EV-Charger & Grid Connections

J. Theuns | Kleefse waard | 11-10-2022

EXIDE® TECHNOLOGIES | ENERGIZING A NEW WORLD

E / ATEPS
A company of Exide Technologies

- >150 years combined experience in battery technology
- Power electronics is an integral part of our designs and business
- Designed to meet standards and applications rather then just offering off-the-shelf products.
- In-house production creates flexibility to best meet the application(s)
- Own control software based on C#; flexible, fast and adaptable.
- Part of advisory boards such as NEN, PGS, etc.
- **Acquired by Exide Technologies in 2021**

1. **Founded in 2014**
2. **Own product design**
3. **Turn-key projects**
4. **Strong R&D**
5. **Technological performance**
6. **After Sales Service**

We have combined **global expertise**.

Combining well-known brands with experience, cutting-edge technology and an unrivaled sales & service network

EXIDE TECHNOLOGIES

Since **2020**

Exide Technologies a standalone global company headquartered in Europe

E / ATEPS
A company of Exide Technologies

Some just go along for the ride.

We are one of the frontrunners.

E / ATEPS
A company of Exide Technologies

Typical Applications

100%
Inhouse system design

>99%
Uptime for systems

>70MWh
Installed base

- Differed use of PV-Energy
- Energy trade through EPEX (imbalanc
- Grid Frequency Stabilisation (FCR/aF
- Ultra-Fast Peak Shaving
- Congestion Management
- EV-charge Buffers
- Mobile systems

E / ATEPS
A company of Exide Technologies

Technological performance for every industry.

We work on future technologies as answers and solutions to energy and power issues to support the energy transition and carbon neutrality.

Transportation

Commercial Vehicle
- Public Transport Sector
- High power & Capacity EV-charge buffers
- First UF-Charge buffers

Light Vehicle
- Grid support for EV-charge islands
- Ultra Fast response systems
- Different sizes and capacities.

Industrial

Motive Power
- Market-leading, fast-charging, high performance batteries
- Lithium-ion based solutions
- High efficiency systems & management software

Network Power
- Utility scale systems for grid stabilization
- Open interface for easy integration
- Scalable in power and battery capacity
- State of the art storage control system

EV-Charging – The issues

- **Low Hanging Fruit**
  - The low hanging fruit, big grid connections, is gone!

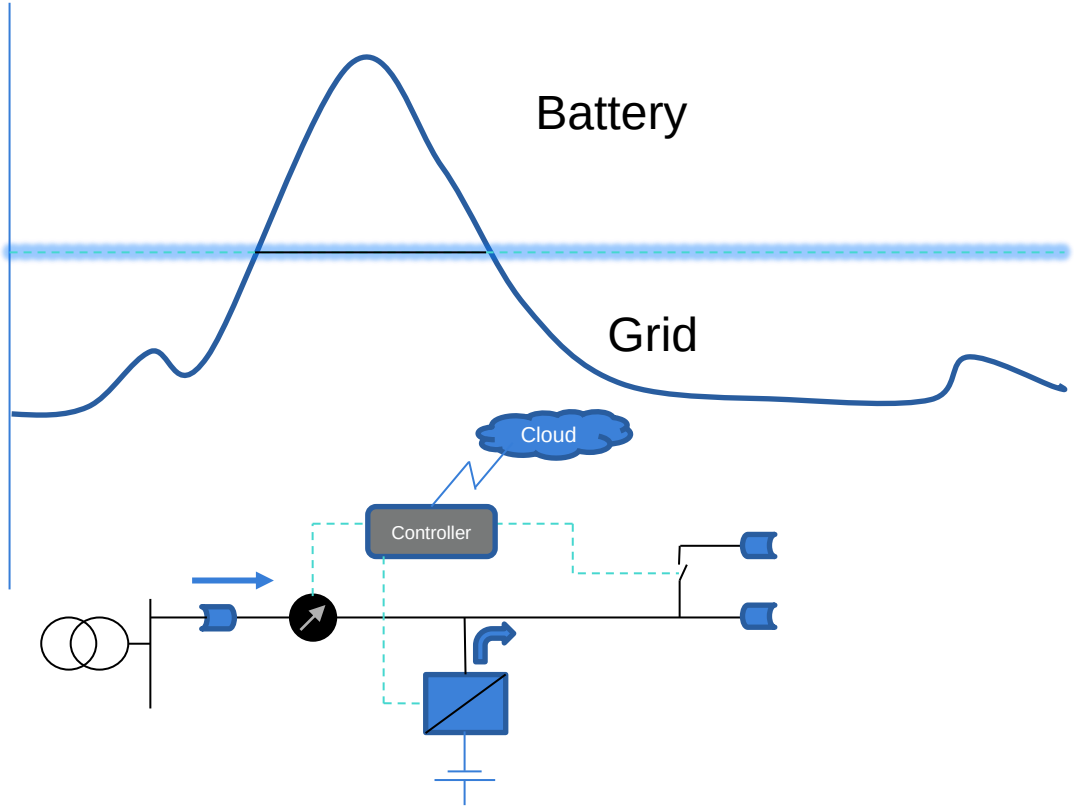
- **Now, available locations for new DC EV-Chargers are limited**
  - New, large, grid connections can take >3 years
  - Shops at fuel stations need supplementary income for EV-charger users
  - Distribution centres are electrifying too

