



Solarise – Kick-off Smart Grids & Solar Energy

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June 18th 2018

ENERGY TRANSITION IS 'HOT NEWS'





Accompanying EU energy policies until 2030

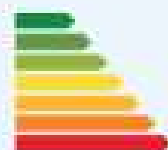
Annual State of the Energy Union

February 2016: Sustainable energy security package

November 2016: Clean energy for all Europeans package



**New Electricity
Market Design**
(Regulation internal
market electricity)



Energy Efficiency
(Energy Efficiency
Directive, European
Performance of
Buildings Directive)



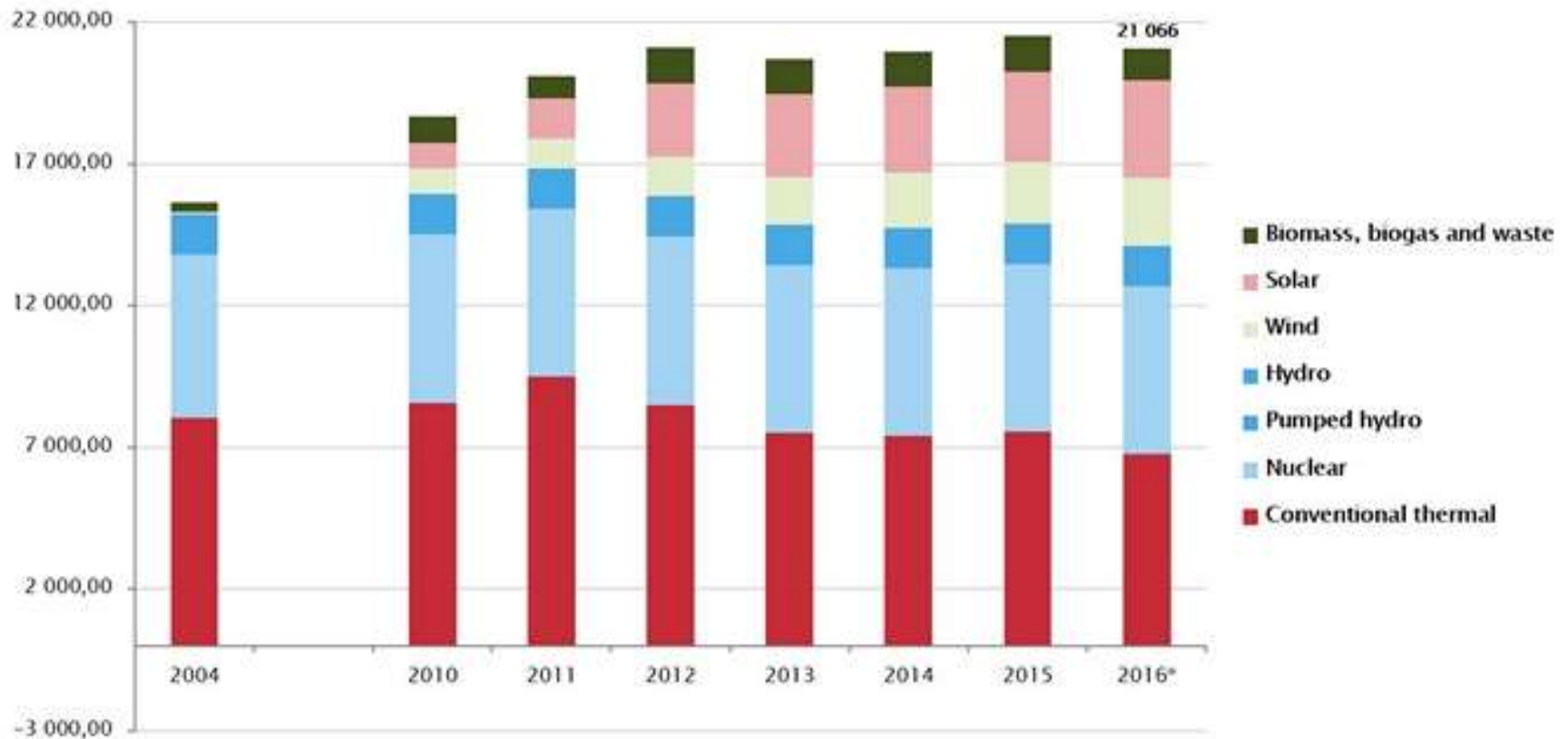
Renewables
(Revised Renewable
Energy Directive)



