



LISBOA **e-nova**
AGÊNCIA MUNICIPAL DE ENERGIA E AMBIENTE



SOLAR THERMAL IN CLASSIFIED CITY QUARTERS
LISBON HISTORICAL BAIXA POMBALINA

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SOLAR PRAXIS, BERLIN, 22ND NOVEMBER 2012

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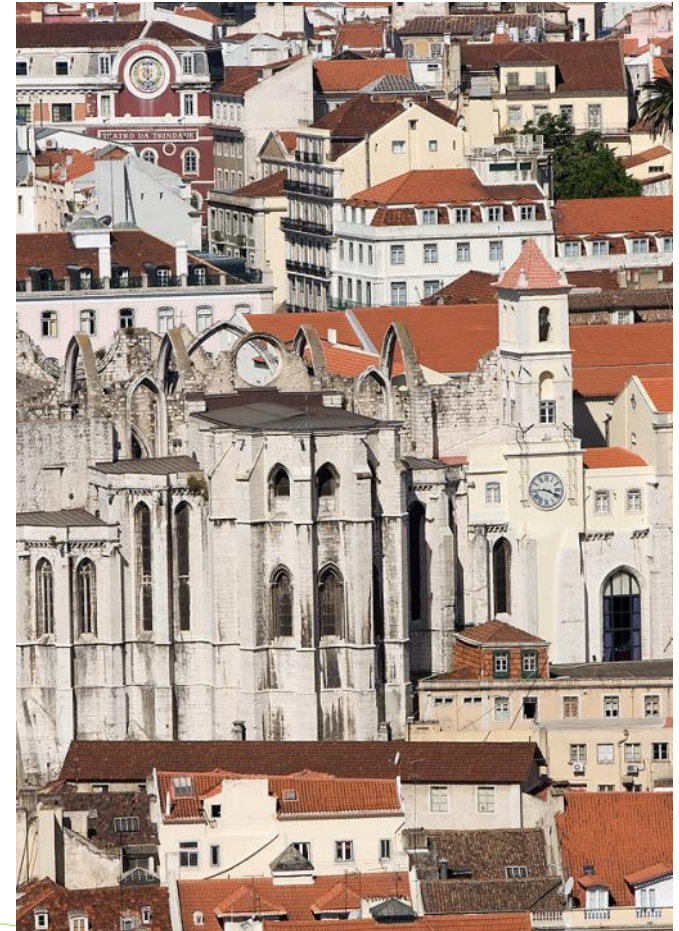
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LISBOA E-NOVA

MISSION

To contribute to Lisbon's sustainable development through the promotion, dissemination and outset of good practices.

Aims at promoting the systematic improvement of the energy-environment performance of the city, involving the city's main stakeholders, from political actors to economic agents and the community.

12 Employees

7000 Mailing list subscribers

50 Communication actions/year

25 Current projects

AFFILIATES



LISBOA E-NOVA



CLASSIFIED CITY QUARTERES – THE CHALLENGES

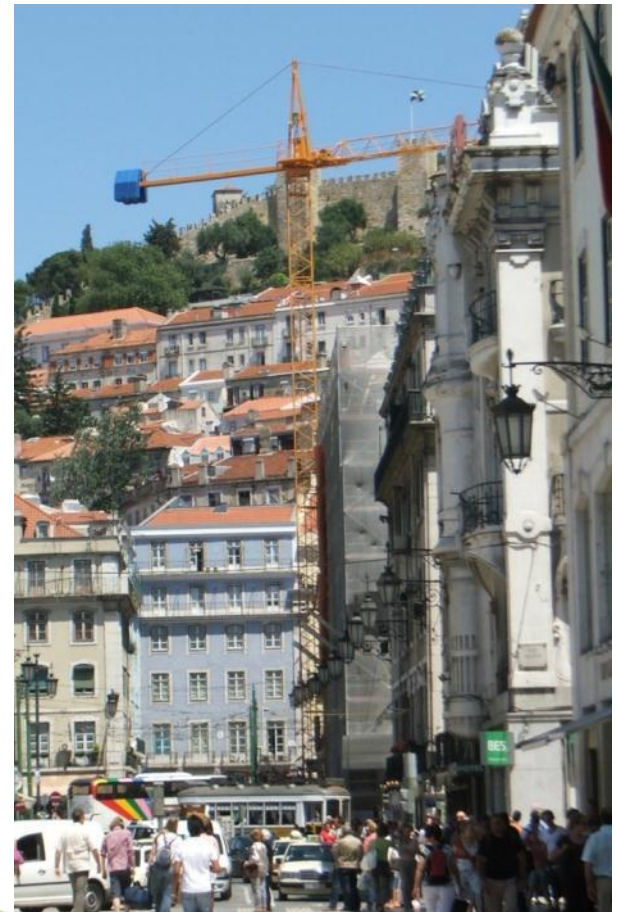
Classified buildings, both residential and services

Historical value to the city and the country;

Untouchable status – to maintain the image!

Nevertheless these areas are highly abandoned due to the fact that the offer resumes to:

- Old buildings that need structural reinforcement;
- Old buildings that lack actual patterns of comfort ;
- Old buildings that do not have garage;
- Old buildings that do not have lift;
- Old buildings that need to comply with strict refurbishment criteria;
- Old buildings with a low energy performance

