Rome

Local context

City size and context

Rome is the capital city of Italy, of the homonymous metropolitan city, and of the Lazio region. With 2,9 million residents, it is also the country's largest and most populated municipality and the fourth most populous city in the European Union by population within city limits. The municipality of Rome is composed of 15 boroughs, each of them with more than 100 thousand inhabitants, while its metropolitan area is composed of 120 municipalities, and counts 4,4 million of inhabitants, a greater number compared to other major European metropolitan areas.

Retail and professional activities characterize the city's economic sector.

KEY FIGURES

Population: 2,900,000 (city); 4,400,000 (metropolitan area)

Area: 1,285 km^2

Density: 2,256.8 people/km^2

NUTS level: NUT-3

TEN-T corridor(s): Rome is an urban node of the TEN-T Scandinavian-Mediterranean corridor.

USER-CHI role: demonstrator city

In Rome, the road network is typically radio-centric with a structure that still recalls the classic radial pattern that dates back to the times of ancient Rome: a set of roads which originally ensured the connection with every corner of the empire and that today constitute the backbone of the road network in Rome's metropolitan area.

Geography

The city is located in the central-western portion of the Italian peninsula, within the Lazio region, along the shores of Tiber river.

Vatican City is an independent country within the city boundaries of Rome, the only existing example of a country within a city: for this reason, Rome has been often defined as the capital of two states.

Rome is located along the Scandinavian-Mediterranean Corridor of the TEN-T network and represents an urban node of this corridor. Rome has been also granted financing as an urban node of the core network by the CEF facility. The location of the city and its role of capital would grant a very relevant impact in the deployment of the charging infrastructure in Italy.

Modal split

The available modal split data refers to the latest SUMP of Rome and is summarised in Figure . The weekday mobility of Rome's residents is equal to 6,1 million journeys. 59% of people use private vehicles - car and/or motorbike (3,75 million total trips)-, 1,3 millions of journeys -or 21.5% of the total- are made by public transport (also in combination with other means), 1.1 million (18%) are the estimated journeys on foot, and around 90,000 journeys are made by bicycle (1.4% of total trips).

As for journey reason, Figure2 shows that more than a third of the trips made (37%) are unsystematic, 21% are systematic (regardless of frequency), the remaining part constitutes the journey back home.

Finally, Figure 33 shows that 55% of the trips are short in duration (less than 30 min.); the two morning peak hours (7.30-9.30) count for almost 20% of the mobility generated during the whole day.