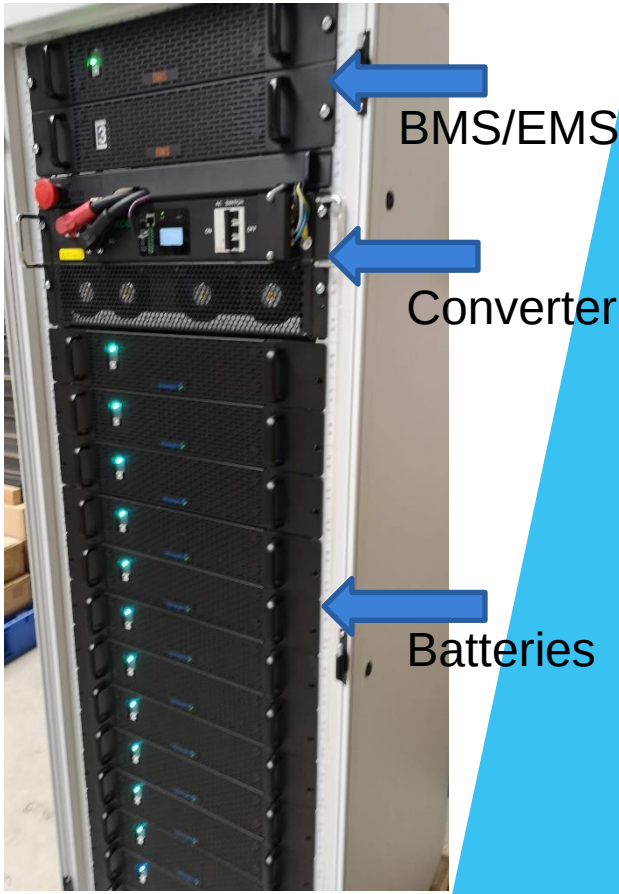
- **The need for more DC EV-Chargers grows**
  - Electrification goes quicker than expected, EV-Charger should keep up
  - Faster recharge of EV's, requires even bigger grid connections

EV-Charging – The solution

➔ One or more PWR Boosters add power to the grid connection to meet the requierments of the vehicle that is being charged

