

## ASSURED workshop:

### *From governance to operations: innovating sectors and services for the full deployment of e-trucks in urban logistics*

BILBAO, 27<sup>TH</sup> OF SEPTEMBER 2019

## Report

### Introduction

The ASSURED project ([www.assured-project.eu](http://www.assured-project.eu)) aims at boosting the electrification of urban commercial vehicles and their integration with high power fast charging infrastructure. ASSURED will test electric buses, waste collection and delivery trucks as well as one light commercial delivery vehicle with innovative fast charging solutions. The goal is to showcase the interoperability between different brands of vehicles and charging solutions, providing more flexibility to the public transport and freight providers in their daily operations.

The workshop aimed at discussing a business case for ultra-fast charging infrastructure that is used by both public transport and logistics vehicles. We looked at both the challenges for implementation (e.g. payment and reservation) as well as the advantages of this solution (e.g. better use of limited space, shared investment costs between operators, etc.). Also, regulatory aspects were taken into consideration (e.g. selling electricity to 3<sup>rd</sup> parties).

### Wrap-up and next steps

From the various presentations and the site visits it emerged that, in addition to the availability and cost of trucks, which however seems to be constantly improving, the main problem for logistics operators is represented by the **risks linked to the electricity supply as well the charging infrastructure**. The stability of the grid is for example a concern that is raised continuously.

Depots (for trucks) and homes (for vans) require major charging infrastructure investments for logistics operations. Moreover, public chargers for opportunity charging are required, especially outside the city centers, to avoid inefficient returns to the depots' chargers and to facilitate seamless delivery trips. For public urban charging spots, municipalities should take the lead and have policies and standards in place to develop **shared charging infrastructure hubs** that can be used by various electric (heavy-duty) vehicles, such as buses, utility vehicles, delivery trucks, vans, taxis, etc.

This has the benefit of **reducing the Total Cost of Ownership** (TCO) for operators as well as a reduced range anxiety for operators of fleets with need for opportunity charging. For a full deployment of the charging infrastructure for logistics, there is a strong need for interoperability and standardization, and initially, public support is needed.

It is necessary to devise a shared charging infrastructure strategy harmonized with neighboring municipalities on a regional level to address transport needs in the entire **functional urban area** (FUA).

In the workshop it became clear that planning for e-mobility will have a significant impact and strongly dependent on **land use planning**. For this reason, local authorities often refrain from granting land for charging stations in the metropolitan areas. However, there are several public-private areas within the urban fabric that are dedicated to specific functions, such as ports, logistics poles, bus depots. Within these areas, charging infrastructure could also be opened up to other professional sectors, thus increasing the business case for ultra-fast charging infrastructure. The case of Munich and Allego are examples to be further explored (see summary of presentations 7 and 8 below).

It is important to segment the **charging needs per sector** (e.g. retail food and non-food, building sector, postal services and service logistics). For some of these, in addition to identifying the most appropriate charging models, it is also possible to rethink the use of vehicles.

For example, for those who need a vehicle for sporadic operations, the city of Paris has launched a van sharing service. Given the scarcity of public space, the city is also investigating the possibility of dedicating a bus depot with e-chargers to daytime logistics operations, since buses are recharged during the night and the depot is empty during the day.

Overall, the participants agreed that sharing charging infrastructure and deploying interoperable ultra-fast charging for various electric vehicles, such as e-buses, e-trucks and e-utility vehicles does not depend mainly on technical limitations. Rather, this topic requires coordination between very different stakeholders and currently is limited by business and operations-related issues.

In this regard, ASSURED is developing a **business model for ultra-fast charging infrastructure used by various sectors and different heavy-duty vehicles, where on-route charging is involved**. Aspects that need to be considered are:

- What level of e-vehicle take-up is needed and, in accordance, when can this become an interesting business model (2020, 2025, 2030)?
- What are differences for shared charging infrastructure in terms of locations and charging approaches (public opportunity charging vs. shared charging at depots/ in private areas)?
- What sectors actually have a need for using shared charging infrastructure, e.g. depending on driving ranges and route profiles)?

