



SOLAR THERMAL SYSTEMS IN LISBON HISTORICAL CAIXA POMBALINA

Joana Fernandes

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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



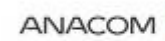
AGÊNCIA PARA A ENERGIA



AGÊNCIA PORTUGUESA DO AMBIENTE
Ministério do Ambiente e do Ordenamento do Território



Aerportos de Portugal



ANACOM
Autoridade Nacional de Regulação da Energia e da Água



emel
Energia Municipal de Lisboa



EPAL
Emissões de Poluentes Atmosféricos de Lisboa



EPUL
Emissões de Poluentes Atmosféricos de Lisboa
40 anos



galp energia



GEURBANA
PARQUE DAS NAÇÕES



ICNOB
Instituto de Cooperação Técnica e de Inovação



IIT
Instituto Superior Técnico



IVECO



JOÃO JACINTO TOMÉ, S. A.
SUSTENTABILIDADE E INOVAÇÃO



Metropolitano de Lisboa



REN
Rede Nacional de Energia Elétrica



SIMTEJO
Sistema Integrado de Gestão de Energia e Ambiente



TMB
Transportes Municipais de Lisboa

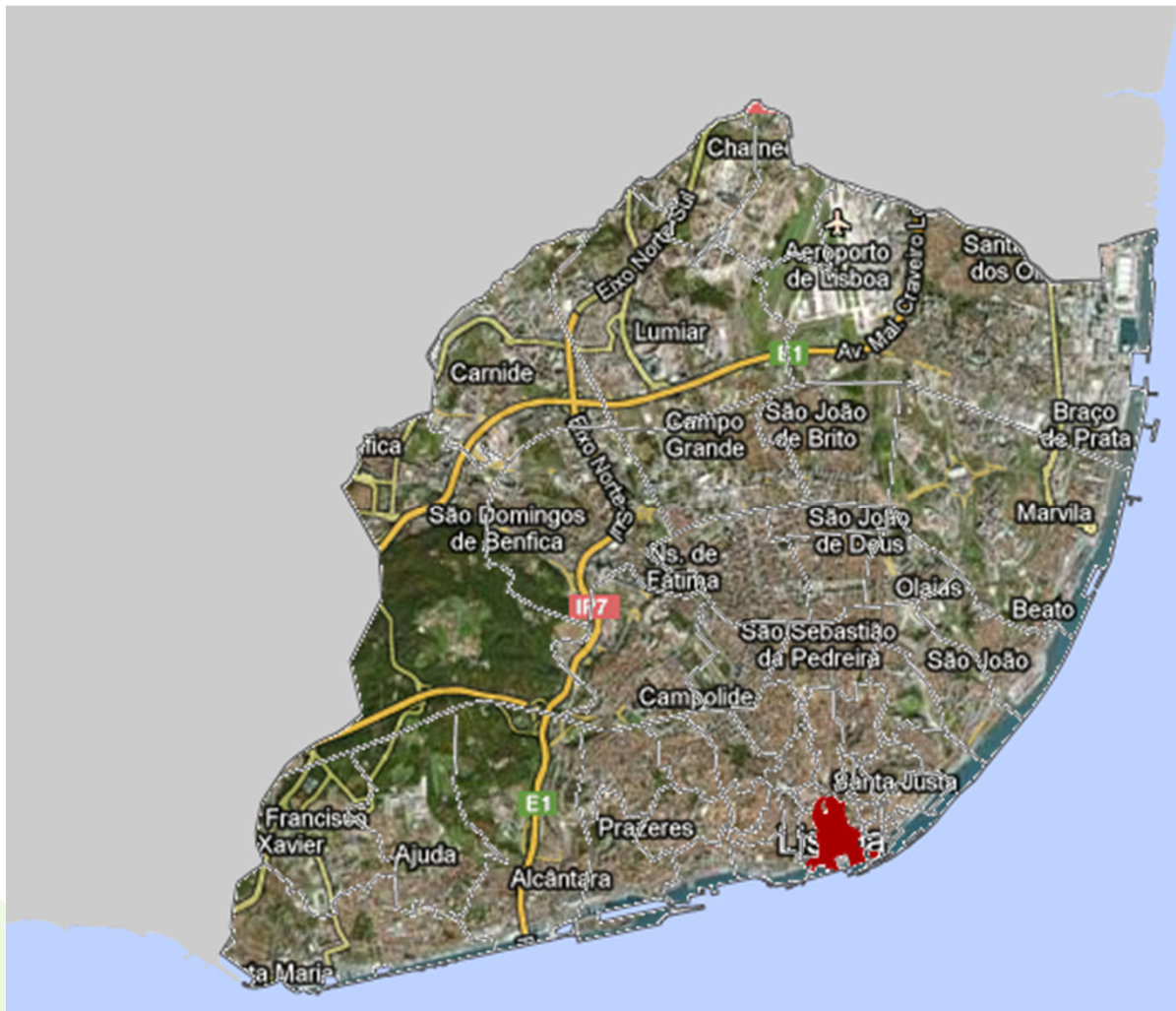


União das Freguesias de Lisboa

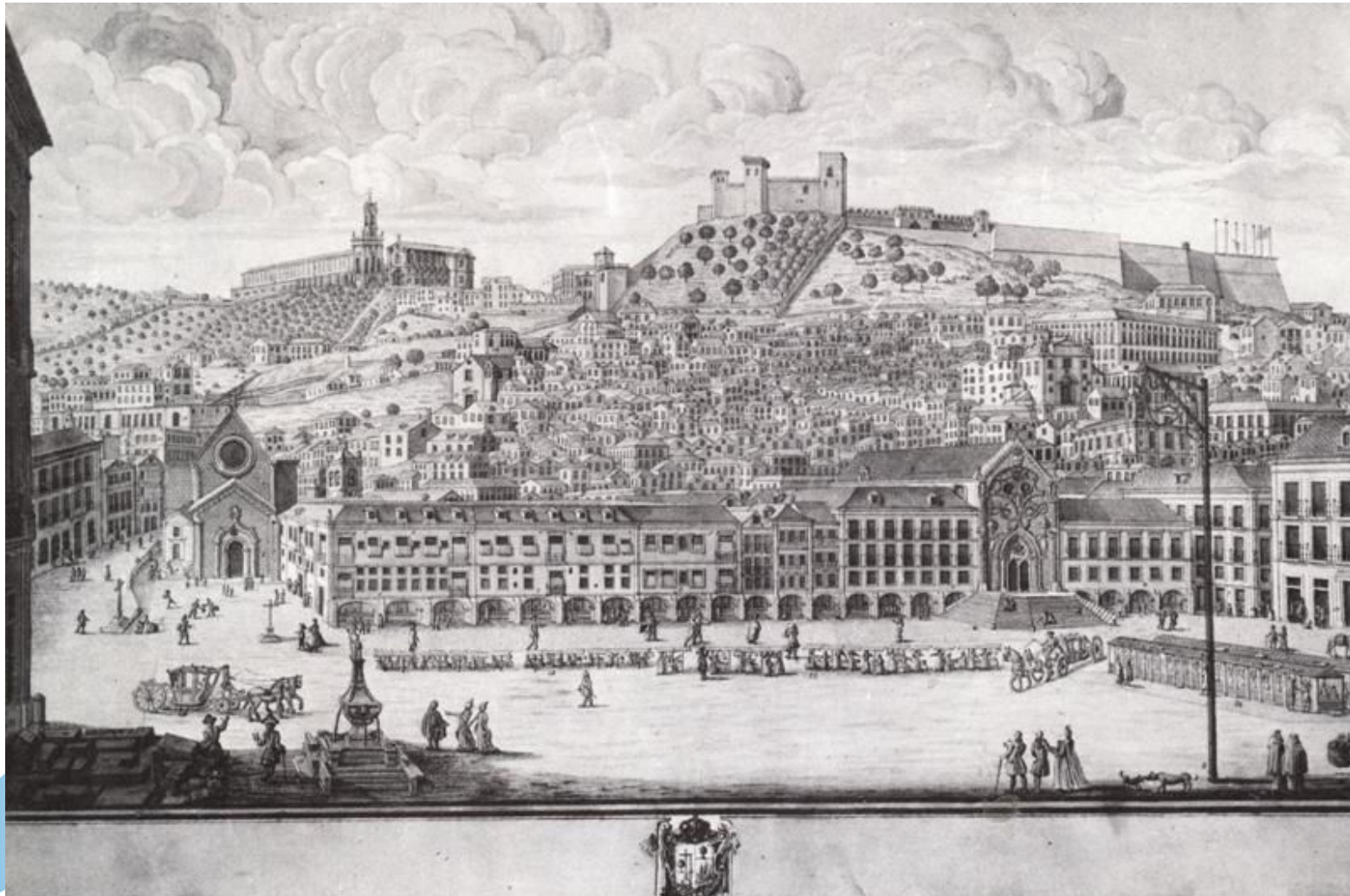
LISBOA E-NOVA



THE BAIXA POMBALINA AREA



THE BAIXA POMBALINA AREA - prior to 1755 earthquake



“Lisboa O Plano da Baixa hoje – Exposição”