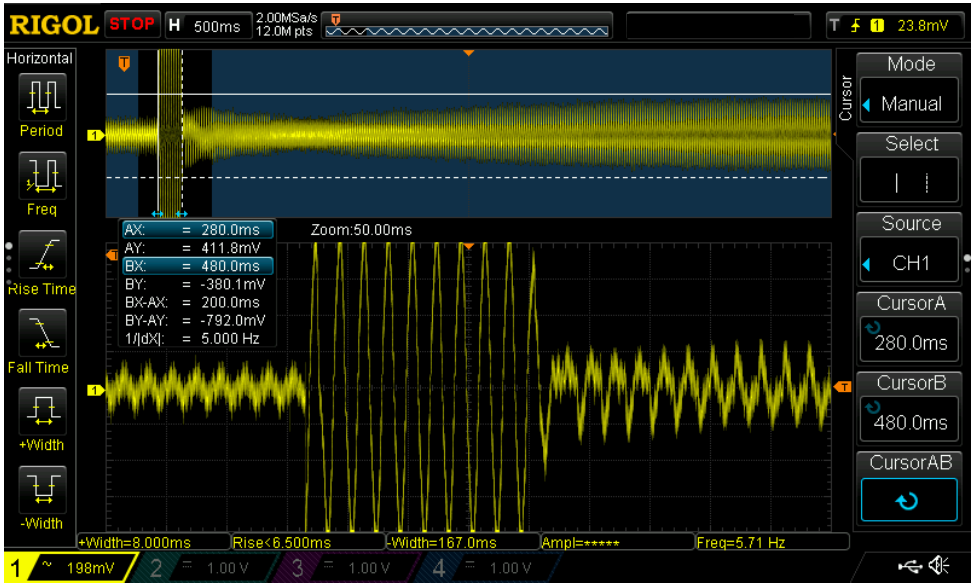
EV-Charging – The criteria





EV-Charging – Speed

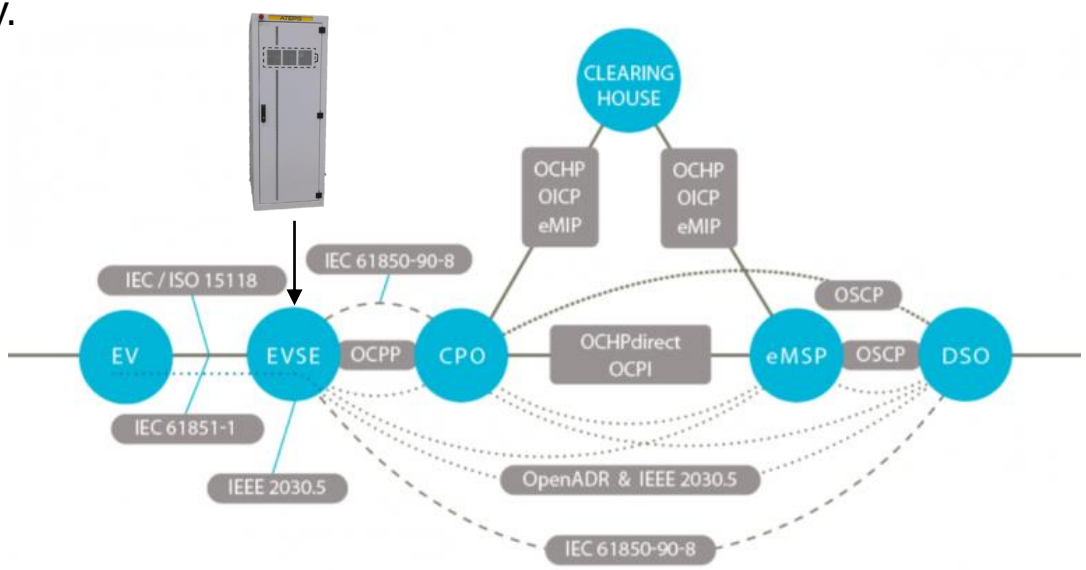
- **The grid ‘boosting factor’ is unlimited…**
  - Even a 3x80A grid connection can be boosted
  - The response time of the system is **critical**