**Energy Union
Governance**
(Governance
Regulation)

SOLAR AS PART OF PRODUCTION TECHNOLOGY IN BELGIUM

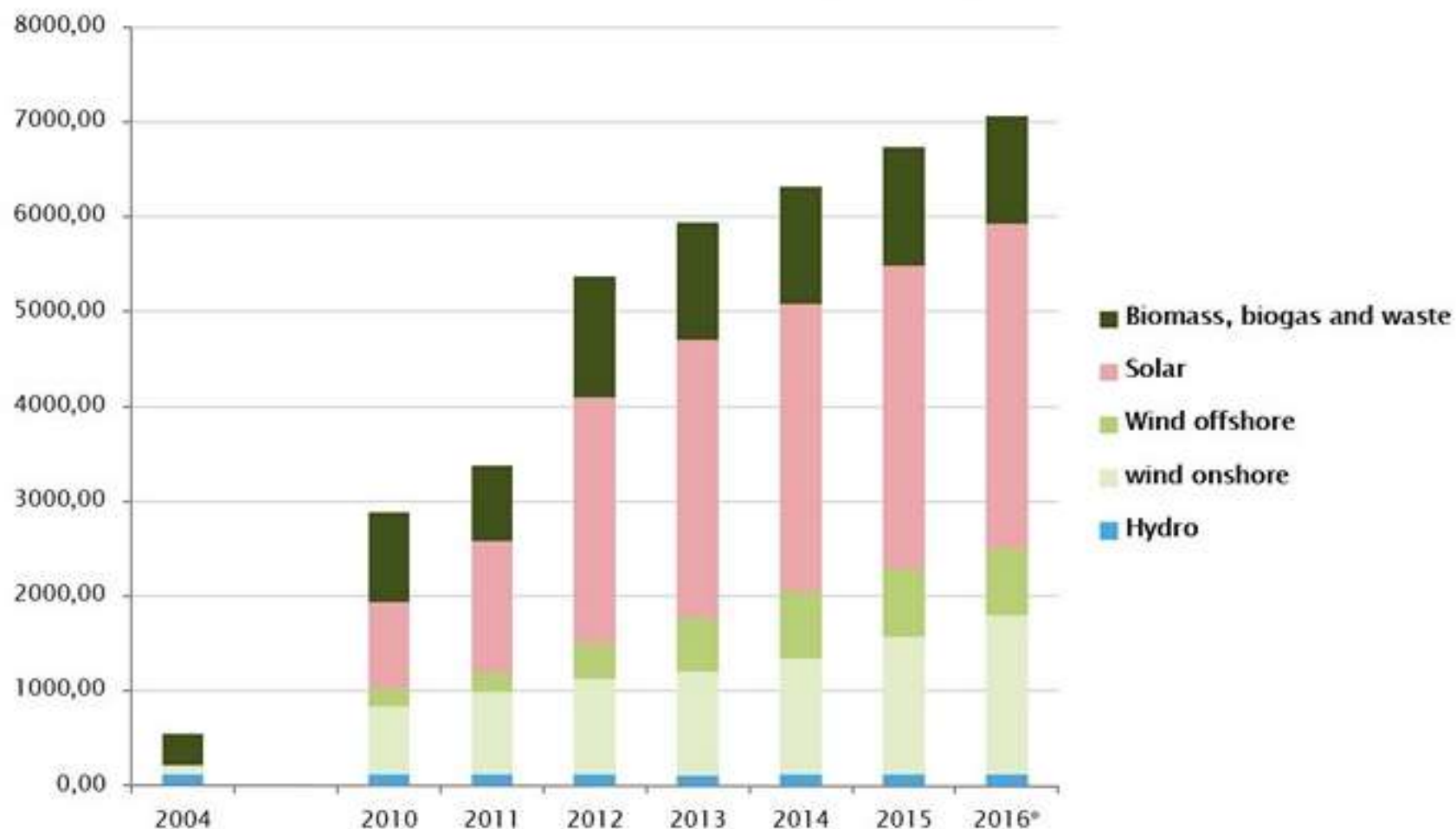
Installed capacity in Belgium by production technology (MW)



