



# Living Labs and Efficient energy solutions in Lisbon

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Miguel Águas  
Technical and Financial Director  
Lisbon's Municipal Energy-Environment Agency

# Living Labs and efficient energy solutions in Lisbon

## LISBOA E-NOVA

### MISSION:

Contribute to Lisbon's sustainable development through the promotion and dissemination of good practice in energy and environment.

### AFFILIATES

26 Affiliates

10 Workers

5.500 Mailing list subscribers

50 Communication actions/year

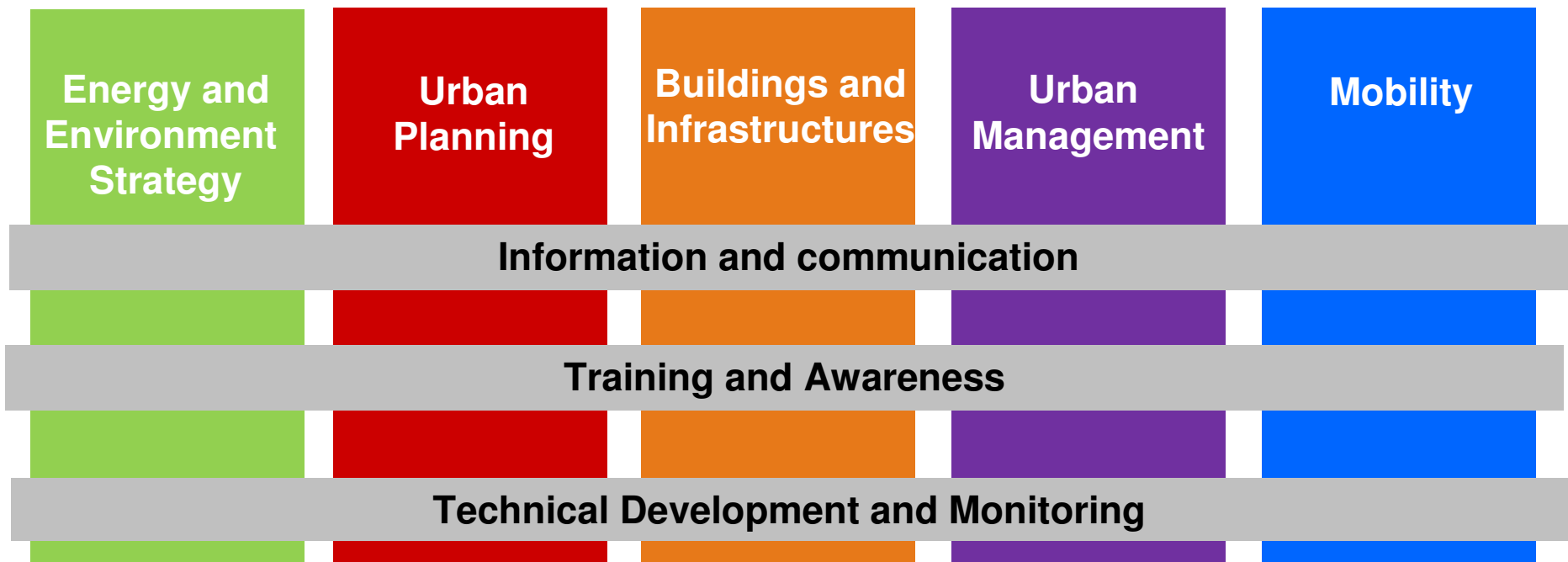
25 Current projects

[www.lisboaenova.org](http://www.lisboaenova.org)



## LISBOA E-NOVA

### MAIN AREAS OF INTERVENTION



## LISBON'S ENERGY AND ENVIRONMENTAL STRATEGY

### Targets for 2013

Energy consumption reduction: 8.9%

Water consumption reduction: 7,8%

Water losses in the distribution grid: 15,6%

Recycled water use: 3.1 m<sup>3</sup>/hab.year

Materials consumption reduction: 10%

Selective materials recycling increase: 29%

DGEG, valores provisórios



## LISBON'S ENERGY AND ENVIRONMENTAL STRATEGY

### CITIZENS ENGAGEMENT AND PARTICIPATION

It's one of the Lisbon's Energy and Environment Strategy key points to increase citizens awareness and active participation in fulfilling the targets set for the city.

This is achieved through the promotion of activities, workshops, debate sessions.

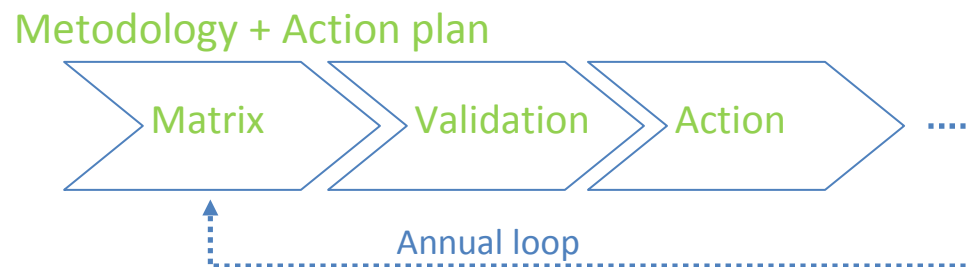


DGEG, valores provisórios

## LISBON'S ENERGY AND ENVIRONMENTAL STRATEGY

### MONITORING

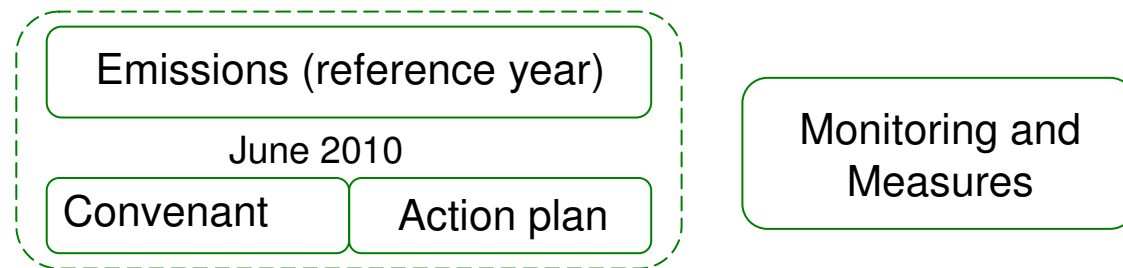
Defined the performance goals of the Lisbon municipality on the horizon 2009 - 2013, it is necessary to ensure continuous monitoring of the actions that are developed within its framework to quantify and identify priority areas of intervention: update of the matrices energy, water and materials, and also noise and air quality.



