



CleanMobilEnergy: Demonstrating the Answer to the City Transition Challenge, Encouraging Local Energy & Mobility Self-Sufficiency

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management by measurement

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

HUGO NIESING, RESOURCEFULLY

SDG PRESENTATION UTRECHT 11TH JUNE 2019



August 19 ALARM !

Dutch Grid operator Liander :

'Amsterdam stevent af op stroominfarct'

Nieuw 03-08-2019 [View de artikel](#)



De vraag naar elektriciteit in Amsterdam stijgt zo hard, dat een 'stroominfarct' op de loer ligt. Daarvoor waarschuwt een woordvoerder van netwerkbedrijf Alliander in Het Parool.

In 20 years 2 to 6 times more energy generation in the city is required.....

- Electric Vehicles?
- Electrical heating & cooking ?
- Datacentre?
- Too much renewables?
- **WHAT HAPPENS AND HOW CAN THIS BE MITIGATED ?**

Contents

- About Resourcefully
- Approach
- EV & RES developments
- The Energy & Grid challenges
- Storage ?
- Need for combined RES & EV growth for flexible energy use

Resourcefully

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

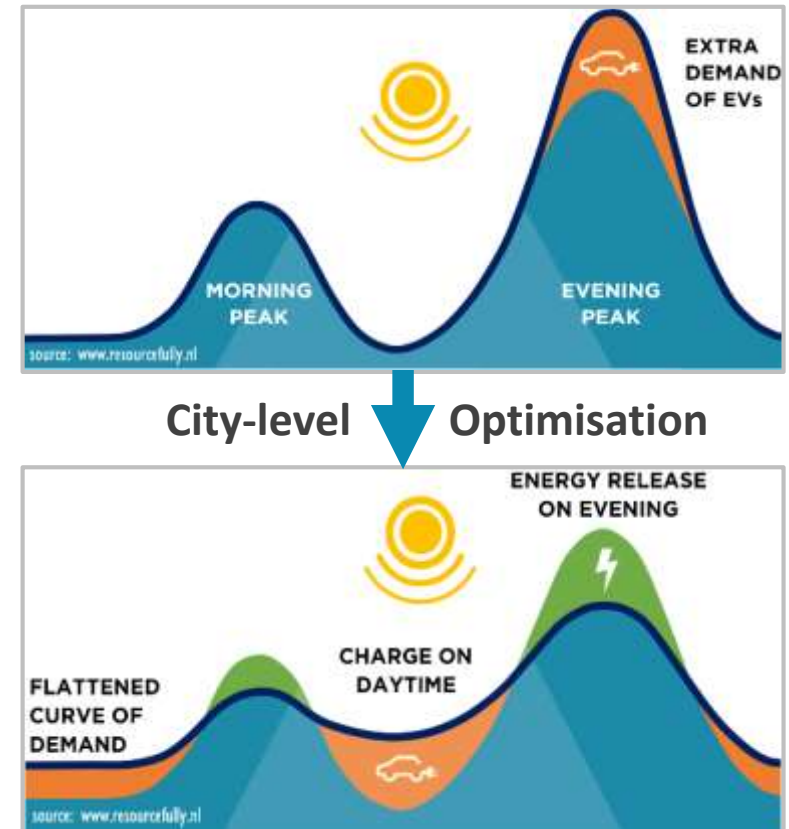
Our mission is to accelerate Europe's sustainable energy transition.

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.



