InnoBuyer

FAST TRACK TO INNOVATION PROCUREMENT

MOTINN

CITY COUNCIL OF LAS ROZAS DE MADRID

MOTINN

PITCH

Madrid Technological West innovative mobility procurement for deploying a charging points network for electric bikes and scooters, in green and natural areas of the city to develop a new mobility model and incorporate new means of urban mobility, based on an accessible, efficient and low environmental impact solution without connection to the conventional power grid.

ORGANISATION DESCRIPTION

The City Council of Las Rozas de Madrid is the public entity responsible for the government and administration of the city. One of the main challenges facing the council is the digital transformation of the city and the definition of a new mobility model.

Las Rozas is the third largest municipality in the Madrid Region (95000 inhabitants) and presents a discontinuous and heterogeneous urban structure. Part of its municipal area is located within the regional park of the Cuenca Alta del Manzanares, the largest protected natural area in the Madrid Region and one of the most ecological and landscape value.

FIGURE 1 LAS ROZAS IN NUMBERS

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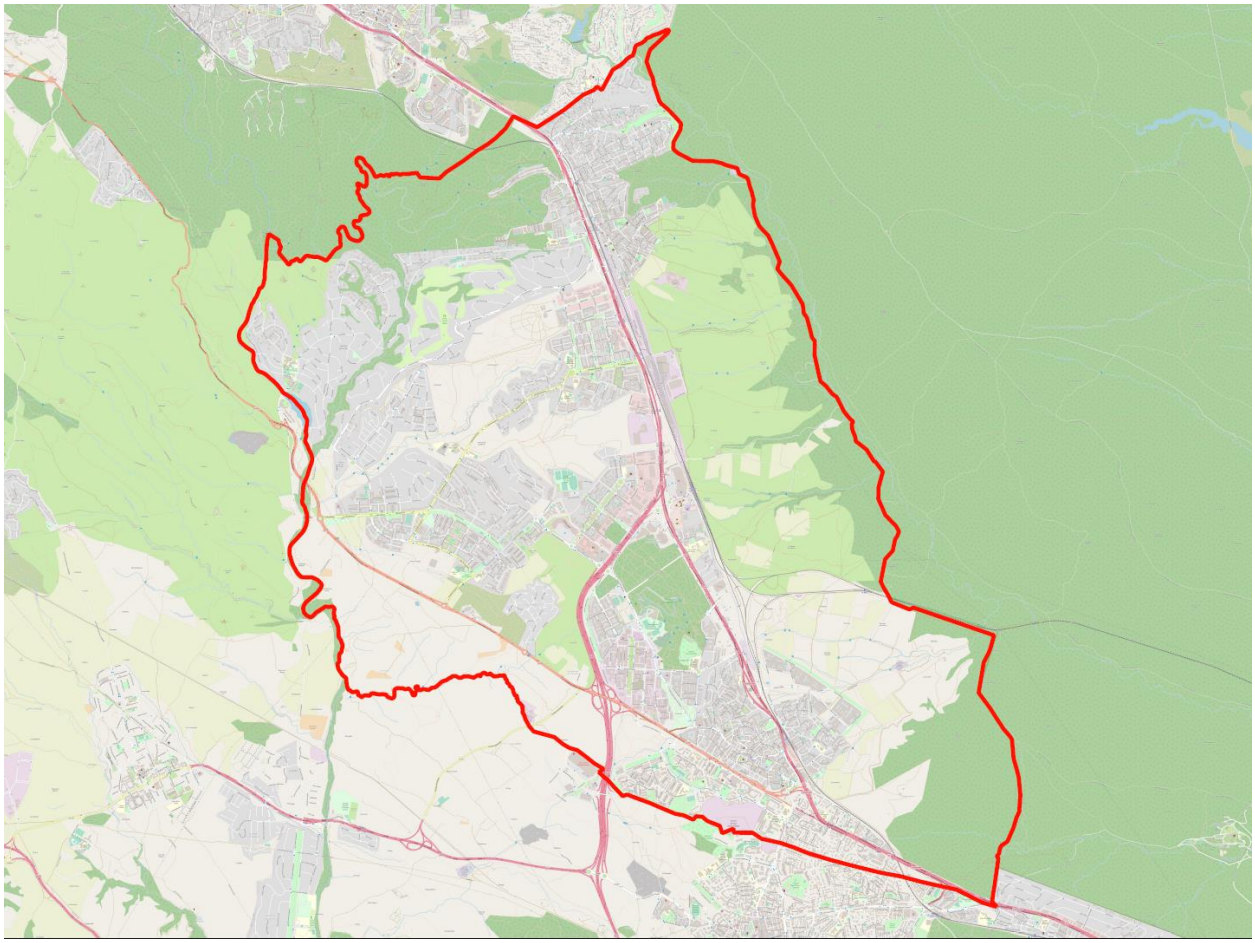
FIGURE 2 LAS ROZAS MUNICIPALITY