Bron: FEBEG

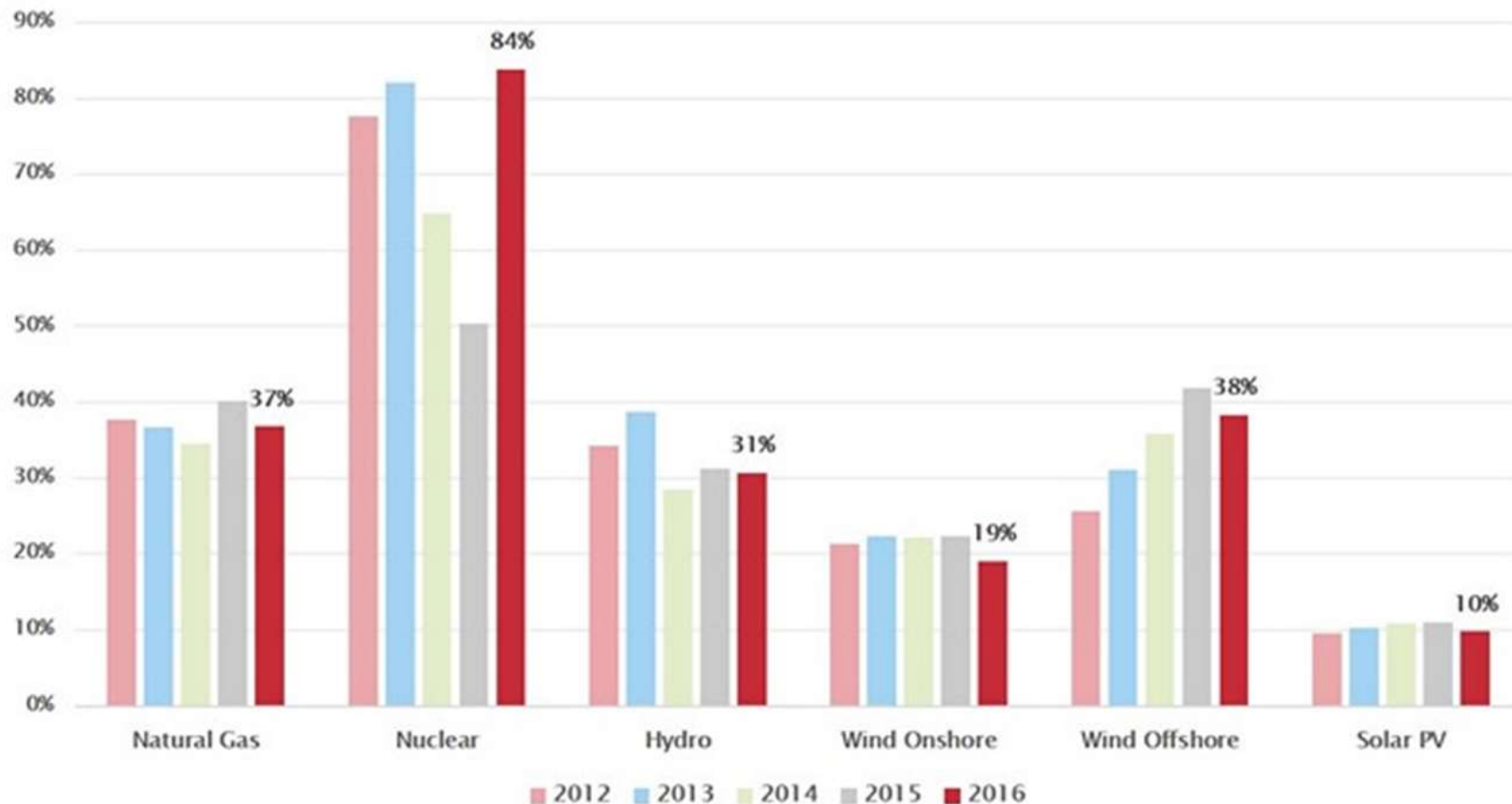
SOLAR IN BELGIUM

Installed renewables capacity in Belgium (MW)



