

**Studium Generale:**  
**'Accelerating the electrification in the process industry'**  
**Optimizing renewable power**



# ENERGICO AUTOMATES THE ENERGY TRANSITION





# ABOUT ME



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**Specialty: everything under control**

# AGENDA

- INTRODUCTION OF CROONWOLTER&DROS & ENERGICO.ENERGY
- ENERGY TRANSITION → AMBITIONS & CHALLENGES
- THE ROLE OF ENERGY MANAGEMENT
- SMARTER SUSTAINABLE TOGETHER.
- THE ROLE OF THE INDUSTRY; OPPORTUNITIES



# INTRODUCTION OF CROONWOLTER&DROS & ENERGICO.ENERGY



## WHY DO WE DO WHAT WE DO?

We are system integrators.

That is our passion

For this we have the knowledge,  
experience, products

IT Security

System integration

Automation

Energy

Data Hosting

IEC-61850

Information-modelling



# ENERGY NEUTRAL TUNNEL

## “DE GROENE BOOG” A13/A16



**ENERGICO**  
Grid Management Systems



# KRIEGER'S FLAK



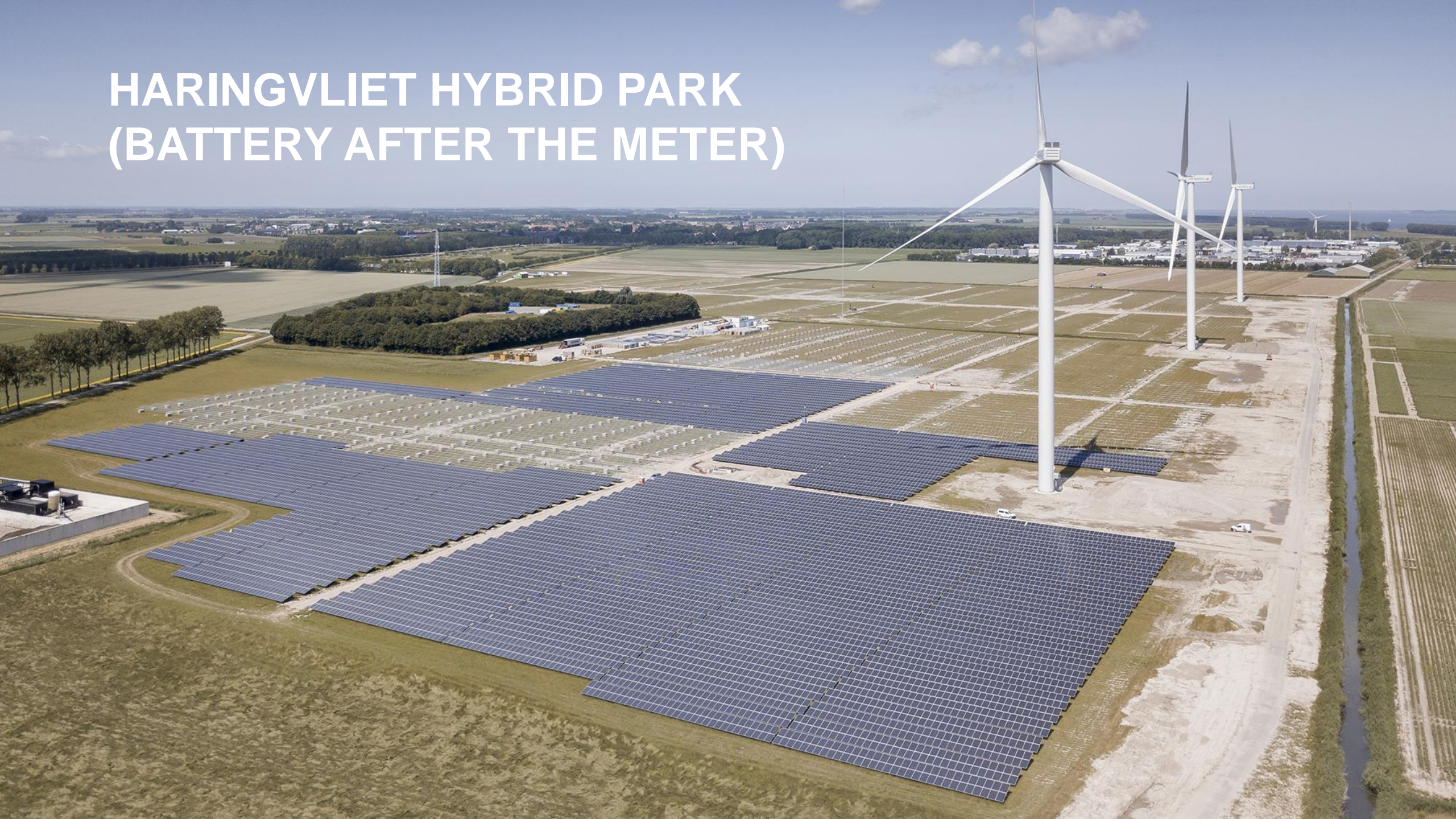


# TENNET 110-150 KV – TURNKEY SUBSTATION RENOVATION





# HARINGVLIET HYBRID PARK (BATTERY AFTER THE METER)





# Smart Grid

Battery with own  
grid connection

InterFLEX

Strijp-S

Eindhoven



STELLA VIE



# ENERGICO: TECHNICAL LEADERSHIP IN THE ENERGY TRANSITION

The world is in the midst of an energy transition and we are excited to be a part of it. We are Energico. We develop, supply and implement **energy management solutions** for smart energy systems. At Energico, we love complex technology. And you know what we like even more? **Converting complexity into simplicity.** That is why we have developed the following four propositions aimed at smart grids:

SAM

EMMA

Consulting  
Services

Energico  
Academy

Energico makes life easier (and more fun) for players in the energy sector.



# SAM : ENERGICO'S SUBSTATION AUTOMATION MANAGER



## Problem:

Sustainable electricity generation offers energy companies new opportunities, but also new types of challenges. There is a **lack of (technical) personnel**, but have to **manage more and more complex systems** (energy management, security, burglar alarm, fire detection, etc.). These systems also provide more and more data.

## Solution:

SAM makes managing complex systems **easily accessible** to those without training. Our Substation Automation Manager (SAM) provides you with **real-time** monitoring and control of your power generation processes, enabling remote and **device-independent** site management and troubleshooting.

Information from different systems from different suppliers is visualized in a unified and intuitive way, allowing for **remote analysis** and **error-free operation** of the system. This helps reduce response times and requires less skilled operators.

**VATTENFALL HAS SELECTED SAM FOR THE MANAGEMENT OF ITS ON-  
AND OFFSHORE WIND FARMS.**





# EMMA: ENERGICO'S ENERGY MONITORING & MANAGEMENT ASSISTANT



## Problem:

Are you planning a local smart grid for a neighbourhood, business park or campus – or for a smart building? How should you **combine energy from different sources**? Or how do you gain sufficient insight into **managing innovative technology** such as hydrogen stations, water electrolyzers and sea salt batteries?

## Solution:

EMMA is a smart management system that allows you to **optimally allocate locally generated energy between consumption, storage, grid supply, trade and containment**.

**EMMA connects and manages all assets and aspects related to energy generation, distribution and consumption**, such as PV installations, batteries and, for example, EV charging stations. Clear dashboards and automatically generated reports provide you with relevant data and insights. And with the help of algorithms, we can tailor the system perfectly to your specific local situation.

**ENEXIS HAS SELECTED EMMA FOR ENERGY MANAGEMENT OF ITS SMART CITY DISTRICT STRIJP-S IN EINDHOVEN.**





# ENERGY CONSULTANCY

## **Problem:**

Our customers often have questions about an area-oriented approach. The scarcity on the electricity grid, now only for the return of energy, plays an important role in this. From the perspective of sustainability and sustainable energy generation, it is necessary to look at how to deal with energy flows in a different way. But how?

## **Solution:**

**Energico analyzes the opportunities for exchanging surpluses and shortages of local energy, designs an area vision and translates this into a feasible plan.** Our approach is creative, we ask all stakeholders in the area that we consider promising, and we deliver our plan in an attractive, readable Vision.

# THE MUNICIPALITY OF BREDA HAS SELECTED ENERGICO FOR CONSULTATION TO COMBINE SUSTAINABLE PROJECTS INTO ONE ENERGY VISION





# ENERGICO ACADEMY

## **Problem:**

There is a lack of (technical) personnel. There will be a new standard IEC-61850.  
How should companies deal with this technically and organisationally?