Las Rozas participates on the MOT project (*Madrid Oeste Tecnológico*/Madrid Technological West), a collaborative project between four municipalities (Las Rozas, Majadahonda, Pozuelo de Alarcón and Boadilla del Monte) which purpose is to promote digital transformation and the creation of a Smart Metropolitan Area, improving mobility between the four cities through a transport network for personal mobility vehicles that communicates them through *Arco Verde* regional green area.

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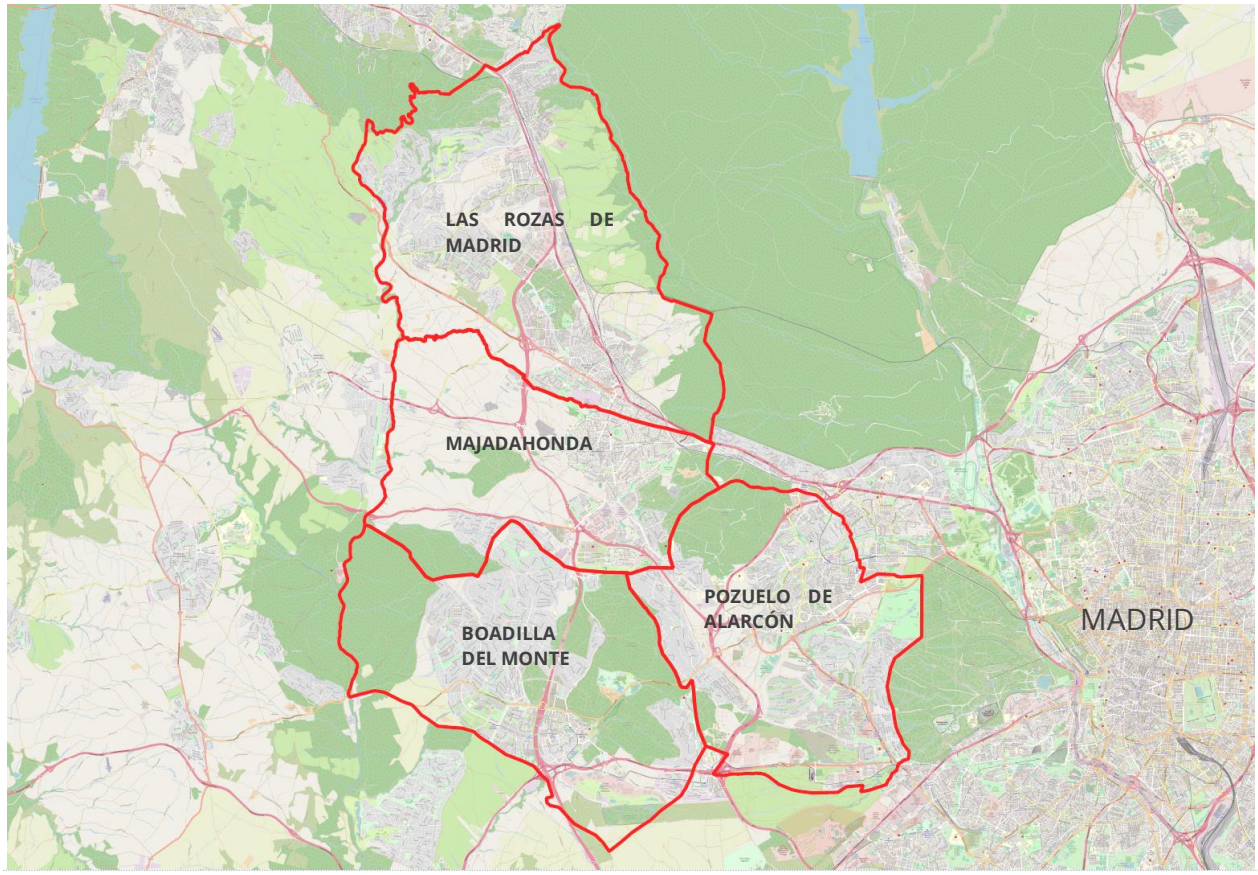
FIGURE 3 MADRID OESTE TECNOLÓGICO



