

Identification and mobilization of solar potentials via local strategies

IEE/08/603/SI2.529237

Work Package 4 Deliverable no 10

**Review of one of Pilot Action per city
29 August 2012**

Lisbon Lyon Malmö Munich Paris Vitoria-Gasteiz

Version: 2

Date: 2012-08-29

Elisabeth Kjellsson, WP4-leader

CONTENT

	Page
1. List of reviewed pilot actions and reviewers	3
2. Summary of all pilot actions	4
3. Lisbon PA 1	5
• Summary, own review, partner reviews	
4. Lyon PA 3	10
• Summary, own review, partner reviews	
5. Malmö PA 2	19
• Summary, own review, partner reviews	
6. Munich PA 1	29
• Summary, own review, partner reviews	
7. Paris PA 1	38
• Summary, own review, partner reviews	
8. Vitoria-Gasteiz PA3	42
• Summary, own review, partner reviews	

Reviewed Pilot Actions:

Pilot actions and names of the partner reviewers

Cities, Pilot Actions	Reviewers
Lisbon	
1. Evaluation of solar potential in Lisbon	Solar Region Skåne Hespul
Lyon	
3. Solar planning scenario for a new development area	Lisboa E-Nova City of Paris
Malmö	
2. Solar energy requirements in municipal land allocation agreements and purchase agreements.	Lisboa E-Nova Ecofys
Munich	
1. Development of a POLIS “Solar Guideline for Urban Planning”	ALE-Lyon City of Vitoria-Gasteiz
Paris	
1. Large scale identification of solar potential and definition of priorities	Lund University UPM Madrid
Vitoria-Gasteiz	
3. Assessment of the general Solar potential of the city of Vitoria-Gasteiz	Paris APUR City of Munich

List of all Pilot Actions


Cities, Pilot Actions	Categories				Reviewed
	1	2	3	4	
Lisbon					
1. Evaluation of solar potential in Lisbon	1				X
2. Definition of goals for solar technologies adoption (thermal & photovoltaic)		2	3		
3. Evaluation of potential to integrate solar technologies in Boavista neighbourhood		2	3		
4. Identification of the solar potential of Lisbon municipality built heritage – Service buildings with medium voltage electricity supply	1				
5. Training workshops for professionals on solar technologies and solar concepts of urban planning		2			
Lyon					
1. Interactive website with detailed real solar potential for Sainte Blandine district	1				
2. Citizen jointly owned PV system at Lyon		2			
3. Solar planning scenario for a new development area			3		X
Malmö					
1. Urban planning in Sege Park			3		
2. Solar energy requirements in municipal land allocation agreements and purchase agreements.				4	X
3. Potential Study in Sege Park	1				
Munich					
1. Development of a POLIS “Solar Guideline for Urban Planning”		2			X
2. Implementation of POLIS “Solar Guideline for Urban planning” findings within a new development area			3		
Paris					
1. Large scale identification of solar potential and definition priorities	1				X
2. Monitoring tool		2			
3. Setting of requirements in local plans			3		
Vitoria-Gasteiz					
1. Methodology and Assessment of the detailed Solar potential of Lakua district	1				
2. Assessment of the detailed Solar potential of Jundiz industrial area	1				
3. Assessment of the general Solar potential of the city of Vitoria-Gasteiz	1				X

Pilot Actions categories:

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

Lisbon Pilot Action 1 Summary

Name of Pilot action and category:	Evaluation of solar potential in Lisbon
City	Lisbon
Summary of the pilot action (short intro)	<p>Lisbon is Europe's sunniest capital. In order to take advantage of this resource it's essential to determine the existing potential at the urban level, namely in existing building covers. Using an aerial photogrammetric flight with a 30 cm resolution and data on the city's cadastre, (more exactly blocks and buildings vector information which allows extracting data solely for the buildings in the analysis area) it was possible to adopt the LIDAR - Light Detection And Ranging methodology to build a local Digital Surface Model. With this model it is possible to identify each roof's slope, compass orientation, shadowing effects from adjacent buildings and/or architectural obstacles and combine it with data diffuse and reflected irradiation, in order to assess each building's solar irradiation. The output for this work is presented in kWh/sqm, data upon which solar systems expected productivity can easily be assessed in order to have a first measure of estimated productivity per roof.</p> <p>Points for improvement:</p> <ul style="list-style-type: none"> - Inability to associate areas per building, nor differentiate according to the classified potential; - non-consideration of the building's structure and effective capacity to support the solar systems.
Background	<p>Lisbon's richness in terms of solar availability needs to be explored and properly evaluated in order to optimize investments and prompt the market. Taking advantage of recent cadastral documents and the technical advances in the use of the Lidar methodology there is now an opportunity to promote the first assessment on Lisbon's solar potential, aiming to contribute to the goals defined for Lisbon within the Local Energy-Environment Strategy, the Covenant of Mayors and the Green Digital Charter.</p>
Development of the pilot action during POLIS project time – describe the activities	<p>Data evaluation; definition of the methodology according to the available data; data collection, namely aerial photogrammetric flights and the city's cadastre; contact with sub-contractors, evaluation of proposals and contract. Evaluation of results, definition of the communication strategy and results usability.</p>
Changes from original plans and reasons for that	<p>The initial plan consisted of a manual evaluation of the solar potential at the parish level, assessing the building typologies and determining the solar potential of pre determined building types, by making calculations for each building. Due to difficulties on accessing actual data (the available data reports to 2001), buildings implantation area and buildings standardization per typology and given the recent contract made by the Lisbon Municipality to have actual data on Lisbon's cartography, Lisboa E-Nova decided to work with the LIDAR methodology to build the solar potential map.</p>
Used instruments/tools	Lidar methodology
Main result/outcome and possible impact to long-term Action Plan	<p>Lisbon Solar Potential Map, covering all the buildings in Lisbon. It identifies the preferable areas to invest in solar technologies and represents an efficient awareness tool, both for local authorities, investors and companies and citizens</p>
Publications – list and links	<p>Not available yet. It will be on http://www.lisboaenova.org/pt/planeamentourbano/1077-polis-identification-and-mobilization-of-solar-potentials-via-local-strategies</p>

Photo/drawings/ etc	
Development period: starting and finishing dates	November 2011 – April 2012
Municipality department(s) involved: address, internet link and contact person(s) (name & e-mail)	Lisboa E-Nova www.lisboaenova.org Joana Fernandes: joanafernandes@lisboaenova.org
Other stakeholders involved (e. g. project developer, housing association)	Lisbon Municipality Municipia, S. A.
Entity responsible of Pilot Action development: name, address, and contact person(s) (name & e-mail)	Lisboa E-Nova www.lisboaenova.org Joana Fernandes: joanafernandes@lisboaenova.org
According topic of Guidelines (No. / name)	Potential assessment

Lisbon Pilot Action 1 Own review

Pilot action Review Feb 2012	Evaluation of solar potential in Lisbon
Strong points	<ul style="list-style-type: none"> - strong awareness raising tool, both for politicians, technicians and citizens; - developed with the most upto date cadastral information; - LIDAR methodology that allows to consider effective irradiation and shadowing effects in roof covers.
Points for improvements	<ul style="list-style-type: none"> - Inability to associate areas per building, nor differentiate according to the classified potential; - non-consideration of the building's structure and effective capacity to support the solar systems; - does not consider minimum areas for ST viability; - facades potential is not assessed.
What to do different when replication	<ul style="list-style-type: none"> - Guarantee an updated database for the buildings so that buildings available area per classified potential can be perceived in the first assessment; - Cross check the roof structure and effective capacity to support solar systems;
Critical local conditions	<ul style="list-style-type: none"> - Up-to-date cadastral information, namely an aerial flight to base the digital elevation models; - political commitment;
General Guidelines resulting from pilot action	<ul style="list-style-type: none"> - potential evaluation can be an important market pull, raising citizen awareness on solar potential but also investors interest in specific projects; - it's essential to associate a dynamic tool to present and get to know the potential;
External factors important for success	<ul style="list-style-type: none"> - political commitment; - legal framework for supporting renewables; - capacity to operationalize the solar potential assessment as an effective tool for urban planning and management;
External risks	<ul style="list-style-type: none"> - lack of political commitment; - inexistence of a national/local strategy to deploy renewable technologies, namely solar;
Other comments	

Lisbon Pilot Action 1 Partner review 1.

Made by: Solar Region Skåne

Pilot action Review Feb 2012	Evaluation of solar potential in Lisbon
Strong points	I agree with the conclusions in the „own review“, but would also like to know some strong points from the process of doing this pilot action. What about the work in the local working group, national workshops etc?
Points for improvements	Are there any points for improvement regarding the work in the local working group?
What to do different when replication	Are there also points for improvement regarding the work methodology in the local working group?
Critical local conditions	Are there any environment or energy strategies of the city that support solar energy investments?
General Guidelines resulting from pilot action	I agree with the conclusions in the „own review“.
External factors important for success	Are there any national environmental or energy strategies that could be important for the development of strategies on local level?
External risks	On national level, instable financing systems for solar energy investments could perhaps be a risk? Also economic instability on national level could affect the interest in solar energy investments.
Other comments	

Lisbon Pilot Action 1 Partner review 2.