This workshop has provided very useful but preliminary insights on this topic, taking into consideration the requirements of public authorities, freight operators, OEMs as well as charging solutions suppliers. Starting from here, ASSURED partners (Rupprecht Consult, RINA) [will develop detailed business models for ultra-fast charging infrastructure that can be used by both public transport and freight vehicles](#). Results will be presented and discussed at the next meeting of the ASSURED Urban Freight User Group.

## Participants

Last Name	First Name	Organisation
Albronda	Terry	City of Groningen
Asanova	Sabina	VUB - Vrije Universiteit Brussel
Asperges	Tim	City of Leuven
Baartmans	Jeroen	BREYTNER Zero Emission Transport
Baartmans	Marie-José	BREYTNER Zero Emission Transport
Barrera	Gabriela	Polis Network
Cederstav	Fredrik	AB Volvo
Corrigan	Claudia	London Councils
Fejes	Balázs	BKK Budapest
Fernandez Balaguer	Sergio	EMT Madrid
Fries	Stefan	MAN
García Cuervo	Enrique	Madrid City Council
García Gonzalez	Ana Yurena	Iberdrola
Guenther	Henning	Rupprecht Consult
Isusi	Pablo	Bilbao City Council
Larrañaga Garate	Urrotz	Bilbao City Council
Lopez Rodriguez	Angel	Barcelona City Council
Madero	Alejandra	Norwegian Public Roads Administration
Mayrock	Matthias	MAN
Mourey	Thomas	Polis Network
Ntemiris	Spyridon	City of Gothenburg
Rojas	Nerea	MLC Cluster
Santos	Nelida	Bilbao City Council
Teoh	Tharsis	Panteia
van den Hoed	Robert	Hogeschool van Amsterdam
Vazquez	Martine	City of Paris
Verhulst	Frank	Allego

## Summary of the day

### Site visit

The workshop began with a site visit organized by the Bilbao City Council. A 100% electric bus led us to visit the bus depot, located in the northern peripheral area of the city, where a section is dedicated to recharging the 6 electric buses. There, we discussed with the depot managers about the possibility of expanding the fleet, and they told us that for them the biggest limitation is represented by the fear that (local) power grid operator will not be able to guarantee the stability of the grid.



Taking a few meters on foot, we went to visit the garbage collection vehicles depot. The city of Bilbao has started a green procurement procedure, so a percentage of the fleet must be electric.



The manager showed us the fleet of small 100% electric vehicles that are used for collection and cleaning operations in the historic centre, which work effectively reducing noise pollution and optimizing consumption: stops&go operations constantly consume large amounts of diesel, which is not the case with electric technology.

However, for heavier vehicles there are critical issues related both to the availability of heavy vehicles, and (again) to the risk of insufficient power supply or unstable power grid.



Some participants suggested creating synergies and setting up a collaboration between the two depots for the development of a solid e-charging infrastructure, in order to gain greater visibility and mass, exploit economies of scale and improve TCO for both types of electric vehicles.

Finally, Iberdrola gave us a practical demonstration of the use of one of its fast chargers, which is used by private individuals but also by taxi drivers and commercial operators (vans). Iberdrola's charging boxes can charge both AC and DC, and data collected by the operator can help the city plan the distribution of charging points.



**1 - Presentation of ASSURED project ([link](#)) - State of the art and intermediate results**  
- Sabina Asanova, VUB, ASSURED project manager

[The ASSURED 1.0 Interoperability Reference](#) describes the standards and definitions that are used in the ASSURED project for conformance and interoperability testing of vehicles and chargers. As the standards related to the testing are not yet finalized or are lacking definitions of some of the parts required for successful interoperability, the report is used to define the missing requirements.

A workshop on Distribution System Operators (DSOs) views will be held in February 2020. This will address the fears and challenges to charge HD vehicles and future considerations among European DSOs, to develop mitigation strategies. More information will follow in the next months.

**2 - SUMP 2.0 Guidelines – Electrification in sustainable urban mobility planning Topic Guide<sup>1</sup> ([link](#)) - Thomas Mourey, Polis Network**

In the framework of the recent update of the core Sustainable Urban Mobility Planning guidelines, a series of topic guides and practitioner briefings were released, including:

- Electrification in sustainable urban mobility planning
- Sustainable urban logistics planning

The aim is to support authorities in planning freight and electric mobility solutions as an integral part of a SUMP process. In particular, focusing on the logistics fleets guarantees an (in)direct influence of planning authorities and contributes for a large share of traffic emissions with significant impacts.

