

BUILDING SMART CITIES TOGETHER

# SHARINGCITIES



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement N° 691895

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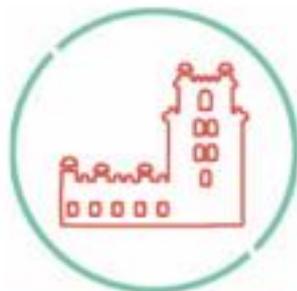
Mobility measures for sustainable urban development

Pedro Machado, Lisboa E-Nova



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## The 'Lighthouse' and 'Fellow' Cities



**LISBON**

**BORDEAUX**



**LONDON**

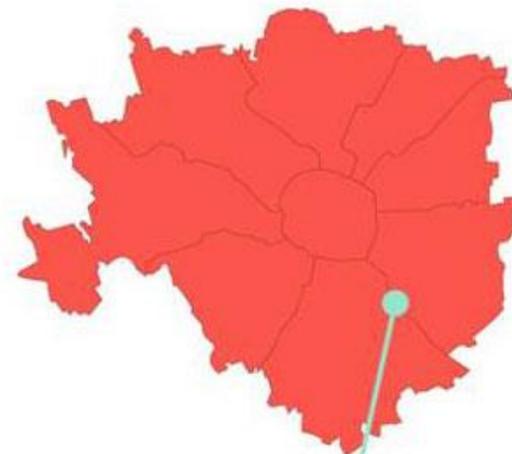
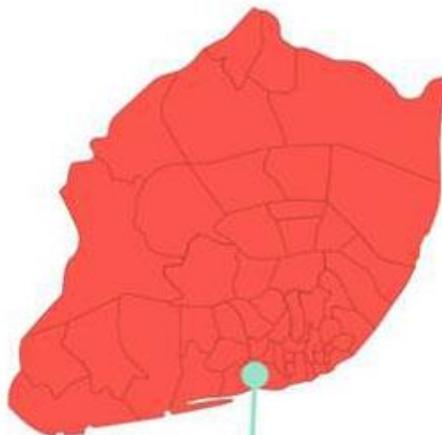
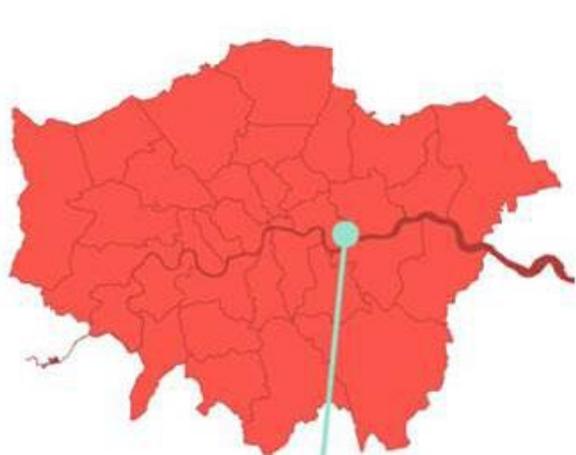
**BURGAS**



**MILAN**

**VARSAW**





## 10 Measures - 'Building Block' Repeatable Solutions



**Citizen Engagement**



**eV Charging**



**Building Retrofit**



**Smart Parking**



**Sustainable energy management systems**



**eLogistics**



**eV Car Sharing**



**Smart Lamp Posts**

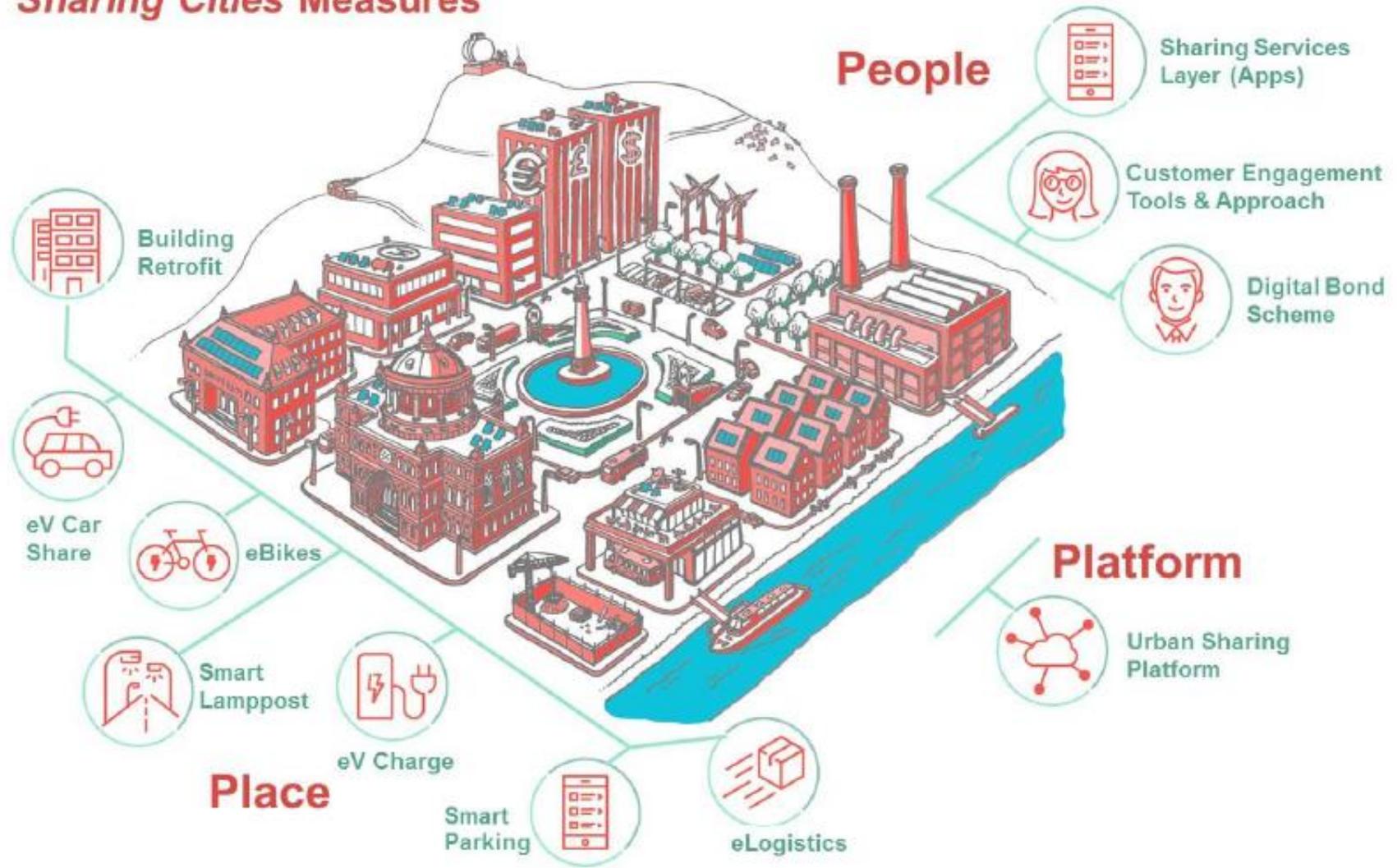


**eBike Sharing**



**Urban Sharing Platform**

# Sharing Cities Measures



# The Demonstration

	<b>Citizen Engagement</b>	Co-creation & co-design of digital services and interfaces by and for citizens and companies Design of incentives schemes - "District Bond"
	<b>Building Retrofit</b>	+600 social houses; 30 private housing blocks; 5 mixed owner blocks; 3 public buildings;
	<b>Energy Management</b>	Implementation and maintenance of a online interoperable Sustainable Energy Management System (SEMS) and a Building Energy Management System (BEMS)
	<b>eMobility</b>	+400 eVehicles; 200 new charging stations; +1100 tons of CO <sub>2</sub> /year saved for e-mobility implementation in the pilot areas
	<b>EV Car Sharing</b>	+150 new eVehicles for public and community shared use; 7 Autonomous vehicles for public services
	<b>eBikes</b>	+ 200 e-bikes (+1500 expected)
	<b>EV Charging</b>	+180 Charging Points to be installed
	<b>Smart Parking</b>	+1000 parking spaces
	<b>EV Logistics</b>	+160 Logistics eVehicles
	<b>Smart Lamp Posts</b>	+3500 Smart Lamp Posts (light automation sensors; wi-fi sensors; environmental sensors; geofencing; traffic)
	<b>Urban Platform</b>	Open Standard reference architecture - "designed by three cities, built for many" Integration facilitator



# PLACE

**Task 3.1**

**Building  
retrofit**

**Task 3.2**

**Sustainable  
EMS**

**Task 3.3**

**Shared e-  
Mobility**

**Task 3.4**

**Smart  
Lamppost**



## 10 Measures - 'Building Block' Repeatable Solutions



**Citizen Engagement**



**Building Retrofit**



**Sustainable energy management systems**



**eV Car Sharing**



**eBike Sharing**



**eV Charging**



**Smart Parking**



**eLogistics**



**Smart Lamp Posts**



**Urban Sharing Platform**

**1**  
**Identification**

**2**  
**Design & Specification**

**3**  
**Market Analysis**

**4**  
**Development & Procurement**

**5**  
**Implementation**

**6**  
**Monitoring**



	Use Case	Objective	Lisbon	London	Milan
1	Prediction of availability of mobility mode	Forecast of availability of vehicles (per service) and charging stations done by the platform	✓	✓	✓
2	User-based bike reallocation with rewards	Real-time incentives-based system generates offers for users to move bikes from overcrowded stations to nearly empty ones	✓	✓	✓
3	Mobility island / Hub	Mobility island services: <ul style="list-style-type: none"> <li>· Bike-sharing docking stations</li> <li>· Car-sharing vehicles</li> <li>· EV Charging stations</li> <li>· Other low-carbon last mile mobility solutions</li> </ul>	✓	✓	✓
4	Optimization of parking space usage	Parking spaces made available to “ICE vehicles” for short stops, provided no decrease in level of service perceived by EV users	✓	✓	✓
5	Optimization of logistics EV routing	Connected infrastructure able to provide sensing data for route optimization based on charging station availability	✓	✓	✓

