Integrating clean energy and e-mobility for the city's energy transition

HUGO NIESING, RESOURCEFULLY

SOLARISE 14TH MAY 2019

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Resourcefully is an innovative boutique consultancy and cleantech developer based in Amsterdam, The Netherlands.

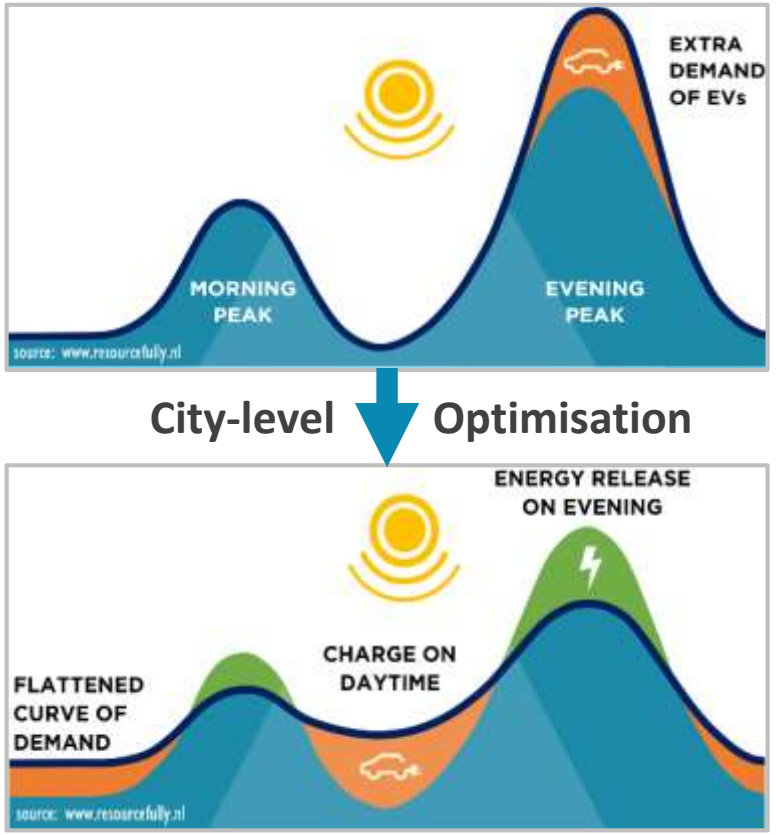
Our mission is to accelerate Europe's sustainable energy transition.

We develop and manage projects and services for sustainable city development.

Our focus is on optimal integration of renewable energy and electric mobility in cities.

We advise both public and private organisations on strategic development that embeds innovation into processes.

We leverage our experiences, expertise and networks in this area to work with Local, National and European stakeholders.



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Our Activities

1. European innovation projects

2. Technology for city energy transition design

3. Stakeholder engagement

4. Amsterdam Energy Living Lab

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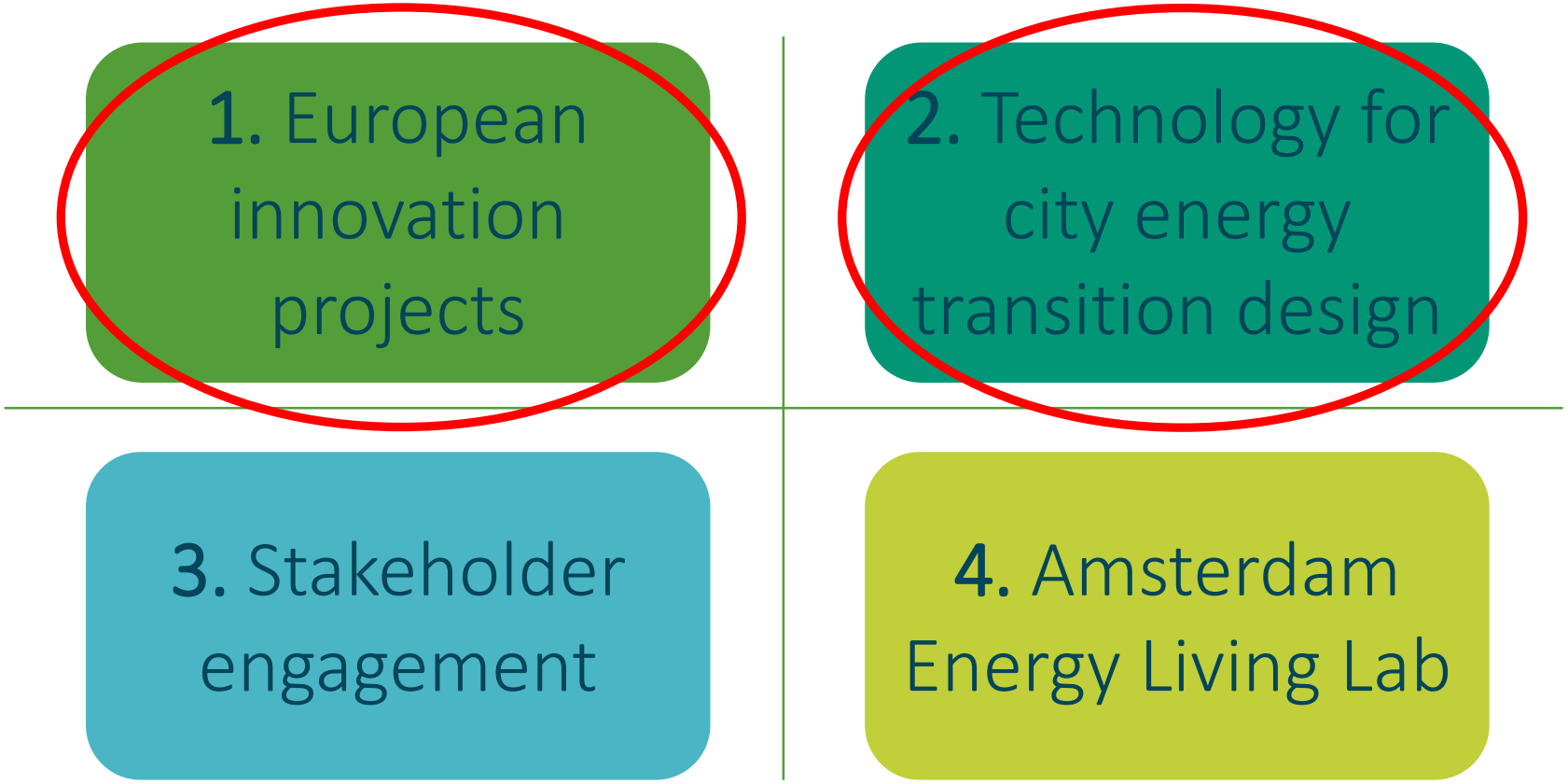
Our Activities