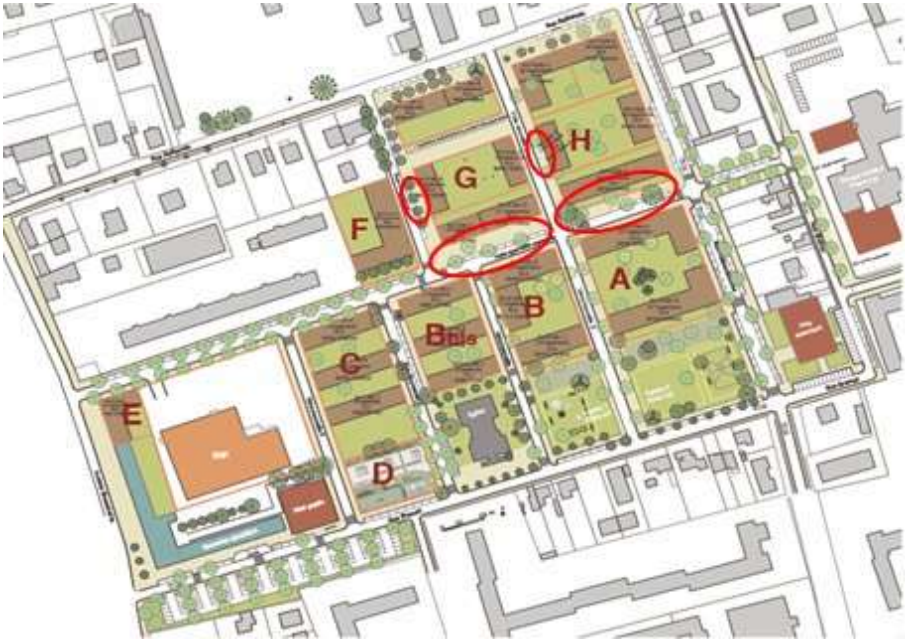
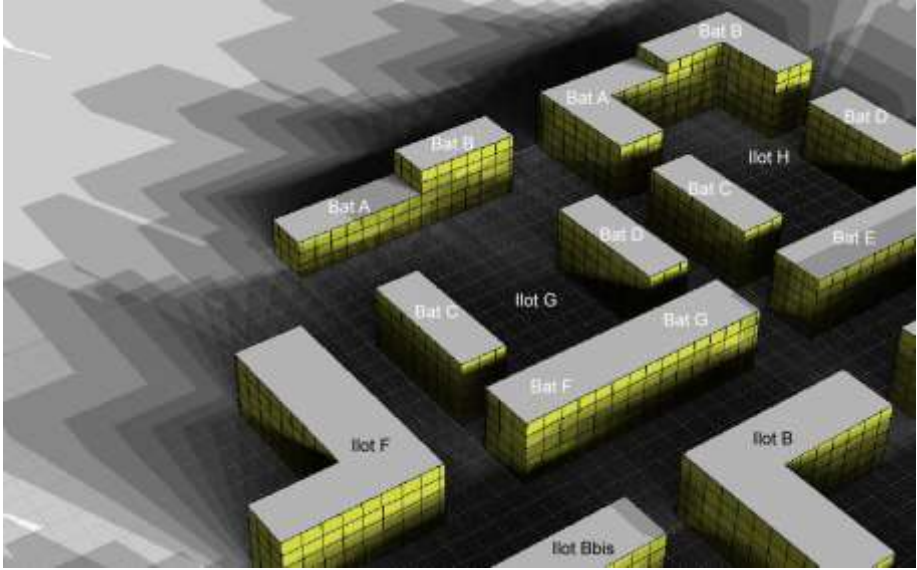
Made by: HESPUL

Pilot action Review Feb 2012	Evaluation of solar potential in Lisbon
Strong points	<ul style="list-style-type: none"> - The methodology allows the assessment for big areas (in most cases, methodologies are used for districts) - Methodology easily usable for other cities - LIDAR methodology that allows considering effective irradiation and shadowing effects in roof covers - It's a good tool to communicate to "masse audience" : we can easily see that there is a big potential
Points for improvements	<ul style="list-style-type: none"> - Facades potential is not assessed. - Non-consideration of the building structure and effective capacity to support the solar system - We don't know which production can be done for each part of roof. - An application that allows a "click" on each roof with presents an information detailed (potential of the roof : percent of the surface that could be equipped, type of roof structure, annual production that could be done for photovoltaic or hot water or heating...)
What to do different when replication	<ul style="list-style-type: none"> - Integrate solar passive in-take / input : with facades potential - Put information about annual production expected and a general information about costs - The software should be more dynamic
Critical local conditions	
General Guidelines resulting from pilot action	<ul style="list-style-type: none"> - Potential evaluation is very important to revitalize the renewable sector - This tools demonstrate the giant potential for solar sector in cities - The tool needs to be improved to be more dynamic and adapted for general public - It's a communication and "general public" tools more than a technical and professional tool
External factors important for success	<ul style="list-style-type: none"> - the possibility to communicate on this tools : the website needs to be well referenced - the political support to optimize this communication -
External risks	<ul style="list-style-type: none"> - inexistence of a national/local strategy to deploy renewable technologies, namely solar : especially for economic feasibility -
Other comments	<ul style="list-style-type: none"> - Associate a group of citizens that could test the tools -

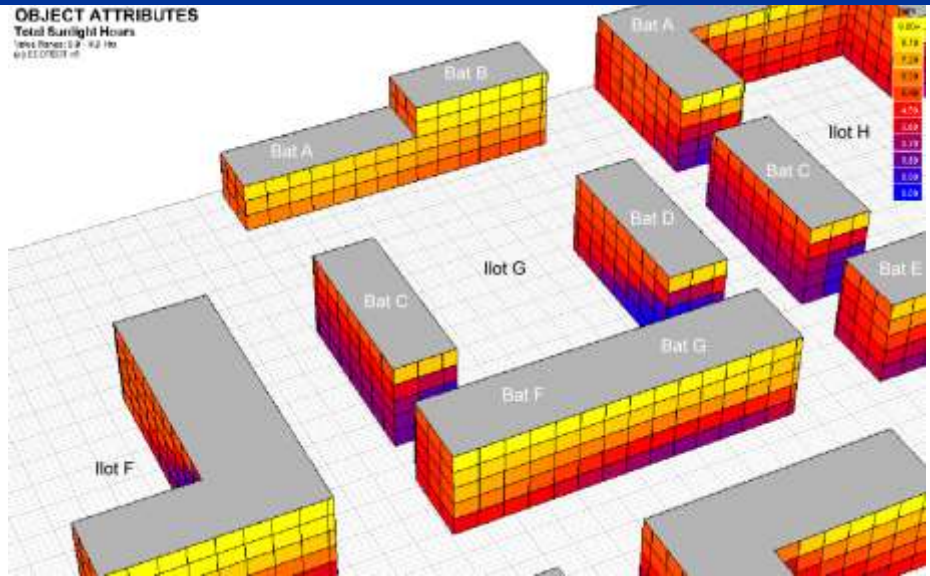
Lyon Pilot Action 3 Summary

Name of Pilot Action and category:	Solar planning scenario for a new development area Category 3
City	Lyon
Summary of the pilot action (short intro)	<p>Realisation of a study on the solar potential and its optimization for the district of Bron Terrailon (within the Greater Lyon area). The master plan proposed by the town planner has been tested in terms of its strengths and weaknesses regarding solar gains. The weaknesses have been highlighted and some optimized solutions have been proposed.</p> <p>A second step is the creation of guide presenting the work that has been done on the optimization of the planning process regarding solar irradiation criteria as an aspect that shall be taken into account during the whole planning process.</p>
Background	<p>The writing of the strategy of the Grand Lyon Climate Plan was ongoing when the POLIS project started in 2009. Since, the project contributed to the renewable energy sheet of the Climate Action Plan of Grand Lyon.</p> <p>In addition, the local system of references for new buildings on town land demands the respect of a low energy consumption and integration of renewable energies. Active as well as passive solar energy is taken in account for the calculation of the % of renewable energies.</p> <p>A new guide for sustainable cities and areas has appeared in 2011.</p> <p>In this context, some urban areas of the Grand Lyon area have already started to take into account urban solar aspects but could go further by taking example on the results of this pilot project.</p>
Development of the pilot action during POLIS project time – describe the activities	<p>The site to be analysed was chosen by Greater Lyon in 2010. The planning area is situated in Bron (city member of Lyon conurbation) and is planned to be restructured into a new district. The surface of the area is about 3 ha on which will be constructed almost 540 apartments. A master plan was drawn by urban planners for the district of Bron Terrailon. In order to analyse the solar potential of this master plan and to propose its optimization, adapted tools were tested as this kind of approach is very uncommon in France. Following this comparison, one main conclusion stated that there was a lack of solar urban planning orientated software on the market. Only few offers exist and most of the time are not appropriated to all European countries or exist in only the language in which they have been designed. For different reasons two tools have been chosen for this study: Pleiades Comfie (version 3.0.5.5) was used to calculate the solar gains, Ecotect Analysis 2011 served for the 3D simulations and the heliodons.</p> <p>The amount of solar gains in the energy demand depends on different elements in addition to the building's orientation, envelope, glass type and surface area...: an optimized organization of the urban plan can help reduce heating and lighting demand.</p> <p>Thus this study aims to improve the arrangement of the buildings and reduce the amount of dropped shadows to optimize the solar energy (light and heat) gains compared with the original master plan. The analysis takes into account the passive solar gains during the heating period (from 15th of October until the 15th of April). Another main issue was the good life quality of the future inhabitants due to the integration of solar aspects into the urban planning. A study to avoid overheating in summertime should be done later, notably on the building level.</p> <p>The first step was to highlight the areas impacted the most by the shadows thrown by the neighboring buildings. Different 3D simulations realized with Ecotect enabled to visualize the hours of direct solar impact on the façades or</p>