CHALLENGE DESCRIPTION

The size of the municipality, its urban dispersion, the increase in population that has occurred in recent years and the existence of an important business network make Las Rozas an important focus for generating and receiving trips both within and outside the municipality. This, together with the environmental problems generated in recent years in the municipalities due to the excessive use of polluting vehicles, makes sustainable urban mobility a strategic point for Las Rozas to improve the quality of life of citizens and visitors.

To improve this situation, Las Rozas City Council, as part of its strategy, wants to develop a new mobility model to incorporate new means of urban mobility. This strategy is described in the city Sustainable Urban Mobility Plan (PMUS)1.

To reach this goal some actions are considered necessary:

[1] https://www.lasrozas.es/smart-city/pmus

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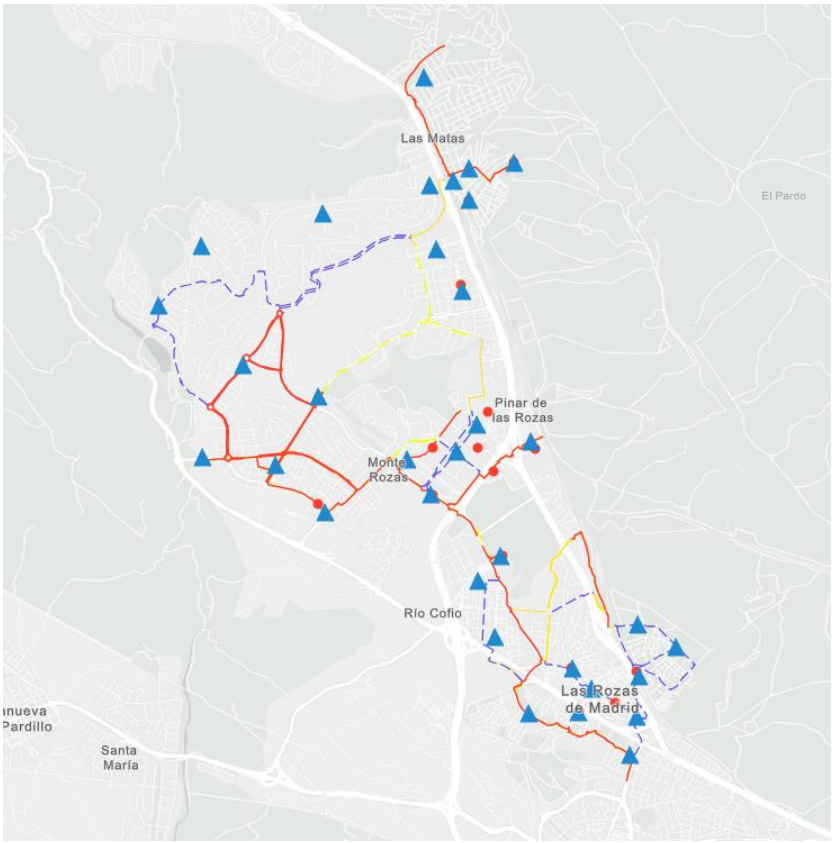
- Deploy a network of bike lanes and for personal mobility vehicles. Currently Las Rozas has more than 35 km of cycle lanes.
- Deploy parking spaces for personal mobility vehicles strategically located in areas with high demand for short trips. Currently Las Rozas has more than 500 bicycle parking spaces.
- Complement this network with a network of charging points for electric bicycles and scooters that allows faster and longer distance travels.

FIGURE 4 BIKE LANES AND PARKING SPACES



In addition, another objective is to develop, together with the MOT municipalities, a new transport network for personal mobility vehicles that runs through the *Arco Verde*, which is a green infrastructure of Madrid Region to improve, preserve and protect the regional biodiversity.