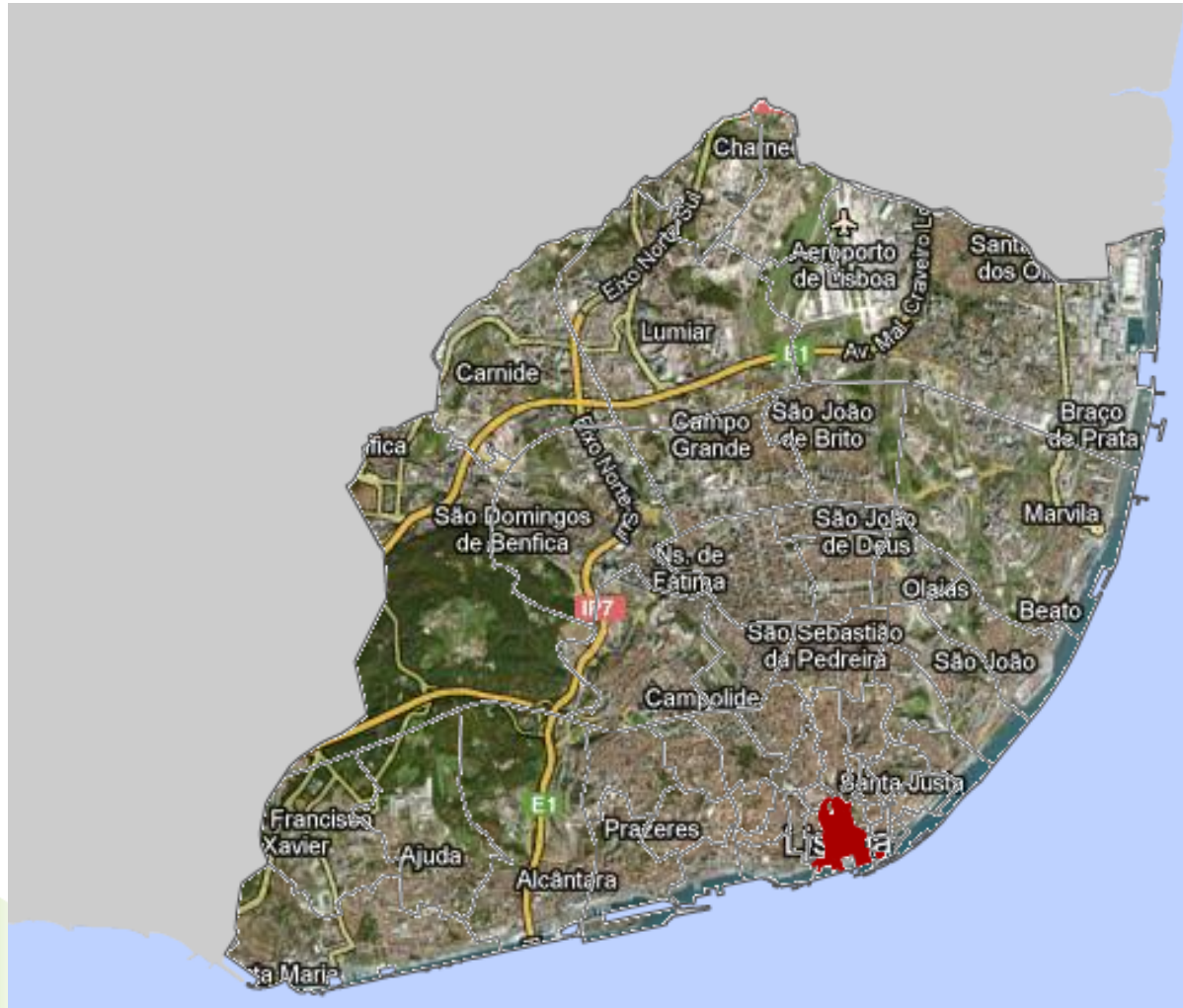


CLASSIFIED CITY QUARTERS – REFURBISHMENT OPPORTUNITIES

- Thermal insulation of the facades;
- Thermal insulation of the roofs;
- Thermal insulation of the floor;
- Install energy efficient windows;
- Promote natural ventilation;
- Integrate renewable energy technologies
 - Solar thermal;
 - Solar photovoltaics.



THE BAIXA POMBALINA AREA

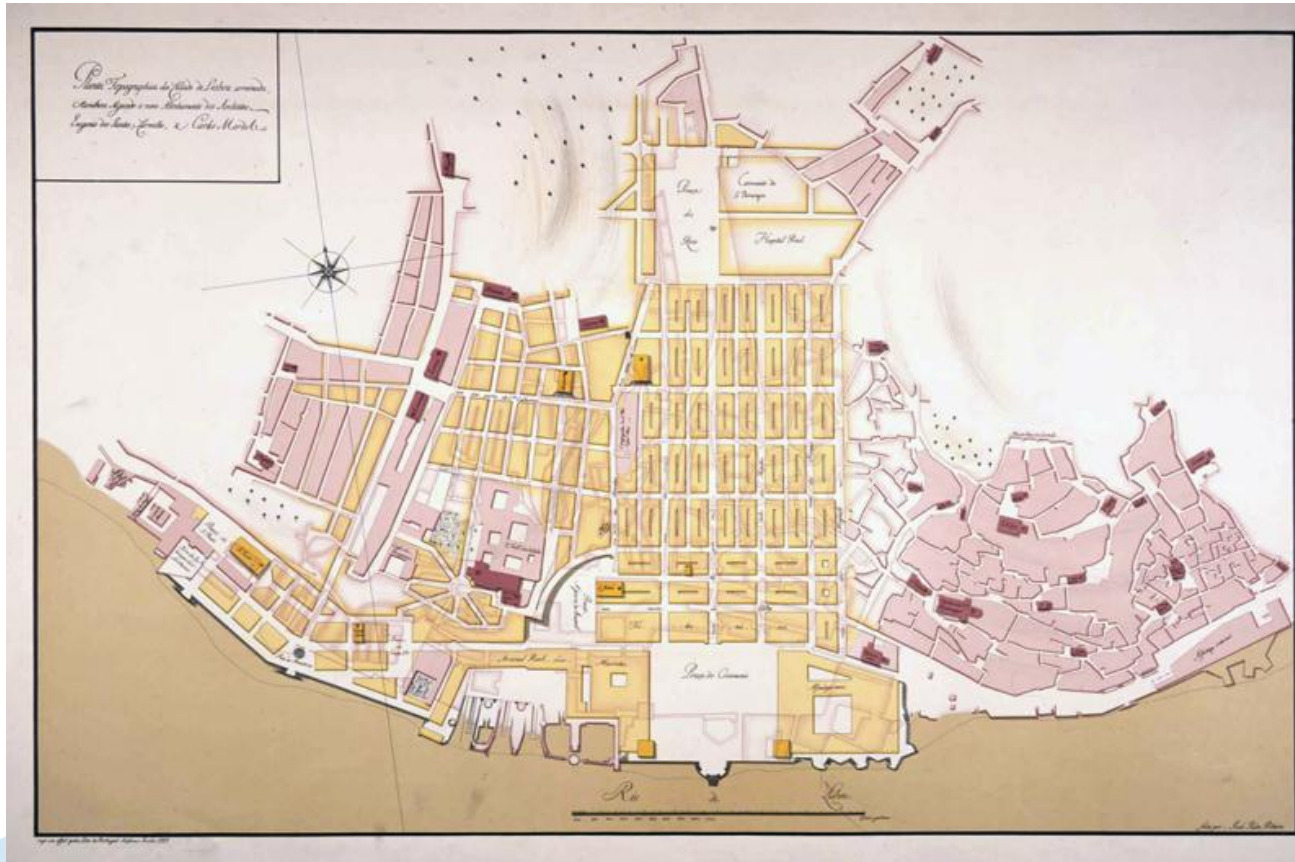


THE BAIXA POMBALINA AREA – the 1755 earthquake



Vorstellung von Lissabon vor und in dem erbeben des 1. Novembris 1755
www.museudacidade.pt/,

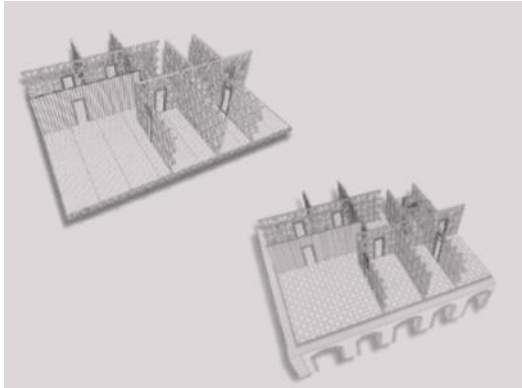
THE BAIXA POMBALINA AREA – the new urban plan in 1758



Benefactor: Marquês de Pombal
Architects Eugénio dos Santos Carvalho e Carlos Mardel

“Lisboa O Plano da Baixa hoje – Exposição”

THE BAIXA POMBALINA AREA – the buildings



“A Baixa Pombalina: da inovação ao mito”



“Lisboa Plano da Baixa Hoje – Exposição”

