Smart and Sustainable Lisbon

Lisboa, 5th June 2015

Francisco Gonçalves

www.lisboaenova.org

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LISBOA E-NOVA AND LISBON

LISBON 2020

RELEVANT PROJECTS

SOME RESULTS

LISBOA E-NOVA

LISBON'S MUNICIPAL ENERGY AND ENVIRONMENTAL AGENCY

Non-profit organization operating under private Law, which seeks the sustainable development of the city of Lisbon

MISSION

- Energy demand management
- Energy efficiency
- Endogenous energy resources management
- Environmental management
- Best practices in Urban Planning and Construction
- Sustainable mobility

LISBOA E-NOVA: AFFILIATES

LISBOA E-NOVA: AREAS OF EXPERTISE

Energy and Environmental Strategy	Energy Efficiency and Renewable Energy	Water	Sustainable Mobility
Smart Cities	Urban Planning	Biodiversity	Environmental Awareness

COMMUNICATION

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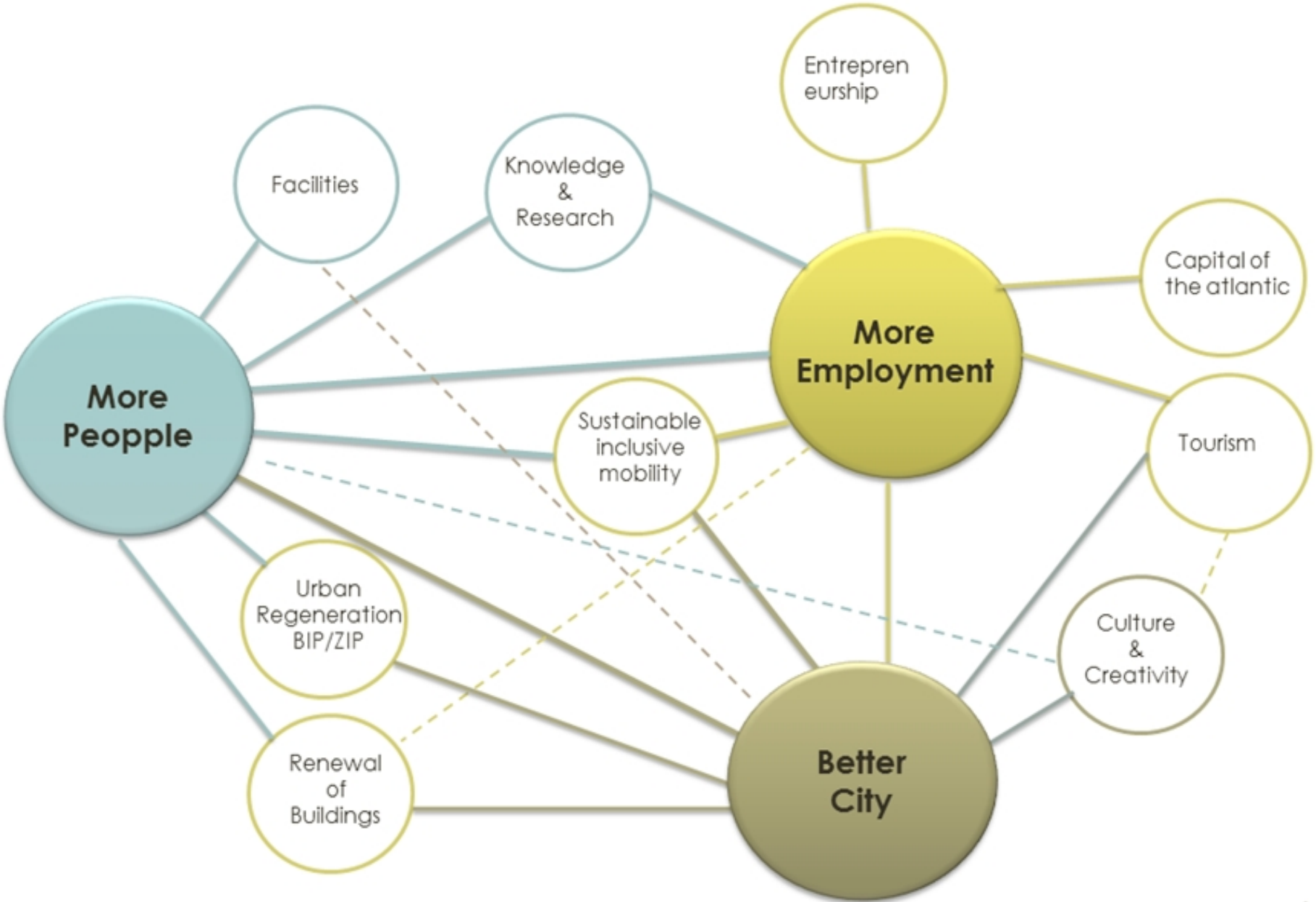
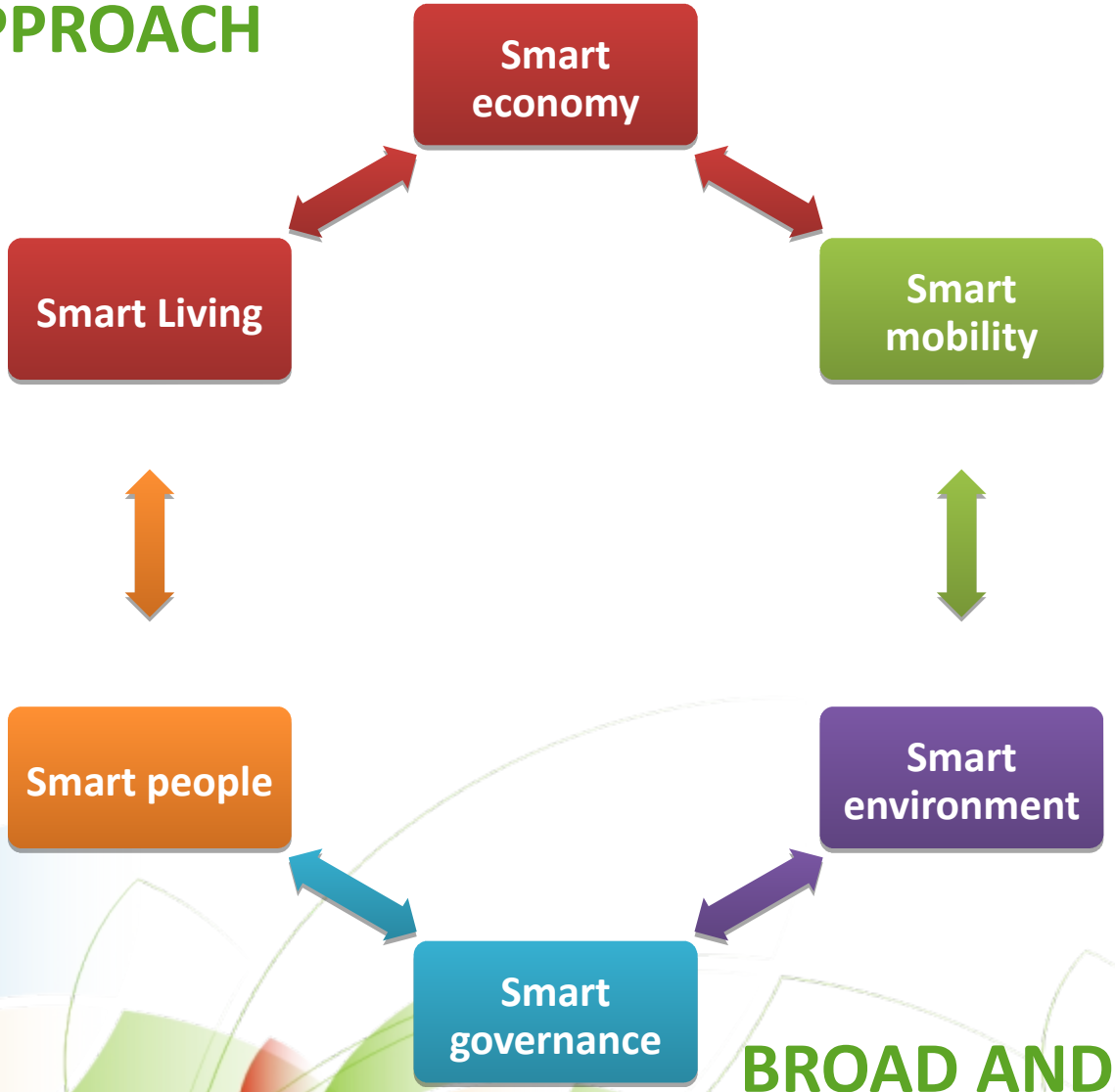
LISBON 2020: AN AMBITIOUS PLAN