## LISBON'S ENERGY AND ENVIRONMENTAL STRATEGY

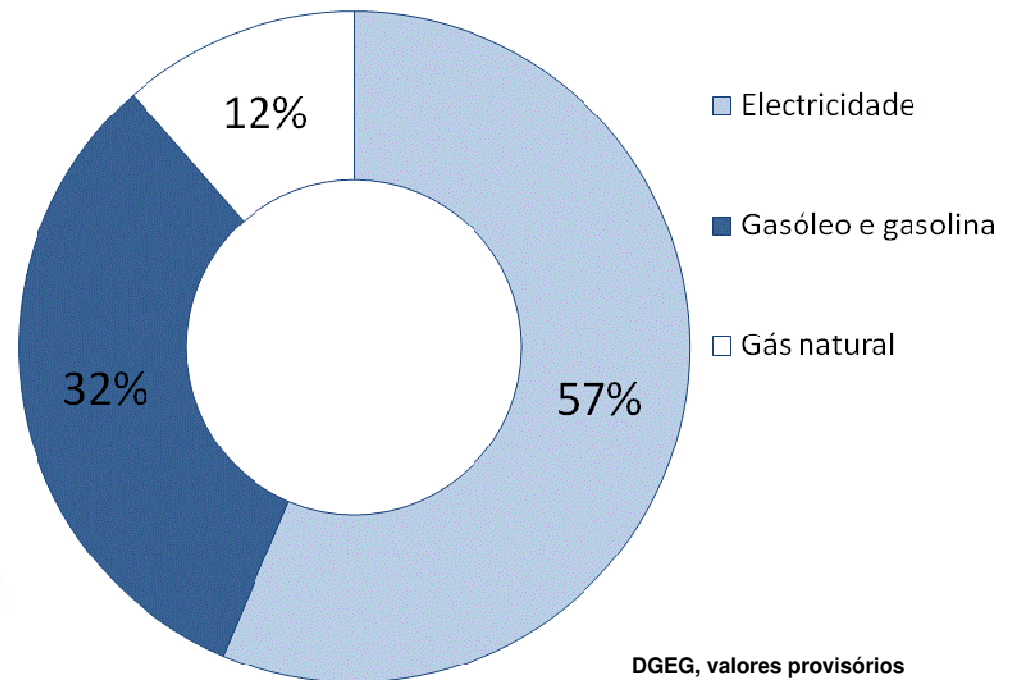
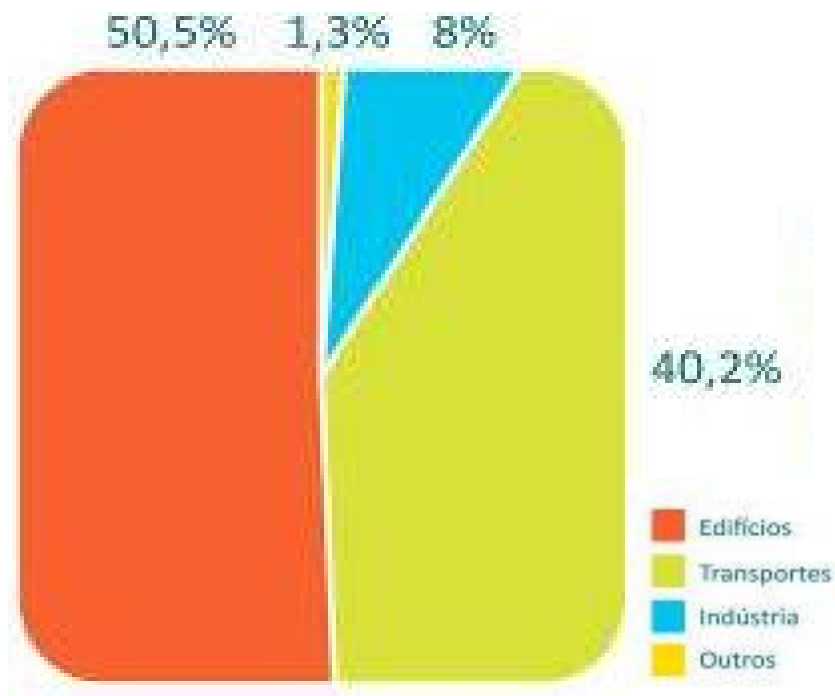
### COVENANT OF MAYORS

The Municipal Council of Lisbon in 03/Dec/08 signed the covenant to promote reductions of CO2 emissions in the city in at least 20% by 2020.



## LISBON'S ENERGY MATRIX

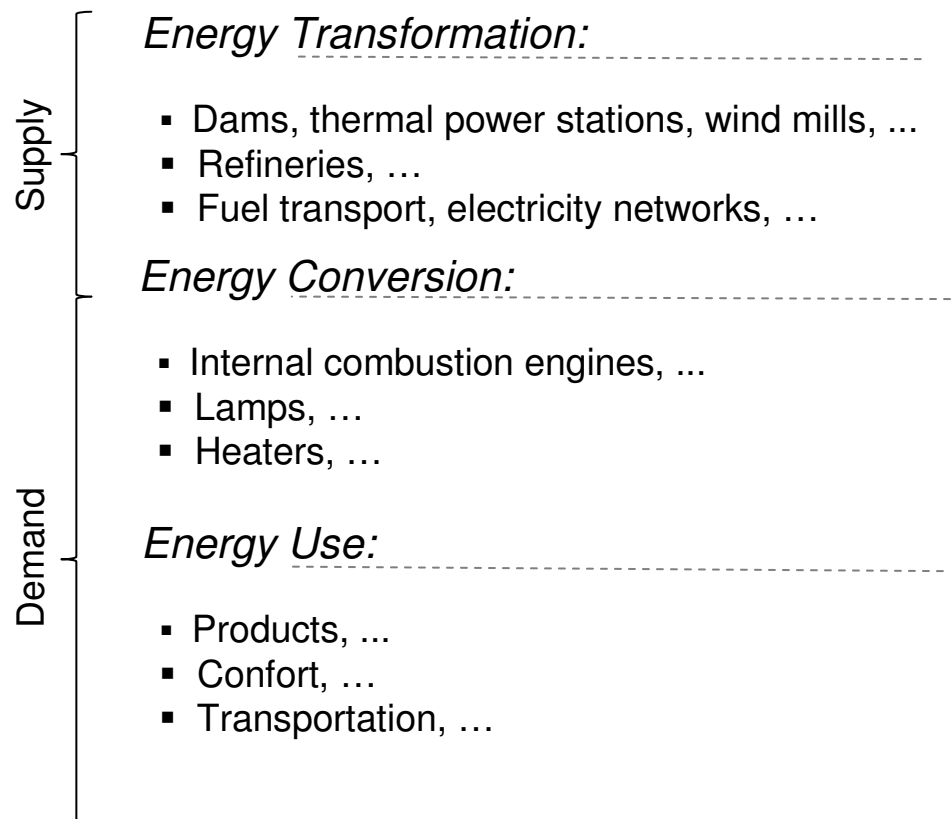
### PRIMARY ENERGY (2008)



