GEMEENTE Arnhem

Interreg North-West Europe CleanMobilEnergy
European Regional Development Fund

CleanMobilEnergy Project Introduction

MARCH 2019

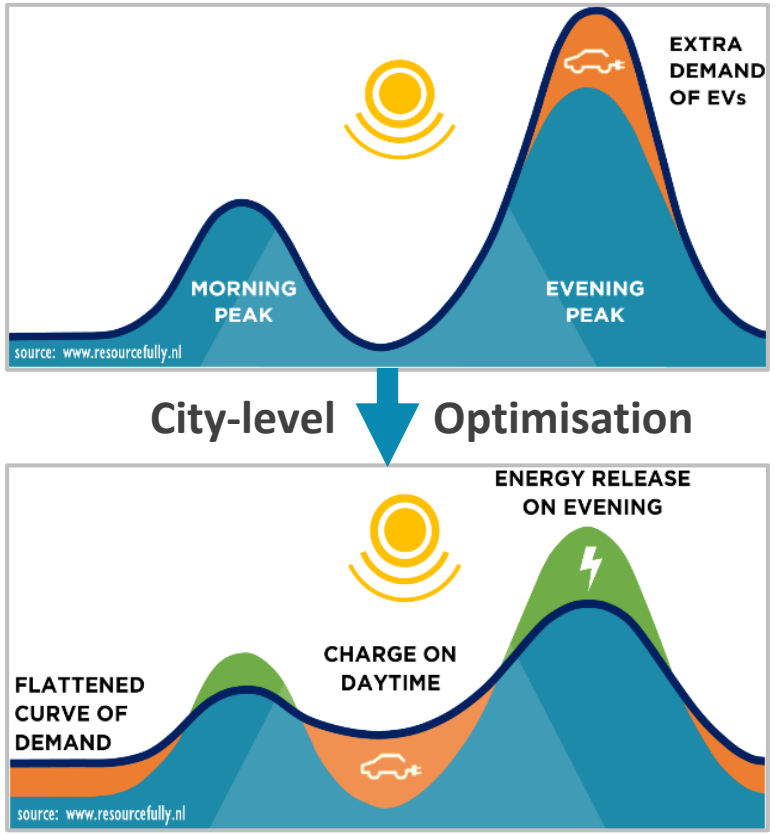
Resourcefully

Project objective

CleanMobilEnergy aims to reduce greenhouse gas emissions in cities by combining renewable energy sources energy storage and the charging of EV's using a innovative energy management system (iEMS).

Critical themes for the iEMS are:

1. Interoperability
2. Scalability
3. Integrating monitoring and control of multiple devices



Project Partners

Lead Partner

Gemeente Arnhem

Sub Partner

DNV·GL

Nijmegen

Project Partners

Transport for London – Every Journey Matters

Nottingham City Council

ElfI Tech

Luxembourg Institute of Science and Technology – LIST

POLIS

IAU – Institut d'Aménagement et d'Urbanisme – îledeFrance

cenex

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CleanMobilEnergy Main Components

CleanMobilEnergy main challenge is the transnational development of an interoperable energy management system, iEMS for all cities:

- PV generation
- EV-fleet smart-charging
- Stationary storage
- Multiple flexible and non-flex city-consumption patterns
- Vehicle 2 Grid-solutions
- Near City Wind-energy generation
- Etc. etc.

City pilots

Arnhem

Nottingham

Schwäbisch Gmünd

The City Pilots in CleanMobilEnergy will act as launching pads - test-beds for implementation and improvement of the system in diverse environments:

- user groups
- city-situations
- supply/demand profiles
- regulatory systems
- energy markets

Pilot example – Arnhem

EV charging Arnhem

Harbour (Cold ironing)

ENERGIEMANAGEMENT-SYSTEEM (EMS)

Solar farm (10MW)