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

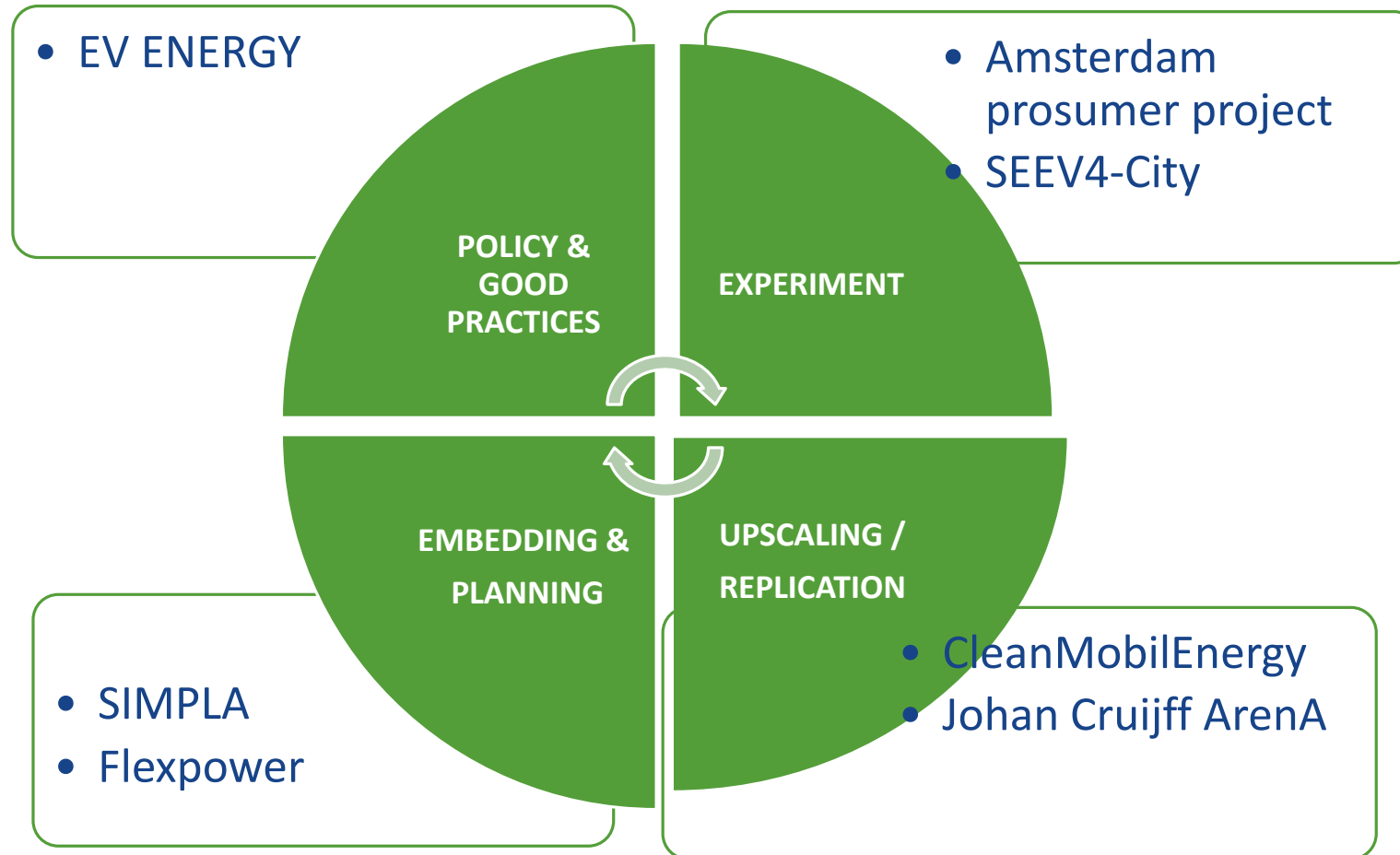
Solutions:

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

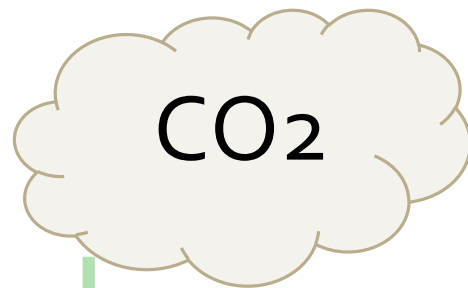
City trends in EVs & renewable energy

- **EV market** is exploding: **electric mobility grows faster than renewable energy** in the city
 - **Charging infrastructure**: development, organization, finance
 - Large scale **projects are scarce**: requires funding & long-term investments
 - **Policies** in the different EU countries are **fragmented & instable**
- **Need for coherence between sectors and across the different member states**

The policy – projects cycle



Example, the Amsterdam policy



55% CO₂ reductie tot 2030

95% CO₂ reductie tot 2050



Aardgasvrij in 2040



Uitstootvrije mobiliteit in 2025.