# Lisbon Overview



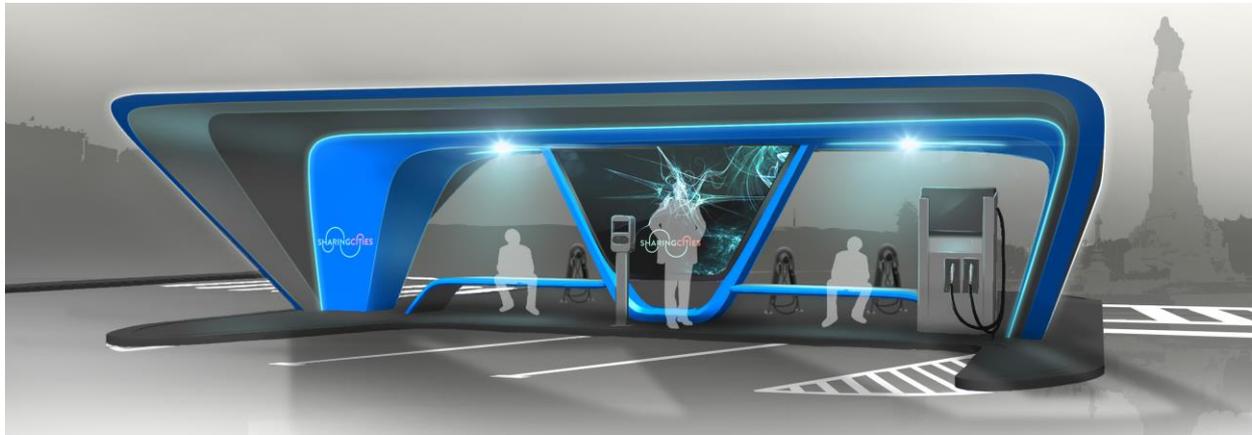
## Lisbon Measure: Mobility Island (Public EV Charging)

### Achievements so far...

- Supplier selection for charging stations and accessories already performed, including electrical project.
- Informal supplier selection for digital interactive billboard + “shelter”.
- Exploration model for mobility island already validated with the City of Lisbon.
- Detailed design of integrated physical solution, according to the services.

### Whats next...

- Discussion of inputs/requirements with WP4
- Launch of public tender requirements for shelter and digital interactive billboard purchase by the City of Lisbon.
- Discussion of end-user engagement and marketing strategy together with WP2.



## Lisbon Measure: eBike-Sharing

### Achievements so far...

- Public tender has been launched and awarded.
- Installation started
- Test phase ongoing with 10 stations and 100 bicycles – 10 000 volunteers, 1 200 users



### Whats next...

- One of the first stations shall be placed in the Mobility Island.
- Detailed use cases to be defined together with WP2 bike-sharing for Lisbon (2S-2017).





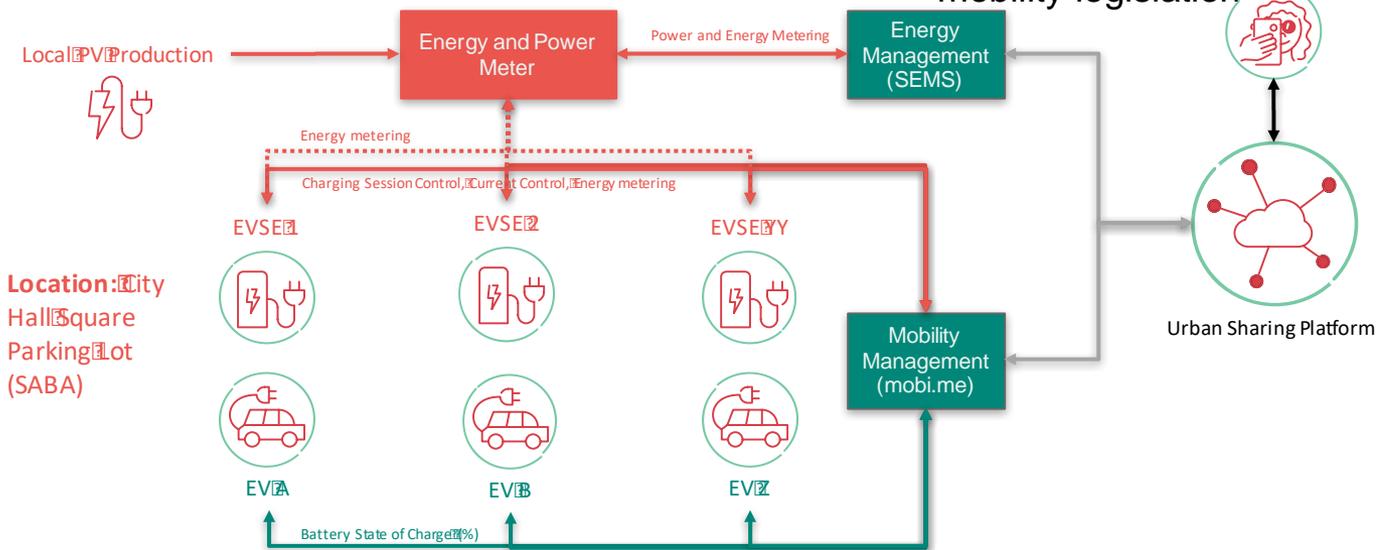
## Lisbon Measure: Private EV Charging

### Achievements so far...

- In-situ Technical evaluation already performed for the technical constraints.
- Preliminary discussions with WP3.2 for SEMS integration and role.
- Definition of overall control architecture.

### Whats next...

- Tendering process for charging stations (including installation).
- Works and installation for additional fast charger.
- Integrated management of business-specific and technical requirements for charging optimization.
- Business Model definition in light of the electric mobility legislation



Location: City Hall Square Parking Lot (SABA)

## Lisbon Measure: E-Logistics

### Achievements so far...

- Some EVs already integrated.
- Awaiting formal authorization from the City of Lisbon.
- EDP fleet vehicles selection on-going.



### Whats next...

- New batch for installations
- Overall definition of scope for the measure in light of the specific stakeholders that have been or are to be attracted.
  - EMEL Fleet for use in their parking meters maintenance and cash collection activities (and other).
  - CML Fleet for deliveries, garbage collection, street monitoring.
  - EDP Fleet for use in day-to-day operations.
- Opportunity: Integration with 25 post-office electric vehicles.
- Opportunity: 25 E-Canter electric trucks are to be included in the City of Lisbon fleet in 2018.

## Lisbon Measure: E-Car-Sharing

### Achievements so far...

- 15 Peugeot iON fleet already identified by the City of Lisbon (+25 vehicles as an objective).
- Preliminary solution awaiting formal approval (baseline monitoring of movements and personnel mobility) – meeting with Deputy Mayor already took place.

### Whats next...

- Corporate sharing service design process to be formally kicked-off together with WP2.
- MDC installation in vehicles.
- Identification / addition of new vehicles to be included in the project.

	UN	YEAR
 Fiat Seicento Elettra	1	2000
 Gem E2 - Segway PT 12 Police	14	2007 - 2008
 Goupil G3	18	2010 -2012
 Mitsubishi I-Miev	2	2011
 Renault Fluence Z.E.	12	2013
 Peugeot iOn	42	2013
 Mega RM	3	2013 -2014
 Renault Twizy	12	2014
 Govecs S 3.4	1	2014
 Toyota Prius Plug-In	3	2015