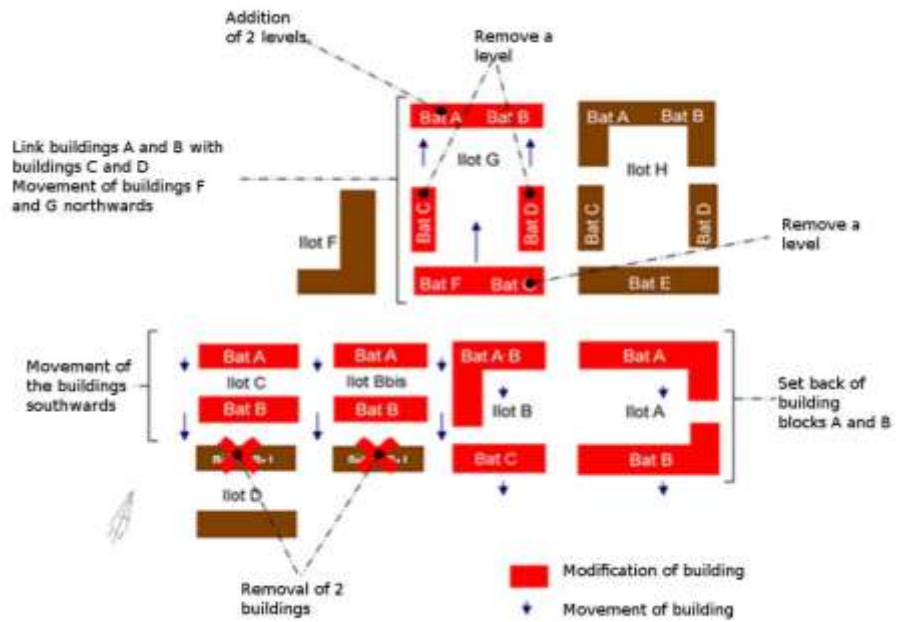
	<p>the most shadowed areas. The simulations were done for one specific day or for the whole wintertime.</p> <p>After identifying these areas, different modifications on the building scale or on the building block scale were tested:</p> <ul style="list-style-type: none"> - Shift the buildings - Add a level on certain buildings - Remove a level on certain buildings - Assemble several buildings - On the demand of the municipality, because of the quality of the urban project, some buildings (mainly the east/ west oriented buildings forming the central vegetation plots) could only be shifted on a north-south axis or change of height. <p>After each modification, the impact on the surrounding buildings was evaluated in %. The % indicates the loss or gain of solar energy by the façade (Wh/sqm) in comparison to the original master plan. This is indicated by means of a color code on the urban plan making the solar gain or loss easily identifiable.</p> <p>All of the modifications, at the building or building block scale, causing solar gains in comparison to the original urban plan, have been synthesized in one optimized master plan. The solar gains are clearly visible on 10 out of 20 buildings and lay between 5% and 33%. 6 of the 20 buildings in the area show no measurable gain or loss of passive solar energy. Only 4 out of 20 buildings show slight losses in passive solar energy.</p> <p>Special attention was paid to the impact of planting in order to optimize solar gains: avoid shadowing in wintertime and have solar protection in summertime.</p> <p>After highlighting the weaknesses of the initial master plan and presenting the different proposed optimization solutions, the final document “Solar planning scenario for a new development area” has been annexed to the call for tender documents as an example to follow. The candidates will have to argument the project they propose considering solar aspects.</p> <p>The conclusion of this first study lad us to consider the project within the general urban planning process (see: figure precisng the general process of an urban planning project at the scale of a Concerted Development Area in France and the possible measures a city can undertake in order to optimize solar irradiation consideration)</p> <p>The second part of the pilot action is to create a guide that presents the different levers of optimization of solar efficiency. This guide will present the available tools that can be used and the feedback and lessons learned from the first areas a solar optimization was tested in.</p> <p>This document will be liven up and completed during collaborative and participative workshops with an organization of local actors of sustainable development and planning (urban planners, architects, engineers...) called VAD. The first workshop organized by ALE Lyon and Hespul is planned for the end of march.</p> <p>Another dissemination of the “solar planning scenario” of Bron Terrailon to the persons in charge of new development areas in Greater Lyon is planned for May 2012.</p>
Changes from original plans and reasons for that	/
Used instruments/tools	<p>Test and comparison of several software tools to find the most adapted ones for this specific project. see toolbox on POLIS internet site</p> <p>Tools used:</p> <ul style="list-style-type: none"> - Pleiades Comfie: french language software with building energy saving orientation, - Ecotect Analysis 2011: English language software with building energy saving orientation and well adapted to the scale of the project

<p>Main result/ outcome and possible impact to long-term Action Plan</p>	<p>The “solar planning scenario” of Bron Terraillon has been integrated in the consultation documents for the area’s future developer in order to indicate possible optimization measures in the original master plan for passive and active solar gains.</p> <p>The main goal of this Pilot Action is to go further and to generalize the integration of solar aspects into each stage of an urban development project.</p>
<p>Publications – list and links</p>	<p>www.ale-lyon.org/IMG/pdf/grand_lyon_annexe_zac_bron_terraillon_finalise.pdf It is planned to publish the guide by the end of April 2012.</p>
<p>Photo/drawings/ etc</p>	<p>Identification of the most shadowed areas on the original master plan:</p>  <p>Visualisation of shadows on a winter day (made with Ecotect):</p>  <p>Visualisation of the hours of direct sunlight on the façades (made with Ecotect):</p>

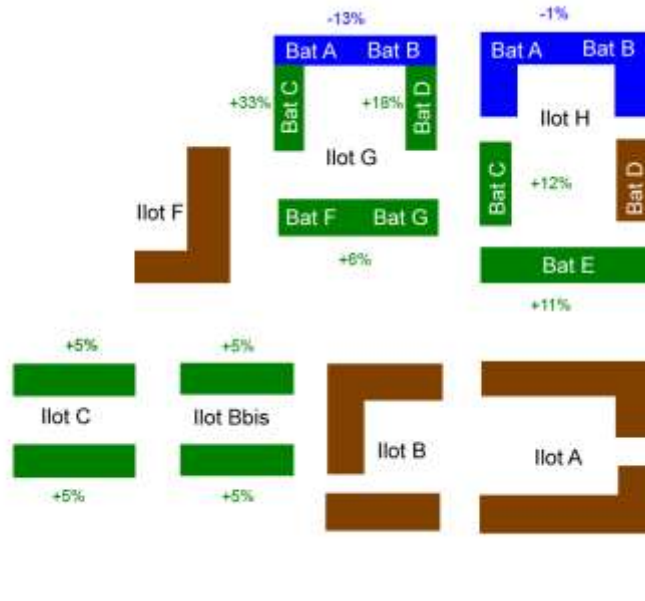
OBJECT ATTRIBUTES
Total Sunlight Hours
Units: Hours: 0.0 - 12.0
0.0 0.000000



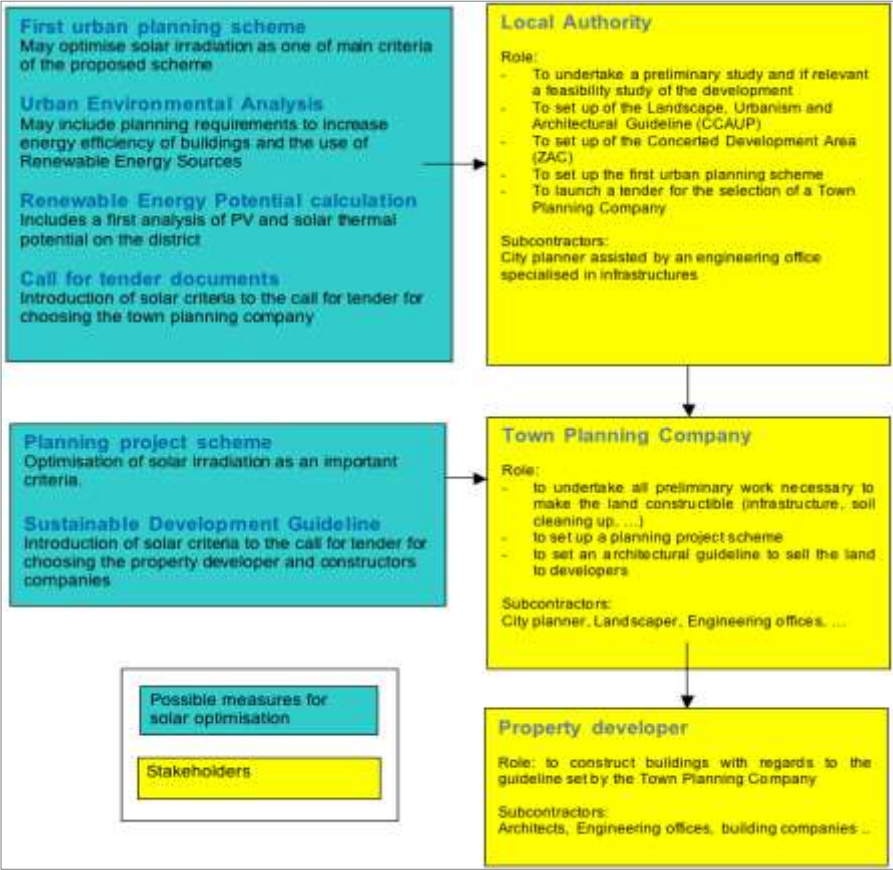
Identification of the different modifications on the building scale or on the building block scale:



Proposal for an optimized urban plan (with solar gains or losses in % in comparison to the original master plan) :



The figure below shows the general process of an urban planning project at the scale of a Concerted Development Area in France and the possible measures a city can undertake in order to optimize solar irradiation consideration:

	
Development period: starting and finishing dates	July 2010 to September 2011 Dissemination to local working groups and the persons in charge of new development areas in Greater Lyon until May 2012
Municipality department(s) involved: address, internet link and contact person(s) (name & e-mail)	Grand Lyon , Direction Générale de Développement Urbain DGDU, 20 rue du Lac, 69003 Lyon, FRANCE www.grandlyon.com urban planning coordinator in charge of the project: Dominique Jestin djestin@grandlyon.org
Other stakeholders involved (e. g. project developer, housing association)	- Agence Locale de l'Énergie de l'Agglomération Lyonnaise , 8 rue Béranger, 69006 Lyon, contact : Ellen Wildbrett : ellen.wildbrett@ale-lyon.org - HESPUL , 114 boulevard du 11 novembre, 69100 Villeurbanne, contact : Angela Saade : angela.saade@hespul.org , Emmanuelle Faysse : emmanuelle.faysse@hespul.org
Entity responsible of Pilot Action development: name, address, and contact person(s) (name & e-mail)	Grand Lyon , Direction Générale de Développement Urbain DGDU, 20 rue du Lac, 69003 Lyon, FRANCE www.grandlyon.com
According topic of Guidelines (No. / name)	1/ Planning with solar optimisation tools 4/ Optimising planning processes for solar potential in new areas

Lyon Pilot Action 3 Own review

Pilot action Review Feb 2012	Solar planning scenario for a new development area Category 3
Strong points	<ul style="list-style-type: none"> - Methodology easily usable for other areas - Comparison of different tools for solar urban planning available on POLIS internet site
Points for improvements	<ul style="list-style-type: none"> - Knowledge of different tools needed - Some tools are not easily usable in other countries or cities: not traduced, not the necessary local climatic conditions ... (detail: see toolbox on POLIS internet site) - Integrate the work on solar urban planning to the first master plan
What to do differently when replicating	<ul style="list-style-type: none"> - Integrate the work on solar optimization into the very first master plan and continue working on it through the whole design and construction process
Critical local conditions	<ul style="list-style-type: none"> - Some software tools are not yet available in french and cannot be easily used in other countries or cities because there are no translations available and some tools don't have options for other local climatic conditions for example (detail: see toolbox on POLIS internet site)
General Guidelines resulting from the pilot action	<ul style="list-style-type: none"> - Optimized master plan can be found step by step by comparing the modification to the initial plan (see "Development of the pilot action during POLIS project time")
External factors important for success	<ul style="list-style-type: none"> - Municipality and urban agency strongly interested and involved: criteria included into tender documents - Competence in local private market needed
External risks	<ul style="list-style-type: none"> - Municipality not enough involved - Need to be able to judge the quality of the validity of the proposals (internal or external competence needed)
Comments to the partner review	<p>The focus of the study for the solar planning scenario has been set on the passive solar gains on the façades in the aim of lowering the heating demand in wintertime. Nonetheless, one part of the study is dealing with active solar potential in the area, mainly PV. By re-modeling some buildings and mainly the roofs (their orientation and difference of height) the urban plan has also been optimized for active solar installations.</p> <p>The study on the solar potential and its optimization did not work on the shadowing awnings because this work is mainly done on the building scale. Moreover, the study was done for the heating season and not during summer time when sun protection is the most needed. One aspect for solar protection has been treated in the study because it seems important to consider it on the urban scale: some guidelines were given for the vegetation of the area in order to optimize the solar gains in winter and to permit solar protection in summer.</p>

Lyon Pilot Action 3 Partner review 1.