250 MW zon in 2022 én
Windpotentieel
maximaal benutten

Neighbourhood Climate Agreement :



**250 MW sun in
2022 !**



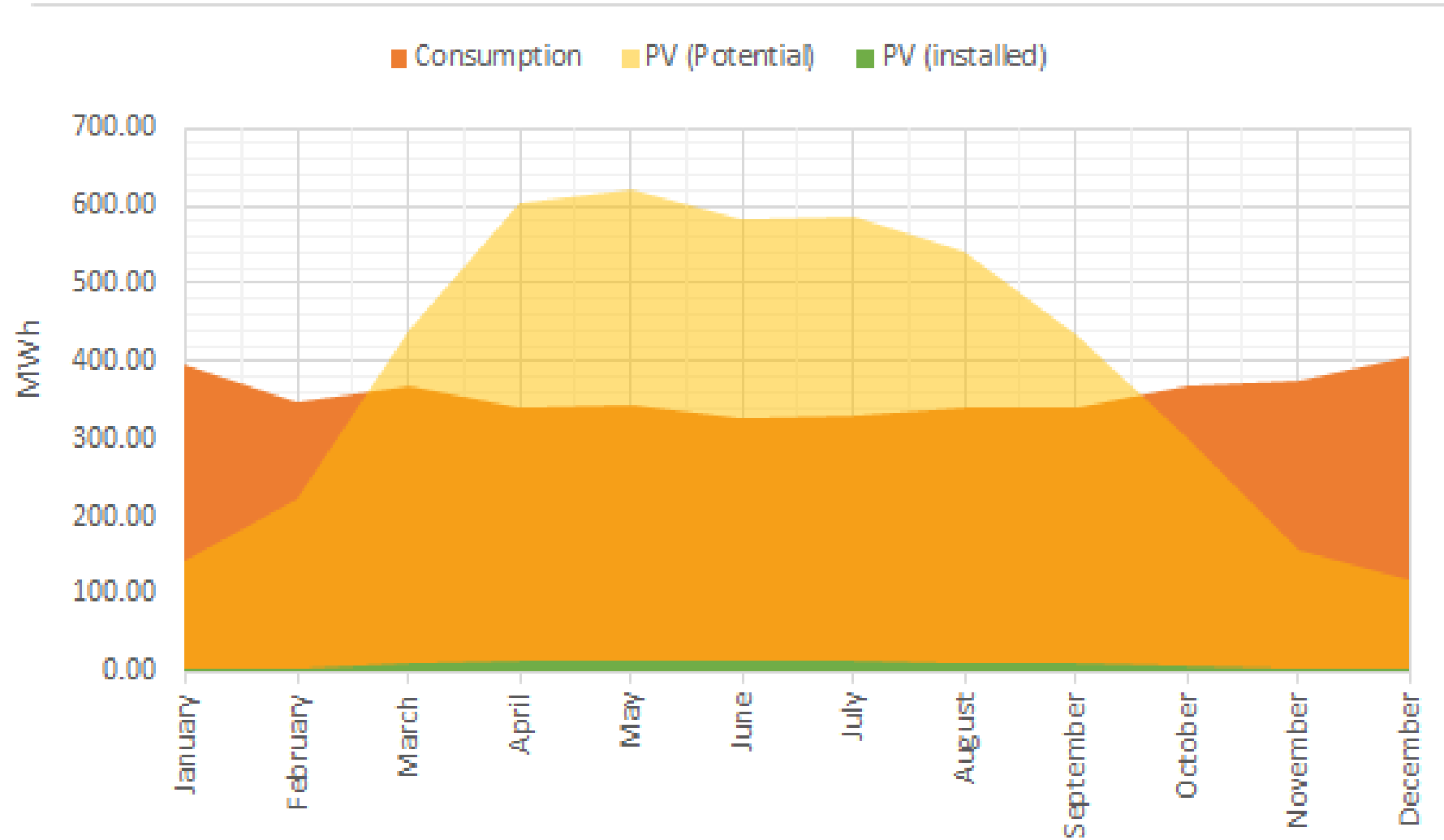
Neighbourhood Climate Agreement :



**Eastern harbour
Area =**

**7 MW sun in
2022**

RENEWABLE ENERGY IN THE EASTERN HARBOUR NEIGHBOURHOOD



Neighbourhood energy independence

Together with city governments Resourcefully developed an open source tool to visualise real energy data in a neighbourhood.

