private property owners.

In the short-term, 8 measures have been identified, 3 of which will be implemented as “Pilot Actions” within POLIS project:

1. (Pilot Action) Setting solar energy requirements in the Local Urban Plan of Sege Park area (2010-2012).
2. (Pilot Action) Development of solar energy requirements in exploitation and purchase

- agreements for developers building on city-owned land (2011-2012).
3. (Pilot Action) Development of a methodology to identify the realistic solar potential of urban areas, and application to the Sege Park area (2010-2011).
 4. Training in solar energy and city planning for architects and city planners, from basic knowledge about solar energy technologies to the possibilities of using local plans and strategic tools to improve the number of solar energy installations (2011-2012).
 5. Development of guidelines to support solar energy planning that will be integrated in the new Energy Strategy and connected to the Environmental program and Environmental Building Program South (2010-2011).
 6. Assessment of the realistic potential of other areas of the city of Malmö (2011-2012).
 7. New PV and solar thermal installations on public buildings, so that the City of Malmö will continue as a role model for other stakeholders in the use of solar energy (2009-2012).
 8. Dissemination activities (meetings, seminars and workshops) by Skåne Energy Agency about solar energy and planning within the whole region for urban planning departments, environment departments, real estate offices, other municipal departments, together with politicians, investors, and large property and utilities owners (2009-2012).

The following table provides an overview of the priorities and measures.

Name and reference of the measure	Type of measure*	Expected result**	Target group***	Planned activities	Start and end dates of the measure	Responsible party/department to implement the measure
1. Urban planning in Sege Park	3 (Pilot action)	Increased installed capacity + Legislative revision	Planners, architects and investors	Setting of requirements regarding solar energy in the local plan of Sege Park.	January 2010 – January 2012	Urban Planning department.
2. Solar Energy Requirements in exploitation and purchase agreements	4 (Pilot Action)	Increased installed capacity + Legislative revision	Planners, architects, politicians, investors, end users	Training/workshops for planners and architects, connection of solar targets to the new Environmental Building Program South.	January 2011 – July 2012	Urban Planning department.
3. Potential Study in Sege Park	1 (Pilot Action)	Increased installed capacity	Planners, architects, investors, end users	Study conducted by Lund University.	January 2010– December 2011	Lund University
4. Training for architects and city planners	2	Behavioural change, Increased installed capacity, legislative revision	Planners, architects, politicians	Training/workshops for target group with external expert and/or exchange of experiences from other POLIS partners.	September 2011 – July 2012	Skåne Energy Agency
5. Development of guidelines	2	Behavioural change, Increased installed capacity, legislative	Planners, architects, politicians, investors	Using external expert and/or exchange of experiences from other POLIS partners.	September 2010 – September 2011	Skåne Energy Agency

Name and reference of the measure	Type of measure*	Expected result**	Target group***	Planned activities	Start and end dates of the measure	Responsible party/department to implement the measure
		revision				
6. General Solar potential studies in Malmö	2	Increased installed capacity + Legislative revision	Planners, architects, politicians, investors, end users	Study conducted by Lund University or external expert.	January 2011 – July 2012.	Urban Planning department.
7. Continuous PV and solar thermal installations on public buildings.	3	Increased installed capacity	Planners, architects, politicians, investors, end users	Investments.	June 2009 – July 2012	Department of Internal Services.
8. Dissemination	2	Behavioral change, Increased installed capacity.	Planners, architects, politicians, investors, end users etc. in other municipalities within the Skåne region.	Meetings, seminars and workshops.	May 2009 – July 2012	Skåne Energy Agency
<p>* Measures category: 1-Large-scale identification of solar potential and definition of priorities; 2-Accomplishment of activities to mobilize solar potentials; 3-Development and realization of solar urban planning measures; 4-Development and realization of political or legislative measures.</p> <p>**Is the expected result behavioural change, installed capacity (MW/year), legislative revision?</p> <p>***Who are the targeted persons: investors, end users, public administration, planners, architects?</p>						

Table V. Overview of priorities and measures of Malmö solar Action Plan

2.7 Vitoria-Gasteiz

In Spain the National Action Plan for Renewable Energies 2011-2020 that will comply with the EU Directive 2009/28/CE is under development. However, present estimations of the Spanish Government about RES contribution to final net energy consumption will amount to 22.7% in 2020 (exceeding the national target established at 20%) and 42.7% for RES contribution to electricity generation in the same year. The objectives of the existing National Plan for Renewable Energies 2005-2010 have been already met in relation to PV technology but for solar thermal systems estimations indicate that 49% of the target will be achieved by the end of 2010.

