



# Session C: The role of (fast) e-charging infrastructure for zero-emission zones

ASSURED Session  
2. April 2020, virtual Lisbon

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 769850.





## Round of introduction

Please shortly address the following questions:

- What is your specific interest in this workshop?
- Does your city have an SUMP/ is preparing an SUMP? Are you specifically planning for the electrification of freight/ commercial vehicles? Are you intending to implement a ZEZ?



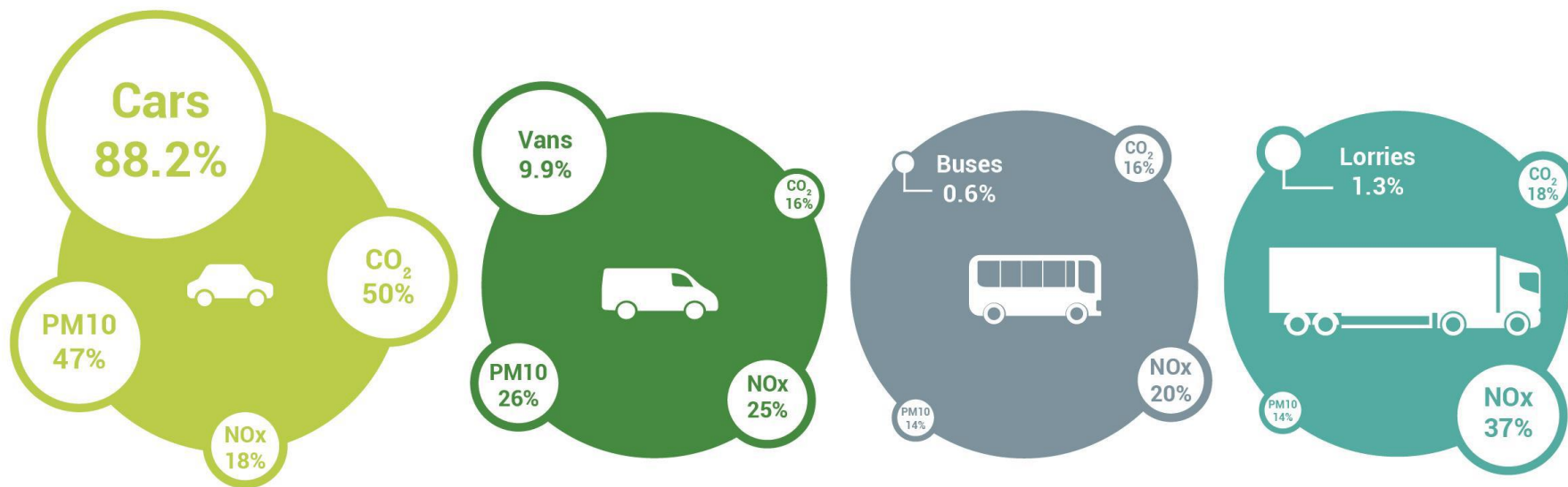
# A brief overview of ASSURED

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# Why HD-vehicles?

Proportion of vehicles in traffic and emissions



- The fleets that are the most polluting (busses, trucks)
- Fleets which cover long distances per day
- Direct decision by the public local authorities
- Big impact of the electrification of these fleets (compared to cars) – see also [ELIPTIC Factor 100 Campaign](#)