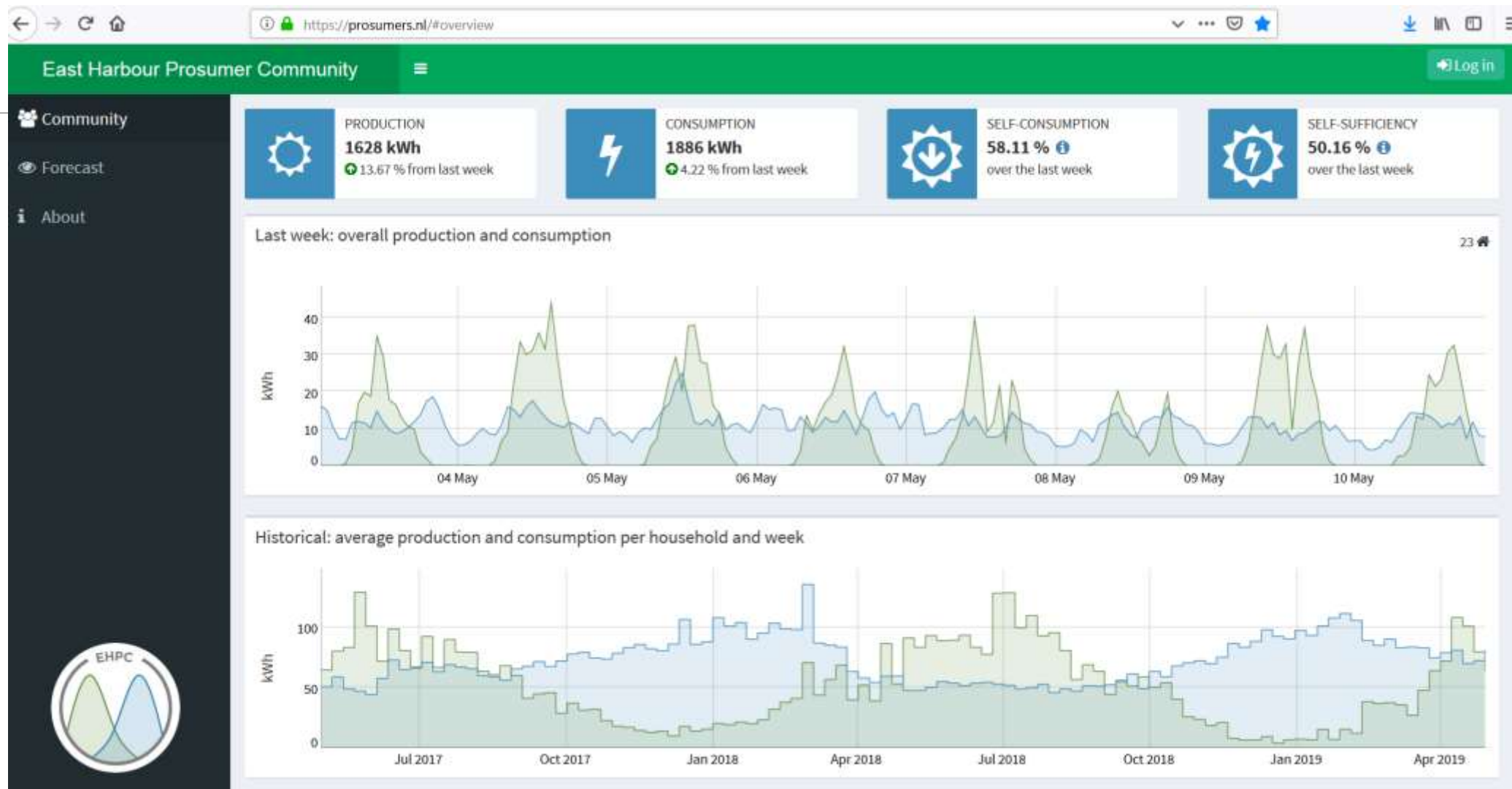
The energy & mobility dashboard optimise energy flows using smart charging of electric vehicles, heat pumps, stationary storage and other flexibility.

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

Impression dashboard display – 1



Impression dashboard display – 2

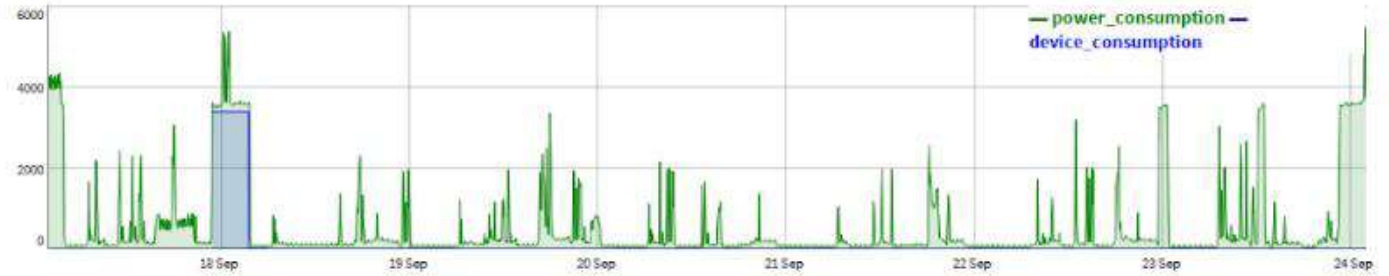
Energy analysis Market analysis EV flows