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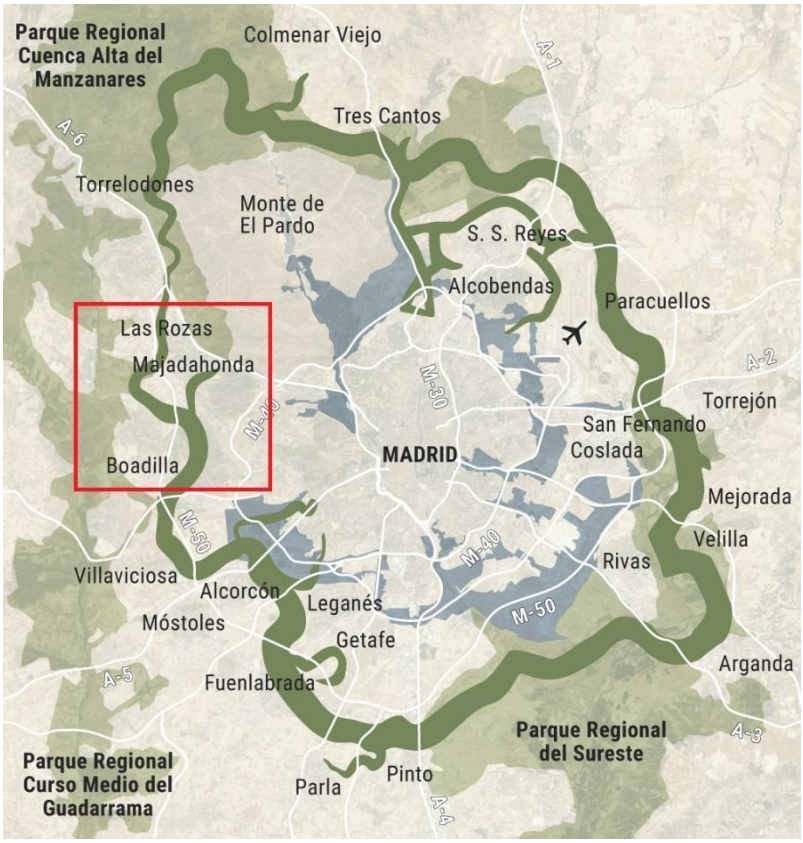
FIGURE 5 ARCO VERDE, MADRID AUTONOMOUS REGION



In order to meet these objectives and promote the use of low and medium-speed transport for short trips, such as electric bicycles or scooters, the challenge is to deploy a network of chargers in different urban areas (green areas, libraries, next to bike lanes, sports centers…), blending in with their surroundings, with low visual and environmental impact, accessible and easy to install and maintain.

Currently, Las Rozas City Council through the municipal innovation company, Las Rozas Innova, is subsidizing the purchase of electric bicycles and scooters.

CHALLENGE MAIN OBJECTIVES

The main objective is to change the mobility habits of citizens through the widespread adoption of low and medium-speed transport for short trips, such as electric bicycles or scooters. To achieve this it is necessary to deploy a network of chargers for personal mobility vehicles that promotes the use of these vehicles for daily commuting within the municipality

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(public transport stops, leisure areas, work, sports areas, schools, universities...) and towards the bordering municipalities through the *Arco Verde* park.

Another objective is to improve the quality of life for people with disabilities and widespread adoption of this medium-speed transport for this group as well.

SOLUTION FUNCTIONAL REQUIREMENTS

The solution, from a design point of view, should be blended into the different environments (natural environment, remote green areas, even places with narrow sidewalks in the historic city centre), with the minimal visual and environmental impact, especially in green and natural areas, as well as complementing the urban landscape. In addition, the solution should take into account that since the infrastructure will be located on public places and without surveillance, it should have anti-vandalism systems, such as resistant materials and remote monitoring that automatically detect damage in the charging point and finally it should provide a secure parking system compatible with different types of personal mobility vehicles. The possible development of a modular solution would facilitate for each installation to be configured with the elements and charging units required at each charging point.

On the other hand, the design and implementation of the solution will be carried out according to "Universal Design" and "Technology for All" criteria. In terms of physical accessibility to the chargers, avoiding obstacles as well as accessibility to the interfaces of the chargers and App.