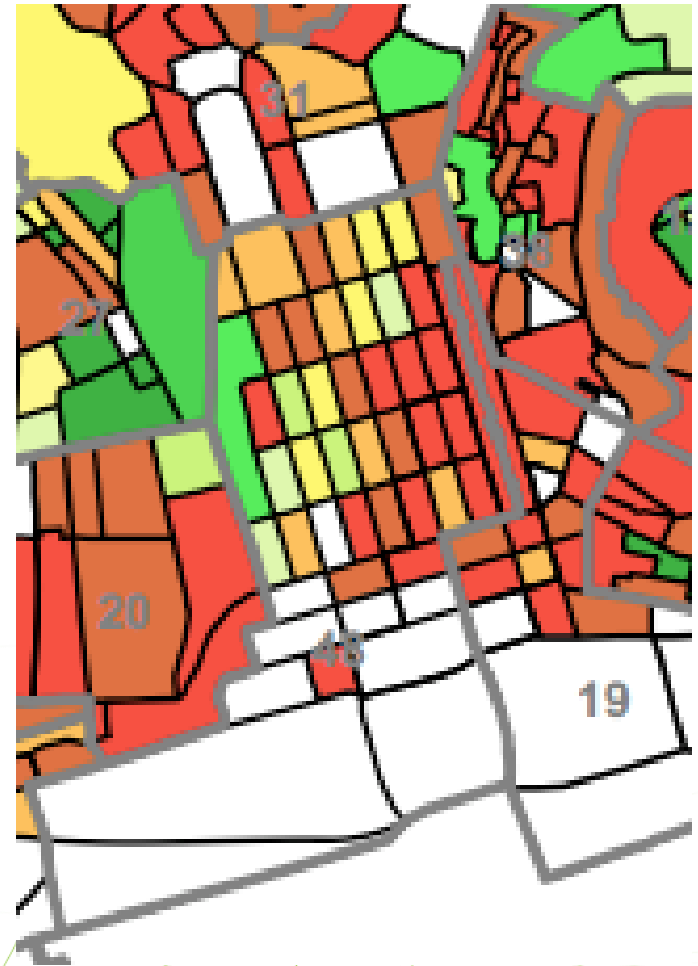


THE BAIXA POMBALINA AREA – today

The Baixa Pombalina area is listed as national patrimony. **Despite the historical status of this Central Historic Area, Baixa Pombalina is one of the least inhabited areas of Lisbon.**

- buildings average age is 75 years old;
- 85% of the buildings do not have a lift;
- 77,6% inhabitants are over 70 years old;
- 96,4% of the inhabitants are retired;
- 87,8% lives in a rented house.

To overcome this fact and urge into the requalification of the area, the Lisbon Municipality defined the **Municipal Framework for the Baixa Pombalina Detailed Safeguard Plan** that establishes the refurbishment conditions for the area.

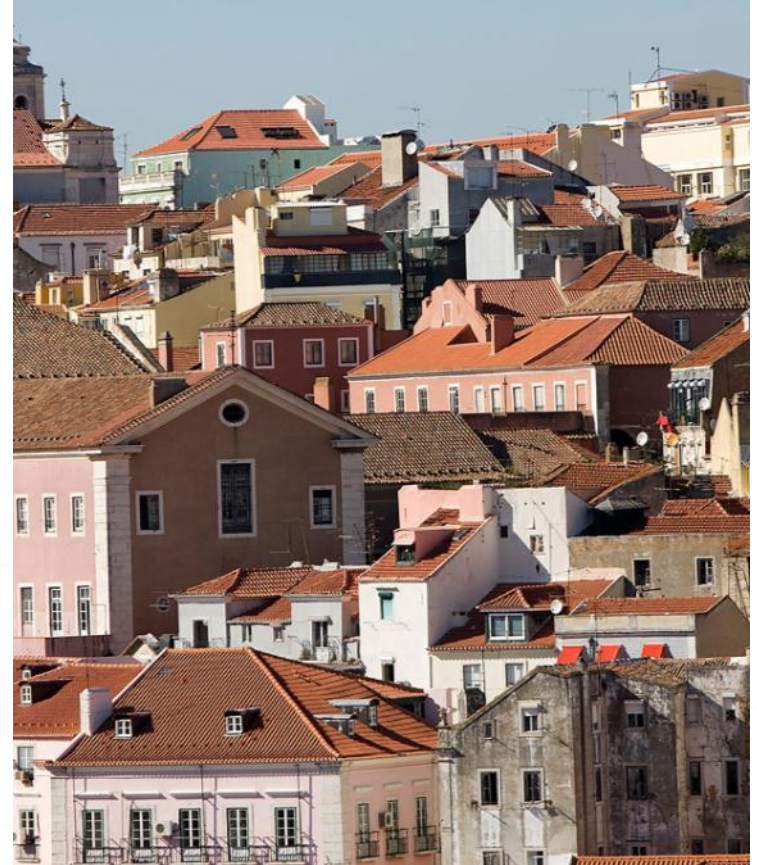


THE BAIXA POMBALINA AREA – today

Dealing with the problematic abandon and desertification of Lisbon's most important historical area, the Lisbon Municipality decided to define an intervention programme, aimed at the urban requalification and revitalization of the Baixa Pombalina area.

The Municipal Framework for the Baixa Pombalina Detailed Safeguard Plan establishes the refurbishment conditions for the Baixa Pombalina area.

It's essential to foster real state promoters interest in this area, and for that define at an early stage the rules for intervention.



THE BAIXA POMBALINA AREA – the requalification plan

Being an historical area all the buildings in this area are not required to oblige to the national STO (1sqm per inhabitant).

Nevertheless, the Municipal Framework for the Baixa Pombalina Detailed Safeguard Plan was perceived as an opportunity to improve buildings energy performance, regarding the possibility to respond to the legal requirements, also in terms of solar thermal systems integration.



THE BAIXA POMBALINA SOLAR INTEGRATION MAP

STAKEHOLDERS

Lisboa E-Nova – Local Energy Agency

Lisbon Municipality

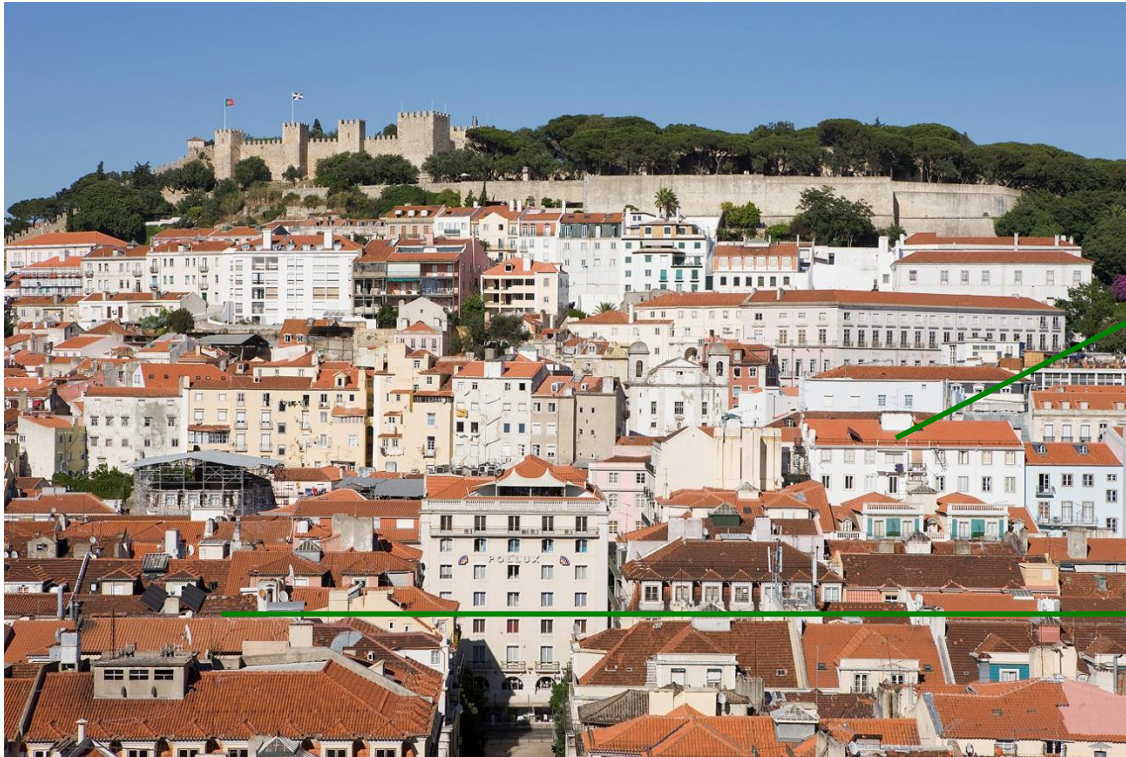
The Urban Requalification Direction
The Baixa Chiado Protection Unit

IGESPAR - The Institute responsible for the management and conservation of the national archaeological and architectural heritage.