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

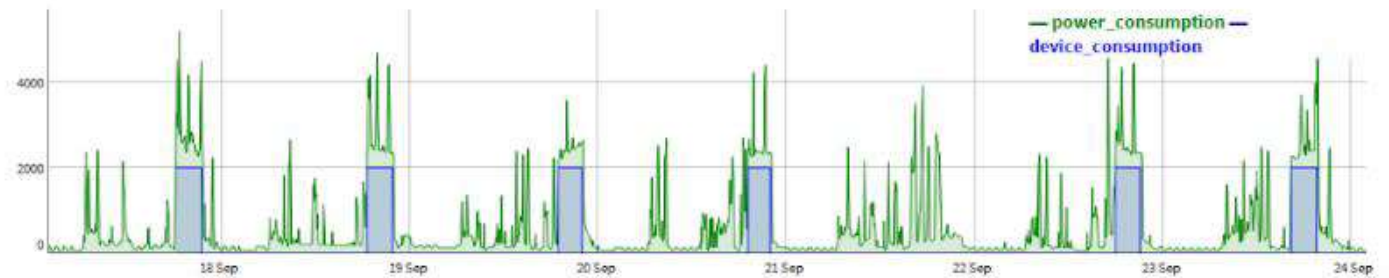


Jippe EV sessions

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

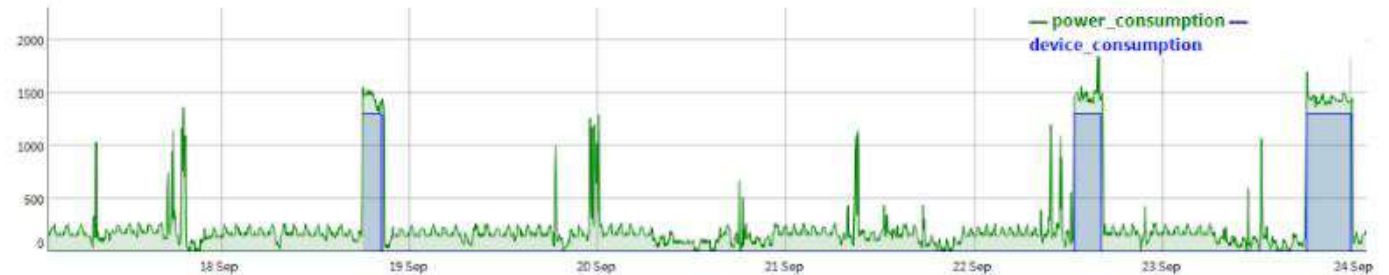


Reindert EV sessions

Charger power (W):