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E-mobility & Renewables in the City

Developments:

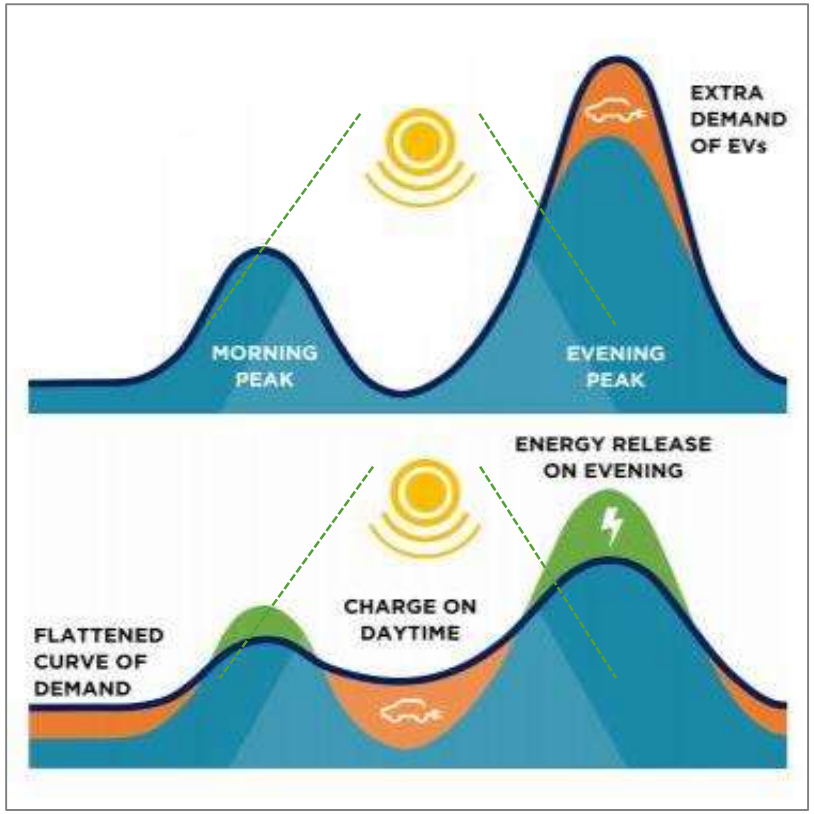
- European cities are moving massively into electric mobility: EVs, but also buses, freight water transport, bikes, etc.
- Renewable energy in the city is also growing.

Challenge:

- Mismatch between production and consumption

Solutions:

- Smart charging of EVs
- Storage
- Vehicle 2 Grid
- Flexible energy use



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Project examples

1) Towards neighbourhood energy independence

Through the work with city governments, we developed an open source tool to visualise real energy data in a neighbourhood. On top of that the energy & mobility dashboard optimise energy flows using smart charging of electric vehicles, heat pumps, stationairy storage and other flexibility.

