Realizing High Power Charging Networks for Europe

ASSURED workshop:
From governance to operations: innovating sectors and services for the full deployment of e-trucks in urban logistics
Bilbao, 27th of September 2019, Frank Verhulst, Team lead Transport as a Business

> Creating the best charging experience

Program of today

Introduction to Allego

Outline MEGA-E project

Heavy Duty charging profiles

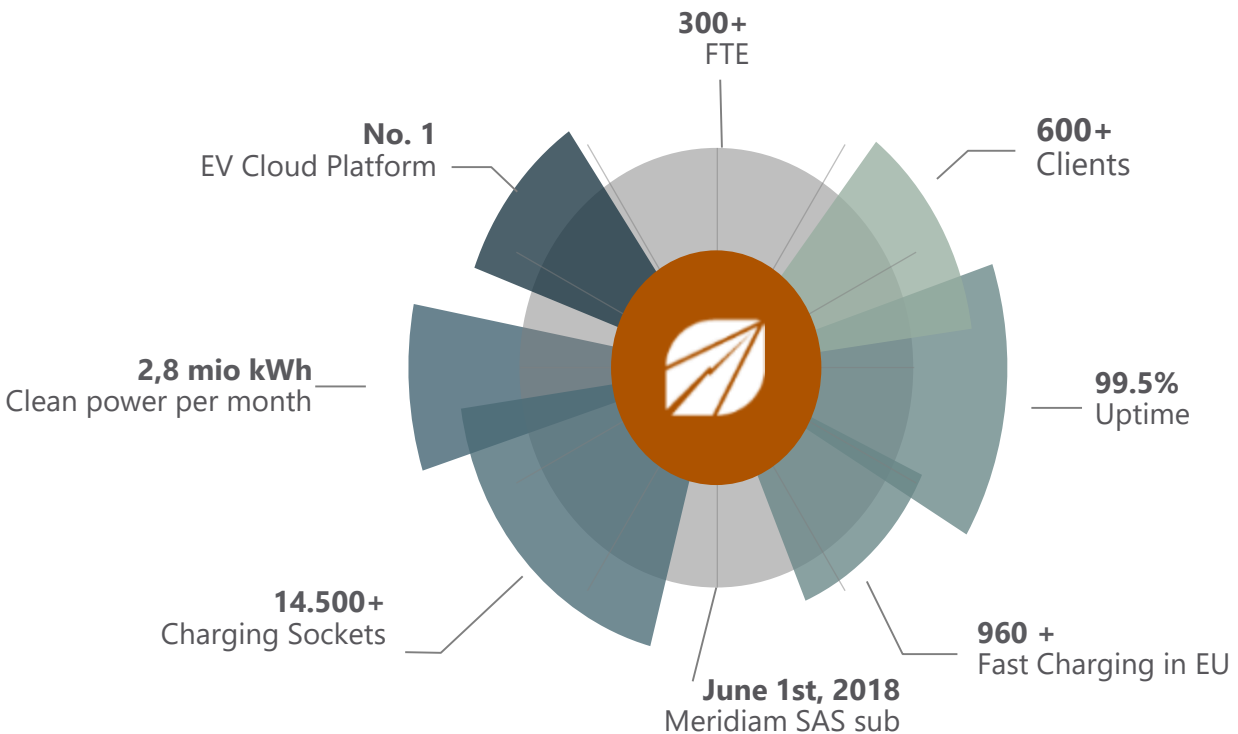
Closing

We are Allego

- A passion and drive for zero emission mobility

Our journey for Zero Emisson Mobility started in 2013, our goal to build a reliable, open, interoperable charging network

Snapshot Allego September 2019



We deliver end-to-end Charging Solutions
EV Cloud Services to Cities, Companies and Consumers

Financial Services

Optional financing and exploitation of charge point network (depending on the business case)

Design & Realisation

Scoping, design, network planning and dimensioning of grid connection. Realisation and deployment of standardised solution portfolio

Maintenance & Service

Continuous full operations and maintenance of the customers' charging solutions, including 24/7 service desk

EV Cloud

Full and future proof IT platform with state-of-the-art functionalities, a.o. operations, billing, analytics, energy management for charging solutions

Our charging solutions offer various power levels to meet any EV driver needs.

