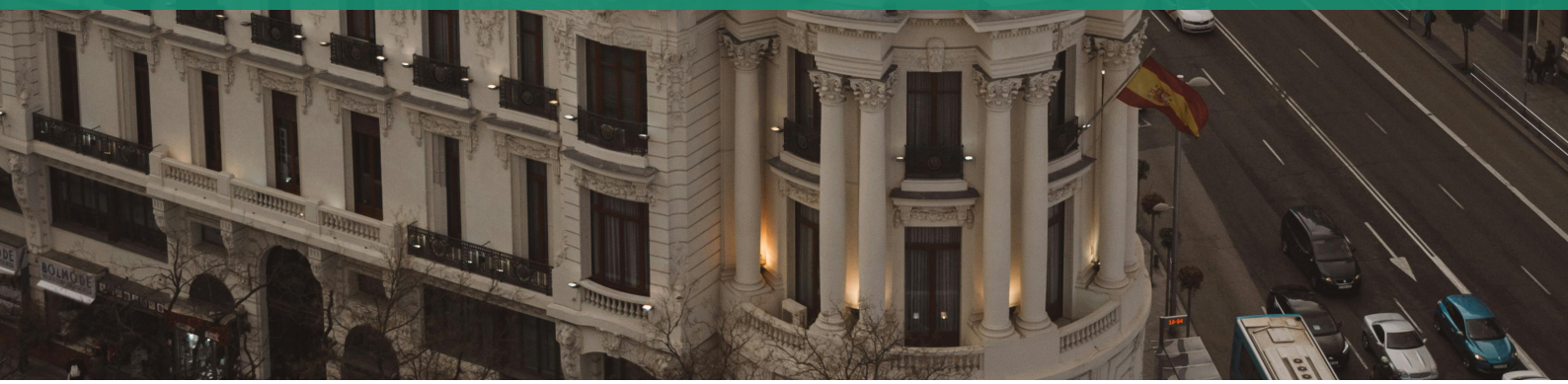
MADRID

SOLUTIONSPLUS I LIVING LABS UPDATE



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PROJECT PARTNERS

ABOUT

This brochure has been prepared for the project SOLUTIONSplus. The project has received funding from the European Union's Horizon 2020 research and innovation programme under the grant agreement no. 875041

TITLE

Solutionsplus Living Labs Update: Madrid, Spain

FINANCIAL SUPPORT

Solutionsplus

DISCLAIMER

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LAYOUT

Yasin Imran Rony, WI

PICTURES

All the pictures are provided by SOL+ partners

June, 2024

MADRID

SHORT SUMMARY

105 e-buses operating by the end of 2020 and effective charging infrastructure. Five charging points have already been established in the city, upcoming e-buses will be equipped with off-board opportunity charging capabilities. A software solution is being tested to monitor and control the power network for charging stations and e-buses. The aim is to maximize bus availability and operational efficiency.
Two inverted pantographs will be installed, offering modular charging power ranging from 90kW to 360kW.

QUOTE

INFORM

Tools and different types of knowledge products on charging infrastructure, batteries and e-buses were incorporated in the SOLUTIONSplus online toolbox and shared with the city, addressing the knowledge gaps identified in the course of the project. Members of the Madrid team participated in exchange sessions and training activities. First results from the demonstration action were presented at conferences and events, including the TRA in Lisbon.

The open-access knowledge products created as part of the Madrid demonstration and published in the SOLUTIONSPlus toolbox include presentations on the local bike-sharing system BiciMad and Madrid's micromobility regulation, a fact sheet on the vehicles and operation of the e-bike sharing system in Madrid, and an introduction to SAE (Sistema de Ayuda a la Explotación), the control system for the operation of EMT Madrid.