## Lisbon Measure: Smart Parking

### Achievements so far...

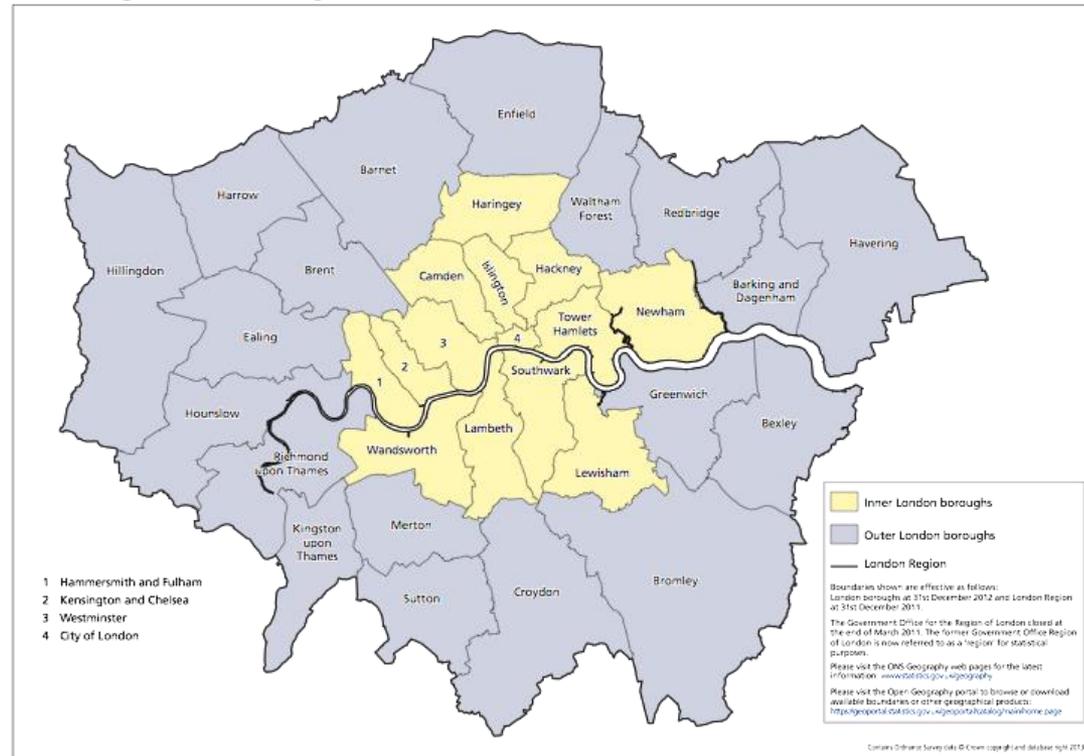
- Technological evaluation and selection of potential solutions.
- Awaiting definition of the mobility island concept in order to include magnetometer pavement-based solutions (or others).
- Installation of first parking sensors concluded

### Whats next...

- Selection and installation of parking sensors next to the mobility island (3 spots)
- Integration with LoRaWAN network (?).
- Selection of second area to be monitored with probable installation of camera sweeping sensors.

# London / Greenwich Overview

London Region: London Boroughs, 2012



## Greenwich Measure: EV Car Clubs

### Achievements so far...

- Feasibility has been undertaken; established that initial pilot of 6-10 vehicles would work well in area
- EV Car Clubs Demand analysis undertaken

### Whats next...

- Detailed local consultation to establish usage, locations and tender process for provider



## Greenwich Measure: Electric Vehicle Charging Points

### Achievements so far...

- Aim: to encourage uptake of electric vehicles to contribute to better air quality and wider Smart City agendas
- Feasibility work undertaken to establish the optimum methods for increasing on-street EVCP provision (resulting from the EV Demand Analysis study).

### Whats next...

- Detailed local consultation to establish usage, locations and tender process for provider

## Greenwich Measure: Electric bike share scheme

### Achievements so far...

- Aim: Improved local air quality from switching from private car use to shared bike system (fewer overall car trips) and improvements to public health from active travel.
- Feasibility work performed to identify the best solution for the demonstration area.
- Initial 'attitude survey' performed.
- First stage for tendering process has been performed. Monitoring strategy defined with WP8 with GPS and travel diaries.

### Whats next...

- Detailed local consultation to establish usage, locations and tender process for provider for second stage.
- Monitoring of usage.





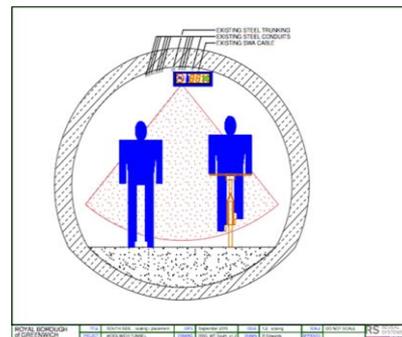
## Greenwich Measure: Foot Tunnel Management

### Achievements so far...

- Aim: Allow safe use of constrained space in the tunnel, allowing for varying use throughout the day. Will allow cycling when low numbers of pedestrians are. Also provides 24/7 usage data.
- Detection cameras and signs in place. A 'live trial' is now in progress, to determine suitable thresholds for different messages to be displayed.

### Whats next...

- Completion of live trial, legal changes, and public engagement



## Greenwich Measure: Autonomous Vehicles

### Achievements so far...

- Preparation for the extensive public trials of autonomous 'last mile' shuttles.
- Development and production of the shuttles, extensive testing of the autonomous systems and development of the safety case.

### Whats next...

- Start of real-world testing.
- Refinement of "Sharing Cities use cases"