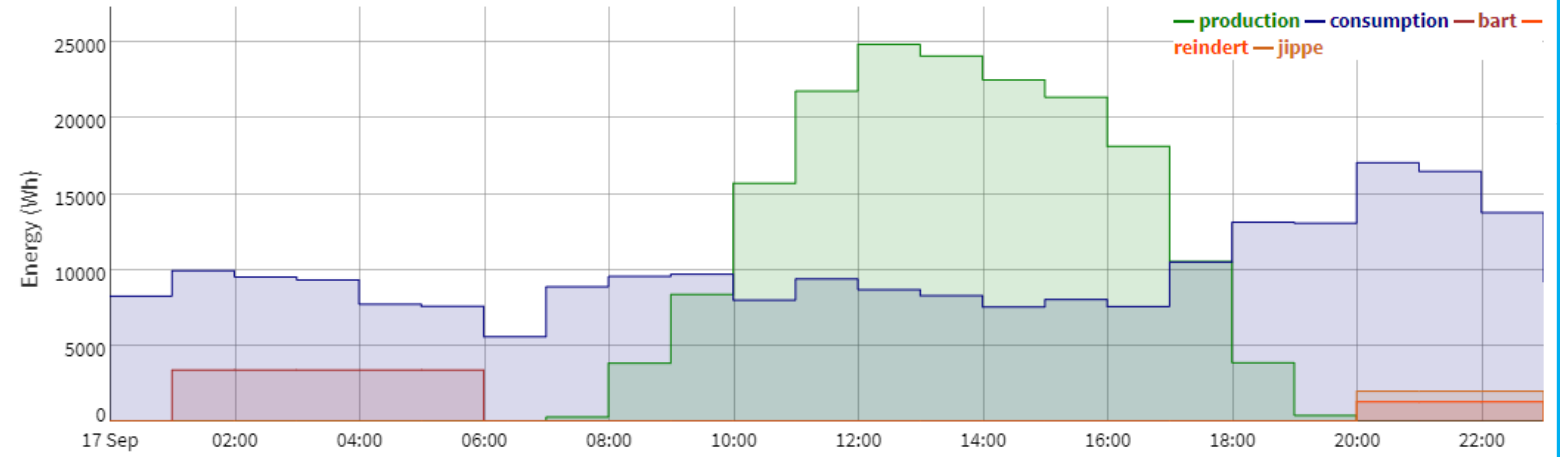
1300

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

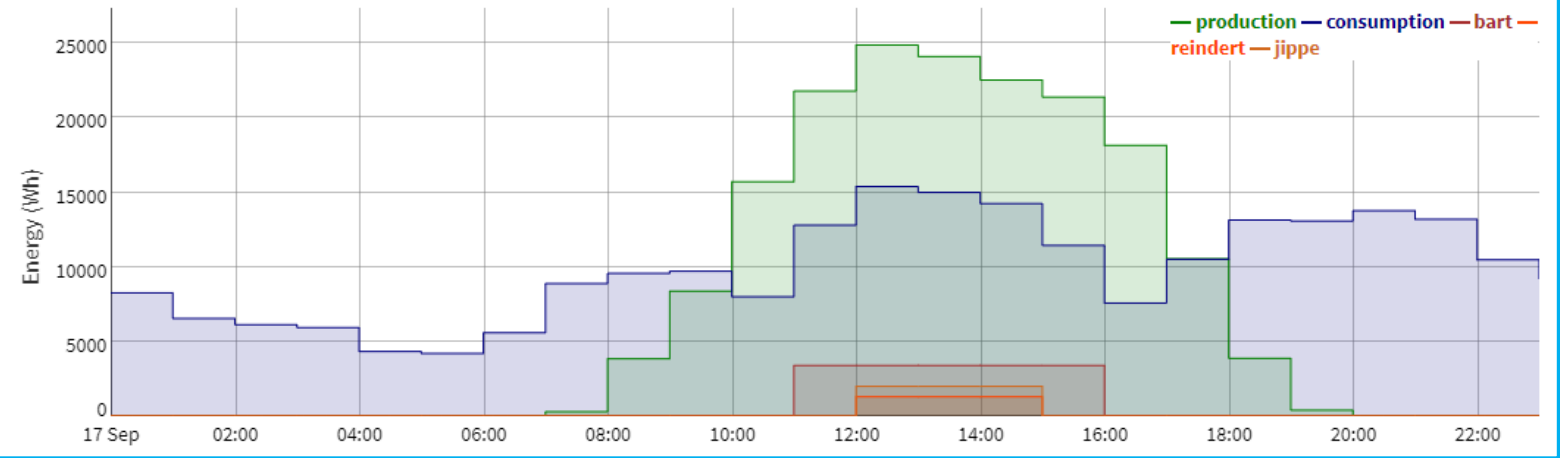


Dashboard information - 2

Community energy profiles



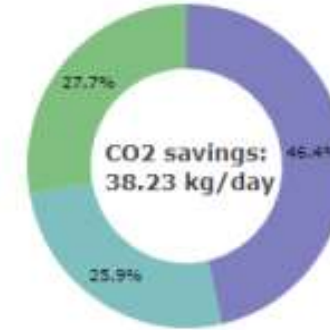
Community energy profiles



Production: 176 kWh

Consumption: 237 kWh