This tool is to:
- Support households to optimise their clean energy and clean mobility performance
- Assist governments in planning for future neighbourhoods or improvements to existing neighbourhoods.

www.prosumers.nl

2) CleanMobilEnergy

A project co-initiated by Resourcefully with 4 city partners to achieve CO2 abatement, profitable renewable energy installations, smart charging, V2G, stationary storage and minimised grid costs, through the development of an innovative, scalable and city- adaptable Energy Management System.

www.nweurope.eu/cleanmobilenergy

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Neighbourhood dashboard

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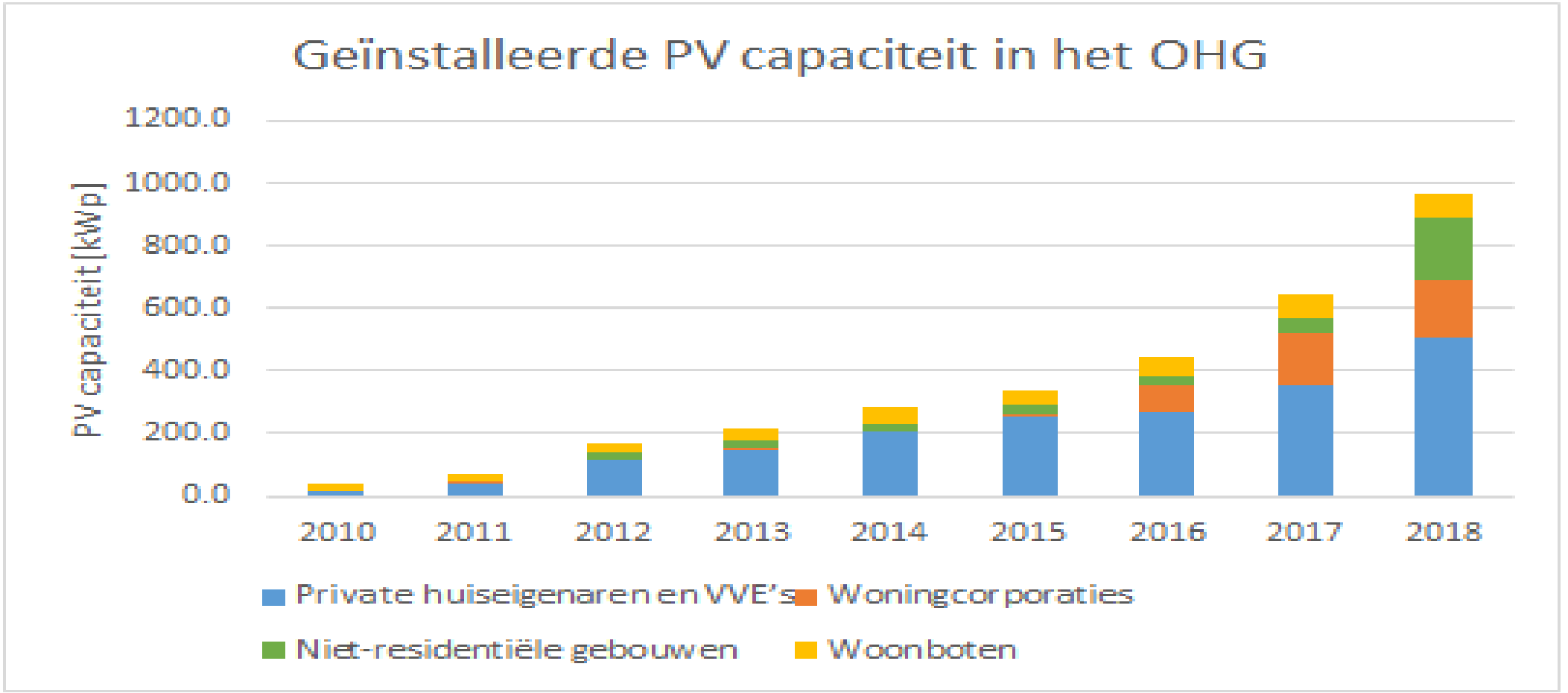
Neighbourhood dashboard



