POCACITO

european post-carbon cities of tomorrow

CASE STUDY ASSESSMENT REPORT

LISBON

INTELI – INTELIGÊNCIA EM INOVAÇÃO, CENTRO DE INOVAÇÃO

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LIST OF ABBREVIATIONS

GDP	Gross domestic product
GVA	Gross value added
KPI	Key performance indicator
Toe	Tonne of oil equivalent

I INTRODUCTION

In the context of the POCACITO – "Post-carbon Cities of Tomorrow – Foresight for Sustainable Pathways towards liveable, affordable and prospering cities in a world context" project, this document intends to present the Lisbon Case Study Initial Assessment, integrated in Task 3.2. – Initial Assessment of Case Study Cities of WP3 – Initial Assessment.

In fact, the POCACITO project aims to develop a 2050 roadmap to support the transition of cities to a more sustainable or post-carbon future, through a collaborative research and participatory scenario building.

In order to use an evidence-based approach, 10 European case studies were selected: Barcelona, Copenhagen/Malmo, Istanbul, Lisbon, Litoměřice, Milan/Turin, Rostock and Zagreb. An important step to achieve the project's goal is to produce an initial assessment of case study cities in order to evaluate the current situation of these cities as an input into the scenario development.

The document is divided in the following parts: approach and methodology; overview of the Lisbon case study city; key strategies and projects; Lisbon case study city assessment; findings and key challenges; recommendations; and conclusions.

II APPROACH AND METHODOLOGY

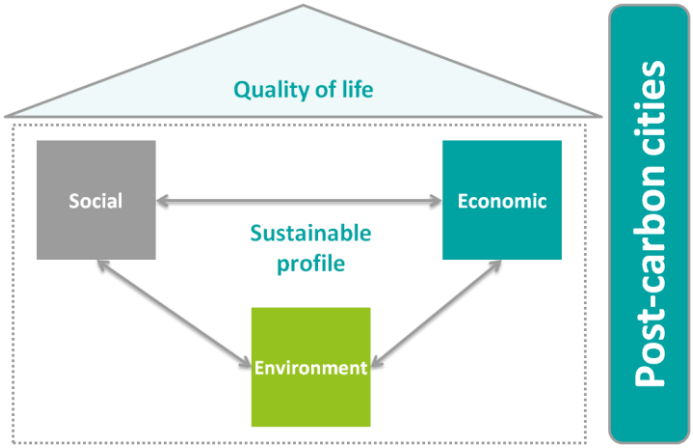
The development of the initial assessment of the case study cities is supported by two methodological documents produced within POCACITO: D 1.2 – Report on Key Performance Indicators and D 3.1 – Methodological Guide for the Initial Assessment. In this context, the initial assessment was developed based on a set of pre-defined KPI – Key Performance Indicators integrated in the PCI – Post-Carbon City Index.

II.I MODEL AND CONCEPT

'Post-carbon cities' were defined by the POCACITO team as a rupture in the carbon-dependent urban system, which has led to high levels of anthropogenic greenhouse gases, and the establishment of new types of cities that are low-carbon as well as environmentally, socially and economically sustainable. The term 'post-carbon' emphasises the process of transformation, a shift in paradigm, which is necessary to respond to the multiple challenges of climate change, ecosystem degradation, social equity and economic pressures.

Thus, it is assumed that the core components of post-carbon cities are in line with the three pillars of sustainability, comprising environmental, social and economic dimensions. However, cities are complex, adaptive, social-ecological systems (Ecologic Institute, 2014) and cannot be fully understood by examining individual components. For this reason, POCACITO moves away from analysing the three dimensions of sustainability as silos towards a more comprehensive and holistic approach.

Figure 1: Conceptual model

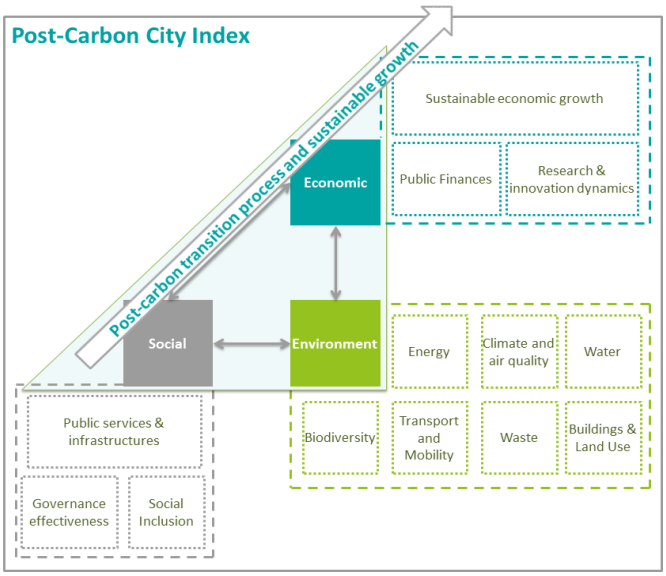


The **social dimension** is concerned about equity both in the current generation and between generations during the transition process to post-carbon cities, which is expected to be smooth for all citizens. The benefits for inhabitants that come out of living in a reduced carbon city are highlighted, showing that these cities are places where it is pleasant to live in and the values of equity and social inclusion are present. Special attention has been given to standards of living related to essential aspects such as education and health (for example, life expectancy and wellbeing). Unemployment rates and poverty are also issues to be addressed on the context of post-carbon cities. Public services and infrastructures that are available for citizens are analysed, as well as aspects of governance and civic society, promoting the positive sense of culture and community.

The **environment dimension** investigates the sustainable profile of the cities and assesses not only the current impacts on the environment, but also during the transition processes, evaluating the environmental resilience of the cities. It is important to continuously adapt the strategies to follow in order to mitigate the negative impacts on the environment during the transition process. The environmental dimension covers the energy sector in general in order to promote not only the final energy efficiency but also the resources depletion associated with energy consumption. Post-carbon cities pay special attention to GHG emission and its contribution to climate change. Some energy intensive sectors are empathised, such as transportation/mobility and the buildings stock. Biodiversity and air quality are critical themes that also belong to this dimension. The concerns regarding waste and water are also evaluated.

The **economic dimension** emphasises the sustainable economic growth based on the wealth of the cities and their inhabitants. It recognises that investments are crucial to promoting post-carbon cities, in particular the ones related to sustainable facilities. The labour market and the life of the companies are taken into account to demonstrate the dynamics of a post-carbon economy in a green economy paradigm. Public finances are also analysed because the cities with a lower level of indebtedness are more prepared to face the challenges during the transition process towards a post-carbon city. This dimension also includes the R&D expenditure because no city can become a post-carbon city without innovation.

Figure 2: Dimensions and sub-dimensions of the Post-Carbon City Index



For each sub-dimension, a set of indicators has been selected which allows a uniform collection of data, improves the comparison and supports the identification of best practices in each case study city, covering environmental, social and economic aspects (ANNEX I).

II.II DATA COLLECTION PROCESS

The production of each case study initial assessment report involves data gathering and data analysis, in order to make possible the quantification of the KPI. Data collection has a central role in the initial assessment of the case study cities and it is crucial to ensure the quality of scenarios and the modelling of the impacts. The selected methods for data gathering and collection comprise the following two approaches:

- Top-down approach – completion of the indicators list (Post-Carbon City Index) according to a review of main statistical findings, existing relevant strategic and planning documents, and legislation to assure an accurate quantitative data collection;
- Bottom-up approach – discussions with local authorities and other selected stakeholders should be used to complement the collection of quantitative data and enrich the contents of the case study assessment reports.

In general, most of the required data can be retrieved by national/regional statistical offices, government departments, environment and energy agencies, research institutes and non-governmental organisations. The data collection process depends on the availability of high quality and relevant data.

Moreover, all the indicators should be collected for both years 2003 and 2012 in order to compare their evolution throughout this period (sometimes, mainly for some economic and social indicators, time series were required). Whenever data is not available for those years,

one should collect the earliest and the most recent years between 2003 and 2012.

The geographical boundaries of the initial assessment of each case study city should be defined by each case study leader, according to the objectives of the work and the limitations of data availability. All indicators should be collected for this geographical level, being priviledged the city or municipality levels. If an indicator is not available at this geographical level, then it could be collected for NUT III or NUT II. If the data is only available at the national level, it is considered that it is not representative of the city, so it should be discarded.

DATA COLLECTION FOR LISBON CASE STUDY

By default, data for the Lisbon case study city is gathered at **municipality level**. If the data is not available at this scale, then data is collected at NUT III level. Only for those cases, it is specifically indicated the geographical level.

Table 1 summarizes the geographical level, sources of data and years of data collection for each KPI. Most of them were collected for the municipality or NUT III and through the national official statistics office - INE. The source of energy indicators is Directorate-general for Energy and Geology - DGEG and the source for carbon emissions and air quality is the Portuguese Environment Agency – APA. Some public reports published by the Lisbon City Council have also been used whenever statistics from INE are not available.

Table 1 - Summary of geographical level and data sources for each KPI

DIMENSION	SUB-DIMENSION	INDICATOR	Geographical level	Year	Source
SOCIAL	Social Inclusion	Variation rate of unemployment level by gender	NUT II	2003-2012	INE, www.ine.pt
		Variation rate of poverty level	NUT II	1989, 2009	*Desigualdade Económica em Portugal*, Carlos Farinha Rodrigues, 2012
		Variation rate of tertiary education level by gender	Lisbon Municipality	1960, 1981, 2001, 2011	INE, Census, censos.ine.pt/
		Variation rate of average life expectancy	NUT III	2003-2012	INE, www.ine.pt
	Public services and Infrastructures	Variation rate of green space availability	Lisbon Municipality	2004-2008; 2009-2014; >2014	*Estratégias locais – boas práticas, Lisboa Smart City*, José Sá Fernandes, Lisbon City Council.
	Governance effectiveness	Existence of monitoring system for emissions reductions	Lisbon Municipality	N/A	N/A

DIMENSION	SUB-DIMENSION	INDICATOR	Geographical level	Year	Source
ENVIRONMENT	Biodiversity	Variation rate of ecosystem protected areas	Lisbon Municipality	2003, 2012	*Estratégias locais – boas práticas, Lisboa Smart City*, José Sá Fernandes, Lisbon City Council.
	Energy	Energy intensity variation rate	NUT III	2003, 2012	INE, www.ine.pt; DGEG, www.dgeg.pt
		Variation rate of energy consumption by sectors	Lisbon Municipality	2008, 2012	INE, www.ine.pt; DGEG, www.dgeg.pt
	Climate and Air Quality	Variation rate of carbon emissions intensity	NUT III	2005, 2009	INE, www.ine.pt; APA, www.apambiente.pt
		Variation rate of carbon emissions by sector	N/A	N/A	N/A
		Exceedance rate of air quality limit values	Lisbon Municipality	2003,2012	APA, www.apambiente.pt
	Transport and mobility	Variation share of sustainable transportation	Lisbon Municipality	2001, 2011	INE, Census, censos.ine.pt/
	Waste	Variation rate of urban waste generation	Lisbon Municipality	2002-2013	INE, www.ine.pt
		Variation rate of urban waste recovery	Lisbon Municipality	2002-2013	INE, www.ine.pt
	Water	Water losses variation rate	Lisbon Municipality	2002-2013	INE, www.ine.pt
	Buildings and Land Use	Energy-efficient buildings variation rate	Lisbon Municipality	2007, 2012	ADENE – Portuguese Energy Agency, www.adene.pt/
		Urban building density variation rate	Lisbon Municipality	2001, 2011	INE, Census, censos.ine.pt/
ECONOMY	Sustainable economic growth	Level of wealth variation rate	NUT III	2004-2012	INE, www.ine.pt
		Variation rate of GDP by sectors	NUT III	2004-2012	INE, www.ine.pt
		Employment by sectors variation rate	NUT III	2003-2011	INE, www.ine.pt

DIMENSION	SUB-DIMENSION	INDICATOR	Geographical level	Year	Source
		Business survival variation rate	NUTIII	2008, 2009, 2010	Eurostat, ec.europa.eu/eurostat
	Public Finances	Budget deficit variation rate	Lisbon Municipality	2009-2013	Pordata, www.pordata.pt
		Indebtedness level variation rate	Lisbon Municipality	2010-2013	*Relatório de gestão 2013*, Lisbon City Council
	Research & Innovation dynamics	R&D intensity variation rate	NUT III	2003-2010	INE, www.ine.pt

As mentioned above, Lisbon Municipality and NUT III are the most used geographical levels. Only the indicators 'variation rate of unemployment level by gender' and 'variation rate of poverty level' was gathered for NUT II region.

Besides the geographical level, the other main limitation of this study is related to the years of available data. Most of indicators are presented for other time periods than the ones indicated in *Report on Key Performance Indicators*, as shown in Table 1.

Some other constrains were found, namely related to carbon emissions indicators. Despite the values of carbon emissions are published by APA at municipality level, the carbon emissions by sector are not known regardless the geographical level. Because GDP is only calculated at NUT III, NUT II or national level, carbon emission intensity had to be computed by summing up the emissions for the municipalities within NUT III. The same procedure was followed for energy intensity.

As far as we could investigate, there is no monitoring system for emissions reduction in Lisbon; therefore, no years or source of data are presented in Table 1 for this indicator. In addition, for the indicators related to exceedance rate of air quality limit values, data is only complete for two pollutants: ozone and PM10.

The two indicators of sub-dimension Public Finances are not presented as a percentage of city' GDP since, as it was mentioned above GDP is not calculated at municipality level.

III OVERVIEW OF THE CASE STUDY CITY

III.I TERRITORY

Lisbon is the capital of Portugal and the largest city in the country. Briefly, Portugal is located in South-western Europe, on the Iberian Peninsula. It is the westernmost country of mainland Europe and is bordered by the Atlantic Ocean to the west and south and by Spain to the north and east. The area of Portugal is 92,212 km^2 and it has 10.6 million inhabitants. In addition to the continental territory, Portugal includes two autonomous regions of the Atlantic Ocean, the islands of Azores and Madeira.

Regarding Lisbon, it is the westernmost city in continental Europe as well as the westernmost capital city and the only one along the Atlantic coast. Lisbon lies on the north bank of the Tagus Estuary and is located more or less in the centre of the country, approximately 300 km from the Algarve in the south and 400 km from the northern border with Spain.

Lisbon municipality occupies an area of 100.05 km²; however if one considers a larger area, known generically as Greater Lisbon (NUT III), comprising other cities, namely Amadora, Cascais, Loures, Mafra, Odivelas, Oeiras, Sintra and Vila Franca de Xira, the area is extended up to 1,389.98 km², as is shown in Figure 3. Each municipality is still divided in several parishes for better administrative purposes, being Lisbon divided in 24 parishes.

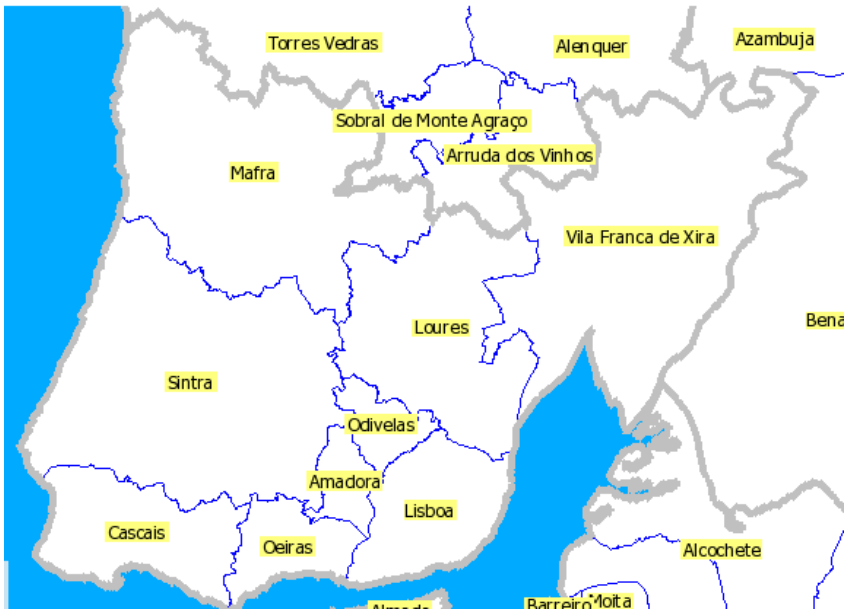


Figure 3 - Greater Lisbon Area, which is comprised by 9 municipalities: Amadora, Cascais, Lisboa, Loures, Mafra, Odivelas, Oeiras, Sintra and Vila Franca de Xira

Geographical position

Lisbon is a city open to the world and wants to become a European Atlantic Hub, in close relation with Latin America, Africa and Asia countries and regions, connected by air and sea and allowing access to 750 million consumers from Europe and Portuguese-speaking countries.

In fact Portuguese is the fifth most spoken language in the world, with over 250 million consumers, and Lisbon is the ideal location for companies wishing to manage and prepare its exports or investment ventures in these markets. The emergent powerhouses Brazil and Angola are at the forefront.