Made by: Lisboa E-Nova

Pilot action Review Feb 2012	Solar planning scenario for a new development area Category 3
Strong points	<ul style="list-style-type: none"> - Effective integration of solar requirements in the initial stages of the urban plan and buildings definition: location, volumetric, etc; - Maximization of buildings solar gains; - Flexibility to test several hypotheses.
Points for improvements	<ul style="list-style-type: none"> - It's an evaluation restrained to facades. Roofs consideration of potential shadowing effects should also be assessed. It's particularly important to maximize the potential to use solar active technologies; - Monitoring the solution's impact in the buildings overall performance; - Test the effect of shadowing awnings when the solution presents a potential for buildings overheating during the summer.
What to do different when replication	<ul style="list-style-type: none"> - Settle solar availability criteria in the urban plan terms of reference so promoters can reply to it since the initial stages of development; - Turn these into compulsory requirements for every new urban plan
Critical local conditions	<ul style="list-style-type: none"> - Compromise of the Municipality and involvement of the urban planning team; - Easy to use software, compatible with the urban planning outputs and requirements;
General Guidelines resulting from pilot action	<ul style="list-style-type: none"> - Essential assessment at the urban planning stage that allows maximizing the solar potential of new area; - Tools adequate to the local conditions, namely in terms of the climate database; - Detailed output, coherent with the team needs, in terms of number of direct sunlight hours in each façade - The output of the plan should also a critical analysis on how to achieve the minimum criteria;
External factors important for success	<ul style="list-style-type: none"> - Involvement of the stakeholders is essential, from the settlement of requirements from the Municipality, to the support of the Municipality technicians and the competences in the urban planning team;
External risks	<ul style="list-style-type: none"> - The results of the solar assessment can imply deep modifications in the urban planning design and in the overall plan. The real state promoter has to be involved in order to guarantee that the evaluation's output are critical requirements for the implantation of the plan;
Other comments	<ul style="list-style-type: none"> - It's important to understand how this evaluation can also be applied to urban requalification plans.

Lyon Pilot Action 3 Partner review 2.

Made by: City of Paris

Pilot action Review Feb 2012	Solar planning scenario for a new development area Category 3
Strong points	<ul style="list-style-type: none"> - Large analyses of different solar modelisation tool - Integrate those simulations as the first beginning of a urban project - Free tools ? - Take account solar passive for heating building - Improvement of quality of life
Points for improvements	<ul style="list-style-type: none"> - Create a classification of different tools available about their languages, cost, technical limits... - Integrate solar financial analyses for development and help of the decision
What to do different when replication	<ul style="list-style-type: none"> - To know earlier at the beginning, the different possibility to move or shift building position and height
Critical local conditions	<ul style="list-style-type: none"> - International tools, cost ? - Capacity of city planning department to use it easily
General Guidelines resulting from pilot action	<ul style="list-style-type: none"> - Capacity to improve a solar project at each step of a program
External factors important for success	<ul style="list-style-type: none"> - Feed-in tariff - Strong political support - Technical expertise
External risks	<ul style="list-style-type: none"> - Feed-in tariff - Not only one priority : solar, density, roofs competency... - budget
Other comments	<ul style="list-style-type: none"> - to test now on a global area or in local strategy for solar development.

Malmö Pilot Action 2 Summary

Name of Pilot action and category:	Solar energy requirements in municipal land allocation agreements and purchase agreements. Development and implementation of political or legislative measures.
City	Malmö
Summary of the pilot action (short intro)	<p>Within this pilot action, the POLIS local working group of Malmö, together with the legal scholar of the Malmö City Council, has investigated the possibilities to include solar energy demands in agreements and still be following the Swedish legislation. A suitable agreement stipulation, which could be used as a general example for future municipal land allocation agreements or purchase agreements, has also been developed. municipal land allocation agreements and purchase agreements that were signed have also been studied, together with some interesting alternative methods for promoting solar energy.</p>
Background	<p>The target for Malmö is to introduce solar energy aspects in the urban planning process during the project period (until 2012). By connecting to the high ambition level in the new Environmental Program, Energy Strategy and Environmental Building Program, urban planning in Malmö should be adapted so that it promotes and facilitates the use of solar energy.</p> <p>Municipal land allocation agreements or purchase agreements are developed with respect to solar energy requirements and are used in selected areas. It is eligible to use the new “Environmental Building Program South” (EBPS) to put higher demands on energy efficiency of the buildings.</p> <p>A municipal land allocation means a right for a stakeholder to, during a limited period of time with some in advance given conditions, work with development of a project within a limited area. This right can be given as a land reservation or through a municipal land allocation agreement, that clarifies the conditions and stipulations that concern the municipal land allocation.</p>
Development of the pilot action during POLIS project time – describe the activities	<p>Most of the development of the pilot action has been made during the local working group meetings, or through email correspondence with the group and the legal scholar of Malmö. Some ideas were also found on the first national workshop. A study has also been made on a national level, where some interesting alternative methods for promoting solar energy have been found.</p>
Changes from original plans and reasons for that	<p>The original plan (and name of pilot action) included the possibility of setting solar energy requirements in exploitation agreements as a tool for promoting solar energy installations. The investigation of this alternative however concluded that such an agreement would not be possible to realize. The exploitation agreement regulates a situation where a developer already owns the land he wishes to exploit. The exploitation agreement is signed between the developer and the municipality, in order for the municipality to make a new local or master plan of the land. This is because the municipalities in Sweden have a plan monopoly.</p> <p>In this pilot action, the purpose was initially to develop a municipal land allocation agreement or a purchase agreement that contains requirements like for example orientation and formation of buildings to facilitate future solar</p>

	<p>energy installations or to set a certain maximum energy demand. There have been three agreements to study, however not quite the same as initially intended. For this reason, a suitable agreement stipulation, which could be used as a general example for future municipal land allocation agreements or purchase agreements, has also been developed within the pilot action.</p>
Used instruments/tools	No tools have been used.
Main result/outcome and possible impact to long-term Action Plan	<p>Municipalities in Sweden are allowed to set their own requirements within municipal land allocation agreements and purchase agreements, when developers are building on city-owned land. The agreement could contain for example demands on orientation and design of the buildings, or requirements regarding maximum energy demand within buildings in accordance with Environmental Building Program South. The agreements could also promote certain energy solutions and set requirements of renewable energy.</p> <p>The local working group of Malmö has developed and agreed on a new agreement stipulation, that can be used generally in future municipal land allocation and purchase agreements:</p> <p><i>"The company should, in the upcoming development and energy planning, remark and investigate the conditions to produce/use renewable energy within the own property. The company should declare, in writing, the conditions and the standpoints that have been made within the property regarding renewable energy. The investigation should be submitted to the local authorities at the latest within three months from the day of entering into this agreement"</i>.</p> <p>Three real cases of agreements that are signed in Malmö have been studied:</p> <p>A municipal land allocation agreement has been signed for the new Congress, Concert and Hotel in Malmö. The developer should reduce the energy demand through using ground heat, solar energy and wind power. The company's intention is for the buildings to be certified with the platinum level of the international rating system LEED.</p> <p>A purchase agreement has been signed for the new area, Annehem, indicating that the developer should act for a cost and energy efficient energy system in the area.</p> <p>A Climate-contract has been signed for the development area of Hyllie, which forms the platform for the Sustainability agreement, to be used as a tool in the municipal land allocation agreement. The contract was signed by the City of Malmö, E.ON (energy supplier) and VA Syd (the water, sewer and waste management supplier). The climate contract has high climate ambitions. Hyllie will be the most climate smart area in the Öresund region, and a global role model for sustainable urban development. The climate contract includes several important targets for the area:</p> <ul style="list-style-type: none"> • Energy supply from 100 % renewable or recycled resources. • Smart energy supply infrastructure. • Energy efficient and smart buildings. • Locally produced energy from renewable sources (for example solar and wind energy) in the area should be significant. • Hyllie should become a world leading demonstration area for climate smart solutions.

	<p><u>Alternatives</u></p> <p>It is not necessary to regulate the possibilities for solar energy within the purchase or municipal land allocation agreements. Most important is to make sure that the local plan does not prevent solar (or other renewable) energy installations. The local plan should make it possible to get building permits for such installations.</p> <p>An alternative to regulation of solar energy within agreements, is the so called “constructor dialogue” that the City of Malmö normally has when it comes to development of larger areas (like the Western Harbour, Hyllie and Norra Sorgenfri). The experiences from these dialogue meetings are very good. During the meetings, the sustainability ambition for the areas is set, and environmental issues that are not regulated in agreements are discussed.</p> <p>Another model for reducing energy demand and promoting locally produced renewable energy in buildings has been developed and used in some municipalities in Sweden. The idea is to reduce or refund the fee for the building permits, for houses built with low energy or passive house standard. This model is used for example in the municipality of Lerum in Sweden, where there are very high ambitions regarding energy efficient building. The energy use in municipal buildings in Lerum are 25-45% below the demands in the national legislation (BBR). The municipality also gives energy advising when selling or giving building permits on municipally owned land.</p>
Publications – list and links	No publications are made.
Photo/drawings/ etc	<p style="text-align: center;">Klimatkontrakt för Hyllie Undertecknat den 17 februari 2011</p>  <p style="text-align: center;">    </p>