LISBON 2020: AN AMBITIOUS PLAN

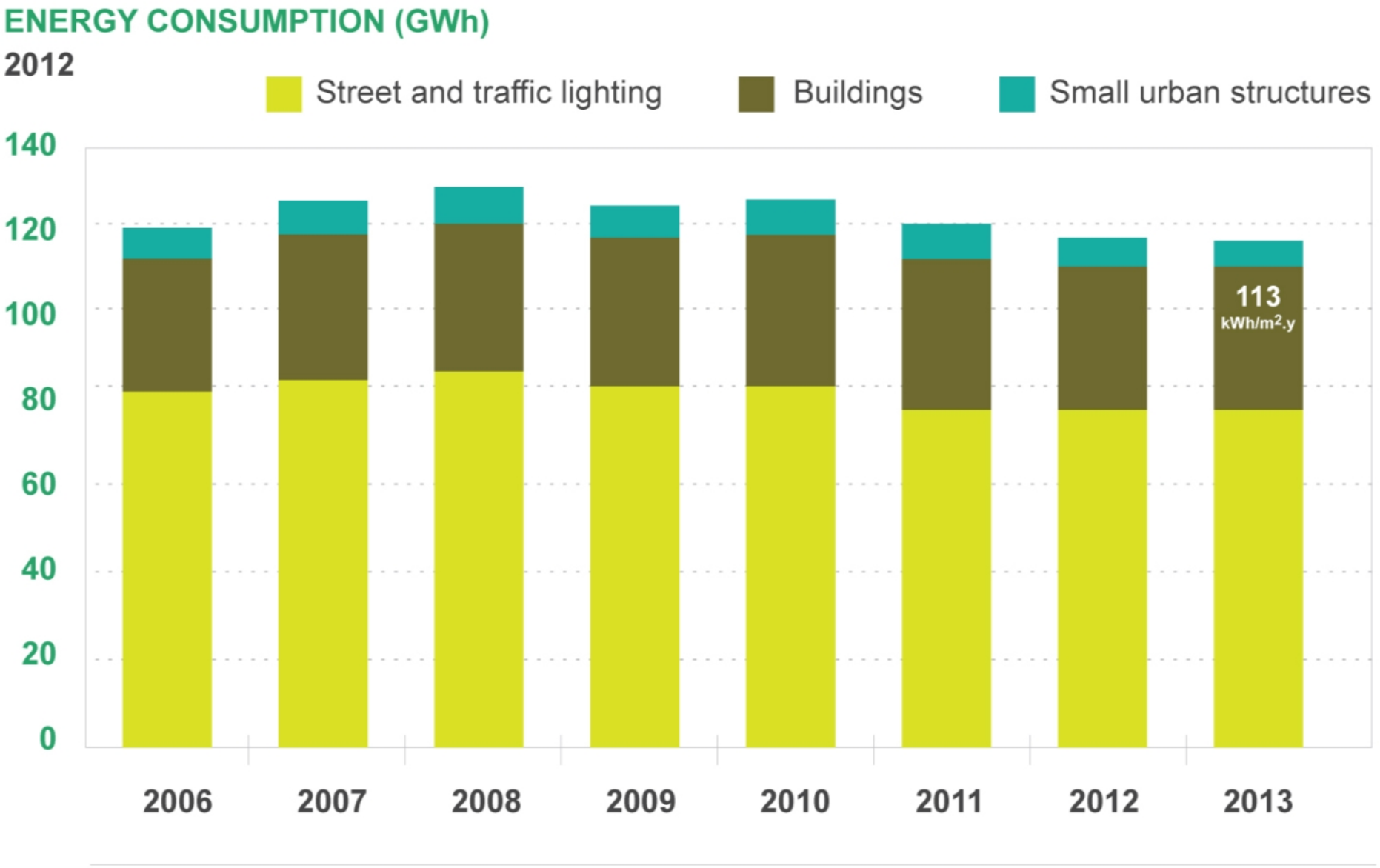


LISBON 2020: AN AMBITIOUS PLAN
SMART APPROACH

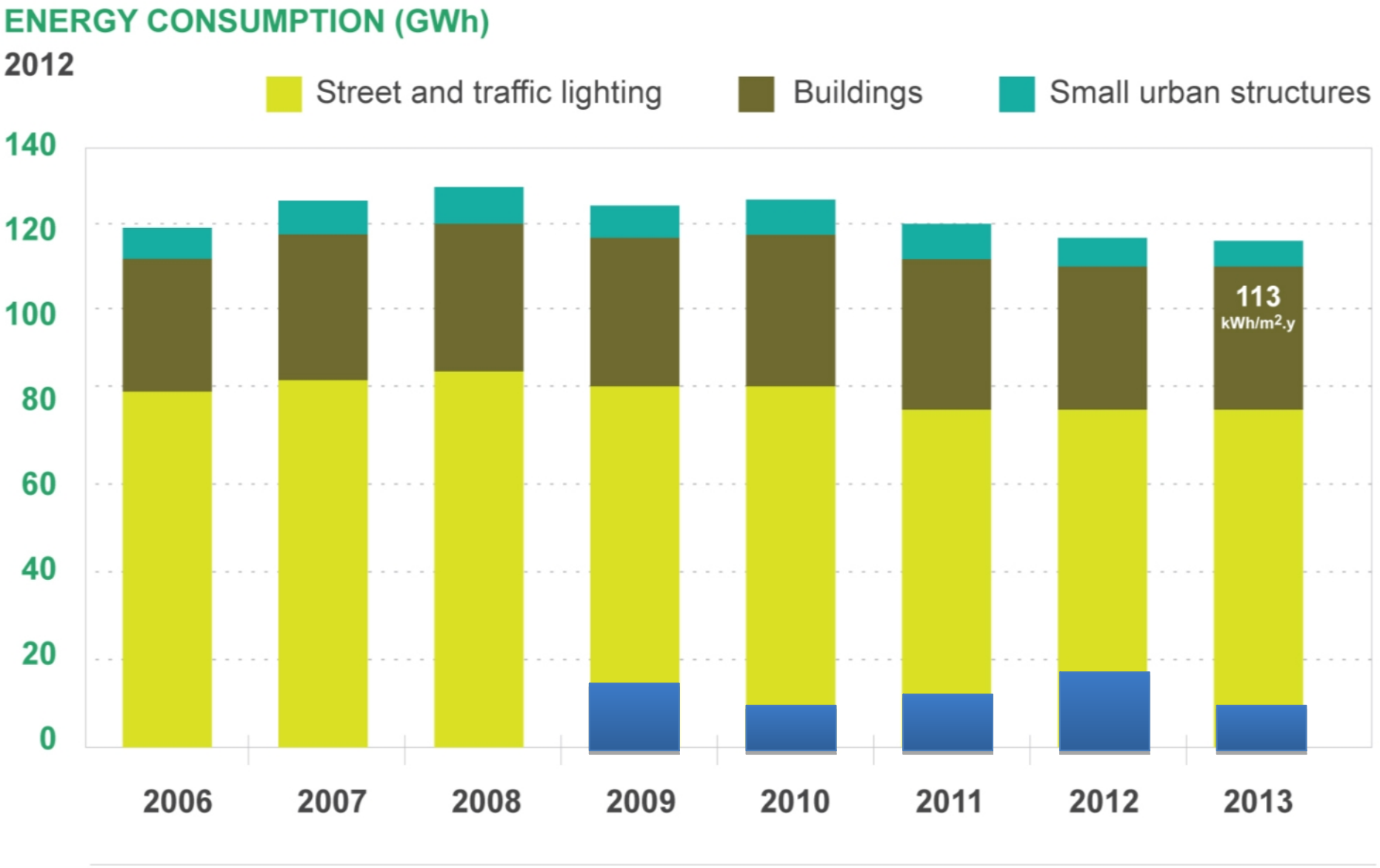


BROAD AND INTEGRATED

LISBOA E-NOVA: LISBON'S PRESENT SITUATION