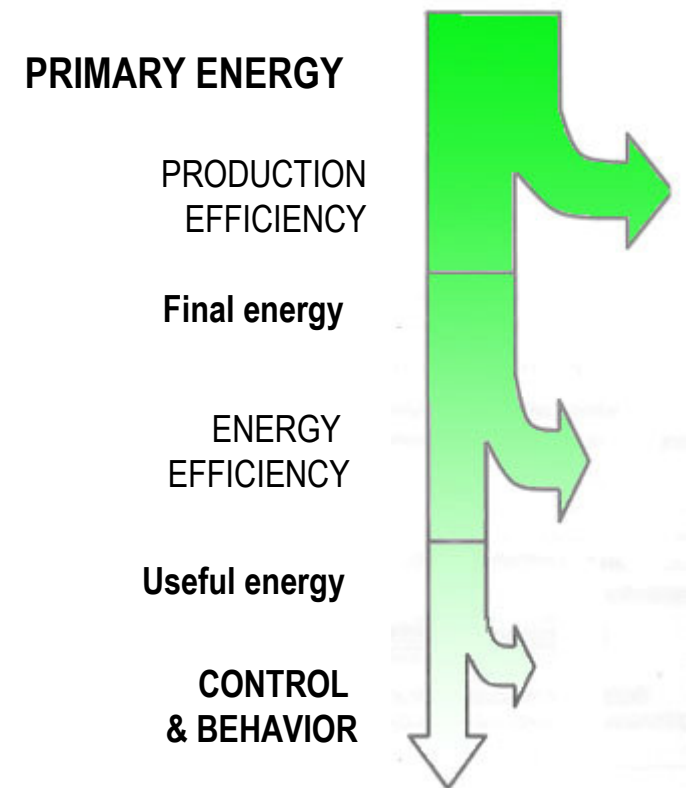
DGEG, valores provisórios



## ENERGY USE

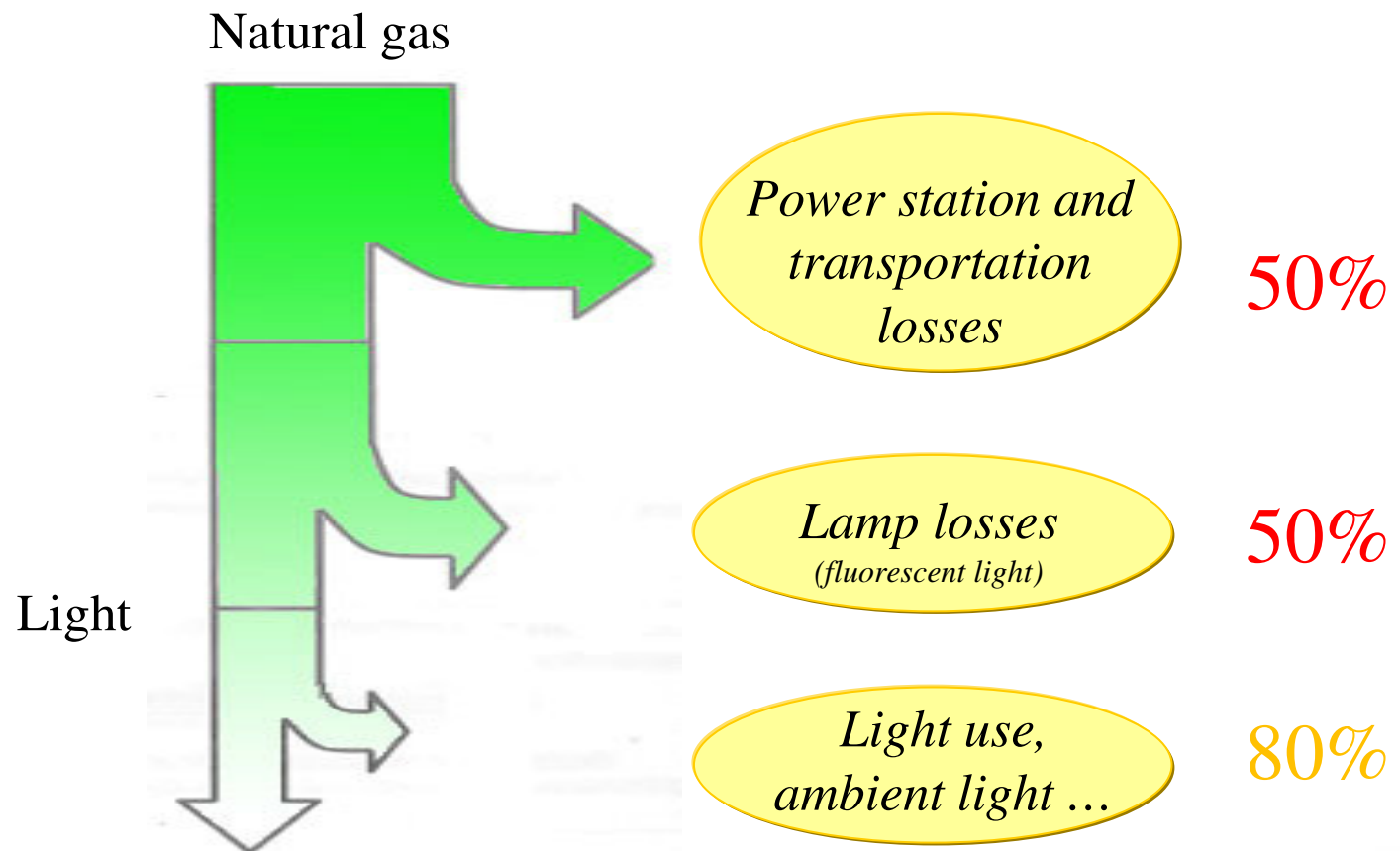


## Sankey Diagramm

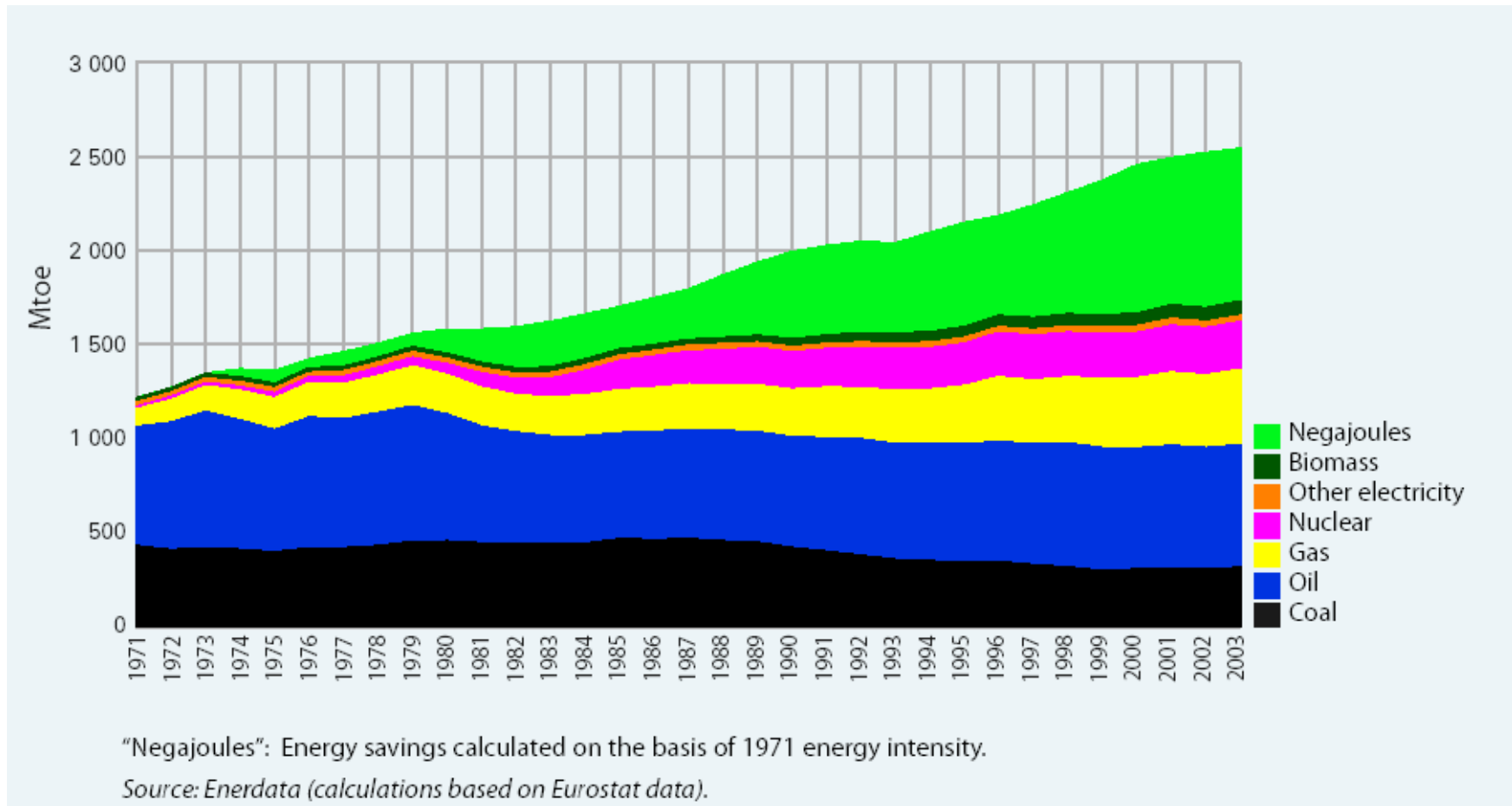


## ENERGY USE

## LIGHT



## ENERGY EFFICIENCY – THE NEW ENERGY



## SOLUTIONS

- **Structuring actions:** to create the necessary framework for future action for energy efficiency.
