Innovations in V2x: underground FlexGrid energy system

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CEO PRE power developers
PRE Power Developers - Quick facts

1. Founded 1984, 50 people - R&D
2. Development of Power Electronics
3. For EV charging since 2009
4. Our focus is on DC fast charging in the range of 6kW - 1MW
5. PRE has partnered with various charging OEM’s in Europe, USA.
6. Part of Heliox-energy group
Heliox is the Dutch no. 1 e-mobility solution provider.

Electrification projects for:
- e-Busses
- e-Trucks
- e-Vehicles

**Hardware**
Chargers from Heliox

**Software**
Backend from Chargesight

**Energy mgt**
Smart (bidirectional) charging by Recoy
e-Bus

The largest fast-charging network in the world

Amsterdam Airport Schiphol

250 e-Buses
31 MW charging solution

Zero emissions goal

Improved air quality in the vicinity

Quick turnaround and installation

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e-Bus and e-Car

Helping Glasgow make the e-transition, [video](#)

Caledonia Glasgow depot

300 e-Buses
162 Chargers of 150kW
e-Cars

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180–360 kW Flex Charger

- Built to last for 15+ years
- Easily upgradable for growing fleets

Charging Estimator
Time to power up to 100km

180 kW Flex PANTO UP/DOWN Charger
- 30 min
- 45 min

360 kW Flex Charger
- 15 min
- 20 min

CCS-1, CCS-2

Design for reference only. Design and product specifications are subject to change without notice.
Dual output
300 kW
Rapid Chargers

Ease of use with a touchscreen and a simple tap payment terminal

Excellent serviceability – one person can easily upgrade the modules

Charging Estimator
Time to power up to 100km

- 55 min CCS
- 8 min CHAdeMO AC
Bidirectional power flow between grid and the vehicle (V2G) helps smoothen daily demand curve/power generation.

**Situation without V2G**
- Evening peak in electricity demand further increased by additional EV charging
- Misaligned with peak in solar generation during daytime

**Situation with V2G**
- EV charging shifted to match abundant solar generation during daytime
- Discharge during evening peak to lower peak demand and supply requirement
- Flatten overall demand curve

Source: Expert input
Roadmap and strategy Heliox-Energy group
Heliox references in V2G

**Europe:**
- Ovo/Indra V2G
- Eon/Virta V2G
- Shell Recharge V2G
- DeelDeZon V2G
- Aircon V2L

**USA:**
- FermataEnergy V2G

*Innovate UK trial with Heliox Technology: monthly credits on bill*
Fermata Energy | Vehicle-to-everything
Park it. Plug it. Profit.

Are you a Fleet Operator? Choose a charger that produces a positive ROI - with Fermata Energy bidirectional charging

10-Year Customer TCO

Fermata Energy charger earns €12k profit

Single directional charger incurs €18k cost

V2X OWNER € 12,435

SINGLE DIRECTIONAL OWNER €(17,567)

€30k swing in customer value based on a 20kW charger

Contact: info@fermataenergy.com
Confidential and proprietary
What is needed for V2G to happen........

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Provider</th>
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</thead>
<tbody>
<tr>
<td>e-Fleets, with bidirectional capability</td>
<td>Garbage truck fleet</td>
</tr>
<tr>
<td>Bidirectional chargers</td>
<td>Heliox chargers</td>
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<tr>
<td>Backoffice</td>
<td>Chargesight</td>
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<tr>
<td>Aggregation software provider</td>
<td>Recoy</td>
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<tr>
<td>Energy market that allow any unit of flexibility to be offered to the Market</td>
<td>Government</td>
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<tr>
<td>Facilitate energy congestion management market</td>
<td>Government</td>
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**RESULT:**
private sector will Invest in Smart Software, Government does NOT have to invest in infrastructure
Thanks to this box my car is charged directly from solar energy and my car can power my house too!
Flexinet

For dwellings with a private charging facility
For small offices

Enabling:
An integrated solution: PV + home battery + V2G
Compact and cost efficient
Higher energy conversion efficiency
V2G + direct solar charging + home storage
Challenges

**Use-case demand**
- A scalable universal method to install the equipment
- Aesthetics
- Safety

**Management**
- Control of all assets in the system
- Integration with other assets (electrical- / heat storage)
Underground system

1. Public space is very limited/expensive. Installing the integrated system underground could solve this issue.

2. Only the charge post with plug is above ground. The technology, (power) electronics and the battery are underground ground.

3. The regulations surrounding lithium-ion batteries are becoming increasingly stringent. An underground battery is a safe solution.

4. ‘The most beautiful charger is an invisible charger.’
Underground system (basic design)
Energy management

To effectively operate the innovative system, in this project we develop:

• Smart algorithms for energy mgt (DUT)
• Integrated control with heat storage via a dedicated/universal protocol (S2 protocol)
• A physical embedded controller, connecting all the assets (PRE EMS)
Get in touch

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