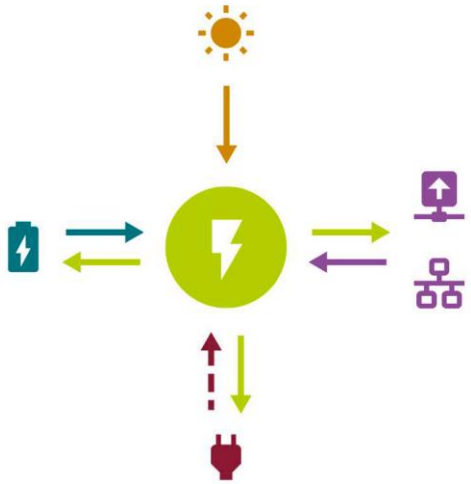
Storage 0.5MWh

Energy management

Optimalisatie (€ / CO_2)
Prijs of CO_2 optimalisatie
'Eiland' of 'Netwerk' modus
Emergency Demand Response

Opwekking
Geïnstalleerd vermogen
Locatie efficiëntie
Opwekking
Voorspelde opwekking

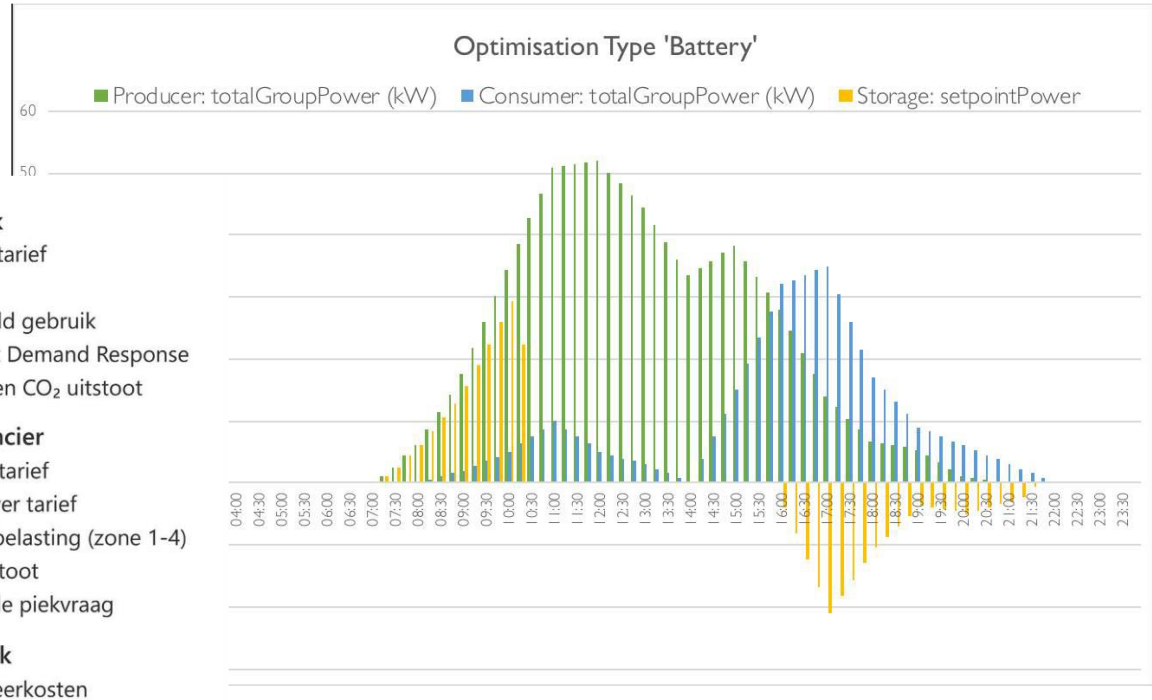
Opslag
Opslag vermogen
Genivelleerde opslagkosten (LCOS)
Laad of ontlaad vermogen