LISBOA E-NOVA: LISBON'S PRESENT SITUATION



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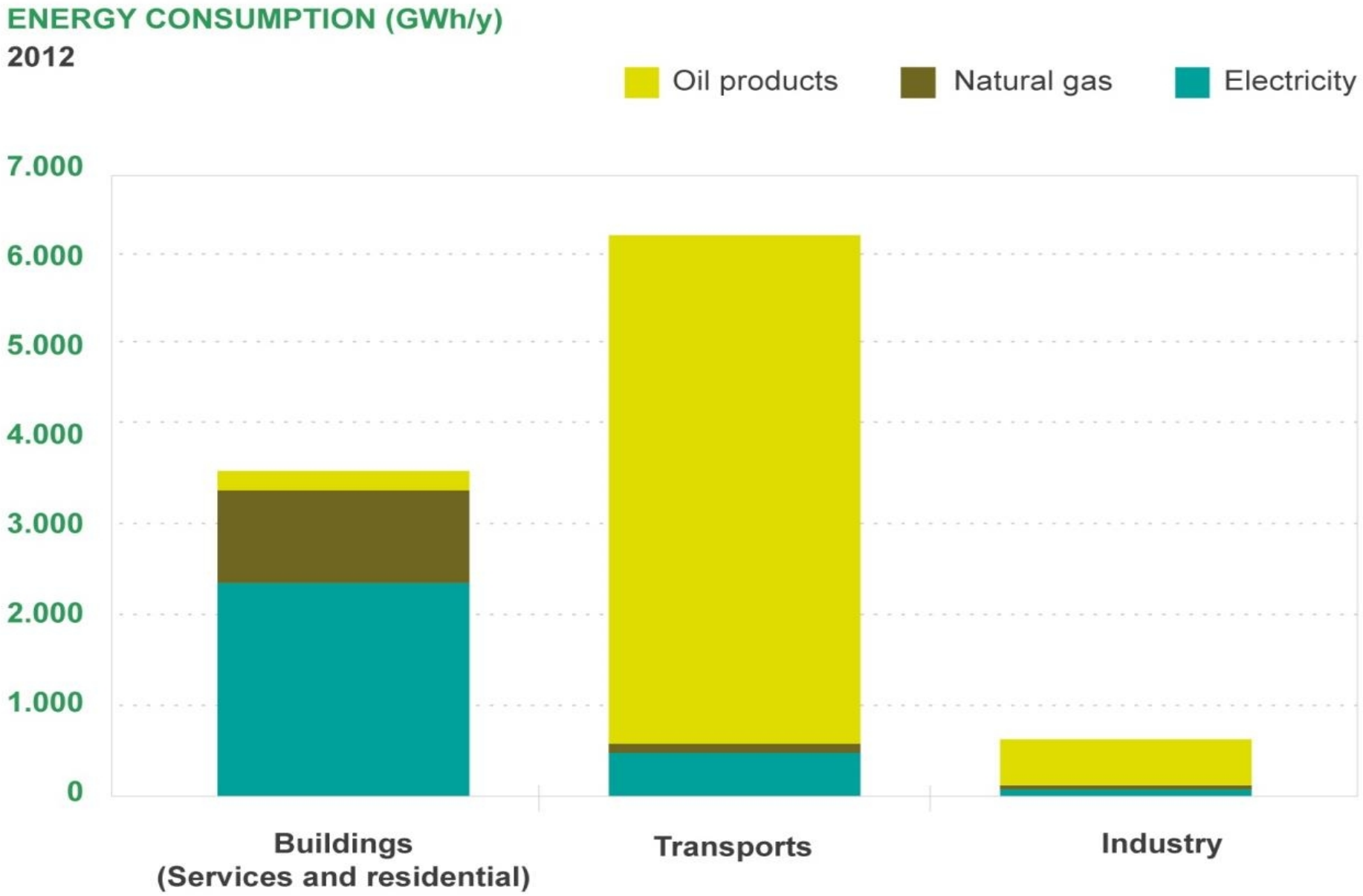
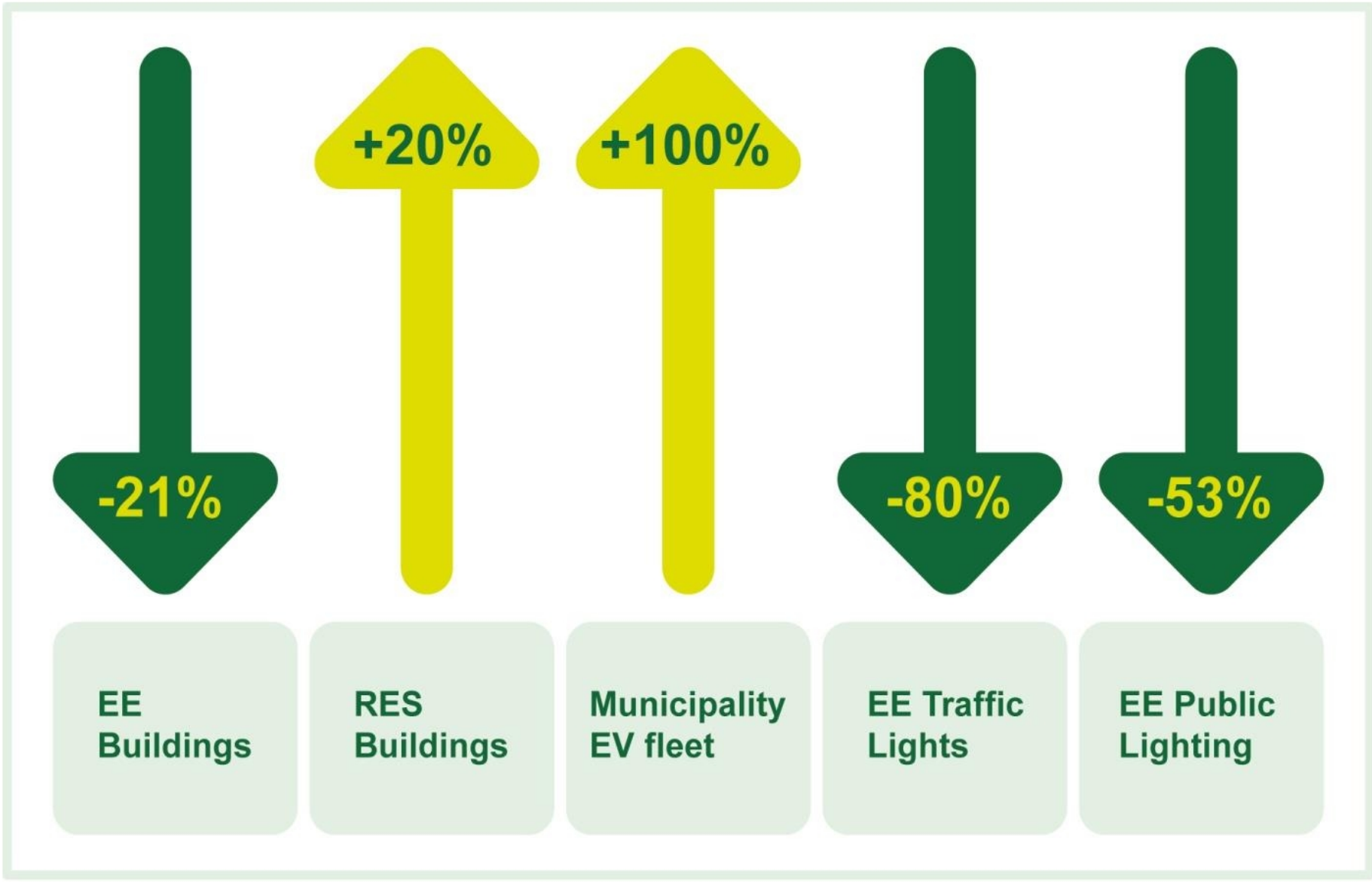
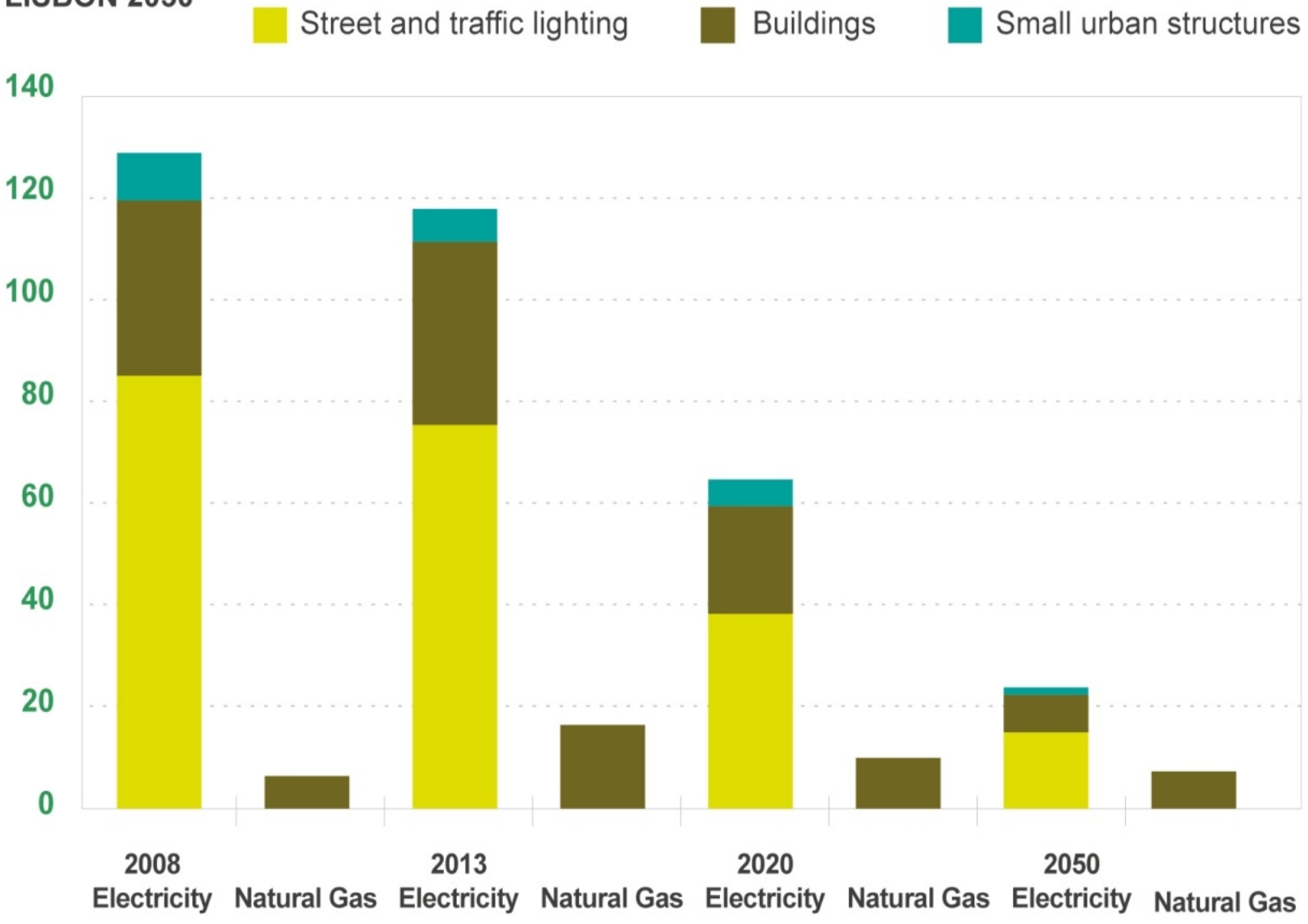