Development period: starting and finishing dates	From January 2011 – July 2012
Municipality department(s) involved: address, internet link and contact person(s) (name & e-mail)	<p><u>Urban Planning Department:</u> Michael Hedman michael.hedman@malmo.se Tor Fossum tor.fossum@malmo.se, Jan Rosenlöf jan.rosenlof@malmo.se Ella Swahn ella.swahn@malmo.se Asmir Emrovic, asmir.emrovic@malmo.se</p> <p><u>Department of Internal Service:</u> Torsten Persson, torsten.persson@malmo.se Anders Elmqvist anders.elmqvist@malmo.se Benny Thell benny.thell@malmo.se Somayeh Al-Noori Somayeh.Al-Noori@malmo.se</p> <p><u>Real Estate Office:</u> Christian Röder, Christian.roder@malmo.se Kjell Sollbe (legal scholar) kjell.sollbe@malmo.se.</p> <p>City of Malmö, 205 80 Malmö, Sweden. www.malmo.se</p>
Other stakeholders involved (e. g. project developer, housing association)	No others.
Entity responsible of Pilot Action development: name, address, and contact person(s) (name & e-mail)	Urban planning department in cooperation with the local POLIS expert group. Contacts: Anna Cornander and Elisabeth Kjellsson (POLIS partners). anna.cornander@kfsk.se elisabeth.kjellsson@byggtek.lth.se
According topic of Guidelines (No. / name)	5. Introducing solar criteria into purchase contracts

Malmö Pilot Action 2 Own review

Pilot action Review Feb 2012	Solar energy requirements in municipal land allocation agreements and purchase agreements.
Strong points	<p>The local working group of Malmö has been an important factor for the success of the pilot action. The group is composed of a wide variety of people from different departments that have attended the local group meetings at different occasions. Although all people have not attended at all meetings, the variety of people has given the pilot action a good penetrating power. There are however some driving spirits that have attended almost all meetings, giving important input to the project during the whole process. One very important person, that did not attend the meetings but was continuously informed about the process and consulted with legal aspects and issues, was the legal scholar of the Malmö City Council.</p> <p>The national workshops have also been important and successful tools for gathering new ideas and experience to the process.</p>
Points for improvements	<p>The work load on urban planning departments in Sweden are generally very high, and the hours are mainly financed from building permits and other urban planning fees. The Malmö department is no exception from that. For this reason, it has been hard for the urban planners to attend all of the POLIS local working group meetings. One possible alternative to inviting planners to those meetings could be to visit some of the urban planning department's internal meetings with status reports and questions. This would however be more time consuming for the POLIS partners.</p> <p>Regarding the process of solar energy in urban planning, one important point is to always ensure that the stipulations in local plans regarding colour and shaping of buildings do not prevent solar energy installations. This was one outcome from the national workshop, where the City of Stockholm shared their experiences of unfavourable stipulations.</p> <p>The experiences of using constructor dialogues in Malmö are very good, and could be used in even larger extent for new development areas. For smaller development areas and single house sites in Malmö, the concept of reducing building fees for energy efficient houses that have been used in some other municipalities could be tested.</p>
What to do different when replication	<p>For the future, it would be favourable to connect more municipalities to the project. The "Environmental building program south" for example, is developed in cooperation between the city of Malmö and the City of Lund, and it has resulted in important improvements in the sustainability of urban planning in those municipalities. With many municipalities agreeing on a certain concept, it is easier to convince developers and other stakeholders to work in the same direction.</p> <p>For future projects it would also be favourable to involve private stakeholders in the process. The City Council can regulate agreements regarding municipality owned land, but a lot of development occur on private properties. Through seminars and information campaigns, private</p>

	<p>stakeholders could be involved and encouraged to start working with sustainable development on a voluntary basis.</p>
<p>Critical local conditions</p>	<p>The „Environmental building program south“, the Environmental program and the Energy strategy of Malmö are agreements that provide essential conditions for the success of sustainable urban development in Malmö.</p> <p>Another important condition is to have competent co-workers and driving spirits in the project.</p>
<p>General Guidelines resulting from pilot action</p>	<p>Agreement stipulation that can be used generally in future municipal land allocation agreements and purchase agreements:</p> <p><i>“The company should, in the upcoming development and energy planning, remark and investigate the conditions to produce/use renewable energy within the own property. The company should declare, in writing, the conditions and the standpoints that have been made within the property regarding renewable energy. The investigation should be submitted to the local authorities at the latest within three months from the day of entering into this agreement”.</i></p> <p>Phrasings from the real cases of agreements that were signed in Malmö:</p> <p>A municipal land allocation agreement: <i>The developer should reduce the energy demand through using ground heating, solar energy and wind power. The company’s intention is for the buildings to be certified with the platinum level of the international rating system LEED.</i></p> <p>A purchase agreement: <i>“The developer should act for a cost and energy efficient energy system in the area.”</i></p> <p>Example of a climate contract signed by the city and the utilities, with climate ambitions for the development area, including the environmental targets for the area:</p> <ul style="list-style-type: none"> • <i>Energy supply form 100 % renewable or recycled resources.</i> • <i>Smart energy supply infrastructure.</i> • <i>Energy efficient and smart buildings.</i> • <i>Locally produced energy from renewable sources (for example solar and wind energy) in the area should be significant.</i> <p><u>Examples of alternative models:</u></p> <p><i>Make sure that the local plan does not prevent solar (or other renewable) energy installations. The local plan should make it possible to get building permits for such installations.</i></p> <p>“Constructor dialogue process” when developing of larger area. During the meetings, the sustainability ambition for the areas is set, and environmental issues that are not regulated in agreements are discussed.</p> <p>Reduce or refund the fee for the building permits for houses built with low energy or passive house standard. Give energy advising when selling or giving bulding permits on municipally owned land.</p>

<p>External factors important for success</p>	<p>One important external success factor is the national plan and building legislation. Development of agreements must be in accordance with national law. Also national environmental and energy strategies are important for the development of strategies on local level.</p> <p>Another important factor is the possibility to show best practise examples from other successful projects.</p>
<p>External risks</p>	<p>Political decisions that change the conditions can be a risk when working on a project in a politically run organisation.</p> <p>On national level, instable financing systems for solar energy investments can be a risk. Also economic instability, like a finance crisis, could affect the interest in solar energy investments and consequently also solar urban planning.</p> <p>Regarding the possibility of implementing solar urban planning concept in municipalities, there are great differences between municipalities in the region. For larger cities, it is normally a big interest in development, while in rural areas, it could be harder to find interested developers. In rural areas it could therefore be harder to set high sustainability requirements e.g. in purchase agreements.</p>
<p>Other comments</p>	

Malmö Pilot Action 2 Partner review 1.

Made by: Lisboa E-Nova

Pilot action Review Feb 2012	Solar energy requirements in municipal land allocation agreements and purchase agreements.
Strong points	<ul style="list-style-type: none"> - Defines compulsory requirements for local renewable energy production and more energy efficient buildings; - Promotes an active dialogue between the local authorities and the private real state promoters;
Points for improvements	<ul style="list-style-type: none"> - The local authorities should prepare support documentation and activities that incentive private real state promoters to comply with the energy requirements for the new area; - The terms of reference should be very precise so the real state promoter can perceive which are the points that need further improvement, just like a check list (public spaces, buildings performance, best energy efficient technologies, renewables integration, etc); - Such a check list serves also the local authorities technicians to validate the interventions that are proposed;
What to do different when replication	<ul style="list-style-type: none"> - Land allocation agreements and purchase agreements should be standard documents that identify all the energy-environment criteria to be assessed in each plan. These documents are then adequate to the local reality of each area for which the agreement is settle.
Critical local conditions	<ul style="list-style-type: none"> - Local authorities determination to settle these compulsory terms and competence to provide the technical support to public and private entities that have to comply with it;
General Guidelines resulting from pilot action	<ul style="list-style-type: none"> - The settlement of compulsory Land allocation agreements and purchase agreements to consider energy efficiency criteria and renewable technologies integration is essential to assure an effective change in the local energy supply paradigm; - Local authorities should not only establish the framework and incentives but also be able to provide know how and foster competence acquisition by the promoters and experiences exchange among peers;
External factors important for success	<ul style="list-style-type: none"> - National legislation: Local authorities commitment needs to be in accordance with the national legislation and framework; - Share of experiences and learn from peers similar initiatives;
External risks	<ul style="list-style-type: none"> - National context; - Regional support to foster other municipalities to assume such a compromise as well; - Hindering from the lack of defined and structured national and local support to energy efficiency and renewable technologies adoption;
Other comments	<ul style="list-style-type: none"> - The local commitment to establish compulsory criteria in land allocation and purchase agreements promoting more sustainable urban areas it's highly valued. Nevertheless the principles should be clear and standard frameworks should be established in order to prevent misleading criteria and avoid miss appropriation of some concepts. The settlement of clear intervention guidelines gives a clear impulse to the market and helps to

	<p>incorporate these concerns in the local administration as well, at the technical level. The Municipalities should also be aware of the importance to promote peers experiences exchange, to promote best practices and to be able to provide technical support for private investors to adequately respond to the requirements established.</p> <p>- Foster the use of simulation tools to achieve energy optimization patterns in the initial stages of design.</p>
--	---

Malmö Pilot Action 2 Partner review 2.

Made by: Ecofys

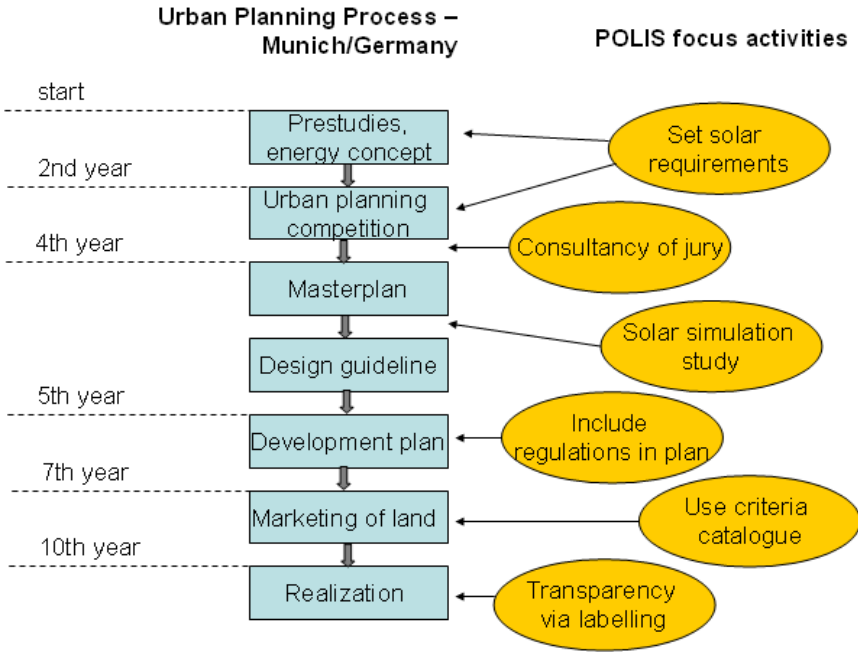
Pilot action Review Feb 2012	Solar energy requirements in municipal land allocation agreements and purchase agreements.
Strong points	<p>The government of Sweden and the Malmö City Council have high standards for urban development like described in the "Environmental Building Program South" (EBPS).</p> <p>The plan monopoly and the capability of Swedish municipalities to establish local or master plans of the land provides the ability to focus on sustainability targets of the municipality.</p> <p>Given the existing barriers within the exploitation agreements the local working group found alternatives to stimulate the implementation of renewable energies in new areas.</p>
Points for improvements	<p>Setting the possibility of solar requirements in exploitation agreements as a tool for promoting solar energy installations couldn't be realized. The reasons for not reaching this goal should be made very clear to provide understanding of the planning process and its barriers.</p> <p>Also stipulations of local plans should not have negative impact on solar energy installations (e.g. color, building shape, panel cooling).</p> <p>It is would be a good option to provide publications about the dos and don'ts within this field in the region of south Sweden.</p>
What to do different when replication	<p>A private-public-partnership in the planning phase could also help to meet the needs of the future partners and the inhabitants of the municipalities.</p> <p>The stakeholders can offer another perspective and point of view.</p>
Critical local conditions	<p>A main problem of the photovoltaic use in Sweden is the low solar irradiation (over the whole country) with a low solar electricity capacity between 700 – 900 kWh/kWp. To avoid unmanageable costs the photovoltaic subsidies should support southern parts of Sweden with its higher irradiation. This means the degree of efficiency is not part of the subsidy. The main incentive for the use of renewable energy sources in Sweden is a quota system in terms of quota obligations and a certificate trading system. Quota systems are useful to overview the costs of the implementation of renewable energies but not to aim for a specific capacity.</p>