Lisbon is served by several motorways, two bridges which cross the Tagus River, trains and buses that connects Lisbon to the main cities and villages within Portugal. In addition, Lisbon International Airport is located within city limits. Regarding the public transportation, Greater Lisbon offers a reliable network, comprising subway, trains, trams, buses and ferries. In digital terms, Lisbon has the best fibre-optic network in Europe (FTTH, 2011).

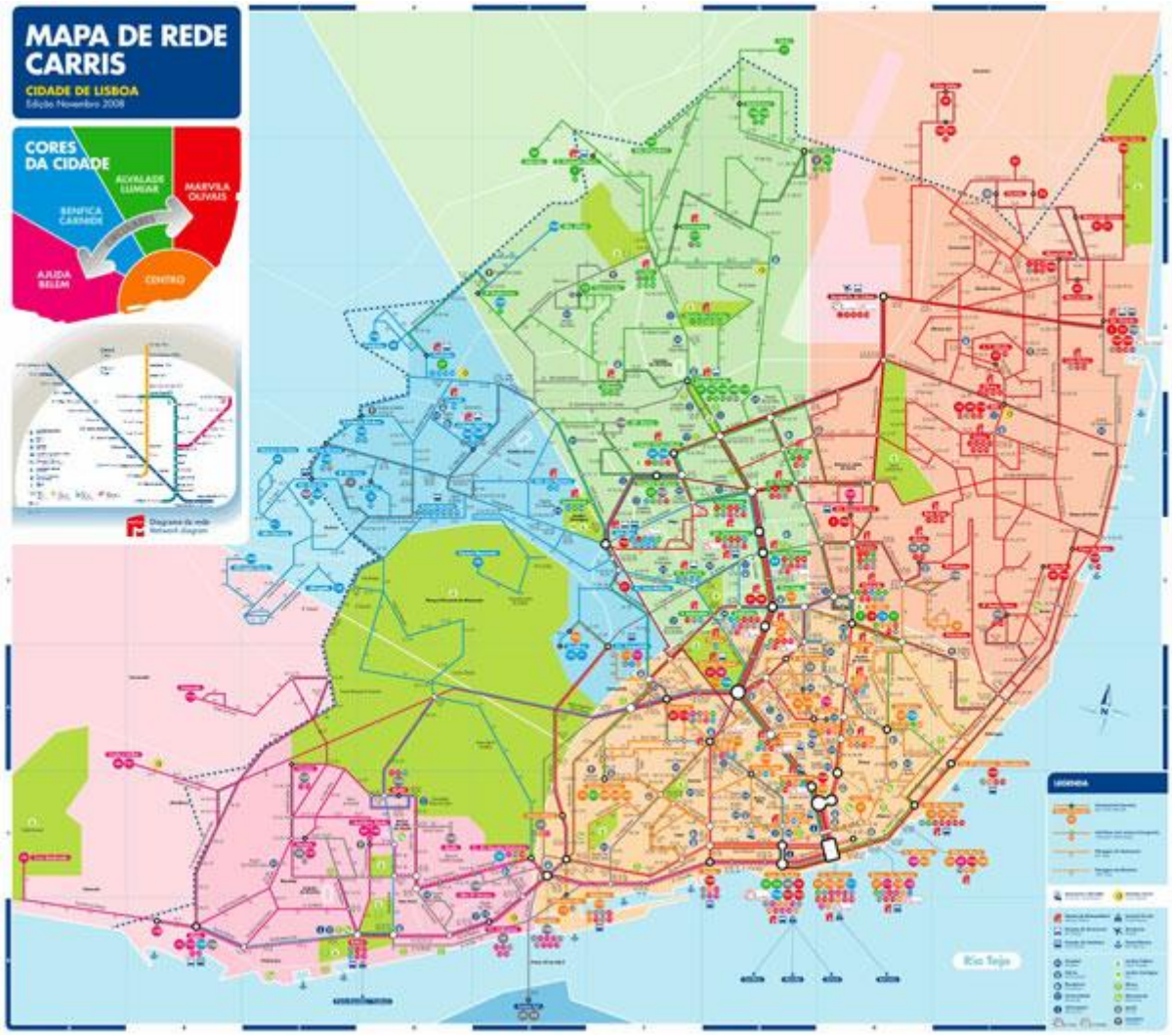


Figure 4 - Public transportation network

Climate

Lisbon exhibits a Subtropical-Mediterranean climate, being considered a pleasant climate throughout the year due to the influence of the Atlantic Ocean, with fairly cold winters and hot summers. The average annual temperature is 21.5 C during the day and 13.5 C at night. Average annual temperature of the sea is 17.5 C. In the coldest days, temperatures can be as low as 3°C at night and in the hotter days the temperature can reach 35°C.

Rain occurs mainly in winter, being the summers generally dry. Sunshine hours are about 2,800 per year, from an average of 4.6 hours of sunshine duration at day in December to an average of 11.4 hours of sunshine duration at day in July.

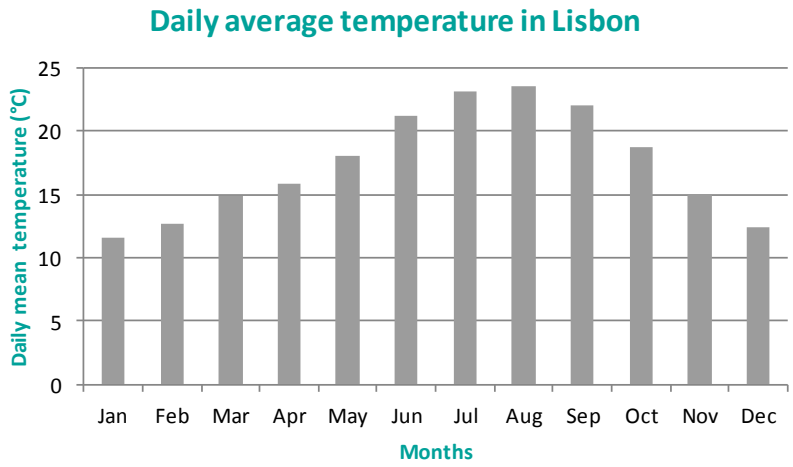


Figure 5 - Daily average temperature in Lisbon. Source: Instituto de Meteorologia, http://www.ipma.pt/pt/oclima/normais.clima/1981-2010/012/.

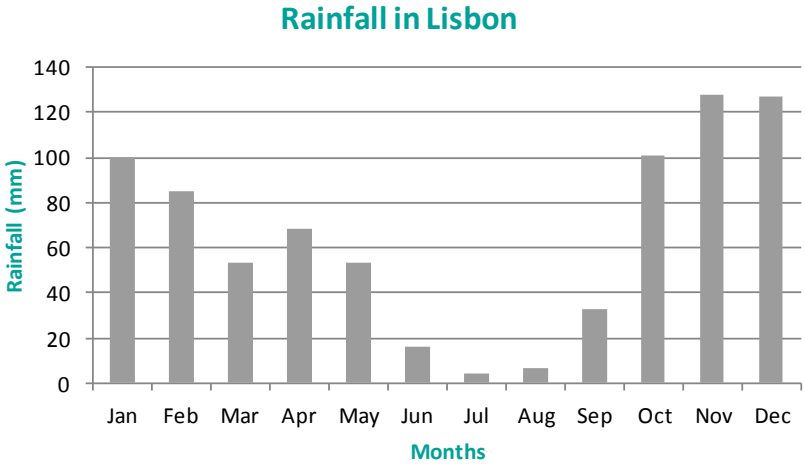


Figure 6 - Rainfall in Lisbon. Source: Instituto de Meteorologia, http://www.ipma.pt/pt/oclima/normais.clima/1981-2010/012/.

III.II POPULATION

Almost 600,000 (547,733 – Census 2011) people live in Lisbon accounting to 5.2% of the total resident population of the country. However, this number rises up to 2 million (2.042.477 – Census 2011) if we include all the population of the Greater Lisbon, thus corresponding to 26.75% of the country's resident population.

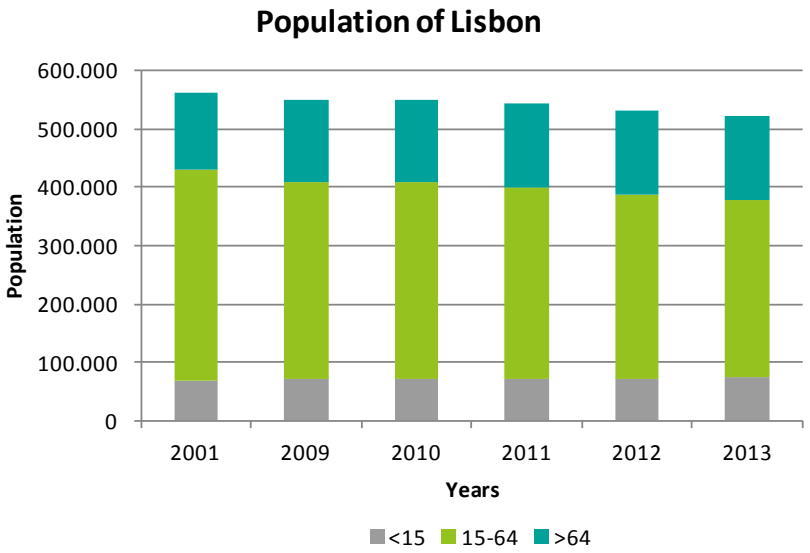


Figure 7 - Population of the municipality of Lisbon. Source: Pordata

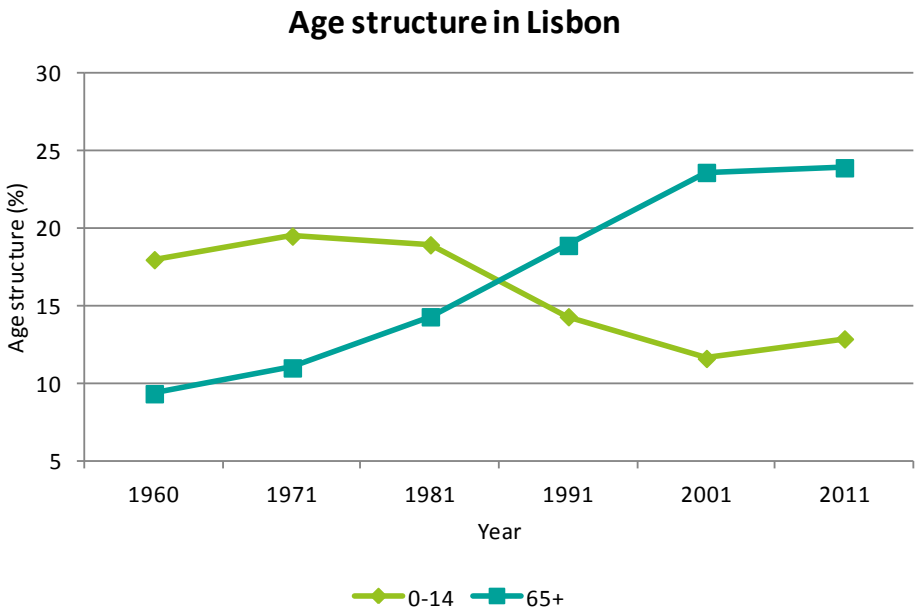


Figure 8 - Evolution of the age structure in Lisbon. Source: A Economia de Lisboa em Números 2014, Lisbon City Council.

Each day, Lisbon has an influx from 550,000 to more than 900,000 people who come in to work. Notice that commuting movements between the main city and the agglomeration cause a major problem, especially since car travel is predominant. Added to the 160,000 vehicles of

Lisbon residents are 430,000 others. The population density of the municipality of Lisbon is 6,247.5 inhabitants/ km^2.

According to Census 2011 data, 13.5% of the population are under 15 years old and 26.9 % are over 65 years old. The percentage of foreign residents is about 8%. 31.1% of the population hold a higher education degree and the employment rate is approximately 48%.

Lisbon is also a place plenty of universities and research and development centres. There is a critical mass of national and international researchers and public and private higher education institutions and other research organizations (universities, laboratories, foundations, etc.), dedicated to several fields of knowledge. Moreover, international cooperation programs between Universities and R&D Institutes such as MIT, University of Austin-Texas, Carnegie-Mellon University, Fraunhofer Program and the Harvard Medical School, make Lisbon a vibrant environment for the attraction of talents and companies which want to recruit highly skilled human resources. It is worth of notice that Portugal is the 4th OECD country with the most researchers in science and engineering per 1,000 inhabitants (Global Benchmark Report 2010).

III.III ECONOMY

Besides being the largest Portuguese city, Lisbon is also the most important centre in terms of economy and financial services in Portugal.

Having a GVA of 47.313,645 Million Euros per capita, services is the sector that contributes the most for the economy, representing 86% of the GVA of the Greater Lisbon. In 2011, Lisbon represented 31% of the national GDP and employed 1,186 thousand persons (24.4% of national employment), reaching an apparent labour productivity 1.3 times higher than the national average.

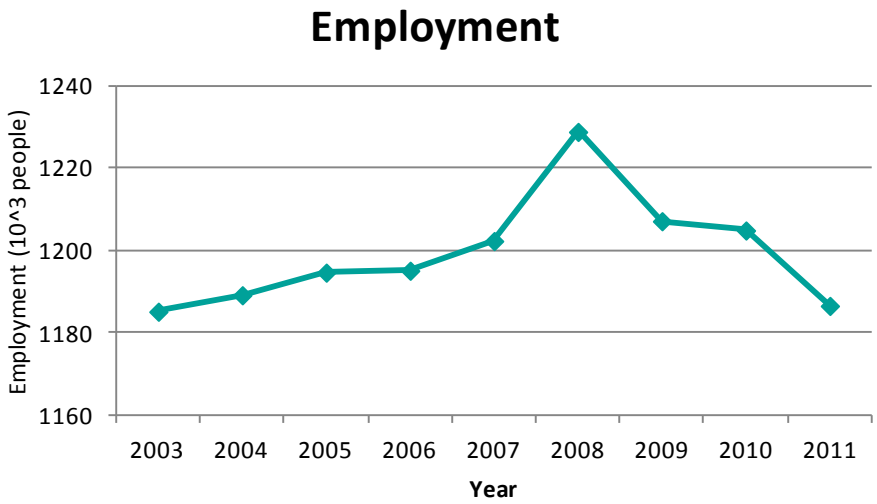


Figure 9 - Employment in Greater Lisbon (NUT III). Source: INE.

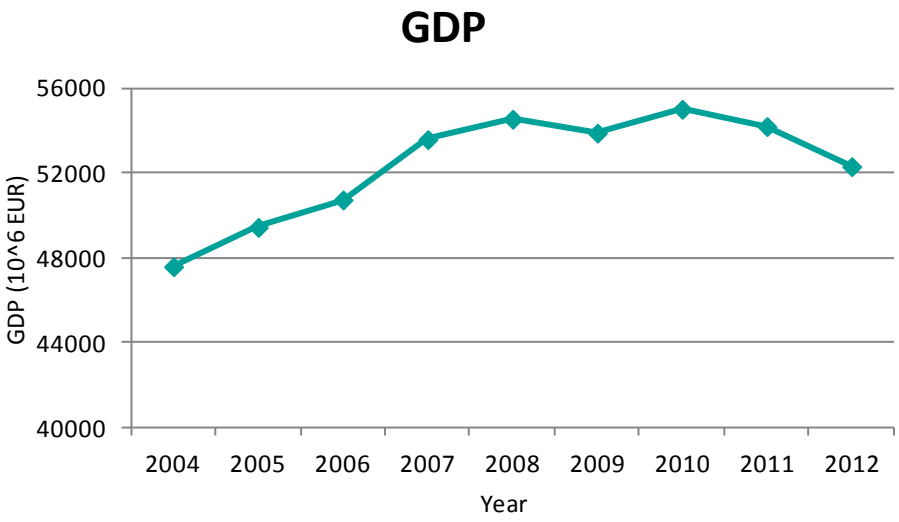


Figure 10 - GDP in Greater Lisbon (NUT III). Source: INE.

The main city is home to 96,731 companies (8.7% of national share) employing 600,000 people. The importance of Lisbon Region on the international trade is growing up, originating about 16% of national exports. Notice that exports grew more than 100% in the last 5 years. Lisbon is the destination of about 30%of national imports

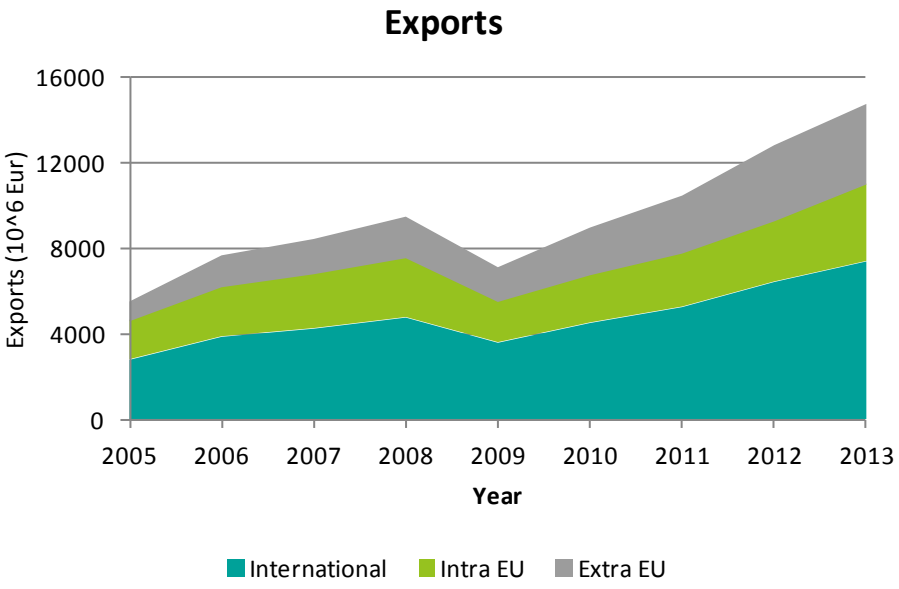


Figure 11 - Exports in Lisbon. Source: INE.