Solar Thermal industry



THE BAIXA POMBALINA SOLAR INTEGRATION MAP



THE BAIXA POMBALINA SOLAR INTEGRATION MAP

INPUTS



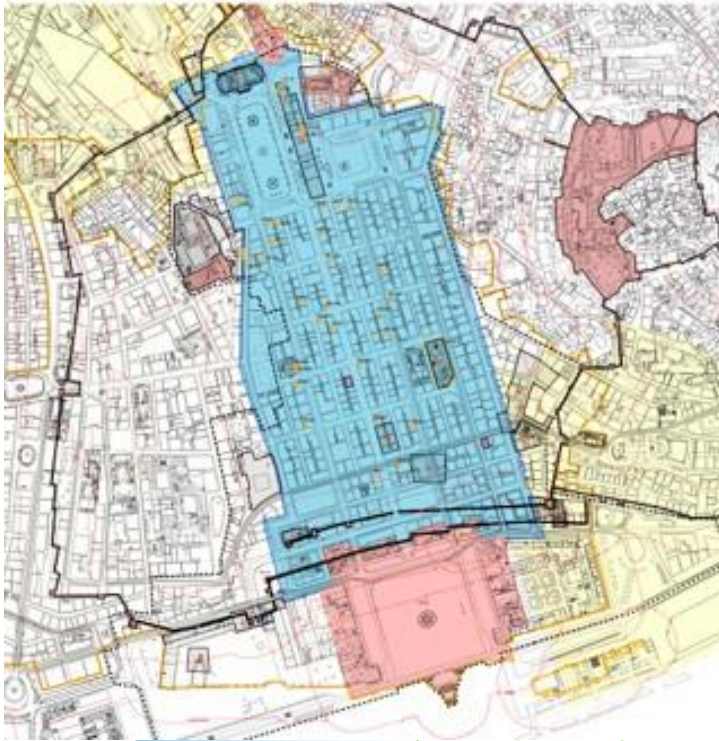
Aerialphotomap, 2006



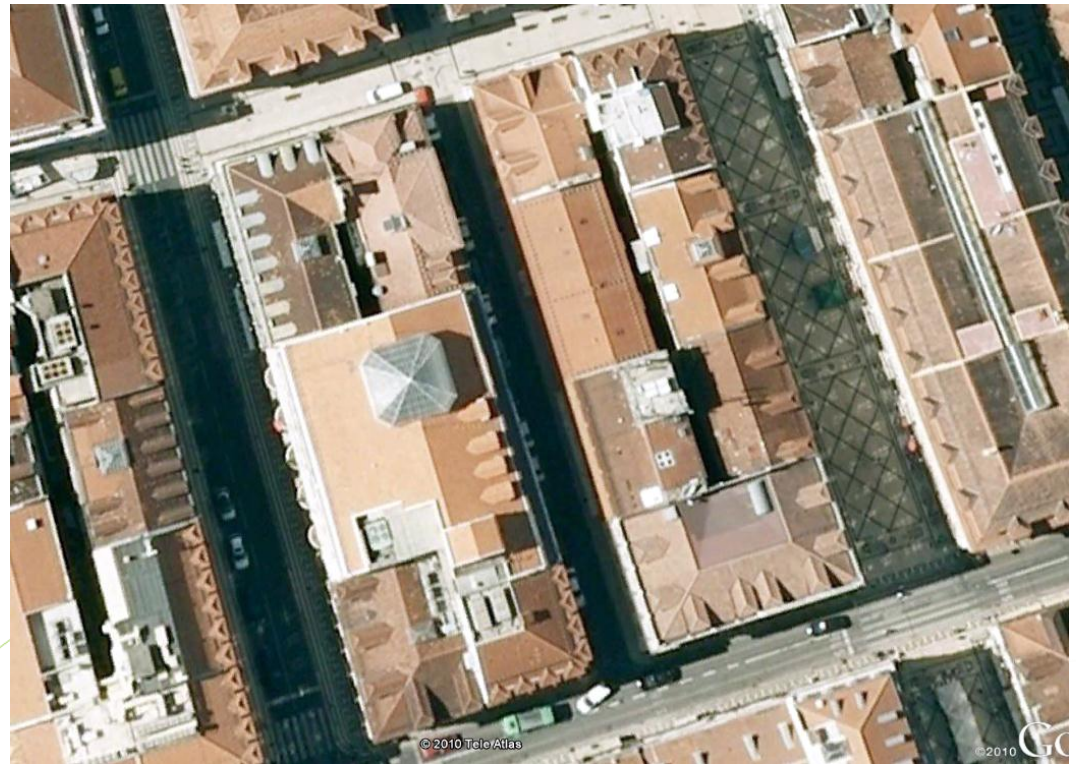
Blocks and buildings limits

THE BAIXA POMBALINA SOLAR INTEGRATION MAP

INPUTS



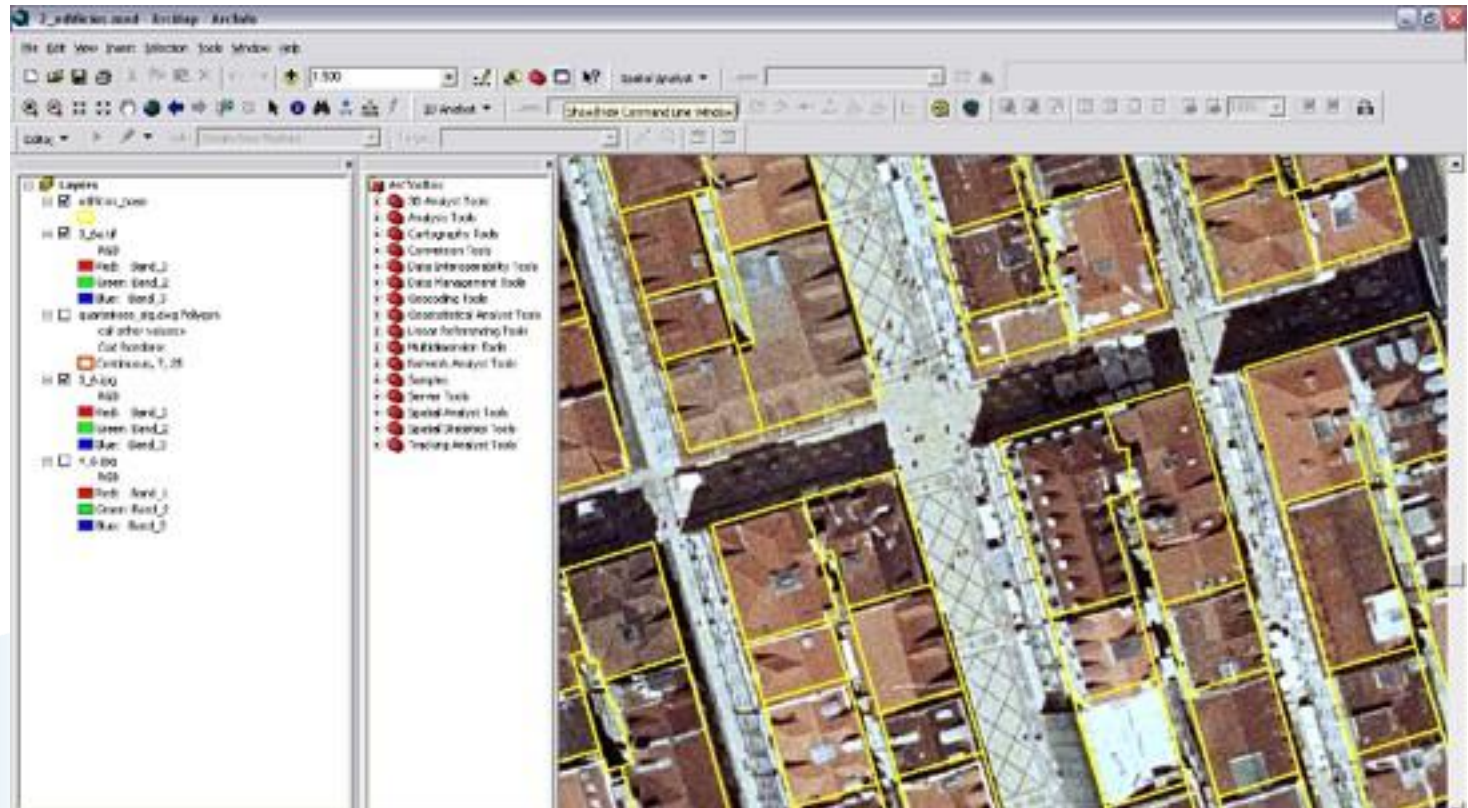
List of the classified buildings.