Example of public measures to facilitate the electrification of the logistics sector:

- Economic & financial advantages: exemption of payment of road charging schemes, free parking
- Regulatory and operational measures: preferential treatment in traffic limited zones, longer (un)loading time windows, (un)loading areas reserved for EFVs.
- Charging infrastructure: Public (fast) charging stations in combination with a priority reservation system
- Leading by example:
  - o Electrifying the public fleets of service vehicles (waste collection, service vehicles, etc.)
  - o Procurement of zero-emission transport/delivery services



<sup>1</sup> [https://www.eltis.org/sites/default/files/electrification\\_in\\_sustainable\\_urban\\_mobility\\_planning.pdf](https://www.eltis.org/sites/default/files/electrification_in_sustainable_urban_mobility_planning.pdf)



### **3 - E-mobility strategy in Bilbao Sustainable Urban Mobility Plan and impact on the logistics sector ([link](#)) - Urrotz Larrañaga Garate, Bilbao City Council & Nerea Rojas, Basque Mobility and Logistics Cluster**



The city of Bilbao is working to promote electromobility for the urban logistics sector. They have installed 8 fast charging stations (50 kW) and are planning to offer 12,000 EUR grants for urban logistics operators, but they also want to improve awareness and communications for the stakeholders: they have released a website for e-mobility professional beginners, and regularly organise workshops for logistics operators. The Bilbao Urban Freight Forum is providing for consultation and Working Group meetings, and one of the topics discussed there is the electrification of the freight fleet. Some enablers identified are regulation, incentives, information, training.

At the same time, in order to better plan the mobility of goods in the city, they are starting up an inventory of vehicles and movements. In line with ASSURED approach, Bilbao has initiated a study on management models of charging points and interoperability in the Basque Country cities.

### **4 - Sustainability Energy Law. Cross-sectorial & multi-governance approach. The role of the Energy Agency of the Basque Government for the electrification of transport in Bilbao ([link](#)) - Álvaro Pérez de Laborda, Basque Energy Agency – EVE**

Electric vehicles can play an important role in emissions reduction only if powered by renewable energy sources. The *Law 4/2019 on Sustainable Energy in the Basque Country* addresses this issue, and it concerns public administrations, industry and enterprise, buildings, transport and mobility. As for the latter, public authorities should procure alternatively-fueled vehicles for the city fleet and for public transport from 2020 onwards. Moreover, new public buildings will have to be equipped with bike parking lots and e-charging stations.

The law also includes general recommendations for urban planning:

- Restriction of access and parking depending on vehicle type
- Favour pedestrian areas and bike lanes vs motor vehicles
- Encourage shared mobility and public transport
- New residential buildings equipped with pre-installation for charge points.



**5 - Needs for providing fast charging infrastructure for urban logistics vehicles – the case of Amsterdam ([link](#)) - Robert van Hoed, Amsterdam University of Applied Sciences & Tharsis Tech, PANTEIA**

This study presents a combined TCO model, comparing the cost b/w owned vs external charging services; slow vs fast vs ultra fast charging; downtime vs opportunity charging. Energy demand in forecast scenarios.

The study is applied to the Amsterdam case study, whose ambition is to have urban logistics electrified by 2025. This means ~30.000 commercial vans and ~5.000 freight trucks.

Issues to be solved are: how to electrify the current operations? Where and how to charge? What's the impact on grid?

The “optimisation” of a charging strategy for electric urban logistics depends essentially on three factors:

- Location: where to charge & number of charging moments
- Type of charger (fast/slow).
- Size of battery in the vehicle

The analysis addresses three charging scenarios: i) without intermediate charging, ii) with intermediate charging (i.e. with a pause for the driver), and iii) charging during deliveries (opportunity charging).

Commercial vans largely charge at home (45%) or at depot (44%). Limited fast charging (due to costs and time) and customer (short stops). For this type of vehicles, home charging should be made possible.

Trucks largely charge at depot. Fast charging is limited at the moment (6%); client charging is higher than for vans optional (16% vs 6%). No home charging in this case, given that trucks stay at depot.