General Guidelines resulting from pilot action	<ul style="list-style-type: none"> - Agreement stipulations - Phrasings for agreements - Description of constructor dialogue process - Ideas for incentives like reduced fee for the building permits - Barriers in the field of local legislation
External factors important for success	<p>The City of Malmö aims to be the world-leading climate city with ambitious targets:</p> <ul style="list-style-type: none"> - Climate neutral and supplied by 100 % of renewable energy sources by the year 2040 <p>This commitment provides the political background for successful implementation strategies.</p>
External risks	<p>According to the Swedish law the installation of on-grid photovoltaic systems must have started before 31. December of 2012. That causes insecurity for the implementation of PV in Malmö. Since the total budget for the scheme is only 60 MSEK for 2012 (6,7 Mio. €) it will be used up very fast. This is not an ideal situation for solar energy implementation.</p>
Other comments	<p>With many flagship projects and its strong commitment, the City of Malmö is a good example for other municipalities in Sweden and world-wide (→future world-leading climate city). Other cities will therefore look closely at Malmö on how the implementation of renewables takes place in order to reach the target.</p>

Munich Pilot Action 1 Summary

Name of Pilot action and category:	Development of a POLIS “Solar Guideline for Urban Planning” - Category 2
City	Munich
Summary of the pilot action (short intro)	<p>Following the POLIS findings of the Solar Action Plan for Munich the development of an “Urban Planning Guideline for Munich” was decided. The POLIS pilot project started in Dec. 2010 with the definition of essential areas of interest within the planning department. The guideline aims to compile instruments, recommendations and solutions from urban planning perspective in the selected areas:</p> <ul style="list-style-type: none"> • Development areas: Competition and promotional grant • Development areas: optimizing solarisation • Building stock: Advancement of refurbishment • Catalogue of ecological criteria –sale of public owned properties • Urban Public-Private agreements – land use planning • Support programs – subsidy and incentives • Appliance of building energy related legal framework at local level (monitoring) <p>The main task of this pilot action is to identify relevant areas and instruments to include in the current planning process in Munich. The participation process includes 8 different areas of the planning department and also the environmental department. As result, useful recommendations and a basics solar urban planning know-how should be presented with this guideline.</p>
Background	<p>The City of Munich has committed itself to meet climate protection targets as agreed in various initiatives (CoM; AdC). Main targets related to solar energy are:</p> <ul style="list-style-type: none"> - coverage of local electricity demand by 10% through photovoltaic installations within the urban area of Munich by 2015. This should be reached supported through the foundation of the Solar Initiative Munich (SIM) in 2010. Background was the local energy supplier - the Stadtwerke Munich - committed themselves to cover the local electricity demand at 100% in 2025 through investing in renewable energy plants (wind, solar thermal, PV, ...) spread all over Europe. <p>A successful implementation of these targets via the SIM requires actors of urban development and planning to get involved and committed concerning solar energy issues as well. There is a need for knowledge about possible instruments and methods to integrate relevant aspects of solar energy into planning practice to support the implementation of passiv and active solar gains an a long perspective in the urban environment. Possible doubts about sense, function and design (Aesthetics) reflecting urban townscape should be clarified or smoothed out. Within the framework of this POLIS pilot project various urban planning instruments are further developed to complement activities concerning Munich’s “Solar Initiative” (SIM).</p>

<p>Development of the pilot action during POLIS project time – <i>describe the activities</i></p>	<p>Several meetings with the local working group have been held to define areas of interest and to discuss possible options for the inclusion of solar urban planning in the different fields. The diverse areas were asked to describe and reflect their current proceedings and to decide about possible options proposed. In addition a literature research has been done and a chapter on the basics of solar urban planning has been compiled.</p>
<p>Changes from original plans and reasons for that</p>	<p>Some of the identified areas / interest groups have not shown great willingness to cooperate since as well the local and national political and legal background was unclear at the respective period (e.g. new renewable energy law for buildings, legal security applying ecological / solar regulations). But some issues regarding legislation changed again during 2011 (e.g. enhancing Building Code during “Fukujima FollowUp”). Furthermore new instruments were strongly in a broad discussion (e.g. Development of a “General Energy Plan” and specific “Energy Concepts” for medium scale town planning) since Munich applied for Winter Olympic Games. The given possibilities need to be discussed with relevant actors in a next round planned for March 2012.</p>
<p>Used instruments/tools</p>	<ul style="list-style-type: none"> - Urban competitions for new development areas. Definition of criteria and other instruments, 1st to include solar requirements in tendering, 2nd to support jury members in their assessment of solar aspects in submitted projects, 3rd to provide basic know-how for the drafting of council resolutions for the implementation of solar planning in new development areas. - For development of new areas with more than 500 apartments a city council resolution for solar energy optimization (SOLENOP) is already in effect in Munich. POLIS proposed to develop flexible instruments to improve the implementation of the outcome of this solar energy assessment of planning drafts in the process of weighing of interests for the final layout. - Analysis and compilation of planning instruments to facilitate the aims of SIM through urban planning (detailed analysis of potentials, basic and advanced training: knowledge transfer and skill enhancement, selection of feasible surfaces, incentives to install PV for owners, analysis of possible barriers (from the urban planning point of view), identification of priority areas / suitable settlement structures). - Criteria concerning the sale of municipal real estates to implement solar architecture. The already existing Catalogue of Ecological Criteria could be extended to include criteria for solar energy use (e.g. solar thermal applications to comply with existing national law (EEWärmeG). Requirements specified in this regulation can become part of urban contracts and other binding agreements. - To mobilize solar energy use in existing buildings incentives and information campaigns on solar thermal and PV systems could be increased with regard to urban regeneration and refurbishment. Specially the experiences made with an existing area [Project "Solare Nahwärme Ackermannbogen" (SNAB)] should be analysed for new requirements concerning “solar-housing”.
<p>Main result/outcome and possible impact to long-term Action Plan</p>	<p>The participative process of this pilot action and the guideline with its general solar urban planning rules and specific options for integrating solar aspects in existing processes and instruments could help to rise awareness of the urban planners, architects and decision makers and lead to energy optimized town planning in the</p>

	near future.
Publications – list and links	http://www.energiespektrum.de/index.cfm?pid=1442&pk=103817&p=1 http://www.detail.de/artikel_polis-muenchen-ecofys_27214_De.htm
Photo/drawings/ etc	 <p>The diagram illustrates the 'Urban Planning Process – Munich/Germany' as a vertical flowchart with stages and corresponding 'POLIS focus activities' indicated by arrows:</p> <ul style="list-style-type: none"> start: Prestudies, energy concept (POLIS activity: Set solar requirements) 2nd year: Urban planning competition (POLIS activity: Consultancy of jury) 4th year: Masterplan (POLIS activity: Solar simulation study) 5th year: Design guideline (POLIS activity: Include regulations in plan) 7th year: Development plan (POLIS activity: Use criteria catalogue) 10th year: Marketing of land (POLIS activity: Transparency via labelling) Realization: (No specific POLIS activity listed)
Development period: starting and finishing dates	December 2010 to June 2012
Municipality department(s) involved: address, internet link and contact person(s) (name & e-mail)	<p>City of Munich - Department of Urban Planning - HAI - Strategical Urban Development and Planning Blumenstr. 31; D 80031 Munich; http://www.muenchen.de/rathaus/Stadtverwaltung/Referat-fuer-Stadtplanung-und-Bauordnung/Stadtentwicklung.html</p> <p>Ramón Arndt - ramon.arndt@muenchen.de Sylvia Pintarits - sylvia.pintarits@muenchen.de</p>
Other stakeholders involved (e. g. project developer, housing association)	<p>City of Munich - Department of Urban Planning - HAI - Urban Planning – areas: HAI/1 General and Legal affairs; HAI/2; HAI/3, ...</p> <p>City of Munich - Department of Urban Planning - HAI - Urban Housing and Urban Renewal areas: HAI/2 and HAI/3</p> <p>City of Munich - Department of Urban Planning - HAI - Building Permits and Historic Monuments areas: HAI/1 General and Legal affairs; HAI/5 Monuments</p> <p>City of Munich - Department of Environment (RGU) -</p>
Entity responsible of Pilot Action development: name, address, and contact person	<p>Ramón Arndt - ramon.arndt@muenchen.de</p> <p><i>As shown above</i></p>

According topic of Guidelines (No. / name)	4: Optimising planning process for solar potential in new areas; 5: Introducing solar criteria into purchase contracts, 6: Introducing solar criteria into land use plan, solar ordinance; 7: Criteria for call of tender/competitions
---	---