Normal charging

1~8 hours

- AC & DC charging
- 3,7 ~ 24kW

Smart charging

1~8 hours

- Integrated AC & DC charging
- Ideal fleet solution up to 100+ sockets
- Load balancing
- Efficient and scalable

Fast charging

30~40 minutes

- 50kW charger

High Power charging

15~20 minutes

- 150 kW – 350 kW charger
- Up to 600kW with pantograph for bus operations
- Multimodal applications (bus / cars) to reduce TCO for operators

All chargers are connected to the EV Cloud system of Allego

Public Transport already evolved to the next level of HPC charging

Pilots up to 100 busses, Smart & Multi modal charging to optimize TCO

Eindhoven

Busoperator: Hermes (Transdev)
Interface: Pantograph
Buses: 43x VDL 18m.
Charger infra: 11x300kW / 22x30kW

Limburg

(Maastricht, Venlo & Kaldenkirchen)

Busoperator: ARRIVA (DB)
Interface: Pantograph / CCS
Buses: 16x VDL 12m.
Charger infra: 4x300kW /4x50kW/10x30kW

Wadden-eilanden

Busoperator: ARRIVA (DB)
Interface: Pantograph / CCS
Buses: 14x VDL 12m.
Charger infra: 4x300kW/3x50kW/8x30kW

Amstelland-Meerlanden

Busoperator: Connexxion (Transdev)
Interface: Pantograph / CCS
Buses: 100x VDL 18m.
Charger infra: 23x450kW / 86x30kW

Den Bosch

Busoperator: ARRIVA (DB)
Interface: Pantograph / CCS
Buses: 14x VDL 12m.
Charger infra: 1x300kW/1x350kW/3x50kW

Differdange

(Luxembourg)

Busoperator: Sales-Lentz (LUX)
Interface: Pantograph (Inv.) / CCS
Buses: 3x Volvo 12.m
Charger infra: 1x350kW / 3x50kW

Largest eBus fleet in Europe

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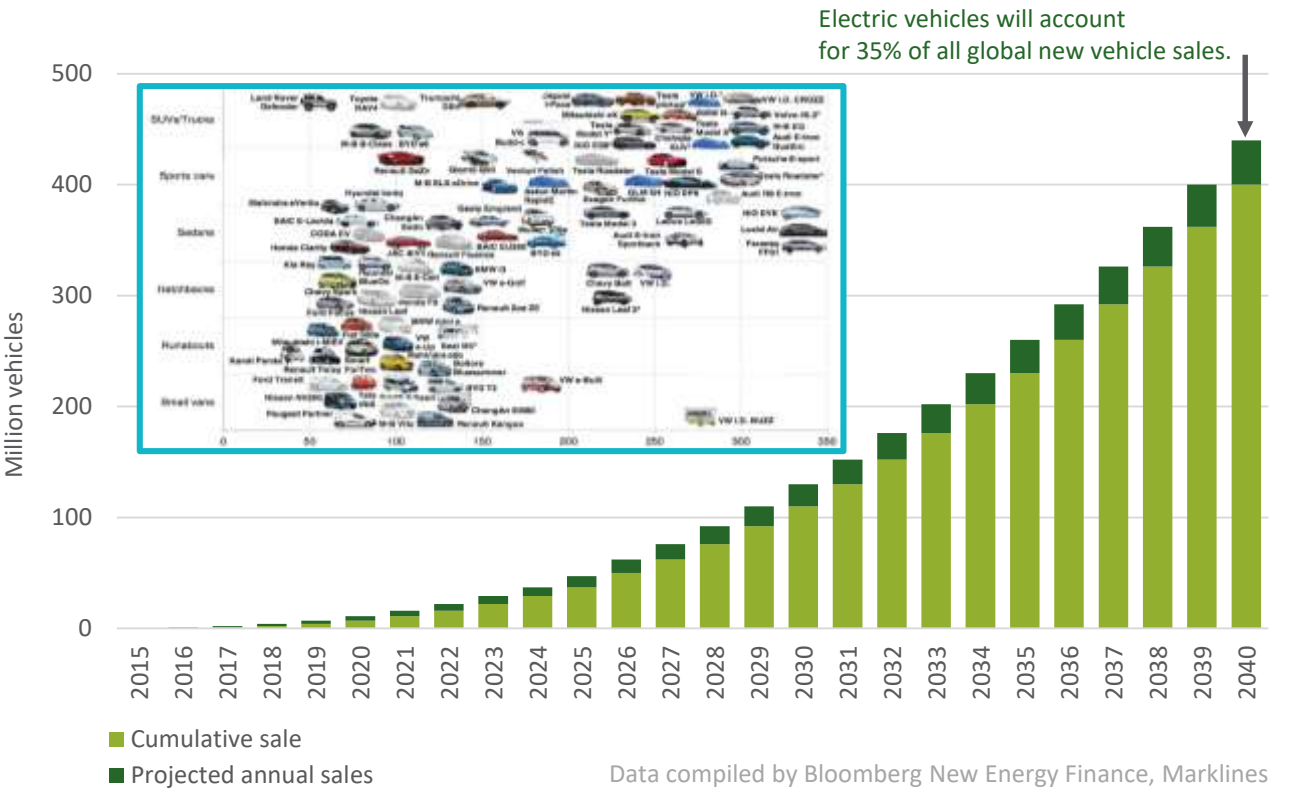
The MEGA-E project

- Metropolitan Greater Area's Electrified
  Creating a European network of ultra fast charging

Sales of electric vehicles explodes due to European policy, demands of cities and shift in car industry



Data compiled by Bloomberg New Energy Finance, Marklines

Mega-E is a large scale third party funded project creating 1250 high power chargers on 322 locations in 20 countries

MEGA-E
an Allego initiative

322 locations, more than 1250 Ultra Chargers

Project connects **20 countries**.