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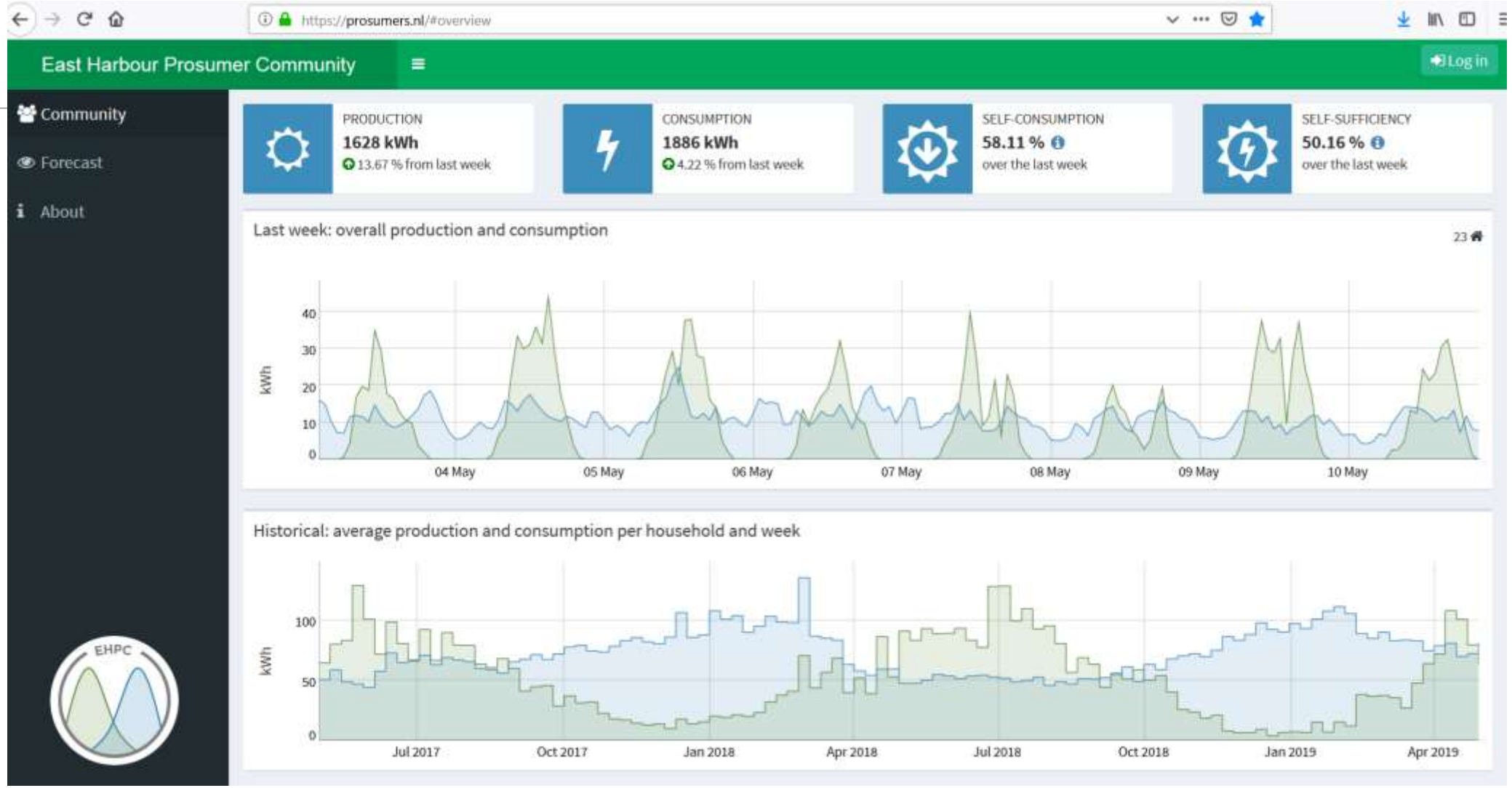
Impression dashboard display – 1



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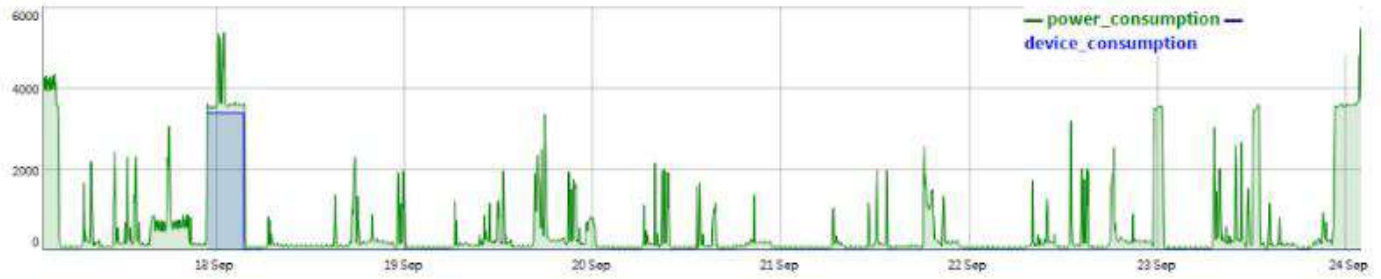
Impression dashboard display – 2