Source: TDA

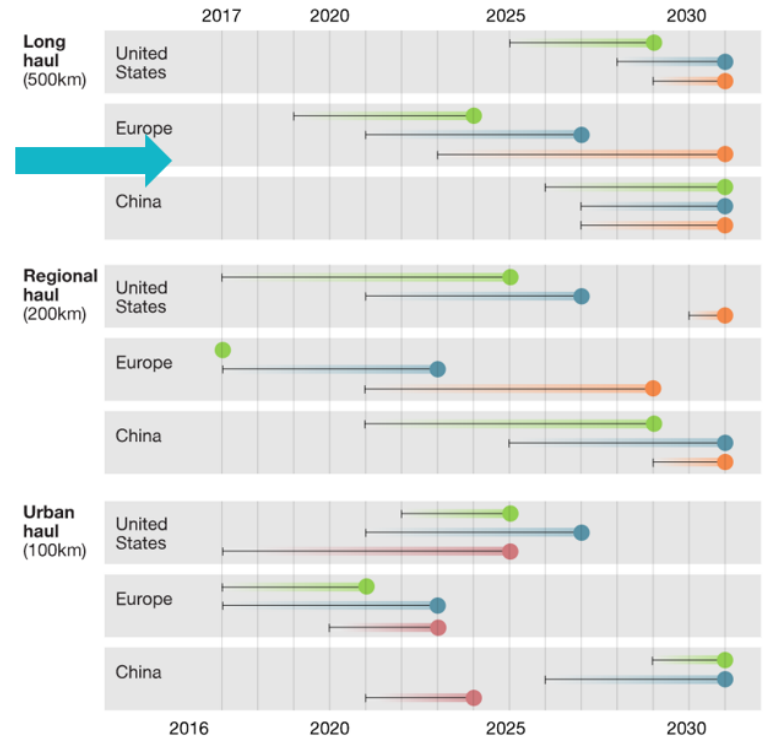
# When to join?

## Electrification of HD segments starts now

- > No Public Chargepoints for Trucks in NL and DE **0%**
  - > pilot projects to prove electrification of Heavy Duty, **focus on depot charging** **5**
- > Record number new trucks for **city distribution** **15.748** in NL (2018), 31% share DAF, 19,2% share Volvo
- > Long Haul requirement for DC/HPC stations by 2025/2030 (# connectors)
  - 20k 150-500kW**
  - 6k >>500kW**
- > Industry estimates huge ramp-up on new BEV sales: 8% HD and 15% MD – BEV's in operation in EU28 in 2030
  - 110.000**
- > Early adoption starts in 2021 – quick ramp up: sales penetration 15-34% in 2030 (BECV) or 8-27% in late adoption scenario's



Timing of battery electric vehicle total cost of ownership parity with diesel vehicle, year achieved range





**Scope**

ASSURED is aimed at boosting the electrification of urban commercial vehicles and their integration with high power fast charging infrastructure.

**Duration**

Oct 2017 – Sept 2021 [ 48 Months ]

**Budget**

€ 23.64 million supported by € 18.65 million EU funding

**Coordinator**

Vrije Universiteit Brussel (VUB)

# Partners





## 3 levels of interoperability in ASSURED

Business Model	Vehicles	Charging Solutions
<b>1. Two different buses – one charger</b>	Different types of buses (12m, 18.75m)	One charging solution (power level, pantograph type, charger alimentation type...)
<b>2. Different buses – different chargers</b>	Different buses of different brands	Different charging solutions (power level, pantograph type, charger alimentation type...)
<b>3. Different vehicles – different chargers</b>	Different vehicles (buses, urban distribution truck)	Different charging solutions (power level, pantograph type, charger alimentation type...)



# Innovations: 1<sup>st</sup> pillar e-Buses



Iveco  
Rorthais



Volvo  
Gothenburg



Irizar  
Bayonne



VDL  
Helmond



Vectia-CAF  
Castejón

# Innovations: 2<sup>nd</sup> and 3<sup>rd</sup> pillars e-truck & e-van

Refuse collection truck demonstrator



Munich



Gothenburg



Turin

Electric van demonstrator with fast wireless charging system

Electric delivery trucks with opportunity superfast charging

## Innovations: 3 Demonstrators for User Acceptance

Barcelona  
& Osnabruck

- Interoperability between buses and chargers of different brands, on vehicles in real operations

Gothenburg

- Interoperability between bus and urban trucks

Eindhoven  
& Jaworzno

- Smart charging for fleet upscale



# Integrating charging infrastructure planning in cities' and operators' strategies and plans

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# ASSURED survey template – ‘building’ the ASSURED City profile