- **Technological actions:** application of the latest and most innovative technological solutions.
- **Information actions:** fostering awareness and behavioral change.

## STRUCTURING ACTIONS

### Lisbon Master Plan

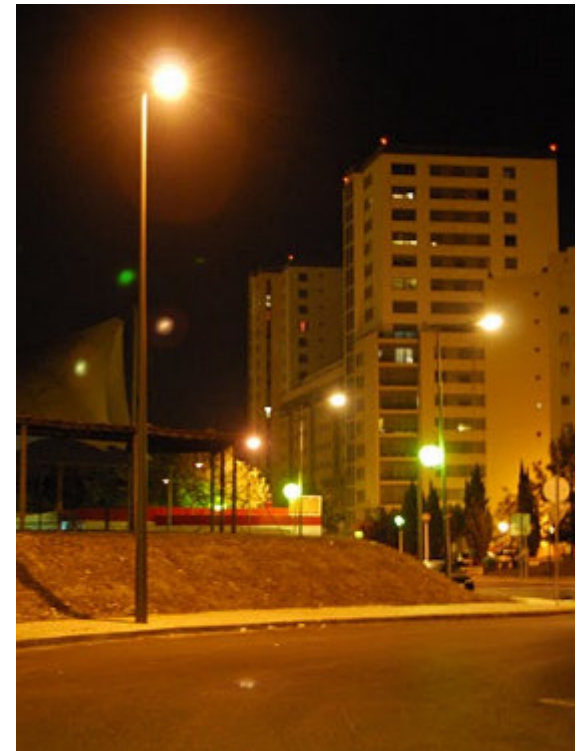
- Includes for the first time a chapter on energy efficiency and renewable energies in the urban environment.