INSPIRE

A total of four modules were conducted in the Regional Training Programs of 2021 and 2022, addressing the gaps identified in the Technical Needs Assessment carried out in 2020. i.e., 1) low-carbon urban logistics, 2) LEV regulations, 3) charging infrastructure, and 4) e-buses. Moreover, members of the Madrid city team participated in the site visit to an e-bus depot in Hamburg in the context of the 2022 General Assembly.
As part of the SOLUTIONSPlus peer-to-peer training project, the Madrid Urban Living Lab partners had the opportunity to share their knowledge, experiences and feedback with interested stakeholders from Asia, Africa and Latin America. The lessons shared focused on micromobility and regulations, as well as the implementation and operation of e-bike sharing systems.

From 6-8 September 2023, a EMT Madrid hosted a SOLUTIONSplus 3-day study tour, bringing together partners from Europe, Africa, Asia and Latin America. Based on the training needs of the regions, the tour covered topics on which EMT Madrid had expertise and best practices to share. Besides presentations about EMT's e-bus policy, about bus retrofitting, about shared light electric vehicles, and about the city's mobility policy framework and relevant regulations, the programme encompassed a visit to an e-bus depot.

Completed pantographs with rapid bus

Inverted pantograph with rapid bus from front

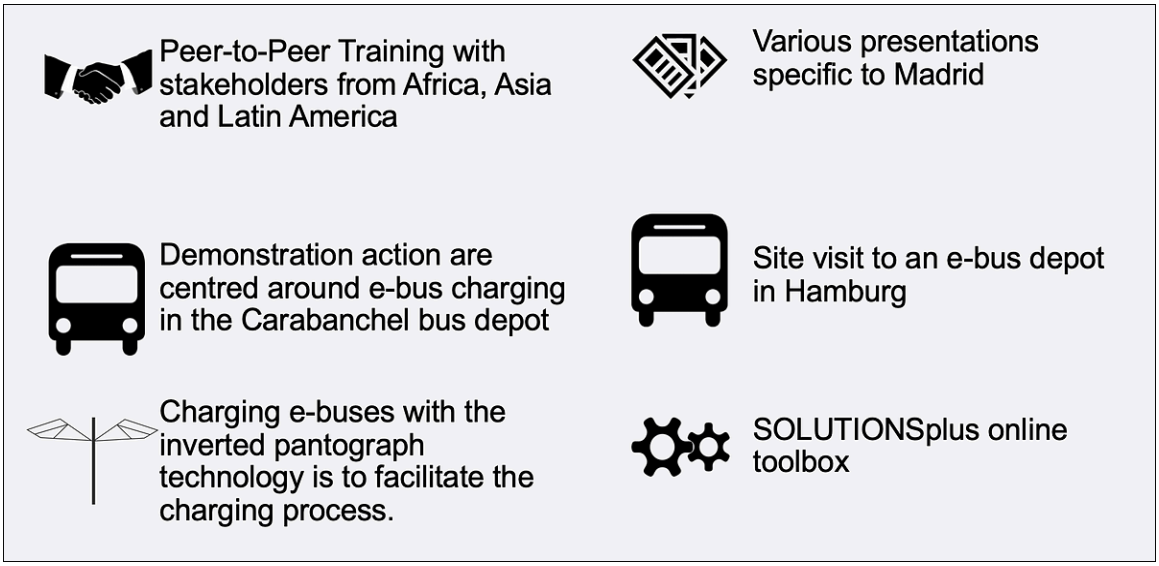
E-bus in Madrid

INITIATE

The main components of the demonstration action are **centred around e-bus charging in the Carabanchel bus depot.** More recently, a new mobility hub with charging solutions for diverse services (carsharing, BiciPark...) at Fuente de la Mora P&R facility was opened as a second component.

IMPLEMENT

The main activities carried out in the Carabanchel bus depot comprise the completion of the infrastructure works for the installation of the ABB charging solution in the bus depot, the development of software solutions for supporting multiple pantographs by an advanced multi-outlet bus charging solution, and the testing of a mobile inverted pantograph provided by ABB. For the depot “Carabanchel” in Madrid with 50 charging stations a Smart Charging concept has been elaborated. The precondition was that the charging scheme must not influence the operation of the bus fleet. The Madrid team also managed the new mobility hub.