## **Solution:**

Energico has developed **five training courses on IEC-61850:**

- Management training IEC-61850
- Theoretical training IEC-61850
- Multivendor systems and IEC-61850
- Top down engineering with IEC-61850
- Maintenance in IEC-61850 stations

Curious about IEC-61850; we advise you to follow the management training ;-)

# TENNET HAS SELECTED ENERGICO AS PREFERRED PARTNER FOR IEC-61850 TRAINING COURSES





# ENERGY TRANSITION → AMBITIONS & CHALLENGES



# ENERGY TRANSITION



Major concerns about the  
effects of a changing  
climate...



... driving the energy transition with  
emission-free, sustainable generation





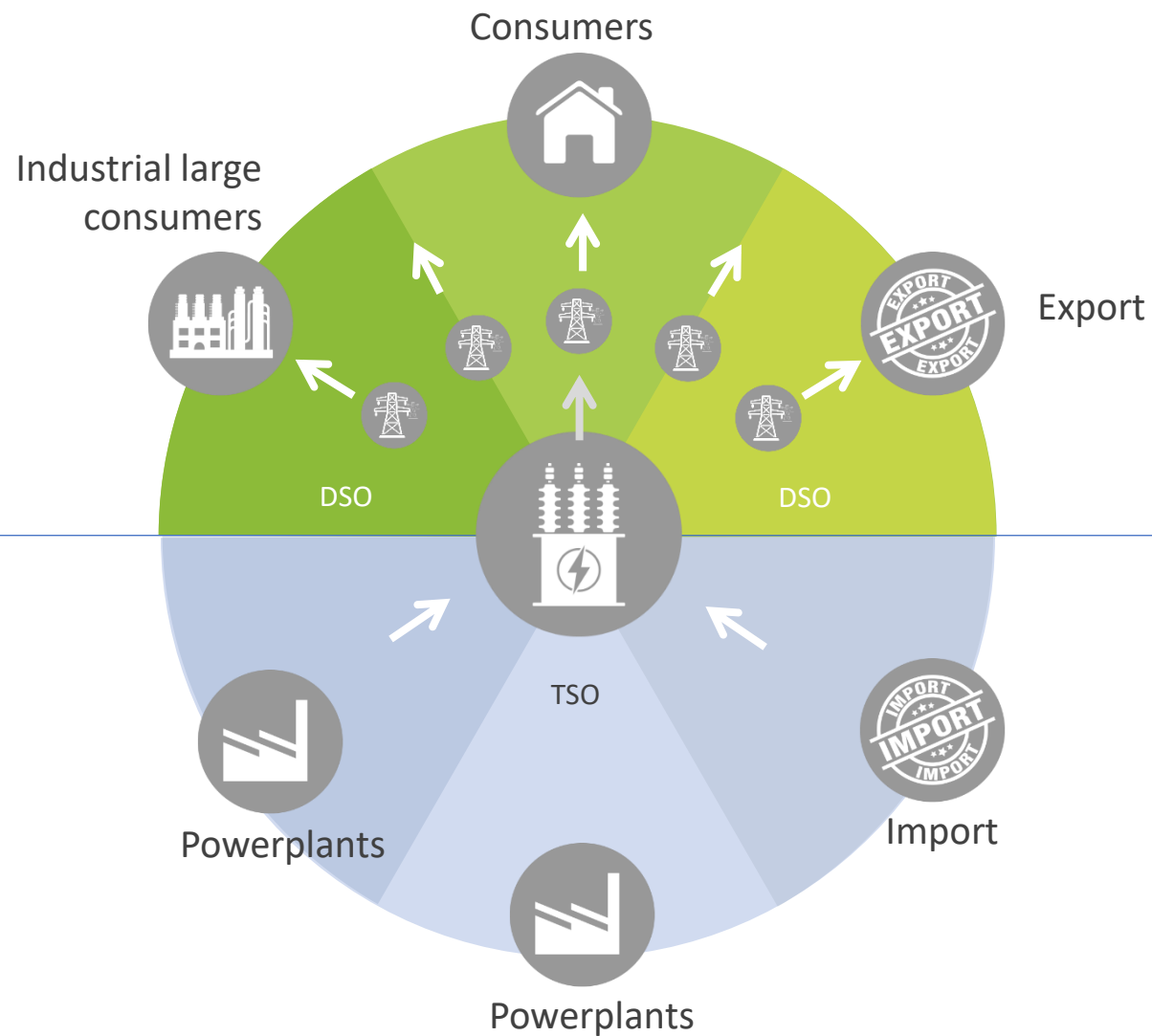
Consumers

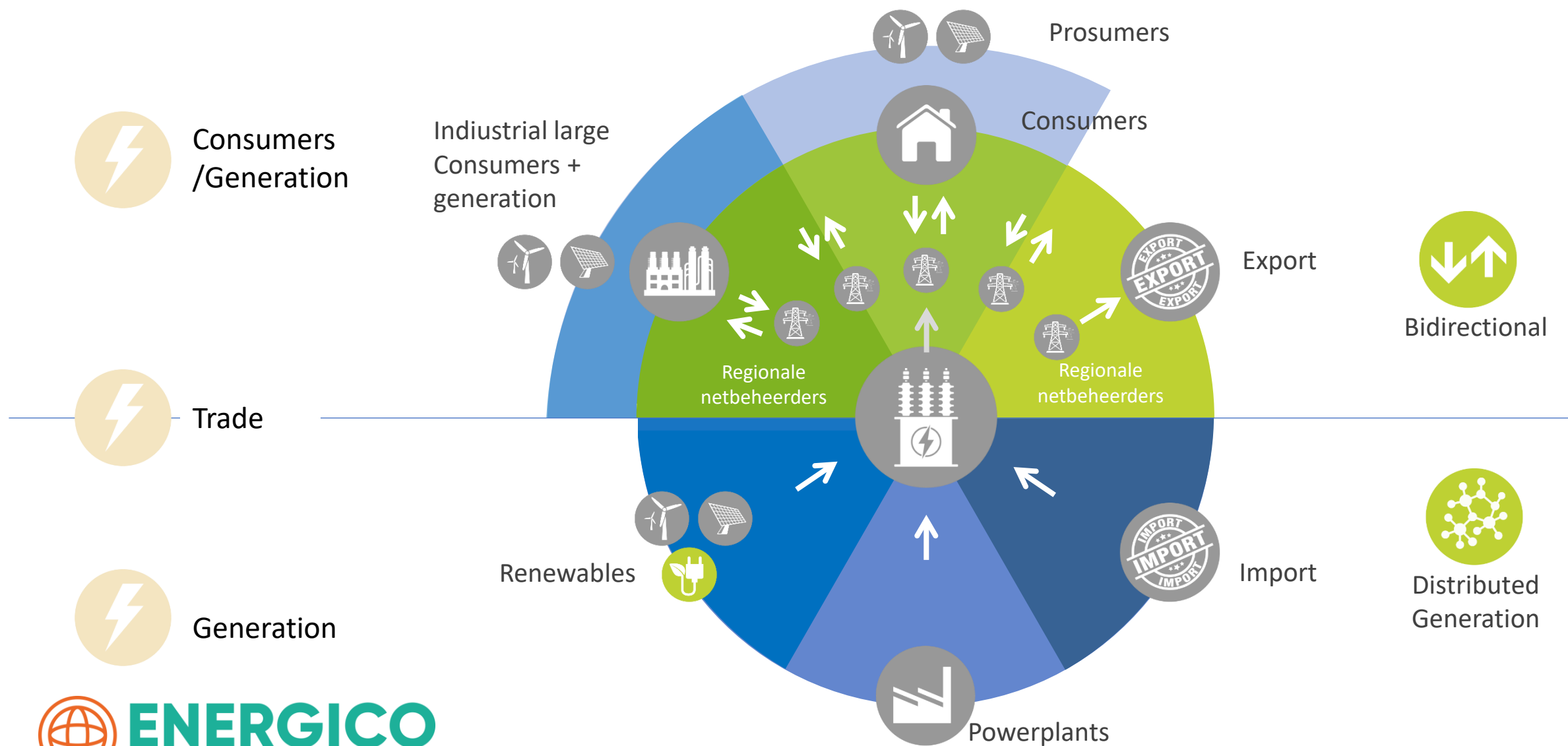


Trade



Generation

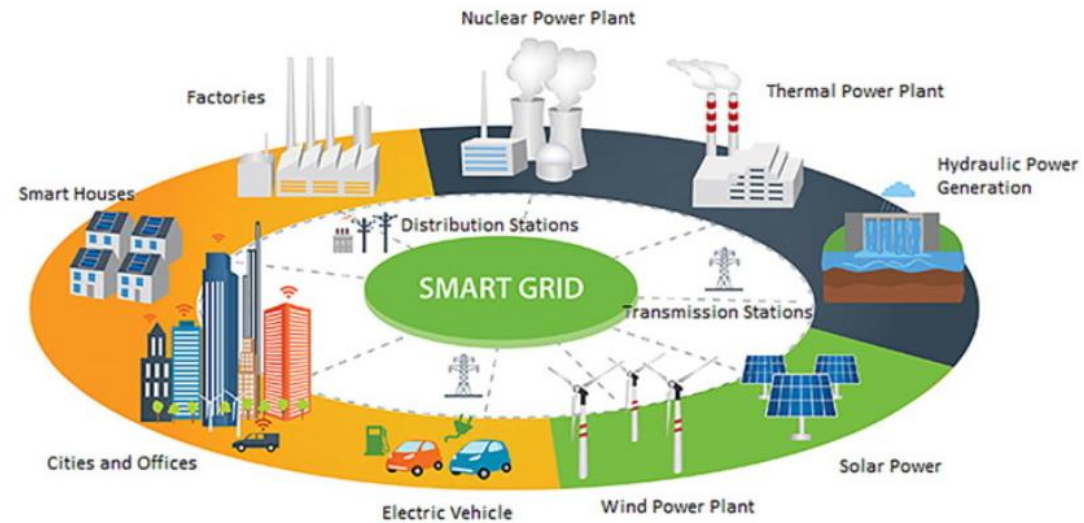






# CHALLENGES

- CO2 reduction goals
- Limited grid capacity
- Sustainable business case
- Responding too late on current energy prices
- Lack of asset insights
- Asset issues caused by reactive maintenance
- No overview because of too much diversity in assets, locations, suppliers, versions, tooling.



# CO2 REDUCTION GOALS

Key targets for 2030: (EU)

At least 40% cuts in greenhouse gas emissions (from 1990 levels)