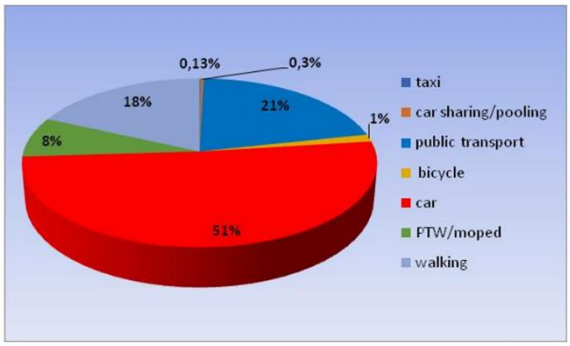

FIGURE 1: MODAL SPLIT (DAILY TRIPS). SOURCE: PUMS DI ROMA

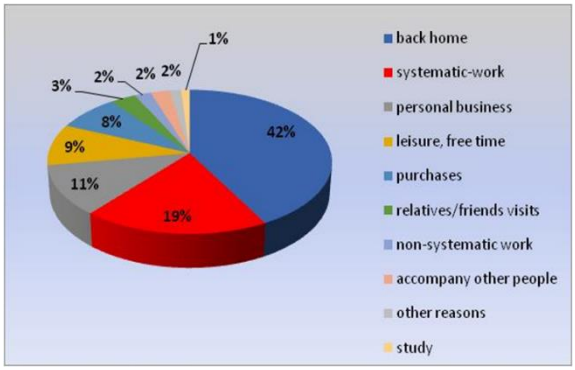

FIGURE2: MOTIVE OF THE JOURNEY. SOURCE: PUMS DI ROMA

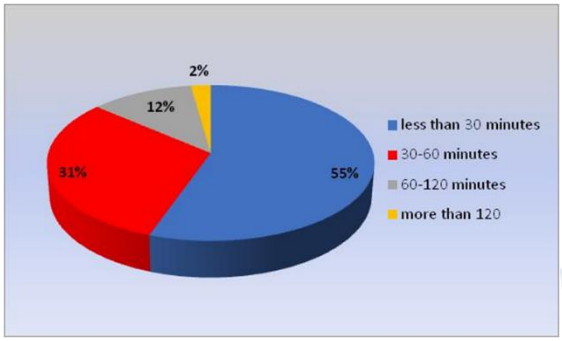

FIGURE 1: DURATION OF THE JOURNEY. SOURCE: PUMS DI ROMA

Electric vehicles

Rome counts 1,7 million cars, with a motorisation rate of 616 cars for every thousand inhabitants; motorcycles (mopeds excluded) are 388 thousand, 136 for every thousand inhabitants (source: ACI – 2018).

TABLE 1: REGISTERED VEHICLES IN ROME (2018). SOURCE: ACI

	Total	Light Electric Vehicles (LEVs)PTWs	Light Electric vehicles (LDV) three wheelers and quadricycles	Light duty vehicles (LDV) Cars	Heavy duty vehicles (HDVs) Freight fleet	Heavy duty vehicles (HDVs) Buses	Heavy duty vehicles (HDVs) Other vehicles
BEVs	2,684	383	744	1,125	338	81	13
PHEVs	23,813	18	1	23,752	41		1

Charge point characteristics

1.1.1. Payment options

Enel X

Enel X Mobility acts as CPO and enters into interoperability agreements with companies acting as MS that offer charging services to final customers.

Enel X Italia S.r.l., part of Enel Group, is one of these MSPs, which provides charging services on Enel X Mobility infrastructure and on infrastructure owned and/or managed by third parties (through interoperability agreements) on the basis of a formal signed contract. As MSP, Enel X Italia S.r.l. is completely neutral in terms of interoperability protocol supported.

Enel X Italia S.r.l. offers charging services, including booking options, through Enel X JuicePass App/card; its market mission is to guarantee a seamless charging experience to every EV users, with no limits in terms of technology and geography. Depending on the customer segmentation, JuicePass offers different tariffs:

A. "Privato" profile (Business To Consumer). Users can set up one out of the following fees:
   i. Flat Large, monthly fee. 120kWh per month at 45€ VAT Included. "Pay per Use" fare for any additional kWh used.
   ii. Flat Small, monthly fee. 60kWh per month at 25€ VAT Included. "Pay per Use" fare for any additional kWh used.
   iii. Premium Pay per Use fee. 0.45€/kWh for charging session on slow and quick (up to 43 kW) stations and 0.50€/kWh on fast stations (up to 350 kW). This fare includes the reservation service at 25€/year VAT Included.

iv. Pay per Use fee. 0.45€/kWh for charging session on slow and quick stations and 0.50€/kWh on fast stations.

B. "Corporate" profile (Business To Business). Companies can set up a public and private charging service at their own employees' disposal at the commercial fare selected during the order (PayPerUse/Small/Medium/Large).
Service fee is 20€ "una tantum", VAT included, and allows the access to the JuiceNet Manager in order to enable RFID cards and "Corporate" profiles for the Public/Private Charging and permit the Private Charging sessions monitoring. Fees settled for this offer are:

i. Pay per Use fee. 0.45€/kWh for charging session on slow and quick pole stations and 0.50€/kWh on fast pole stations. No additional fare for private charging session.

ii. Flat Small fee. 80kWh per month at 32€ VAT Included. "Pay per Use" fare for any additional kWh used. Public plug's reservation included.

iii. Flat Medium fee. 150kWh per month at 56€ VAT Included. "Pay per Use" fare for any additional kWh used. Public plug's reservation included.

iv. Flat Large fee. 500kWh per month at 175€ VAT Included. "Pay per Use" fare for any additional kWh used. Public plug's reservation included.