Topic	Indicators
City info and vision	<b>City</b> basic information <b>Alternative Fuels</b> considered in local strategy <b>Projects</b> EU/National, case studies <b>Targets</b> , e.g. long-term electrification, zero emission vehicles, renewable energy...
Strategies and policies	<b>Planning</b> : SUMPS/electrification strategy including freight <b>Procurement</b> promoting fleet electrification <b>Incentives</b> : purchase, parking, access, infrastructure... <b>Charging infrastructure</b> , including fast charging
Infrastructure data	<b>Statistics</b> charging points and stations <b>Normal/High Power</b>
Vehicles data	<b>Statistics</b> according to EU vehicle categories or could be completed with data as registered by local authority
E-buses data	Manufacturer, technology, charging method...

# Roadmaps for transport electrification E-mobility in SUMP



### Ajuntament de Barcelona Urban Mobility Plan of Barcelona 2013-2016

**Study Incentives to encourage the use of sustainable vehicles within the municipal area**

- Promote the use of sustainable vehicles in the city.
- Reduce emissions in the city (air pollution and noise).

**Description:**  
The transformation of the public transport bids, has permitted to the Barcelona to have a large part of its clean vehicles. For example at the year 2011, it had more than 280 vehicles and plug-in hybrids.

The transformation of the fleet of municipal services towards more modes is one step further in the new model of mobility.

#### SUCCESS CRITERIA 2015

- A municipal electric car company has been established
- 20% of public-sector vehicles in the capital region are electric cars or other types of cars running on green energy
- There are 12,000 electric cars in the capital region, the majority privately owned
- Collaboration has been initiated between public authorities and private operators for planning and rollout of a sub-area network of charging points for electric cars based on common standards, ease of access and visibility throughout the Region
- The municipalities and the Region have conducted analyses of their own transport requirements in relation to fleet management and rationalisation of operations and optimisation of the public-sector fleet
- The municipalities and the Region are stepping up their demands in relation to the transport operators' carbon emissions

- Municipalities and the Region inform the state to continue making significant investments in transport conditions for transportation to promote clean-technology transport
- A comprehensive plan has been drafted to boost responses in the capital region

#### We will:

##### ELECTRIC CAR REGION

We will bring together public-sector and private players to develop a shared vision and plan to make the capital region a leading electric car region. Together, we will establish a collaborative organisation to support joint municipal and regional procurement of electric cars and other vehicles. In addition, we will prepare a joint plan to expand a sub-area network of charging points for electric cars in the capital region.

##### CLIMATE-FRIENDLY BUSES

We will look at ways to re-evaluate joint climate requirements for transport operators and suppliers that go beyond the requirements already in

place today. The requirements could, for example, relate to green fuels, transport technology in the form of electric buses or hybrid buses, requirements concerning driving patterns, lower buses serving less popular travel routes, etc. Merse Regional Municipality Council of the capital region and the Capital Region of Denmark will appoint an administrative working group to prepare a proposal for the Mayor, Regional Municipality Council of the capital region and the regional council during 2012.

##### MOBILITY PLANNING

We will use different methods for more effective mobility planning. In so doing, we will explore the possibilities of initiating a co-ordinating project in the capital region. The purpose of the project will be to increase mobility and reduce the need for use of private cars, as well as to test ways affected by new technology for increasing the logistical benefits typically associated with car-sharing.



## An Ultra Low Emission Vehicle Delivery Plan for London

Cleaner vehicles for a cleaner city

July 2015

MAYOR OF LONDON



Plan de Movilidad

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#### PLAN DE MOVILIDAD URBANA SOSTENIBLE DE LA CIUDAD DE MADRID

##### BO. DEFINICIÓN DE UN MARCO ESTRATÉGICO DE FOMENTO DE VEHÍCULOS MENOS CONTAMINANTES

El taller realizado por la Mesa de Movilidad sobre la movilidad eléctrica estableció las bases estratégicas en materia de promoción de la movilidad eléctrica en Madrid. El nuevo PCA deberá integrar estas orientaciones entre sus medidas:

- Realización de una Estrategia de Movilidad Eléctrica que como mínimo concrete las siguientes acciones:
  - Mantenimiento e incremento de incentivos existentes, que compensen los mayores costes de adquisición y mantenimiento (desgravación impuesto de circulación y SER)
  - Aplicación de una política comercial por parte de los fabricantes de automóviles que acreque los precios de inversión y de uso a los estándares de otras tecnologías, así como que de respuesta a los problemas del coste residual y de siniestro total
  - Habilitación de una red de recarga rápida en gasolineras, centros comerciales y aparcamientos subterráneos.
  - Promoción de nuevos productos para el uso de los aparcamientos como puntos de recarga (tarificación bonificada en los aparcamientos públicos de concesión a los vehículos poco contaminantes)
  - Aprobación de una nueva legislación que potencie en las nuevas edificaciones la incorporación de la dotación correspondiente de puntos de recarga eléctrica.
- Prefinanzar en el marco regulatorio de la zona de bajas emisiones.
- Apoyo a las empresas interesadas en la adquisición y renovación de sus flotas desde un servicio de información y asistencia objetivo y fiable
- Refuerzo el funcionamiento del Foro de Movilidad Eléctrica como marco de trabajo interinstitucional necesario para concretar la Estrategia

Además de las acciones comentadas anteriormente, en el período de aplicación del PCA, el Ayuntamiento de Madrid, a través de la Agencia de la Energía de la Ciudad de Madrid, impulsará una serie de actuaciones para la incorporación de combustibles y tecnologías menos contaminantes en el parque circulante de la ciudad, entre las que destacan las siguientes:

**Greater Manchester Electric Vehicle Scheme**

**Park up, plug in  
Go Electric**

**Why Electric?**  
Everything you need to know...

**Charging your car**

**Register**  
The UK's open recharging network. Charge your car is our partner organisation who will take you through the registration process. (Read our privacy statement)

**Register for app**  
The Charge Your Car app is the first of its kind in the world that allows drivers to use charge points