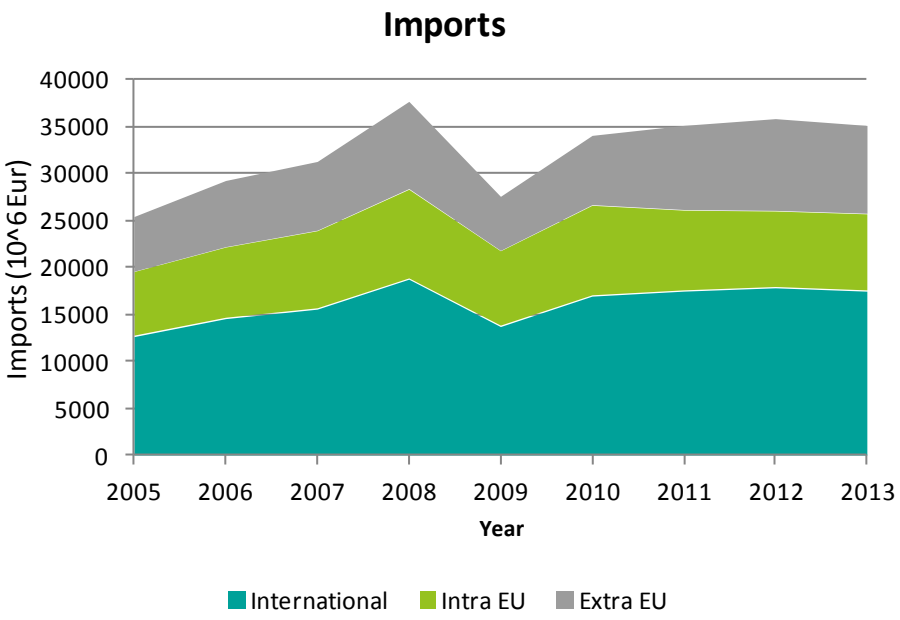


Figure 12 - Imports in Lisbon. Source: INE.

In terms of knowledge and innovation, the region concentrates more than 50% of national R&D expenditures and the company's share of these expenditures is higher.

Table 2 - R&D indicators for Lisbon Region in 2011 (NUT II). Source: INE.

R&D indicators		
	Lisbon Region	**Portugal**
Expenditures (% of GDP)	21.1%	1.5%
Employment (‰ of active population)	17.7‰	10‰
Researchers (% of active population)	1.6%	0.9%

The region is the destination spot for 6 million tourists, and according to the Travel & Tourism Council´s forecasts these figures should jump by 50% in 2017. The tourism sector creates nearly 80,000 direct jobs and 140,000 indirect jobs, generating a total activity volume of 2.8 billion Euros per year which corresponds to about 5% of the GDP of the region.

The city dynamism has reinforced Lisbon's position in the main cities' world ranking for international meetings, achieving a closer position to the most relevant EU capitals. For several

years now, Lisbon has been ranked as one of the European cities of the future by the Financial Times (European Cities and Regions of the Future 2014/15). This ranking, which lists the top 25 European cities, is based on a comparison of several aspects: economic potential of the area, the quality of human capital, the existence of adapted infrastructure (road, air, rail and maritime hubs) and finally the business friendliness of the cities.

III.IV CULTURE

Lisbon is an interesting combination of a historic city marked by a strong heritage and traditions with an innovative city characterised by cosmopolitanism, cultural diversity, creativity and entrepreneurship.

The city has a long history materialised in a strong cultural tangible and intangible heritage. São Jorge Castle, 'Sé de Lisboa' Cathedral, convents and churches, palaces, and the monuments linked to the Discoveries (Belém Tower, Jerónimos Monastery, Padrão dos Descobrimentos) are some of the city attractions. Moreover, traditions, memories, and legends are the foundations of the social-cultural urban identity of its people. The recent election of Fado as Intangible World Heritage by UNESCO is an example of the value of these immaterial assets.

Natural amenities mix with cultural heritage making the city a unique place to live, learn, work, play and visit. Lisbon is a city with a port, being the Tagus River one of the important assets of the town in economic, social and cultural terms. Moreover, the hills, the views, the light, the colours create a unique scenic environment. Lisbon has also several urban natural parks and gardens, such as Monsanto and Eduardo VII parks, which provides the citizens and visitors with places of leisure, sports and culture.

The combination of these elements makes Lisbon a city with quality of life. For these reasons, Lisbon was considered by the Institute of Urbanism as the "European City of the Year 2012".

Figure 13 - Torres de Belém, in Lisbon.

Figure 14 - Mosteiros dos Jerónimos, in Lisbon.

IV KEY STRATEGIES AND PROJECTS

IV.I OVERALL STRATEGY

The Municipality of Lisbon has defined a smart city strategy which main goal is "to facilitate creativity, providing citizens, small enterprises, start-ups and civil organisations the tools needed to create, to innovate, to enable social innovation, centring the citizen as a co-producer/partner of the city" [Lisbon City Councillor Graça Fonseca (2009)].

Objectives

Lisbon's development has been progressively evolving as a global city, namely addressing the following challenges for the future:

- An international hub for world scale companies, benefiting from the bridge Lisbon represents between Europe, Africa and America;
- A pole for creativity and innovation, acknowledging that the creative industry already accounts for 6% of Lisbon's employment and further represents an important asset in Lisbon's economy;
- A city with a prospering atmosphere for entrepreneurs, incubator for new ideas and business models;
- A dynamic city for exhibitions, events and cultural activities, listening and learning from experienced partners the ways to better exploit its resources;
- A centre for excellence in R&D, recognizing the fact that Lisbon is Portugal's biggest university pole;
- A sustainable city, focused on achieving excellence in the efficient use of its resources, bearing in mind the commitments assumed within the Covenant of Mayors and the city's Energy-Environment Strategy that sets ambitious targets for the energy, water and materials consumption;
- An inclusive city for its citizens, fostering a cooperative environment between the local authorities and the population [Fernandes, J.; Gonçalves, F.; Águas, M. (2013)].

Strategic Areas

The three main axis of this strategy are:

- Citizen participation, promoting open governance and the intervention of civil society in the definition of the city's future and the resolution of urban problems, through projects like the participatory budget, "A Minha Rua" portal, the requalification of Mouraria, and the Lisbon Academy;
- Entrepreneurship and innovation, enhancing the creation of new companies and jobs, triggered by the Lisbon Start-up initiative, the fab lab, the promotion of co-working spaces, and the open data portal;
- Sustainability, focused on energy efficiency, sustainable mobility and renewable energy, through projects such as electric mobility, solar potential map, Mob

carsharing, reduced emissions areas, Eco-Neighbourhood - Boavista Ambiente +, etc.

Methodology

In this context the Municipality decided to create the Lisboa Living Lab (LxULL) which supports the smart city strategy of the city, creating an environment that nurtures co-creation processes oriented by a user-centric approach and involving the relevant stakeholders. LxLL is member of the European Network of Living Labs (ENoLL).

Moreover, the City of Lisbon is a partner in several Living Lab projects developed under the Competitiveness and Innovation Programme of the European Commission. Among these, we can stress the participation in projects such as Apollon, Fireball, Save Energy, City SDK and MyNeighbourhood, where the city had a chance to work closely with a number of existing Living Labs, including Manchester, Forum Virium (Helsinki), and Barcelona.

IV.II ACTION PLANS

A detailed description of key sectorial action plans is presented below.

ACTION PLAN FACTSHEET 1	
Title	**Sustainable Energy Action Plan – Covenant of Mayors**
Dimension of KPIs	Environment – Energy, Climate and air quality
Period	2010
Strategy/Action Plan description	
Objective	In 2008 the Municipality of Lisbon decided to join the Covenant of Mayors initiative. The Covenant of Mayors is the mainstream European movement involving local and regional authorities in the fight against climate change. It is based on a voluntary commitment by signatories to meet and exceed the EU 20% CO_2 reduction objective through increased energy efficiency and development of renewable energy sources. In June 2010 the Sustainable Energy Action Plan was submitted, in the framework of the Energy-Environmental Strategy of Lisbon. Moreover, Lisbon subscribed the Mayors Adapt initiative in 2013. Adaptation to climate change is the main objective of this platform with a view to adapting infrastructure and policies to climate impacts. Lisbon has also presented a bid to become the European Green Capital in 2017.

Measures	Several measures are proposed in the Sustainable Energy Action Plan of Lisbon in order to reduce the CO_2 emissions till 2020, such as: - Promotion of energy efficiency in the transport system; - Use of more efficient vehicles; - Increase in energy efficiency in new construction and urban rehabilitation; - Use of more efficient lighting systems; - Use of energy solar systems; - Organisation of energy efficiency awareness campaigns; etc.
Targets	Reduction of the CO_2 emissions in more than 20% till 2020.
Links and Contacts	
Promoter	Municipality of Lisbon, Lisboa E-Nova
Document/website	http://lisboaenova.org/en/projects/energy-environment-strategy/convenant-of-mayors
Contact E-mail	info@lisboaenova.org

ACTION PLAN FACTSHEET 2	
Title	**Creative Economy Blueprint**
Dimension of KPIs	Economy –Sustainable Economic Growth
Period	2013
Strategy/Action Plan description	
Objective	The Creative Economy Blueprint presents a strategic vision for a co-creative Lisbon for the year 2020, and a plan for the development of the creative economy in Lisbon. It intends to make the creative economy an instrument of innovation, skills, entrepreneurship and urban regeneration, and to promote cultural and creative spaces, neighborhoods, factors that are increasingly critical to attracting investment, companies and people, and contributing to the internationalization of the Lisbon “brand”.
Measures	The strategic priorities of this plan are: - Internationalisation; - Creative events: anchors of competitiveness;

	- Creative districts and territories; - Spaces and equipment: new uses and functions; - Creative entrepreneurship; - Workshops for artists and residencies; - Creative talent.
Targets	Promotion of the creative economy in Lisbon with the involvement of the relevant stakeholders.
Links and Contacts	
Promoter	Municipality of Lisbon
Document/website	http://www.cross-innovation.eu/proud-to-present-the-lisbon-creative-economy-book/news/
Contact E-mail	paulo.s.carvalho@cm-lisboa.pt

ACTION PLAN FACTSHEET 3	
Title	Integrated Urban Renewal Strategy of Lisbon 2011-2024
Dimension of KPIs	Environment, Economic, Social
Period	2011-2024
Strategy/Action Plan description	
Objective	Urban rehabilitation is an area of huge potential of intervention and of great relevance to the city of Lisbon. The Municipality has been launching several programs and specific measures to support urban rehabilitation (including legislation, taxation, financial incentives, new institutional arrangements, etc.), integrating principles of energy and environmental sustainability. In this context, the Integrated Urban Renewal Strategy of Lisbon 2011-2024 was launched.
Measures	The main objectives and measures of this strategy are: - City rehabilitation, enhancement of social cohesion, rejuvenate the center of Lisbon, attract new families, establish businesses and employment; - Repopulate and reuse the existing buildings, increasing the environmental quality and energy efficiency; - Give priority to periodic maintenance of buildings; - Rehabilitate the degraded buildings, given the risk of fire and earthquakes;

	- Keep the memory of the city, restore the historical, architectural and natural heritage of Lisbon; - Maintain, restore, enhance and upgrade the public space and community facilities; - Regenerate the Priority Intervention Neighbourhoods/Priority Intervention Zones.
Targets	One of the quantitative targets is the urban rehabilitation of 7,000 degraded buildings till 2014.
Links and Contacts	
Promoter	Municipality of Lisbon
Document/website	http://ulisses.cm-lisboa.pt/data/002/004/prospectivos/1/estrategia.pdf
Contact E-mail	Not applicable

ACTION PLAN FACTSHEET 4	
Title	**Biodiversity Strategy 2020**
Dimension of KPIs	Environment – Biodiversity
Period	2010-2020
Strategy/Action Plan description	
Objective	In March 2010, a Cooperation Protocol was established between Lisboa E-Nova, Lisbon Municipality and the Institute for Nature Conservation and Biodiversity, with the pioneering and ambitious goal of increasing the biodiversity potential of Lisbon city by 20% until 2020. In this Protocol, the parties committed to constitute a Task Force, with representatives of the above entities and invited experts from the Science Faculty of the University of Lisbon, and to prepare, among other reference documents, an Urban Biodiversity Matrix of Indicators. Under this Protocol, an Advisory Committee was also formed, comprising representatives from several institutions or individual experts. In September 2012, the Task Force finalized editing the book “Biodiversity in the City of Lisbon: a Strategy for 2020”, which integrated the "Urban Biodiversity Matrix of Indicators", the "Characterization of Biological Diversity in the City of Lisbon" and the “Biodiversity Strategy”.

Measures	Several measures are included in this strategy, for example: - Increase in public green spaces area; - Implementation of zones with urban gardens; - Conservation of natural areas such as the Tagus estuary; - Promotion of citizens' awareness in relation to biodiversity.
Targets	To increase the biodiversity potential of Lisbon city by 20% until 2020.
Links and Contacts	
Promoter	Municipality of Lisbon, Institute for Nature Conservation and Biodiversity, Lisboa E-Nova
Document/website	http://lisboaenova.org/en/projects/biodiversity/biodiversity-lisboa-2020;
Contact E-mail	info@lisboaenova.org

IV.III KEY PROJECTS

The key projects in the three strategic areas identified – sustainability, entrepreneurship, and participation - are summarised in the following table. A detailed description of each project is also presented.

STRATEGIC AREAS	KEY PROJECTS
Sustainability	Electric Mobility
	Mob Carsharing
	Bicycle Lanes Network
	Lisbon Solar Potential Map
	ECO-Neighbourhood - Boavista Ambiente +
	ZER – Reduced Emissions Areas
Entrepreneurship	Start-up Lisboa
	Fab Lab Lisboa
	Co-working Spaces
	Open Data Portal
Participation	Participatory Budget
	Requalification of Mouraria
	Fix My Street ("Na Minha Rua")

IV.III.I SUSTAINABILITY PROJECTS

PROJECT FACTSHEET 1	
Title	**Electric Mobility**
Dimension of KPIs	Environment – Mobility and Transports
Area of implementation (city, neighbourhood, etc.)	City
Implementation period	2009-(…)
Project description	
Aims	The objective of the project is to facilitate the introduction of the electric vehicle in the city, through the provision of charging points and an intelligent mobility management system. It is integrated in the Portuguese Electric Mobility Program, launched in 2009 by the national Government. In fact, Portugal was one of the pioneer countries in the implementation of a countrywide EV charging network, which includes more than 1,300 charging points across the country, with Lisbon having the most prominent position with 687 charging points. 
Content	The main activities of the project were: - Production of the Electric Mobility Plan; - Installation of the EV charging points in the city; - Connection to the Mobility Intelligence Centre: Lisbon and other cities charging points are interconnected within a unique platform with multiple interfaces which presents the location and status of each charging point (energy consumption, tons of

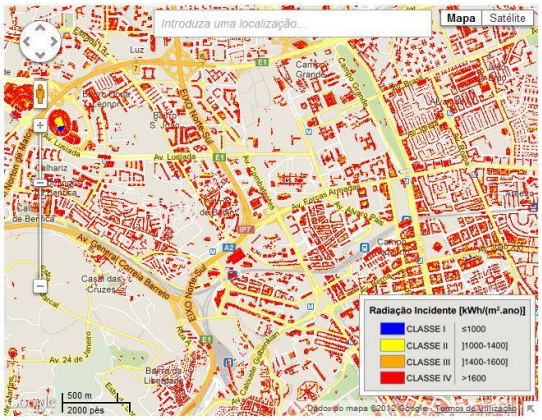
	CO_2 avoided, clients, etc.); - Awareness actions related with electric mobility. It is worth of notice that the Municipality bought 54 electric vehicles to the municipal fleet.
Promoters/Beneficiaries; Partnership	Municipality of Lisbon; INTELI – Intelligence in Innovation, Innovation Centre; CEIIA – Mobility Intelligent Centre; EDP; Portuguese companies (EFACEC, etc.)
Financing	Mobi.e project (FAI – Innovation Support Fund and FPC – Portuguese Carbon Fund)
Outcomes and impacts and Main factors of success	The main outcomes and impacts are the reduction of GHG emissions, the internationalization of Portuguese companies (ex.: EFACEC is the top worldwide exporter of fast charging points) and the promotion of citizens' quality of life. Main success factors are linked to electric mobility awareness among citizens and the development stage of the EV market. Due to the economic crisis, the sales of electric vehicles were lower than forecasted, which hindered the development of the program.
Reproducibility and transferability	The solutions and technologies related to electric mobility can be transferred to other cities and regions. Besides Lisbon, 24 municipalities are part of the RENER Living Lab – Portuguese Smart Cities Network and have functioned as places for the experimentation of EV charging points.
Links and Contacts	
Promoter	Portuguese Government, Municipality of Lisbon, INTELI
Website	https://www.mobie.pt/en
Contact E-mail	info@mobie.pt