Regarding the technology, the solution should provide a mobile App that includes the main user functionalities such as user registration, status and location of charging points and parking opening system. Another important feature is a management platform to configure, monitor and manage the charging stations. Finally, the solution should integrate a communications system that allows remote monitoring, configuration and management of each charging point.

The table below summarizes the functional requirements of the solution.

Glossary:

- D1: Unique code that identifies the functional requirement.
- TYPE: What aspect does the functional requirement refer to (e.g.: design, software...).
- PRIO: If it refers to a Compulsory or Desirable functional requirement.
    - 1: Compulsory functional requirement.
    - 2: Desirable functional requirement.
- NAME: The name given to the specific functional requirement.
- DESCRIPTION: Short description of the functional requirement.

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TABLE 1 SUMMARY OF REQUIREMENTS

CODE	TYPE	PRIO	NAME	DESCRIPTION
D1	Design	1	Minimal visual impact	Charging points should blend into the different environments described in this document above (natural environment, remote green areas, even places with narrow sidewalks in the historic city centre), with the minimal visual and environmental impact, especially in green and natural areas.
D2	Design	1	Anti-vandalism systems	Made with resistant materials
D3	Design	2	Damage sensors	Automatically detect damage in the charging point
D4	Design	2	Modular solution	Easily adding new modules according to the need for charging points.
D5	Design	2	Portable solution	Move and transport easily to other locations
A1	Accessibility	1	Avoid obstacles	Charging points must not become an obstacle or add any risks either in the lanes or in the sidewalks and pedestrian mobility in the sidewalks must not be hindered.
A2	Accessibility	2	Accessibility and use of chargers by persons with disabilities	In terms of covering power supply needs for elements or personal vehicles used by people with disabilities and to facilitate accessible interfaces and operation of the elements of the installation.
P1	Parking functionality	1	Secure parking system	Provide a secure parking system compatible with different types of personal mobility vehicles (every type of bike, including electric bicycles, and scooters, at least) for the storage of bicycles
P2	Parking functionality	1	Opening system	Opening system through a mobile application
P3	Parking functionality	2	Alternative opening systems	To facilitate its use by people with reduced mobility, could use other mechanisms such as: • Contactless cards.

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				• Smart watches. • NFC.
C1	Charging functionality	1	Unplugged form conventional power grid	It should be able to provide service in remote points of the urban area without connection to the conventional power grid. A solution based on the use of self-consumption photovoltaic systems is considered.
C2	Charging functionality	2	Quick and convenient	Charging should be quick and convenient, allowing users to quickly resume their trip.
C3	Charging functionality	2		Enable accessible use of chargers to provide service to users with physical disabilities who make use of accessible mobility devices such as handbikes, electric wheelchairs or electric Joelette chairs.
S1	Software	1	Mobile App	Solution should provide a mobile application that allows: • User registration • Know the status and location of charging points. • Opening of parking lock.
S2	Software	2	Mobile App	In addition, it is desirable that app allows: • Book a charging point. • Recommend the nearest charging station. • Know the amount of energy supplied. • Know the estimated charging time.
S3	Software	2	Mobile App	Capability of including communications to users: • Promote green areas • Healthy habits • Traffic • Safety awareness and correct use of personal mobility vehicles
S4	Software	1	Management platform	The solution should provide a software platform to configure, monitor and manage the charging stations with the following functionalities: • User Management

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				• Management of charging points: configuration of each charging station, knowing the status (free, busy, charging, malfunctioning), duration of charging sessions. • Statistics and usage reports: number of recharges, energy consumed and produced, CO2 savings. • Alarms: malfunction, thefts. • Provide an API to send data to Las Rozas smart city platform.
C1	Communications system	1	Data communication	The solution should provide a communications system to send information about the status of the charging point to the management platform
C2	Communications system	2	Technologies	The system supports different types of communications such as 4/5G-M2M, NB-IoT, LoRaWAN

Compulsory functional requirements

- Design:
  - Charging points should blend into the different environments described in this document above (natural environment, remote green areas, even places with narrow sidewalks in the historic city centre), with the minimal visual and environmental impact, especially in green and natural areas.
  - Charging infrastructure should be designed in a way that complements the urban landscape.
  - Vandal resistant.
- Accessibility:
  - Pedestrian mobility in the sidewalks must not be hindered.
  - Charging points must not become an obstacle either in the lanes or in the sidewalks.
  - Accessibility and use of chargers by persons with disabilities must be considered. Both in terms of covering power supply needs for elements or personal vehicles used by people with disabilities and to facilitate accessible interfaces and operation of the elements the installation.
- Parking functionality:
  - It should provide a secure parking system compatible with different types of personal mobility vehicles (every type of bike, including electric bicycles, and scooters, at least) for the storage of bicycles.