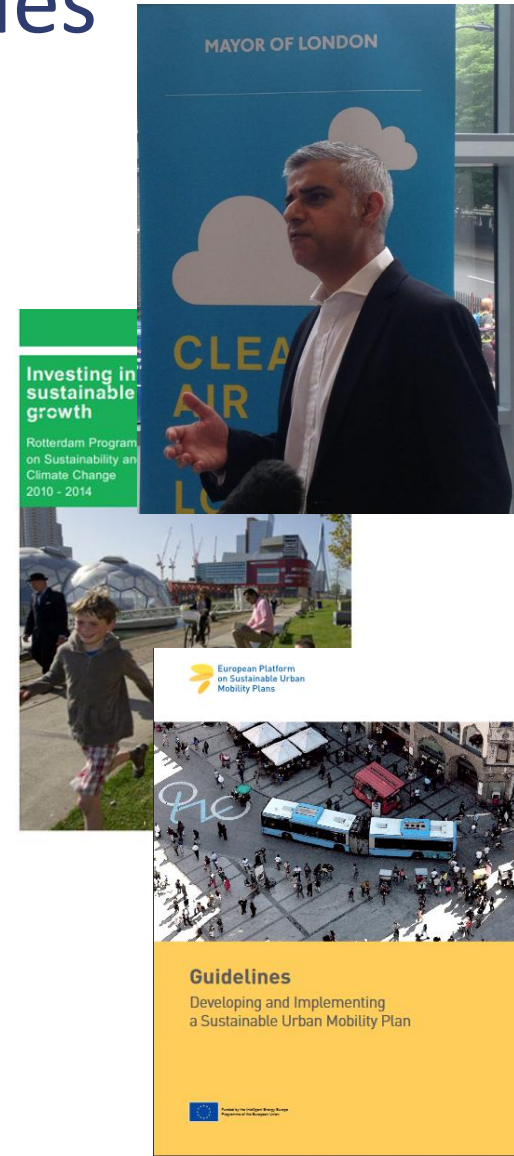
**Clean vehicles in Stockholm**

**TRA FOR**



# Types of integration of e-strategies

- **Horizontal:**
  - E-mobility in Air Quality Plans / SUMP: no target actions
  - Standalone e-mobility strategy: targets + measures
- **Modal:**
  - E-mobility is multimodal (PT as backbone)
  - Targets for e-travel share & Fast charging/ interoperable solutions missing
- **Sectoral:**
  - Strong influence on CI if city owns utilities
  - Need for cooperation with stakeholders, incl. logistics
- **Societal:**
  - Inclusion of e-mobility in SUMP requires public participation (e.g. enable citizens to submit requests for charging points)





# SUMP Topic Guide

<https://www.eltis.org/mobility-plans/topic-guides>

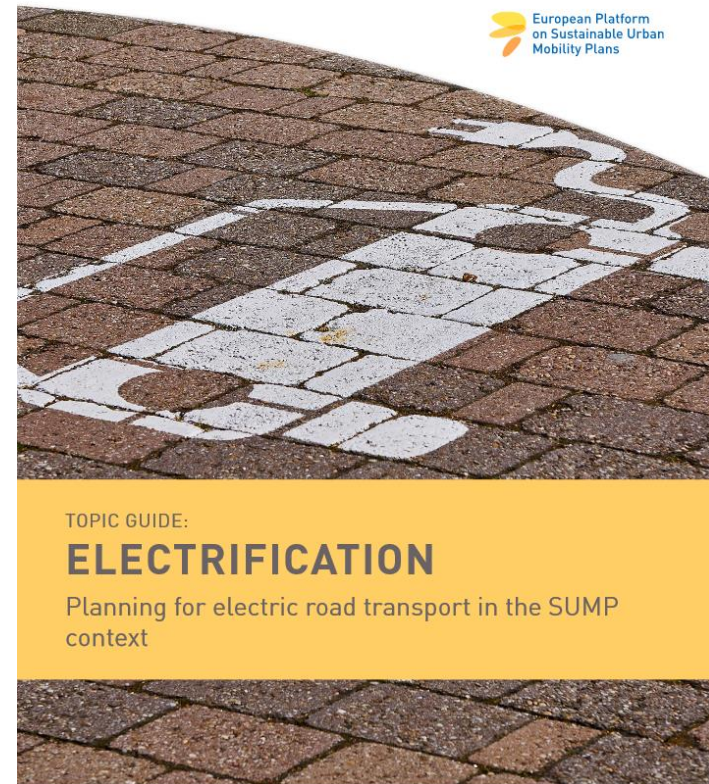


Figure 1. The SUMP Cycle (SUMP 2.0). A planner's overview of the 12 steps of Sustainable Urban Mobility Planning

## Survey results on charging infrastructure

- **Upscaling:** challenges with the energy grid & lack of space (conflicting usages)
- Couple with smart energy use / **renewable energy** strategies
- Cities to work with **service providers:** PPPs? But data needs to be available and accessible!
- **On-street infrastructure design** of fast chargers: consider needs of freight (position, power, etc.)
- **Fast opportunity charging** coupled with a pre-booking system + added value for drivers



# Identifying users' charging needs

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## Possible users of relevance with HD-fleets