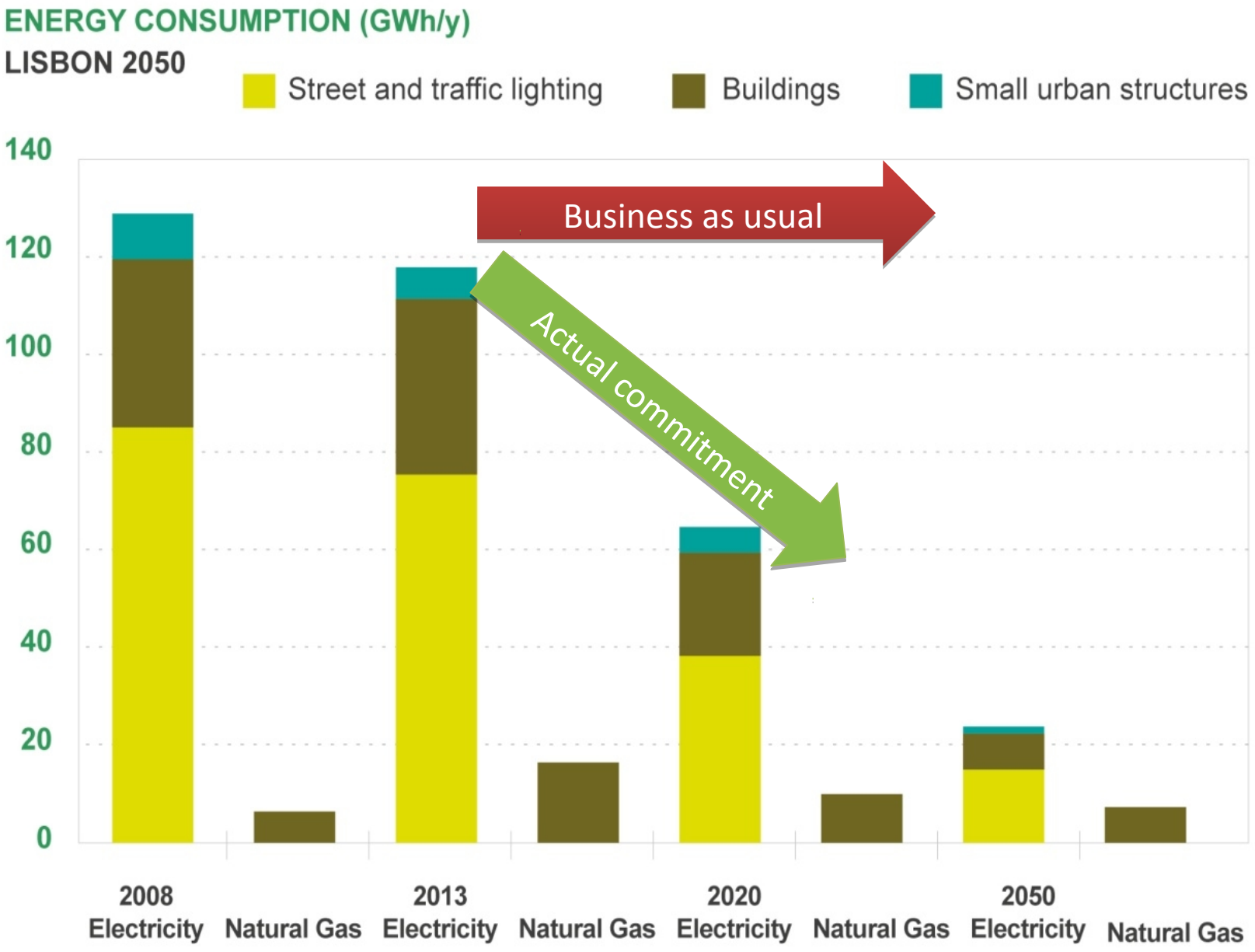
LISBOA E-NOVA: 2020 GOALS



ENERGY CONSUMPTION (GWh/y)

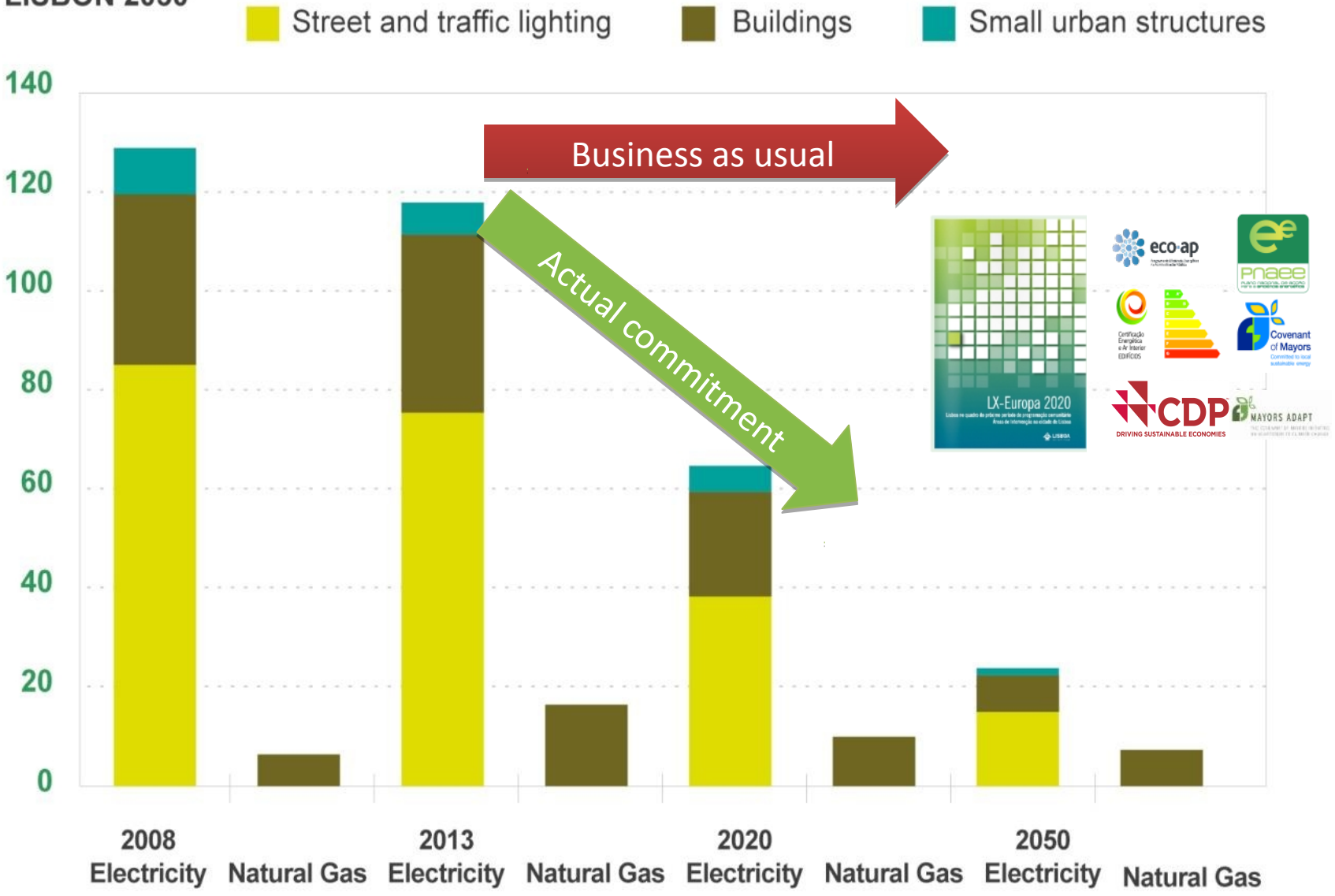
LISBON 2050




ENERGY CONSUMPTION (GWh/y)
LISBON 2050
Street and traffic lighting
Buildings
Small urban structures
140
120
100
80
60
40
20
0
Business as usual
Actual commitment
2008
Electricity
Natural Gas
2013
Electricity
Natural Gas
2020
Electricity
Natural Gas
2050
Electricity
Natural Gas

ENERGY CONSUMPTION (GWh/y)

LISBON 2050



LISBOA E-NOVA: NETWORKS AND COMMITMENTS

Covenant of Mayors
Committed to local sustainable energy

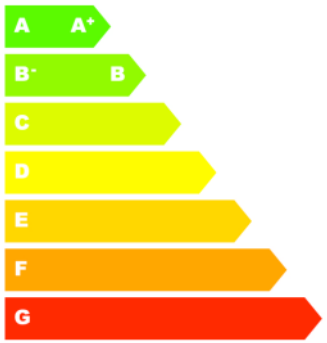
PNAEE
Plano Nacional de Acção para a Eficiência Energética

eco.ap
Programa de Eficiência Energética na Administração Pública

MAYORS ADAPT
THE COVENANT OF MAYORS INITIATIVE ON ADAPTATION TO CLIMATE CHANGE

ClimAdaPT.Local
Estratégias Municipais de Adaptação às Alterações Climáticas

Certificação Energética e Ar Interior EDIFÍCIOS



CDP
DRIVING SUSTAINABLE ECONOMIES

ICLEI
Local Governments for Sustainability

MAYORS ADAPT

THE COVENANT OF MAYORS INITIATIVE ON ADAPTATION TO CLIMATE CHANGE

LISBOA e·nova

AGÊNCIA MUNICIPAL DE ENERGIA E AMBIENTE

Initiative within the framework of the Covenant of Mayors (flagship European initiative for cities on taking action on climate change mitigation)