Energy analysis | Market analysis | EV flows

Bart EV sessions

Charger power (W): 3400

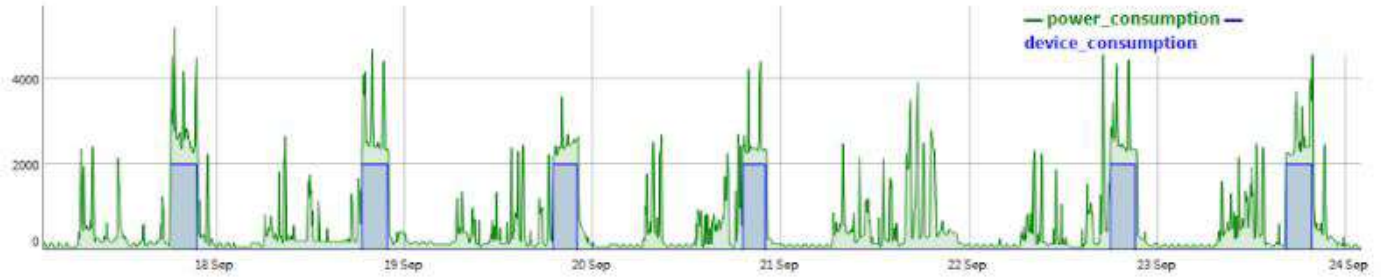
Average consumption (Wh)	Average duration (h)	Average charging start time	Number of sessions detected
15583.33	4.58	23:00	1



Jippe EV sessions

Charger power (W): 2000

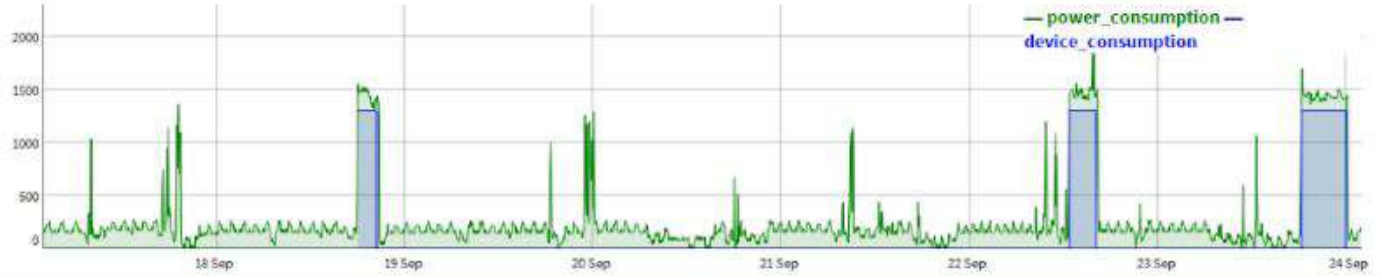
Average consumption (Wh)	Average duration (h)	Average charging start time	Number of sessions detected
6416.67	3.21	18:00	6



Reindert EV sessions

Charger power (W): 1300

Average consumption (Wh)	Average duration (h)	Average charging start time	Number of sessions detected
4441.67	3.42	18:00	3