Photographic assessment of roofs

THE BAIXA POMBALINA SOLAR INTEGRATION MAP

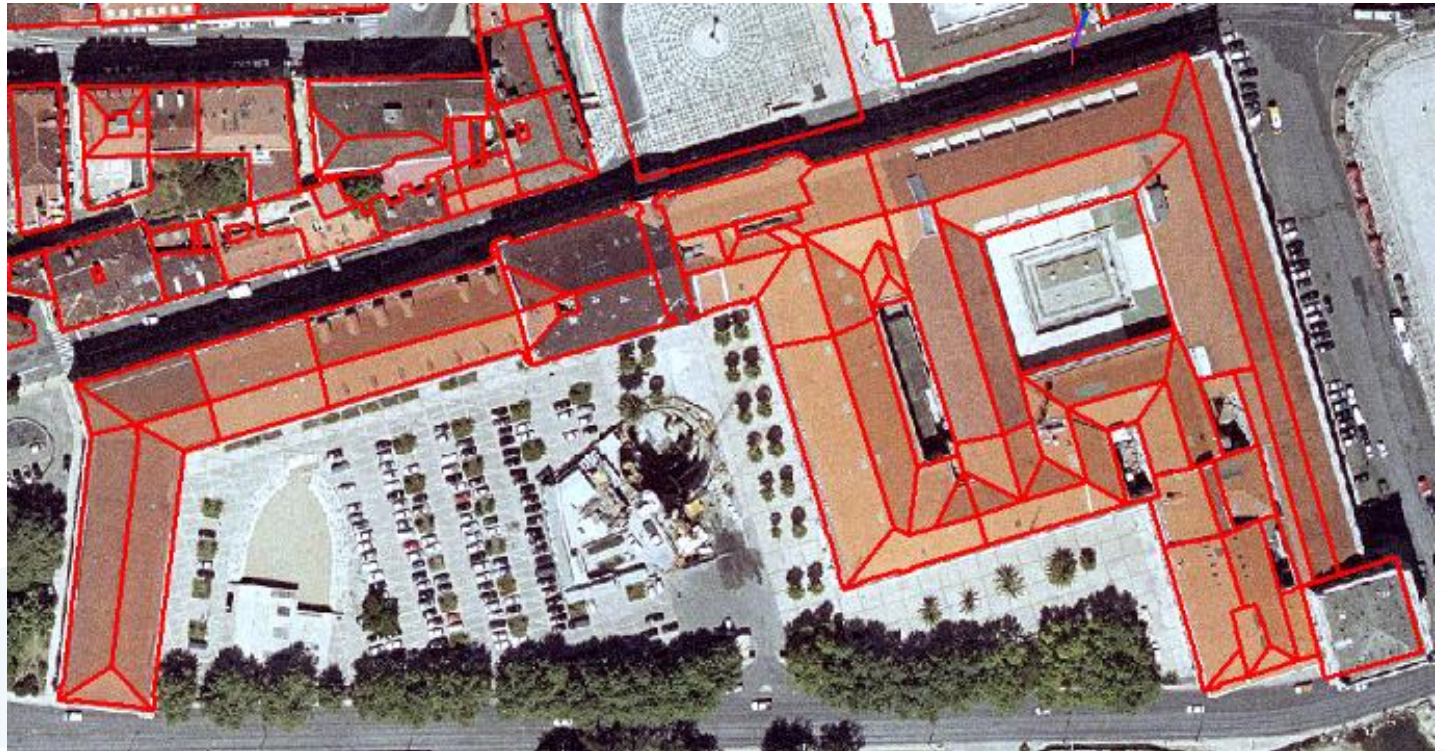
METHODOLOGY



ArcGis,
scale 1/1000

THE BAIXA POMBALINA SOLAR INTEGRATION MAP

METHODOLOGY

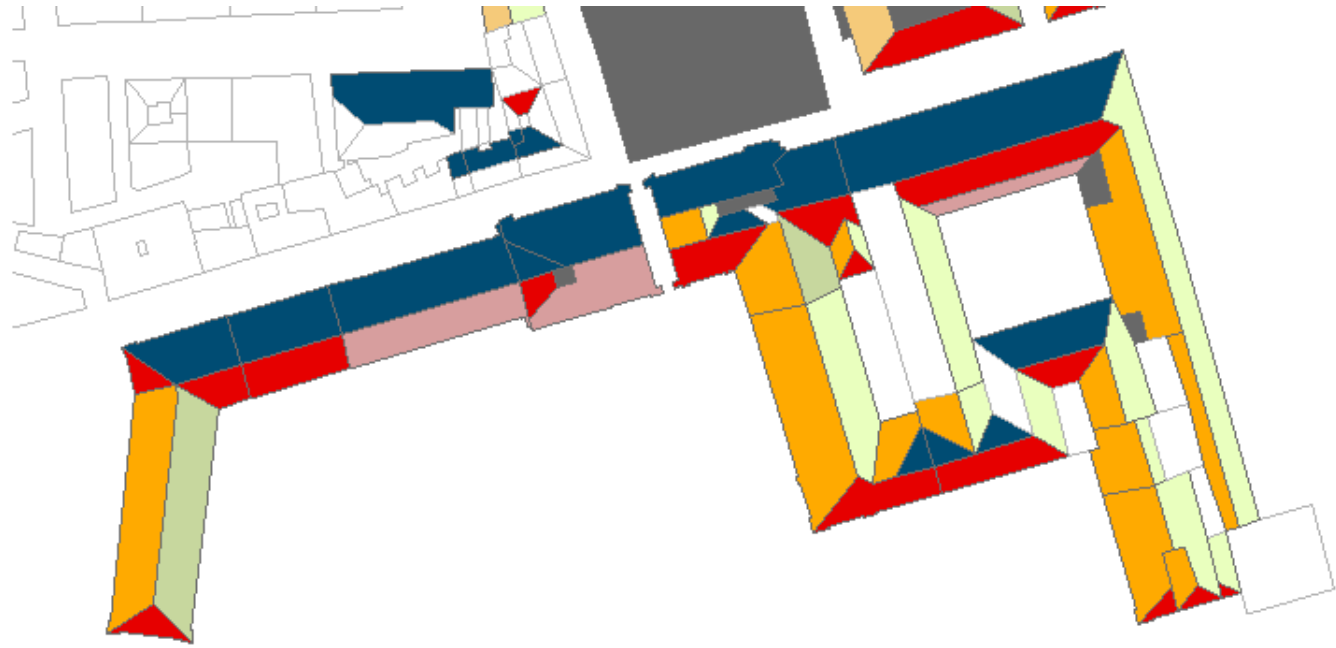


Definition of
the roof covers
limits
according to
the roof
orientation.