PROJECT FACTSHEET 2	
Title	**Mob Carsharing**
Dimension of KPIs	Environment – Mobility and Transports
Area of implementation (city, neighbourhood, etc.)	City
Implementation period	2008-(...)
Project description	

Aims and Content	Mob Carsharing is a carsharing service provided in the city of Lisbon. It's a short-term car rental with gas and parking included, for members to rent a car by the phone or the internet and have it available in the next minute. The car is reserved during the chosen time. In the end, the car must be returned to its reserved parking location. Lisboa Viva Card is the car key. It's an electronic card, also valid on public transports. Each month, members receive the invoice with detailed information of all reserved cars, duration, driven km, etc. 
Promoters/Beneficiaries; Partnership	Carristur, EMEL, Municipality of Lisbon
Financing	Public-private funding
Outcomes and impacts and Main factors of success	The main outcomes and impacts are: decrease of households' expenses, reduction of GHG emissions, decrease of traffic congestion, pollution reduction, etc. Main success factors are linked to carsharing awareness among companies and citizens.
Reproducibility and transferability	The project can be transferred to other cities and regions. In Portugal, the city of Porto has also available a carsharing service, provided by Citizenn carsharing operator.
Links and Contacts	
Promoter	Carristur
Website	http://mobcarsharing.pt/pt/
Contact E-mail	mobcarsharing@carristur.pt

PROJECT FACTSHEET 3	
Title	**Bicycle Lane Network**
Dimension of KPIs	Environment – Mobility and Transports
Area of implementation (city, neighbourhood, etc.)	City
Implementation period	2007-(…)
Project description	
Aims and Content	In late 2007, the Municipality of Lisbon started to implement a strategy for bicycles. The aim was to build bicycle lanes and overlap them with the city's ecological green structure, creating a friendly bike paths network together with green corridors, connecting fragmented green spaces and covering main parts of the city, including access to important public transport interfaces as well as representative educational and office equipment. The first step resulted on almost 40 km of cycle paths including more than 40 public bike parks and 2 specific bicycle-pedestrian bridges. In 2010 there were around 80 km of cycle paths in Lisbon. 
Promoters/Beneficiaries; Partnership	Municipality of Lisbon
Financing	National and European funds; Public-private funding
Outcomes and impacts and Main factors of success	The main outcomes and impacts are: reduction of GHG emissions, decrease of traffic congestion, pollution reduction, and health improvement. Main success factors are linked to the awareness of users of the benefits associated to the use of bicycles as an effective

	commuting alternative.
Reproducibility and transferability	The project can be easily transferred to other cities and regions, with the needed adjustments.
Links and Contacts	
Promoter	Municipality of Lisbon
Website	http://www.cicloviaslx.com/; http://lisboaciclavel.cm-lisboa.pt/
Contact E-mail	Not applicable

PROJECT FACTSHEET 4	
Title	**Lisbon Solar Potential Map**
Dimension of KPIs	Environment – Energy
Area of implementation (city, neighbourhood, etc.)	City
Implementation period	2009-2012
Project description	
Aims and Content	The Lisbon Solar Potential Map was promoted by Lisboa E-Nova under the European Project POLIS – "Identification and Mobilization of Solar Potentials via Local Strategies". The project aimed at the evaluation of the potential solar installation of solar systems in the built heritage of Lisbon. Lisbon Solar Potential Map, available online via Google Maps application, covers all the buildings in Lisbon. It allows the identification of the preferable areas to invest in solar technologies and represents an efficient awareness tool, both for local authorities, investors and companies and citizens. 

Promoters/Beneficiaries; Partnership	Municipality of Lisbon, Lisboa E-Nova (Portugal), Climate Alliance, Polytechnic University of Madrid (Spain), Lund University (Sweden), Skåne Energy Agency (Sweden), HESPUL (France), APUR - Atelier Parisien d'Urbanisme (France), Ecofys Germany GmbH (Germany), Paris, Lyon, Munich, Malmo, Victoria-Gasteiz
Financing	POLIS - Identification and Mobilization of Solar Potentials via Local Strategies – Intelligent Energy Europe Program - EC
Outcomes and impacts and Main factors of success	As a result of the project and cooperation between the various European partners, it was possible to identify measures that contribute to the definition of public policy at the level of development of municipal urban planning regulations, as well as new legal and financial mechanisms to encourage the adoption of solar technologies in the urban environment.
Reproducibility and transferability	The project can be transferred to other cities and regions. In fact, under the POLIS project all partner cities, Lisbon, Paris, Lyon, Munich, Malmo and Victoria, have developed a Solar Plan Action.
Links and Contacts	
Promoter	Lisboa E-Nova
Website	www.lisboaenova.org/cartasolarlisboa
Contact E-mail	info@lisboaenova.org

PROJECT FACTSHEET 5	
Title	**ECO-Neighbourhood - Boavista Ambiente +**
Dimension of KPIs	Environment – Energy
Area of implementation (city, neighbourhood, etc.)	Neighbourhood
Implementation period	2010-(…)
Project description	
Aims and Content	The project aims at the reconversion and qualification of public space, implementation of measures to improve the energy performance of buildings and remodelling of some equipment in the social neighbourhood Boavista, including the municipal

	swimming pool. Dissemination and awareness actions to the residents of the neighbourhood were also promoted, such as the launching of a challenge posed to 100 families to cooperate in order to enhance domestic savings of electricity, natural gas and water. 
Promoters/Beneficiaries; Partnership	Lisbon Municipality, Lisboa E-Nova, EPUL - Empresa Pública de Urbanização de Lisboa, GEBALIS - Gestão dos Bairros Municipais de Lisboa, Santa Casa da Misericórdia de Lisboa, etc.
Financing	Lisbon POR program in the framework of QREN (Partnerships for Urban Regeneration) - Eco-neighbourhoods program
Outcomes and impacts and Main factors of success	The main outcomes and impacts are: reduction of GHG emissions, energy and water consumption reduction, expansion of public space, social sustainability, etc. Main success factors are linked to community involvement in the project's actions.
Reproducibility and transferability	The project can be replicated in other neighbourhoods. Within the Eco-neighbourhoods program, an additional project is being supported in a neighbourhood in Vila Franca de Xira.
Links and Contacts	
Promoter	Municipality of Lisbon
Website	http://ecobairroboavista.hostname.pt/
Contact E-mail	gabipboavista@cm-lisboa.pt

PROJECT FACTSHEET 6	
Title	**ZER – Reduced Emissions Areas**
Dimension of KPIs	Environment – Climate and air quality
Area of implementation (city, neighbourhood, etc.)	Some areas of the city
Implementation period	2011-(…)
Project description	
Aims and Content	The introduction of Reduced Emissions Areas (ZER) is integrated in the program for the improvement of air quality in the Lisbon Region. Reduced Emissions Areas are zones in which the circulation of more pollutant vehicles is forbidden, due to health reasons and compliance with national and European legislation. The ZER's second phase consists of two areas (Area 1 and Area 2), with the following characteristics: - Time: 7h - 21h | working days - Circulation of vehicles: a) Area 1 (Axis Liberdade/Baixa) – only light and heavy vehicles that comply with the EURO2 emissions norm (light vehicles built after January 1996; heavy vehicles build after October 1996); b) Area 2 – only circulation of vehicles that comply with the EURO1 emissions norm (vehicles built after July 1992). Permitted exceptions: emergency and special vehicles; historic vehicles; Lisbon residents in Area 2 and Area 1. The ZER's third phase with more restrictive limits will enter in force in January 2015.
Promoters/Beneficiaries; Partnership	Lisbon Municipality, CCDR-LVT
Financing	Not applicable
Outcomes and impacts and Main factors of success	The main outcomes and impacts are the reduction of pollutants in 30% in the axis Liberdade/Baixa, and the improvement of air quality in the city of Lisbon.
Reproducibility and transferability	The project can be replicated in other areas of the city, if needed.

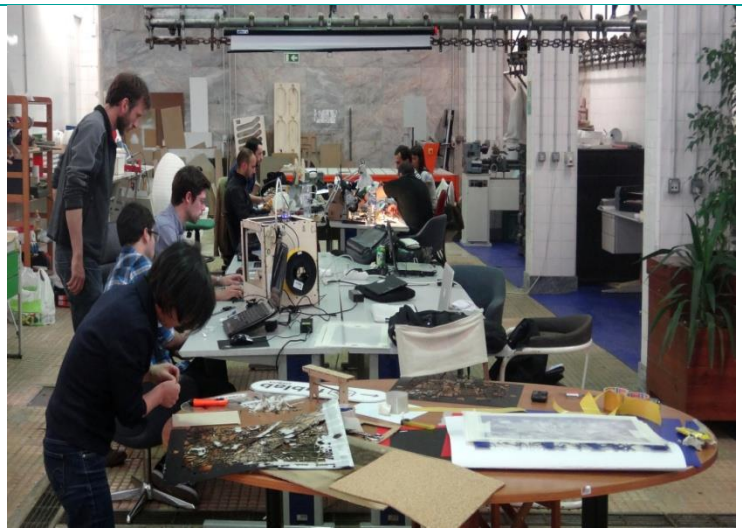
Links and Contacts	
Promoter	Lisbon Municipality
Website	http://www.cm-lisboa.pt/perguntas-frequentes/ambiente/zer-zona-de-emissoes-reduzidas
Contact E-mail	Not applicable

IV.III.II ENTREPRENEUSHIP PROJECTS

PROJECT FACTSHEET 7	
Title	**Startup Lisboa**
Dimension of KPIs	Economic – Sustainable economic growth
Area of implementation (city, neighbourhood, etc.)	3 buildings
Implementation period	2011-(…)
Project description	
Aims and Content	Start-up Lisboa is an incubator that supports entrepreneurs to deploy their ideas into market viable solutions. It provides entrepreneurs and companies with office space as well as a support structure, to maximize their chances for success. Mentoring, link to strategic partners, access to angel investors, venture capital or loan funds, help with business basics, networking activities, communication and work spaces. They've opened and requalified three buildings in Lisbon's Centre, two for tech and other for commerce and tourism. 

Promoters/Beneficiaries; Partnership	Municipality of Lisbon, Montepio Geral Bank, IAPMEI
Financing	Participatory budget; other private funds
Outcomes and impacts and Main factors of success	The main outcomes and impacts are: 186 start-ups supported; 602 jobs created; 46 partnerships. More than 20 start-ups already expanded to international markets. About 30% of foreign entrepreneurs.
Reproducibility and transferability	The project can be replicated in other cities. The Municipality of Lisbon has also launched the Lisbon Incubator Network that includes Startup Lisboa and other incubators and creative spaces located in the city (http://www.incubadoraslisboa.pt/).
Links and Contacts	
Promoter	Municipality of Lisbon
Website	http://startuplisboa.com/
Contact E-mail	geral@startuplisboa.com

PROJECT FACTSHEET 8	
Title	**Fab Lab Lisboa**
Dimension of KPIs	Economic – Sustainable economic growth
Area of implementation (city, neighbourhood, etc.)	Forno do Tijolo old Market - Neighbourhood of Intendente
Implementation period	2013-(…)
Project description	
Aims and Content	Fab Lab Lisboa is located in the central neighbourhood of Intendente in the heart of an old market. It is a municipal initiative driven from the need to create public spaces where innovators and entrepreneurs can benefit from a low cost prototyping environment, having access to peers from different areas of action, joining efforts in the testing of virtual ideas on a small scale approach. These digital manufacturing laboratories are constituted by specific tools, such as digital milling machines, 3D printers, etc. which allow the creation of new products.

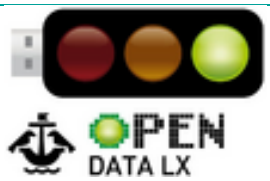
	
Promoters/Beneficiaries; Partnership	Municipality of Lisbon, Amorim Cork Composites, YDreams, ETIC, Iberomoldes, CENTIMFE
Financing	Public-private funding
Outcomes and impacts and Main factors of success	The main outcomes and impacts are: promotion of innovation dynamics, democratisation of innovation, and creation of new products. Main success factors are linked to the awareness of the population towards the DIY ("Do-it-Yourself") trend.
Reproducibility and transferability	The project can be replicated in other cities. In fact, fab labs are connected through the Fab Labs Network (promoted by MIT) that shares information from fab labs at a world wide scale.
Links and Contacts	
Promoter	Municipality of Lisbon
Website	http://fablablisboa.pt/
Contact E-mail	info@fablablisboa.pt

PROJECT FACTSHEET 9	
Title	**Co-working Spaces**
Dimension of KPIs	Economic – Sustainable economic growth
Area of implementation (city, neighbourhood, etc.)	City
Implementation period	2010-(…)

Project description	
Aims and Content	The co-working concept is another reality in Lisbon, where independent professionals are invited to share a working space, benefiting from the synergies of using the common infrastructures, both in terms of lower costs and the contacts network. One of the most important co-working spaces in Lisbon is the LX Factory co-working space. LX Factory is a space to house creative industries located in old industrial buildings in Alcantara Docks. A creative island occupied by corporations and professionals of the industry serves also has stage for a diverse set of happenings related to fashion, advertising, communication, fine arts, architecture, music, etc., attracting numerous visitors to rediscover the neighbourhood. 
Promoters/Beneficiaries; Partnership	Municipality of Lisbon, Mainside property developer
Financing	Public-private funds
Outcomes and impacts and Main factors of success	The main outcomes and impacts are: promotion of entrepreneurship; development of creative industries; creation of new companies; job creation; etc.
Reproducibility and transferability	The project can be replicated in other cities, with the needed adjustments to the territorial reality. Co-working spaces are also integrated in the Lisbon Incubator Network (http://www.incubadoraslisboa.pt/).
Links and Contacts	

Promoter	Municipality of Lisbon, Mainside property developer
Website	http://www.lxfactory.com/; http://www.coworklisboa.pt/en/
Contact E-mail	info@coworklisboa.pt

PROJECT FACTSHEET 10	
Title	**Open Data Portal**
Dimension of KPIs	Economic - Sustainable economic growth
Area of implementation (city, neighbourhood, etc.)	City
Implementation period	2012-(…)
Project description	
Aims and Content	The objective of the Open Data Portal is to make available sets of data regarding the city of Lisbon in the most diverse areas both collected from public and private entities, allowing citizens and entrepreneurs to consult and create new services and functionalities based on this data, creating projects with an added-value at the local scale. A competition for the development of applications based on this data was also launched - Lisbon Big Apps. The initiative was oriented to hackers and entrepreneurs that understand the real benefit and possible gains in providing added value to those that live, work and visit Lisbon. Moreover, Lisbon is partner of the CitySDK European project. Helping cities to open their data and giving developers the tools they need, the initiative (January 2012–October 2014) aims for a step change in how to deliver services in urban environments. With governments around the world looking at open data as a kick start for their economies, CitySDK provides better and easier ways for the cities throughout Europe to release their data in a format that is easy for the developers to re-use. The project is focused on three pilot domains: Smart Participation, Smart Mobility and Smart Tourism, being Lisbon responsible for the last one.