200mSec

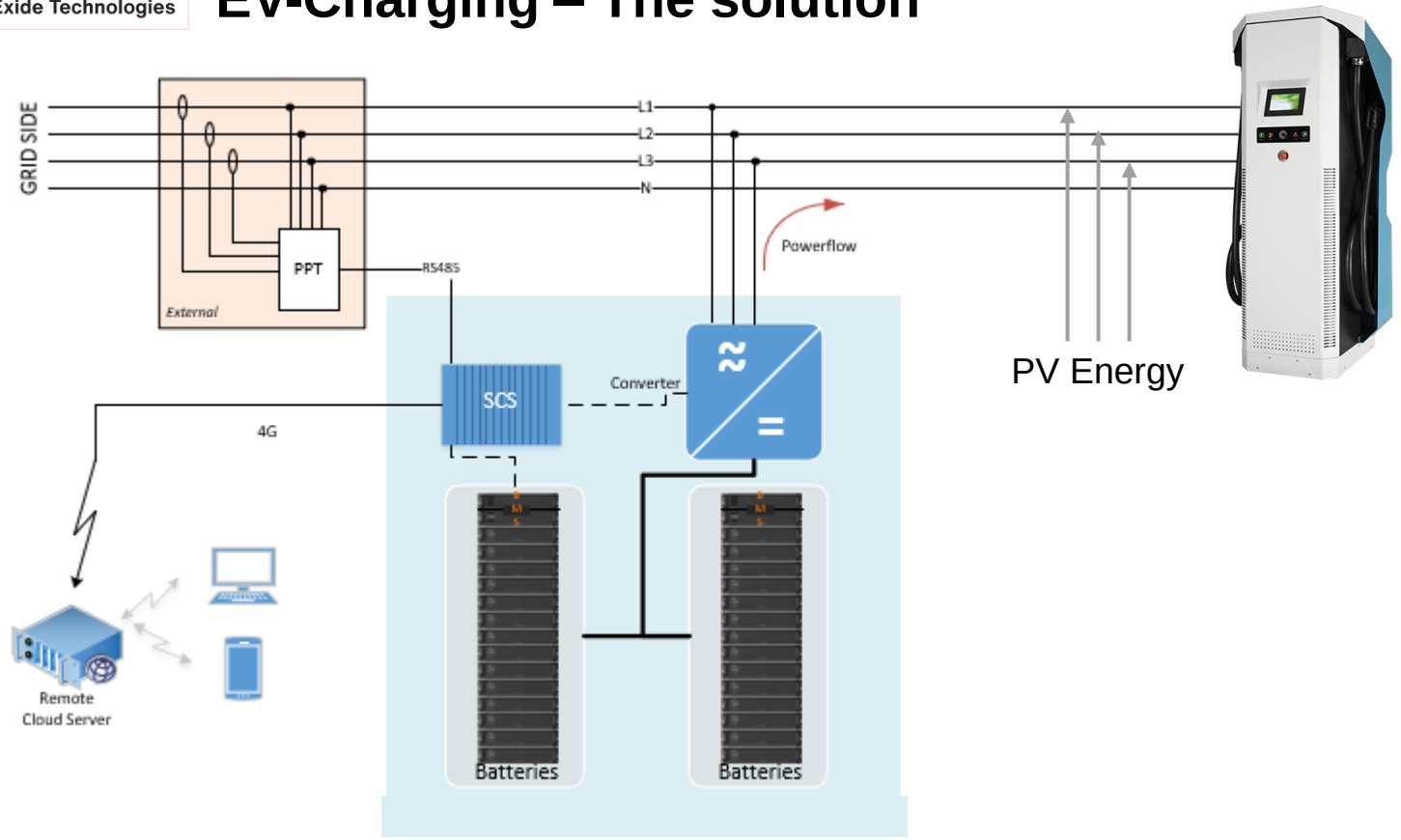
EV-Charging – Communication

- **No standard for direct communication with EV-Chargers**
  - With direct communication the EV-Charger's power can be influenced in real time.
  - Needed for a higher than expected duty-cycle > discharged PWR Booster battery.



E / ATEPS
A company of Exide Technologies

EV-Charging – The solution

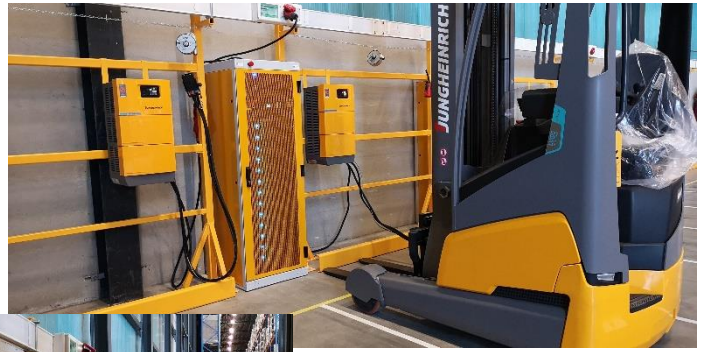


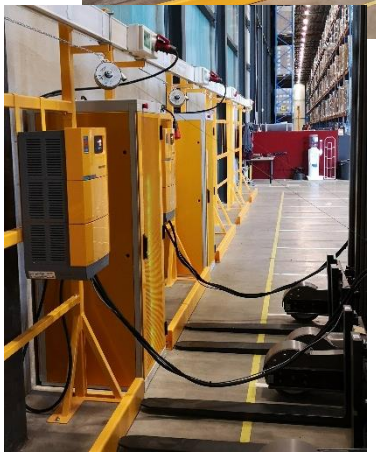
EV-Charging – Solutions

- Q8/Tango – Fuel Stations – 120kW/140kWh → EV-Chargers
- UNIBUSS Oslo– 4x 1MW/1,1MWh → Public & Private transport
- NEOM City – Saudi Arabia – 15MWh → µGrid for Public & Private transport
- Ferwert Fuels – 120kW/140kWh → EV-Chargers
- AVIA Maarhees – 2x 120kW/140kWh → EV-Chargers
- Jungheinrich – 33x 30kW/35kWh → Internal transport
- Total Energy – 240kW/280kWh → Last Mile transporters

EV-Charging – Solutions

- Q8/Tango – Fuel Stations
- 120kW/140kWh
- EV-Chargers





- Jungheinrich
- 33x 30kW/35kWh
- Internal transport

EV-Charging – Solutions

- NEOM City – Saudi Arabia
- 15MWh / 5MW
- µGrid for Public & Private transport

- Total Energy
- 240kW/280kWh
- Last Mile transporters

Thank you

EXIDE TECHNOLOGIES | ENERGIZING A NEW WORLD