Munich Pilot Action 1 Own review

Pilot action Review Feb 2012	Development of a POLIS “Solar Guideline for Urban Planning” - Category 2
Strong points	The compilation of best practice planning instruments and procedures and the assessment of planning process and options for improvement in Munich lead to an increased engagement of the diverse stakeholders within the municipality. Due to the participative process the awareness of solar aspects rises, which could lead to further options within urban planning.
Points for improvements	The political and legal background is an unstable aspect and it is difficult to improve during profound changes being done. Additionally, the political will should be in line with the project targets and support from the decision making parties should be ensured early to make sure the cooperation of the diverse involved groups is settled.
What to do differently when replicating	Make sure to involve decision making parties in the process and remind them to act according to their targets. Define time budget for those that should give important inputs. Establish mutual understanding concerning project aims. Communicating more with command structure at different involved areas.
Critical local conditions	The general organization of the diverse areas within the municipality is quite complex. There is a lack of transparency for external parties about decisions and targets and the reasons for refusal of cooperation. Lack of human resources concerning dealing with “new” topics like climate and energy policies in existing administrative structures / areas.
General Guidelines resulting from pilot action	The general outcome of this pilot action is based on the work within the local working group. The assessment of the planning process, the relevant stakeholder to include and the dos and don't of solar urban planning will be described for the POLIS guidelines. This experience can help other cities and their consultants to find a way to include solar urban planning aspects in the projects.
External factors important for success	<ul style="list-style-type: none"> - robust legal framework to be applied (experience!) and stable political background at national and local level - broader understanding of basic aspects of building physics concerning future (zero emission) building performance - Political willingness and engagement with solar targets in the city - Encouragement for a sustainable solar city - Clear structures and shorter decision finding within municipal administration
External risks	<ul style="list-style-type: none"> - High complexity of topic related to addressed actors as “neighbouring professionals” (knowledge includes electricity / heat – thermal / passiv

	<p>gains) in an extremely dynamic field of action</p> <ul style="list-style-type: none"> - Constant changes and fluctuation concerning building legislation, existing supporting incentives and framework (market for solar energy) - Available time resources in a complex and broad planning process
Other comments	

Munich Pilot Action 1 Partner review 1.

Made by: ALE Lyon

Pilot action Review Feb 2012	Development of a POLIS “Solar Guideline for Urban Planning” - Category 2
Strong points	Many people can use the guideline because existing processes and instruments are used + different states of the projects are treated. Different departments of the city and the local energy supplier are strongly interested in renewables and push other partners to go further in their projects and planning.
Points for improvements	The stabilization of the political background permits easier integration of solar aspects in urban planning. The work on existing buildings is less developed than the work on new construction sites. The different processes and instruments identified might not be easily usable in other cities or countries or might not always permit the integration of solar aspects.
What to do different when replication	The different parties participating in the planning process (jury members, city council, urban planners...) need to have a certain knowledge to facilitate the integration of solar aspects in the planning process. The planning process is not the same in other cities or countries so the guideline might need an adaptation for the local background. It is interesting to assure that the instruments and the processes as well as the results and studies are easily usable for all the parties of the planning process. Permit an exchange between the different parties.
Critical local conditions	The different departments of the city need to be motivated and integrated into the planning process and need to work together (also with the other parties participating in the planning process). Concrete requests need to be formulated and the project needs to be accompanied through the whole design and construction process.
General Guidelines resulting from pilot action	The pilot action gives a good basis for other projects because it works on the organization in different stages of the urban planning process. It includes the aspects of passive and active solar energy into different existing processes and instruments and how to take in account the local legal and political background.
External factors important for success	The city of Munich as well as the Solar Initiative Munich want to meet the climate protection targets. The local energy supplier committed itself to cover the local energy demand at 100% by renewable in 2025. The city has already some experience in the integration of solar aspects in urban planning: city councils already take place for solar energy optimization of new areas with more than 500 dwellings.
External risks	Some groups or areas might not be willing to cooperate. Solar aspects need to be integrated in every planning phase and accompanied by the municipality and the different parties of the planning process. The legal background and the demand of the municipality need to be clearly defined.

Other comments	
----------------	--

Munich Pilot Action 1 Partner review 2.

Made by: City of Vitoria-Gasteiz

Pilot action Review Feb 2012	Development of a POLIS “Solar Guideline for Urban Planning” - Category 2
Strong points	The internal participation at the city council of 9 different planning and environmental departments is key to enrich the guideline and to create a strong commitment and responsibility for its successful deployment. Guideline supported by ambitious city objectives to cover 10% of local electricity demand with solar energy by 2015 with solar PV and 100% with renewables by 2025.
Points for improvements	Political decisions and misguidance, budget reductions and national legal energy framework modifications persist as the main risks for the deployment of solar or renewable energy initiatives.
What to do different when replication	Not evaluating the final product, but the process to design a guideline to be afterwards implemented in the city, the commitment and allocation of budget to promote renewables and solar by politicians and other decision makers seems to be the key aspect, where the works and tasks fulfilled afterwards may be worthless if this commitment fails.
Critical local conditions	Complex and diverse city council organization creates difficulties and barriers for effective and efficient decision takings not only in Munich, but in any other mid and large size municipalities. Interdepartmental teams needs to be created mandated by political decision to promote these initiatives.
General Guidelines resulting from pilot action	<i>Can not evaluate because there is no access yet to the guideline (English version)</i>
External factors important for success	<ul style="list-style-type: none"> - Clear and stable legal framework on solar and renewable energy. - Political support at European, national and local level. - Promotion of European funds or subsidies to promote solar installations (thermal and PV) and more nowadays with the cut of feed-in tariffs and the economical crisis affecting municipalities to promote large and costly investments. - Modernizing city council organization and management to create interdepartmental structures with clear objectives and budget to

	promote renewable or solar energy.
External risks	- Legal framework constantly changing to the worse, with cutting feed in tariff and stopping the promotion of renewable and decentralized energy sources by European and national politicians, mainly lobbied by gas, oil and electric industry sectors.
Other comments	- The "Urban Planning Guideline for Munich", the SOLENOP resolution, the Catalogue of Ecological Criteria and, the Solar Initiative Munich (SIM) and the solar requirements set in the tendering process is a very important output to share with the rest of the European Countries, so the translation of these documents into English is fundamental.

Paris Pilot Action 1 Summary

Name of Pilot action and category:	Large scale identification of solar potential and definition priorities
City	Paris
Summary of the pilot action (short intro)	Solar cadastre : it gives a local information about the solar opportunities of each building.
Background	First step of global solar identification
Development of the pilot action during POLIS project time – describe the activities	Create a grid to divide the territory in order to start a global solar calculation for the city of Paris. Make a solar calculation from a DEM with a GIS technology. Tests are made to offer a useful potential and not only a “raw” potential. In parallel a website is being developed.
Changes from original plans and reasons for that	The first step is to give a “raw” potential for our 1 st version of the website in 2012. In the 2 nd version in 2013, the useful potential will be available
Used instruments/tools	DEM, it is to say “a false” 3D vision of the territory. A SIG solar analysis.
Main result/outcome and possible impact to long-term Action Plan	The main objective is to develop local initiatives of solar developments
Publications – list and links	We are waiting to communicate, we will do it just before summer 2012
Photo/drawings/ etc	
Development period: starting and finishing dates	From the beginning of Polis to the end of 2012 for the 1 st version of the tool.
Municipality department(s) involved: address, internet link and contact person(s) (name & e-mail)	Paris.fr
Other stakeholders involved (e. g. project developer, housing association)	No one at present
Entity responsible of Pilot Action development: name, address, and contact person(s) (name & e-mail)	APUR, 17 bd Morland 75004 Paris (www.apur.org)
According topic of Guidelines (No. / name)	

Paris Pilot Action 1 Own review

Pilot action Review Feb 2012	Large scale identification of solar potential and definition priorities
Strong points	The tool gives a global overview of solar potential for 80 000 buildings of Paris.
Points for improvements	The calculated potential is a raw potential, it is to say that the real potential is lower than estimated. A slope calculation of the roof will be used to approach the real potential.
What to do different when replication	A typological review of the buildings is needed. It will be different for each city. The typological review is necessary to determine the constraints of practical installation of the panels.
Critical local conditions	The identification of flat roofs is the main issue in the parisian case. Thoses roofs are the only ones with patrimonial facilities and are numerous in Paris. Thoses ones are the first step of a global policy for solar encouragement
General Guidelines resulting from pilot action	The use of DEM is the easiest way to evaluate solar insolation at a large scale, i.e. the city scale.
External factors important for success	It's important to have a DEM of the city (at least 50cm per pixel) and to have a GIS map of each building in the city.
External risks	The communication around the tool (for ex. the website) has to be followed by a campaign of explanation of the possibilities and limitation of the solar energy in the case of the parisian buildings.
Other comments	-

Paris Pilot Action 1 Partner review 1.

Made by: Lund University

Pilot action Review Feb 2012	Large scale identification of solar potential and definition priorities
Strong points	In this pilot action an efficient tool has been developed by using Lidar data and GIS program, which gives the possibility to make surveys over large areas with buildings analysing the irradiation and potential use of solar energy from the roofs of the buildings.
Points for improvements	The user interface may be developed for different purposes. The raw potential should be converted to real potential (planned to be realized in 2013).
What to do different when replication	Criteria for different types of buildings should be developed as well as special values like historical or architectural considerations.
Critical local conditions	By improving the Lidar data and decrease the level of 50 cm/pixel, the potential analyses will be more accurate. The majority of the buildings have flat roofs and they are better analysed compared tot he buildings with strong slopes.
General Guidelines resulting from pilot action	The developed methodology should be applicable for other cities.
External factors important for success	Cities must have or get Lidar data in order to use the method.
External risks	It may be difficult to include all constrains for using the roof for solar energy applications in the information to people.
Other comments	

Paris Pilot Action 1 Partner review 2.