Energy balance before shifting demand

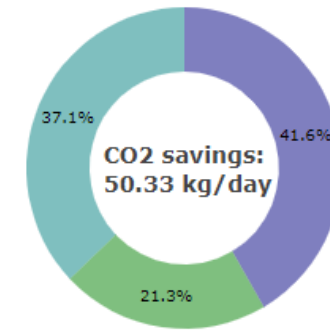


Exported: 91 kWh

Local: 85 kWh

Imported: 152 kWh

Energy balance with EV flexibility



Exported: 64 kWh

Local: 112 kWh

Imported: 125 kWh

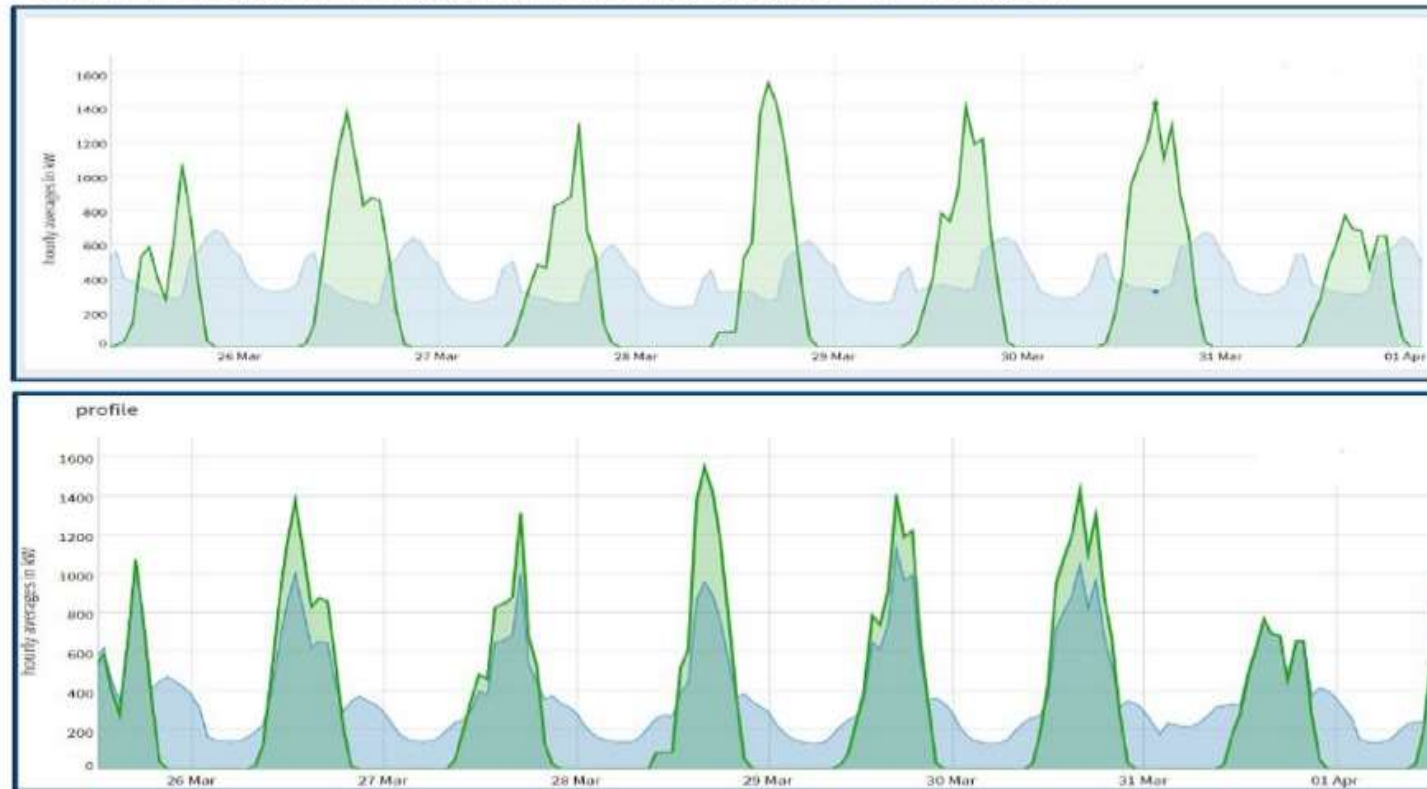
Flexibility contribution within the community