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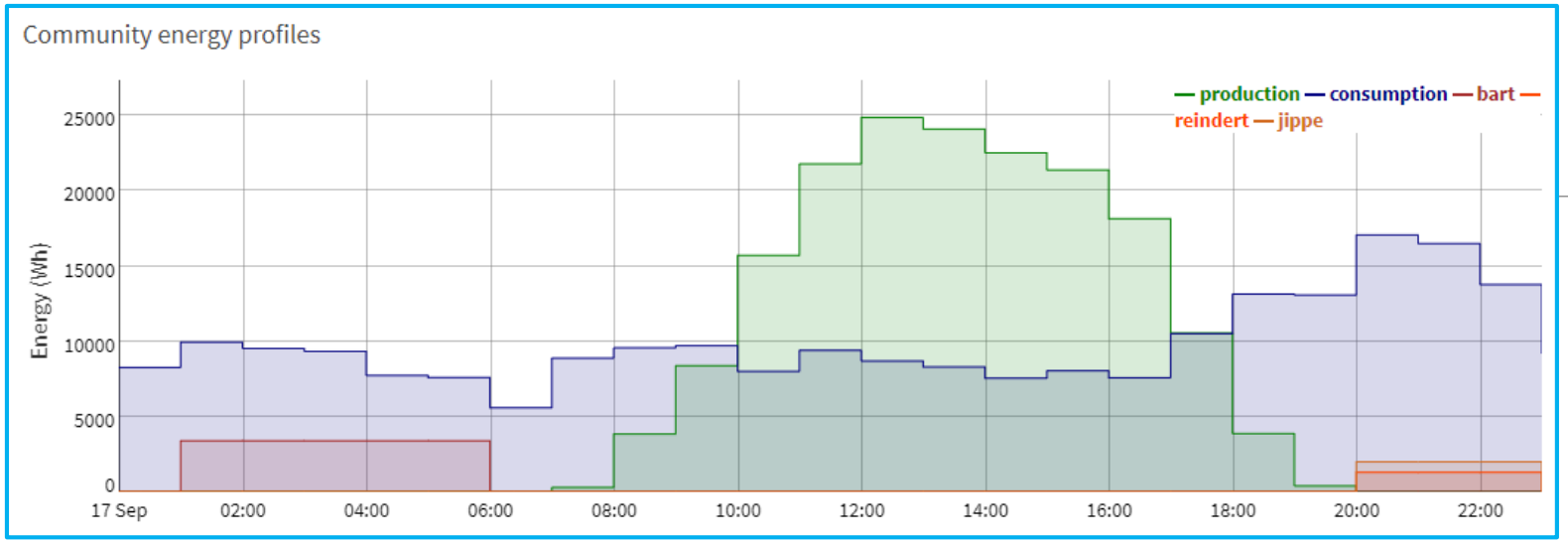
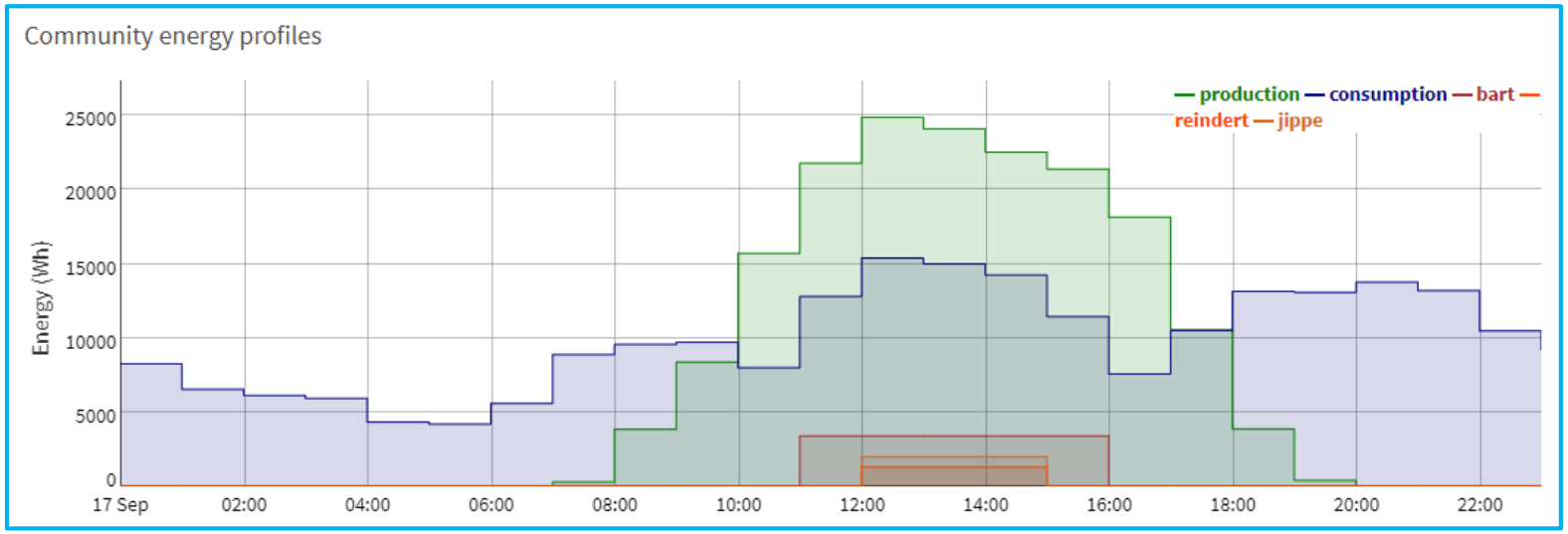