IMPLEMENT

The expected impact of charging e-Busses with the inverted pantograph technology is to facilitate the charging process. It requires no personnel (in contrast to the plugging process) and offers further advantages regarding safety & security, which enable the usage of a higher voltage and thus higher charging power. In total, this technology enables a faster introduction of an electric bus fleet (target for the city of Madrid: multiply the number of electric vehicles by ten in the next 8 years) due to a facilitated and faster charging process.

The following changes in the charging scheme were suggested:

- The charging starts at midnight, whereas before charging started at 23:30 and also the peak load occurred before midnight.

- The charging ends at 04:00 in the morning, with a constant total charging power for the whole duration. Before, the charging power reached a peak before midnight and was decreasing step by step until 02:45 in the morning

With these changes and the constant total charging power managed by the smart charging software, the peak load can be reduced significantly from 3000 kW (3 MW) to 1500 kW (1.5 MW). Further, the biggest part of the energy is consumed outside of the peak hours.

Due to this smart charging strategy, which can be applied for up to 50 charging points, saving of 50.000 €/Year could be achieved without changing the current power tariff.

Event Highlights	3-day Study Tour to EMT Madrid
Trainings	
How many people trained in total (approx.)	40
How many women trained in total (approx.)	15
Was there any specific training for women?	No
Was there any data collection? If yes, please link the documents.	Fact sheet:Download PDF Presentation: Download Presentation User Needs assessment: Read more
SOL+ Publications (put in the title or link the documents)	
Gender specific Publications	-
People involved in your Organization in SOL+ (during 2020 – 2024)	9
Women involved from your Organization in SOL+ (during 2020 – 2024)	4
Contacts of women involved from the Organization in SOL+	Montserrat Luque <montserrat.luque@emtmadrid.es> Irene Blázquez Irene.BlazquezJimenez(at)emtmadrid.es Lidia León Ana Pérez del Olmo consultoria@emtmadrid.es
Is it possible to do an online survey with past/ current participants?	

PARTNERS CITY: MADRID (EMT) INDUSTRY: ABB, CRF IMPLEMENTATION: UITP, POLIS, IDIADA, ZLC

Additional questions or information

TRENDS AND DRIVERS

According to the Mobility Survey conducted in 2014, 13 million trips are carried out in 14.3 million stages every day in the Community of Madrid. From the latter, 73% were done in motorised vehicles and 27% by non-motorised modes. It is worth noting that between 2004 and 2014 the share of NMT increased 2.5% (GFK, 2014). Despite the fact that the number of bike users have increased significantly in Madrid, reaching an estimate of 60,000 - 80,000 trips per day, in the overall figures it's use is still negligible with 0.7% - 0.9% of the total trips (gea21, 2016).

When it comes to motorised transport, the public/private distribution, expressed in stages, reverses the trend of the last survey, with a decrease in the participation of public transport, with a weight of 46.2% in 2014 compared to 53.2% in 2004. However, this varies depending on the area being considered. Figure 1 shows the trips conducted within and between the different areas (city (turquoise) – metropolitan area (yellow) – community (pink) – beyond), divided by public (red) and private (blue) transport. It can be observed that the lion share of trips corresponds to the ones occurring within the city (3.8 million). Despite the fact that between 2004 and 2014 the participation of public transport decreased from 62% to 60%, it is the only area where public transport dominates (GFK, 2014).
Moreover, in 10 years the motorisation rate in the Community of Madrid went from 0.97 to 1.41, i.e., an increase by 45%. The rate in the city centre, which is the lowest, went from 0.72 to 1.15 cars per household (GFK, 2014).

In terms of public transport, the Metro is the public transport with the highest share of all public modes of transport, with 40.5%, followed by EMT buses with 29.3%. In comparison to 2004, the participation of these modes (Metro and EMT) has hardly changed. On the other hand, there has been a slight increase in the participation of the Renfe suburban train (12.6% in 2004 and 14.1% in 2014) and a reduction in the participation of the intercity bus, from 17.3% in 2004 to 15.3% in the ESM14 (GFK, 2014).

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