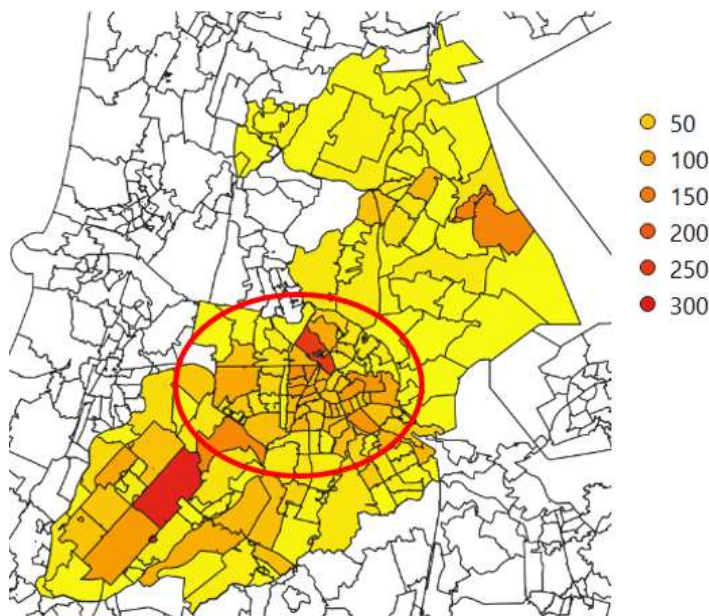
It is important to segment the charging needs per sector:

- Retail food and non-food: depot dominant. For long trips (>100km) charging at the customer premises is more likely.
- Building sector: commercial vans dominant at home. Trucks at depot. Charging at building sites requires innovation.



- Postal services: Mostly at home and at depot. Fast charging not required due to limited range.
- Service logistics: home charging is dominant.

Given this analysis, depots (for trucks) and homes (for vans) require major charging infrastructure investments, while most public chargers are required outside the city center, therefore outside the environmental zone. These would be mainly used by commercial vans of service logistics and building sector.



This configuration implies a governance issue: in the case of Amsterdam, but also of other cities surrounded by other municipalities, it is necessary to devise a strategy in concert with them, from a planning perspective addressing the whole functional urban area (FUA).

#### **6- ASSURED Volvo Case: interoperability between e-trucks and e-buses sharing the same fast charging infrastructure. How can it work in practice? ([link](#)) -**

*Fredrik Cederstav, AB Volvo & Spyros Ntemiris, City of Gothenburg*

Within ASSURED, a demonstration in Gothenburg will start in October 2020, testing bus & truck interoperability. Charging solutions will include OppCharge, DC & depot (250-300 kW).

Addressing the private customer unique demand is not enough to develop a sound business model. Bus operators are more mature and usually have a preferred charging need, while the needs of logistic stakeholders are mostly unknown or immature. Most actors seem to focus on night (depot) charging only. However, public charging complementing depot charging could improve the business case. In the



framework of the [DenCity](#) project, a [new public super-fast charger](#) for heavy electric vehicles has been installed, to charge the [Volvo electric trucks for city distribution and waste collection](#), Volvo FL and Volvo FE. At the moment, there is a piece of paper saying that it is reserved for logistics. In the future, the use will be extended to passenger vehicles, but the operator will make sure that it is possible to book time slots for logistics. The idea is to utilize this opportunity charging to make twice as many runs with each truck.



The main challenges for a wider implementation are related to the fact that a standard for high power charging over 350 kW is not ready yet, nor standard for inductive or for dynamic charging. For a full deployment of the charging infrastructure for logistics, there is a strong need for interoperability and standardization. Besides taking part in ASSURED, Volvo is participating in standardization forums like [Char-In](#).

Initially, public support is needed to a significant extent to lift the business out of the “death valley” of constant prototyping. Besides depot chargers, a good network of reliable public charging stations will ease the fear of “range anxiety”. To optimise their use and build a strong business model, ASSURED in Gothenburg will explore the potential added value of interoperable charging solutions for both e-buses and other electric vehicles, such as multi-brand usage, lower TCO, scale of economy, lower development cost, lower use of components in the future. For public urban charging spots, municipalities should prepare to combine bus, car/taxi and logistic charging for refuse trucks and delivery trucks in hubs. This brings economy of scale. A role model is the city of Oslo ([see the report of the previous meeting in Oslo](#)).