The main aim is to inspire and support local authorities to show leadership and take action on climate change adaptation (besides mitigation)

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LISBOA E-NOVA AND LISBON

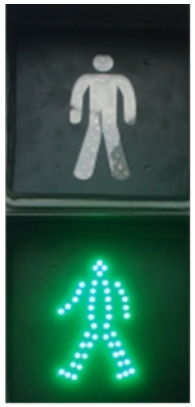
LISBON 2020

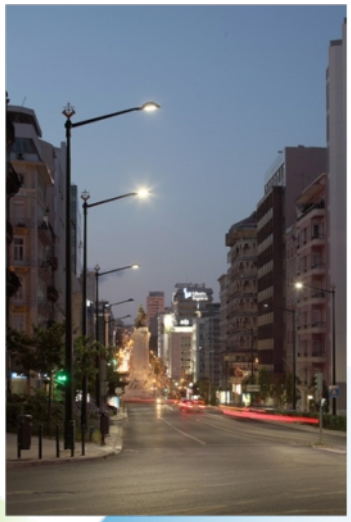
RELEVANT PROJECTS

SOME RESULTS

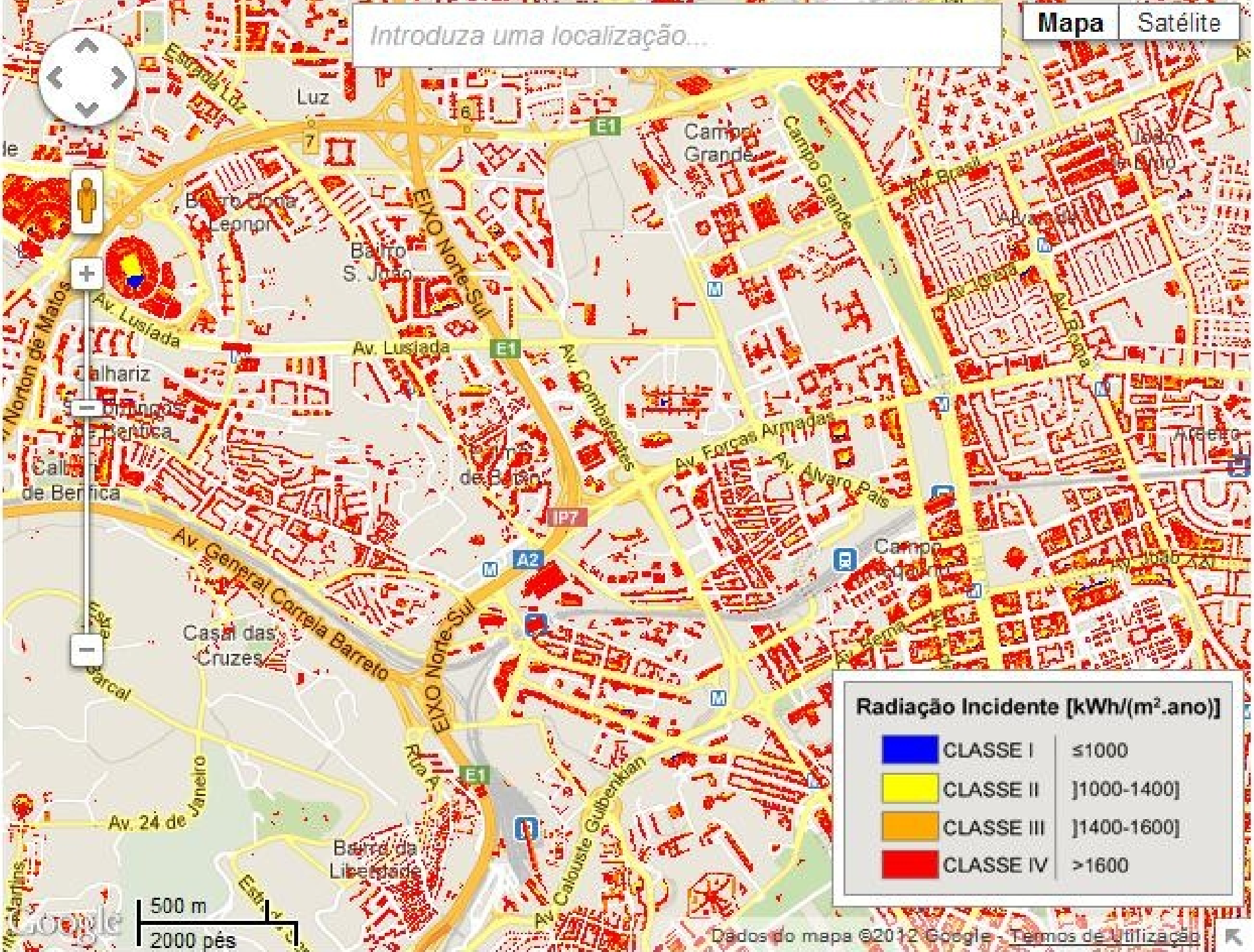
EFFICIENT STREET LIGHTING AND TRAFFIC LIGHTS

LISBOA E-NOVA: RELEVANT PROJECTS





LOCAL LOW CARBON ENERGY PRODUCTION


Introduza uma localização...
Mapa
Satélite
Radiação Incidente [kWh/(m².ano)]
CLASSE I ≤1000
CLASSE II]1000-1400]
CLASSE III]1400-1600]
CLASSE IV >1600
500 m
2000 pés
Dados do mapa ©2012 Google - Termos de Utilização


Introduza uma localização...
Map
Satellite
Tv. da Espera
Fado in Chiado
Silk Club
R. das Gaivotas
R. Nova da Trindade
Tv. Trindade
Tv. Carmo
Praça Luís de Camões
Largo de Camões
Monumento to Luís de Camões
Igreja Da Nossa Senhora Da Encarnação
VISTA ALEGRE ATLANTIS
Largo Chiado
R. Garrett
R. Paiva de Andrada
R. Anchieta
Restaurante Belcanto
Largo Barão Quintela
Radiação Incidente [kWh/(m².ano)]
CLASSE I ≤1000
CLASSE II]1000-1400]
CLASSE III]1400-1600]
CLASSE IV >1600
Municipia, E.M., S.A.
LISBOA e·nova
Map data ©2014 Google Imagery ©2014, DigitalGlobe
10 m
Terms of Use
Report a map error






SUSTAINABLE REFURBISHMENT

eco-bairro

BOAVISTA

Ambiente +

um modelo integrado de inovação sustentável

SCHOOL COMMUNITY

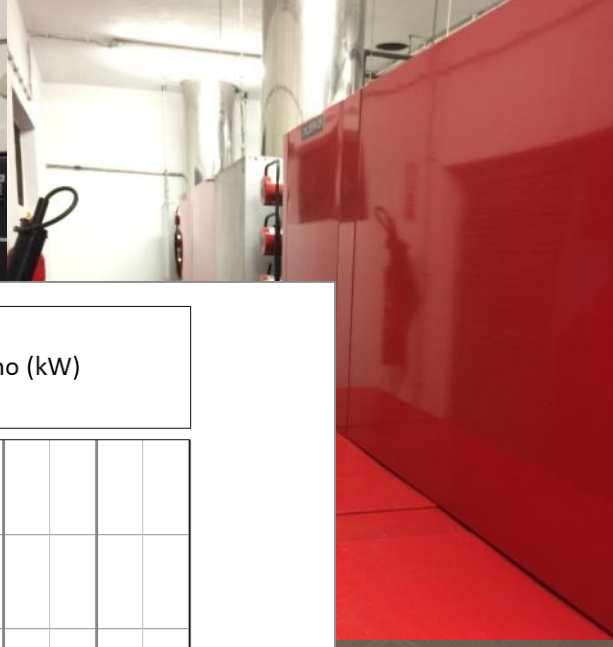

escola+
Promoção da Eficiência Energética
Escolas do 1.º Ciclo do Ensino Básico
Lisboa