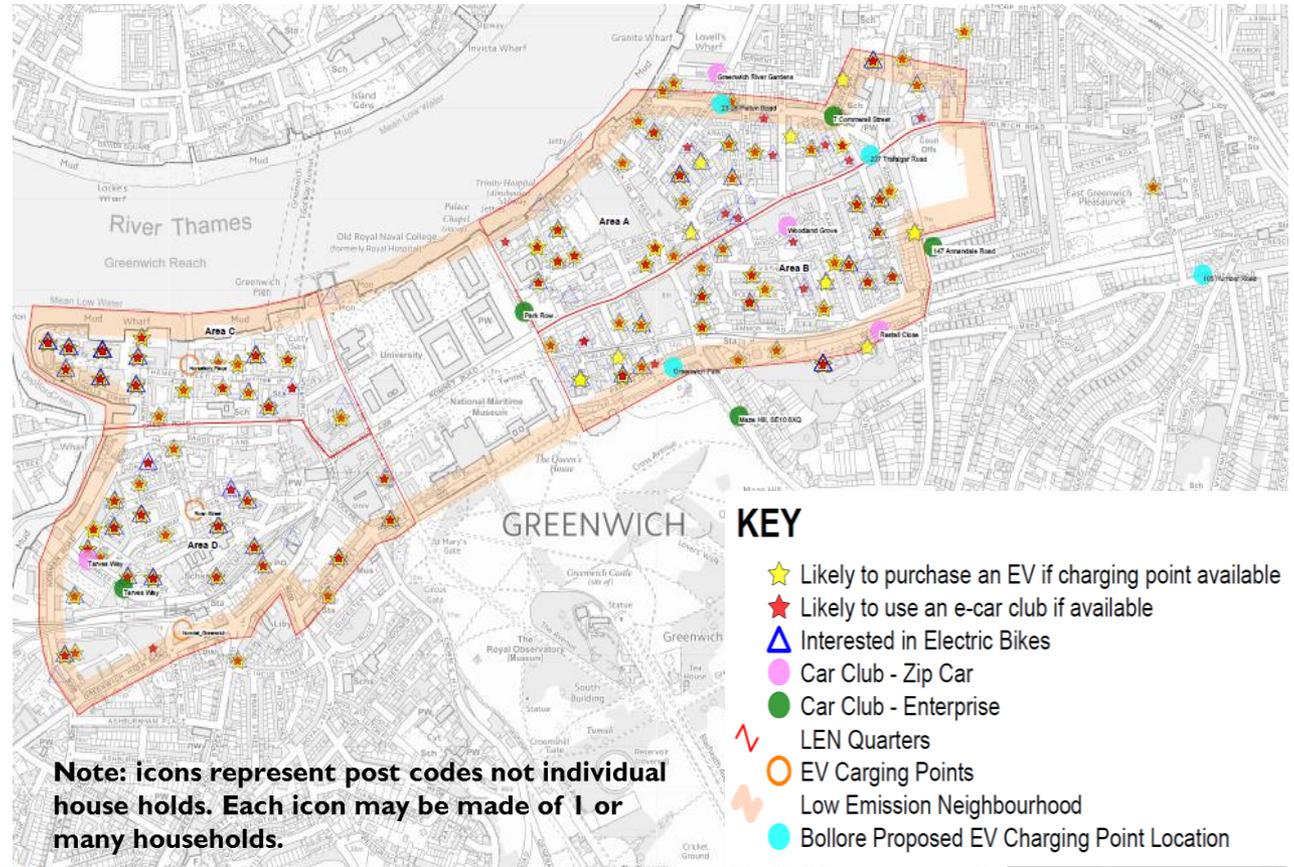
## GATEway project overview



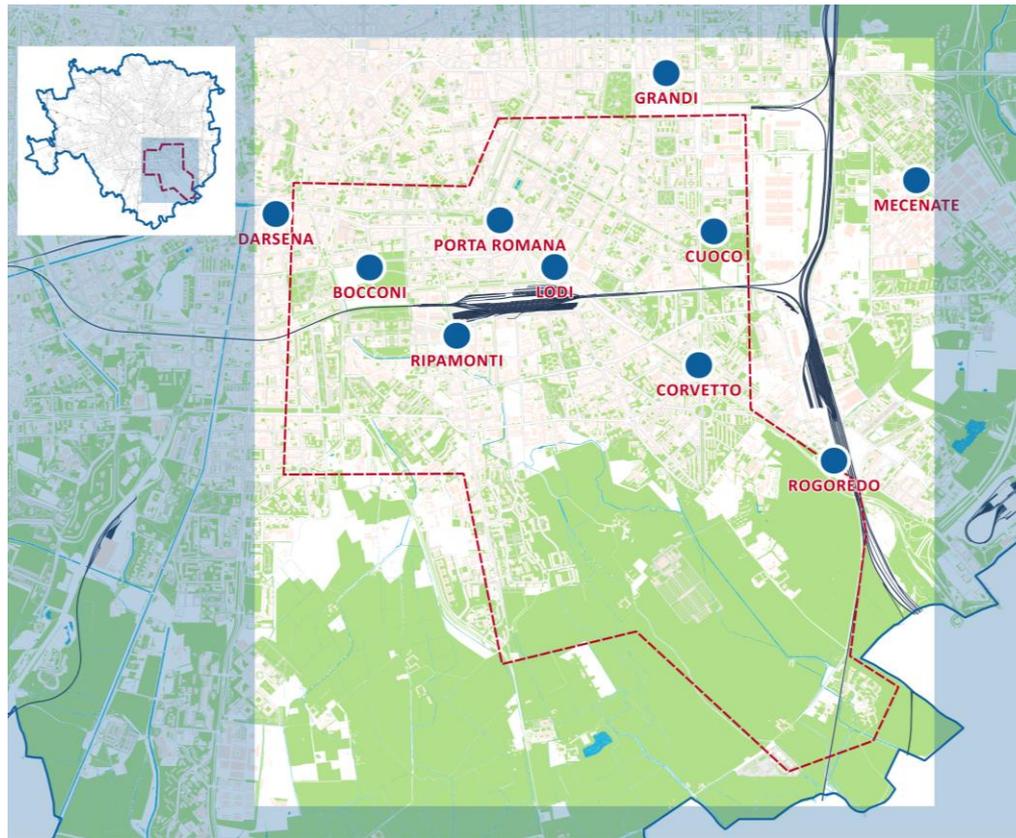
- Test and evaluate several use cases for autonomy
- Human factors and technology focus
- Shuttles ready for validation and testing July 2016
- Live trials with participants in August 2016
- £2.3m deployment includes, command and control, visualization, mapping, demand control and monitoring software and shuttle development (x7)

## Greenwich: EV Demand Analysis

- Went out to 7000 house holds in the demonstrator area
- 652 responses came back (9.3% response rate)
- 11% (74 households) own or would consider owning an EV currently
- Rises to 36% (231 households) considering purchasing an EV if a charging point was available on their road
- 41% would use an EV car club if available
- 40% would use an e-bike sharing scheme if available



# Milan Overview



## Milan Measure: eBike-Sharing

### Achievements so far...

- 7 new bike sharing stations have been identified through Technical examinations.
- Set up of 4 bike-stations (out of 7 stations foreseen) .



### Whats next...

- Install 3 new bike sharing stations and deploy 150 e-bike sharing (End 2017)
- Introduce a reservation system that ensures the availability of a bicycle at any time of the day (June 2017)
- Planning of a bike's reallocation system (End 2017)



## Milan Measure: eCar-Sharing

### Achievements so far...

- 10 Mobility Areas inside the test area and in close surroundings have been identified through technical examinations



### Whats next...

- Installation of 60 charging points for the electric car sharing (6 points each area) of which 20 rapid charge (planning end October, set-up March 2017)
- Deployment of 60 electric cars e-car by e-car sharing operators (End 2017)
- Planning of a bike's reallocation system (End 2017)



## Milan Measure: Condominium eCar-Sharing

### Achievements so far...

- Preliminary evaluation of possible condominiums
- Call for service providers identification opened

### Whats next...

- Co-design the condominium car sharing service (November 2017)
- Service provider selected (October 2017)
- Testing the service with at least 2 vehicles for 3 years (start-up by January 2018)



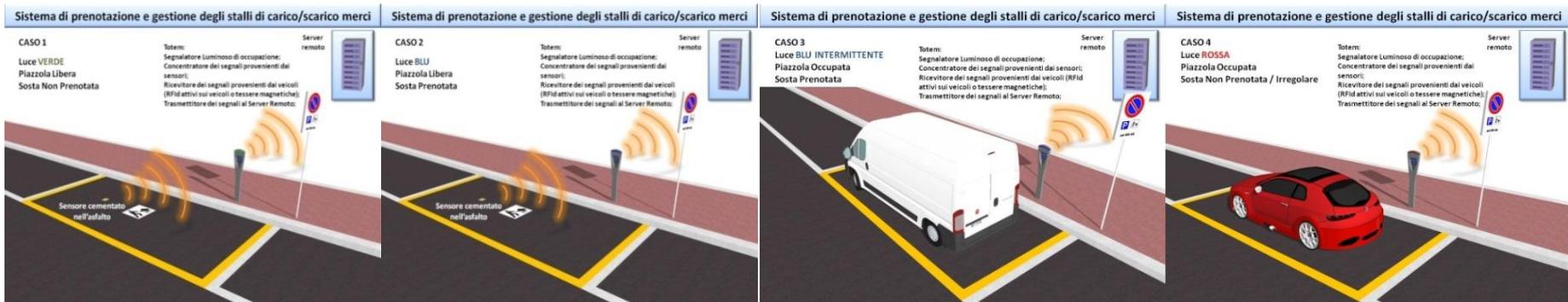
## Milan Measure: Smart Parking

### Achievements so far...

- Preliminary studies and evaluation of technologies.
- On-site inspection for technical assessment

### Whats next...

- Identify and install 125 sensors for the monitoring and parking control (September 2017)
- 100 more sensors could be included in the District area (tbc)





