CleanMobilEnergy
Using renewable energy for charging

December 2020
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
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.
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-situation governance**
- supply/demand profiles
- regulatory systems
- energy markets
Governance in Arnhem
producers and consumers connected through the grid

EV charging Arnhem

Solar farm (10MW)

Harbour (Cold ironing)

Storage 0.5 MWh
Energy management

**Optimalisatie (€ / CO₂)**
- Prijs van CO₂ optimalisatie
- 'Eiland' of 'Netwerk' modus
- Emergency Demand Response

**Opwekking**
- Geïnstalleerd vermogen
- Locatie efficiëntie
- Opwekking
- Vooropgestelde opwekking

**Opslag**
- Opslag vermogen
- Geïnvesteerde opslagkosten (LCOS)
- Laad of ontlad vermogen

**Gebruik**
- Energie tarief
- Gebruik
- Voorspelde gebruik
- Prioriteit Demand Response
- Vermeden CO₂ uitstoot

**Leverancier**
- Energie tarief
- Teruglever tarief
- Energiebelasting (zone 1-4)
- CO₂ uitstoot
- Maximale piekvraag

**Netwerk**
- Netbeheerkosten
- Aansluitkosten
Energy management
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 at
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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