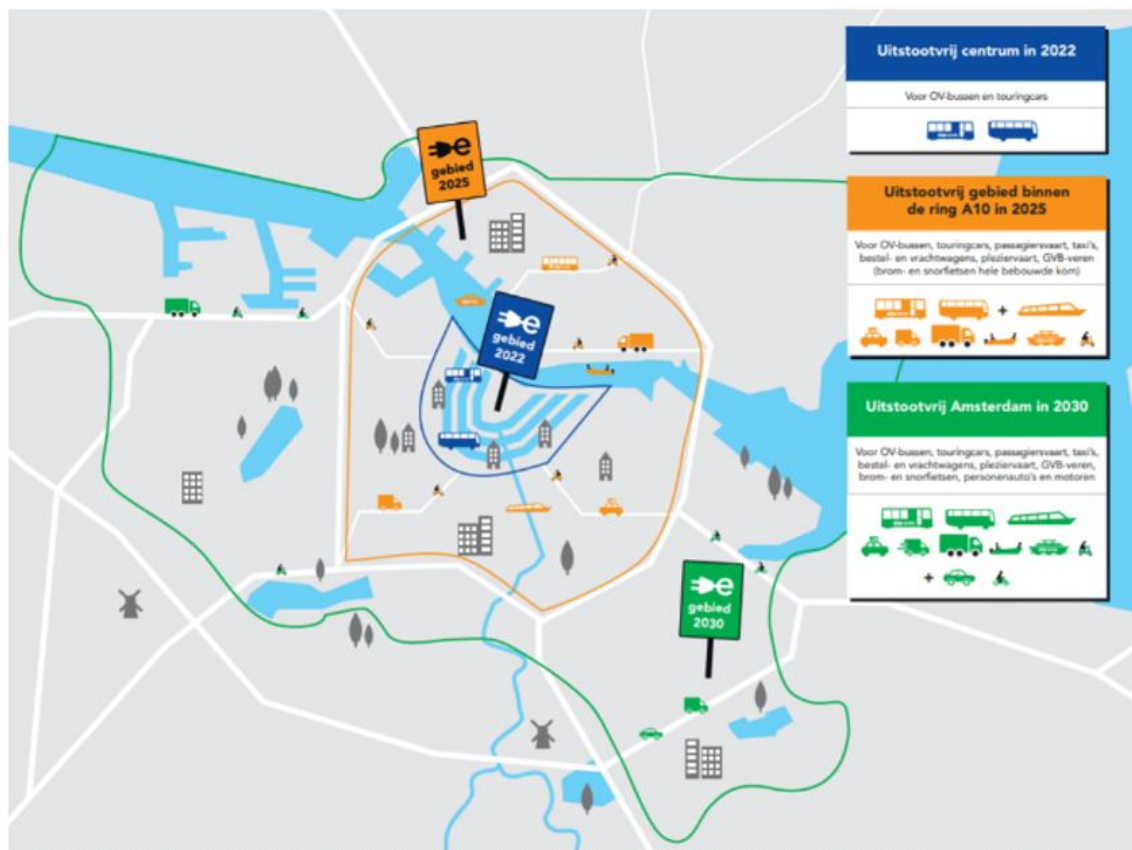
- Public transport operators/ public transport authorities
- Logistics companies (e.g. delivery, retail)
- Public utility companies (e.g. service vehicles, wastewater, etc.)
- Commercial fleets (e.g. craftsmen/ craftswomen)
- Municipal fleets (e.g. garbage trucks, clearance)
- Building sector



## Case of Amsterdam: Environmental Zone 2025

Progressive electrification in (i) sectors, (ii) geographic region

[https://www.polisnetwork.eu/wp-content/uploads/2019/10/5-Charging-infrastructure-for-urban-logistics\\_Amsterdam-Robert-van-Hoed-AUAS-Tharsis-Teoh-PANTEIA.pdf](https://www.polisnetwork.eu/wp-content/uploads/2019/10/5-Charging-infrastructure-for-urban-logistics_Amsterdam-Robert-van-Hoed-AUAS-Tharsis-Teoh-PANTEIA.pdf)



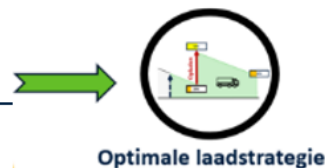
**Ambition:** Urban logistics electrified by 2025

- ~30.000 commercial vans
- ~5.000 freight trucks

Questions:

- How to electrify current operations?
- Where and how to charge?
- Impact on grid?