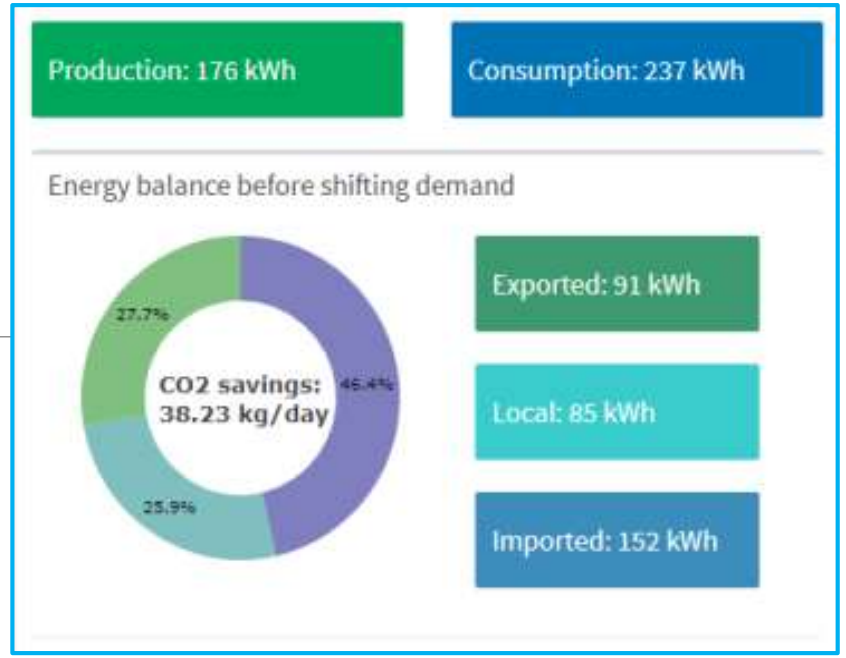
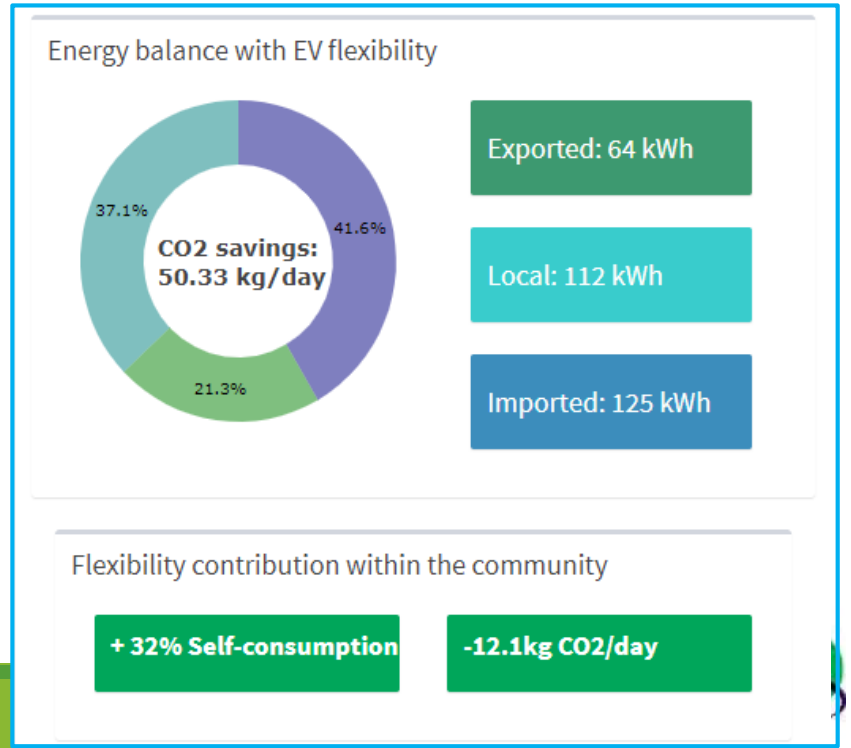
Dashboard information - 2

