BUILDING A LOCAL ENERGY COMMUNITY
LOCAL ENERGY COMMUNITIES

Renewable energy directive
Energy market directive
ELECTRICITY TARRIF

Cost reflective

Dump
ELECTRICITY TARIFF

Cost reflective

- Energy component
- Distribution components
  - Grid costs
  - Meter rent
  - Subsidies rational energy use
  - Costs related to energy poverty
  - Maintenance for public lighting
  - Obligation to buy up green certificates
  - Reduction of regularly deficit
  - Public contributions CHP
  - Charges and levies
- Transmission components
  - Maintenance and operation of infrastructure
  - Operation of electric system
  - Reserve power and black start
  - Market integration
  - Offshore windturbine connection
  - Green certificates
  - Strategic reserve
  - Subsidies on CHP, RES and rational energy use
  - Contribution on masts and slots
- Federal charges
  - CREG (Commission on regulation on electricity and gas)
  - Denuclearisation
  - Kyoto
  - Protected clients (energy poverty)
  - Heating subsidy
  - Energy contribution
  - Prosumer tariff

Dump
EFFECTIVE FLEXIBILITY

Flexible

Relevant
AGGREGATION

Market development  Value
Unique Living Lab
  Battery Lab (Lead Acid/Lithium/Ni-Fe)
  Thermal Lab (VC/PVT/HP/SEASONAL/GEO)
  Electric Vehicles & Chargers (Tesla Model X – BMW i3)
  Smart Appliances
LOCAL ENERGY COMMUNITIES
LEC TRANSITION
OPHEMSTRAAT — OUD-HEVERLEE

Energy Production
- Photovoltaics (Solar ~60 kW)
- Fuel Cell (Gas to Electricity 1kW)

Energy Storage
- Living Lab – Battery Lab (14kW/50kWh Li-FePO4)
- Neighborhood Battery (90kW/90kWh Lithium-Ion)

Flexible Devices
- EV’s & Chargers (6 Full Electric & 1 Hybrid ~400kWh)
- Heat Pumps
- Electric boilers
COMMUNICATION CHALLENGES

Communication = Essential in the LEC = Coordinated Energy transfers
- New Houses = Isolation = no GSM/3G/4G/LTE inside
- WiFi doesn’t penetrate the building / basement
- Frequent Internet Connection Dropouts

Pay for use of the neighbor’s internet connection?
Data & Energy Cost of Data Transfer?
Load Availability (EV gone during the day)?
INTEROPERABILITY

Car does not talk to charger

ABB doesn’t talk to ABB
THEORY ≠ PRACTICE

Model predictive control

Start from simple and robust, the rest can be done later.
SOME DATA ON DATA

- 6 MB of data per day
- MPC integration: 960 exchanges with US daily
VACUUM SOLAR COLLECTORS

Energy production and efficiency

![Graph showing energy production and efficiency for months from June 2017 to April 2018.](image-url)
PVT on 5/5/2018

Time of day (hr:min:sec)

Power (kW)

SOC (%)

Qth
Qel
SOC
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*Net extra yield for PVT set-up ($W_{el}$)*
QUESTIONS?