	
Promoters/Beneficiaries; Partnership	Municipality of Lisbon
Financing	European funds; other public and private funds
Outcomes and impacts and Main factors of success	The main outcomes and impacts are: development of new products, services and applications to solve urban problems; citizen participation; promotion of entrepreneurship; creation of new companies; etc.
Reproducibility and transferability	The project can be replicated in other cities. In fact, there are several cities around the globe that launched open data portals and apps competitions in order to promote the development of urban innovation applications.
Links and Contacts	
Promoter	Municipality of Lisbon
Website	http://www.lisboaparticipa.pt/pages/newApps.php; http://lisboa.bigapps.co/; http://www.citysdk.eu/
Contact E-mail	Not applicable

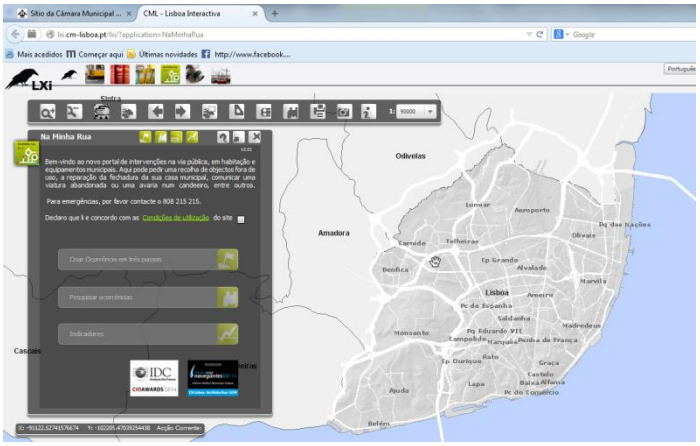
IV.III.III PARTICIPATION PROJECTS

PROJECT FACTSHEET 11	
Title	**Participatory Budget**
Dimension of KPIs	Social - Governance
Area of implementation (city, neighbourhood, etc.)	City
Implementation period	2008-(…)
Project description	
Aims and Content	Lisbon's strong tradition in participatory decision-making processes has achieved wide visibility with participatory budgeting, an initiative which allows the population to decide the projects in which the Municipality should invest 5% of the municipal total

	annual budget. This is an innovative tool for citizen's participation in urban development. With a budget of around € 2.5 million, about ten projects are selected each year by citizens to receive the necessary funding for their completion. At the same time, a vast campaign to raise awareness of this practice was started by the city and the platform of the participatory budget went from 1,000 voters to more than 17,000 in 2013. This practice has already been recognised as a best practice in urban governance by UN-Habitat. 
Promoters/Beneficiaries; Partnership	Municipality of Lisbon
Financing	Municipal budget
Outcomes and impacts and Main factors of success	The main outcomes and impacts are: increase in citizen participation; open governance; resolution of urban problems; etc.
Reproducibility and transferability	The project can be replicated in other cities. For example, in Portugal there are around 30 cities that have adopted this practice.
Links and Contacts	
Promoter	Municipality of Lisbon
Website	http://www.lisboaparticipa.pt/pages/orcamentoparticipativo.php/A=711___collection=cml_article
Contact E-mail	municipe@cm-lisboa.pt

PROJECT FACTSHEET 12	
Title	**Requalification of Mouraria**
Dimension of KPIs	Social
Area of implementation	Neighbourhood

(city, neighbourhood, etc.)	
Implementation period	2010-(…)
Project description	
Aims and Content	Located in the historic centre of Lisbon, Mouraria has a long time been afflicted by a negative image. This multicultural neighbourhood is today at the centre of a vast requalification program, set in motion by the Municipality of Lisbon. The main aim of this program is to rehabilitate this neighbourhood full of old buildings and enhance its image among Lisbon residents without driving out the people living there. The initiative has two intervention domains: the physical restoration of the area, and the implementation of social measures to strengthen cultural identity. Nearly €12 million was spent on the requalification of buildings, redesign of public spaces, and the promotion of the architectural value of historic buildings. 
Promoters/Beneficiaries; Partnership	Municipality of Lisbon, several partners
Financing	Lisbon Operational Program - QREN
Outcomes and impacts and Main factors of success	The main outcomes and impacts are: rehabilitation of old buildings; improvement of public space; social capital and participation; enhancement of the neighbourhood's image; strengthen of cultural identity; social cohesion; employment opportunities; etc.
Reproducibility and transferability	The project can be replicated in other cities, with the needed adjustments to the territorial reality.
Links and Contacts	
Promoter	Municipality of Lisbon
Website	http://www.aimouraria.cm-lisboa.pt/pdcm.html
Contact E-mail	pa.mouraria@cm-lisboa.pt

PROJECT FACTSHEET 13	
Title	**Fix My Street ("A Minha Rua")**
Dimension of KPIs	Social
Area of implementation (city, neighbourhood, etc.)	City
Implementation period	2008-(…)
Project description	
Aims and Content	Through the "A Minha Rua" portal, citizens can report, view or discuss local problems, asking for their resolution by the Municipality of Lisbon. It is possible to locate the problem on the map of the area. Requests can be related to: public lighting, municipal equipments, housing, public space, etc. 
Promoters/Beneficiaries; Partnership	Municipality of Lisbon
Financing	Public funds
Outcomes and impacts and Main factors of success	The main outcomes and impacts are: increase in citizen participation; resolution of urban problems; open governance; etc.
Reproducibility and transferability	The project can be replicated in other cities. In fact, several cities in Portugal have adopted this practice.
Links and Contacts	
Promoter	Municipality of Lisbon
Website	http://lxi.cm-lisboa.pt/lxi/?application=NaMinhaRua
Contact E-mail	municipe@cm-lisboa.pt

V CASE STUDY CITY ASSESSMENT - LISBON

V.I ENVIROMENTAL PERFORMANCE

The environmental performance assessment of the city of Lisbon will be based on the KPI identified for this dimension. It is also important to compare some of these values with the targets defined in the action plans and projects presented in the last chapter.

V.I.I BIODIVERSITY

In spite of being a border ecosystem, Lisbon's municipality has several botanical gardens with exotic and endogenous species. Assuming the importance of the biodiversity and ecosystems preservation, in 2010 the City Council of Lisbon cooperated with the Municipal Agency for Energy and Environment (Lisboa E-Nova), the Institute for Nature Conservation, and Lisbon University, to launch its "Lisbon Biodiversity 2020" strategy. The strategy inventory reveals that near 18% of the city's area is semi-natural. Of its 2,800 plant species, fewer than 10% are native, and at least 148 species of birds can be found in the city, including 14 threatened species.

Additionally, due to the municipality administrative reorganization occurred in 2012, the city acquired an area of 1,50 km^2 of a special and classified protection zone, the Special Protection Zone of Tagus Estuary (Sector Plan Natura 2000 - PTZPE0010) (Table 3). Being now one of the municipalities involved on the Sector Plan Natura 2000, Lisbon Special Protection Zone of Tagus Estuary is under an extensive and restricted set of management guidelines of natural values at national and European level.

Table 3 - Ecosystem protected areas in Lisbon Municipality. Source: Lisbon City Council.

ECOSYSTEM PROTECTED AREAS AVAILABILITY (KM^2)	
2003	0,0
2012	1,5

V.I.II ENERGY

The consumption of energy (electricity, fuel and natural gas) in 2008 in Lisbon was 828.751 toe and in 2012 it was 927.389 toe, experiencing an increase of 12% during this period. The sector that contributes the most for the overall consumption is the transportation sector, followed by the services sector, as it is shown in Figure 15 and Figure 16.

In absolute numbers, the energy consumption for all sectors increased during this period with

the exception of the residential sector, whose variation rate was -10.5% (Table 4). The industry sector was the one that recorded the highest increase (45.8%) and the services sector exhibits a slight increase of 0.5%.

Table 4 – Variation rate of energy consumption by sector between 2008 and 2012 in Lisbon. Source: DGEG; Calculations: INTELI.

VARIATION RATE OF ENERGY CONSUMPTION BY SECTOR				
Industry	**Agriculture**	**Services**	**Transport**	**Residential**
45.8%	31.8%	0.5%	25.4%	-10.5%

In more detail, in 2012 the transportation sector was responsible for more than half of the overall energy consumption, increasing from 47% in 2008 to 53% in 2012. Moreover, the services sector decreases its share from 35% to 31%, and the residential sector experienced a decrease from 15% to 12% during the same period.

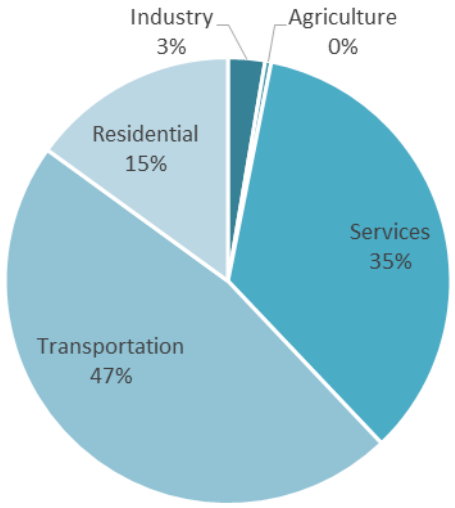


Figure 15 - Energy consumption by sector in 2008. Source: DGEG.

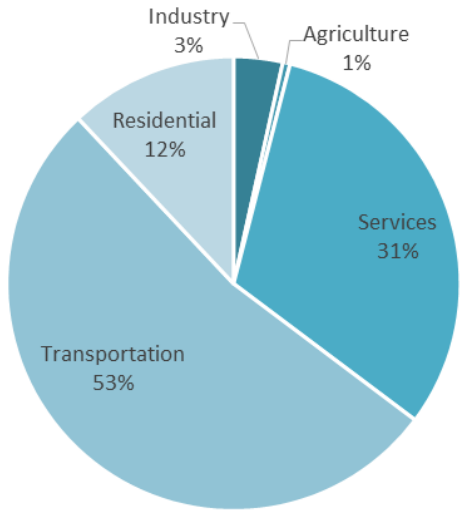


Figure 16 - Energy consumption by sector in 2012. Source: DGEG.

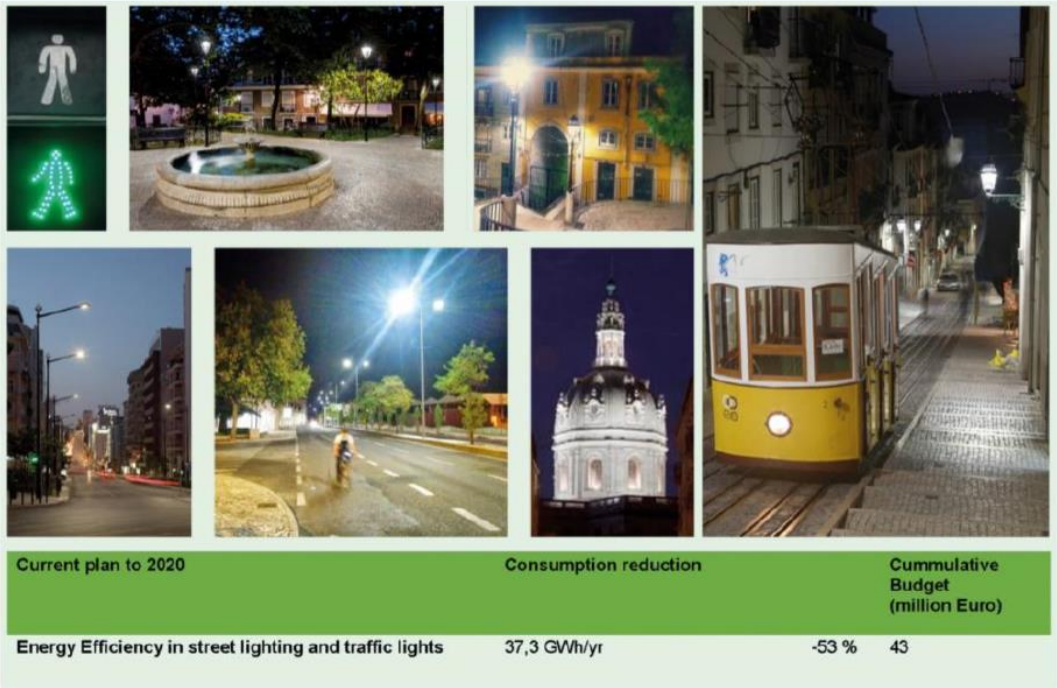
Despite the energy consumption has increased between 2003 and 1012 in Greater Lisbon from 2.339 kToe to 2.441 kToe, the GVA has also increased, resulting in a decrease of almost 10% of the energy intensity (Table 5), which is a good indicator since the consumption of energy for each unit of a produced good is lower. In other words, it means that to produce the same wealth, it has been used a smaller quantity of energy.

Table 5 – Energy intensity in Greater Lisbon (NUT III). Source: INE, DGEG; calculations: INTELI

Energy intensity (toe/ 10^6 €)	
2003	59,22
2012	53,34
Variation Rate (%)	**-9.9%**

Energy efficiency

Among several initiatives to reduce the consumption of electricity, bulbs have been replaced by more efficient devices as LEDs.



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

Figure 17 - Energy efficiency in street lighting and traffic lights. Source: Municipality of Lisbon.

V.I.III CLIMATE AND AIR QUALITY

Regarding the CO_2 emissions, Lisbon is the municipality of Greater Lisbon which is responsible for the higher CO_2 emission/ km^2, although a slight decrease has been observed between 2005 and 2009.

This number is far above from the average CO_2 emissions/ km^2 taking into account all Portuguese municipalities, which is 3.869 ton CO_2/km^2 in 2012.

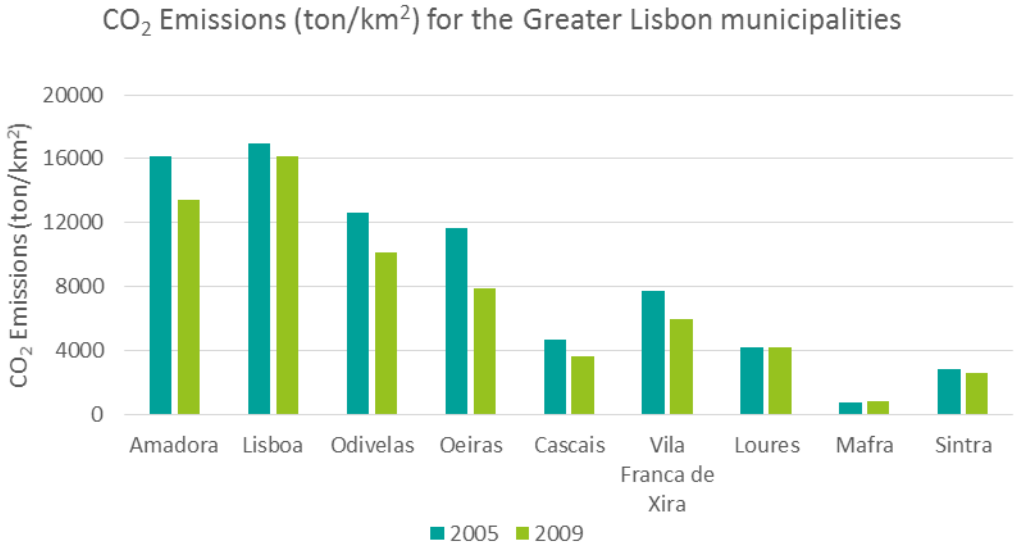


Figure 18 - CO_2 Emissions (ton/km^2) for the Greater Lisbon municipalities (NUTIII). Source: APA.

Similarly to the energy intensity, the carbon emission intensity also recorded a substantial decrease of about 24% from 2005 to 2009 due to a higher GVA and less carbon emissions in 2009. Therefore, to produce the same amount of wealth, Lisbon has produced less CO_2 emissions, which is an important step towards a post-carbon city.

Table 6 - Variation rate of carbon emissions intensity for Greater Lisbon (NUT III) between 2003 and 2012. Source: INE, APA; calculations: INTELI.

Variation rate of carbon emissions intensity (ton/10^6 €)	
2005	175.6
2009	133.9
Variation Rate (%)	**-23.8%**

Table 7 -Variation rate of exceedance air quality limit values between 2003 and 2012 in Lisbon municipality. Source: APA; calculations: INTELI.

Exceedance of air quality limit values (days)[1]		
Pollutants	**O_3**	**PM_{10}**
2003	11,8	76,3
2012	5,3	25,4
Variation Rate (%)	**-55.1%**	**-66.7%**

In the last 10 years (Table 7) the exceedance levels of limit values for ozone and PM_{10} microns pollutants have recorded a considerable drop (-55.1% and -66.7%) in the number of days that exceed the legally acceptable values imposed by the European and national legislation.

However, and due to all the seven air quality monitoring stations covering the municipality of Lisbon, still occurred disturbing levels of PM_{10} particles in certain areas of the city due to the high concentration of inhalable particles mostly issued by automobile traffic excess, which has been subject to legal sanctions.

V.I.IV TRANSPORT AND MOBILITY

Figure 19 represents the main modes of transportation used by people who lives in Lisbon on their commuting to work or school. The results are quite disappointing since the share of sustainable modes, i.e. walk, bus, company or school collective transportation, metro/ underground, train, bicycle and ship, have decreased from 59% in 2001 to 51% in 2011. Notice that in 2001, the car was responsible for 32% of the model share and in 2012 it was 34%. Likewise, in 2012 less people chose buses as their main mode of transportation (27% in 2001 and 19% in 2011). Moreover, metro/underground was the only public transport that exhibits an increase in the number of passengers for commuting who lives in Lisbon.

[1] The values presented in this table are the average of the values recorded in seven air quality monitoring stations spread around Lisbon.