C. "Corporate" profile (Business To Government). Public Administrations can buy through MEPA[1] two main public fares including the following services:

i. All Inclusive Fare. 1,550/2,250/3,000/7,500/11,250/15,000 kWh per year with 3 or 5 RFID Cards and the access to the JuiceNet Manager in order to enable RFID cards and "Corporate" profiles for the Public Charging and allow the Private charging sessions monitoring. Public plug's reservation included.

ii. Standard Fare. 1,550/2,250/3,000/7,500/11,250/15,000 kWh per year and the access to the JuiceNet Manager in order to enable RFID cards and "Corporate" profiles for the Public Charging and allow the Private charging sessions monitoring. Public plug's reservation included.

D. "Automotive" profile (Business To Business To Consumer). The offer is based on the agreement signed with automotive companies and usually includes, for each end user, domestic charging infrastructure (turn-key solution) and a coupon of kWh for the public charging sessions.

E. "Special" profile. Offering is based on a special framework agreement with a partner and includes a dedicated fare that allows the end user to run-up the charging session to the public network including dedicated infrastructures.

Be Charge

Be Charge is both a CPO and MSP. The Be Charge recharging service does not include any activation cost and foresees two different pricing plans:

A. Flat: with a single and fixed monthly fee until the kW / h month threshold is

[1]Mercato Elettronico per la Pubblica Amministrazione; a program for the rationalization of public spending of the Public Administration

exhausted, on all types of power supplies. In particular:

i. BE SUPER 100: 38.00 euros per month per 100 kWh

ii. BE HAPPY 50: 21 euros per month for 50 kWh

B. Consumer rate: with a single cost per kWh based on the energy supplied, equal to 0.45 euros per kWh with VAT included.

Total RES supplied

Enel X declares that 100% of its purchased energy comes from renewable sources (certified by the energy vendor).

Electromobility strategies and initiatives

State of play

At present, 257 charging systems have been installed throughout Rome. 122 of them were installed before the approval of the Electric Mobility Plan in 2018 (see below), including:

- 105 POLE type (22 KW AC) for vehicles charging
- 4 FAST type (50KW DC) for fast vehicles charging
- 12 for motorcycles charging
- 1 for van sharing charging

135 charging points have been implemented since the approval of the Electric Mobility Plan, divided as follows:

- 124 POLE type (22 KW AC) for vehicle charging
- 11 FAST type (50KW DC) for fast vehicle charging

These recharging systems are currently located in 12 boroughs out of the 15 that compose Rome's municipality, as summarised in Table2 here below.

TABLE 2: DISTRIBUTION OF CHARGING POINTS IN ROME'S BOROUGHS. SOURCE: ROMA MOBILITÁ

Context	Type	B. 1	B. 2	B. 3	B. 4	B. 5	B. 7	B. 8	B. 9	B. 10	B. 11	B. 13	B. 15
Pre-Plan	POLE	42	29	2			9	10	12		2	6	2
	FAST								4				
Plan	POLE	9	3		4	6	25	10	45	22	4		
	FAST	2			1		3		5				
Total		**53**	**32**	**2**	**5**	**6**	**37**	**20**	**66**	**22**	**6**	**6**	**2**
%		**21%**	**12%**	**12%**	**2%**	**2%**	**14%**	**8%**	**26%**	**9%**	**2%**	**2%**	**1%**

The location of these charging systems can also be described in relation to the six areas indicated by the General Urban Traffic Plan (PGTU), as shown in Table 3.

TABLE 3: DISTRIBUTION OF CHARGING POINTS IN PGTU AREAS. SOURCE: ROMA MOBILITÁ

Context	Type	Zone 1 Mura Aureliane	Zone 2 Anello Ferroviario	Zone 3 Fascia Verde	Zone 4 GRA	Zone 5 Extra GRA	Zone 6 Cittá verso il mare
Pre-Plan	Pole	32	43	21	16	2	4
	Fast				4		
Plan	Pole	9	7	24	57	9	18
	Fast	2	1	2	5	1	
Total		**43**	**51**	**47**	**82**	**12**	**22**
%		**17%**	**20%**	**18%**	**32%**	**5%**	**9%**

From the information provided directly by Enel X, a vehicle takes 2 hours as the minimum charging time. There is no substantial difference in charging duration between daytime or night-time.

