

Vehicle2Grid and Smart Charging: Learnings from 6 pilot cases

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Vehicle To Infrastructure (V2X):



Utilizing battery electric vehicles for energy services (V4ES)



Without SC or V2G

With SC or V2G





Loughborough



Cenex employee home owner

Kortrijk

(BE)

(UK)

The City Depot of Kortrijk

(UK)

Leicester City Hall

Amsterdam(NL)Johan Cruyff Arena

Oslo

Scale

(NO)

Vulkan Real Estate

Amsterdam

(NL)

FlexPower Amsterdam

Q Loughborough (ик)

EMS

Cenex employee home owner

4 kWp

2 kWh

1x V2X



Pilot characteristics

- A single household
- Nissan Leaf + PV + static battery + V2G
- Autonomy increase limited (5%)
- Grid impact reduction >10%

Key findings

Incompatibility of hardware

- Communication and data issues
- Size limits business case (energymarkets)

O Kortrijk (BE) The City Depot of Kortrijk



Pilot characteristics

- Depot building & sport facilities
- PV + static battery + V2G + e-vehicle/bikes
- Limited added autonomy (5%)

Key findings

- Lacking energy management system
- Sourcing bi-directional charger



Ф Leicester (ик)

Leicester City Hall





90x

5x

4x

68 MWh

Pilot characteristics

- City hall two relocations
- Solar + V2G charging
- Still in develoment.



Limited expertise on V2G – relative high complexity

Key findings

Internal support: chargers, bi-directional, solar.

Johan Cruijff Arena

2.8 MWh

14x



EMS

Pilot characteristics

- Static storage: (140 Nissan Leaf Battery packs)
- Frequency Containment Reserve (FCR)
- Recently installed one V2X charger and 14 fast chargers

Key findings

- 1.13 MWp Different suppliers V2G
 - Communication & compatibility challenges
 - Trading energy market positive for business model

Oslo (NO) Vulkan Real Estate



Interrea 📖 North Sea Regior



EMS

1000

50 kWh

104x

Pilot characteristics

- 100 AC sockets semi-fast wall box charging points with SC capability (22 kW)
- 2x (4 sockets) DC fast charging (50 kW) with ChaDeMo and CCS
- Battery supports the garage at peak demand moments

Key findings

- Importance of good EMS to reduce grid impacts on this size
- One company responsible for whole system
 - Choose own charging speed



Ó Amsterdam (NL) Flexpower Amsterdam





Pilot characteristics

- Smart Charging (SSC) profiles: lower speed at peaks & higher at "valleys"
- Higher speeds when sunny





PRIORITIES

PROCUREMENT

PERSPECTIVE

Key takeaways

Price and availability of bi-directional charging units are key barriers

Compatibility of the V2G-technology requires major development Also Smart Charging requires technical development.

Smart Charging holds significant promise for grid impact reduction In cases (large scale) V2G may hold potential in long term. Amsterdam University of Applied Sciences

E-mobility getting smart with data

CREATING TOMORROW

Robert van den Hoed, Simone Maase, Jurjen Helmus, Rick Wolbertus, Youssef el Boyhassani, Jan Dam, Milan Tamis, Bronia Jablonska

More on charging infrastructure

Publication *E-mobility: Getting Smart With Data*

30 short research summaries on optimizing charging infrastructure development for electric vehicles

Download at: https://tinyurl.com/smartwithdata



Thank you for your attention!