## Milan Measure: eLogistics

### Achievements so far...

- Activities planning shared among Poliedra, AMAT, Comune di Milano

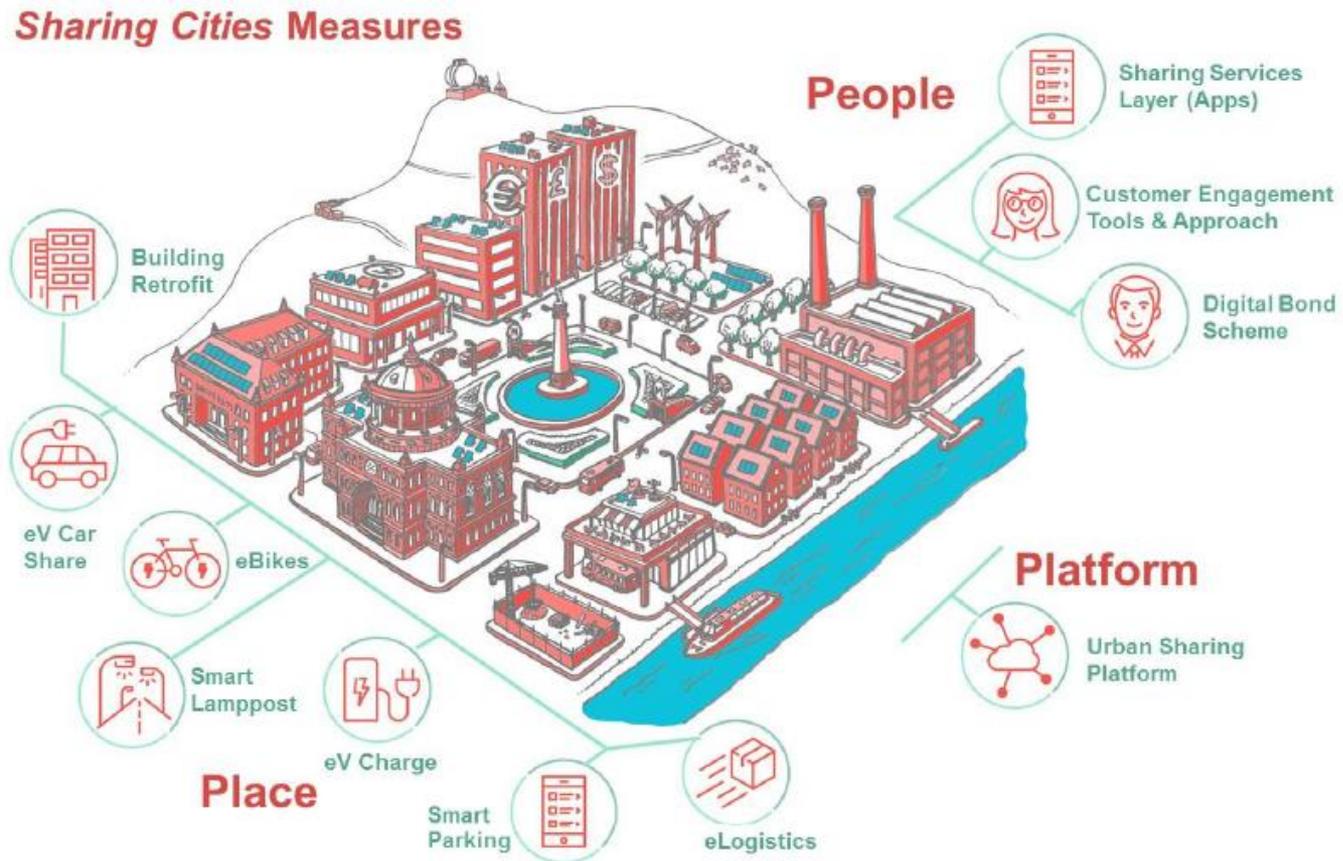


### Whats next...

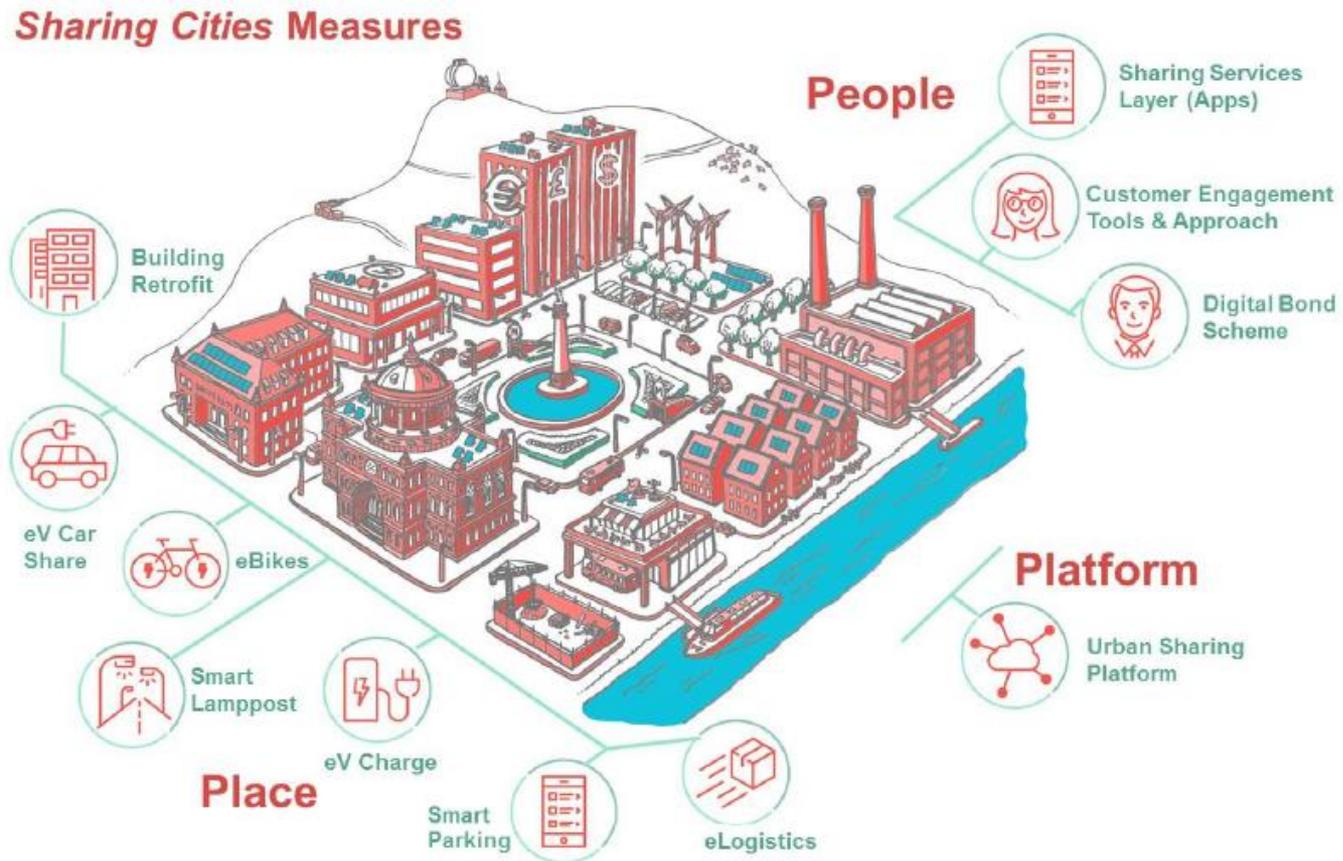
- Develop a logistics platform with 9 electric vans (with OBU) and 2 e-bikes (starting activity September 2017)
- Plan and co-design innovative logistics services (starting activity September 2017)
- Install 1 rapid charging point for logistics operations. (2018)



## Why are we doing this? Why should a city go for eMobility actions?

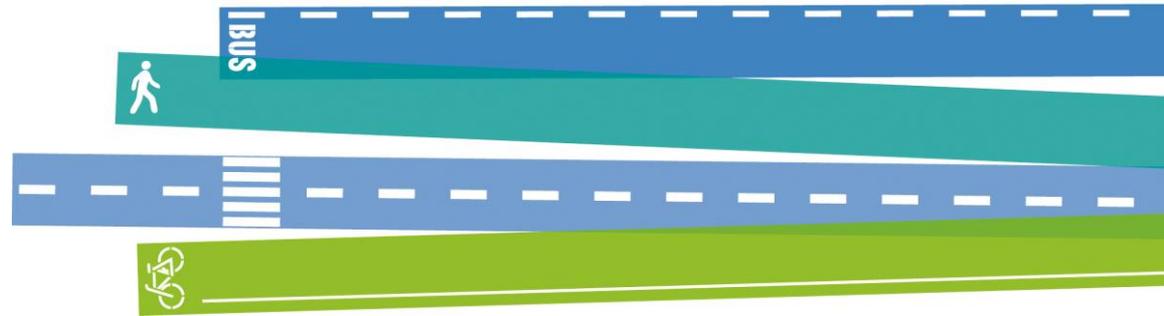


## Why are we doing this? Why should a city go for eMobility actions?



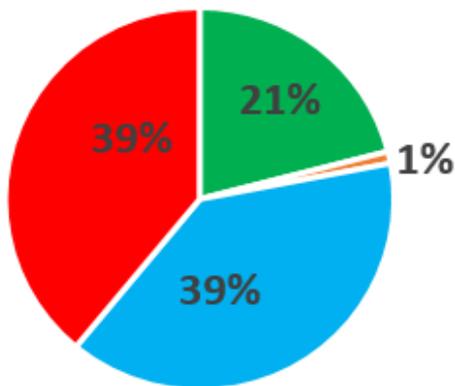
**It's technology supporting urban planning and management!**

**Example: the Lisbon experience...**



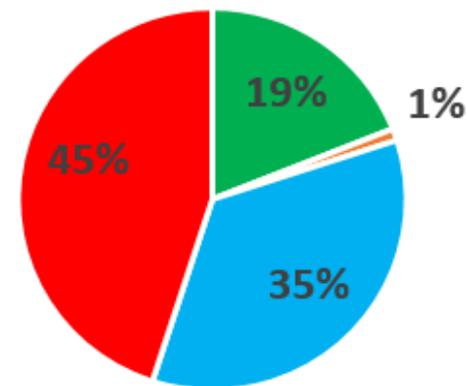
## Commuting trips starting and ending in Lisbon

Modal Split Lisbon  
(2001)



■ Walk ■ Bicycle + Moto ■ PT ■ Car

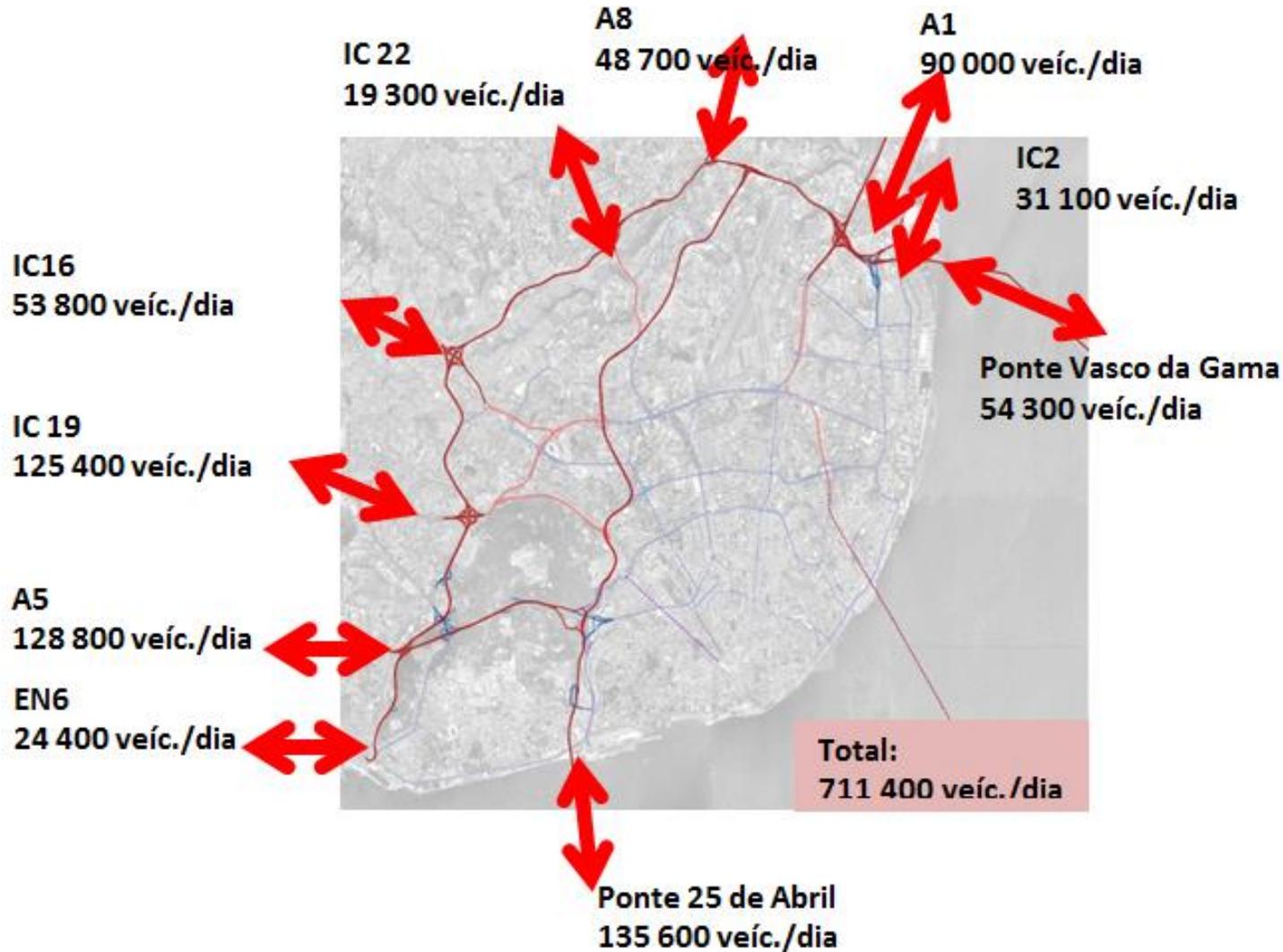
Modal Split Lisbon  
(2011)