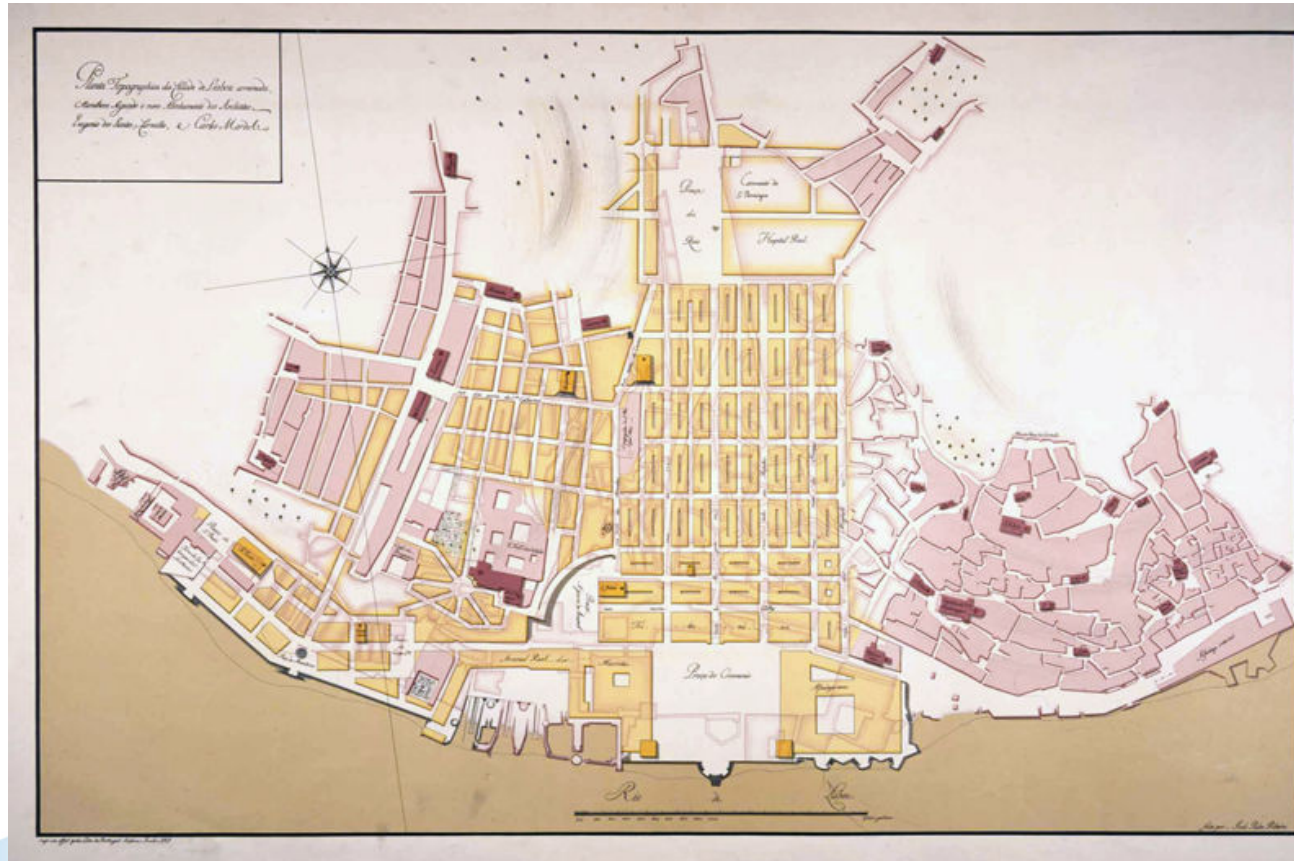
THE BAIXA POMBALINA AREA – the 1755 earthquake



Vorstellung von Lisabon vor und in dem erbenen des 1 Novembris 1755

www.museudacidade.pt/,

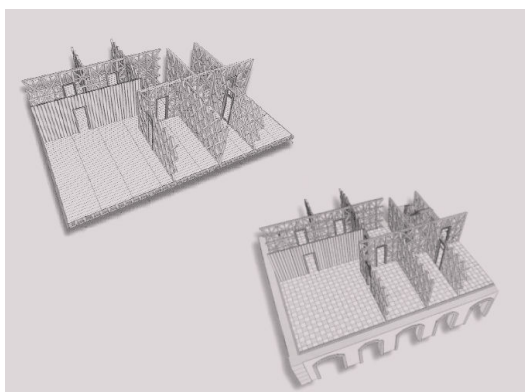
THE BAIXA POMBALINA AREA – the new urban plan in 1758



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”

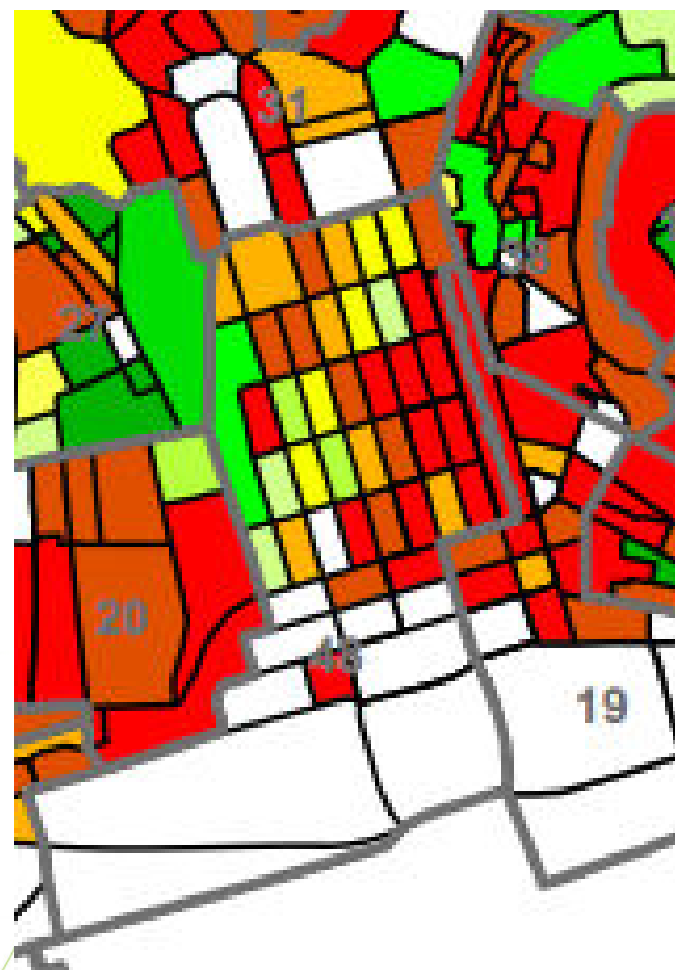


THE BAIXA POMBALINA AREA – today

The Baixa Pombalina area is listed as heritage by IGESPAR, the entity responsible for the management of the national archaeological and architectural 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.