SOLAR – LOAD FACTOR

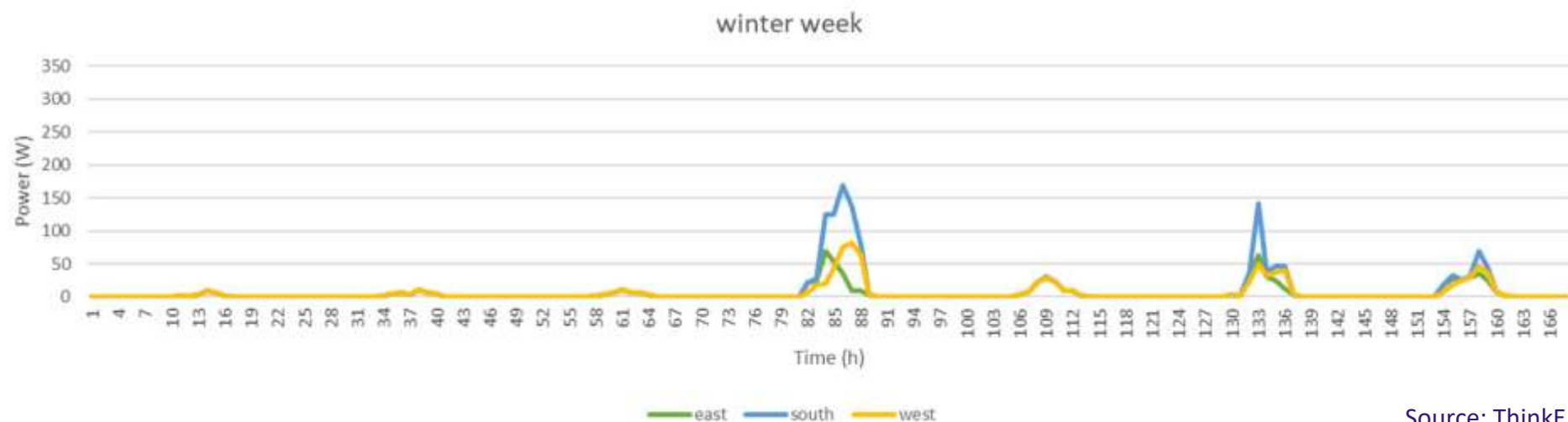
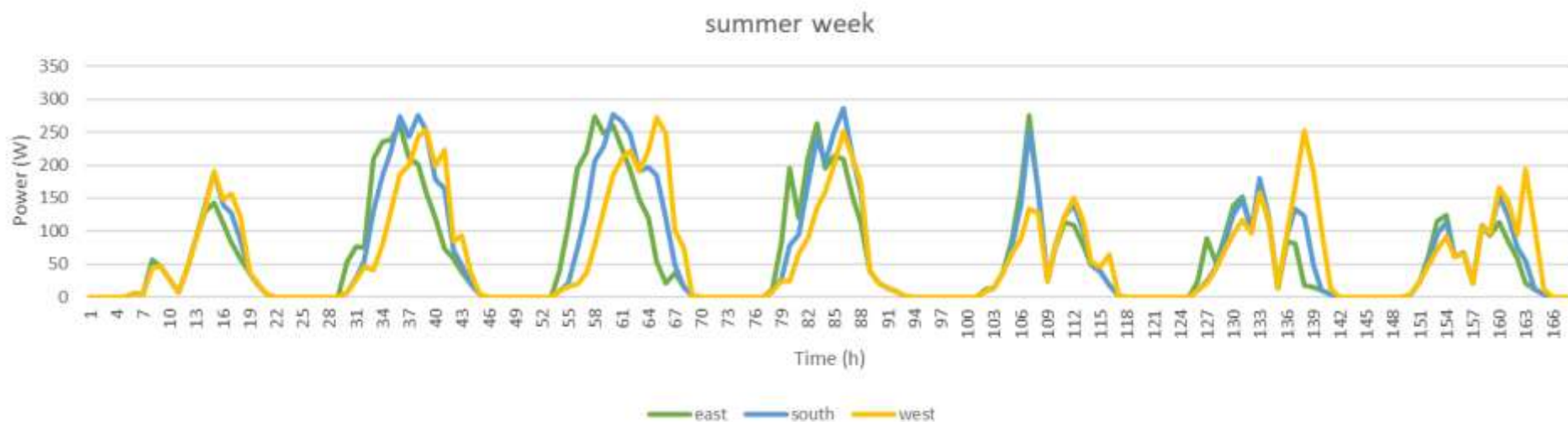
Load factor: percentage of total number of hours per year when production assets are in operation in Belgium (equivalent full load hours capacity)



SOLAR PRODUCTION IN BELGIUM 2017

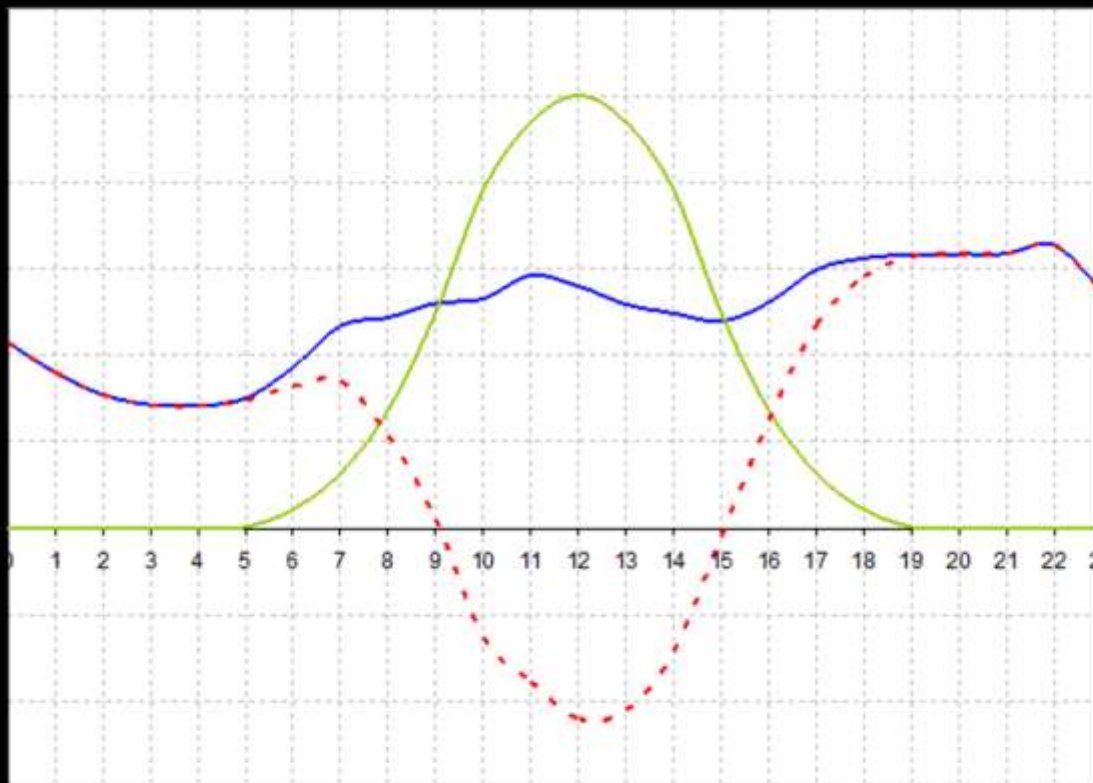


ORIENTATION OF SOLAR PANELS



MONITORING (REAL TIME) = IMPORTANT

f50



Digitale
meter
(DNB's)