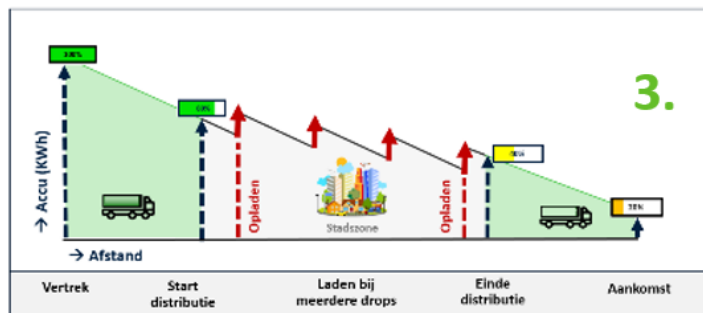
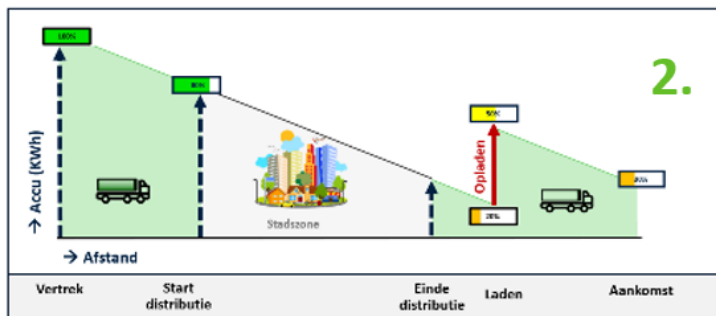
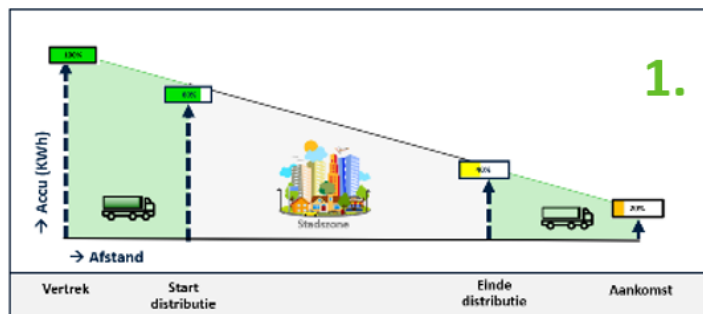
# Charging scenarios



Input = Trips

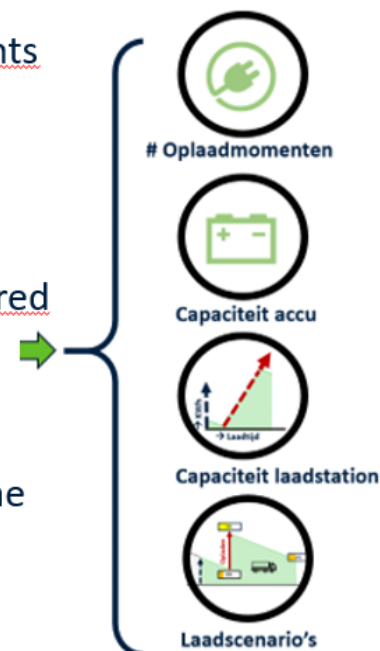
Three charging options:

1. Without intermediate charging
2. Intermediate charging
3. Charging during deliveries (opportunity charging)



## Charging per sector

- ❖ **Retail – Non food:** charging at clients most likely. Remainder at depot.
- ❖ **Retail food:** Depot dominant. For long trips (>100km) charging at clients likely.
- ❖ **Building sector:** Commercial vans dominant at home. Trucks at depot. Charging at building sites optionals – requires innovation.
- ❖ **Postal services:** Mostly at home and at depot. Fast charging not required due to limited range.
- ❖ **Horeca:** Depot charging dominant.
- ❖ **Facilitair:** Depot charging dominant; for commercial vehicles also home charging.
- ❖ **Service logistics :** Home charging dominant.