## TECHNOLOGICAL ACTIONS – Public lighting

### PHOTOELECTRIC SENSOR

- Began operating in 2008
- Consists in controlling the lighting of the public lighting by natural light instead of a fix schedule
- In 2009 the reduction was nearly 20 min / day.
- Energy saving energy and economic in 2009:  
1.6 million kWh and 0.1 million €



## TECHNOLOGICAL ACTIONS – Public lighting

### ILLUMINATION OF MONUMENTS

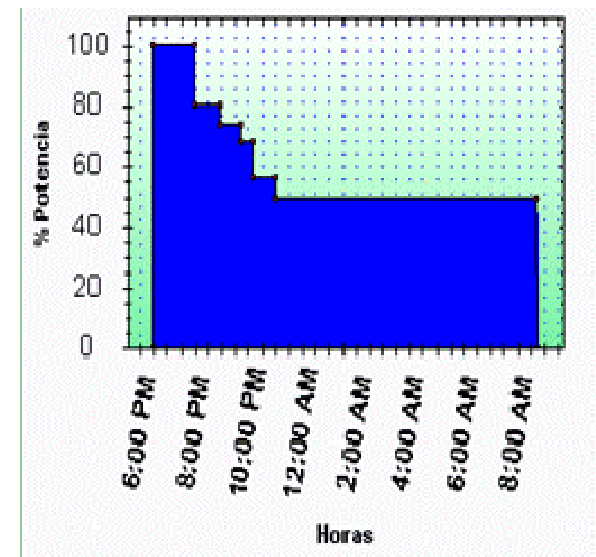
- Basilica da Estrela
- Consists of the technological upgrading of the lighting of the monuments, with improved lighting quality and reducing light pollution.
- Saving energy and economic: the estimated savings are higher than 50%.
- Applied to 10 monuments equivalent to the Basilica da Estrela, the annual savings will exceed half a million kWh and 40 000 €



## TECHNOLOGICAL ACTIONS – Public lighting

### ELECTRONIC BALLASTS WITH CONTROL FLUX REDUCTION

- Consists in of substitution of the ferromagnetic ballasts of 250 W for electronic ballasts.
- Saving energy: reduced by 50%.
- Lisbon has about 15,000 lights that can be changed without any additional technical equipments, savings of 5 million kWh/y and 500.000 €/y.
- Investment payback between 3-5 years.





## TECHNOLOGICAL ACTIONS– Traffic lights

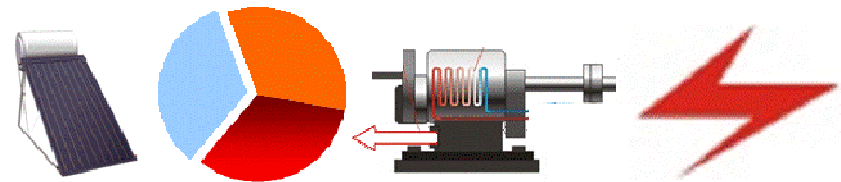
### LED IN TRAFFIC LIGHTS

- Center of Lisbon (Baixa, Rossio, Av. Liberdade)
- Consists in the substitution of the traditional lamps of traffic lights with LEDs
- Big energy savings (reduction of 90%), road safety and maintenance.
- Saving energy and economic for the 1<sup>st</sup> phase: 567 lights will save half a million kWh and 60 000 €.
- Lisbon has about 24,000 lights traditional lamps, and the savings potential 7 million kWh and 750.000 €.
- Investment payback between 3-5 years.

## TECHNOLOGICAL ACTIONS – Buildings

### COGENERATION (CHP) IN SWIMMING POOLS

- Installation of cogeneration systems in 7 municipal pools for hot water production and electricity exportation, combined with the optimization of heat in thermal solar panels.
- These pools currently have an annual consumption of natural gas from 5 million kWh (1/3 of consumption of natural gas of the Municipality).



## TECHNOLOGICAL ACTIONS – Buildings

### BUILDINGS ENERGY REFURBISHMENT

- Identification of buildings energy matrix;
- Evaluation of intervention opportunities via a cost-benefit analysis;
- Presentation of results in best practice manuals;
- Most advantageous intervention: Replacement of window frames and double glazing – 10 years pay back with a 10% reduction on the energy bill;
- 
- Saving energy and economic: Generalizing this measure to about 23 000 dwellings managed by the Municipality, the annual savings reaching 18 million kWh and 2 million €



## TECHNOLOGICAL ACTIONS – Transportes and Mobility

### MOBI-E: ELECTRIC MOBILITY IN LISBON

Identification and installation of 687 charging points for electric cars in the city of Lisbon.

The first year is free of charge!

Interconnection with the public transports system;

Straight connection with smart grids and bi-directional energy flux.