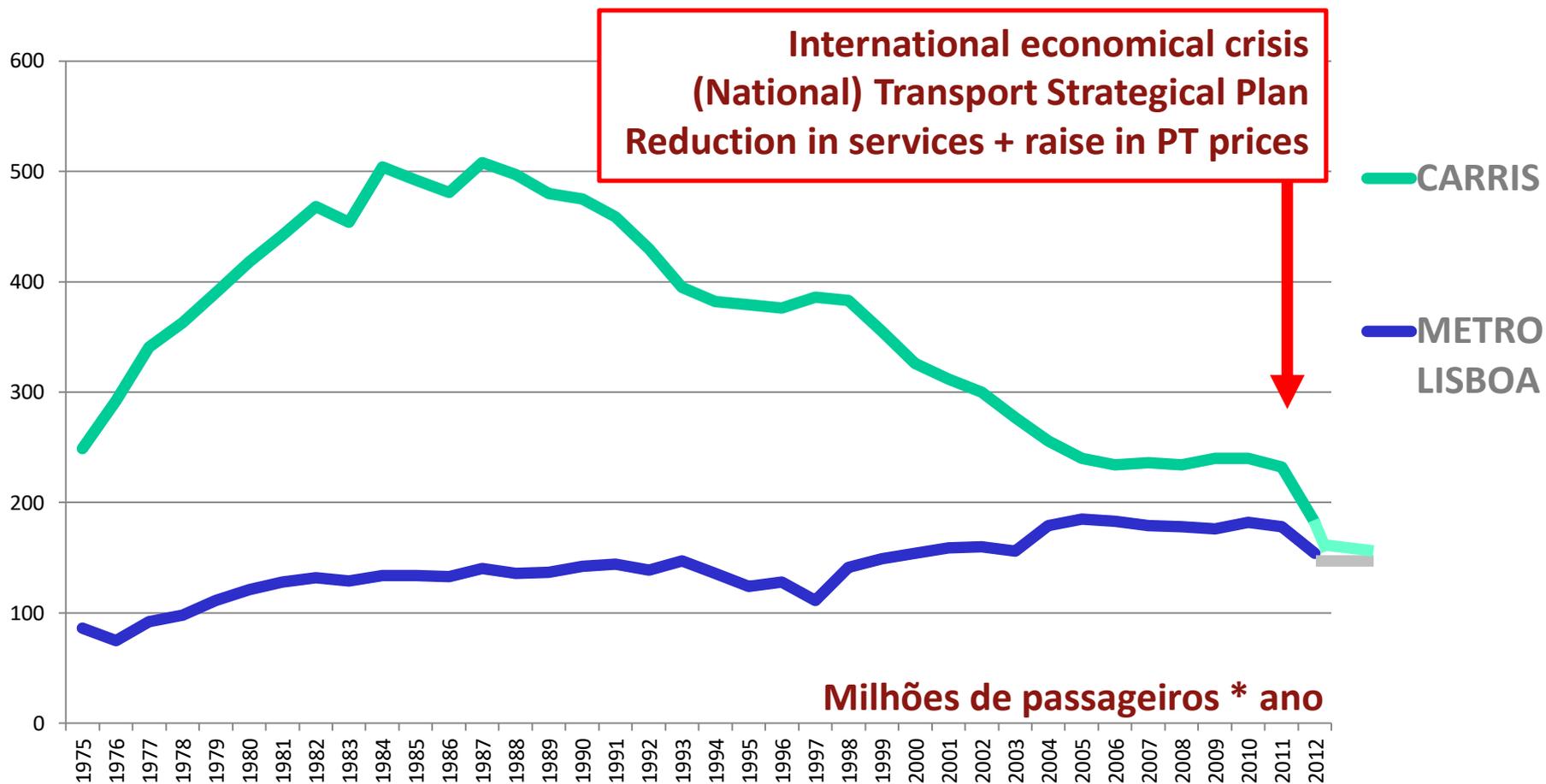
■ Walk ■ Bicycle + Moto ■ PT ■ Car

Commuting trips starting outside Lisbon and ending in Lisbon  
50% TP + 50% carro

Source: Census 2001 and Census 2011



Source: CML/TIS (2015)

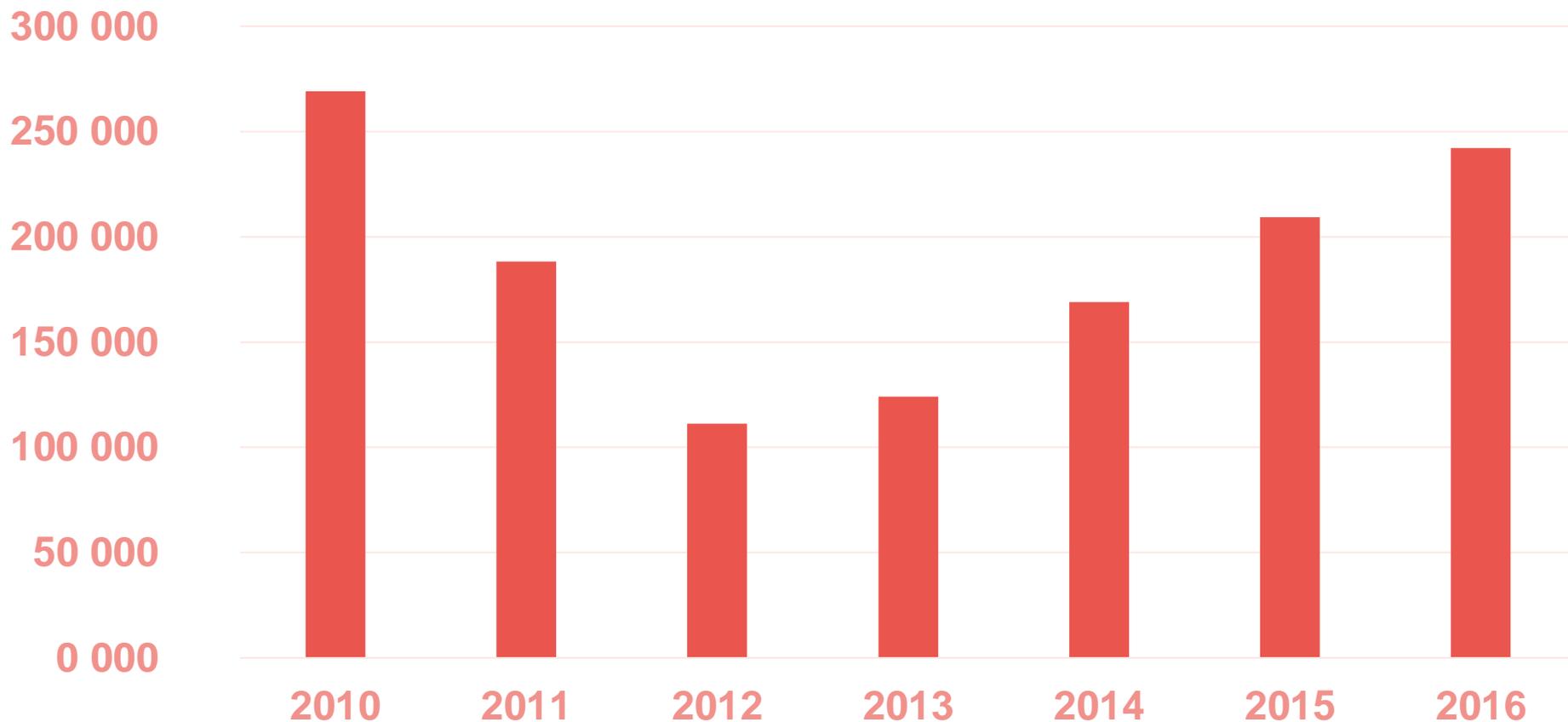


**Carris – 145 Million passengers (2015) Fonte: Carris**

**Metro – 139 Million passengers (2015) Fonte: Metro Lisboa**

**▲ 2014/2011 = - 21,4% Carris**  
**▲ 2014/2011 = - 21,6% Metro**

## Car sales Portugal



Source: ACAP



## Great mobility challenges in Lisboa

- Increase population
- Increase proximity – guarantee services in each neighbourhood
- Increase home-school connectivity
- Requalify public space and pedestrian network
- Employment near PT interfaces
- Redefine PT network and increase services
- Park&Ride
- Create a strong cycling network
- Promote sharing & incorporate smart phone services
- Integrate all networks and services
- ...