Made by: UPM, Madrid

Pilot action Review Feb 2012	Large scale identification of solar potential and definition priorities
Strong points	The methodology used is applicable to huge areas like Paris. A web dissemination program is being developed. This can be useful to communicate the citizens the solar potential of their buildings roofs, in terms of solar annual gain
Points for improvements	The solar potential assessment is translated into a mean solar irradiation value for each building by averaging the different roof surfaces. The methodology does not take into account the different values for each roof part. It could be possible that the use of the optimum building's roof part to install solar panels therefore the solar potential assessment of individual surfaces would be advisable. Surface available, structural conditions, legal conditions and historical protection issues are not being considered.
What to do different when replication	The methodology should be adapted to local conditions such as historical protection laws, legal conditions, structural conditions of the buildings and local climate study. The dissemination campaign must be adapted to the local social context.
Critical local conditions	The huge size of Paris makes necessary a simplification of the parameters taken into account, i.e.: details of construction elements or detailed structural information cannot be taken into account. Quality of input data (LiDAR, Digital Elevation Models, GIS) are in this sense essential for performing the solar potential assessment under reasonable timeframe conditions.
General Guidelines resulting from pilot action	The combination of Digital Elevation Model and Solar Analyst GIS software is an adequate methodology for big areas due to the high level of automation of the process.
External factors important for success	<ul style="list-style-type: none"> -It is necessary the availability of LiDAR data or a Digital Elevation Model of the city and GIS data of the city. -A good dissemination campaign must be designed in order to communicate the outcomes of the pilot action. This would encourage stakeholders to implement solar energy systems.
External risks	-Changeable financing systems due to political decisions could be a risk and a difficulty to communicate clearly the results of the pilot action.
Other comments	-

Vitoria-Gasteiz Pilot Action 3 Summary

Name of Pilot action and category:	Assessment of the general Solar Potential of the city of Vitoria-Gasteiz
City	VITORIA-GASTEIZ
Summary of the pilot action (short intro)	<p>Calculation of the global annual radiation incident on the roofs of Vitoria-Gasteiz and evaluation of the suitability of these roofs for installing solar energy Systems.</p> <p>LIDAR Data have been used to create a Digital Elevation Model (DEM) of the city. The radiation incident has been calculated through the ArcGIS Solar Radiation Tool, using the DEM and radiation data adapted to Vitoria-Gasteiz provided by UPM Solar Energy Institute. Once the radiation incident has been calculated, different filters have been applied to identify the roof parts which are really suitable for solar energy panels. Some of these filters are surface available, building protection and structural conditions.</p>
Background	<p>After developing Pilot Action 1 „Assessment of the detailed Solar Potential of Lakua Residential district” and Pilot Action 2 „Assessment of the detailed Solar Potential of Jundiz Industrial Area”, it has been concluded that it is not possible to apply this methodology at a city scale due to the huge amount of data that should be used.</p> <p>The availability of LIDAR data has been a key factor to create a Digital Elevation Model of the city. The use of GIS software for Solar Radiation Calculation using the DEM avoids a case by case study. This combined with the cartography incorporating a high detailed definition of the roof parts has been translated into a detailed solar potential map of the whole city.</p>
Development of the pilot action during POLIS project time – describe the activities	<p>Three cartographic sources are being used simultaneously:</p> <ol style="list-style-type: none"> 1.-Cartography 1:500. This cartography provides detailed definition of the roofs. 2.-Digital Elevation Model (DEM) of the city. From the LIDAR data a DEM has been created. Afterwards the ArcGIS solar radiation tool has been used to calculate the global annual radiation incident on the city. This tool has incorporated the data indicated by UPM Solar Energy Institute in order to adapt it to the local conditions. 3.-General Urban Development Plan. This Plan includes cartography related to zoning, ordinances and protected areas. This maps have been used to identify determining factors for installing Solar Energy System on the roofs. Some of these factors are protected buildings, structural conditions and surface available. <p>The methodology created follows this procedure:</p> <ol style="list-style-type: none"> 1.-Creation of a Digital Elevation Model (DEM) of the city from LIDAR data (Light Detection and Ranging). This DEM has been used for calculating the global annual solar radiation incident on the roofs through ArcGIS solar tool. This tool has been previously studied by UPM Solar Energy Institute in order to adapt it to Vitoria Local Conditions. 2. - Creation of a Cartography GIS from 1:500 CAD Cartography. This cartography includes a detailed definition of the roof parts. 3.-Calculation of Mean Value and Standard deviation of Global Annual radiation Incident on each part of the roof. 4.-Combination of this radiation values per roof part with other determining factors to install solar energy Systems. Some of these factors are surface available, building protection and structural conditions.
Changes from original plans and reasons for that	The methodology developed in this pilot action hasn't changed. It has been an adaptation of the methodology developed in pilot actions 1 and 2 but taking


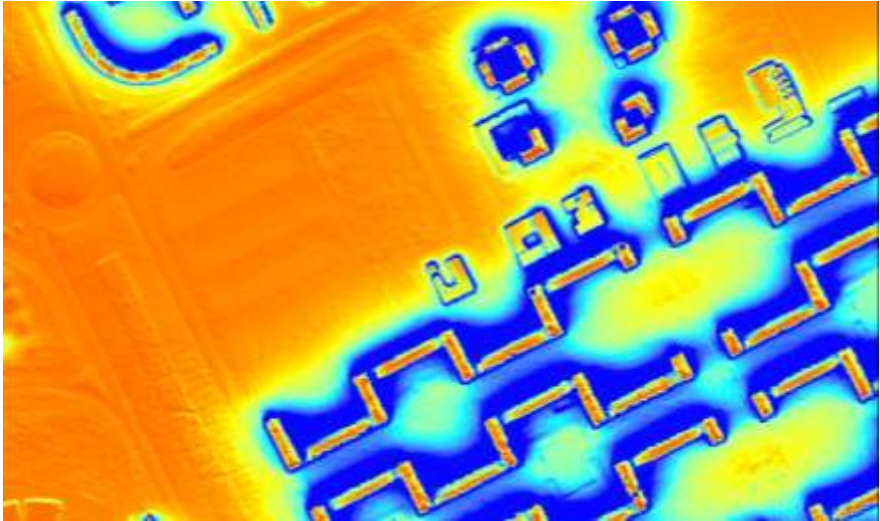
	into account the huge amount of data to be used at a city scale and the possibility of using the LIDAR data.
Used instruments/tools	AUTOCAD ArcGIS UPM Solar Energy Institute Software
Main result/outcome and possible impact to long-term Action Plan	1.-Methodology applicable to any city. 2.-The creation of solar potential maps of the whole city can be a great Communication material to rise awareness between the stakeholders (citizens, professionals and industry associated to solar energy and construction sector). 3.-Possibility to determine requirements related to solar energy in ordinances and legal texts.
Publications – list and links	This methodology has not been published yet.
Photo/drawings/ etc	 <p data-bbox="523 1330 1407 1361">Fig.1. Local Cartography which provides detailed definition of the roofs.</p>  <p data-bbox="523 1939 1407 1971">Fig. 2. Global annual radiation map.</p>



Fig. 3. Map sample applying mean radiation values for each roof part and considering filters to identify roof parts which are actually suitable for installing Solar panels. Some of these filters are surface available, building protection and structural conditions.

Development period: starting and finishing dates	September 2011-Currently
Municipality department(s) involved: address, internet link and contact person(s) (name & e-mail)	Environment and Public Space Department. Urban Planning Department. San Prudencio Street, 30. 01105 Vitoria-Gasteiz. www.vitoria-gasteiz.org Xabier Marrero (xmarrero@vitoria-gasteiz.org)
Other stakeholders involved (e. g. project developer, housing association)	None
Entity responsible of Pilot Action development: name, address, and contact person(s) (name & e-mail)	UPM. Universidad Politécnica de Madrid Calle de Ramiro de Maeztu, 7 28040 Madrid
According topic of Guidelines (No. / name)	Tools for solar potential identification

Vitoria-Gasteiz Pilot Action 3 Own review

Pilot action Review Feb 2012	Assessment of the general Solar Potential of the city of Vitoria-Gasteiz
Strong points	Identification of solar potential for each roof part. Identification of parameters related to the possibility of installing solar energy systems different from incident radiation (Building protection, structural conditions, Minimum surface available, etc)
Points for improvements	It is difficult to identify the structural conditions at a city scale without assessing case by case. This is especially difficult in buildings which were constructed before 1988.
What to do different when replication	Identification of Kt and Kd value. LIDAR availability Availability of Cartography with a detailed definition of roof parts.
Critical local conditions	Temporal Spanish Elimination of solar energy subsidies.
General Guidelines resulting from pilot action	Possible relationship between kind of urban fabric and solar potential
External factors important for success	Institutional Support Project dissemination
External risks	Current economic situation
Other comments	-

Vitoria-Gasteiz Pilot Action 3 Partner review 1.

Made by: Paris, APUR

Pilot action Review Feb 2012	Assessment of the general Solar Potential of the city of Vitoria-Gasteiz
Strong points	<p>The method allows an estimation at a global scale, an also at local scale. This approach of different scales is the strongest point of this pilot action.</p> <p>A specific work is done on each roof in the area of the project. This point gives a really precise idea of the solar potential.</p>
Points for improvements	An improvement should be done to permit an automatic cartography of the details of each roof. It's not obvious that I could be done at present with the LIDAR precision.
What to do different when replication	It can be replicated everywhere, that's a strong point of that method.
Critical local conditions	The local conditions seem strongly focused on PV, the possibilities of solar thermal need also specific studies
General Guidelines resulting from pilot action	The GIS tools available on the market allow at present a global understanding of solar possibilities which was not the case few years ago.
External factors important for success	A good GIS is needed, a precise DEM is needed too.
External risks	That kind of tool needs to be integrated in a global urban strategy.
Other comments	-

Vitoria-Gasteiz Pilot Action 3 Partner review 2.

Made by: City of Munich

Pilot action Review Feb 2012	Assessment of the general Solar Potential of the city of Vitoria-Gasteiz
Strong points	Learning Process concerning different Instruments for solar analysis, beginning with hand Made Tools and reaching high level standard using LIDAR Data to create a Digital Elevation Model (DEM) Experience will be useful for spreading around to other Spanish cities
Points for improvements	As an external expert I could not tell in detail without more information; Beyond the analysis level tool: German experiences show, that the biggest effect using "Solar Potential analysis" is generated by combining the illustrative Information with other Applications (information about costs, income by feed In Tariff, local companies installing panels...) on a public website. If given a hotline investors seem to be motivated to install more PV / solarthermal devices
What to do different when replication	Knowing the amount of effort that was given to the Pilot actions 1 and 2 I would say: next time let's begin with Action 3 (knowing that at the beginning in 2010 there probably still was no LIDAR Data available for Euskadi ...
Critical local conditions	I see the big choice developing the tool for public access via Internet specially reflecting that Vitoria-Gasteiz is European Green Capital. They have the competence and background knowledge to develop it further on getting in contact with potential investors even without lucrative Feed In Tariff
General Guidelines resulting from pilot action	It's not only analysis and planning tools that will get solarization increase in urban environment: a stronger information policy about potentials and a close involvement of local Stakeholders applying those results developed will make a difference.
External factors important for success	Once having gained the knowledge about this tools it should be important to spread this in national conferences – the gained knowledge is basic for defining a tool ore strategy for transmission (e.g. instruction of consultants)
External risks	Possibly None – May be: Technology is developing with high velocity. You must follow the development actively
Other comments	