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 – Energy Agency

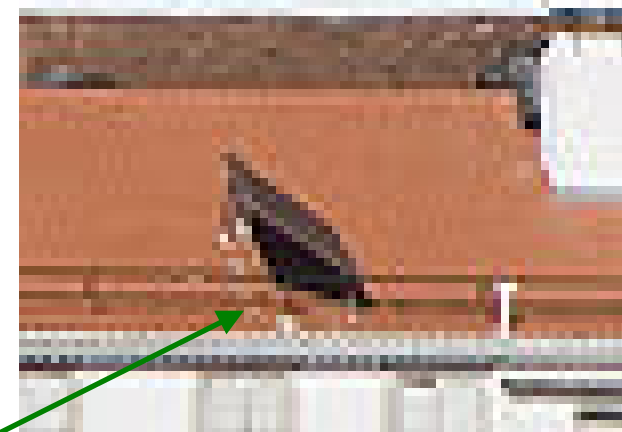
Lisbon Municipality
The Urban Requalification Direction
The Baixa Chiado Protection Unit

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

Solar Thermal systems manufacturers



THE BAIXA POMBALINA SOLAR INTEGRATION MAP



THE BAIXA POMBALINA SOLAR INTEGRATION MAP

INPUTS



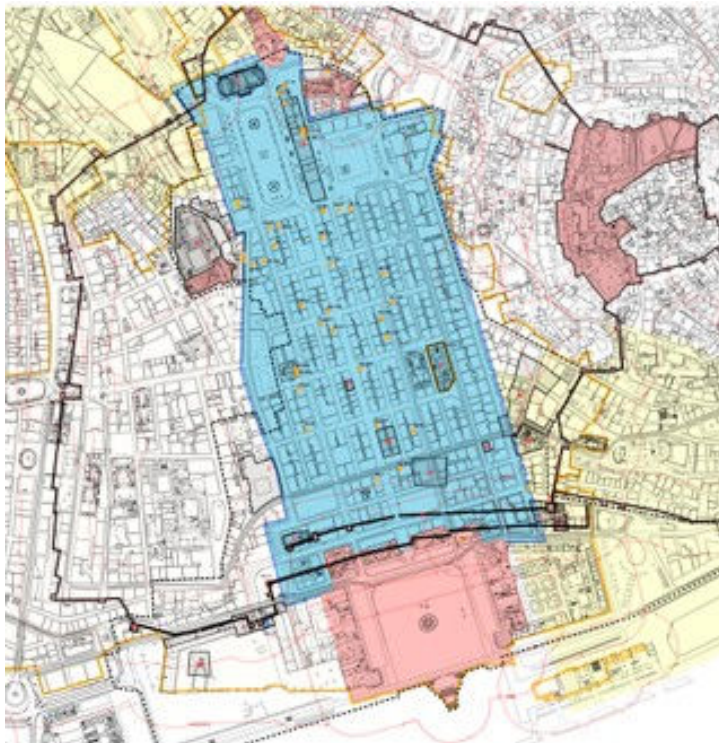
Aerialphotomap, 2006



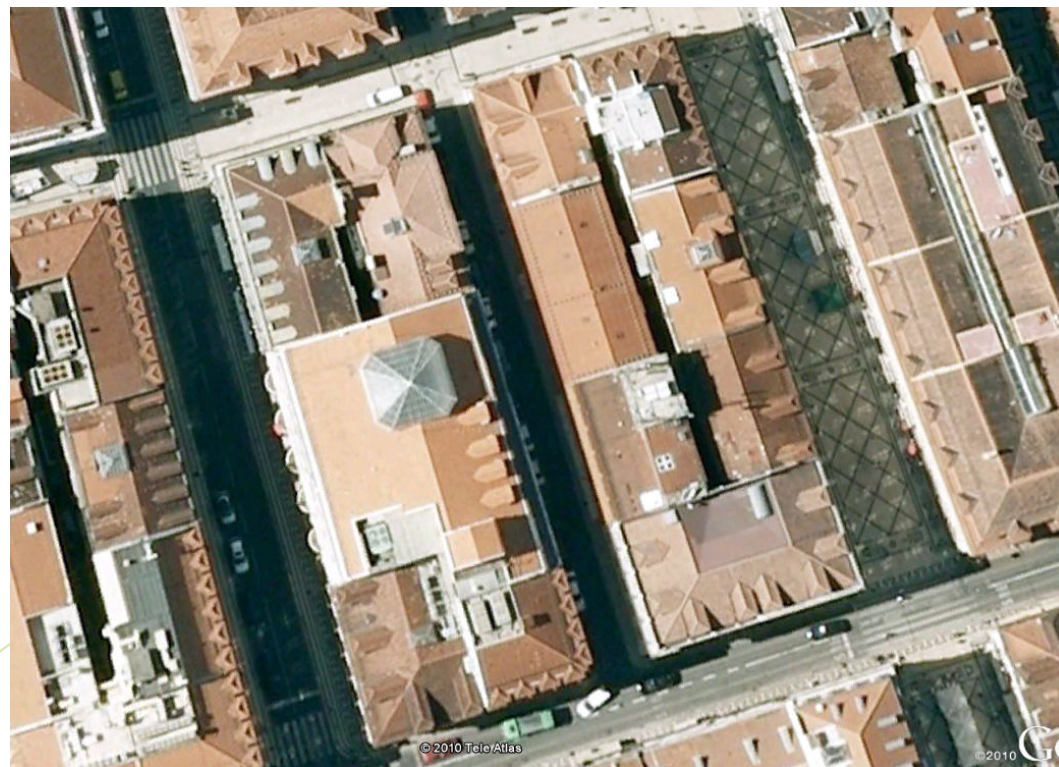
Blocks and buildings limits

THE BAIXA POMBALINA SOLAR INTEGRATION MAP

INPUTS



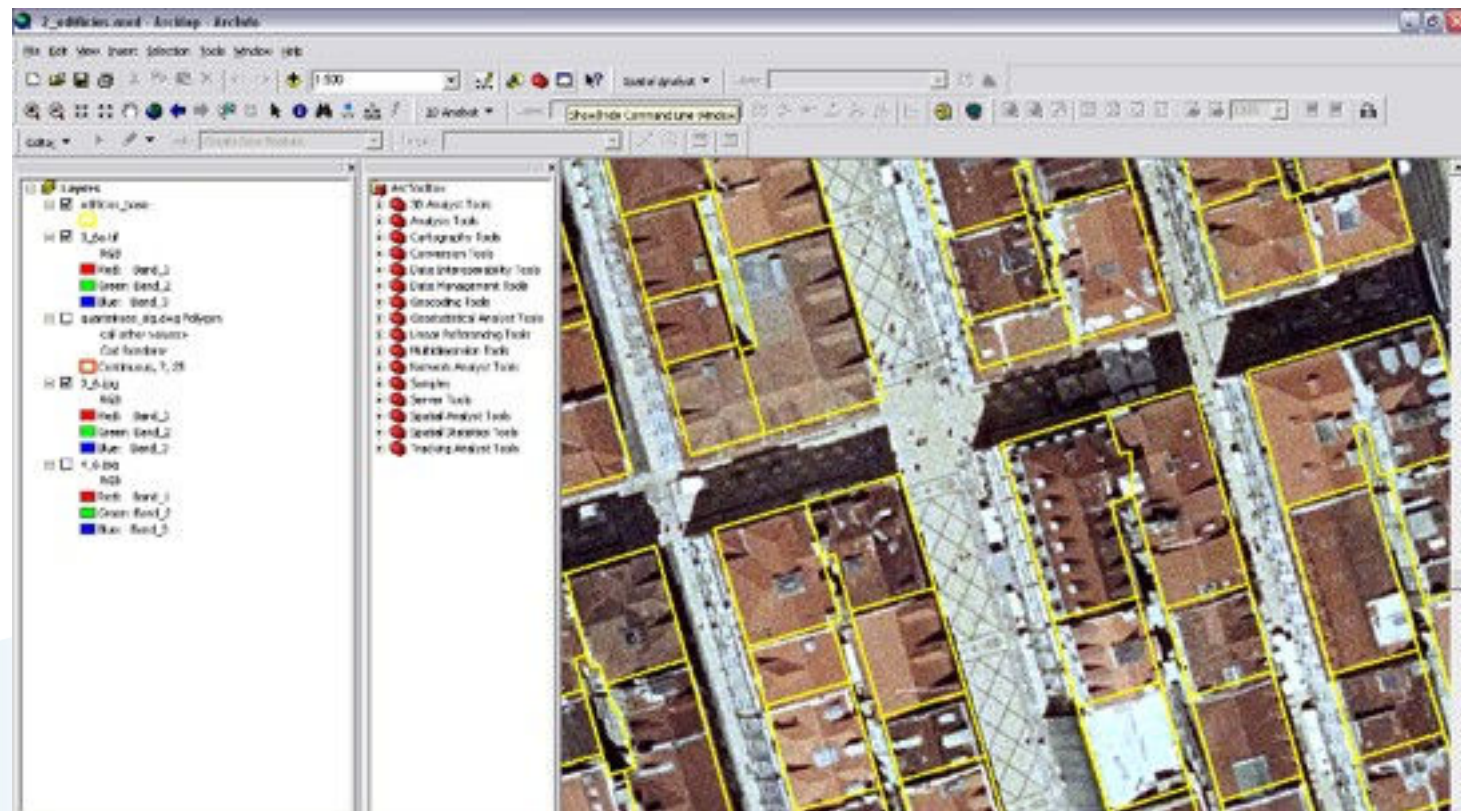
List of the classified buildings.