**S5 - Scholar**

**S4 - Turistic**

**S3 - Logistics**

**S2 - Sharing**

**S1 - Parking**

**N5 - Interfaces**

**N4 - Traffic**

**N3 - PT**

**N2 - Cycling**

**N1 - Pedestrian**



**S5 - Scholar**

**S4 - Turistic**

**S3 - Logistics**

**S2 - Sharing**

**S1 - Parking**

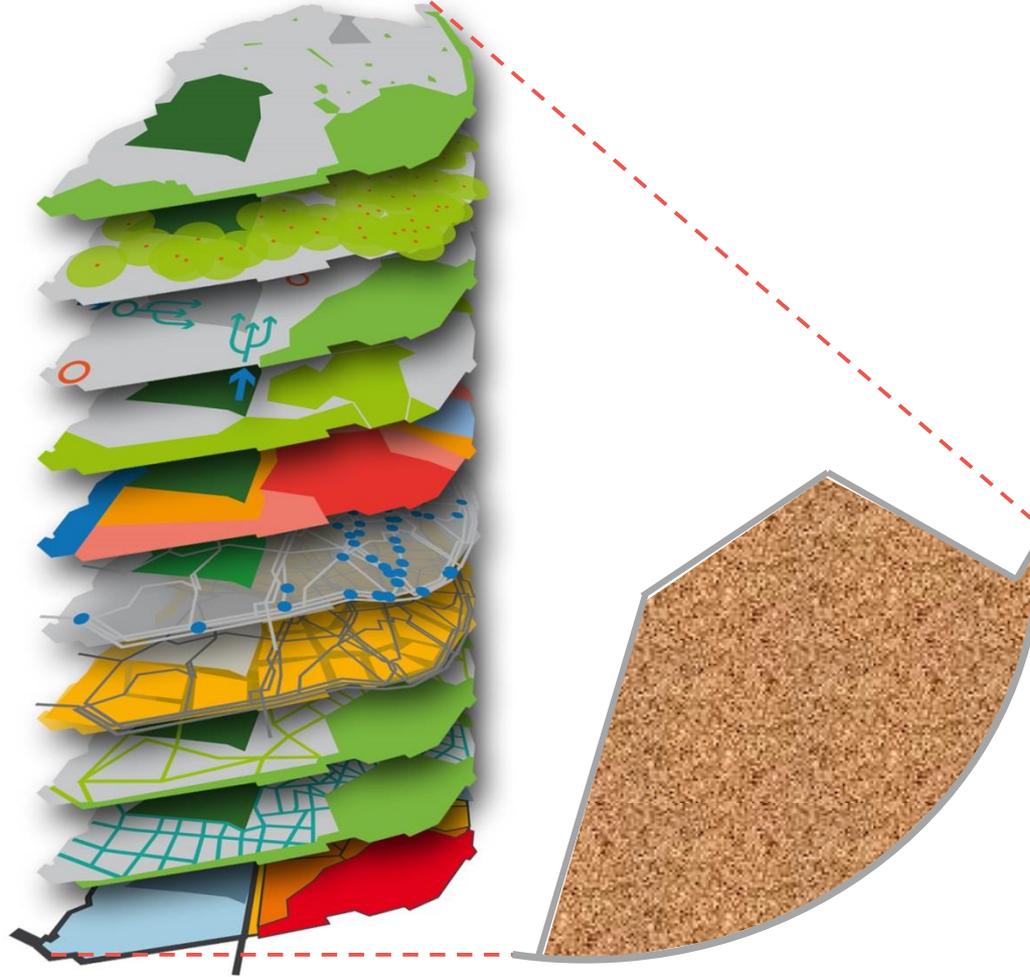
**N5 - Interfaces**

**N4 - Traffic**

**N3 - PT**

**N2 - Cycling**

**N1 - Pedestrian**



**E1 - Control and management**  
**E2 - Information, promotion, public participation**  
**E3 - Financing**  
**E4 - Regulation and Incentives**  
**E5 - Monitoring and Evaluation**