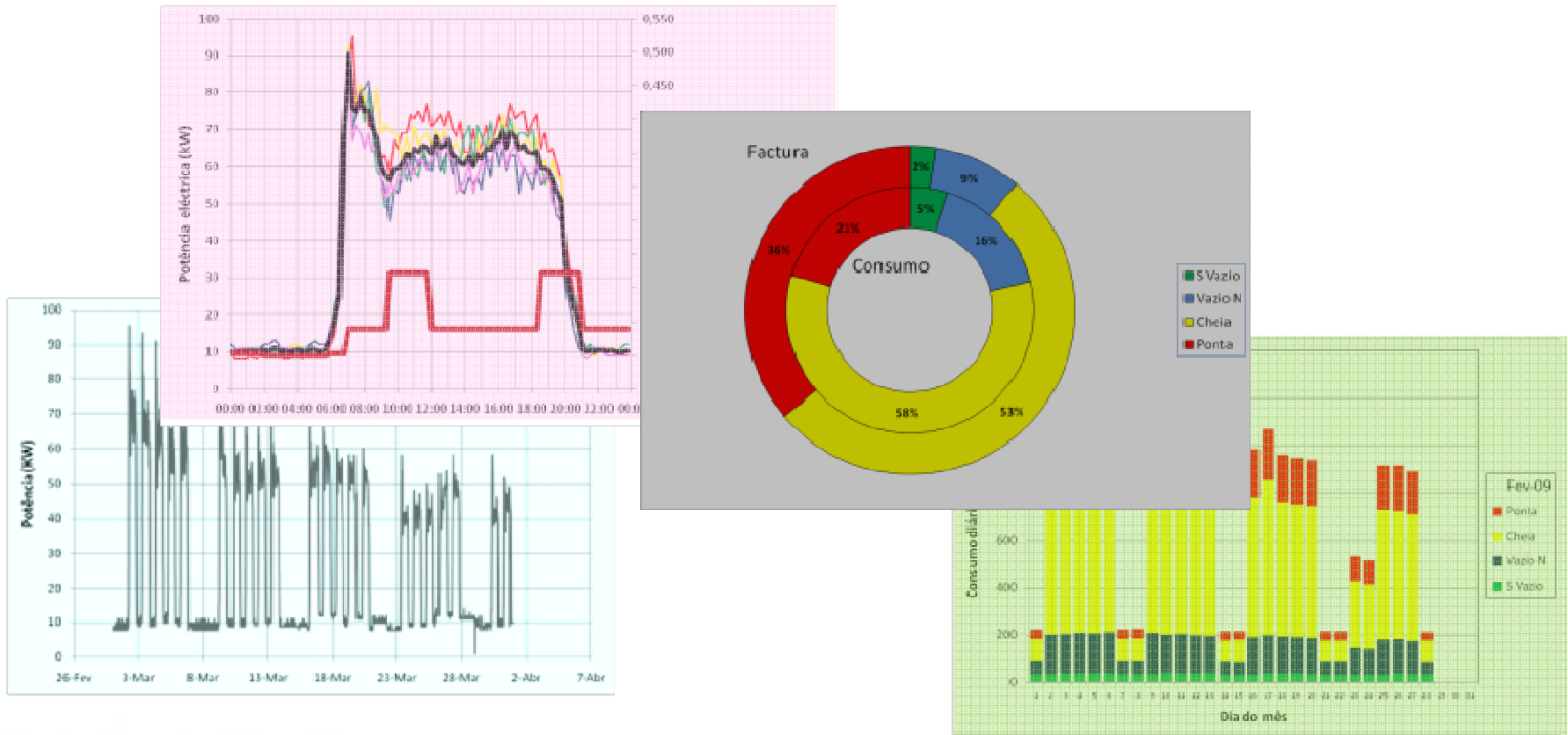


## TECHNOLOGICAL ACTIONS – Transportes and Mobility

### MOBI-E: ELECTRIC MOBILITY IN LISBON

## TECHNOLOGICAL/BEHAVIOR ACTIONS – Buildings

### REMOTE MANAGEMENT – ELECTRICITY CONSUMPTIONS

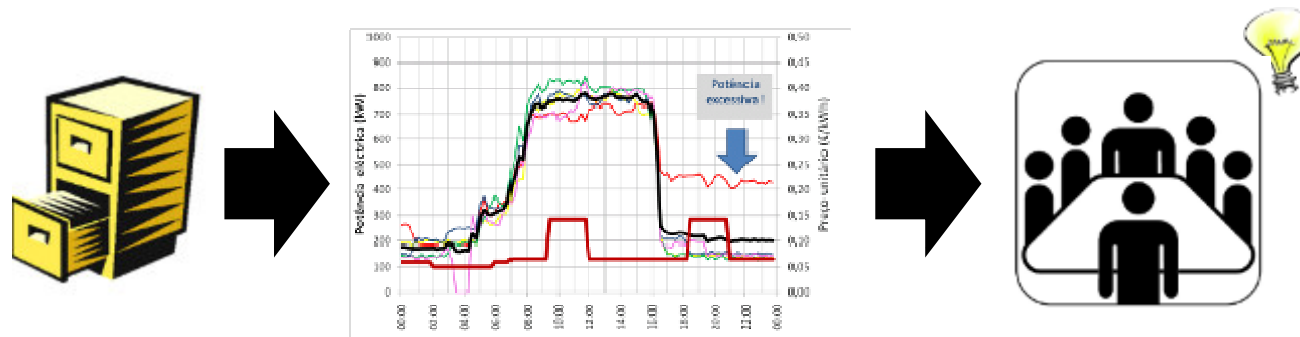


## TECHNOLOGICAL/BEHAVIOR ACTIONS – Buildings

### REMOTE MANAGEMENT – ELECTRICITY CONSUMPTIONS

In Municipal buildings and buildings of Lisboa E-Nova Associates analyze and monitor the electricity consumption patterns and present/discuss it with the building manager.

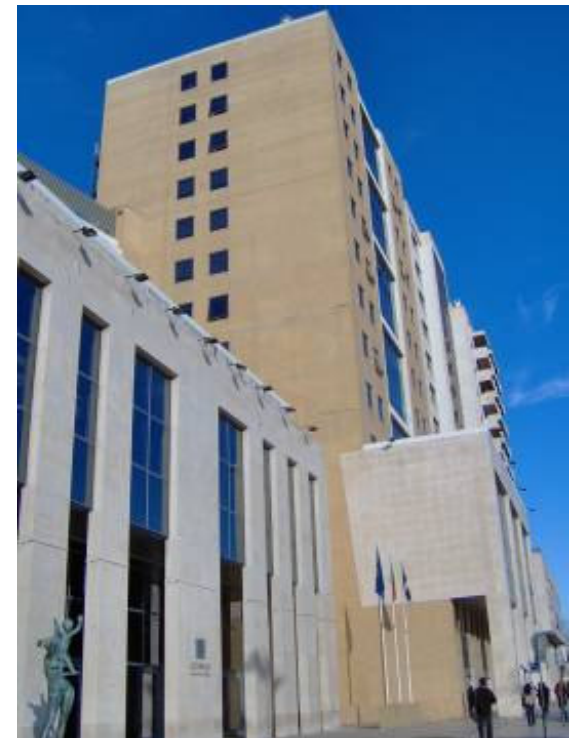
Promotes a better management of the building and the adequacy to electricity tariffs.



## BEHAVIOR CHANGE ACTIONS – Office Buildings

### SAVE ENERGY PROJECT

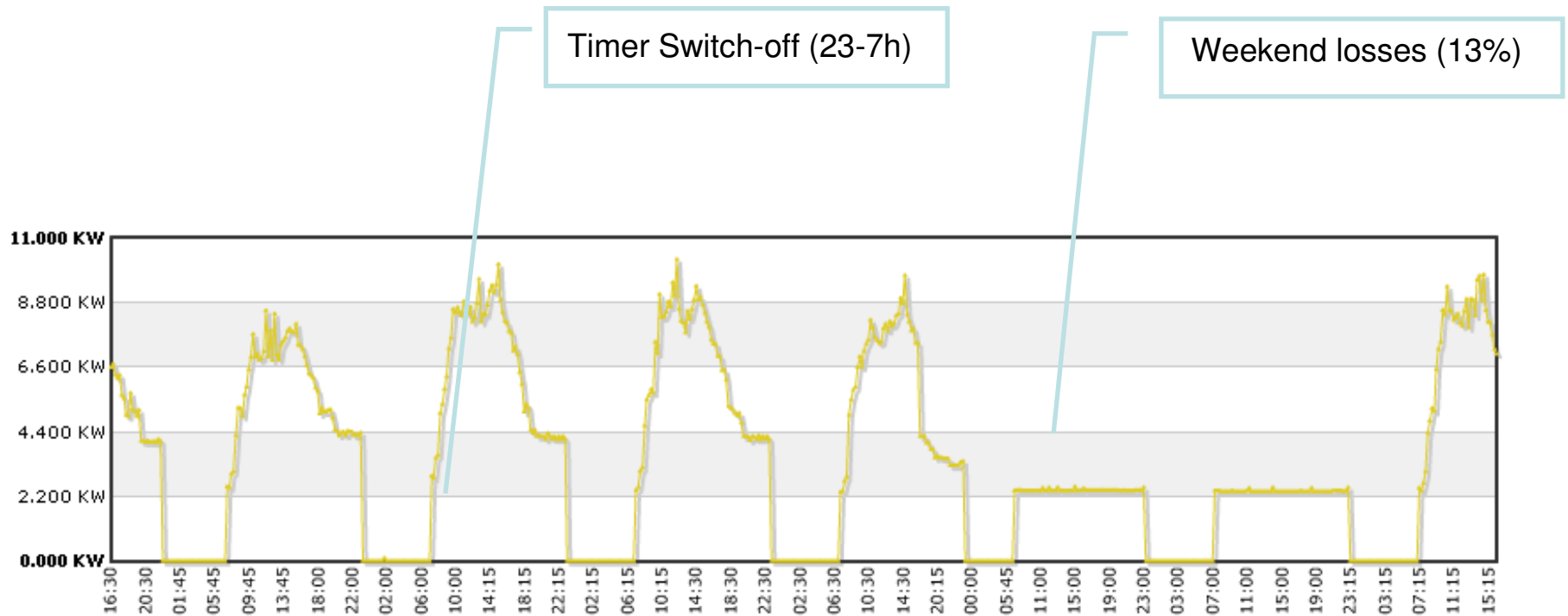
- Through the installation of 54 electricity meters, the pilot area of the building is continuously remotely monitored (at Lisboa E-Nova/ISA).
- The goal is to promote technicians' adoption of more energy efficient behaviors, inducing the reduction of electricity consumption.