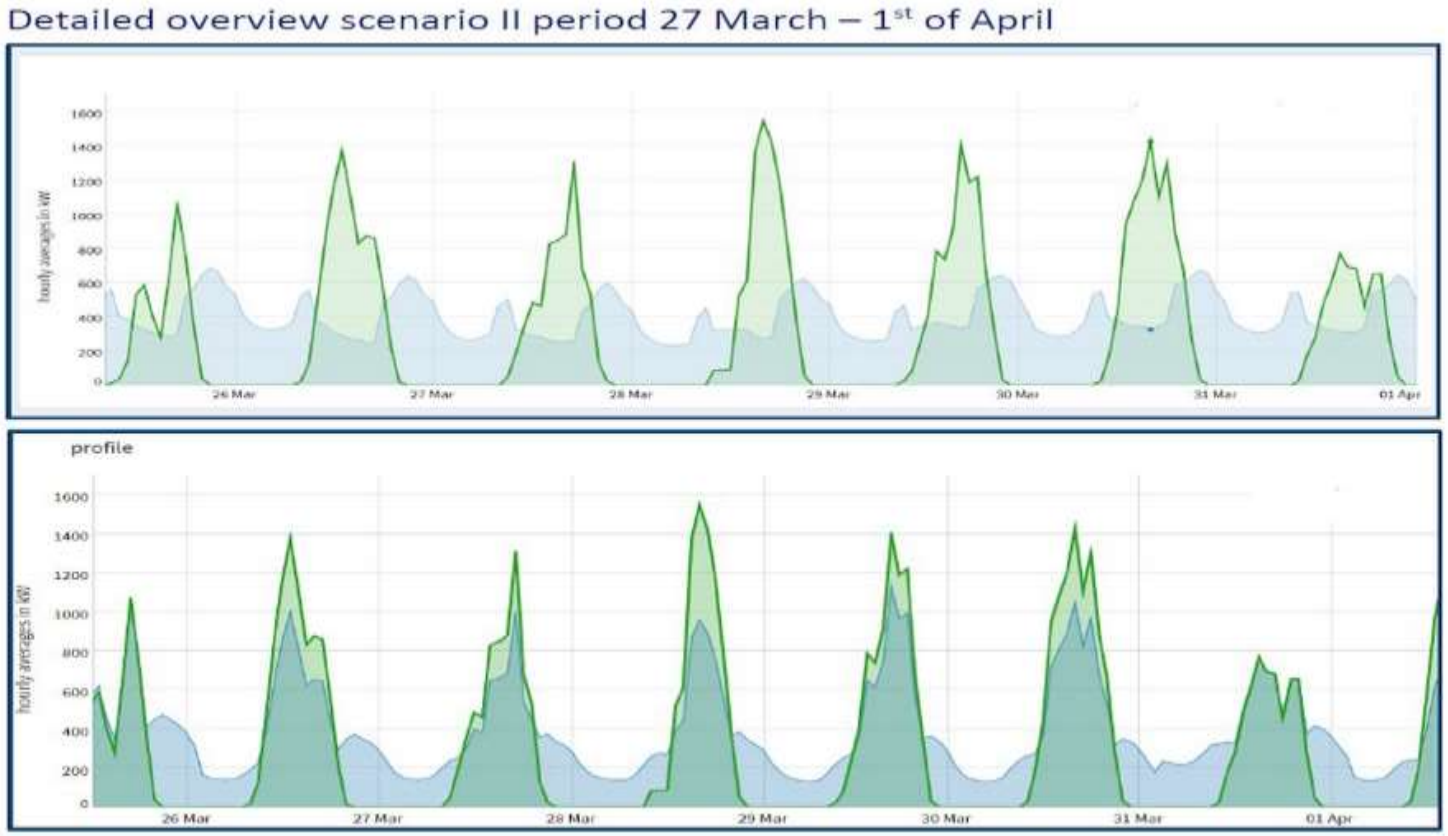








Impression results



Scenario without flexible energy consumption (above) and with flexible energy consumption (below). In the latter case, supply (green) and demand (blue) are much better matched.

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Next steps:

I. Introduce key-stakeholders to participate, create awareness and co-ownership in the design & development process

II. Increase flexibility
- Include more household devices (boilers, wash / dishwash devices);

III. Refinement of data sources
- Better & more detailed & realistic heat-pump energy data;

IV. Including of new variables
- Stationary storage
- Monetary translation for self-sufficiency and Grid control

V. Extrapolate (grid) impacts of large scale electrification

VI. Introduce dashboard concept in other types of neighbourhoods

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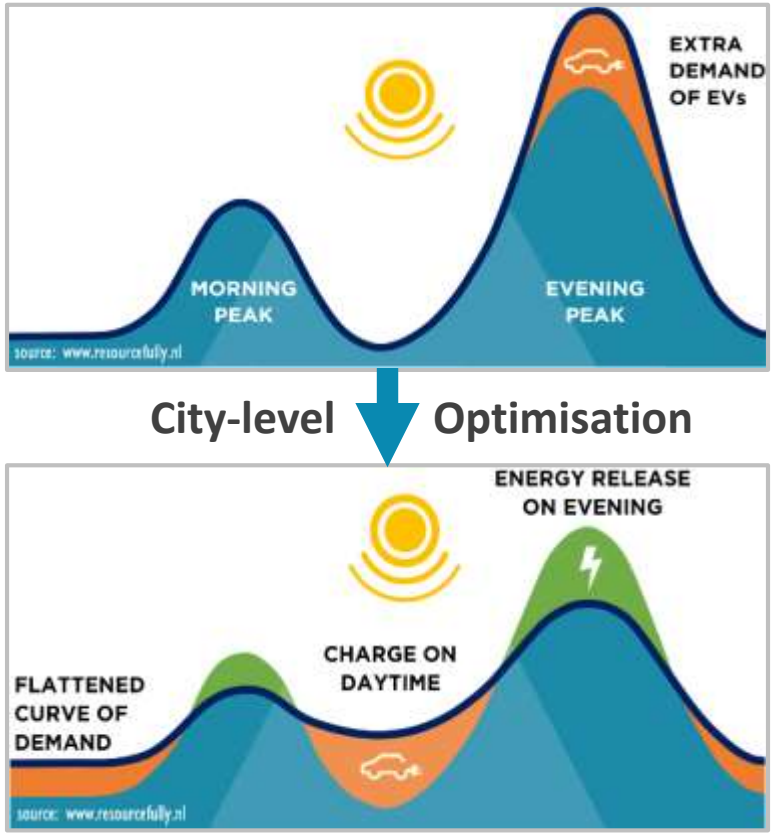
CleanMobilEnergy

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's main challenge is the transnational development of an interoperable energy management system (iEMS) for all cities, encompassing:

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

City pilots

Arnhem

London

Nottingham

Schwäbisch Gmünd

The four 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

150 EV charging points

Harbour (Cold ironing)

ENERGIEMANAGEMENT-SYSTEEM (EMS)

Solar farm (10MW)

Storage 0.5MWh

Visible Impact

- To reach a more visible impact, we need **real-life & large-scale demonstration projects**
- Create awareness about the implications at different levels:
  - Technical
  - Financial
  - Social
- Experiences needed to define policies and regulations

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EV Energy
Interreg Europe

European Union
European Regional
Development Fund

Interreg
North-West Europe
CleanMobilEnergy

Programme

"Clean energy, clean mobility" conference 2019
5th June in Flevoland, The Netherlands

For more information, see www.resourcefully.nl

Contact us at h.niesing@resourcefully.nl or at +31 651 731 190