Another possibility is to use depot chargers for trucks also for the cars of the employees, to create economies of scale and reduce number of chargers needed in urban areas. Moreover, trucks and ferry could use shared infrastructure. If combined, permissions from the public sector would be easier to get.

## 7 - ASSURED MAN Case: optimised electric drivetrain of refuse collection trucks demonstrator ([link](#)) - Stefan Fries, MAN Truck & Bus SE

Within ASSURED, MAN aims to demonstrate a truck for refuse collection operations with a drivetrain and its auxiliary units optimized in means of energy consumption.



In fact, the energy consumption of refuse trucks is approx. 2-3 times higher compared to delivery trucks. Instead of additional battery capacity which would have negative impact in terms of weight, space and costs, MAN is setting up two range extender (REX) modules running on well-known and available high-density fuels, namely natural gas (NG) and diesel, to cover the peak power consumption of the refuse truck during transport operations outside of inner-city areas. During the collection phase in the cities the truck will run silently on battery energy with zero emissions.

The modules have the potential to be installable and usable in commercial battery electric vehicles (BEV)-Trucks. These will result in reduced TCOs, a higher payload and consequently a maximized competitiveness with regards to conventional low emission trucks. The truck will be fast chargeable with 150 kW at charging stations with CCS connector.

The demonstrator truck will be handed to a refuse collection company. First driving tests will start in 2020, followed by a demonstration phase lasting for several months and will take place in the cities of Munich and Brussels.

**8 - Allego: first MEGA-E high power charging network site in Europe. 322 ultra-fast chargers up to 350 kW in at least ten metropolitan areas in Europe ([link](#)) - Frank Verhulst, Allego**

Allego provides for segmented charging solutions, offering various power levels to meet different EV driver needs:

- Normal and smart charging (1~8 hours)
- Fast charging (50 kW, 30~40 minutes)
- High Power charging (15~20 minutes). These are usually 150 kW – 350 kW chargers, up to 600kW with pantograph for bus operations. Multimodal applications (bus / cars) can be envisaged to reduce TCO for operators.



Public Transport already evolved to the next level of High-Power Charging (HPC) charging. Allego is involved in pilots with up to 100 busses, including smart & multi modal charging to optimize the TCO.

Mega-E stands for Metropolitan Greater Areas Electrified and the 322 Mega-E charging points will stretch over 39 multi-modal charging hubs. The network is based on open standards, fully interoperable and connected to renewable energy generation.

Mega-E project received 29 million euros in funding through the European Union, as part of the EU TEN-T/CEF programme. The project is among the first to implement high power charging at European scale. The first High-Power Chargers have been installed in Eindhoven, located close to the A2 and A67 motorways.

Three types of locations to best cover the needs of a strongly evolving concept of mobility:

- Multimodal locations, located at the key nodes of transportation crossings within European biggest metropolises
- Metropolitan locations, on the outer border of the cities, where long distance and suburban circulation meets
- Corridor highway locations, to extend range and make long distance travelling more comfortable.

So far dedicated to private cars, Allego aims to expand the usage of their multi-modal charging hubs to the logistics sector, enabling 'business as usual' for medium and long-haul e-Trucks and e-Coaches. In fact, electrification of heavy-duty (HD) segments is in its early stage, but the industry estimates a huge ramp-up on new battery electric vehicle (BEV) sales, which means 8% HD and 15% MD in operation in EU28 in 2030. This requires an adequate development of suitable charging infrastructure. According to Allego's scenarios, e-transportation will start from depot charging, extended by destination and on-route (public) charging.



As regards shared use of infrastructure, there are already some applications: in Germany, Allego has opened a special HPC location near Munich. The three Combined Charging System (CCS) chargers were built for the private bus company Josef Ettenhuber, but while they charge their three e-busses at night, during the day the chargers can be used by the public. The charging stations are located near the Munich East motorway junction. For those with vehicles capable of fast-charging or even high-power charging, it is possible to charge vehicles for 200 km in just 15 minutes.