Photographic assessment of roofs

THE BAIXA POMBALINA SOLAR INTEGRATION MAP

METHODOLOGY

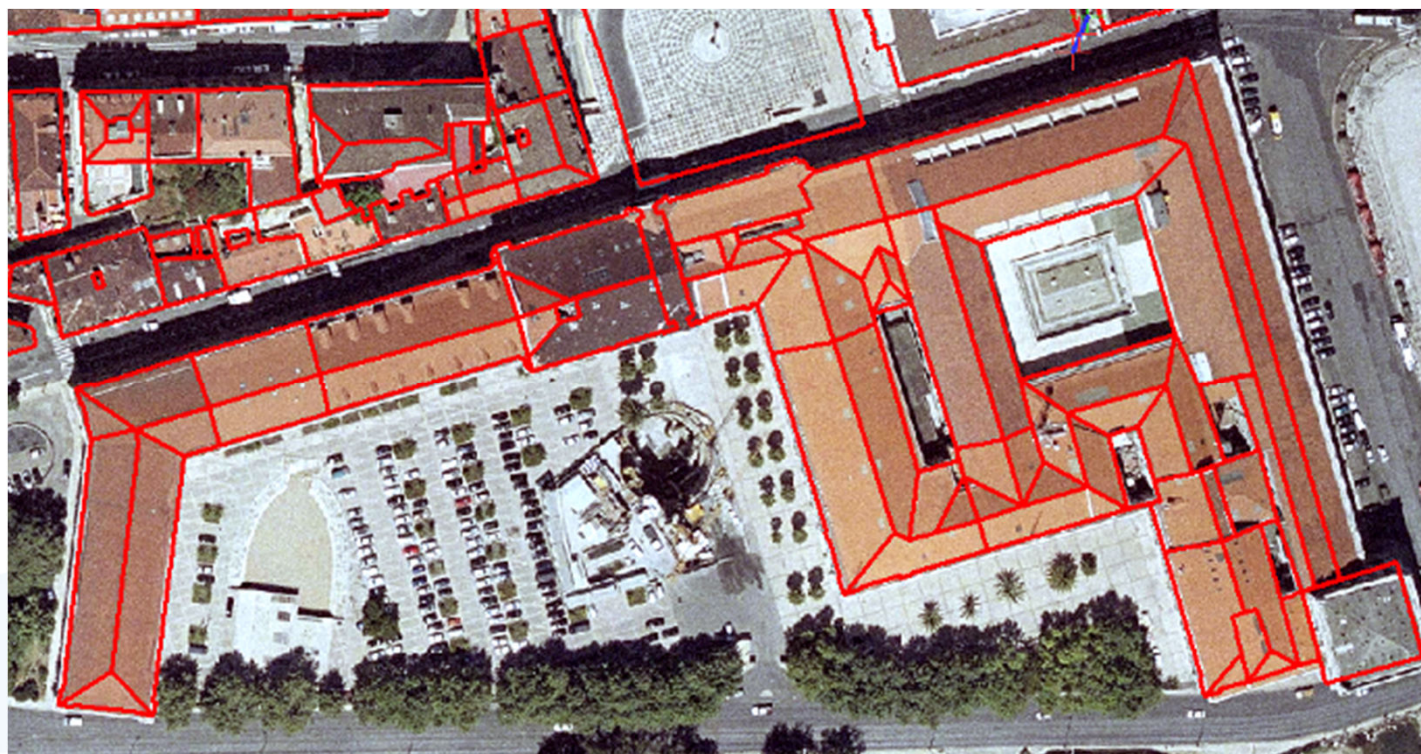


ArcGis,
scale 1/1000

THE BAIXA POMBALINA SOLAR INTEGRATION MAP

METHODOLOGY





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