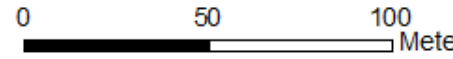
THE BAIXA POMBALINA SOLAR INTEGRATION MAP





METHODOLOGY

Classification of the roof covers orientation.

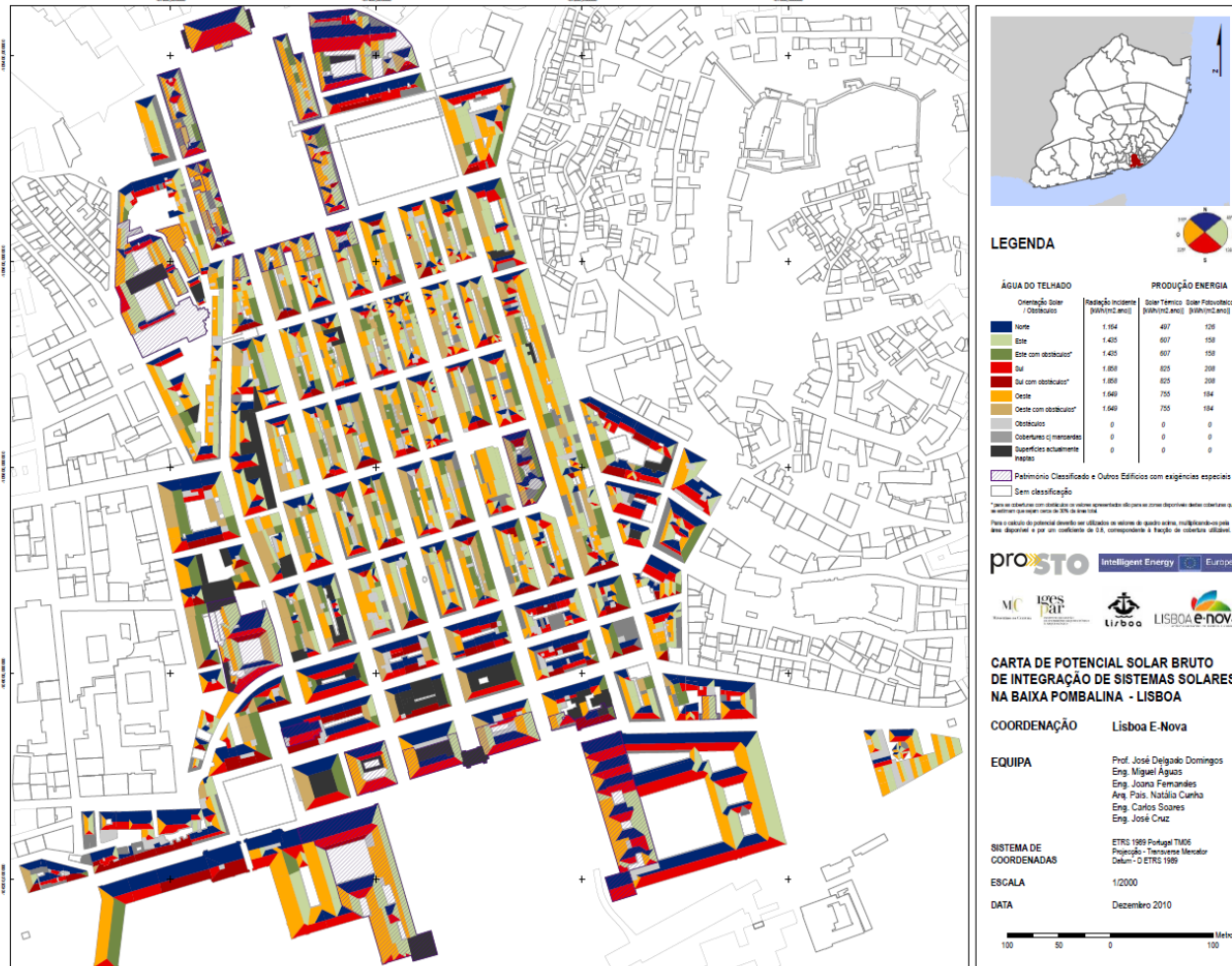


Escala 1/2 000



Orientation	Subtitle
East	
South	
West	
North	

THE BAIXA POMBALINA SOLAR INTEGRATION MAP



THE BAIXA POMBALINA SOLAR INTEGRATION MAP

THE POTENTIAL

Orientation	Area (Average Slope 30°)		
	TOTAL	EFFECTIVE MIN. (covers without obstacles)	EFFECTIVE MAX. (covers with obstacles)
	m ²	m ²	m ²
South	30,762	17,065	19,856
East	49,279	24,388	30,022
West	55,688	28,927	34,781
North	35,884	23,058	23,058
Horizontal	0	0	0
Total	171,613	93,439	107,718

THE BAIXA POMBALINA SOLAR INTEGRATION MAP

THE POTENTIAL

- 652 buildings
- 5 floors/building
- 2 apartments/floor



Domestic hot water

- 1 bath eq. => 2.1 kW

(40 l/day.apartment of DHW at 60°C, $T_{\text{tap water}}=15\text{ °C}$)

- 3 baths/day.appart. \Rightarrow **14.9 GWh/year**

6500 fogos

Solar Fraction 70%

**17% of the total
available area**
Without obstacles

$E_{\text{solar}} = 10.4\text{ GWh/year}$

THE BAIXA POMBALINA SOLAR THERMAL OBLIGATION

Municipal Framework for the Baixa Pombalina Detailed Safeguard Plan,

Article 22º

Roof Covers

2 Intervention in the roof covers are only allowed for the following works:

...

f) integrating solar energy technologies;

3. Intervention works for changes in roof covers are allowed to:

...

h) Installing solar energy technologies in the locations not excluded in the Solar Systems Integration Potential Map for the Lisbon Baixa Pombalina Area.

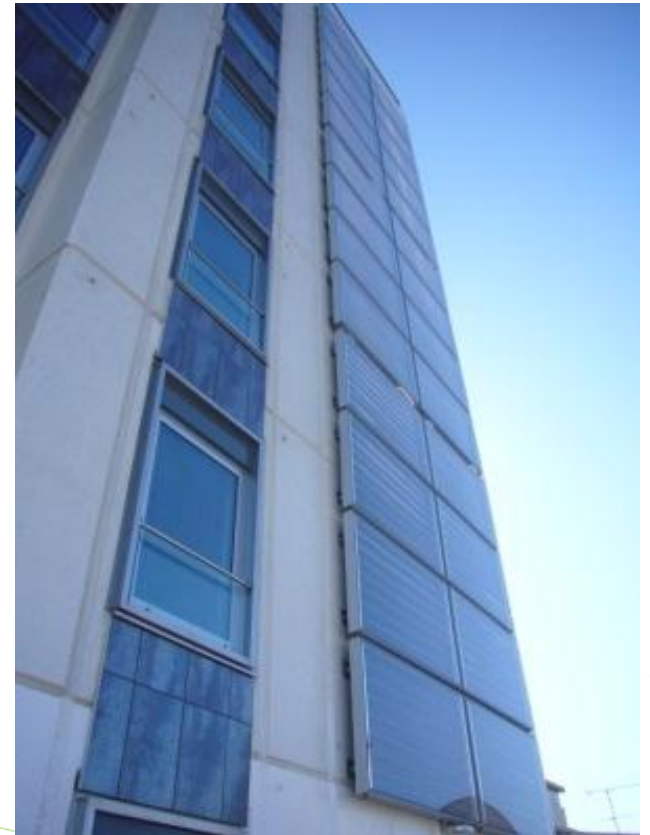
4. The installation of STS should be done according to the Manual for integration of Solar Systems in Lisbon's Baixa Pombalina.