39 Multimodal Charging Hubs in at least 10 metropolitan areas

- Pan-European Ultra Fast EV charging network
- HPC project of scale where Slow (AC), Fast (DC) and Ultra-Fast (HPC) are combined at charging hubs
- Target locations at highway, in metropolitan areas and city rings
- Network: based on **open standards**, **fully interoperable** and connected to renewable energy generation
- Supported by the European Commission

City partners

City of Amsterdam
Gemeente Rotterdam
muenchen
PARIS
ESSEN
VILLE DE LYON
Berlin
toulouse métropole

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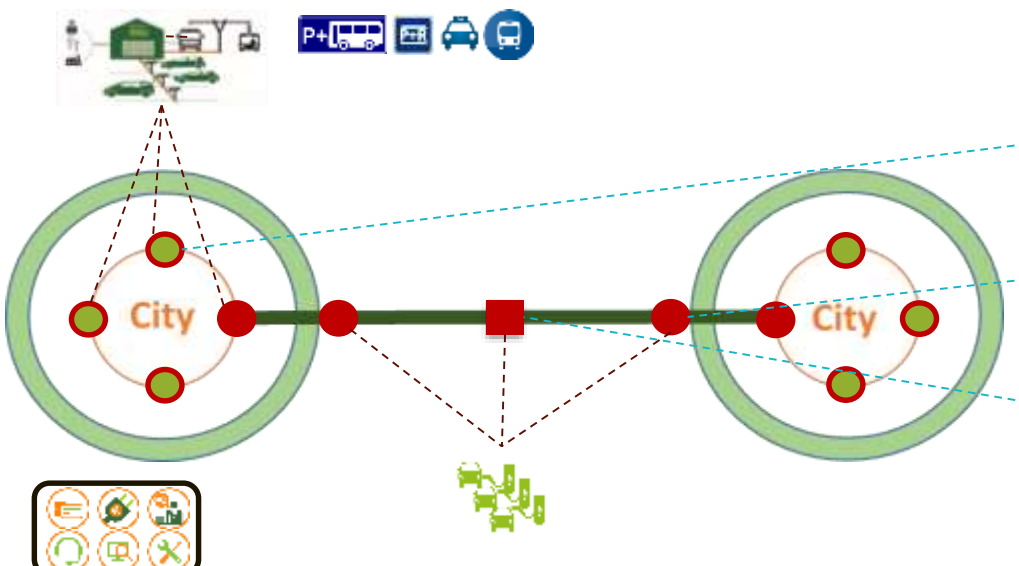
Mega-E High Power Charging European Network

3 type of locations to best cover the needs of a strongly evolving concept of mobility



Allego EV cloud supports EV drivers and B2B

- **Multimodal locations**, located at the key nodes of transportation crossings within European biggest metropoles
- **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

Preferred types locations for MEGA-E

Highway location

- Serves the need of HPC charging on long trips
- Very close to the highway
- Easy to reach from the highway
- Preferably bidirectional
- Has amenities like toilets/shop/restaurant
- Space and available power often a challenge

Multimodal location

- Within the city area of the 10 multimodal cities
- next to transport locations like airports, train or bus stations
- Can combine different user groups by also serving highway demand, commuters and destination charging

City location

- Can combine different user groups by serving highway demand but also commuters and destination charging
- Close to a major road leading into the city or highway in or around a city
- Preferable next to a supermarket or other shopping centre
- Has amenities like toilets/shop/restaurant

Mega-E network throughout Europe

Deployment in 2018

Netherlands: 4 in Operation and **9** in realisation

Germany: 12 in Operation and **34** in realisation

Deployment in 2019

Belgium: 2 in realisation

France: 22 in realisation

Deployment in 2020

- **Austria**
- **Denmark**
- **Estonia**
- **Finland**
- **Ireland**
- **Italy**
- **Latvia**
- **Lithuania**
- **Luxembourg**
- **Norway**
- **Poland**
- **Portugal**
- **Spain**
- **Sweden**
- **Switzerland**
- **United Kingdom**