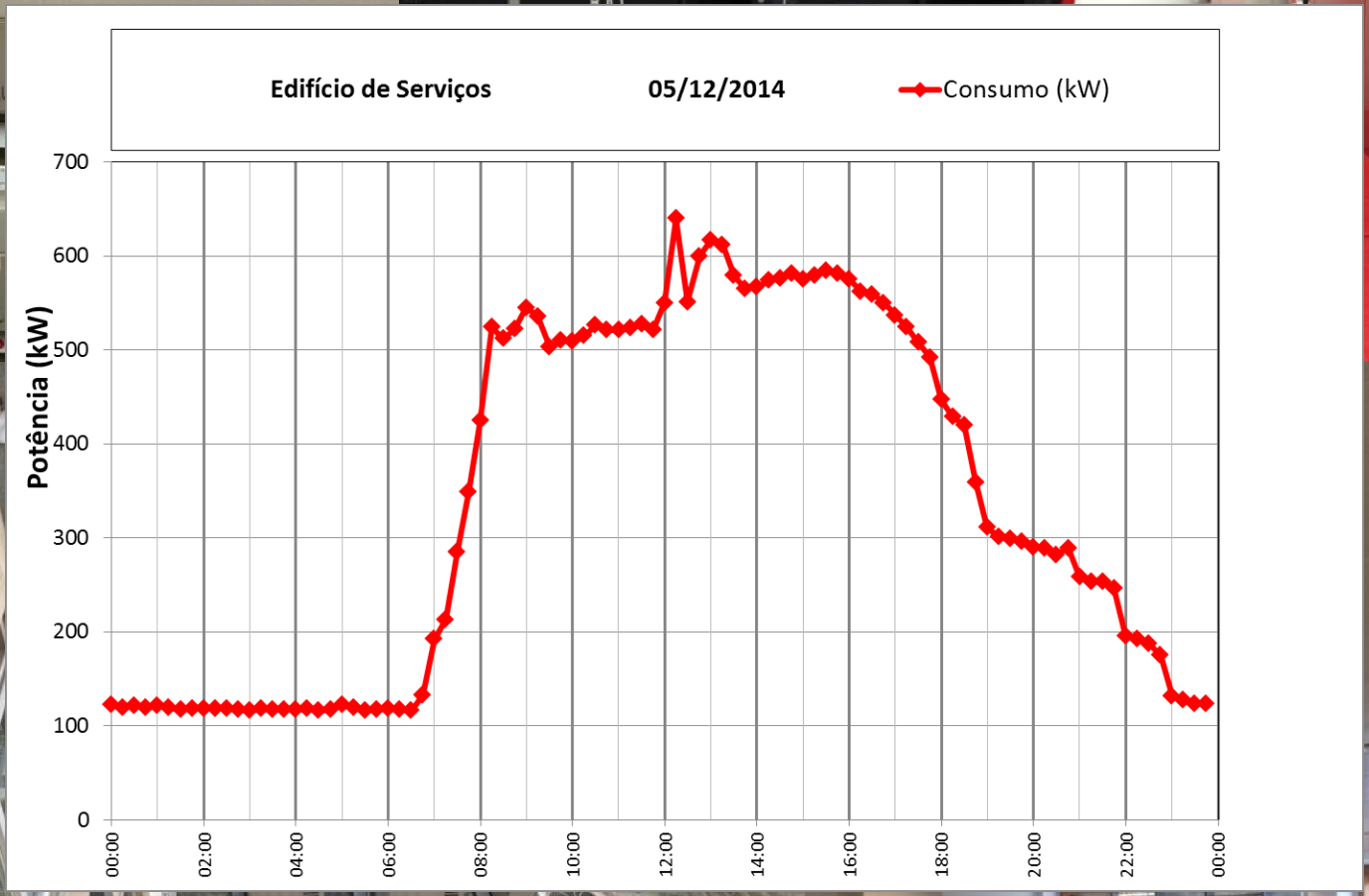
SERVICE PUBLIC BUILDINGS


Pt 1
Pt 2
ELEVADORES
CHILLER 1
CHILLER 2
CHILLER 3
BLOCO A
BLOCO B
BLOCO C


CEL MEDIDA (TIsi e TTsi)
MERLIN GERIN


Pt 1
Pt 2
ELEVADORES




Edifício de Serviços
05/12/2014
Consumo (kW)
Potência (kW)
700
600
500
400
300
200
100
0
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00

RESIDENTIAL BUILDINGS

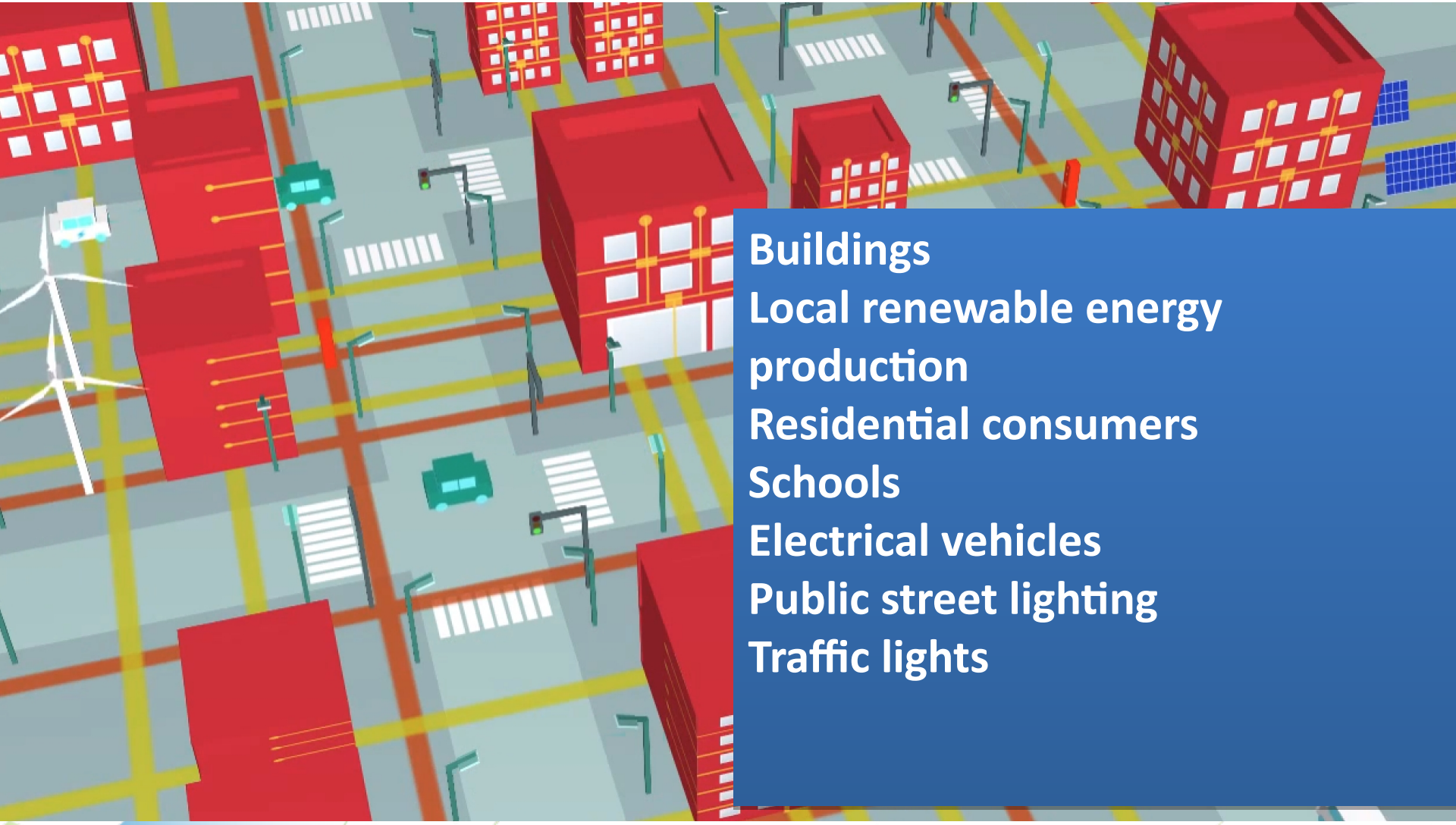
DWELLINGS – RESIDENTIAL BUILDINGS

Energy efficiency based in smart metering and feedback mechanisms (user empowerment through information and behaviour change)