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    - Opening system through a mobile application.
- Charging functionality:
    - It must be able to provide service in remote points of the urban area without connection to the conventional power grid. A solution based on the use of self-consumption photovoltaic systems is considered.
- Software:
    - Mobile App. Solution should provide a mobile application that allows:
        - User registration
        - Know the status and location of charging points.
        - Opening of parking lock.
    - Management platform. The solution should provide a software platform to configure, monitor and manage the charging stations with the following functionalities:
        - User Management.
        - Management of charging points: configuration of each charging station, knowing the status (free, busy, charging, malfunctioning), duration of charging sessions.
        - Statistics and usage reports: number of recharges, energy consumed and produced, CO2 savings.
        - Alarms: malfunction, thefts.
        - Provide an API to send data to smart city platform.
- Communications system:
    - To send information about the status of the charging point to the management platform.

Desirable functional requirements

- Design:
    - Modular solution. Module-based parking spots.
    - An easy portable solution is desired.
    - Damage sensors that automatically detect damage in the charging point.
- Accessibility:
    - Accessibility and use of chargers by persons with disabilities must be considered. Both in terms of covering power supply needs for elements or personal vehicles used by people with disabilities and to facilitate accessible interfaces and operation of the elements the installation.
- Parking functionality:
    - It is desirable that the opening system, to facilitate its use by people with reduced mobility, could use other mechanisms such as:
        - Contactless cards.
        - Smart watches.

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        - NFC.
- Changing functionality:
    - Charging should be quick and convenient, allowing users to quickly resume their trip.
    - Allow charging for other devices for people with disabilities, like electric handbikes.
- Software:
    - It is desirable that the mobile App provide the following functionalities:
        - Book a charging point.
        - Recommend the nearest charging station.
        - Know the amount of energy supplied.
        - Know the estimated charging time.
        - Capability of including communications to users:
            - Promote green areas and natural spaces
            - Healthy habits
            - Traffic
            - Safety awareness and correct use of personal mobility vehicles
- Sistema de comunicaciones:
    - It is desirable that the system supports different types of communications such as 4/5G-M2M, NB-IoT, LoRaWAN.

PILOT SCOPE

Several possible locations for the installation of charging points have been pre-selected for the development of the pilot.

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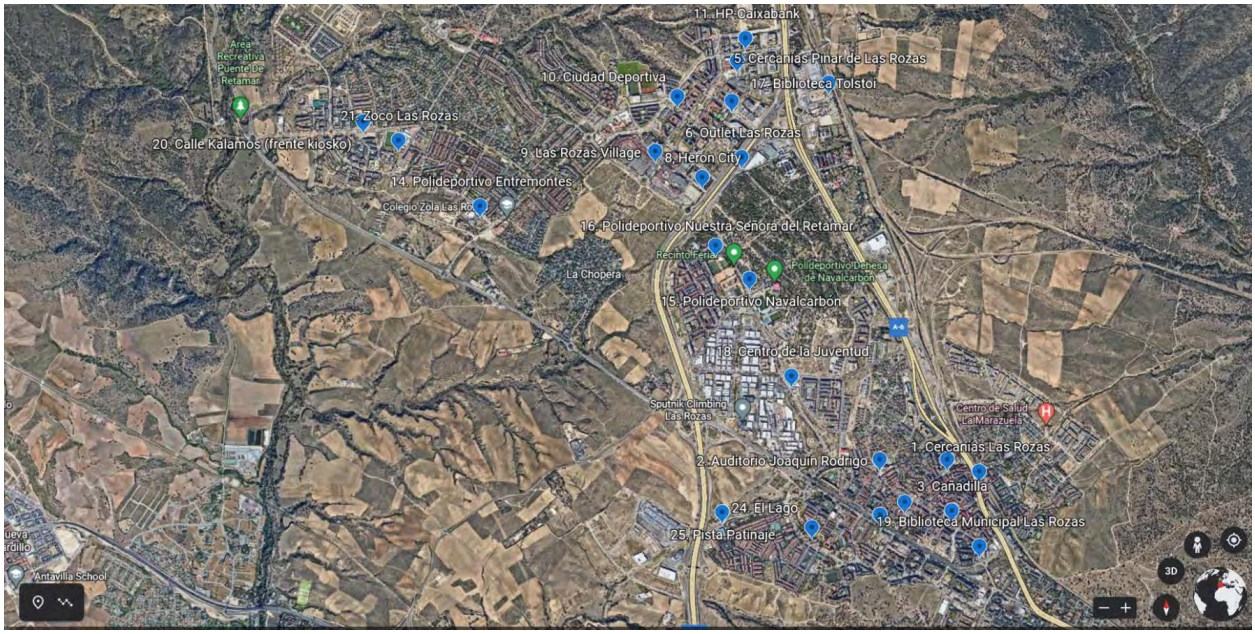
FIGURE 6 POSSIBLE LOCATIONS FOR CHARGING POINTS