## BEHAVIOR CHANGE ACTIONS – Office Buildings

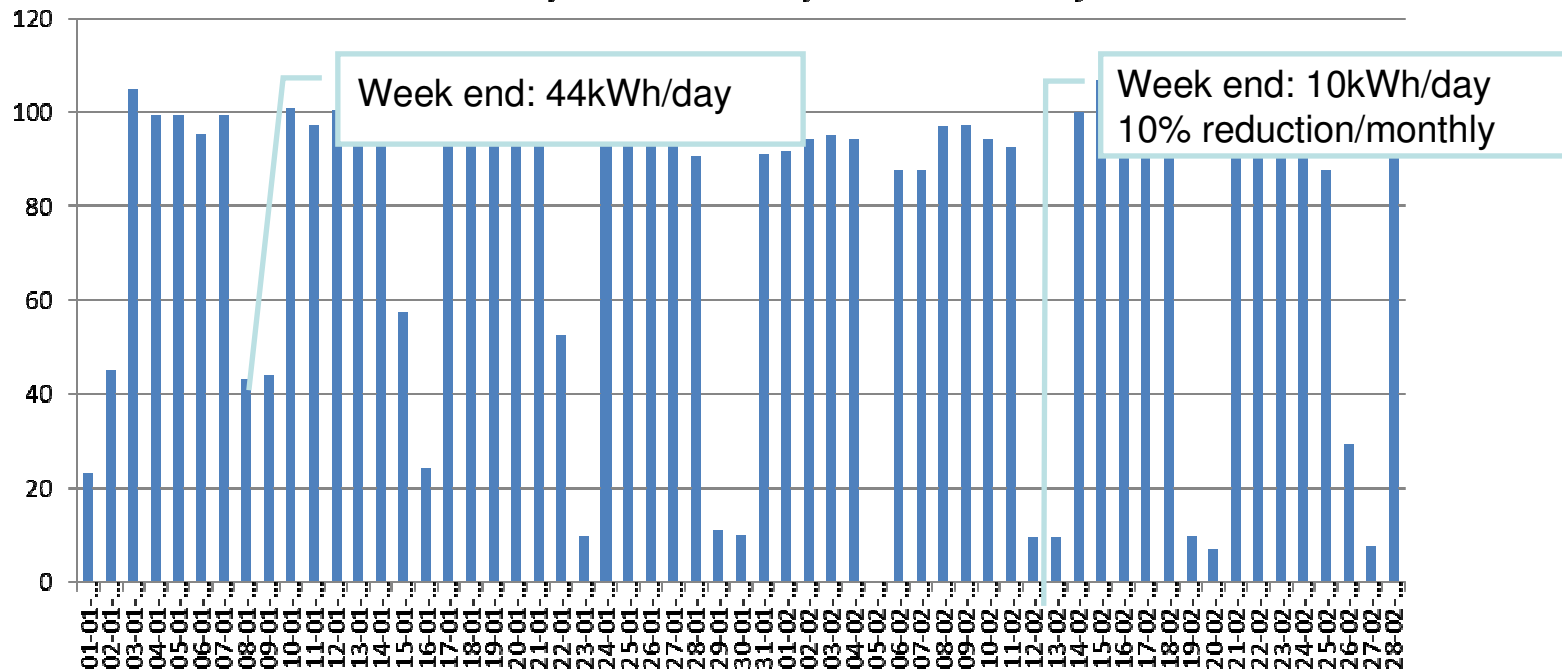
### Electricity consumption weekly profile



## BEHAVIOR CHANGE ACTIONS – Office Buildings

### SAVE ENERGY PROJECT

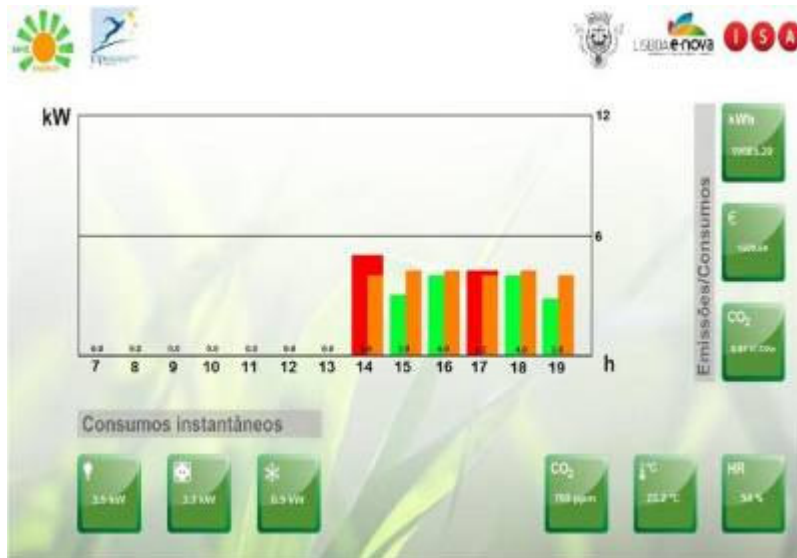
Consumption January and February



## BEHAVIOR CHANGE ACTIONS – Office Buildings

### SAVE ENERGY PROJECT

- The data collected is available to users through a real time data display and historical consumptions in a webpage.