At least 32% share for renewable energy

At least 32.5% improvement in energy efficiency

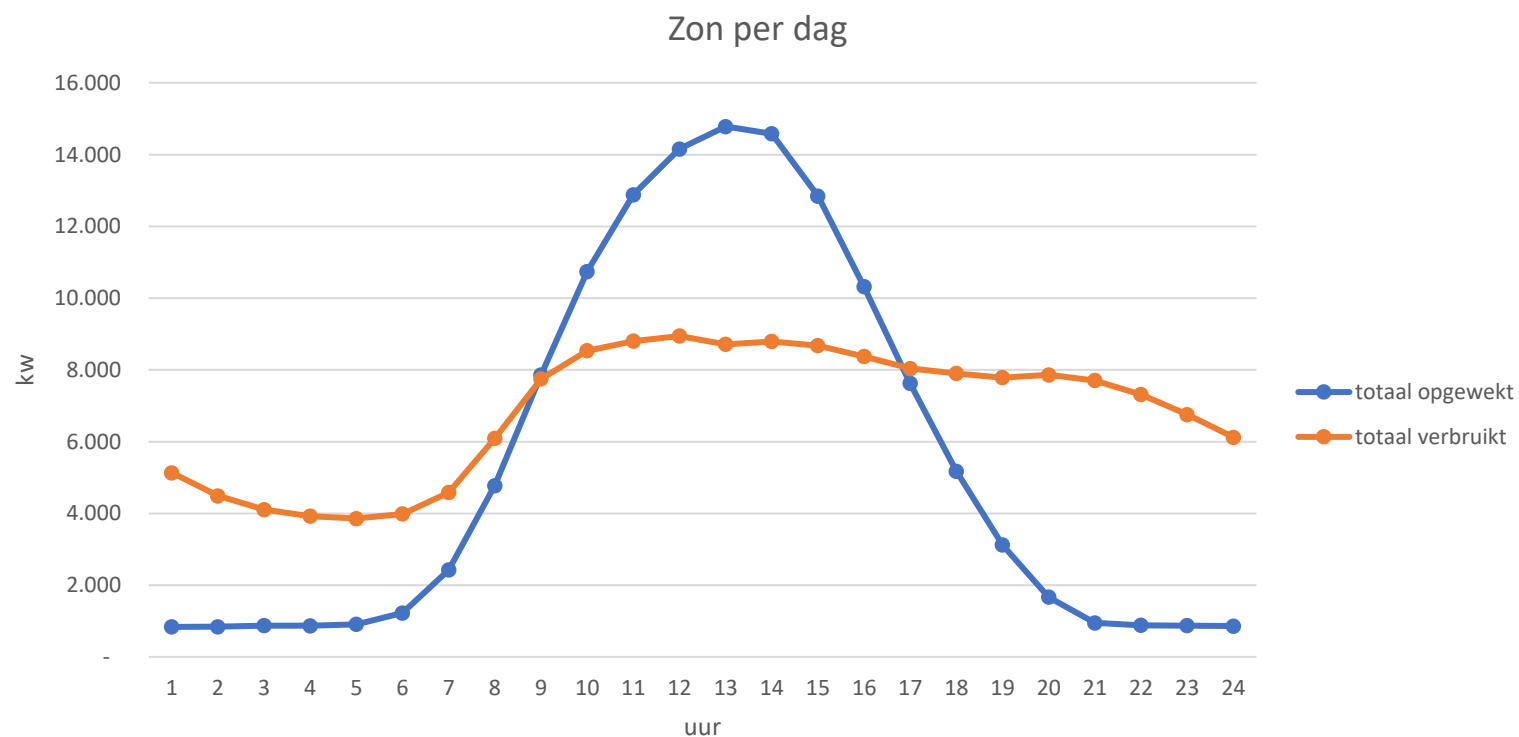




# THE CHALLENGE

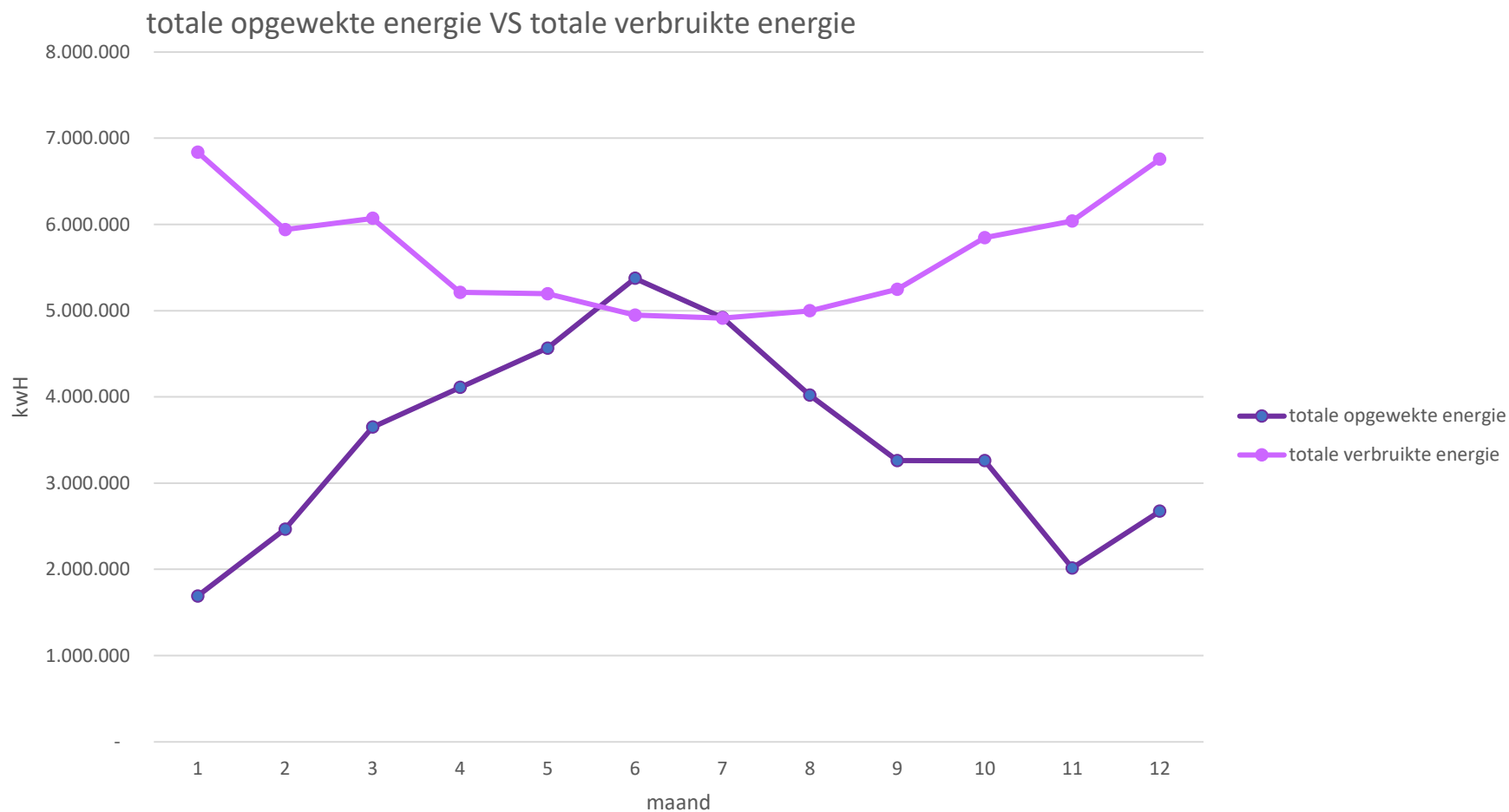


# SUN PER DAY

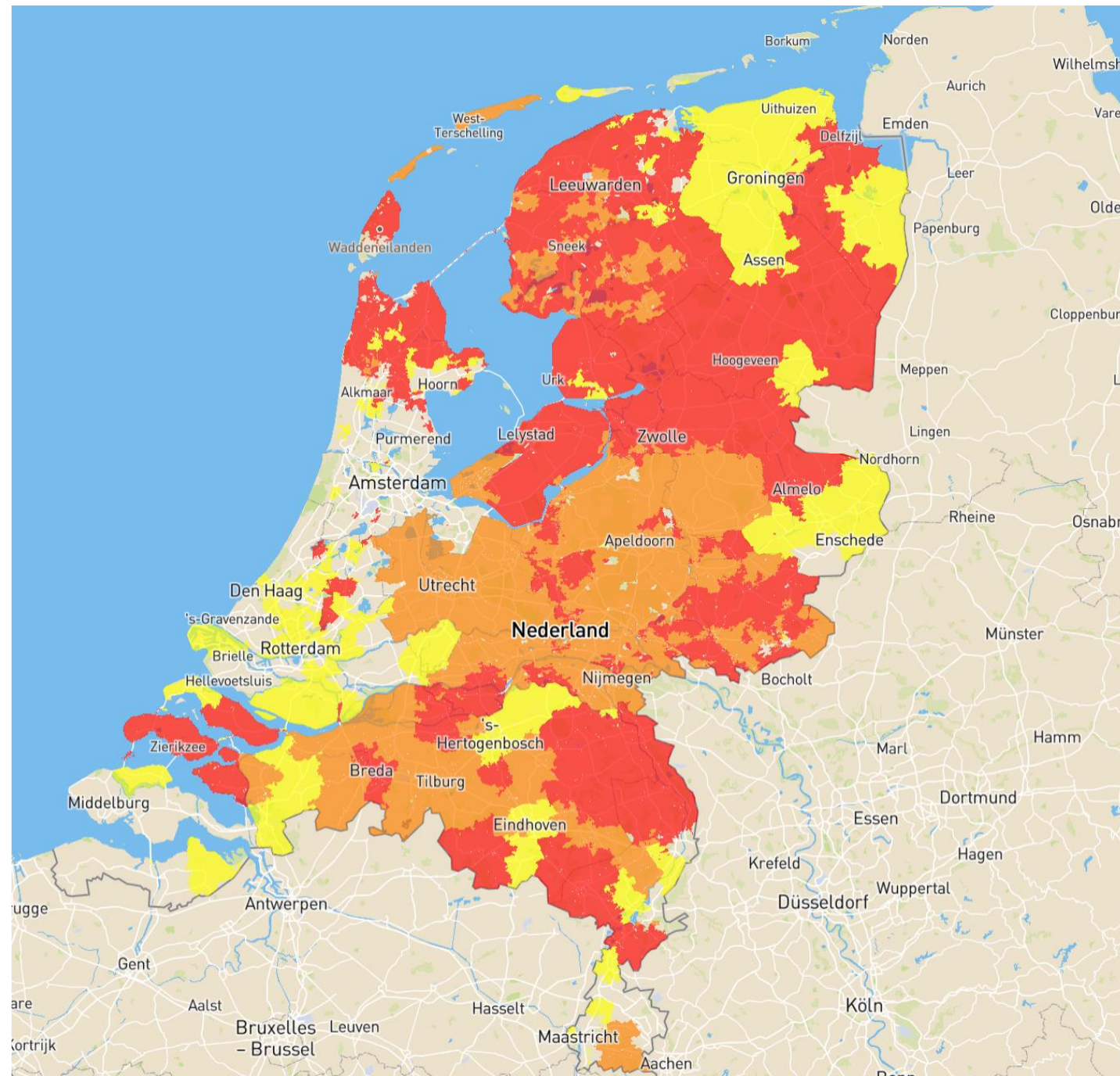




# SUN PER YEAR



# CONGESTION EXAMPLE NETHERLANDS:





# THE ROLE OF ENERGY MANAGEMENT



# CONTROL: IMPROVING MATCH BETWEEN E-DEMAND AND E-SUPPLY



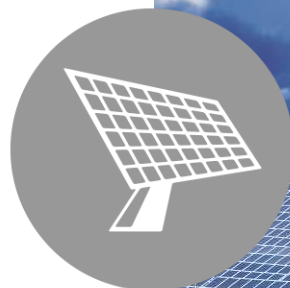
Supply and demand =  
asynchronous:  
highly fluctuating at different  
times