THE BAIXA POMBALINA SOLAR THERMAL INTEGRATION

- a) the integration of solar panels on the roof cover is compulsory, and the installation should be performed in accordance with the roof's orientation and slope, not interfering with the support structure of the existing coverage and the overall composition of the adjoining buildings roof covers;
- b) the integration of solar panels must consider the criteria of integration that enables the preservation of the various types of roofs in the Baixa Pombalina area. The integration proposal must be submitted along with the architecture plan;
- c) the STS must be of forced circulation, concealing the storage tank in the building;
- d) the non-integration of the STS may be accepted subject to technical reasons.

APPLICATION OF SOLAR THERMAL SYSTEMS

Solar thermal collectors are installed within the building's existing architecture, without jeopardizing the aesthetics' of the building and even enhancing it's overall image.



INTEGRATION OF SOLAR THERMAL SYSTEMS



Solar thermal collectors are embedded in the building's skin (roof or façade) performing a wider set of functions other than the exclusive production of energy.

Constructive functions;
Aesthetical functions;
Protective functions, etc.

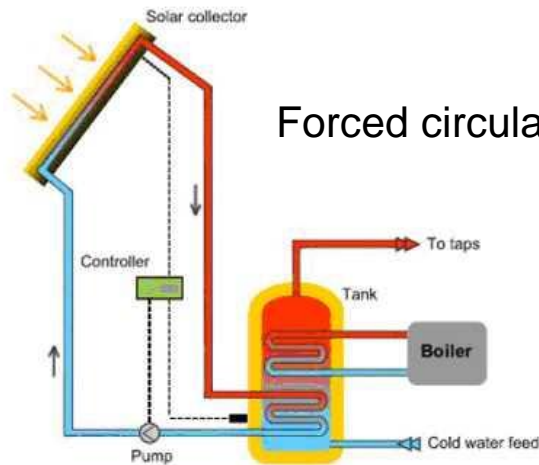
BiST – building integrated solar thermal



THE BAIXA POMBALINA SOLAR THERMAL INTEGRATION



Integration STS in the roof cover



Forced circulation system



BAIXA POMBALINA SOLAR INTEGRATION POTENTIAL

The goal:

Evaluate the best areas to select good value projects;

To highlight that it's possible to combine solar technologies with historical patrimony and enhance the historical value of this area, responding to buildings energy performance demandings and confort criteria that todays inhabitants require;

Attract new inhabitants to the Baixa Pombalina area.



BAIXA POMBALINA SOLAR INTEGRATION POTENTIAL

The forthcoming challenges:

Partnerships;

Evaluate the building's roof structural capacity to support solar collectors;

Challenge new forms of integration and design.

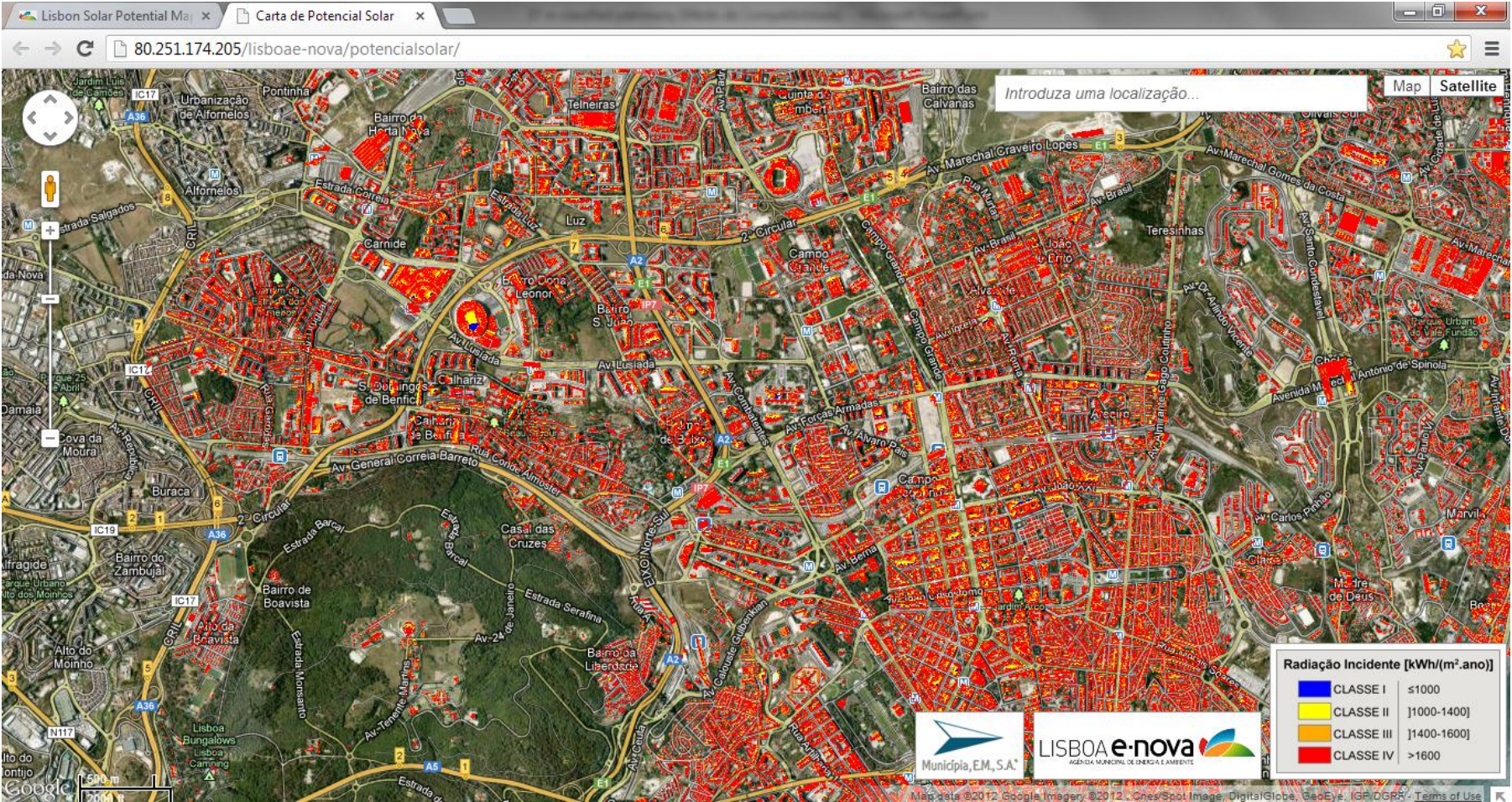


LISBON'S SOLAR POTENTIAL

Carta de Potencial Solar para o Concelho de Lisboa (2012)