+ 32% Self-consumption

-12.1kg CO2/day

Impression results

Detailed overview scenario II period 27 March – 1st of April



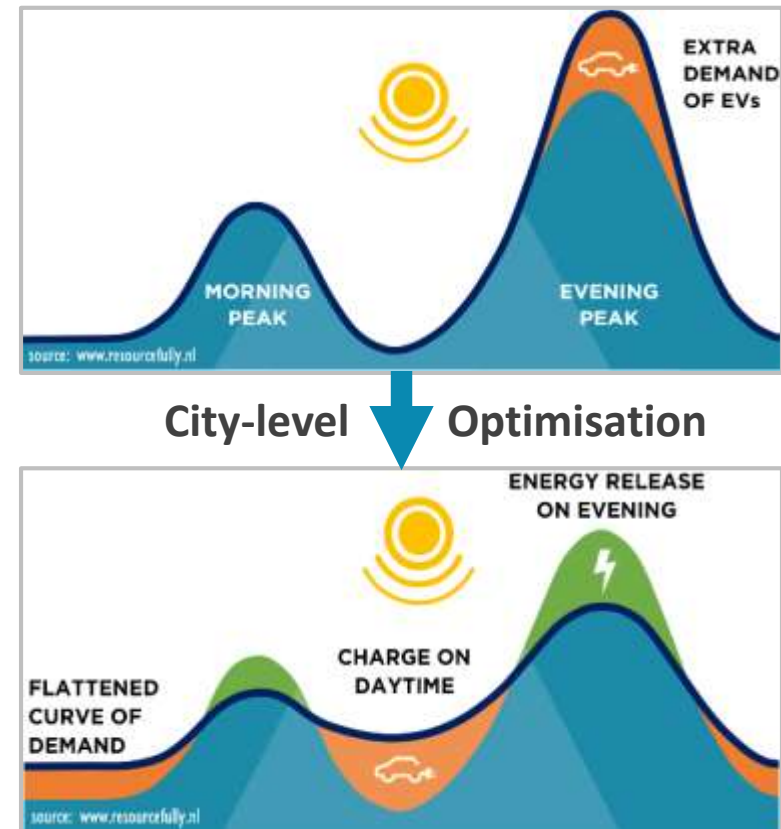
Scenario without flexible energy consumption (above) and with flexible energy consumption (below). In the latter case, supply (green) and demand (blue) are much better matched.

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

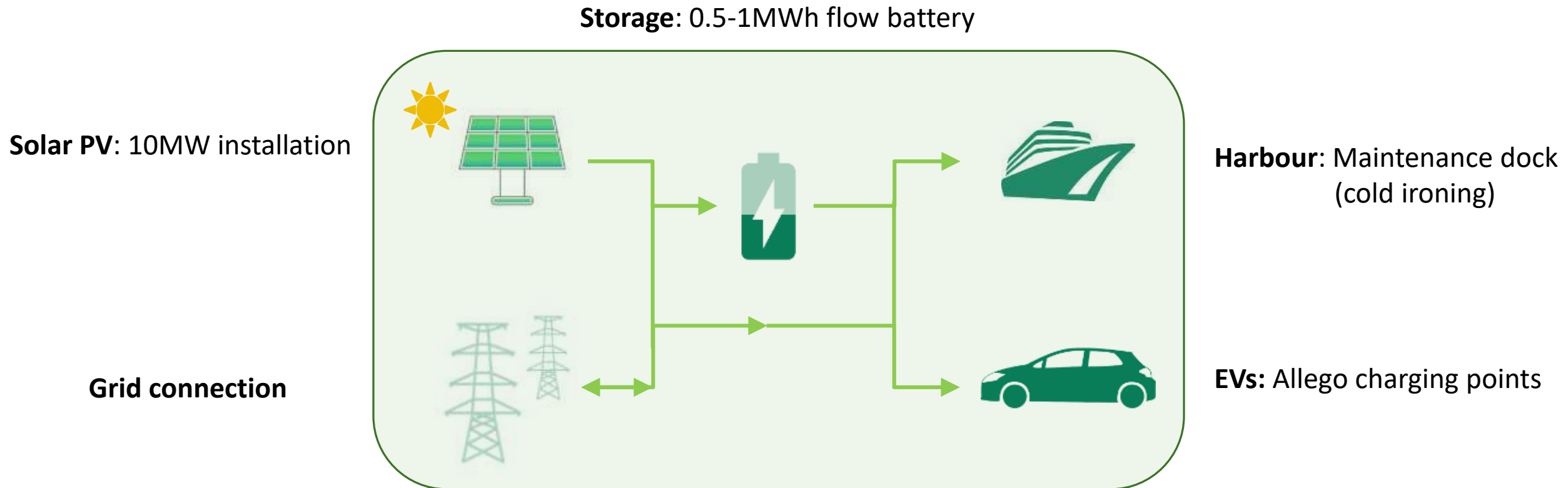
Nottingham

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

System components in Arnhem city pilot



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 to define **new policies and regulations**
- **Without new policies both renewable and smart systems have a very limited replication and upscaling future**

Thank you!

Questions?

For more information, see www.resourcefully.nl

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