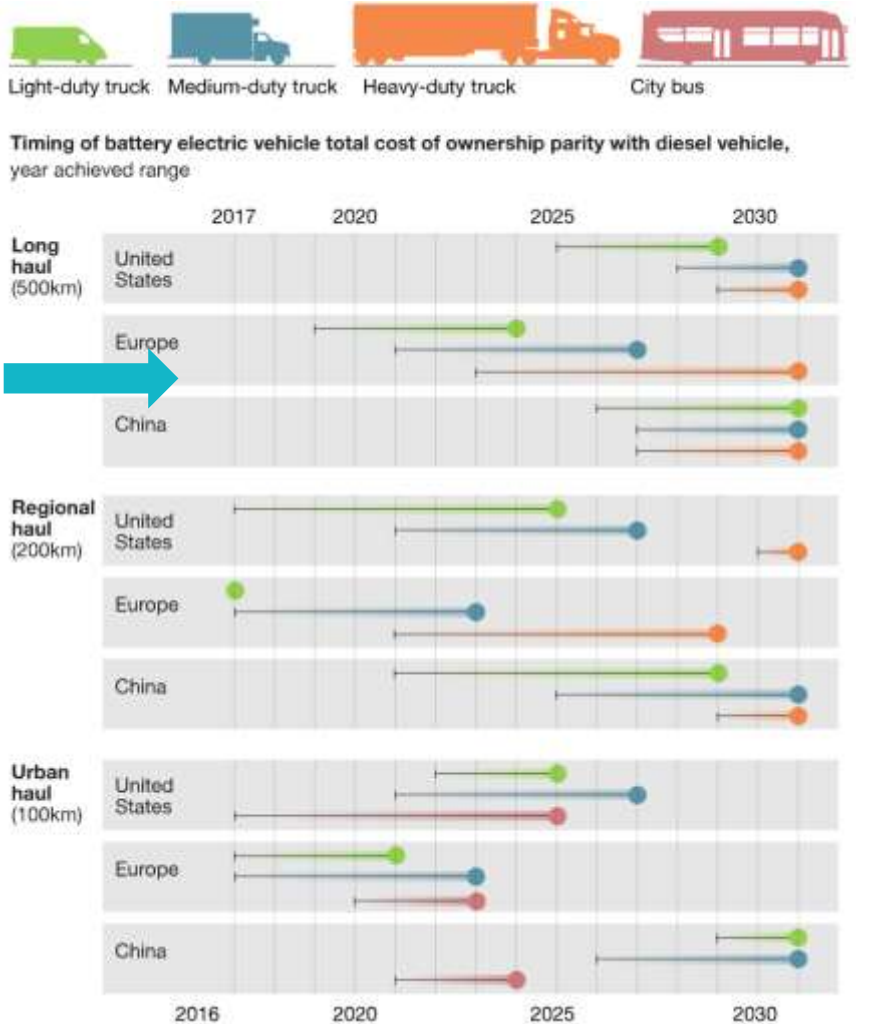
Future Heavy-Duty networks

- Enabling ‘business as usual’ for medium and long-haul e-Trucks and e-Coaches

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** in NL (2018), 31% share DAF, 19,2% share Volvo **15.748**
  - 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



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Allego HD network strategy | Scenario setting

eTransportation will start from depot charging, extended by destination and on-route charging

Scenario Depot (A to A)

- charging at depot **(50-150kW)**
- regularly returning to depot (-150 km)

Scenario Depot-to-Destination (A to B)

- charging at depot (overnight) **(50-150kW)**
- extend trip after charging during docking (150-300km)

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

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

(<300km)

Scenario Depot-Public-Destination (A to C^x to B)

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

(unlimited km)

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Depot Charging (A)

(On-route) Opportunity Charging (C)

Destination Charging (B)

Corridor E-pilot | Concept

WORK IN PROGRESS 2021 - 2023

How?

CONCEPT
- ✓ 12 sites with OC charging facilities for 20+ vehicles
- ✓ 2000km, charging every 75km

ROUTE
1. A2/61 Amsterdam-Eindhoven-Bonn (300 km)
2. A15/3 Rotterdam-Nijmegen-Dortmund (270 km)
3. A16/E17 Rotterdam-Antwerp-Lille (227 km)
4. A73/E25 Nijmegen-Roermond-Luxembourg (290 km)
5. A67/40 Antwerp-Venlo-Duisburg-Dortmund (243 km)

OPTIONAL
1. *E40/42/4 Lille-Charleroi-Cologne-Dortmund (416km)*
2. *France – main corridor Calais-Dover*
3. *Poland – main corridor*

From **'Port-to-Port'** to **'Port-to-Destination'**

Logistic Operator | OC location | Port location