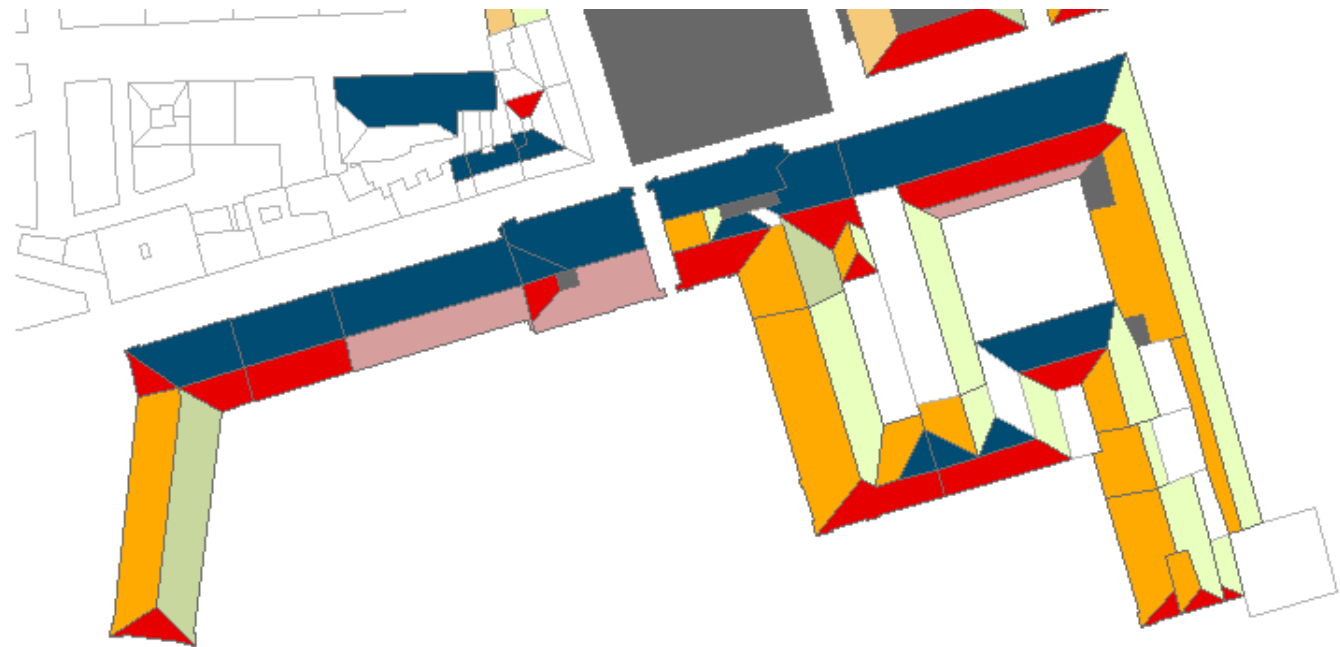


THE BAIXA POMBALINA SOLAR INTEGRATION MAP

METHODOLOGY

Classification of the roof covers orientation.

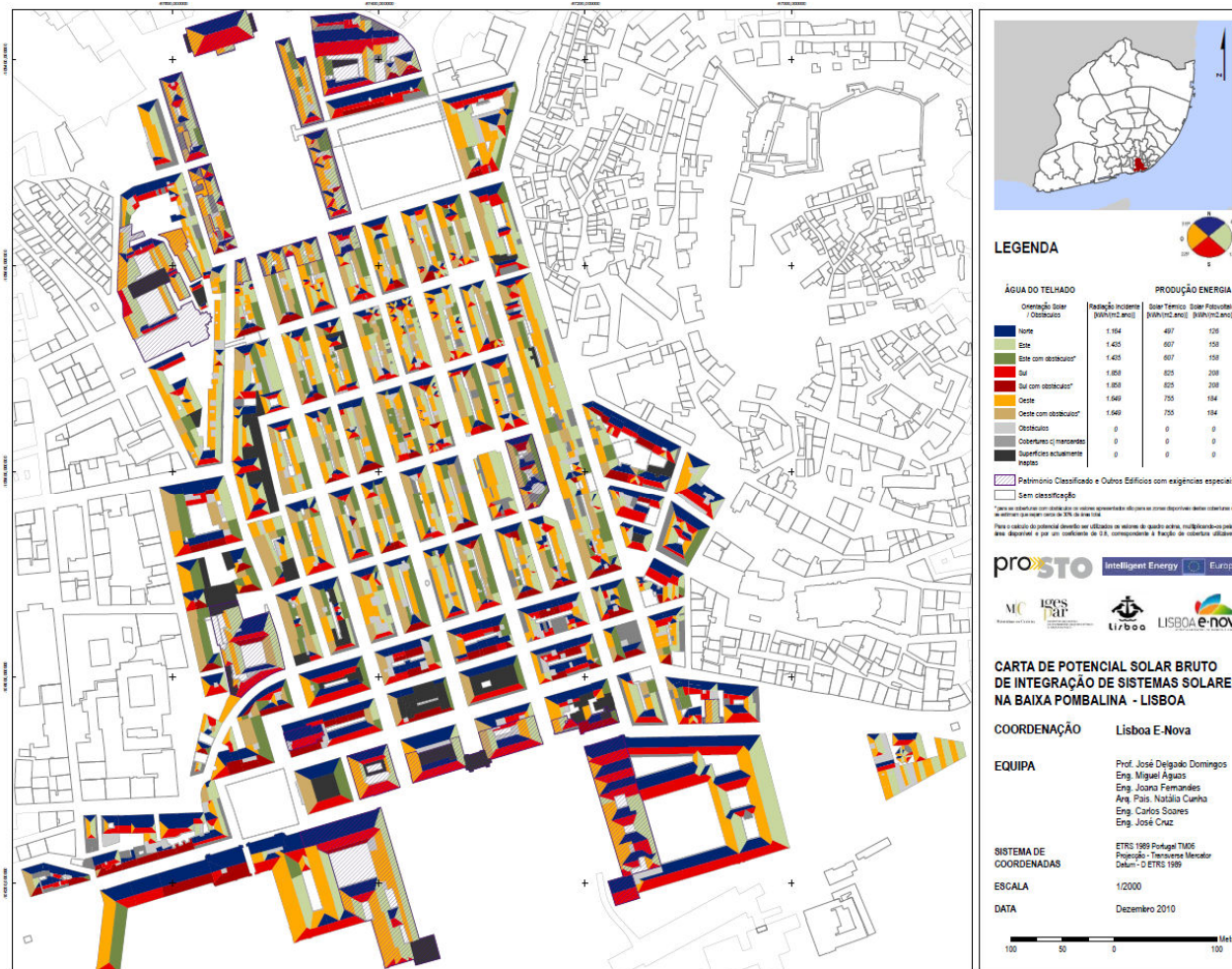
Orientation	Subtitle
East	
South	
West	
North	