**SUSTAINABLE OFFER:  
DEPENDING ON WEATHER  
CONDITIONS**



**NOT CONTROLLABLE,  
DIFFICULT TO PREDICT**



**HOW DO WE KEEP THE  
BALANCE?**





## **ELECTRICITY DEMAND: STRONG ELECTRIFICATION**

- **ELECTRIC TRANSPORT**
- **GASLESS NEIGHBORHOODS**

**LARGE PEAKS IN ELECTRIC  
ENERGY CONSUMPTION**





# GOAL CONTROL: IMPROVING MATCH BETWEEN E-DEMAND AND E-SUPPLY



Supply and demand =  
asynchronous:  
highly fluctuating at different  
times

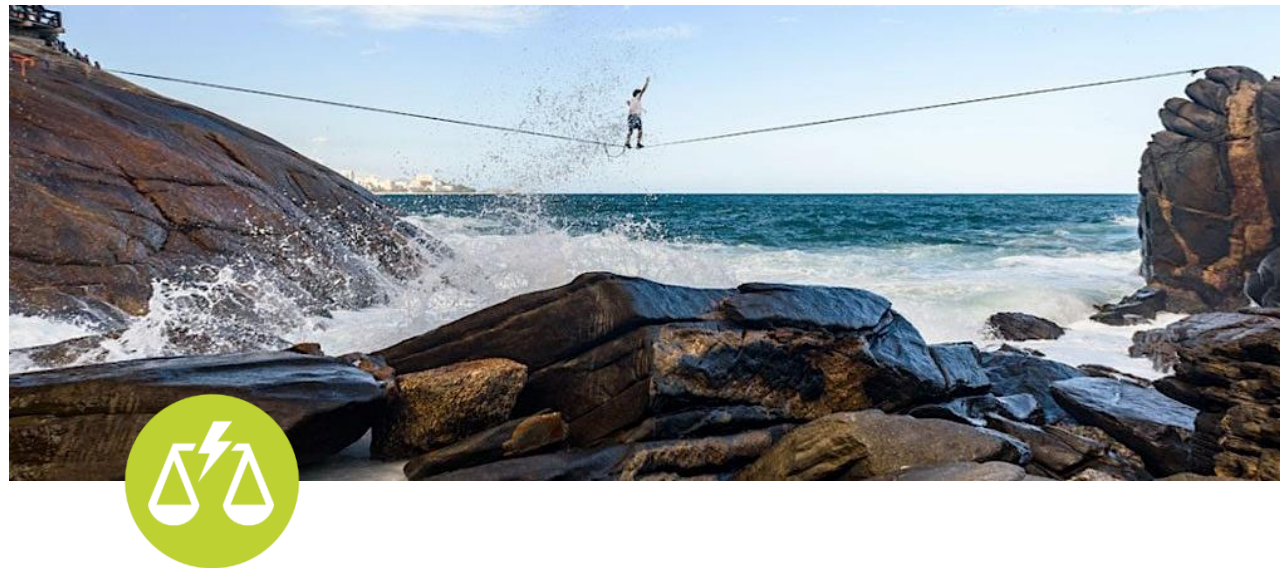


Who is in charge of  
fluctuations in  
decentralized generation?