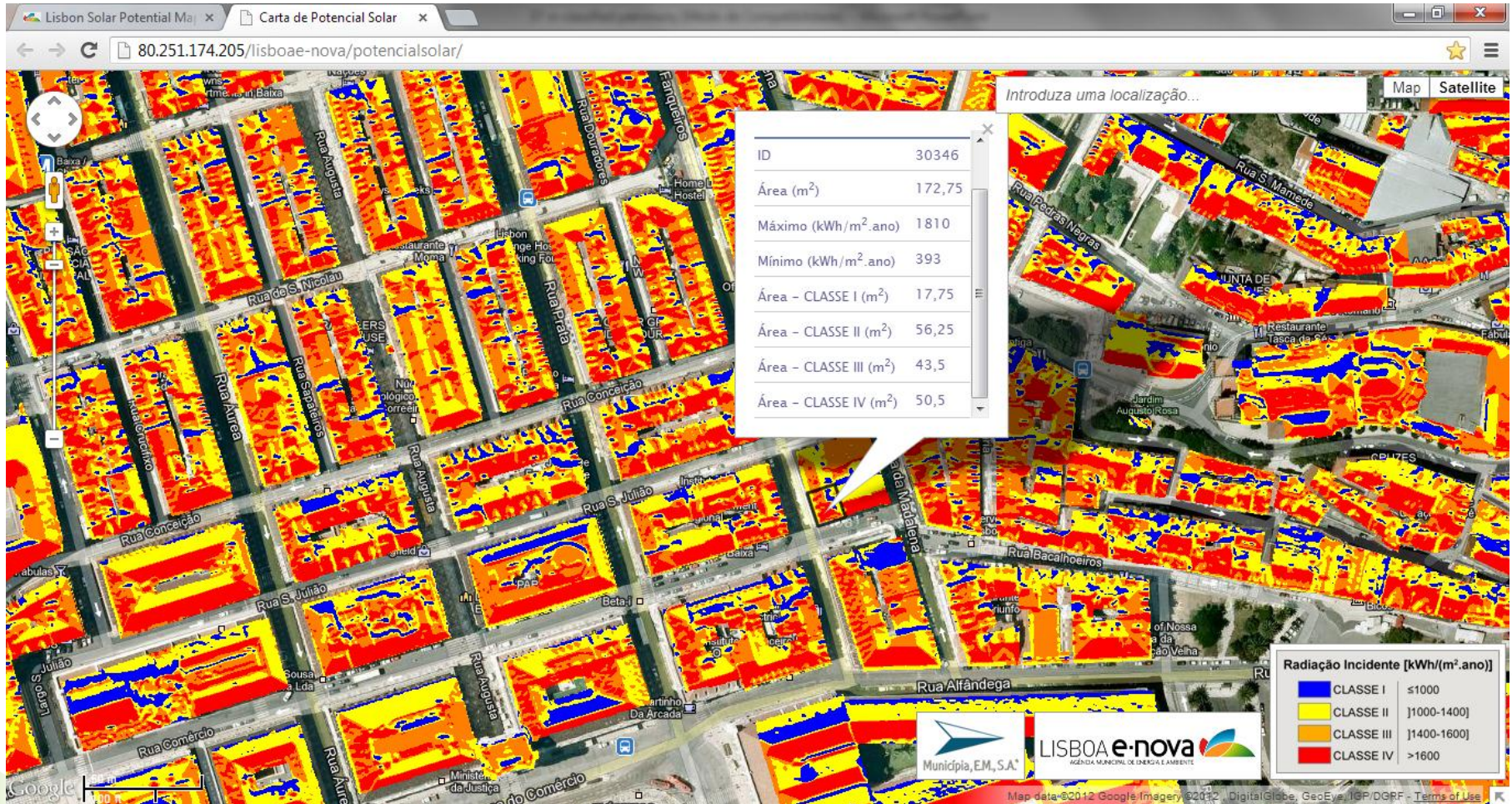
LISBON'S SOLAR POTENTIAL



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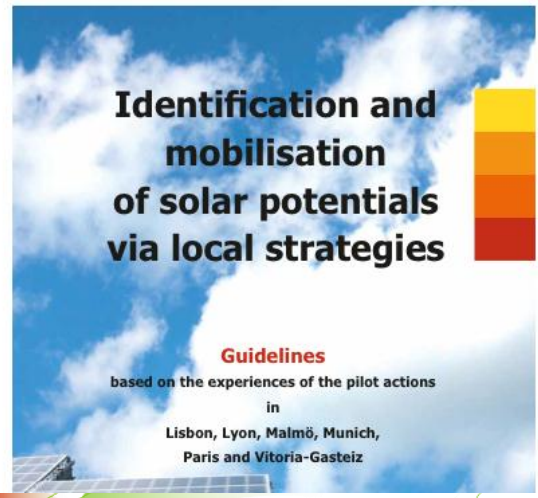
- NEWS AND EVENTS
- CURRENT PRACTICE IN EUROPE
- SOLAR URBAN PLANNING IN POLIS CITIES
- POLIS NATIONAL ACTIVITIES
- PLANNING INSTRUMENTS
- PUBLICATIONS**
- E-ROOM
- PARTNERSHIP AND CONTACTS
- LINKS

Publications

- POLIS publications**
- Other publications

POLIS publications

POLIS Guidelines, based on the experiences of the pilot actions in Lisbon, Lyon, Malmö, Munich, Paris and Vitoria-Gasteiz



Based on experience gathered during the pilot actions in the cities of Lisbon, Lyon, Malmö, Munich, Paris and Vitoria-Gasteiz, guidelines were developed to support the adaptation of urban planning procedures with the aim of boosting solar energy in other cities and towns. The POLIS partners have identified a total of ten guidelines necessary to implement a coherent planning policy in favour of solar energy. They address how to identify and mobilise the solar potential, optimise solar urban planning processes, and adapt local policies and legislation. Each of the ten guidelines (covering the entire process from data collection to policy development and legislation) will help replicate these successful experiences in other cities, benefitting from the lessons learned in practice.

The document is available in different languages :
[English version](#)
[French version](#)
[German version](#)

LISBON'S SOLAR POTENTIAL – PROJECTS



URBAN SOL PLUS

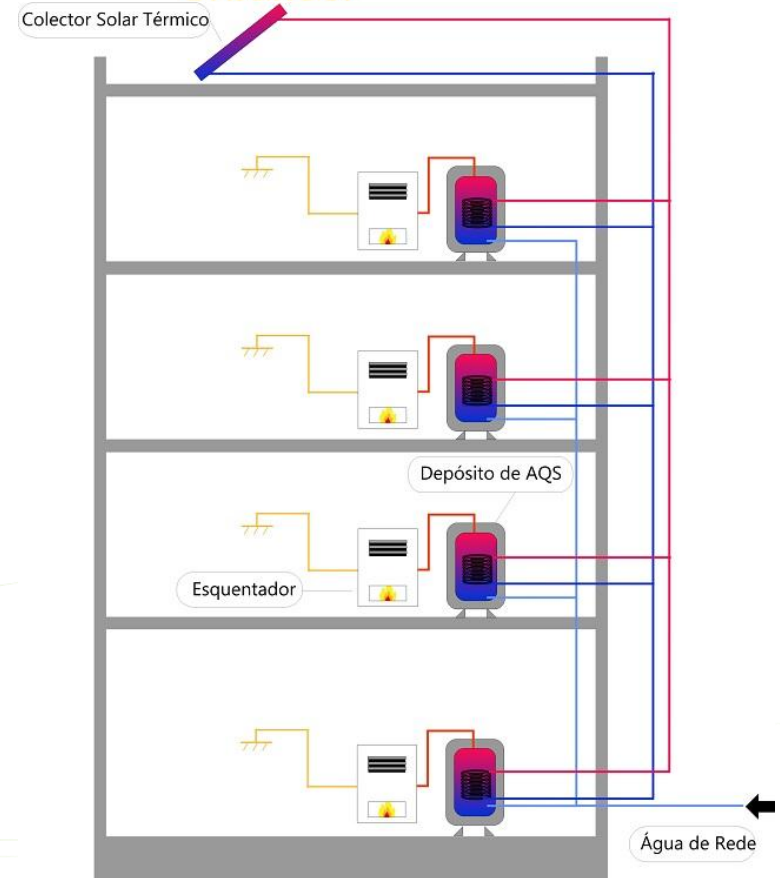
www.urbansolplus.eu

Support and promote the usage of solar thermal systems in multi-family buildings undergoing major renovation works and in protected urban areas and classified buildings.

Documents:

Transfer guidelines on protected buildings;

Transfer guidelines on architectural integration



Thank you for your attention

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www.lisboaenova.org