Telecom-
operatoren
LTE/4G



eandis

infrax

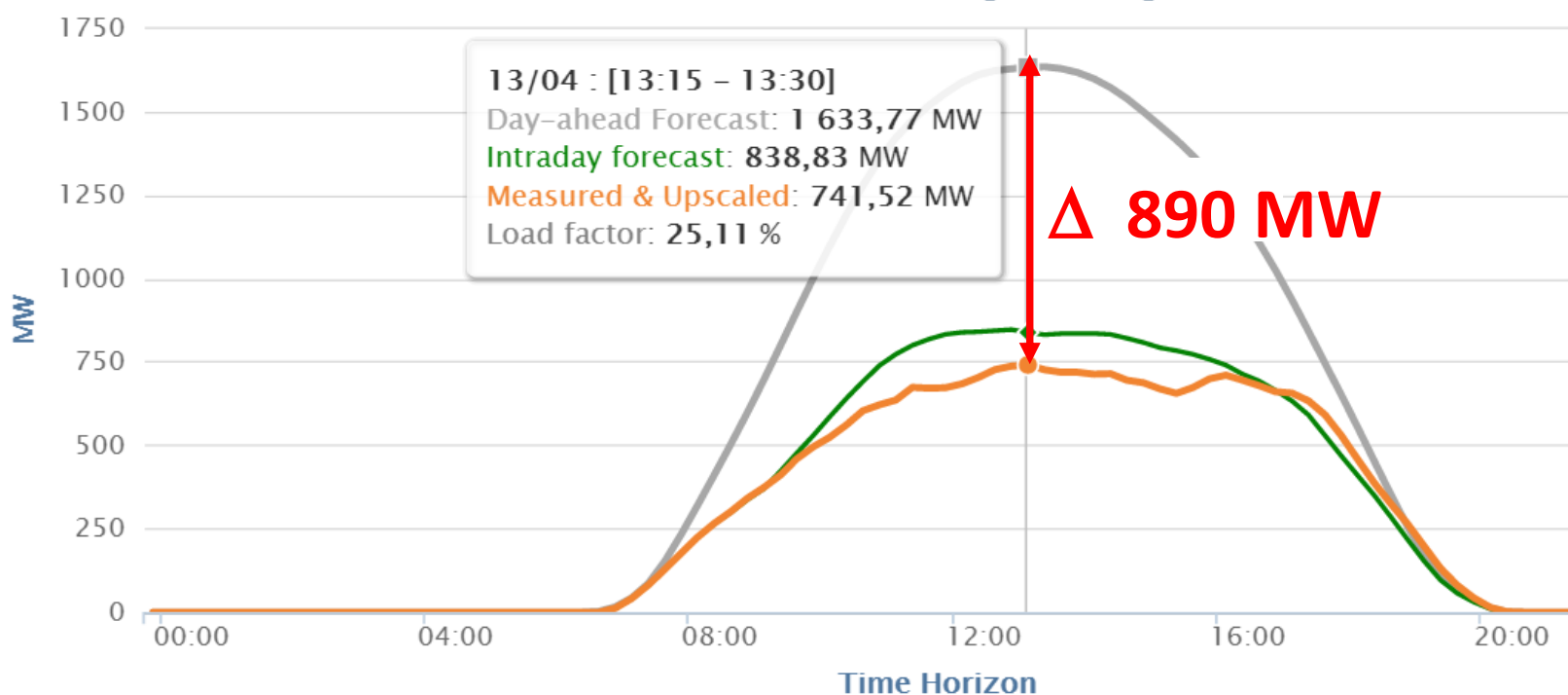
eandis | infrax

PREDICTABILITY SOLAR POWER

13-04-2016

Monitored solar PV capacity: 2 952,78 [MWp]

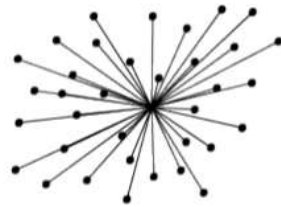
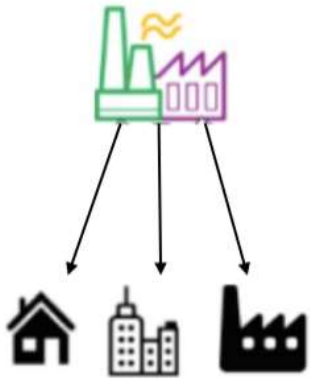
Solar-PV Power Forecasting for Belgium