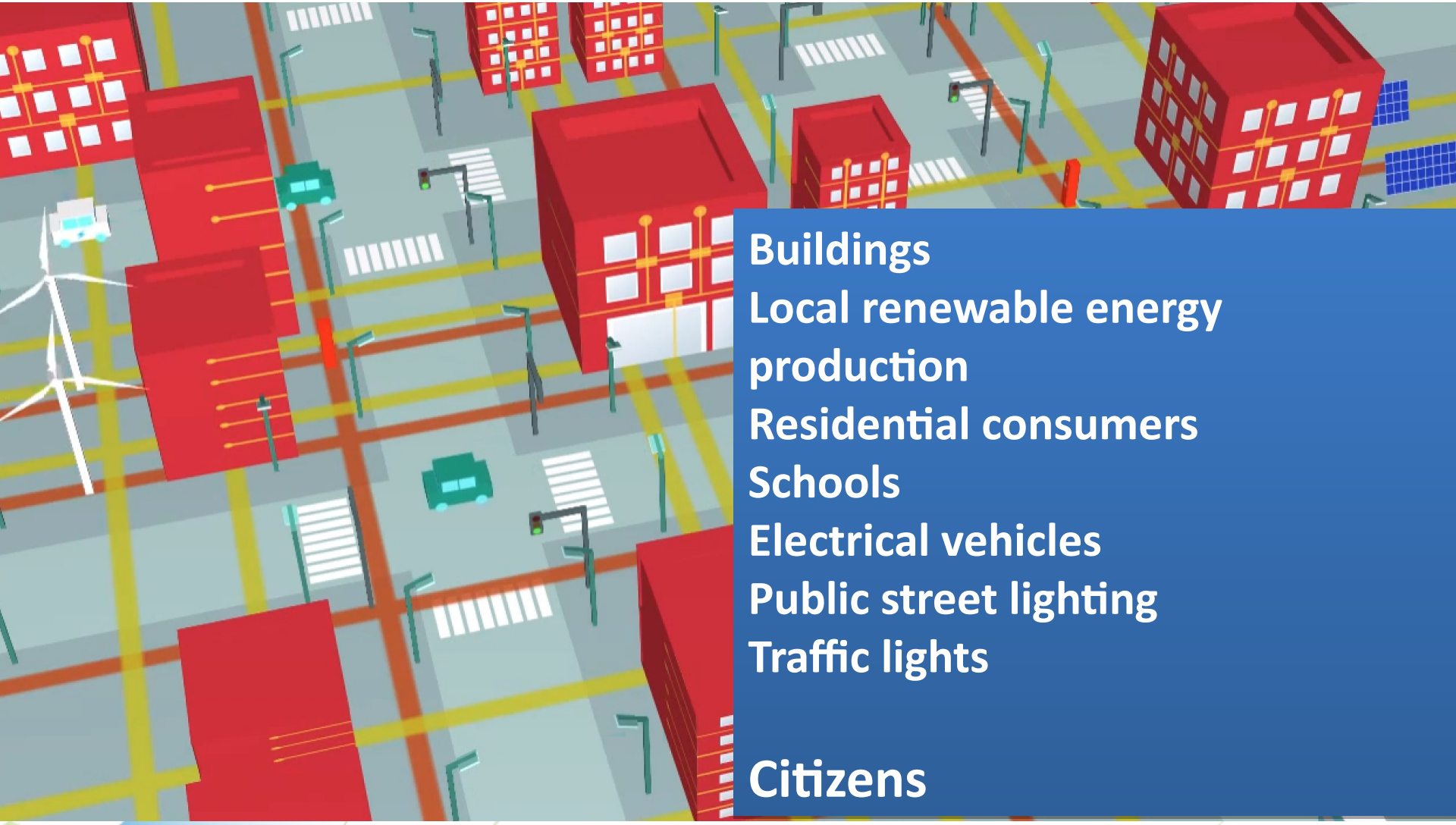
Empowered consumer

- **ICT**
- **Information** (Informative billing)
- **Continuous motivation**
- **Results** (Energy savings and decreasing energy costs)

MANY DIFFERENT ENERGY MANAGEMENT SYSTEMS



- Buildings
- Local renewable energy production
- Residential consumers
- Schools
- Electrical vehicles
- Public street lighting
- Traffic lights



Buildings
Local renewable energy production
Residential consumers
Schools
Electrical vehicles
Public street lighting
Traffic lights

Citizens

HOW TO INTEGRATE THEM?

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AGÊNCIA MUNICIPAL DE ENERGIA E AMBIENTE

Building Energy Decision Support Systems for Smart Cities

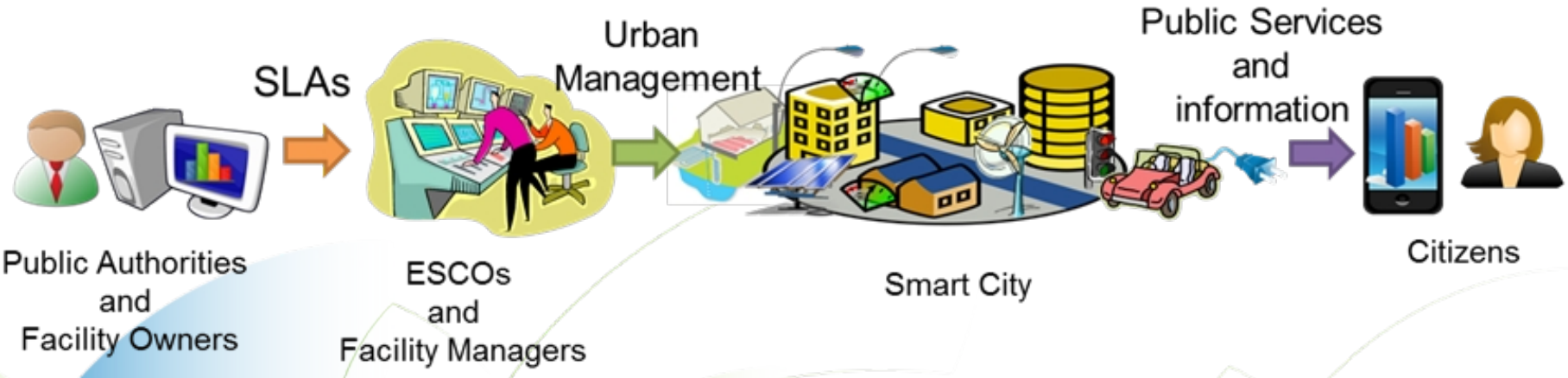
SEVENTH FRAMEWORK PROGRAMME

EUROPEAN COMMISSION

HOW TO INTEGRATE EVERYTHING

Energy efficient Smart cities rely on highly heterogeneous already deployed infrastructure and services- e.g. public lighting system, urban heating system, public buildings, electric vehicles, micro-generation, residential prosumers, etc.

All these systems are currently managed by isolated Energy Management Systems (EMS)



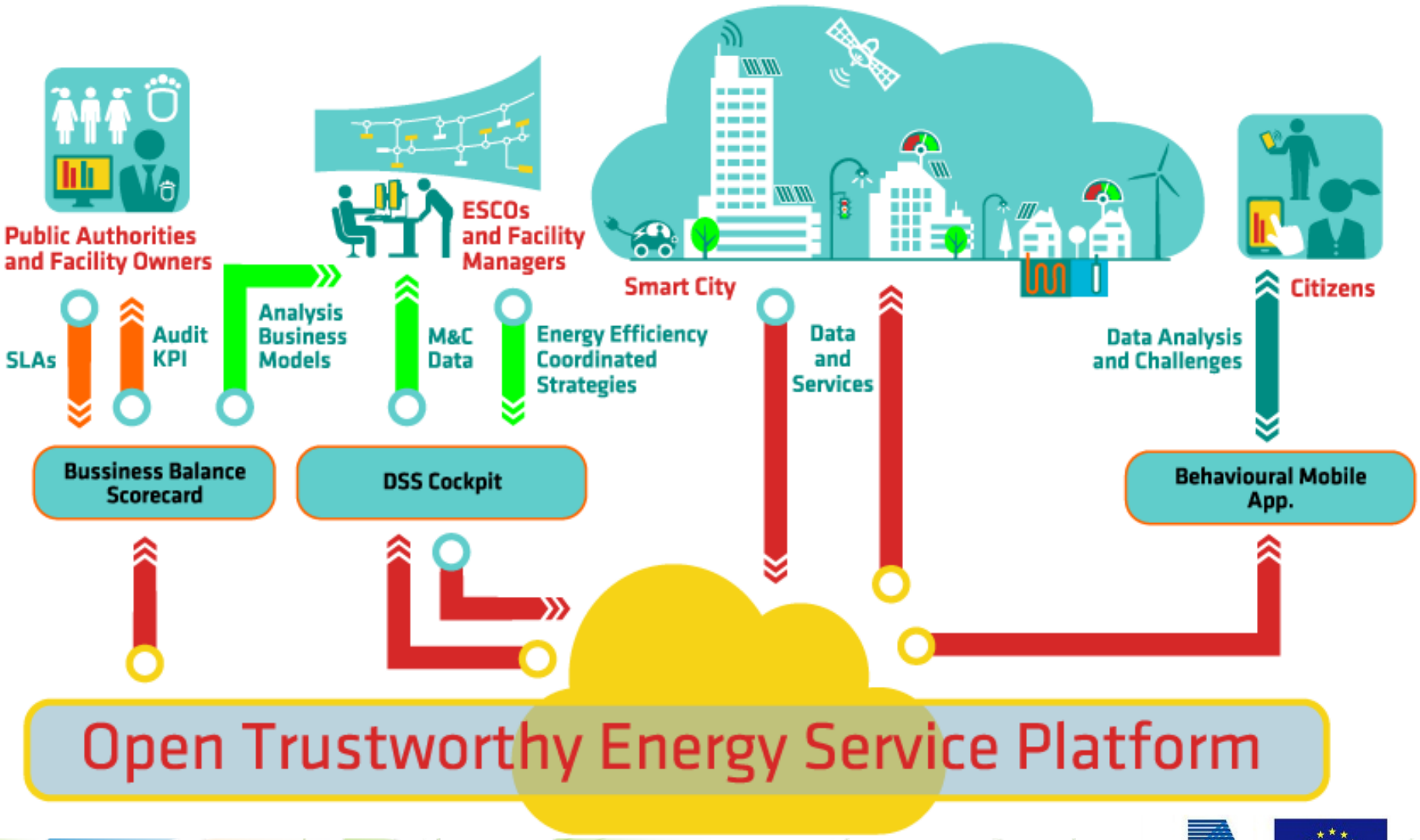
HOW TO INTEGRATE EVERYTHING

HOW TO INTEGRATE EVERYTHING

HOW TO INTEGRATE EVERYTHING

Our MISSION is to design, develop and validate in a smart city:

- An Open Trustworthy Energy Service Platform.
- A Business Balanced Score Card (BBSC) for public authorities to audit SLA established with the ESCOs and Facility Managers (FM)
- A Decision Support System Cockpit for ESCOs and FMs
- New opportunities to mobile application to awareness among citizens.