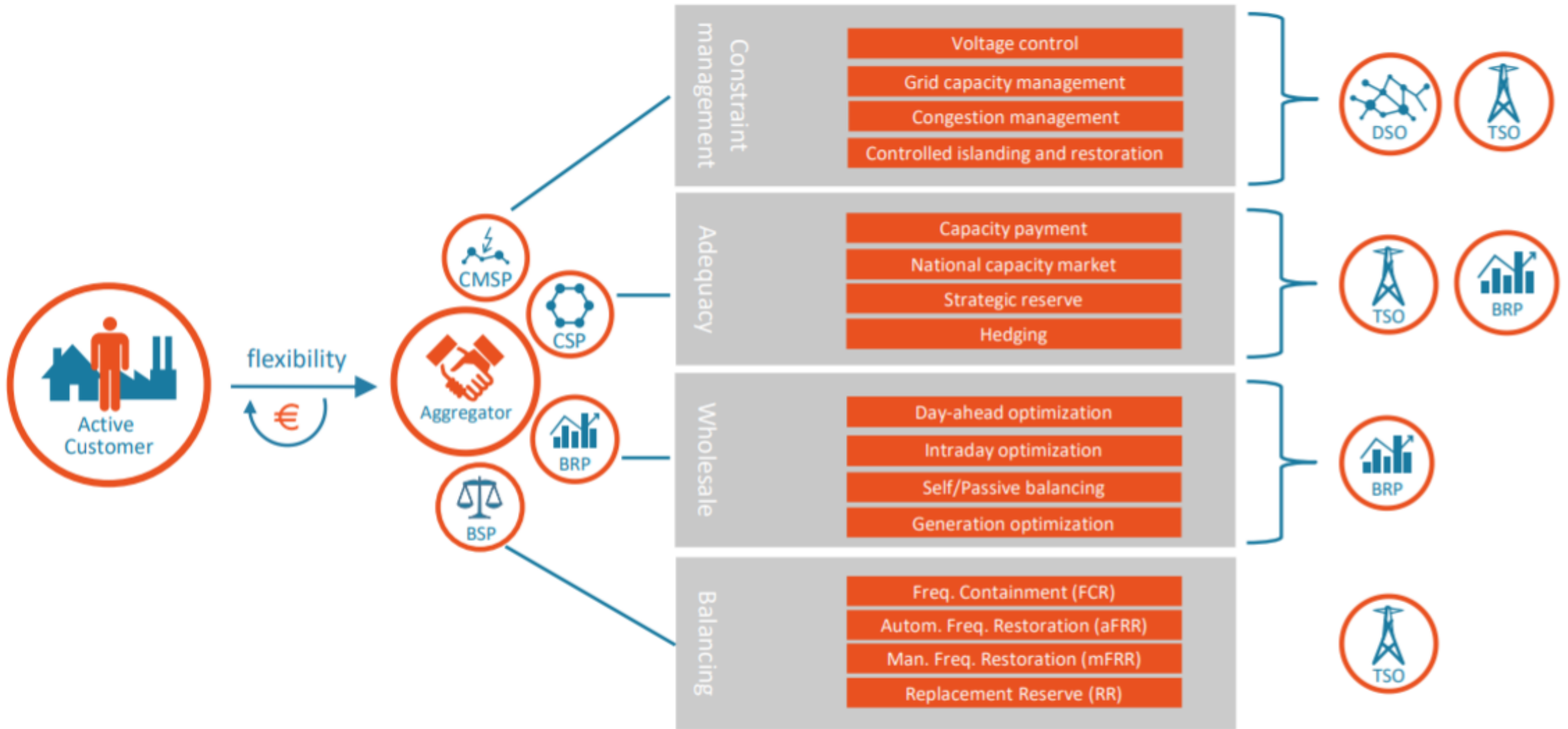
## **CENTRALIZED BRP GUARANTEEING THE BALANCE (NETWORK OPERATORS)**

**BETTER KEEP THE BALANCE  
TOGETHER  
(DECENTRALIZED)  
AGGREGATOR**





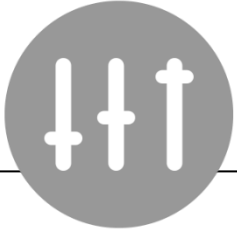
# AGGREGATOR



# CONTROL OPTIONS



# CONTROL OPTIONS



Demand management



Energy Storage



Grid connection?



Curtailment:



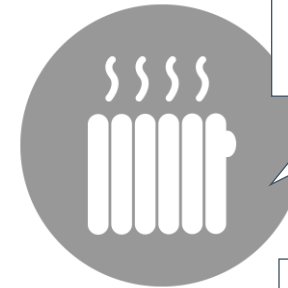
Conversion

# DEMAND CONTROL

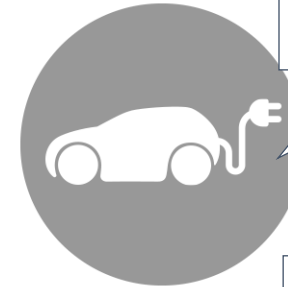


## SMART CONTROL

- Cap peaks
- Choosing the smartest moments of use
- Time shifting
- Taking user-friendliness into account
  - financial incentives
  - working on awareness and/or support



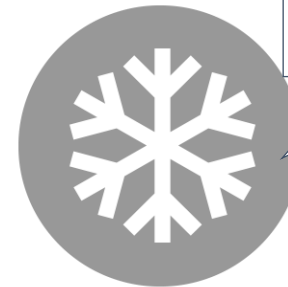
Control of temperature



EV-charging:  
smart charging



Industrial process  
Time shifting



Freezer,



# GRID CONNECTION

## TO DO OR NOT TO DO?



- **Not always possible**
- **Not always profitable (cable costs)**
- **Project delaying factor: cable extension sometimes has to be requested / realized first**