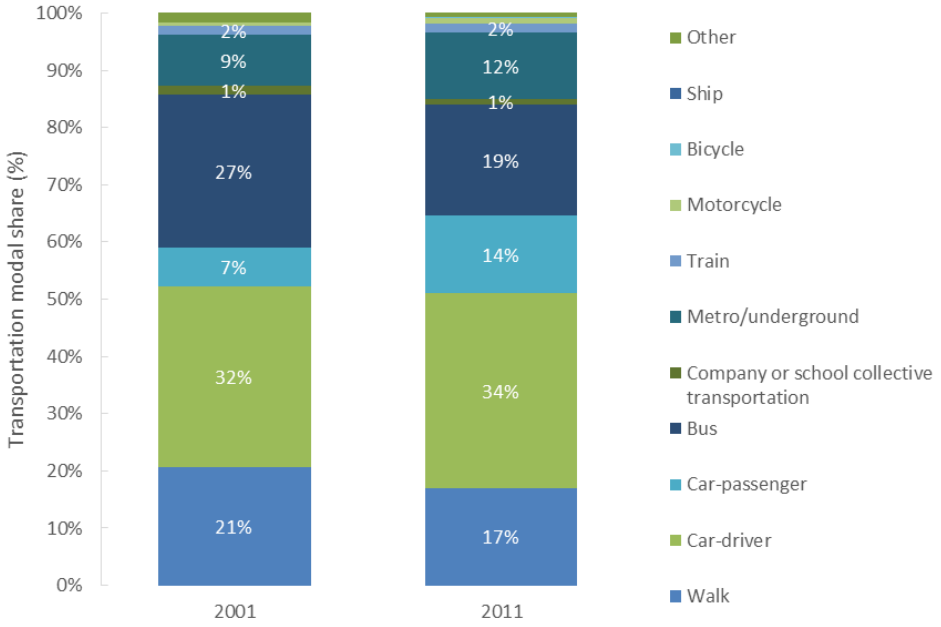


Figure 19 - Modal share on commuting. Source: INE

Commuting movements

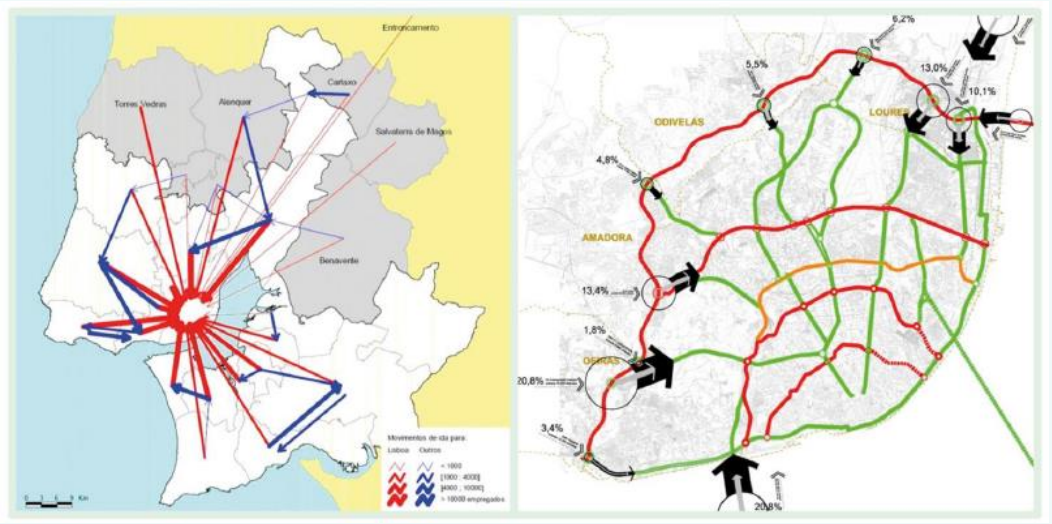


Figure 20 - Diagram of commuting movements from areas from outside of the city. Source: Municipality of Lisbon

Mobility targets for a better environment

The municipality of Lisbon has launched some actions in order to reduce the number of cars within the city, thereby reducing the pollution and GHG emissions as well as the noise.

- Reduce traffic;
- Promote public transportation;
- Bet on soft modes;
- Improve parking policy;
- ZER – Reduced Emissions Areas (see page 29)

EMEL (municipal company for parking and mobility) was the responsible for one of these initiatives. As a result, an online platform was developed to manage the parking in Lisbon (Figure 21). Several zones were created (green, yellow, blue and red) according to specific rules regarding the price and maximum duration allowed for parking. Moreover, parking can be paid using an application for smart phones.

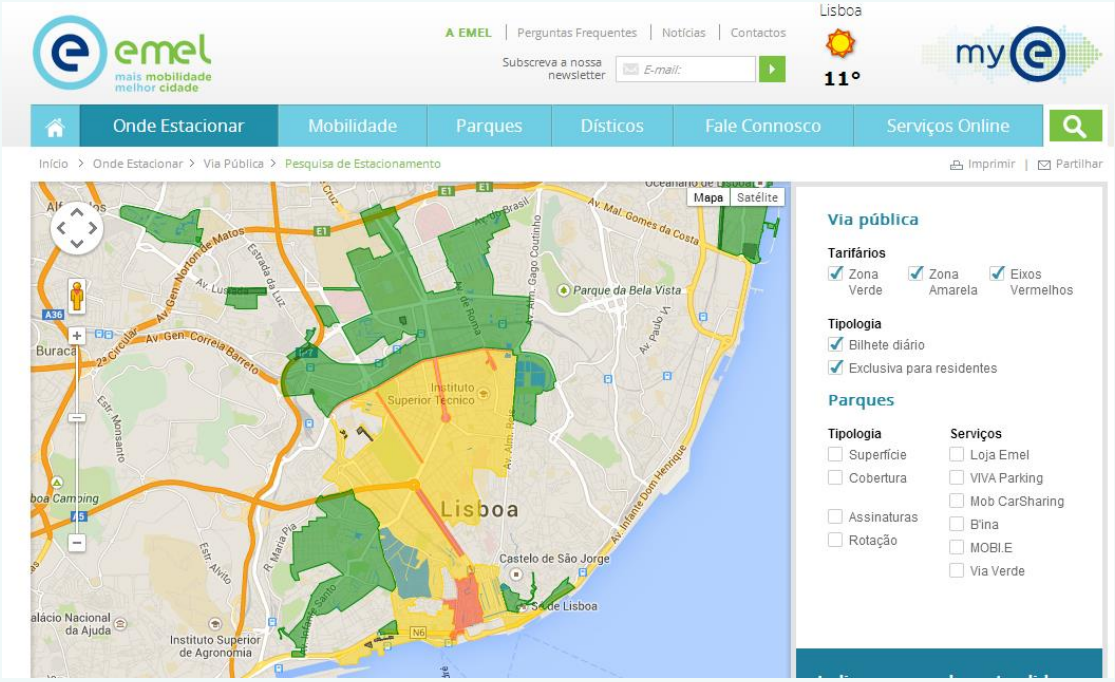


Figure 21 - Online platform created by EMEL for parking management. Source: EMEL, www.emel.pt

V.I.V WASTE

Figure 22 shows a decrease of the total urban waste generation (organic and able to selective collection) recorded in the period 2002-2013; however, it is notorious a jump between 2007 and 2008. In terms of recovery waste through all selectively collected waste (after collection),

it has been increasing significantly, from 6% in 2002 to 13% in 2013. Remember that in 2003 the process of selective collection from door to door in specific locations of the city begun, increasing the amount of waste delivered for recycling.

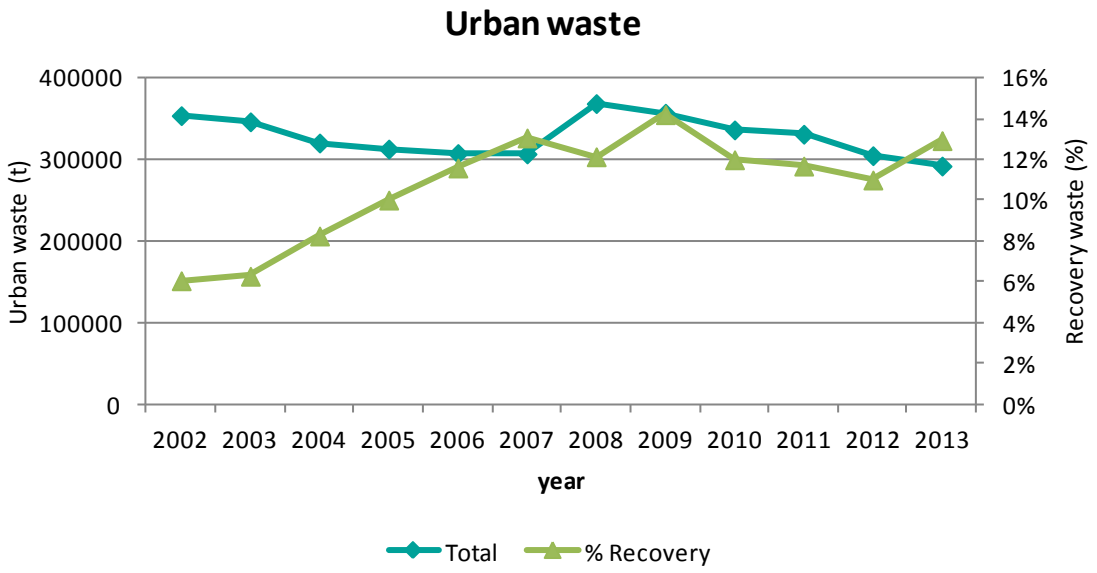


Figure 22 - Urban waste generated in Lisbon. Source: INE

Table 8 - Variation rate of urban waste generation in Lisbon municipality between 2009 and 2013. Source: INE. Calculations: INTELI.

Urban Waste Generation (T)		
Year	**Total (kg per capita)**	**Variation rate (%)**
2009	648,6	-
2010	612,8	-6%
2011	610,2	0%
2012	574,5	-6%
2013	561,4	-2%
2009-2013		**-13%**

Despite the resident population has been decreasing, the waste production per capita has been declining along the total waste generation, which means that the production of waste falls at a higher rate than the population.

Table 9 - Variation rate of urban waste recovery in Lisbon Municipality between 2009 and 2013. Source: INE. Calculations: INTELI.

Urban waste recovery		
Year	**Total (kg per capita)**	**Variation rate (%)**
2009	92,2	-
2010	73,5	-20%
2011	71,3	-3%
2012	63,2	-11%
2013	72,6	15%
2009-2013		**-21%**

The figures of the urban waste recovery per capita are disappointing since it has been decreasing throughout the years according to Table 9, although in the last years it has recorded a slight improvement. According to the analysis conducted by Lisbon City Council, these results may have been caused by some collateral effects of the recent economic crisis (illegal robbery of recyclable materials).

V.I.VI WATER

A new strategy based on a continuous sectoring and monitoring of the entire water distribution network was the main action adopted by the company EPAL which holds the entire supply and distribution of water in Lisbon.

Through a network segmentation, data monitoring and subsequent analysis and control combined with active control leakage interventions, it has been possible to successfully reduce water losses by 74%, from 32 M m^3 in 2002 to 8.2 M m^3 in 2013.

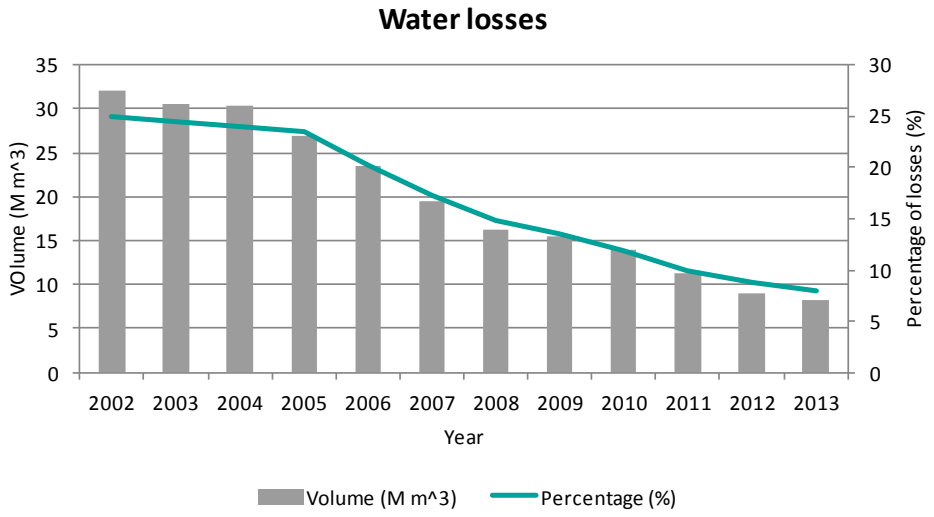


Figure 23 - Water losses in Lisbon. Source: Lisbon City Council

Table 10 - Variation rate of water losses in Lisbon Municipality between 2009 and 2013. Source: EPAL. Calculations: INTELI.

Water losses (M M^3)		
Year	**Losses (m^3 per capita)**	**Variation rate (%)**
2009	27,98	-
2010	25,49	-8,9
2011	20,63	-19,1
2012	16,95	-17,8
2013	15,75	-7,1
2009-2013		**-43,7**

Concerning water losses per capita, it has been decreasing, however at a slower variation rate according to Table 10. Notwithstanding, the reduction of water losses are truly impressive.

Water matrix in Lisbon

The sector that consumes more drinking water is by far the residential, representing about half of all the consumption throughout the years.

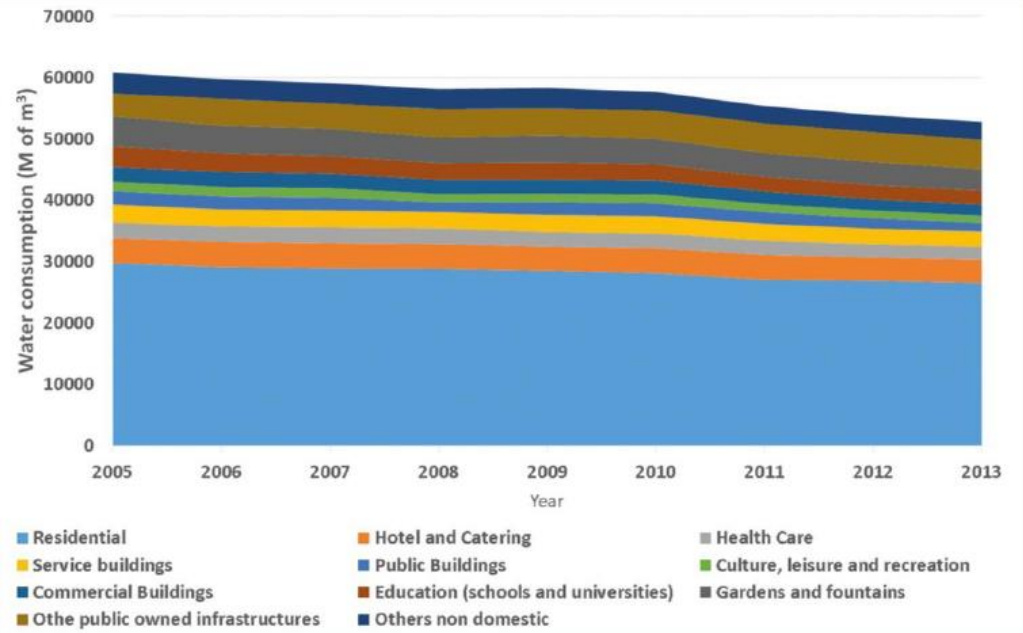


Figure 24 - Consumption of drinking water by activities. Source: Municipality of Lisbon.

V.I.VII BUILDINGS AND LAND USE

On Table 11 we can see that in 2007 the energy certification for buildings was clearly absent, due to the fact that only since January 2009 the Energy Certification System become mandatory for all buildings (new and existing), thereby justifying the exponential increase (14%) of certificates issued in 2012.

Table 11 - Variation rate of energy-efficient (with A+ and A energy class) buildings in Lisbon municipality between 2003 and 2012. Source: ADENE. Calculations: INTELI.

Energy-efficient (A+ and a energy class) buildings			
Year	**No of certificates issued with A+ and A energy class**	**No of total certificates issued**	**Variation rate (%)**
2007	0	4	0%
2012	1,042	7,291	14%

Table 12 - Variation rate of urban building density in Lisbon municipality between 2001 and 2011. Source: INE. Calculations: INTELI.

Urban building density (nº of buildings/km^2)	
2001	628,08
2011	617,82
Variation Rate (%)	**-1.63%**

The low variation rate of urban building density observed in the decade 2001-2011 may have as main causes the demolition of buildings left vacant and/or unused without any legal registration.

V.II SOCIAL PERFORMANCE

The social performance assessment of the city of Lisbon will be based on the KPI identified for this dimension.

V.II.I SOCIAL INCLUSION

The unemployment level was practicably stable until 2008 at 4%, and then it stated climbing until 10% in the case of men and almost 8% in the case of women, exhibiting annual growth rates up to 40%. Remember that 2008 was the year when the economic crisis began, which has impacted all the Portuguese economy, and being Lisbon an important economic centre, the region has also suffered extensively.

Figure 25 - Unemployment level by gender and its annual variation rate, for the Lisboa and Vale do Tejo (NUTS II) region. Source: INE.

In 1960 only 2.7% of Lisbon population held a tertiary education degree. At a national level, the picture was even worst, with 0.6% of the population having tertiary education degree. Fortunately nowadays the numbers are not the same and 32.2% of Lisbon residents have attended a tertiary education school against 13.8% at national level. Despite the growth rates have been declining, they are very expressive since between 1960 and 1981 the variation rate was 215% and between 2001 and 2011 the tertiary education level grew 54%.