Escala 1/2 000

0 50 100 Meter

THE BAIXA POMBALINA SOLAR INTEGRATION MAP



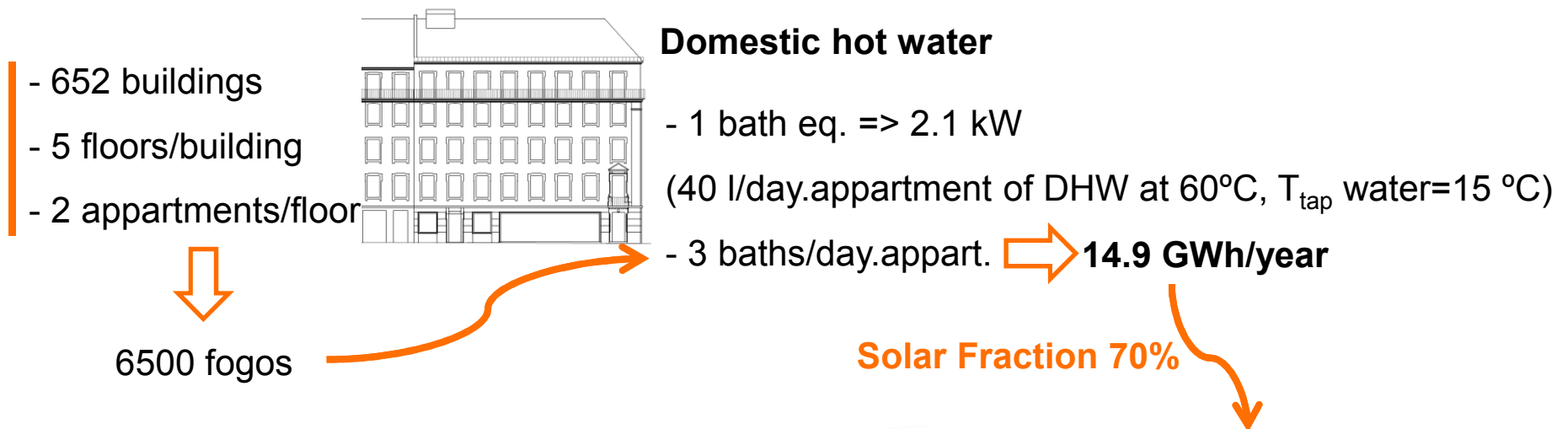
THE BAIXA POMBALINA SOLAR INTEGRATION MAP

THE POTENTIAL

Orientation	Area (Average Slope 30°)		
	TOTAL	EFFECTIVE MIN. (covers without obstacles)	EFFECTIVE MAX. (covers with obstacles)
	m2	m2	m2
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



17% of the total
available area
Without obstacles

E_{solar} = 10.4 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.

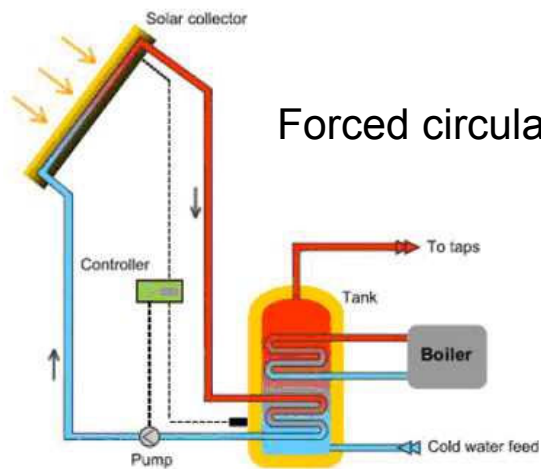
THE BAIXA POMBALINA SOLAR THERMAL INTEGRATION

- a) the integration of solar panels on the roof cover is compulsory, and the installation should be performed in accordance to 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.

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;

Atract new inhabitants to the Baixa Pombalina area.



FOR MORE ON LISBOA E-NOVA SOLAR PROJECTS

www.lisboaenova.org

PROSTO

The logo for PROSTO, featuring the word "pro" in black, three yellow chevrons pointing right, and "STO" in a large, grey, sans-serif font.

POLIS

The logo for POLIS, featuring a stylized house icon with a sun rising behind it, composed of orange and yellow circles. To the right, the word "POLIS" is written in a large, blue, sans-serif font. Below the icon, the text "Identification and mobilisation of Solar POTentials via Local strategies" is written in a smaller font.

URBAN SOL PLUS

The logo for UrbanSol+, featuring a stylized building icon with a sun rising behind it, composed of orange and yellow circles. Below the icon, the text "UrbanSol+" is written in a large, orange, sans-serif font.

Thank you for your attention

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CAIXA POMBALINA

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