Public Authorities and Facility Owners
ESCOs and Facility Managers
Smart City
Citizens
SLAs
Audit KPI
Analysis Business Models
M&C Data
Energy Efficiency Coordinated Strategies
Data and Services
Data Analysis and Challenges
Bussiness Balance Scorecard
DSS Cockpit
Behavioural Mobile App.
Open Trustworthy Energy Service Platform

HOW TO INTEGRATE EVERYTHING
EXPECTED RESULTS

- A common Architecture and data models for energy positive smart cities.
- An Open Trustworthy Energy Services Platform
- Integration with the different Energy Management Systems.
- A Business Energy Balanced Scorecard .
- A Decision Support System Cockpit.
- Large Demonstration in two scenarios

a) The Smart city of Barcelona, Spain

b) The Smart city of Lisbon, Portugal

BESOS Building Energy Decision Support Systems for Smart Cities

LISBOA e·nova AGÊNCIA MUNICIPAL DE ENERGIA E AMBIENTE

http://www.youtube.com/watch?feature=player_detailpage&v=IE3XSusQ_IE

SEVENTH FRAMEWORK PROGRAMME

EUROPEAN COMMISSION

WHAT IS THE CITY (ALSO) DOING?





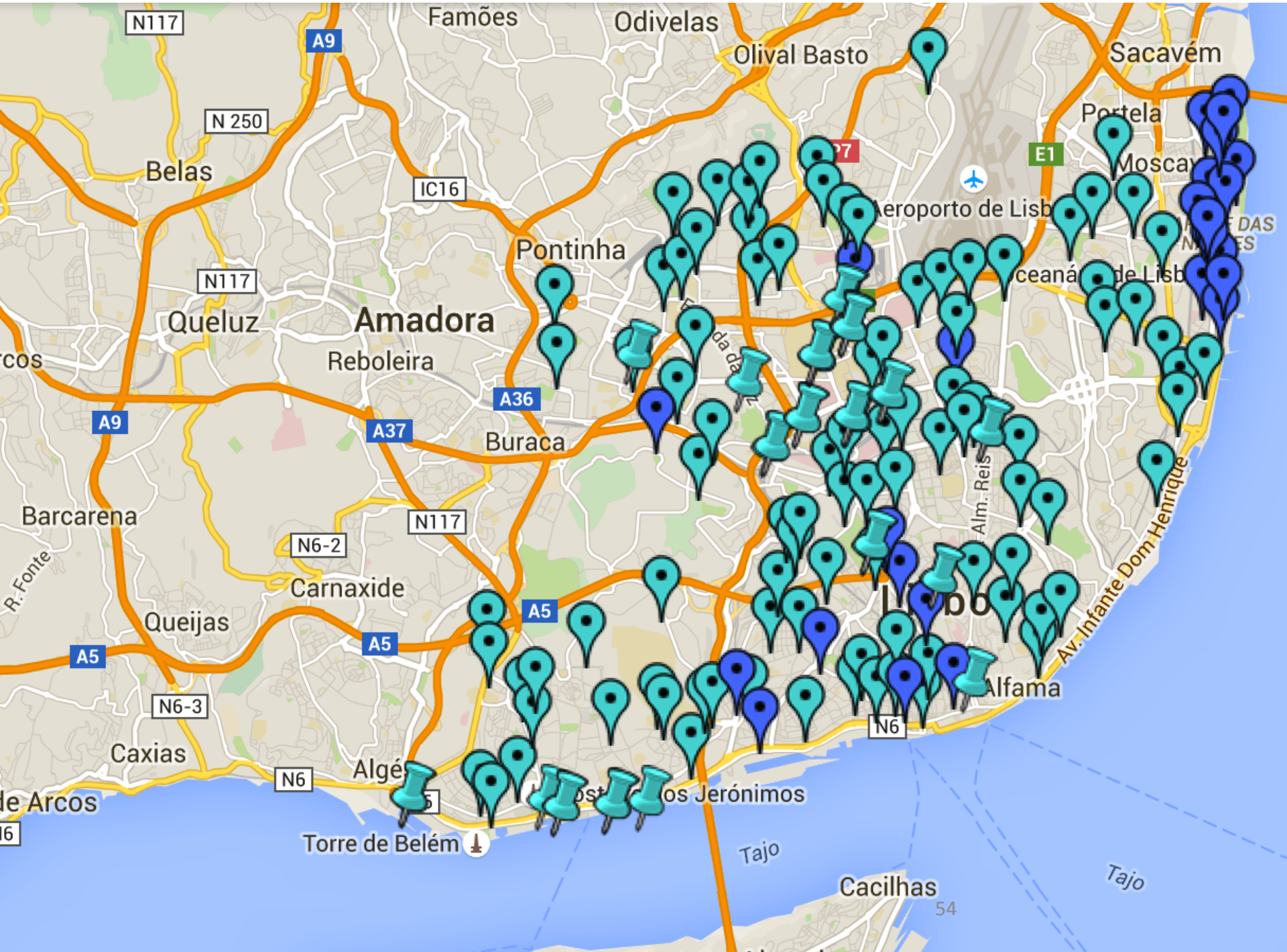


714 PC FIGUEIRA


ris


MOBI.E
41-NX-95
41-NX-


-1
42·NX·02
13
07


N117
A9
Famões
Odivelas
Olival Basto
Sacavém
N 250
Belas
IC16
Portela
E1
Moscavide
Aeroporto de Lisboa
Pontinha
N117
Queluz
Amadora
Reboleira
A36
A9
A37
Buraca
Barcarena
N117
N6-2
Carnaxide
Queijas
A5
A5
A5
N6-3
Caxias
N6
Algés
Torre de Belém
Mosteiro dos Jerónimos
Tajo
Cacilhas
Tajo
Lisboa
Alfama
N6
Av. Infante Dom Henrique
Alm. Reis

BIODIVERSE PASTURES

FRUIT TREES
URBAN FOREST

900 HECTARES
FOREST PARK

MONSANTO PARK – MAIN CENTRAL PARK (EDUARDO VII) GREENWAY

URBAN ALLOTMENT GARDENS

CROP FIELD URBAN PARK





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LISBOA E-NOVA AND LISBON

LISBON 2020

RELEVANT PROJECTS

SOME RESULTS

LED IN TRAFFIC LIGHTS

- Replacement of 4000 bulbs for LED in the last 3 years (15%)
- Reduction of 1300 MWh in energy consumption
- Less 48 ton CO_2/year
- Less130.000 Euros/year in the energy bill of the Municipality

EPC IN TRAFFIC LIGHTS

- Replacement of 22500 bulbs for LED during 2013
- Reduction of 6,2 GWh in energy consumption/year
- Less 230 ton CO_2/year
- Less 700 k Euros/year in the energy bill of the Municipality

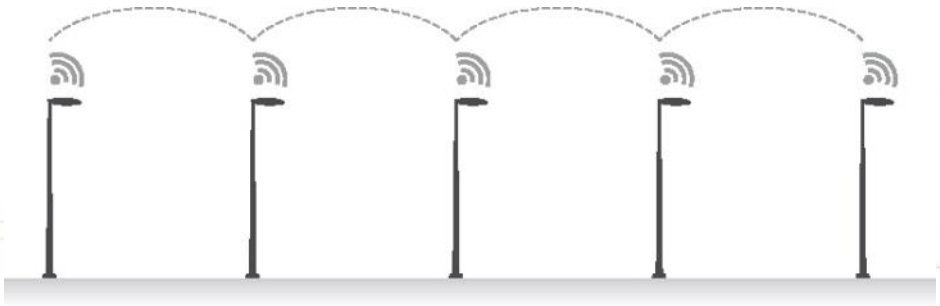
PUBLIC LIGHTING

- Important investment in more efficient technology - and LED, electronic ballasts, mercury eradication, and integrated telemanagement systems – 3,439 GWh/year.

EPC IN PUBLIC LIGHTING

Preparing an entire District for more efficient lighting under an EPC procedure

Current plan to 2020	Consumption reduction		Cummulative Budget (million Euro)
Energy Efficiency in street lighting and traffic lights	37,3 GWh/yr	-53 %	43



AND....

1. **Municipal electric vehicle fleet -** 90 electric vehicles – 57 cars (out of 184), 22 street-cleaning vehicles and 11 segways)
2. **EV charging stations network** - Installation of 540electrical vehicles public charging points; 104 on Municipality parking lots
3. **Bus fleet** – 70% of the public bus company fleet was renewed
4. **Solid waste collection vehicles** – 54 natural gas heavy vehicles (out of 243)
5. **Restrictions on more-pollutant and inefficient vehicles to access the city**
6. Implementation of conditioning traffic access to several districts and creation of low speed neighbourhoods (30 km/h)
7. **Increase of 545% of the cycling infrastructure in the last 6 years**
8. **Co-generation** in industry, health-care and shopping centres: Companhia Térmica do Beato ACE (Power 4.7 MW) Centro Colombo (Power 6.9 MW), Central do Hospital de São José (Power 1.8 MW), Central do Hospital de São Francisco Xavier (Power 2.9 MW).

THANK YOU!

Lisboa E-Nova
Agência Municipal de Energia – Ambiente
Rua dos Fanqueiros, 38 1º, P - 1100-231 Lisboa

Tel. +351 218 847 010
Mobile: +351 927 993 006
Fax. +351 218 847 029

Francisco Gonçalves
franciscogoncalves@lisboaenova.org

info@lisboaenova.org
www.lisboaenova.org