STORAGE IN  
LITHIUM-ION



**ENERGICO**  
Grid Management Systems



## STORAGE IN LITHIUM-ION



Life expectancy



Temperature dependant



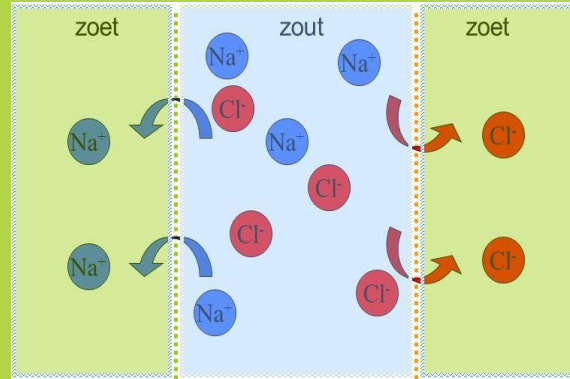
Cost



Not durable



## MANY ALTERNATIVES SALT WATER BATTERY



- Low energy density
- + Cheap
- + Very common available



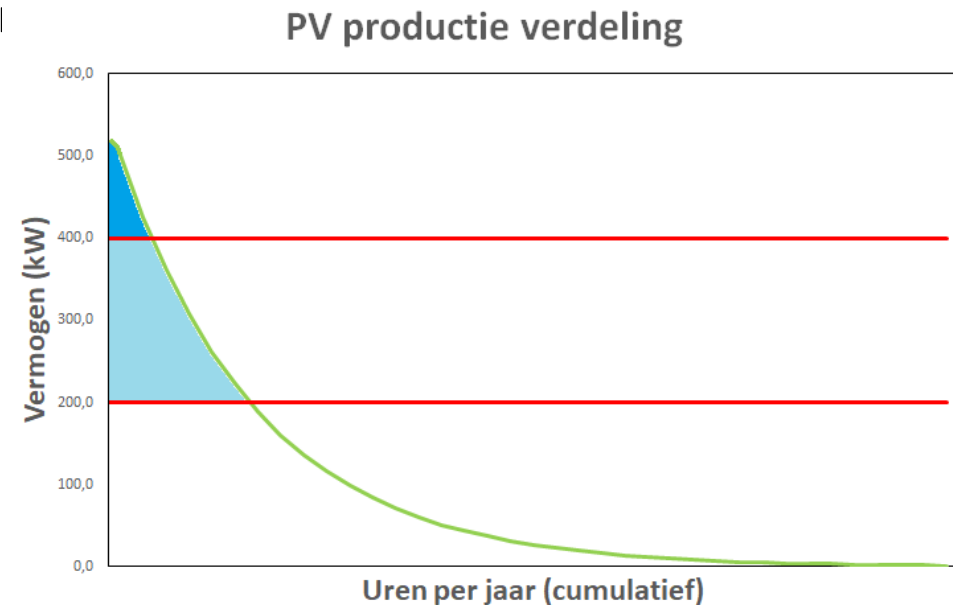
# CURTAILMENT

## SOMETIMES THE BEST OPTION



Overproduction only a few ti  
year

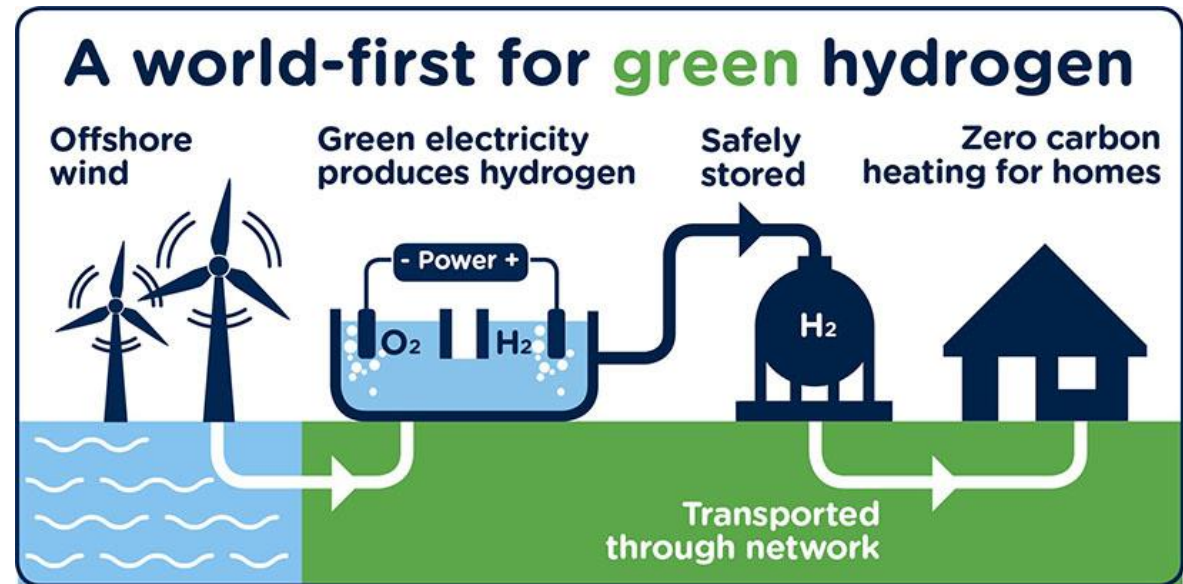
When other options are  
expensive/unprofitable