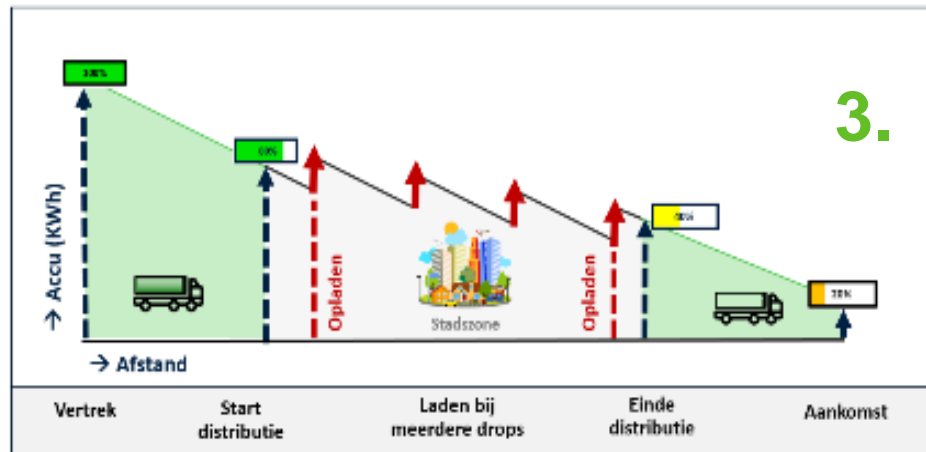


# Business model for interoperable/ shared ultra-fast charging infrastructure

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# ...where on-route charging is required



Source: Connekt study, Amsterdam – ASSURED workshop

## Scenario Depot-Public-Depot (A to C to A)

- charging at depot (overnight) (50-150kW)
- extend trip by public charging OC (-450kW)



## Scenario Depot-Public-Destination (A to C<sup>x</sup> to B)

- charging at depot overnight (50-150kW)
- extend trip by (multiple) public charging OC (450kW)
- charge (overnight) at destination (50-150kW)



Source: Allego – ASSURED workshop

# Towards a business model for interoperable, (shared) ultra-fast charging infrastructure

- **Assumption:** a higher uptake of electric HD-vehicles in the coming years will require that multiple fleet operators and sectors cooperate and potentially need to use the same charging infrastructure to reduce TCO
- **Main questions**
  - What are **user's charging needs/ operational requirements** (e.g. public transport, freight and logistics, utility vehicles)?
  - What **sectors** actually have a need for using shared charging infrastructure (e.g. dependent on daily routes/ driving ranges)?
  - What are **existing challenges** that need to be overcome?
  - What are differences in terms of **locations and charging approaches** (shared public opportunity charging, charging at depots/ in private areas)?
- **Background materials:** <https://www.polisnetwork.eu/news/assured-workshop-bilbao/>

## Guiding workshop questions

- **Policy integration:** How is charging infrastructure planning integrated in your city's SUMP/ other strategic city goals? Which stakeholders were involved?
- **Understanding needs:** knowledge and accounting for the different user's and operator's charging needs and requirements?
- **Business models:** what could increase the business model for providing charging infrastructure for HD-vehicles? What are best practices?
- **Shared and interoperable infrastructure:** What do you think are enablers and challenges in the topic?  
Locations: where should this take place (public, depot)?

# 1. How is charging infrastructure planning integrated in your city's SUMP/other strategic city goals? Which stakeholders were involved in the process?

grid operator city logistical companies carriers national charging agenda

We have a strategic plan for e-charging. Urban freight is not yet part of it.

Not really integrated in the SUMP. Talk with environment and mobility administrations, grid operator mainly.

E-charging should be more prominent in our SUMP - in preparation.

As far as I know, for the moment, only for public charging for light EVs.

We are working to have a charging point network integrated with Sump. We would like to do a study as Amsterdam

Not really, so far. There's a public national network for cars, but not very integrated with the municipality's action.

Transport for London have set a plan of requirements for the next 5 yrs for ev infrastructure; we at City of London- borough, five yr forecast to see how much we need based on take up of EV s across all sectors



# Thank you for participating!

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