**S5 - Touristic**

**S4 - Complementary**

**S3 - Logistics**

**S2 - Sharing**

**S1 - Parking**

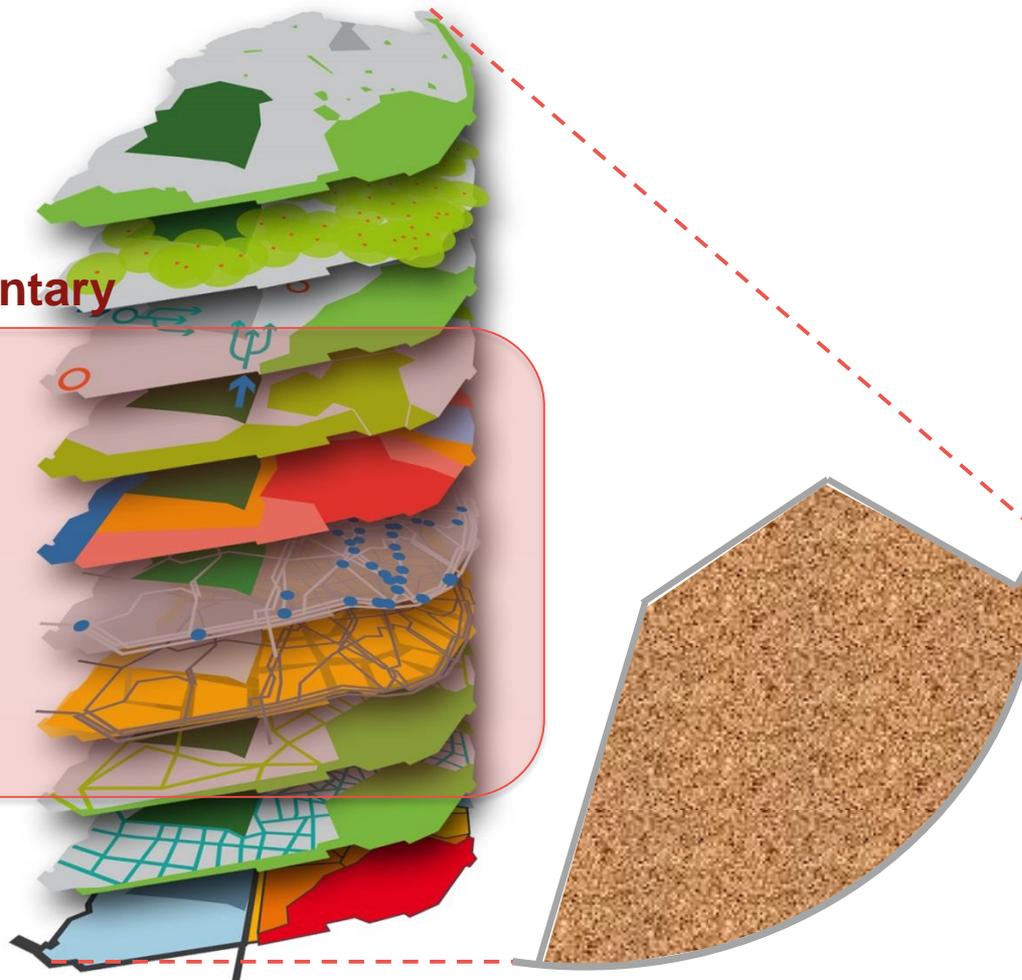
**N5 - Interfaces**

**N4 - Cycling**

**N3 -Traffic**

**N2 - PT**

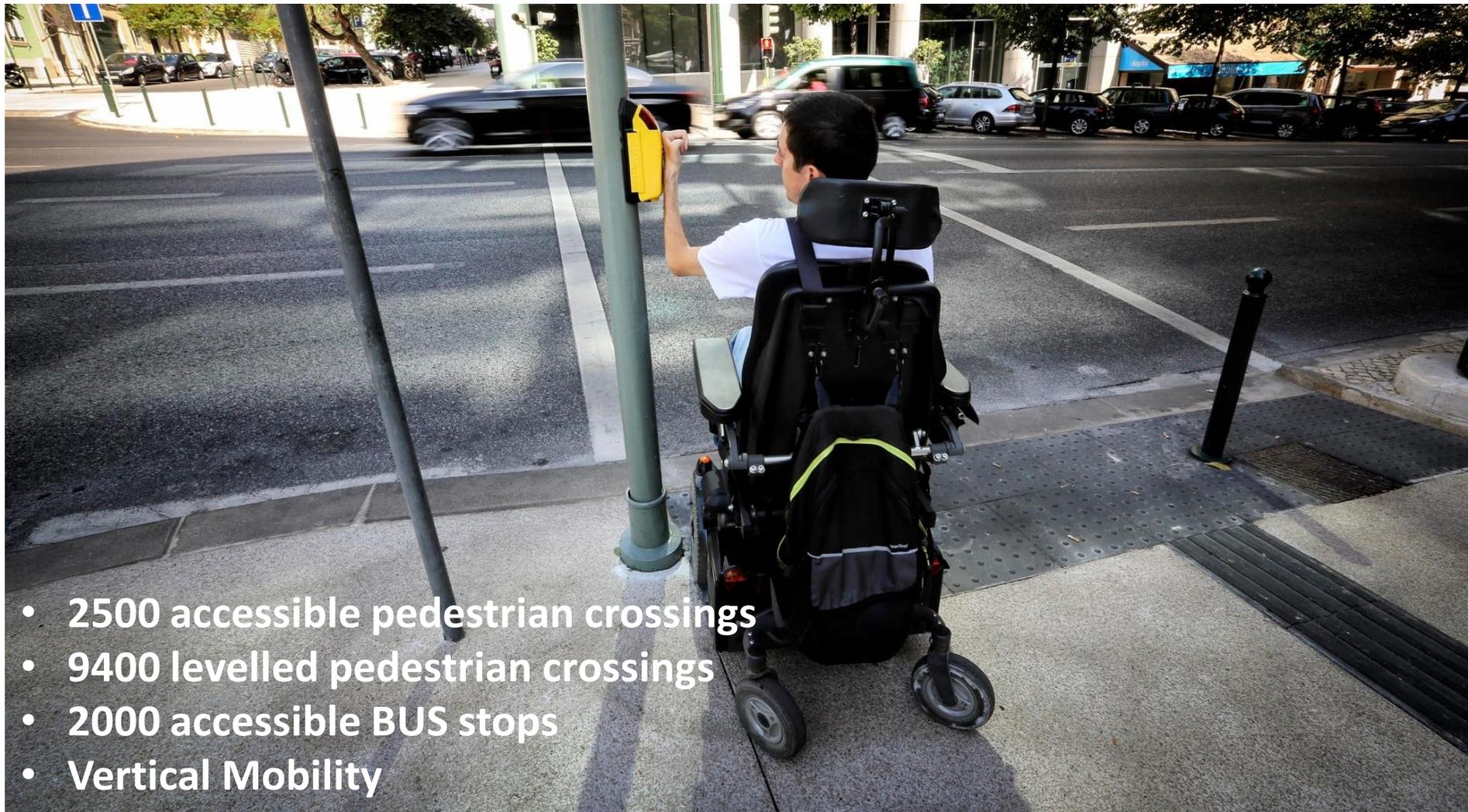
**N1 - Pedestrian**



**E1 - Control and management**  
**E2 - Information, promotion, public participation**  
**E3 - Financing**

**E4 - Regulation and Incentives**  
**E5 - Monitoring and Evaluation**

## N1 – Pedestrian Network



- 2500 accessible pedestrian crossings
- 9400 levelled pedestrian crossings
- 2000 accessible BUS stops
- Vertical Mobility

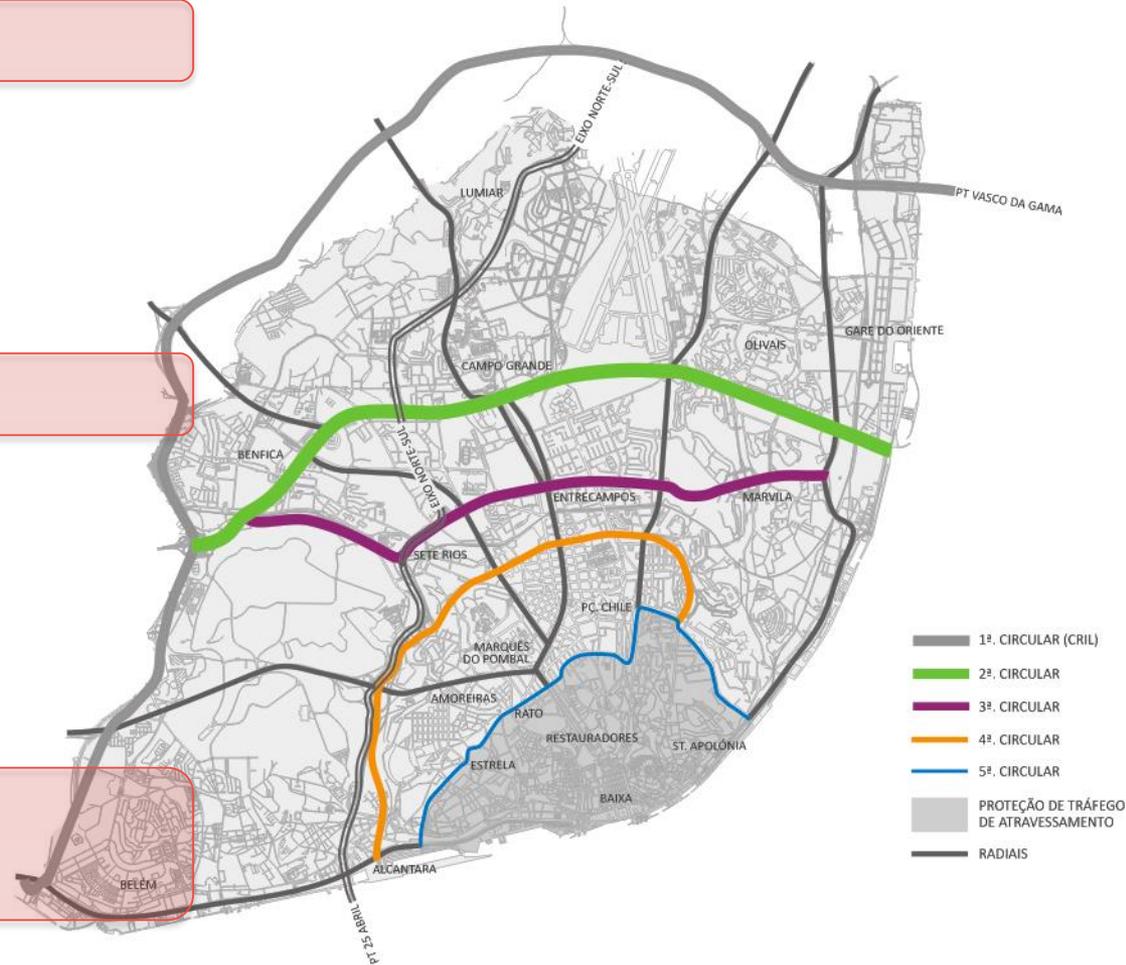
## N2 - PT Network

- **Municipal BUS control**
- **Increase quality of service**
- **Regain passengers**
- **60 millions CAPEX (3 years) + structural funds**
- **250 new buses (15 eBus)**
- **220 new drivers**
- **7 MetroBUS (BHLS) new lines**
- **21 neighbourhood lines**
- **Free of charge < 12 years old**
- **15€ > 65 years old**



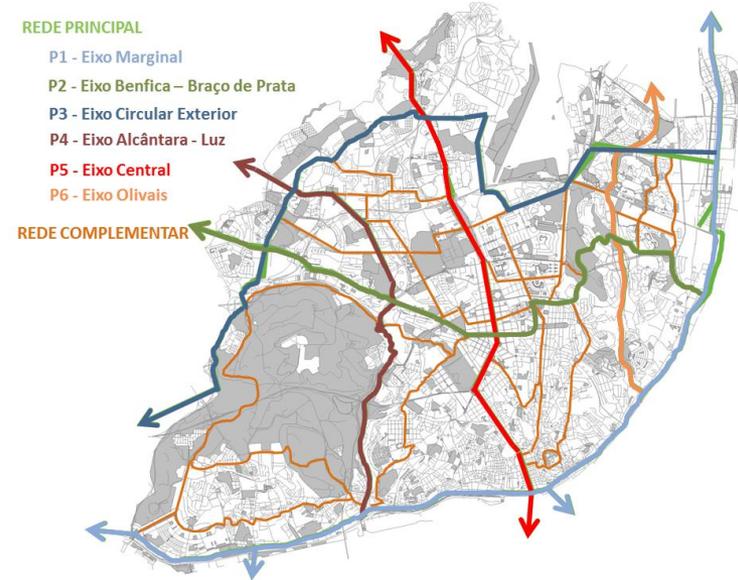
## N3 - Traffic Network

- LEZ
- CAZ
- 30Z
- Downtown protection
- Traffic calming
- Speed monitoring
- Camera monitoring
- Mental Map strategy
- Ring vs Radial
- Sign strategy
- Traffic light strategy
- EV market increase
- Environmental impacts
- ...



## N4 - Cycling Network

- 150 kms of bike paths
- 3 levels
- Different typologies
- Bike Parking (dif levels)
- Signing
- Image
- Promotion (EMW; ECC...)







## S1 - Parking Services

- New parking strategy – reach the entire city
- Residents vs commuters (regulation by price and stamps)
- Resident stamp, green stamp, low mobility stamp, logistic stamp
- APP ePark e Smart Parking
- SH vs SV
- Parking: eV (charging)
- Parking: private
- Parking: motorcycle
- Parking: bicycle
- Parking: touristic services
- Parking: L/U
- Parking: sharing services
- Parking: building (365 parks)
- Park&Ride (4455 spots)



## S2 – Sharing Services

- **Lisbon Bike-sharing**
  - 23 M€
  - 1410 bicycles
    - 940 eBikes
    - 470 standard
  - 140 Stations
  
- **eScooter Sharing**
- **Car Sharing (?)**
- **What else?**



## S3 – Logistic Services

- **Small regulation**
  - **Studies and proposals**
  - **EC Projects (FREVUE, DOROTHY, STRAIGHTSOL, SC...)**
  - **Stamps L/U**
  - **Smart parking**
- 
- **New strategy?**



## S4 – Complementary Services

- **Municipal transport scholar services - Alfacinhas**
- **Private transport scholar services**
- **Corporate/business transport services**
- **Neighbourhood Lx Door-to-Door**
- ...



## S5 – Touristic Services



**E1 – Control and management**

**E2 – Information, promotion, public participation**

**E3 – Financing**

**E4 – Regulation and Incentives**

**E5 – Monitoring and Evaluation**

Thank you!

[pedromachado@lisboaenova.org](mailto:pedromachado@lisboaenova.org)