These locations are based on:

- Close to bike lanes.
- Proximity to places of extended stay (parks, libraries, gardens, sports centres, recreational and leisure areas).
- Locations with high solar radiation and few shaded areas.

Type and number of targeted end-users

End-user type	Role	Number
Citizens - Group A: Bike users	They have to validate the solution.	4
Citizens - Group B: Scooter users	They have to validate the solution.	4
Citizens - Group C: users with disabilities	They have to validate the solution.	2
Cycling association	They have to provide requirements, use and validate the solution.	2
Las Rozas Innova Smart City department	They have to provide requirements about integration with smart city platform	1

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Language

Language used in internal communication will be English.

The solution language will be English and Spanish. Las Rozas will help translating to Spanish.

PILOT SET-UP CONDITIONS

Ethical, legal or regulatory

Since we are going to deal with personal data, the solutions shall be fully GDPR and Spanish data security regulation (ENS) compliant.

Technological

Beyond the technical solution to be implemented at each charging point, it is considered necessary to address the following technical characteristics of the system for the pilot:

- The software platform shall be Software as a Service (SaaS). The systems and servers needed for running the piloted App will be hosted by the Solver.
- The Solver will provide mechanisms to guarantee secure login.
- The End-user App shall be at least Android compatible, iOS compatible is a plus.
- The solution software platform shall be able to exchange information with Las Rozas Smart City Platform. This platform is based on EU standard FIWARE and uses smart data models2, as far as possible the solution should use these models.

Data access

No initial data will be provided for pre-load. All participants will have to register for free and fill their own data.

In any case, the Solver cannot exploit or make use of the data for different purposes than the ones agreed with the Challenger and, after pilot end, the Challenger will establish whether all copies of the data should be destroyed, returned to the Challenger or handed over, where appropriate, to a new data processor.

Other

The definition and validation of specific accessibility requirements that will complete the design, operational and functional requirements of the implemented technological solution will be established with the collaboration of social entities linked to accessibility and end users.

[2] https://www.fiware.org/smart-data-models/

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EXPECTED IMPACTS AND KPIs

Expected impact from the solution:

- Boost **new urban transport means** adoption.
  - This means **car usage would be reduced** for short trips within the city.
  - The MOT is well connected to Madrid with train lines (20 minutes to the city centre). Therefore, public transport together with medium speed transport may also be a viable option for longer trips, thereby **reducing the car usage within MOT.**
  - Flexibility: **This solution could be installed almost anywhere**, making them ideal for remote areas or areas where adequate electricity infrastructure is not available.
- Promote **use of clean and renewable energies**.
  - **Energy savings**: Reduce demand from the conventional power grid, it means low energy costs and increase energy efficiency.
  - The solution has **low polluting emissions**.
- **City image and positioning:** The installation of solar chargers can contribute to improving the city's image as a sustainable and environmentally committed city, which can be an attractive factor for residents and tourists.