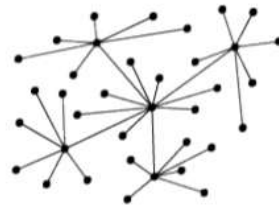
ELECTRICITY PRODUCTION

f50

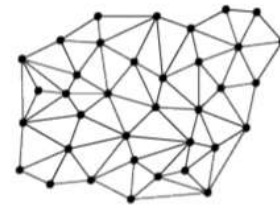
PAST



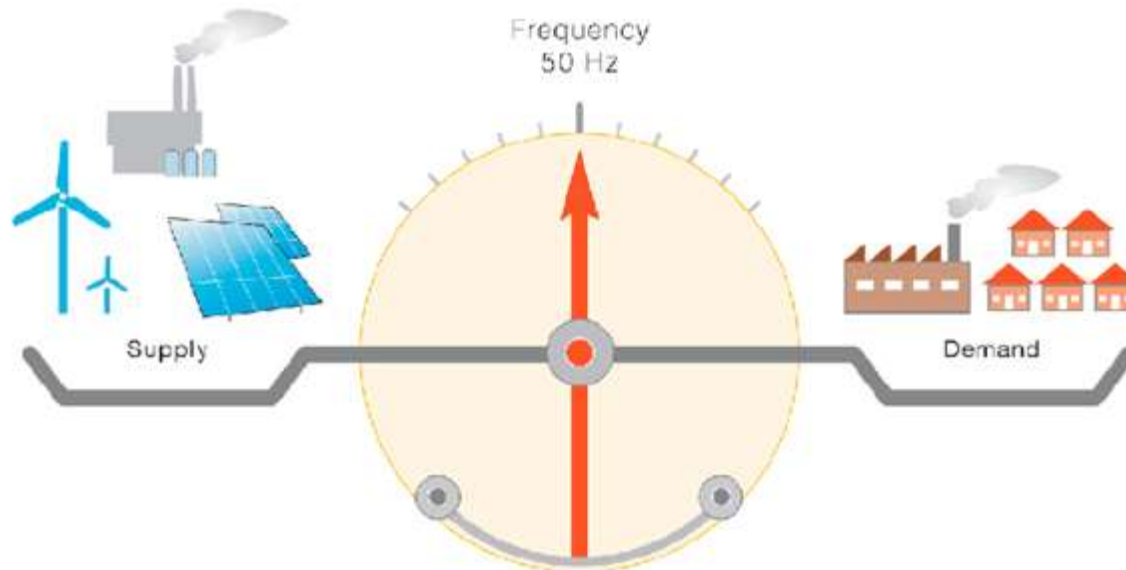
centralised



decentralised



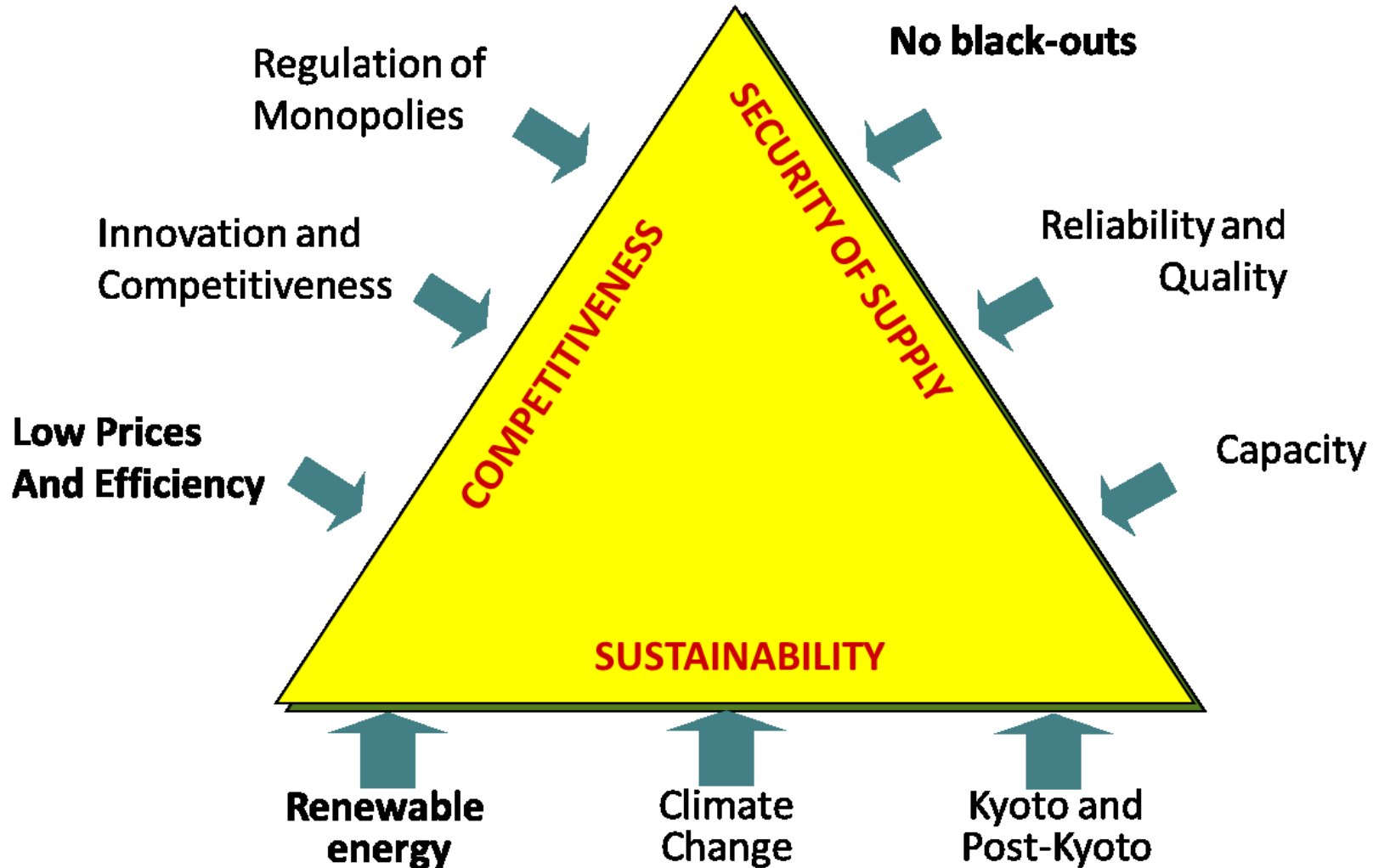