From the half-yearly reports of Enel X, the average power for each recharge is equal to 8.3 KW taking for example a typical month.

Supporting policies for zero emission vehicles

Piano capitolino della mobilitá elettrica

Rome approved in 2018 the Electric Mobility Plan for the city (Piano capitolino della mobilitá elettrica)[2], which defines the rules for the instalment of charging points in public areas. The plan identifies 320 areas where each supplier can propose a project for an ECP of 22 kW. For the ECP of more than 50 kW, it is possible to propose a site along the main road network of the city.

The Electric Mobility Plan addresses the charging point need in the public areas and supports the private investments in the sector defining the rules, including technical and administrative regulations that include:

- How to submit applications.
- The technical specifications of charging points.
- Road signs of the parking lots.
- Technical requirements.
- Obligation and penalty.

The plan further identifies:

- A high-power charging point network (50 kW) along the main roads
- A set of medium power charging

2 https://romamobilita.it/sites/default/files/PIANO%20MOB%20ELETTRICA%20ver%2023%20giugno%202017%20delibera.pdf

points (22 kW). The planning of these points is based on the most popular destinations in town. The plan defines 320 areas in the municipality of Rome where is possible to submit proposals to install electric charging points.

It is also included an action plan to support the private investments in:

- Freight vehicles
- Taxi
- Fuel distributors
- Parking lots and garages
- Private buildings

The high-power charging network will be realized along the main roads and in 2 rings:

- GRA (Outer highway ring) to intercept the traffic flow towards the city centre and the main tangential traffic flows
- Aurelian walls (Inner ring), with a network for the inner flows of the city

Limited traffic zone

In Rome there is a limited traffic zone (LTZ) covering an area of 5.5 km^2. To foster the use of electromobility, electric vehicles can enter this area free of charge. Dedicated parking slots are reserved to electric vehicles through specific horizontal and vertical signals.

Regional and national frameworks

The PNIRE -*Piano nazionale infrastrutturale per la ricarica dei veicoli alimentati a energia elettrica*– (E-vehicles charging infrastructure National plan), released in June 2016, defines the development strategic lines according to the European Directive 2014/94/EU.

The Electric Mobility Plan of Rome is planned according to these strategic lines and in accordance with the General Urban Traffic Plan (PGTU) of the city.

Deployment approaches

For the municipality of Rome, the private companies are best placed to develop the electromobility network.

The Rome Capital administration with Official Resolution 48/2018 approved the electric mobility plan and the regulation to promote the installation of electric vehicle charging systems on public land.

Good practices

Electric mobility plan

As explained above, the Rome electric mobility plan defines the areas in which companies offering electric charging systems will be able to request them.

The number of target charging points was calibrated on a forecast study on number of electric vehicles on the road. Consequently, areas with a radius of 300 m have been defined so as to cover all the territorial portions of the municipality of Rome which have a density of employees greater than 100 employees per hectare. The number of employees is an indicator of the area's ability to attract mobility. As the need for recharging occurs mainly at the journey destination, the number of employees seemed therefore the correct indicator to represent the need for charging points.

The plants can be offered in lots of 40 units, of which at least 20% must be high power (50 kW or higher).

The regulation defines:

- the rules for installing systems in terms of technology and location.
- the criteria for a correct distribution in the territory of Rome according to the constraints of the specific plan for electric mobility.
- management and penalties constraints.

Citizens consultation through web portal

Rome has set-up a web portal to better meet the electromobility offer with its demand. 1,150 users have indicated, at present, their desired electric charging point localisation through the web portal**.** 46% of the respondents are electric car owners, 56% are potential users.

This users' sample could be addressed in the future to carry out a survey that further investigates the services desired by final users[3].

Challenges and barriers

The main challenge that Rome must tackle is to guide its own citizens towards more sustainable mobility, strengthening electric mobility, also through incentives. The main barriers to the full take-up of electromobility in the city are the purchase costs of the electric car. The city also faces the challenge of tackling illegal parking of non-electric cars in spots reserved to electric vehicles or charging point areas.