Key Performance Indicators to measure the solution performance during the pilot:

- At least two charging points installed.
- Average monthly usage of 60.
- 100% kWh of autonomous and renewable installed power.
- 2 daily charges.
- 30 app downloads.
- Impact in media: 3 publications about the project in local and/or regional press.

Key Performance Indicators to measure the solution performance after large scale deployment:

- At least 20 charging points installed.
- Average monthly usage of 400.
- 100% kWh of autonomous and renewable installed power.
- 40 daily charges.
- app downloads.
- Impact in media: 1 publication about the project in the national press

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BUSINESS OPPORTUNITY

• Market size

A study entitled "New Urban Mobility and Road Safety. Accident rates in the new culture of travel" presented by the Línea Directa Foundation in collaboration with the Spanish Foundation for Road Safety (FESVIAL) has released important data on the use of these new electric vehicles that dominate our cities.

This study shows that just over 44% of the Spanish population (17 million people) recognise that they are regular or occasional users of one of these electric scooters or an electric bicycle, while 60% are likely to use them in the short term.

New regulations on the use of scooters have reduced the percentage of users. Only 14% of them admit to regularly complying with the current regulations on the use of these personal mobility vehicles.

Considering these figures, the percentage of bicycle and electric scooter users in the city of Las Rozas who are expected to make proper use of the facilities has been estimated at 15.000 people.

- Internally, at the Challenger organization this project would be replicable in 24 different locations across the municipality. Potential users are estimated at 200 daily users.
- At the regional level, in order to connect the MOT municipalities through Arco Verde, this project would be replicable in 20 different locations across these municipalities. Potential users are estimated at 500 daily users.

Therefore, main market indicators:

- TAM (Total Addressable Market). Maximum potential users[3]. Population between 13 and 80 years old: 71.000 people
- SAM (Serviceable Available Market): 15.000 people.
- SOM (Serviceable Obtainable Market): 200 daily unique users. 1.000 yearly unique users.

[3] According to INE:
https://www.ine.es/jaxi/Tabla.htm?path=/t20/e244/avance/p02/l0/&file=1mun00.px&L=0

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Adoption plans

If the pilot is successful, Las Rozas plans to procure the solution for between 10 and 15 locations within the municipality (see table below) depending on the final cost of the solution. The main aspects of this plan are:

- The estimated budget for this adoption plan is 150.000 €.
- The planning for this deployment is to carry it out after the completion of Innobuyer: Starting at the end of 2024 and executing during 2025.
- The procurement procedure will be through a single tender for the supply and installation of charging points.

TABLE 2 POSSIBLE FUTURE LOCATIONS

Number	Location
1	Cercanías - Las Rozas Carretera Vía de Servicio de Las Rozas
2	Auditorio Camino del Caño con Avda del Polideportivo
3	Cañadilla Calle Cañadilla con Calle Real
4	CC Burgo Centro Calle Comunidad de Madrid
5	Cercanías Pinar Las Rozas Avda de los Bomberos
6	Outlet Las Rozas Avenida del Noroeste
7	Las Rozas Innova Calle José Echegaray con Jacinto Benavente
8	Heron City Calle Juan Ramón Jiménez
9	Las Rozas Village Calle Camilo José Cela
10	Ciudad Deportiva Calle Severo Ochoa
11	HP-Caixabank Calle Gabriel García Márquez
12	Cercanías Las Matas Avda Peñascales con Martín Iriarte
13	Polideportivo Las Matas Calle Colegios con Camino Garzo
14	Polideportivo Entremontes Calle Aristóteles
15	Polideportivo Navalcarbón Avda Nuestra Señora del Retamar
16	Polideportivo Nuestra Señora Retamar Avda Nuestra Señora del Retamar con Navalcarbón
17	Biblioteca Tolstoi Calle Octavio Paz
18	Centro de la Juventud Avda Nuestra Señora del Retamar
19	Biblioteca Municipal (Carretera del Escorial) Calle Juan Barjola
20	Calle Kálamos (Frente al Kiosko) Calle Kalamos con calle Nardo
21	Zoco Las Rozas Avenida de Atenas
22	Parque municipal. San Miguel Avda. del Dr. Toledo
23	La Iglesia Avda de la Iglesia
24	Parque París Avda España
25	Pista de patinaje Calle de la Comunidad de Aragón

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