# ENERGY CONVERSION

Power2Heat

Power2Hydrogen



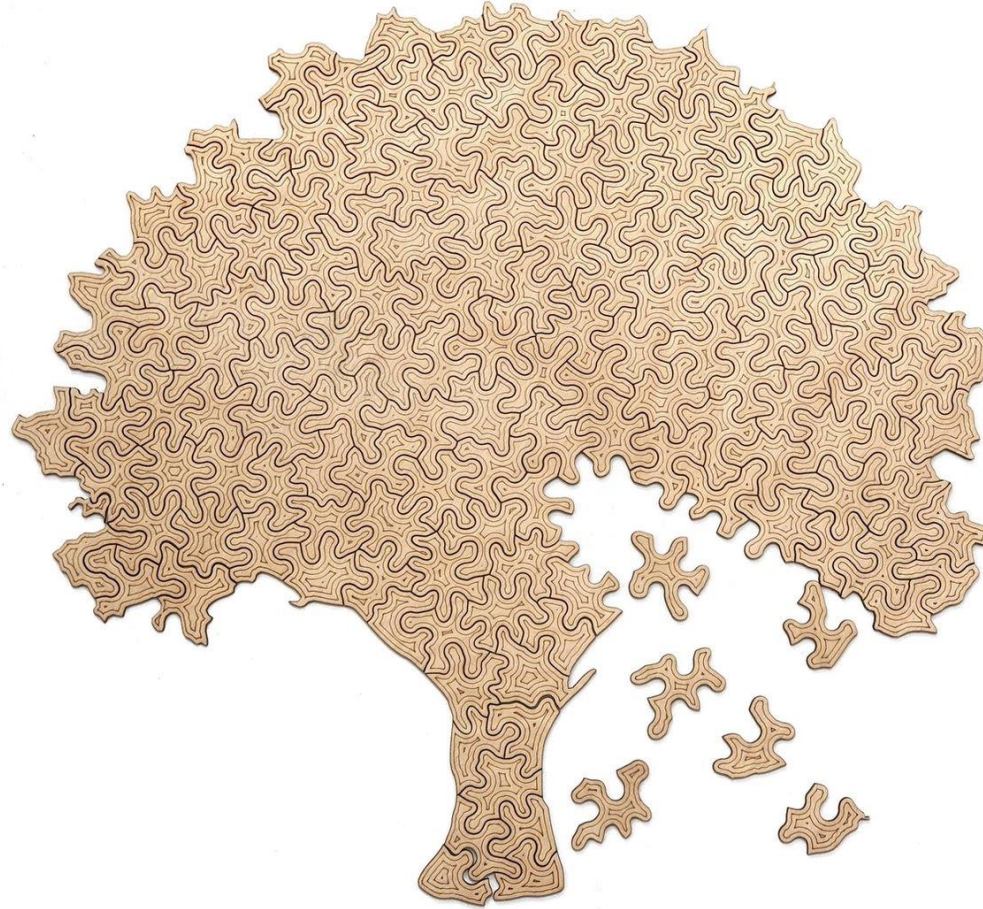


SMARTER SUSTAINABLE TOGETHER

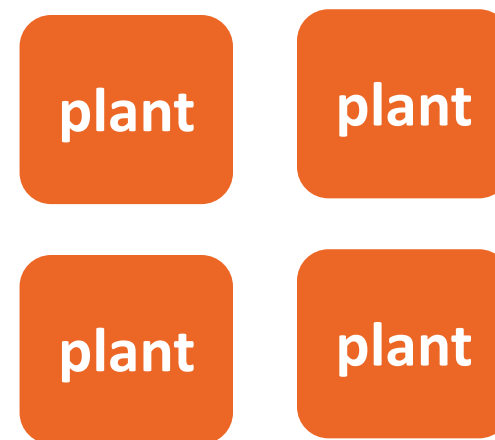




# CAN THIS PROBLEM BE SOLVED BY BEING SMARTER SUSTAINABLE TOGETHER?



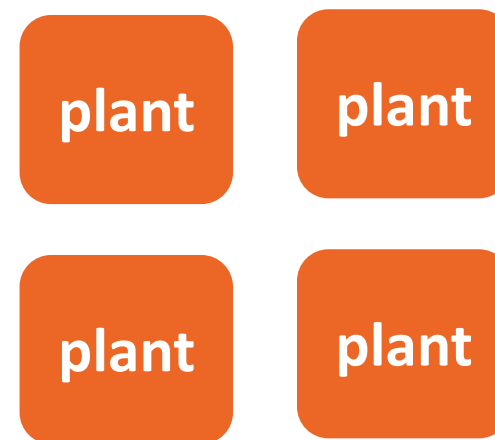
# THREE VIEWS



Portfolio

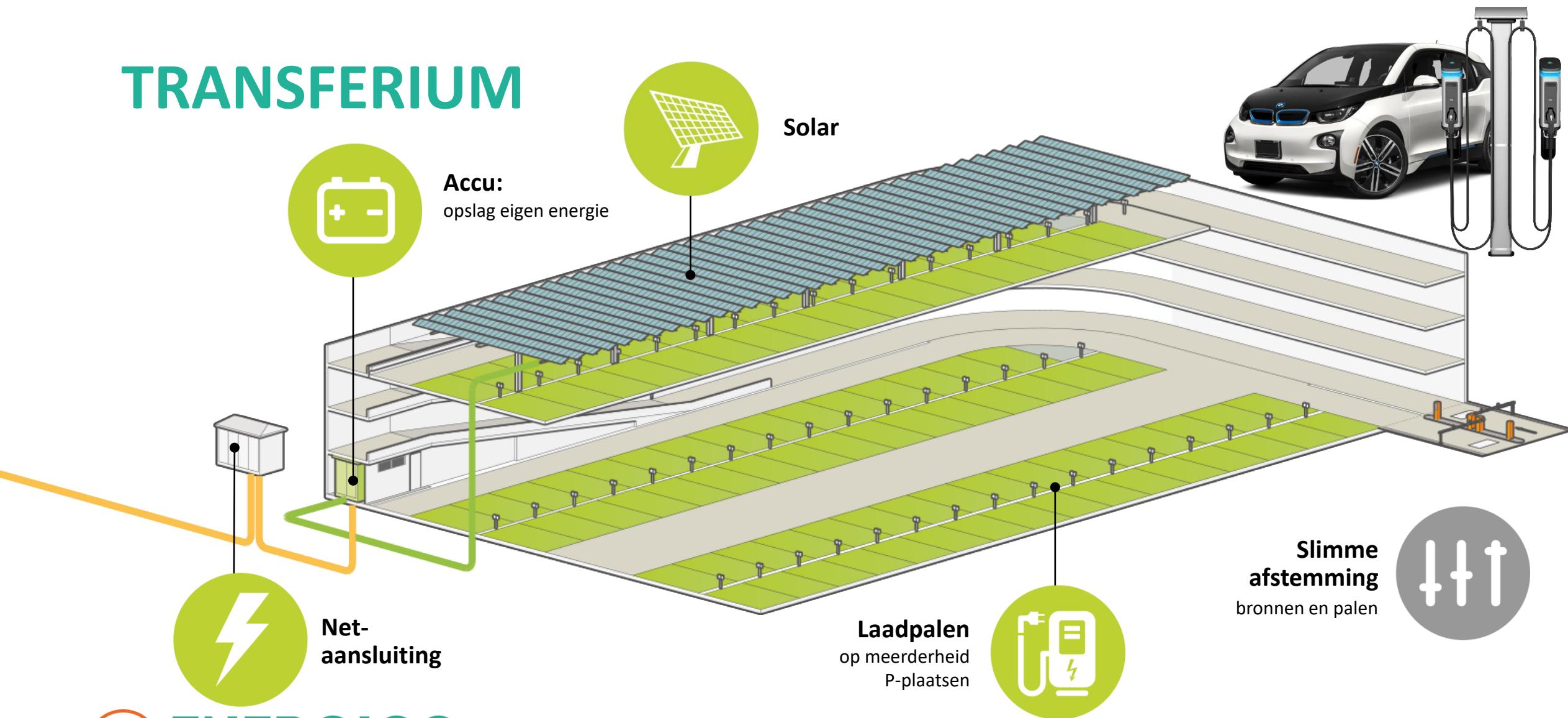


# THREE VIEWS



Portfolio

# TRANSFERIUM

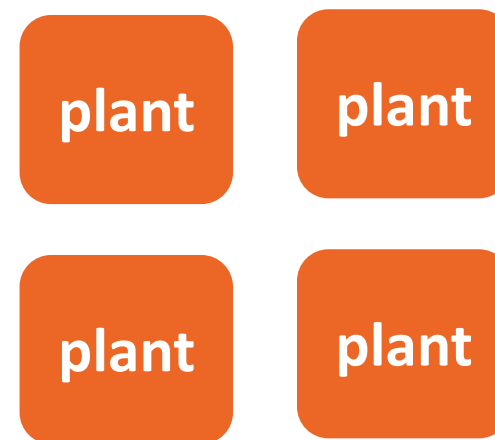


# HYBRID PARK



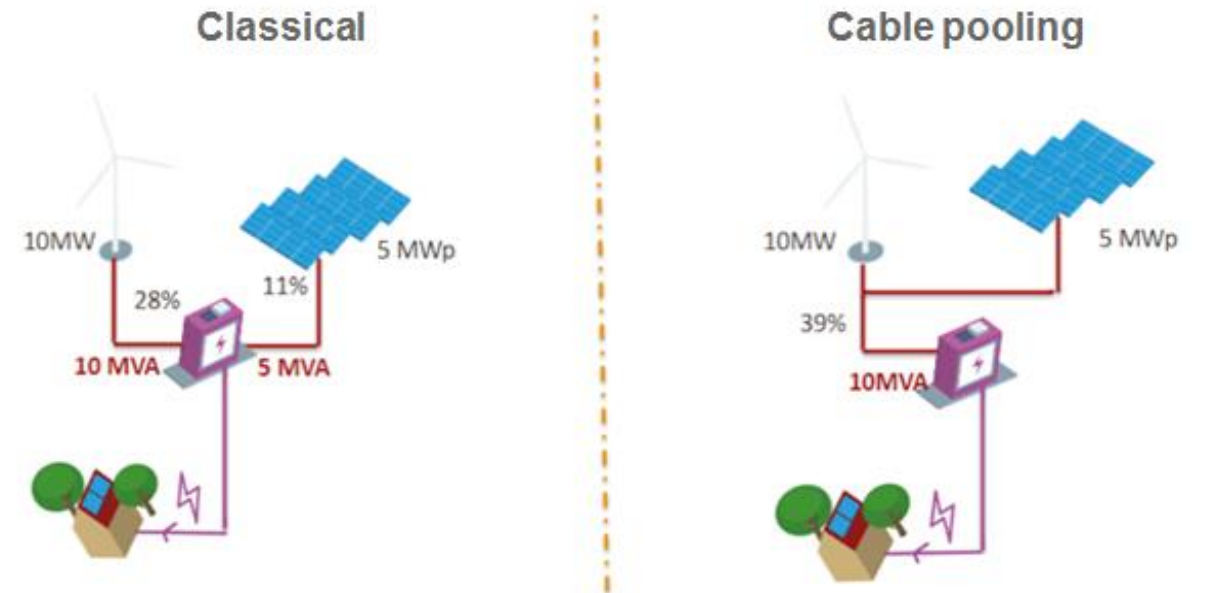


# THREE VIEWS

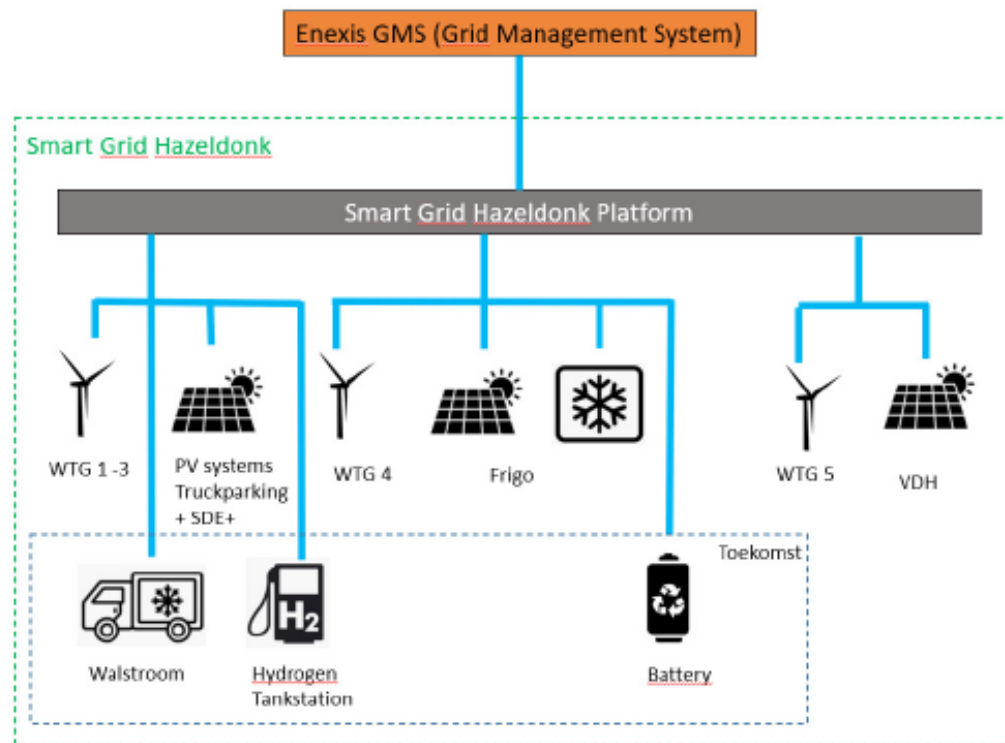


Portfolio

# DE GRIFT CABLE POOLING



# HAZELDONK





# OLD GASTEL

Congestion Management



# TEC TERHEIJDEN



## PHASE 1A

Windturbine  
4 MW



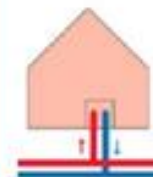
E-Boiler  
5 MW



Warmtebuffer  
350 m3



Warmte afname



## PHASE 1B

Zonnepark

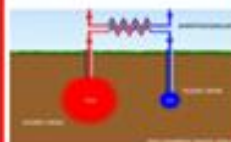


## PHASE 2

4 Warmtepompen



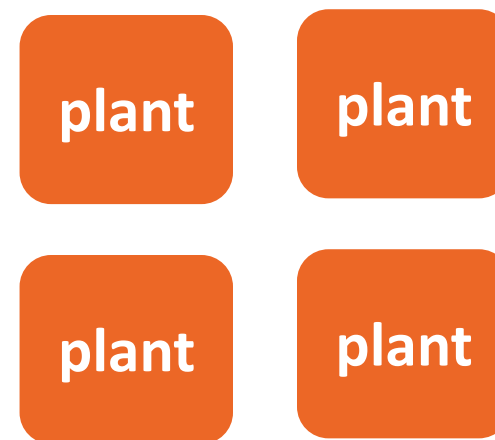
WKO  
3 warmtebronnen  
3 koudebronnen



EOW

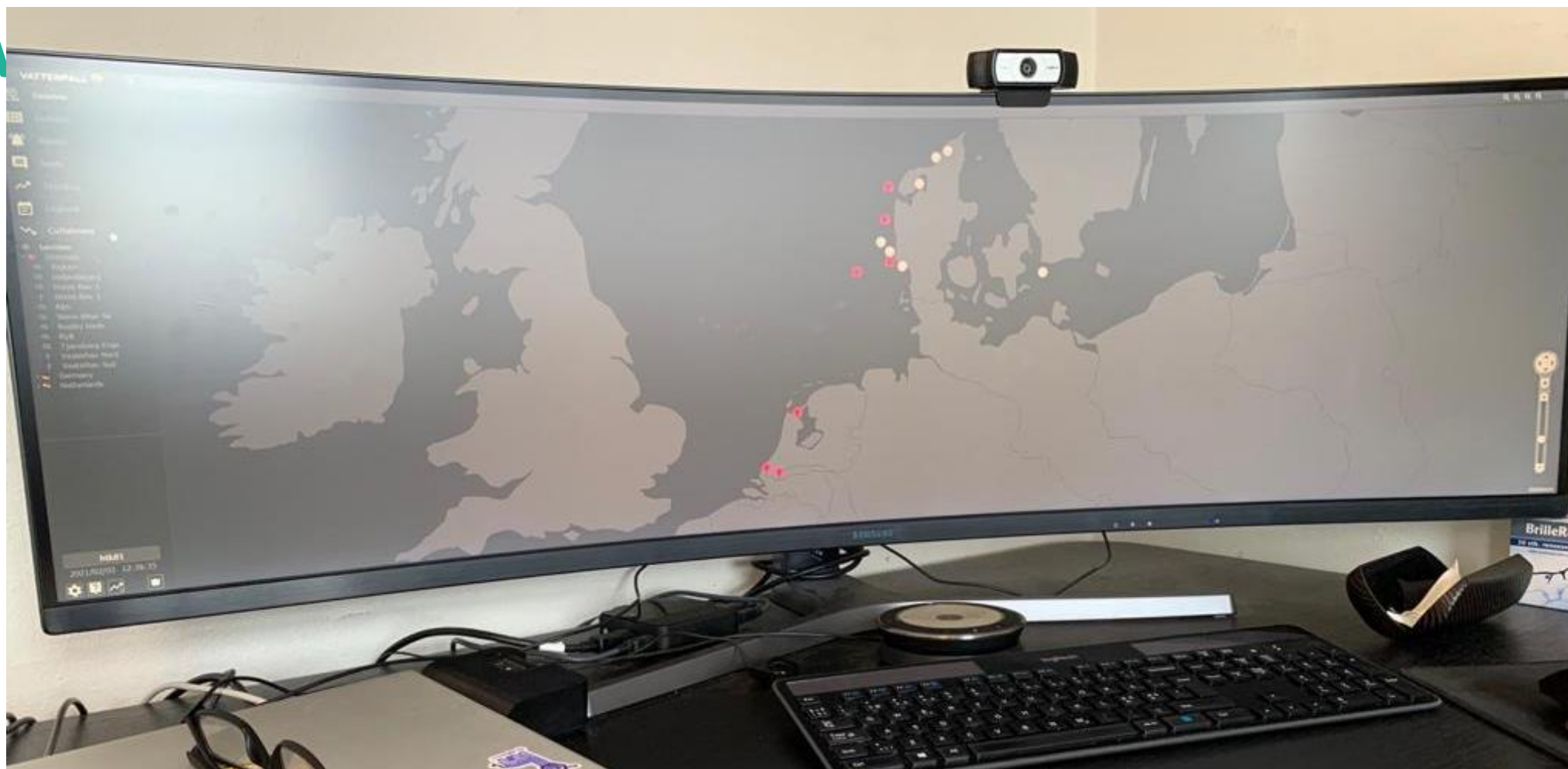


# THREE VIEWS



Portfolio





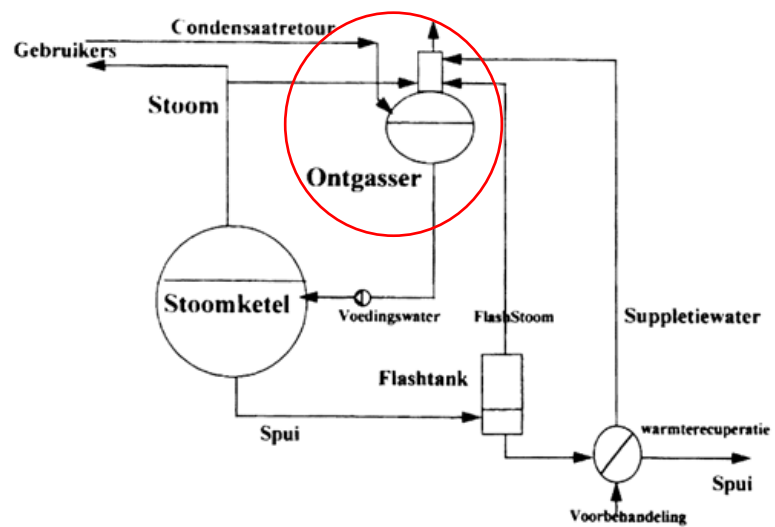
# OPPORTUNITIES FOR INDUSTRY



**ENERGY  
FLEXIBILITY  
HAS VALUE**



# HYBRID ENERGYSYSTEM - BOILER



# HOW TO CREATE VALUE FROM FLEX

Support on the market for ancillary services during balancing problems, using:

- regulating reserve (aFRR),
- incident reserve (mFRRda)
- Frequency Control Reserve (FCR).

Sell its flexible capacity for a fixed fee to balance responsible parties (BRPs).

Making good use of price fluctuations on the spot markets by concentrating electricity consumption in time windows with cheap electricity, and by avoiding consumption when electricity prices are high.

Local / regional optimization

# PIONEERS

Far ahead:

metal producers, waste incinerators and horticulture entrepreneurs

But opportunities available in many more markets: chemical,  
packaging, paper, food, glass



# BOTTLENECKS

- Limited knowledge of opportunities for additional earning by offering demand response to the electricity market
- Limited insight into the investments required to unlock the available potential
- Limited 'sense of urgency' for developing the potential in the short run with policy makers and industries. For many companies energy management is not core business and energy makes up a minor proportion of operational costs. For highly electrified companies energy does make up a significant proportion of operational costs, and they may represent quick wins.

**CALL  
TO  
ACTION**

# CALL TO ACTION

(1) understanding your  
flexibility potential

(2) revenue model





**ENERGINCO**  
Grid Management Systems



# QUESTIONS? DISCUSSION!

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**THANKS FOR THE ATTENTION**