The City of Vitoria-Gasteiz has signed several commitments related to energy and sustainability, such as the Aalborg Charter (1995), Local Agenda 21 (1998), Aalborg+10 Charter (2004). In 2007 it approved the Local Energy Plan 2007-2012, setting targets for energy consumption reduction of 9% (compared to 2004). In addition, due to the signing of the “Covenant of Mayors” document in 2009, Vitoria-Gasteiz has to adapt its targets to the new commitment of going beyond the 20% CO₂ emission reduction and the promotion of renewable energy. 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 CO₂ emission and promote renewable energies. The existing draft of the “Fight against Climate Change Plan” already

establishes the following targets: 70,000 m² of solar thermal, 10 MWp of solar PV, 9% on energy savings and 24.5% of CO₂ emission reduction by 2020. As it was the case with Lisbon, a detailed study to quantify the urban solar potential is considered of highest priority within the Action Plan in order to identify the realistic possibilities of solar energy use in Vitoria-Gasteiz.

The main criterion for the integration of solar energy in urban planning is the national Technical Building Code (Código Técnico de la Edificación-CTE), mandatory since 2006, with specific requirements for active solar technologies. At local level, there are 2 instruments that establish further requirements on solar energy: the Urban Master Plan (PGOU, “Plan General de Ordenación Urbana”) for passive solar and the Administrative Statement by Ensanche 21 (21 (Social building Agency linked to City Council) for active solar systems in social buildings.

Within the Vitoria-Gasteiz solar Action Plan the following long-term targets have been set :

- Identification of the realistic solar potential at municipal level by 2012.
- Integration of solar requirements in the Urban Master Plan and Energetic Ordinance by 2015.
- Mobilization of 10% of the assessed solar potential in the existing industrial area of the city by 2015.

Main focus areas of the Action Plan will be existing and new developments in Lakua District (376 Has. of surface, mainly residential use) and the industrial area of Jundiz (710 Has.). The most important stakeholders for the implementation of the Action Plan are the City council and its different departments.

In order to support the integration of solar energy at urban level in Vitoria-Gasteiz as well as contribute to the CO₂ emissions reduction and renewable energies promotion targets, 5 short-term measures have been indentified, 3 of which will be implemented as “Pilot Actions” within POLIS project:

1. (Pilot Action) Development of a methodology for the assessment of the realistic solar potential of urban areas, and application to the district of Lakua (2009-2010).
2. (Pilot Action) Assessment of the realistic solar potential of the industrial area of Jundiz (2010-2011).
3. (Pilot Action) Assessment of the realistic solar potential of the complete city of Vitoria-Gasteiz (2011).
4. Development of a Planning guideline for passive and active PV solar energy to be included in the city Urban Master Plan (2012-2013).
5. Mobilisation of the solar potential identified in Jundiz industrial area (2012-2013).

The following table provides an overview of the priorities and measures.

Name and reference of the measure	Type of measure*	Expected result**	Target group***	Planned activities	Start and end dates of the measure	Responsible party/department to implement the measure
1. Methodology and Assessment of the Detailed Solar Potential of Lakua district	1 (Pilot Action)	Methodology for the identification of the solar potential in Vitoria-Gasteiz. Detailed	Department of Urban Planning, Department of Environment and Sustainability	Analysis of the local climate and morphological characteristics of the city. Elaboration of a Solar masterplan for Lakua	October 2009 to October 2010	Department of Environment and Sustainability. Universidad Politécnica de Madrid (technical partner)

Name and reference of the measure	Type of measure*	Expected result**	Target group***	Planned activities	Start and end dates of the measure	Responsible party/department to implement the measure
		knowledge about solar potential in Lakua district		district and recommendations for strategic mobilisation measures		
2. Assessment of the Detailed Solar Potential of Jundiz industrial area	1 (Pilot Action)	Detailed knowledge about solar potential in Jundiz industrial area	Department of Urban Planning, Department of Environment and Sustainability	Elaboration of a Solar masterplan and recommendations for strategic mobilisation measures	January 2010 to December 2010	Department of Environment and Sustainability. Universidad Politécnica de Madrid (technical partner)
3. Assessment of the General Solar Potential of the city of Vitoria-Gasteiz	1	Knowledge about the solar potential of the complete city	Department of Urban Planning, Department of Environment and Sustainability	Elaboration of a Solar masterplan and recommendations for strategic mobilisation measures	January 2011 to December 2011	Department of Environment and Sustainability. Universidad Politécnica de Madrid (technical partner)
4. Planning guideline for bioclimatic and active solar PV technology	3	Integrate solar energy in urban planning	Department of Urban Planning. Department of Environment and Sustainability	Form a Solar Energy Expert group to design efficient and realistic urban planning integrating solar energy. Later on, this design will need to be incorporated to city master plan and approved by political parties.	January 2012 to December 2013	Departments of Environment and Sustainability and Urban Planning. Universidad Politécnica de Madrid (technical partner). Solar Energy Experts Group.
5. Mobilisation of PV potential in Jundiz Industrial Area	2 & 3	Promote solar energy in industries	Department of Urban Planning. Department of Environment and Sustainability. Private investors	Form a Solar Energy Expert group to design efficient and realistic urban planning integrating solar energy. Find joint ventures with industries, private investors and the city council to promote a solar PV market on industrial roofs.	June 2012 to May 2013	Department of Environment and Sustainability. Department of Urban Planning. Solar Energy Experts Group.