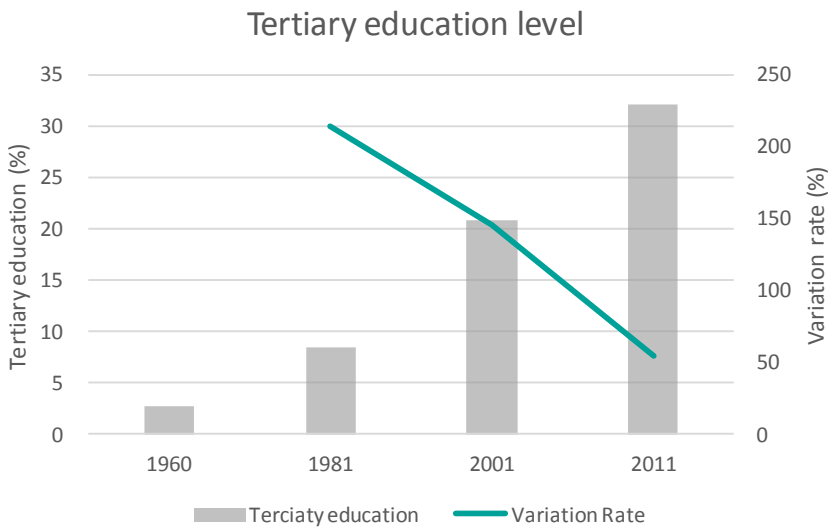


Figure 26 - Tertiary education level for population over 15 years old and its variation rate. Source: INE

Despite the average life expectancy has been increasing, the annual growth rate has broadly decreased; however the values range is narrow (from about 0.2% to almost 0.7%). Nevertheless, the increase of average life expectancy in a 10 years period from 77.8 to 79.9 is remarkable since, on average, the life expectancy has increased 2.4 months per year.

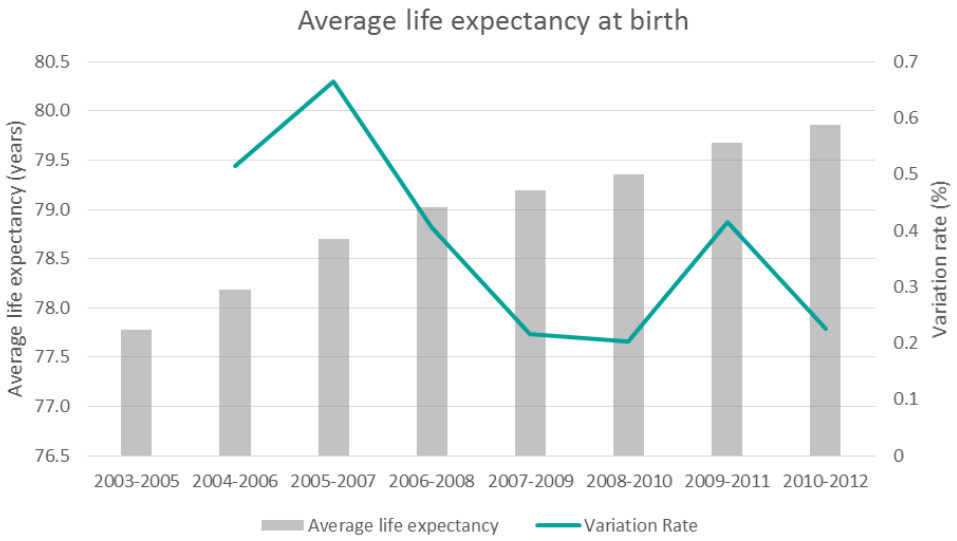


Figure 27 - Average life expectancy at birth and its annual variation rate for Greater Lisbon (NUT III region). Source: INE.

Regarding the level of poverty, the figures are very worrying because between 1989 and 2009 the level of poverty in the region of Lisboa and Vale do Tejo jumped by 80%. The large urban concentrations and the unemployment are the main causes of this condition ["Desigualdade Económica em Portugal, Carlos Farinha Rodrigues, 2012]. Nonetheless, at national level, the level of poverty decreased from 22.5% to 17.9% between 1993 and 2009.

V.II.II PUBLIC SERVICES AND INFRASTRUCTURES

The area of green spaces in Lisbon has been increasing. Between 2009 and 2014, 107.23 ha of green spaces were created and 53.06 ha have suffered improvements.

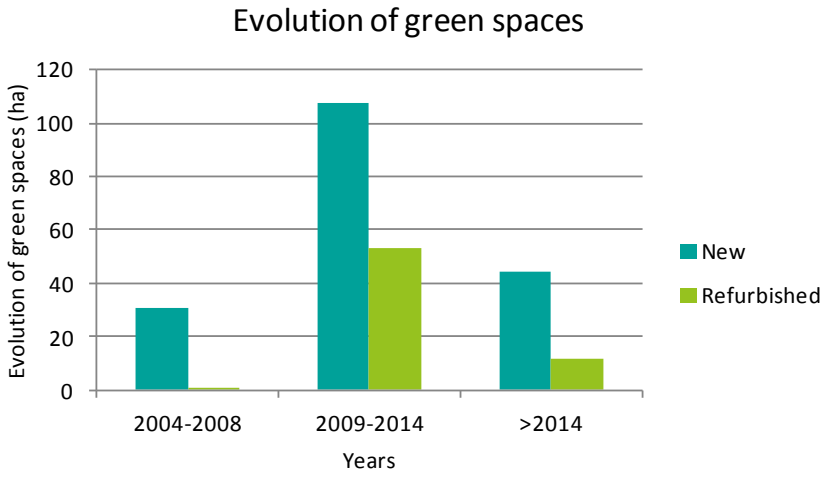


Figure 28 - Evolution of green spaces in Lisbon. Source: Municipality of Lisbon.

The exponential increase of new green space in Lisbon is clearly demonstrated in the period 2009-2014 through its 413.42% variation rate in comparison with the period 2004-2008.

Evolution of urban gardens in Lisbon

Urban gardens are increasingly popular and Lisbon follows this trend. In 2013-2014, urban gardens rose by 29.9 ha in the city.

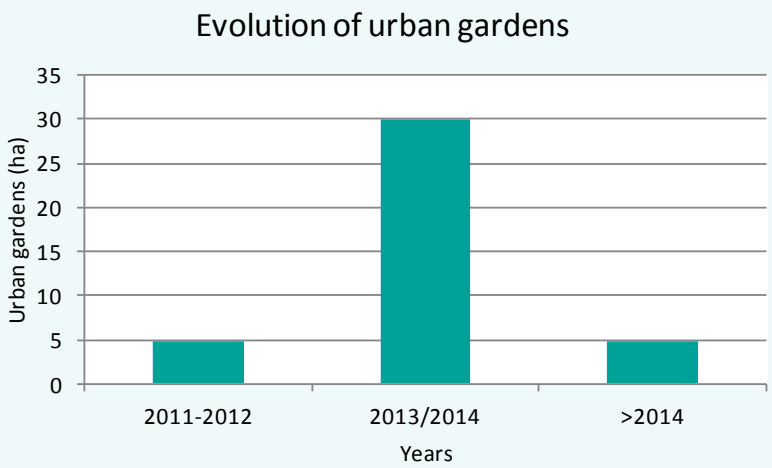


Figure 29 - Evolution of urban gardens in Lisbon. Source: Municipality of Lisbon

V.II.III GOVERNANCE EFFECTIVENESS

Lisbon has seven air quality monitoring stations spread around the city and the municipality has joined the Covenant of Mayors. Nevertheless, as far as it could be noticed, there is neither formal monitoring system for emission reductions nor monitoring program launched by Lisboa E-Nova or by City Council. Therefore, the answer for the indicator related to the existence of monitoring system for emissions reductions is negative.

V.III ECONOMIC PERFORMANCE

The economic performance assessment of the city of Lisbon will be based on the KPI identified for this dimension.

V.III.I SUSTAINABLE ECONOMIC GROWTH

The level of wealth, measured in terms of GDP for the NUTS II region, increased until 2008 (year of the beginning of the economic crisis) on average 2% to 5%. Nevertheless, between 2007 and 2008, the GDP increased 1% only. In 2009 the annual average rate was negative, but in 2010 the GDP raised again to a value closer to the one recorded in 2008. In the last three years, GDP falls continuously, with rates up to 3.5%, as it can be seen in Figure 30.

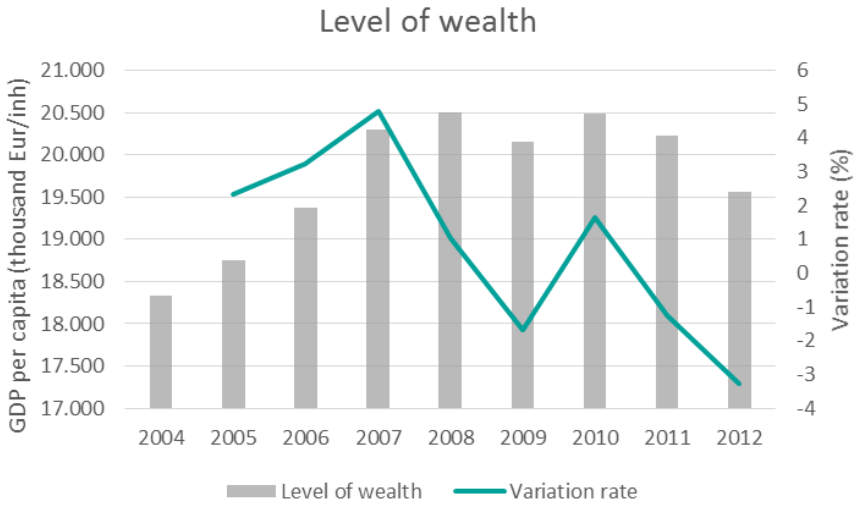


Figure 30 - Level of wealth and its annual variation rate for Greater Lisbon region (NUT III). Source: INE.

Since GDP are published by sectors for national level only, it was substituted by GVA for the Greater Lisbon region. In fact, there is no data about GVA by municipality, so NUT III was the closest option for the indicator.

Table 13 shows that GVA has been growing up throughout the years mainly due to the growth of the industry sector which offsets the decline of the agricultural sector. Despite this broadly trend, a slight decline of GVA is noticeable in the last two years (2011 and 2012).

Table 13 - GVA by sector for the Greater Lisbon region (NUTIII). Source: INE.

VAB by sectors (10^6eur)				
Year	**Agriculture**	**Industry**	**Services**	**Total**
2003	84,61	6.728,09	32.678,45	39.491,15
2004	83,09	7.030,04	34.429,61	41.542,74
2005	81,03	7.080,66	35.580,72	42.742,41
2006	94,07	7.034,91	36.509,84	43.638,81
2007	93,52	7.127,14	39.048,78	46.269,44
2008	95,16	7.158,55	40.098,00	47.351,71
2009	91,64	6.739,17	40.713,96	47.544,77
2010	94,79	6.852,34	41.237,40	48.184,53
2011	88,99	6.584,89	40.639,77	47.313,64
2012	90,67	6.218,26	39.454,16	45.763,10

Figure 31 shows that the share of GVA by sector follows a quite stable pattern throughout the years, since the annual variation rate is small, being the services sector the most representative sector (about 80%), followed by industry (about 20%) and the contribution of the agriculture sector is negligible.

Figure 31 - Share of gross value added by sector and its annual variation rate for the Greater Lisbon region. Source: INE.

Regarding the employment by sector, which is summarized in Figure 32, it is observed that that the number of employees has been growing up in services, which is in line to the GVA trend of this sector. On the other hand, the number of people working in industry is declining, which is proved by a negative annual variation rate. The sector which has recorded higher annual

variation rates is agriculture; however its contribution for the employment is residual. Summing up the contributions of all sectors, the number of people employed increased until 2008 (year of the economic crisis), and then it stated to fall down.

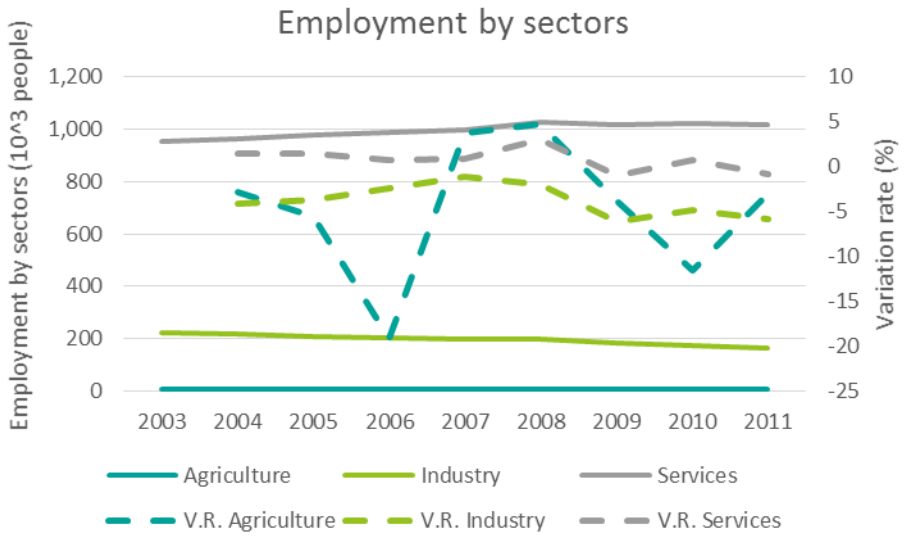


Figure 32 - Employment by sectors for the Greater Lisbon region (NUT III). Source: INE.

The number of enterprises newly born that has survived in the year of birth and the following 3 years have been rising up at least for the years between 2008 and 2010 according to Table 14. These figures are exciting since the economic crisis stated in 2008. Taking into account the population of active enterprises, the survival rate has increased, whilst the variation rate have the opposite trend by decreasing slightly.

Table 14 - Business survival in Greater Lisbon (NUT III). Source: Eurostat.

Business survival				
Year (t)	**Number of enterprises[2] newly born in t-3 having survived to t**	**Population of active enterprises in t**	**Survival rate**	**Variation rate (%)**
2008	21.361	377.684	5,7%	-
2009	22.409	364.404	6,1%	8,7%
2010	22.763	341.226	6,7%	8,5%

[2] Industry, construction and services except insurance activities of holding companies.

V.III.II PUBLIC FINANCES

Globally, the expenditures of Lisbon City Council have been decreasing; however, the revenues are very volatile, thereby the balance varies greatly resulting in extreme variation rates, as it is shown in Table 15.

Table 15 - Budget balance of the Lisbon City Council. Source: Pordata

YEAR	EXPENDITURES (10^3 EUR)	REVENUES (10^3 EUR)	BALANCE (10^3 EUR)	BALANCE – VARIATION RATE (%)
2009	593.136,95	556.730,09	-36.406,86	
2010	564.333,03	600.698,24	36.365,21	-200%
2011	486.484,07	536.563,79	50.079,72	38%
2012	488.166,72	823.676,40	335.509,68	570%
2013	474.492,94	487.365,85	12.872,91	-96%

Regarding the indebtedness level of the Lisbon City Council, it is notorious the efforts to reduce it. In the last 4 years, it jumped from 79.3% to 4.5%, thereby a variation rate of 94%. Notice that in 2012, the indebtedness level was 0%, increasing slightly in 2013.

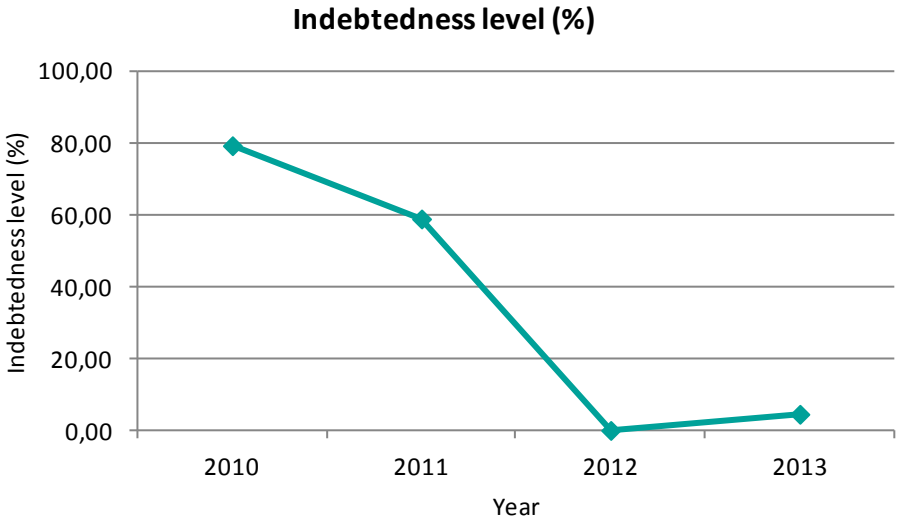


Figure 33 - Indebtedness level of the Lisbon City Council. Source: Lisbon City Council

V.III.III RESEARCH & INNOVATION DYNAMICS

Research and development activities merited increasing efforts until 2009, exhibiting significant annual variation rates, especially in 2006 and 2008 with values up to 27%. Despite in 2009 it was recorded the highest contribution for R&D activities, from 2008 onwards the variation rate started to decrease. In 2010 the R&D intensity decreased 5% in relation to 2009, being its value between the ones occurred in 2008 and 2009.