## BEHAVIOR CHANGE ACTIONS – Office Buildings

### SAVE ENERGY PROJECT

- Continuous awareness actions are developed to promote users engagement to energy efficiency:
  - Applets with energy efficiency tips;
  - Electricity consumption plugs to experience at home;
  - Serious games on energy;
  - Information workshops;
  - Information and feed-back questionnaires



## BEHAVIOR CHANGE ACTIONS – Office Buildings

### INTELLIGENT MONITOR FOR EFFICIENT DECISIONS

- The success of SAVE ENERGY drove Lisboa E-Nova to replicate this experience in other 10 service buildings, not exclusively service buildings but also commercial and cultural buildings;
- The goal is to analyze the electricity consumption of the buildings with the building managers improving the building management and also interact with users through real time display and information campaigns.

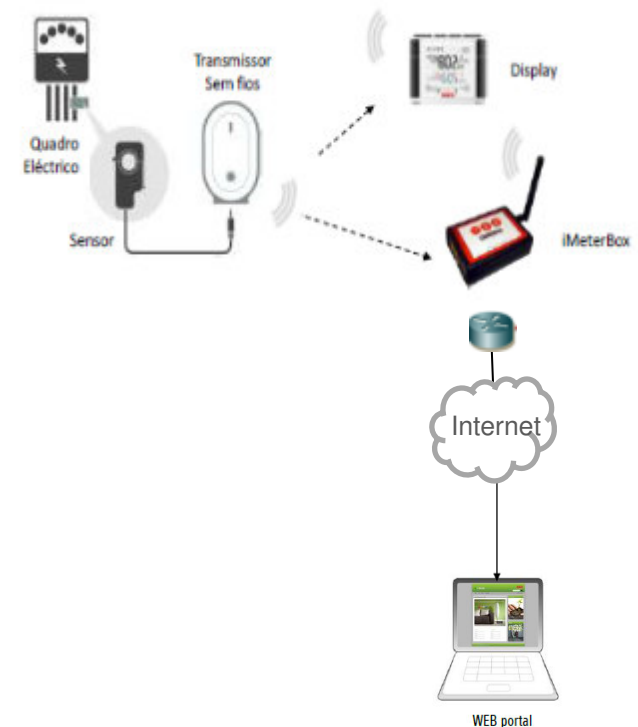
## BEHAVIOR CHANGE ACTIONS – Residential Buildings

### INTELLIGENT MONITOR FOR EFFICIENT DECISIONS

#### APOLLON PROJECT

Promote dwellers behavioral change through the installation of telemetry systems for electricity consumption and presentation of data in a local display and at a website.

- 250 dwellings will be in this study and a special effort will be developed in support to consumers based on analysis of personal consumption profile.
- Annual savings: 0,4 – 0,8 GWh/y  
Total investment: 250.000 € (supported by PPEC)



## BEHAVIOR CHANGE ACTIONS – Residential Buildings

### INTELLIGENT MONITOR FOR EFFICIENT DECISIONS



## BEHAVIOR CHANGE ACTIONS - Mobility

### INTELLIGENT AND SUSTAINABLE MOBILITY

- Identify the mobility matrix of a services municipal building and present efficient mobility solutions according to users needs and suggestions:
  - Carsharing (privileged parking),
  - Videoconferencing (in test),
  - Teleworking via common web based platforms;
  - Public transport information online (in development).



**Carpooling**  
CÂMARA MUNICIPAL DE LISBOA

**O que é o CARPOOLING?**  
Nas deslocações regulares entre dois locais, nomeadamente nas deslocações **casa trabalho casa** existe a oportunidade, para quem trabalha neste edifício, de poder partilhar o mesmo veículo

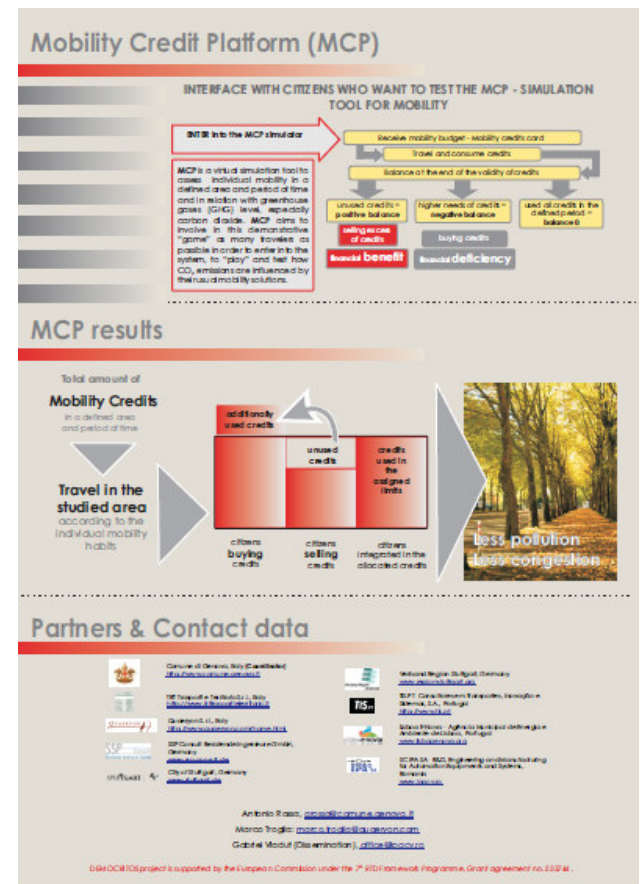
**A cidade agradece!**  
Com menos veículos individuais em circulação conseguem-se melhorias na qualidade do ar, na eficiência energética, no congestionamento do tráfego, no tempo dispendido nas deslocações e também nos respectivos custos.



## BEHAVIOR CHANGE ACTIONS - Mobility

### DEMÓCRITOS

- Developed with the European Commission support it studies the creation of a platform for mobility credits.
- Based on users needs and inputs through questionnaires and suggestions pool.
- Exchange of benefits for using public transports, soft mobility modes like bicycle, carsharing, park and ride, etc.



## INFORMATION ACTIONS

### CONFERENCES ON ENERGY EFFICIENCY

- ICT and Energy Efficiency Solutions
- 4<sup>th</sup> of May 2011, Lisbon





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**Thank you for your attention**