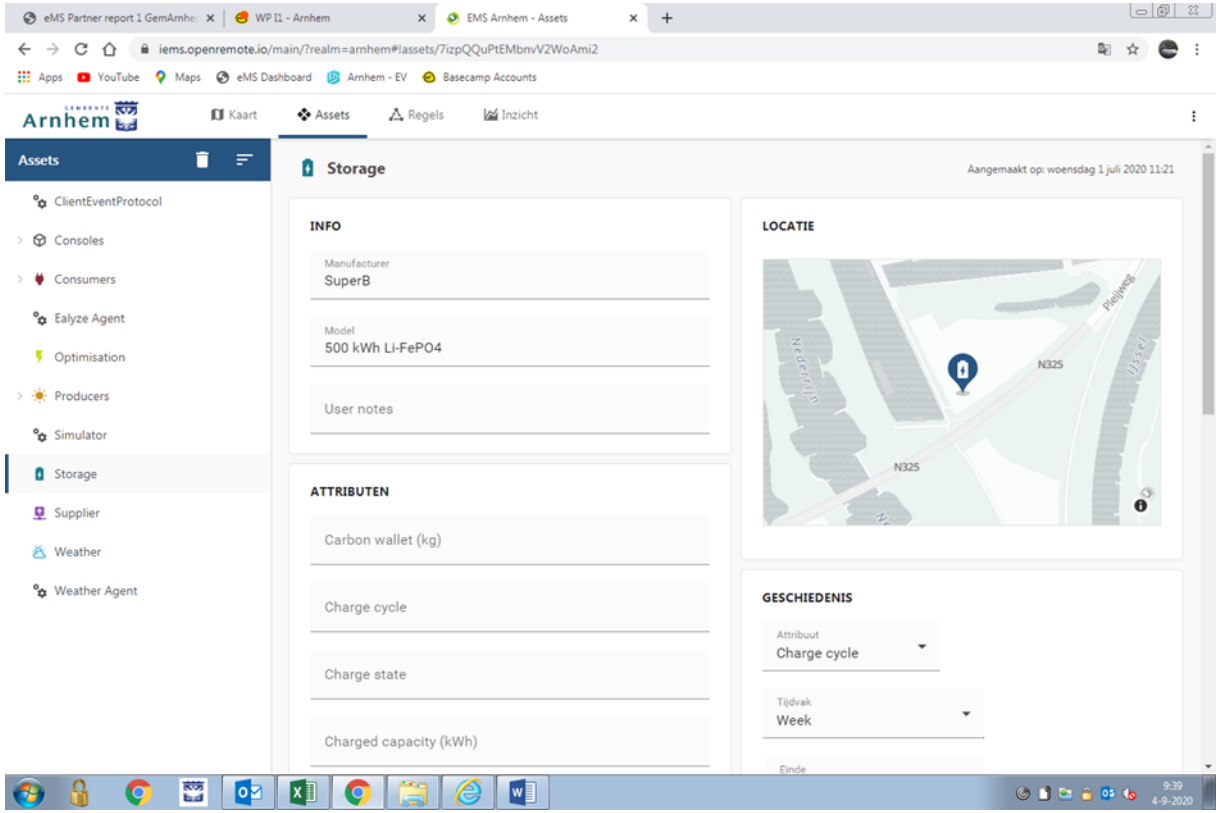
Gebruik
Energie tarief
Gebruik
Voorspeld gebruik
Prioriteit Demand Response
Vermeden CO_2 uitstoot

Leverancier
Energie tarief
Teruglever tarief
Energiebelasting (zone 1-4)
CO_2 uitstoot
Maximale piekvraag

Netwerk
Netbeheerkosten
Aansluitkosten



Energy management



Lessons learned

Cable pooling is difficult: to share responsibility between different owners (wind and solar)

Sharing a grid connection: make sure a contract is signed before operation….what costs are included?

All parties should be partners: beggars can’t be chosers

Governance

- Two cases: behind the meter or through the grid
- Behind the meter: interventions are possible
- Through the grid: only suggestions are possible
- City Pilot Arnhem: multiple stake holders, grid who is in “charge”?
- Public authority is no longer willing to intervene, only facilitates.. So who is next?

Thank you – any Questions?

For more information, visit:

http://www.nweurope.eu/cleanmobilenergy

Or contact Peter Swart

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Extra slides

New projects for iEMS

Neighbourhood energy system plus battery

Solar carport with charging and building

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System components in Arnhem City Pilot

- 10 MW **solar field**, which might link to the wind generation in the future,
- 0.5-1.0 MWh **storage** with flow batteries,
- Various Allego's **charging points** in the city to be included,
- A dock in **Arnhem harbour** for cruise maintenance (**cold-ironing**),
- **Existing grid** to be connected to the system

System functionalities in Arnhem City Pilot

- **Forecasting**
  - Solar **generation** forecast based on the upcoming weather condition and PV capacity,
  - **Demand** forecast in the harbor and EV charging points
  - **Energy flow** and amount for **storage** forecast, amount going to/from the grid