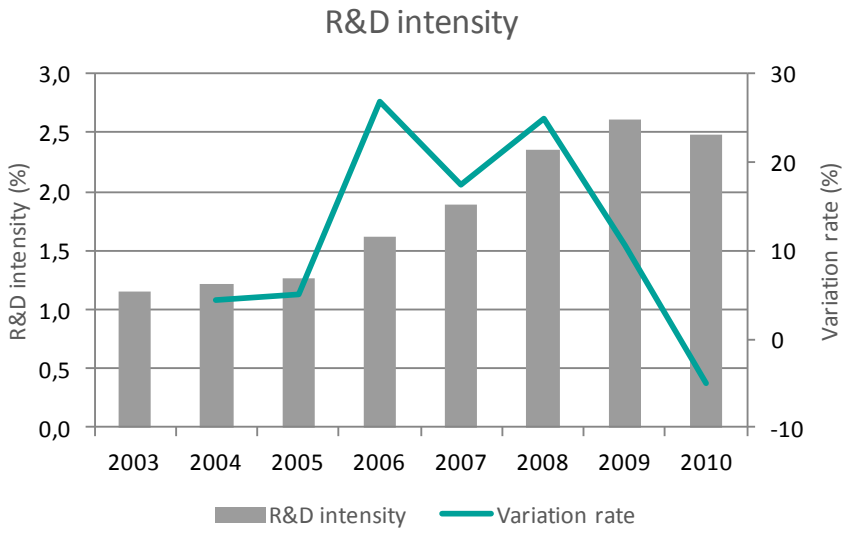


Figure 34 - Proportion of gross expenditure on research and development in GDP (%) and its annual variation rate for the Greater Lisbon region (NUT III). Source: INE

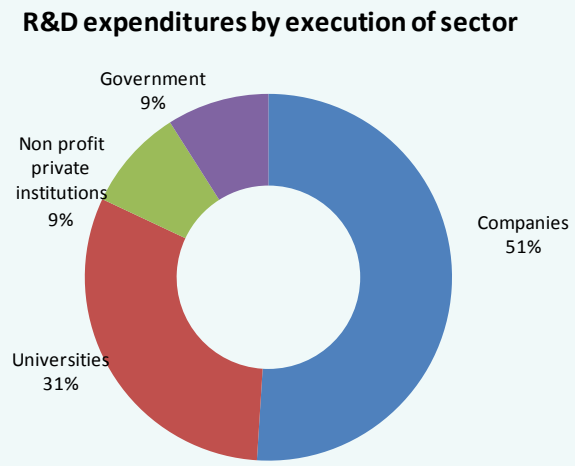


Figure 35 - R&D expenditures by execution sector. Source: *Economia em Números 2014*, Lisbon City Council.

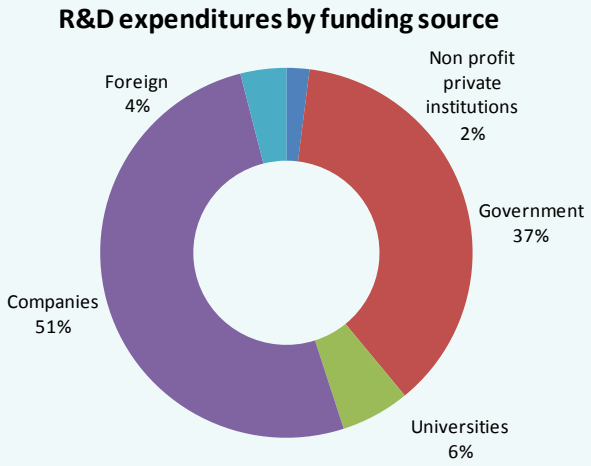


Figure 36 - R&D expenditures by funding source. Source: *Economia em Números 2014*, Lisbon City Council.

Knowledge map of Lisbon

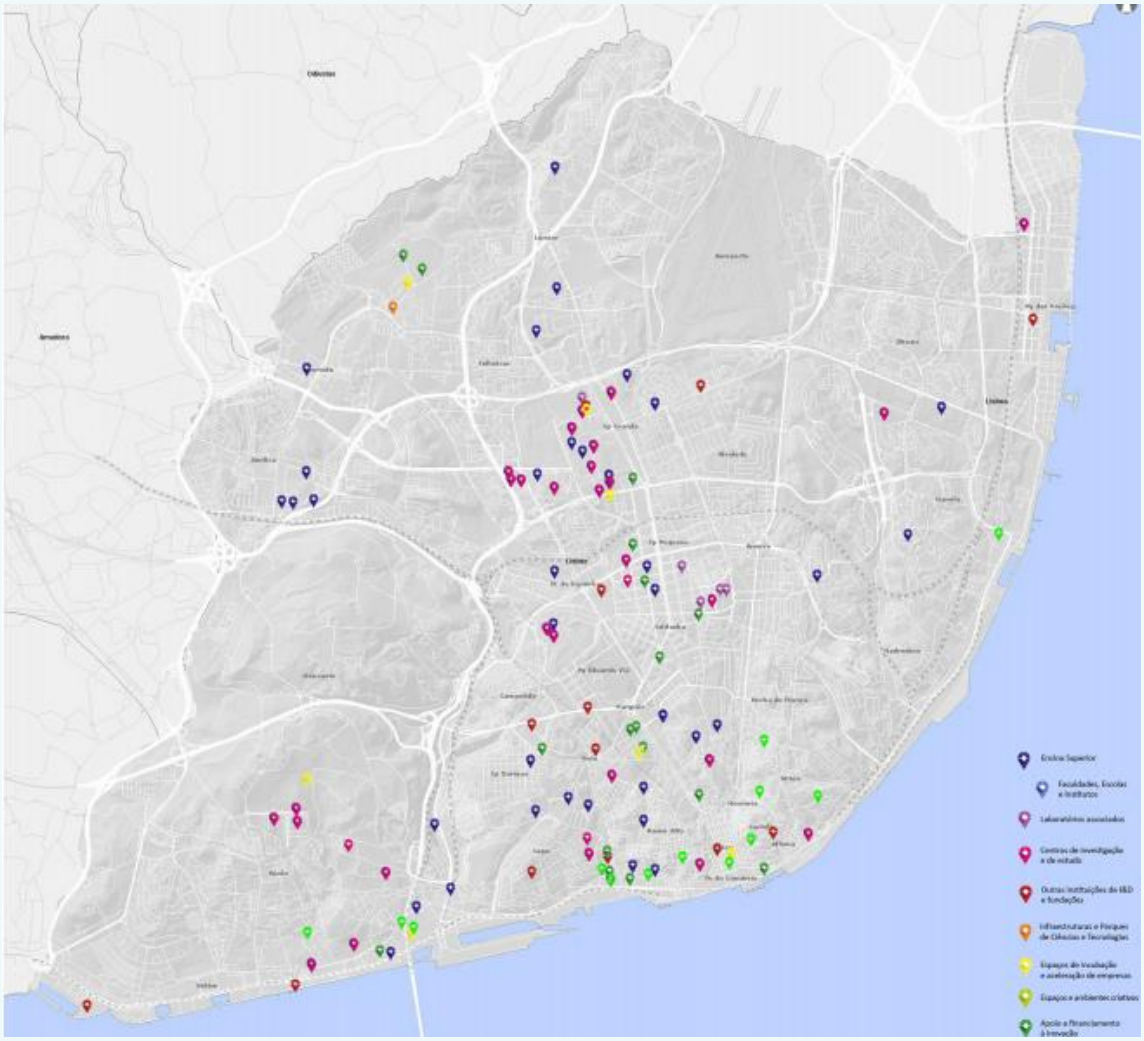


Figure 37 - Knowledge map of Lisbon. Dark blue: Universities; violet: Laboratories; pink: research centres; red: other R&D institutions and foundations; orange: infrastructures and parks of science and technology; yellow: spaces for incubation and entrepreneurship; green: creative spaces and environments; dark green: support and funding for innovation. Source: http://lxi.cm-lisboa.pt/lxi

VI FINDINGS AND KEY CHALLENGES

Table 16 summarises the global trends for each KPI indicator for the Lisbon case study city. In red are the indicators in which Lisbon has records a worst performance; nevertheless Lisbon is moving positively for the majority of the indicators towards a post-carbon city.

Table 16 - Summary of KPI's global trends

DIMENSION	SUB-DIMENSION	INDICATOR	Year	Trend
SOCIAL	Social Inclusion	Variation rate of unemployment level by gender	2003-2012	↗
		Variation rate of poverty level	1989, 2009	↗
		Variation rate of tertiary education level by gender	1960, 1981, 2001, 2011	↗
		Variation rate of average life expectancy	2003-2012	↗
	Public services and Infrastructures	Variation rate of green space availability	2004-2008; 2009-2014; >2014	↗
	Governance effectiveness	Existence of monitoring system for emissions reductions	N/A	**N/A**
ENVIRONMENT	Biodiversity	Variation rate of ecosystem protected areas	2003, 2012	↗
	Energy	Energy intensity variation rate	2003, 2012	↘
		Variation rate of energy consumption by sectors	2008, 2012	↗
	Climate and Air Quality	Variation rate of carbon emissions intensity	2005, 2009	↘
		Variation rate of carbon emissions by sector	N/A	**N/A**
		Exceedance rate of air quality limit values	2003,2012	↘
	Transport and mobility	Variation share of sustainable transportation	2001, 2011	↘
	Waste	Variation rate of urban waste generation	2002- 2013	↘
		Variation rate of urban waste recovery	2002- 2013	↘
	Water	Water losses variation rate	2002- 2013	↘
	Buildings and Land Use	Energy-efficient buildings variation rate	2007, 2012	↗
		Urban building density variation rate	2001, 2011	→
ECONOMY	Sustainable economic	Level of wealth variation rate	2004-2012	↗
		Variation rate of GDP by sectors	2004-2012	↗

DIMENSION	SUB-DIMENSION	INDICATOR	Year	Trend
	growth	Employment by sectors variation rate	2003-2011	→
		Business survival variation rate	2008, 2009, 2010	↗
	Public Finances	Budget deficit variation rate	2009-2013	↘
		Indebtedness level variation rate	2010-2013	↘
	R & I dynamics	R&D intensity variation rate	2003-2010	↗

Over a span of 30 years, the Portuguese capital has lost more than 200,000 of its residents, shrinking from 800,000 in 1980 to 550,000 today. Most of those people now live in the metropolitan region, reaching 2.8 million residents. This change of Lisbon demography leads to several problems such as aging people. Another issue is related to commuting. Each day more than 300,000 people come in to Lisbon to work and most of them arrive by car, which has impacts on the quality of the environment, on energy consumption and on quality of life, because people take more time on commuting, causing stress and fatigue and also spend a higher share of their budgets on transportation. Therefore, bringing people back to Lisbon is undoubtedly a key challenge.

In addition to this main issue, KPIs allow us to identify a set of domains in which Lisbon is not doing well on its transition to a post-carbon city. Both poverty level and unemployment are rising up (although the employment rate is quite stable), being the two indicators interconnected somehow since unemployment leads to a reduction of people income.

The use of sustainable modes of transportation has lost enthusiasts despite the public transportation network in Lisbon is extensive and the kilometers of cycling lanes have been improved. The use of car is very popular among Lisbon residents, so it should be developed new ways of using car, including car pooling and car sharing. Actually, some related projects have already been launched such as Mob Carsharing (see page 23), which means that the creation of synergies between transport modes is essential. Public transport alongside cycling and walking should be encouraged as well. Therefore, a holist overview of urban development, including the metropolitan area should be addressed, taking into account the main residential and work areas.

Despite the percentage of urban waste recovery has been increasing, the performance of Lisbon regarding urban waste recovery per capita is getting worse since 2010. Notwithstanding, if one looks to the period of 2002-2013, it can be observed a substantial improvement on recovery waste. Therefore, Lisbon should create new initiatives to revive the population awareness about this question, as well as to adopt intelligent urban waste management solutions.

On the other hand, Lisbon is a nice city to live in, since new green spaces have been created and the carbon emissions were reduced by nearly 5% between 2005 and 2009. In fact, Lisbon is committed to reduce 20% of its carbon emissions by 2020. Moreover, people are living longer due to the increase of the average life expectancy.

Currently there are nearly 7,000 buildings in Lisbon holding an energy certification, of which about 1,000 are A or A+ energy efficient buildings. Although this number is likely to grow, it is a matter of concern, because 80% of world's energy is consumed by cities and buildings are responsible for 40% of energy use and 23% of GHG emissions. However, we have to become aware that the reduction of energy consumption and GHG emissions cannot be achieved solely through the thermal efficiency of new buildings. In fact, the urban building density in Lisbon is quite stable; thus it makes more sense to intervene in the existing stock or in building renovation. Meritorious examples are the project Eco-Neighborhood – Boavista Ambiente + (see page 27) and Requalification of Mouraria (see page 36). Thus, Lisbon is also committed with more energy efficiency buildings, which is a flagship area of the European Commission through the ambitious targets of NZEB – Nearly net zero energy buildings.

Concerning the indicators in which the Lisbon City Council can have an active role, it is notorious the improvement of public finances because the indebtedness level has been falling down very significantly and the balance of expenditures/revenues has been positive since 2010. Regarding the environmental policy and initiates such the Reduced Emission Areas (see page 29), the results are encouraging: the pollutants and carbon emissions have been reduced, and it was possible to reduce water losses and new and more pleasant green spaces have been emerged. Lisbon has recorded real world-class values in terms of water losses, mainly due to the projects and solution launched by EPAL, the water operator in the city (for example the Wone system - http://www.epal.pt/EPAL/en/menu/products-and-services/wone).

The wealth of Lisbon, measured in terms of GDP, has been increasing as well as the investments in R&D activities. Thereby it can be found a negative correlation between the level of wealth and both the consumption of energy and carbons emissions. In fact, when cities and countries are richer, they can invest more money on the environmental questions. The business survival records a positive growth, which are really good news given the adverse economic context.

VII RECOMMENDATIONS

The main recommendations for the transition of Lisbon towards a post-carbon city, taking in account the KPI analysed are:

- **Sustainable Mobility:** Despite several initiaves have been launched by the Lisbon City Council in the area of sustainable mobility (such as electric mobility, carsharing, bycicle lanes, improvement of public transport, etc.), private car is still the main transport mode used by the population. It is needed a change of mentality, which takes time.
- **Buildings Renovation:** There are several buildings in Lisbon that needs intervention, mainly in the area of energy efficiency. An Urban Renewal Strategy is under development till 2024, which may help to solve this situation.

- **Monitoring Carbon Emissions**: A formal monitoring plan of carbon emissions is needed in order to evaluate the progress towards the 2020 target of 20% reduction. The impact of the ZER (Reduction Emission Areas) needs also to be monitored.
- **Renewable Energy**: According to the Lisbon Solar Potential Map, huge opportunities of production of renewable energy are available and should be improved. Reducing energy consumption through energy efficiency is also a trend that should be reinforced. Public lighting is an important area of intervention, in which some actions have been already launched (LED).
- **Waste management:** Waste management intelligent solutions can be used by the municipality in the framework of the Lisbon smart city strategy, in order to improve urban waste recovery amounts.
- **Economic crisis:** Poverty and unemployment are a result of the national (and European) economic crisis. These problems should also be managed at municipal level. Employment opportunities should be created, and social innovation projects should be launched.

VIII CONCLUSIONS

It can be concluded that Lisbon is following a sustainable economic growth towards a post-carbon city. Nevertheless, some actions should be improved in the areas of mobility, buildings renovation, renewable energy production, carbon emissions monitoring, and waste management. In economic and social terms, unemployment and poverty should be stroke at municipal level, along with European and national measures.

ANNEX I

List of key performance indicators

DIMENSION	SUB-DIMENSION	INDICATOR	UNIT	YEAR
SOCIAL	**Social Inclusion**	Variation rate of unemployment level by gender	**Percentage**	**2003-2012**
		Variation rate of poverty level	**Percentage**	**2003-2012**
		Variation rate of tertiary education level by gender	**Percentage**	**2003-2012**
		Variation rate of average life expectancy	**Average Nº**	**2003-2012**
	Public services and Infrastructures	Variation rate of green space availability	**Percentage**	**2003 2012**
	Governance effectiveness	Existence of monitoring system for emissions reductions	**Yes/No Description**	**2013**
ENVIRONMENT	**Biodiversity**	Variation rate of ecosystem protected areas	**Percentage**	**2003 2012**
	Energy	Energy intensity variation rate	**Toe/euro Toe**	**2003 2012**
		Variation rate of energy consumption by sectors	**Percentage**	**2003 2012**
	Climate and Air Quality	Variation rate of carbon emissions intensity	**Ton CO_2/euro Ton CO_2**	**2003 2012**
		Variation rate of carbon emissions by sector	**Ton CO_2**	**2003 2012**
		Exceedance rate of air quality limit values	**Nº**	**2010 2012**
	Transport and mobility	Variation share of sustainable transportation	**Percentage**	**2001 2011**
	Waste	Variation rate of urban waste generation	**Kg/person/year**	**2007 2012**
		Variation rate of urban waste recovery	**Percentage**	**2007 2012**
	Water	Water losses variation rate	**m^3/person/year**	**2003 2012**

DIMENSION	SUB-DIMENSION	INDICATOR	UNIT	YEAR
	Buildings and Land Use	Energy-efficient buildings variation rate	**Percentage**	**2007 2012**
		Urban building density variation rate	**Nº/ km^2**	**2003 2012**
ECONOMY	**Sustainable economic growth**	Level of wealth variation rate	**eur/person**	**2003-2012**
		Variation rate of GDP by sectors	**Percentage**	**2003-2012**
		Employment by sectors variation rate	**Percentage**	**2003 2012**
		Business survival variation rate	**Percentage**	**2008,2009,2010**
	Public Finances	Budget deficit variation rate	**Percentage of city's GDP**	**2003-2012**
		Indebtedness level variation rate	**Percentage of city's GDP**	**2003-2012**
	Research & Innovation dynamics	R&D intensity variation rate	**Percentage**	**2003-2012**