Learning needs

Rome has not identified at this stage specific learning needs. Those will be further defined based on the complete overview of the USER-CHI solutions. This paragraph will be updated accordingly.

USER-CHI solutions

In Rome, seven USER-CHI products will be demonstrated. The USER-CHI products demonstrated in Rome are the following:

- **CLICK- Charging location and holistic planning kit**: An online tool for the location planning of new charging infrastructure in cities and TEN-T corridors.
- **Stations of the future handbook**: Guidelines and recommendations to design the perfect user-centric charging station of the future.
- **eMoBest – e-Mobility replication and best practice cluster**: A collaboration platform to facilitate the transfer of best practices among the demonstration and replication cities.
- **INFRA – Interoperability framework**: A package of rules, guidelines and recommendations

3 https://romamobilita.it/it/azienda/contatti/comunicazione-clienti

that will support highly interoperable processes among the electromobility stakeholders.

- **INCAR – Interoperability, charging and parking platform**: A platform providing roaming and barrier-free access to EV charging points and offering related innovative integrated services for the EV drivers.
- **SMAC – Smart Charging tool:** A tool providing smart grid integration and demand management services for slow, medium, fast and ultrafast charging.
- **INSOC – Integrated solar DC charging for Light Electric Vehicles (LEVs):** A solution combining charging, onsite production of renewable energy and theft-proof parking for Light Electric Vehicles.

At this stage, 2 main areas of intervention have been identified in Rome as USER-CHI demonstration city:

Demo site solution 1: EUR piazzale dell'industria

The EUR borough, with its rationalist architecture, is included in the historic city perimeter and it has been chosen to host the Formula E Grand Prix since 2018. For Rome, this combination is the basis for a new vision of electric mobility: modern, smart and sporty, but with zero impact. To date, Enel X has implemented numerous charging points in the district, both 22 kW and 50 kW. For the 2020 edition of the Formula E Grand Prix, Enel X proposed the installation of a high-power charger (HPC) for public charging that could also be used during the aforementioned event by its participants and organisers. The COVID-19 crisis halted the plans which are currently in stand-by.

Stakeholders involved

Roma Mobilitá, Enel X as technical partner.

Objectives

Due to the strategic nature of the place, it has been proposed the construction of a hub on this site, at short distance from other charging stations already installed by Enel X.

The Piazzale dell' Industria site is optimal to test the multisource charging and some user centric solutions, because:

- 2 Enel X electric recharging stations already exist and by placing the high-power column next to the two existing ones, it would be possible to create a hub
- The large spaces allow the creation of a dedicated bike sharing station: Piazzale dell' Industria is close to the Via Tre Fontane-Laurentina-Colombo cycle path, ideal for a connection with the city centre
- Adjacent to the site there is a gym and some accommodation facilities with whom it would be possible to subscribe an agreement to test services for the person (smart working, fitness)
- The station is easily accessible from the Colombo, Ostiense, Pontina, Laurentina and Autostrada A12/Aeroporto access roads

- The site is very well served by the local public transport (metro and bus)
- Important commercial activities/restaurants nearby exist
- It would be possible to evaluate whether to create a photovoltaic roof and a storage of exhausted batteries in the Luneur area

Timing

With the current COVID-19 crisis there is no clarity about when the hub can be deployed, hence there is no fixed date for starting the testing.

Demo site solution 2: CORSO FRANCIA

An area owned by Enel X is proposed to test this solution. The area is less connected to the mobility systems and interest points as described in the demo site solution 1, even though it is quite close to the Auditorium Parco della Musica.

The site offers the opportunity to users of the northern basin of the city to test electromobility opportunities. Charging points will be installed here, next to an Enel X shop, it has been hypothesized to experiment mainly with Vehicle to Grid charging.

Objectives

Test Vehicle-to-Grid solutions providing added-value services to the grid. EV users may benefit from advantageous pricing schemes if they accept to use their EV(s) as power sources too. In this area a multi-source charging hub will be tested with the aim of testing the vehicle to grid.

Stakeholders involved

Roma Mobilitá, Enel X as technical partner.

Timing

With the current COVID-19 crisis there is no clarity of when the hub can be deployed, hence there is no fixed date for starting the testing.