* Measures categories: 1-Large-scale identification of solar potential and definition of priorities; 2-Accomplishment of activities to mobilize solar potentials; 3-Development and realization of solar urban planning measures; 4-Development and realization of political or legislative measures.
 **Is the expected result behavioural change, installed capacity (MW/year), legislative revision?
 ***Who are the targeted persons: investors, end users, public administration, planners, architects?

Table VI. Overview of priorities and measures of Vitoria-Gasteiz solar Action Plan

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 CO₂ mitigation targets in solar Action Plans embedded 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 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 creation and evaluation of possible measures in diverse planning areas connected to general renewable energy targets

In this report a compilation of the solar Action Plans developed in POLIS participating cities has been presented. Within these Action Plans, developed by Local Working Groups composed by municipalities and technical partners of POLIS project, main areas of interest (focus areas) have been identified, as well as 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. Overall, 61 short-term measures have been defined, of which almost 1/3 (19 measures) have been identified as priority “Pilot Actions” that will be developed within POLIS duration. These Pilot Actions cover the 4 categories defined within POLIS:

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, introduction of a solar ordinance for new or existing buildings).

All solar Action Plans have been validated by the corresponding municipal authorities.

ANNEX I – SOLAR ACTION PLANS TEMPLATE

SOLAR ACTION PLAN – CITY OF [INDICATE]

Municipality department(s) involved: address, internet link and contact person(s)	
Municipal validation: date and person responsible	
Timeframe:	

Rationale:

The IPCC Report proves the existence of climate change and the influence of mankind to this subject. Therefore countries, regions and also cities are asked to develop strategies to fight global warming.

European leaders signed up to a binding EU-wide target to source 20% of their energy needs from renewable energies, including biomass, hydro, wind and solar power, by 2020. To meet this target, EU leaders agreed a new directive on promoting renewable energies, which set individual targets for each member state.

Directive 2009/28/ EC requires each Member State to adopt a national renewable energy action plan. These plans are to set out Member States' national targets for the share of energy from renewable sources consumed in transport, electricity and heating and cooling in 2020, taking into account the effects of other policy measures relating to energy efficiency on final consumption of energy, and adequate measures to be taken to achieve those national overall targets, including cooperation between local, regional and national authorities.

Many municipalities have agreed to fixe CO₂ mitigation targets until 2020 or 2050 voluntarily. For instance the Covenant of Mayors is a commitment by towns and cities to go beyond the objectives of EU energy policy in terms of reduction in CO₂ emissions through enhanced energy efficiency and cleaner energy production and use.

Hence, the intention of this solar action plan is to steer the future development of solar energy with respect to urban planning by:

- Assessment of existing climate strategies and targets (city level)
- Evaluation of solar potential in the city area
- Development of solar targets
- Creation and evaluation of possible measures in diverse planning areas
- Connection to general renewable energy targets

Solar Action Plan

This Action Plan is developed within the scope of POLIS in cooperation with the local urban planning department to create a strategy adapted to the specific situation in the City of [...].

Local Background:

Assessment and analysis of the current conditions for solar energy and the urban planning process in the respective city: building structure, energy supply structure, existing targets, existing solar actions and measures, urban planning practice (regarding solar), solar potential (PV, solar thermal).

Targets:

Long term targets of the Solar Action plan on city or quarter level, in terms of (examples): percentage of solar power and heat, changes in urban planning process, installation of solar expert team, amount of systems per city, amount of investments in solar, large-scale solar policy scheme, etc.

Focus areas:

Main areas of special interest and further actions, for example: new areas, existing living areas, existing industry areas, areas of trade and service, urban waste land, urban renewal areas, etc.

Target groups:

Relevant stakeholders of concern for the implementation of solar energy in connection with urban approaches, for example: private building owners, housing industry, municipal building department, architects and planners, investors, banks, politicians, etc.

Measures:

Relevant measures to support the upgrade of solar energy and reach the respective solar/CO₂ mitigation targets, for example: upgrade PV in industry areas, implementation of solar campaigns, settlement development (solar quarters), public participation models (PV), urban renewal and restructuring, reward of solar competitions, generation of solar subsidy scheme, setting of requirements in local plans, introducing solar ordinances, generation of pilot projects, etc.

Overview of priorities and measures to promote the use of solar energy in the City of [...]

Name and reference of the measure	Type of measure*	Expected result**	Target group***	Planned activities	Start and end dates of the measure	Responsible party/department to implement the measure
1.						
2.						
3.						

* Indicate the category of each measure (1-Large-scale identification of solar potential and definition of priorities; 2-Accomplishment of activities to mobilize solar potentials; 3-Development and realization of solar urban planning measures; 4-Development and realization of political or legislative measures).

**Is the expected result behavioural change, installed capacity (MW/year), legislative revision?

***Who are the targeted persons: investors, end users, public administration, planners, architects?