distributed



PRESENT



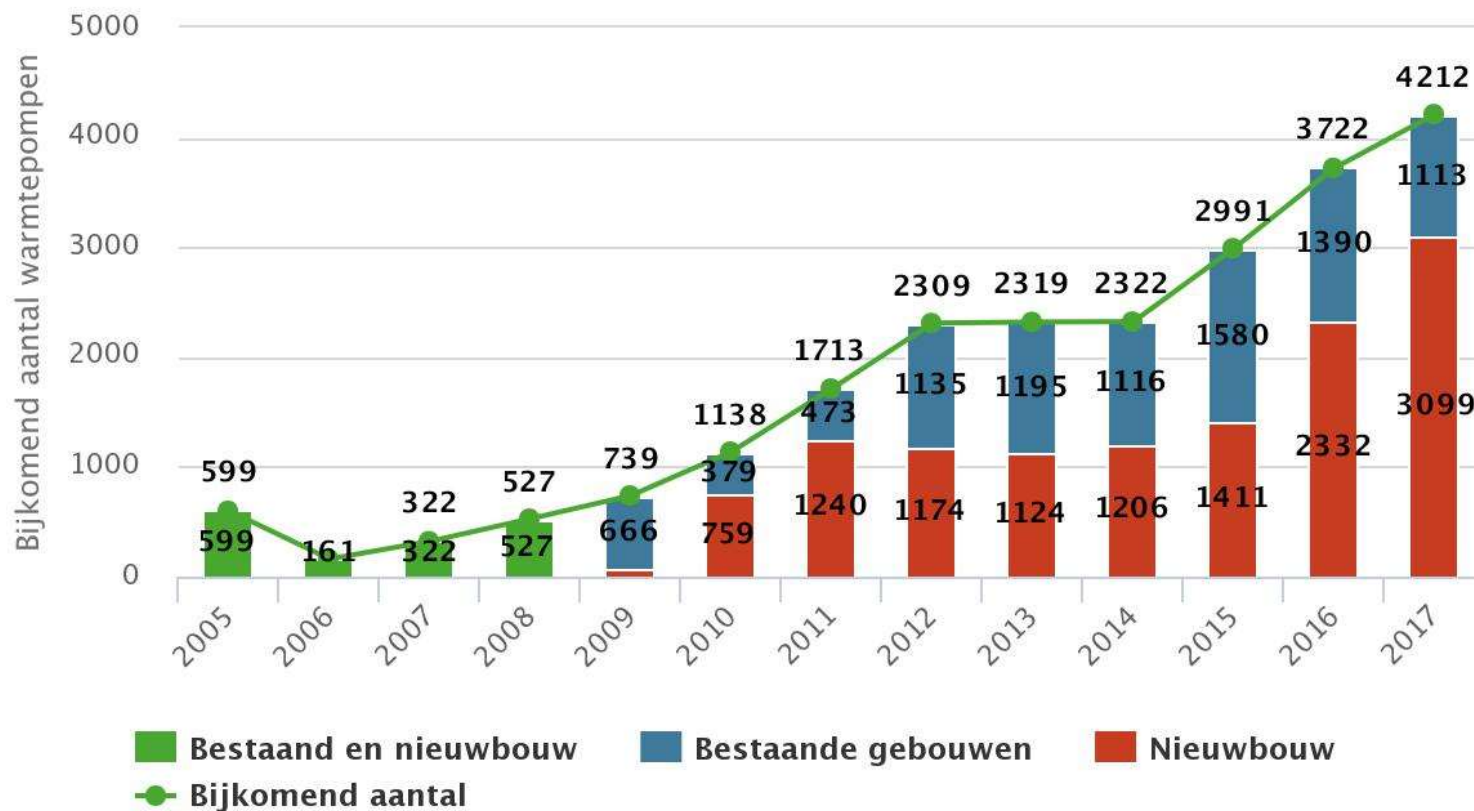
TRILEMMA – FINDING THE OPTIMUM



NOT ONLY PRODUCTION OF ELECTRICITY CHANGES... ELECTRIFICATION

Warmtepompen

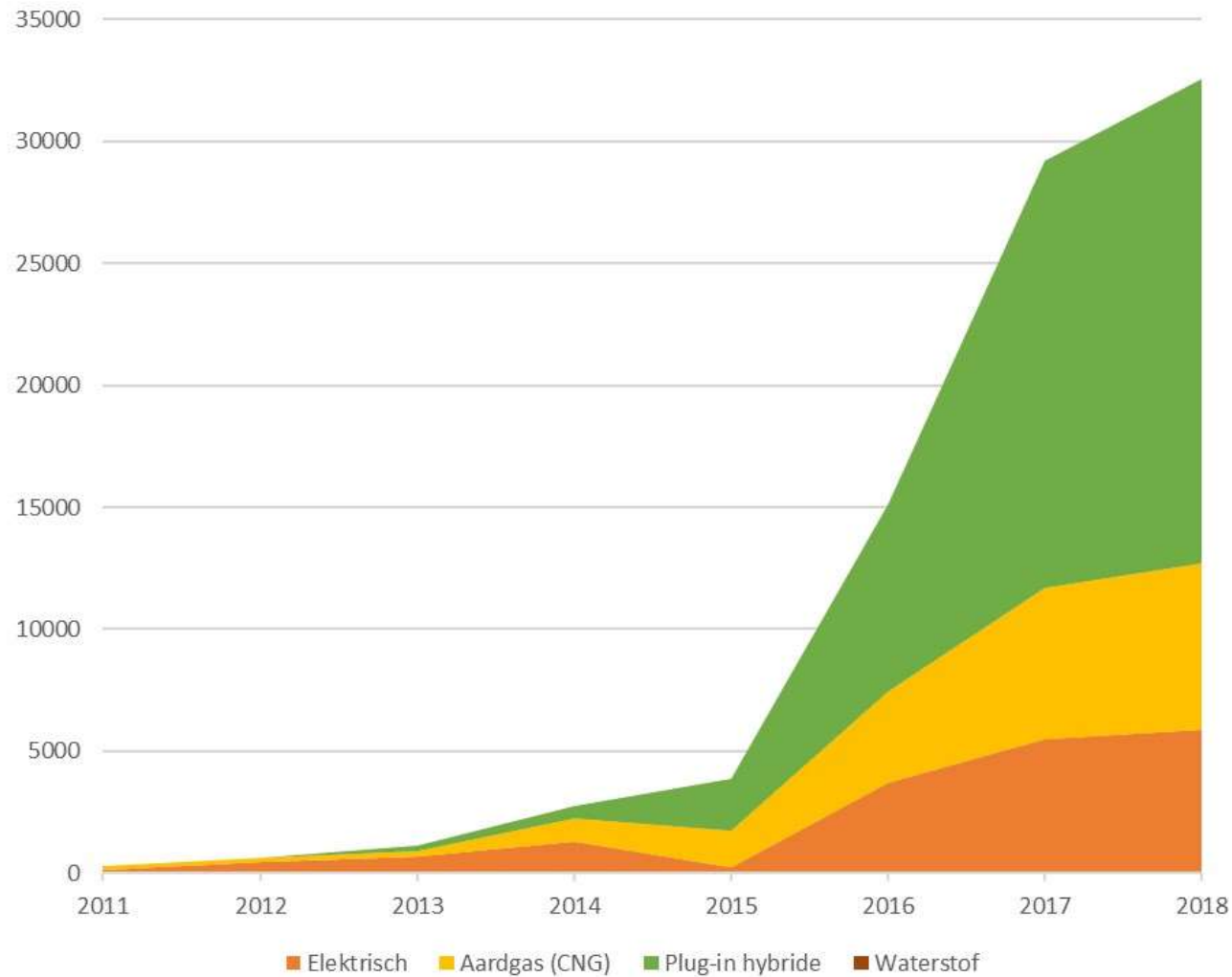
Grafiek 1: Evolutie bijkomend aantal warmtepompen



TRENDS IN ENERGY: ELECTRIFICATION: MOBILITY



Aantal milieuvriendelijke voertuigen in het Vlaamse park



EMOBILITY: 1979 AND 2014

1979 - Vrije Universiteit Brussel

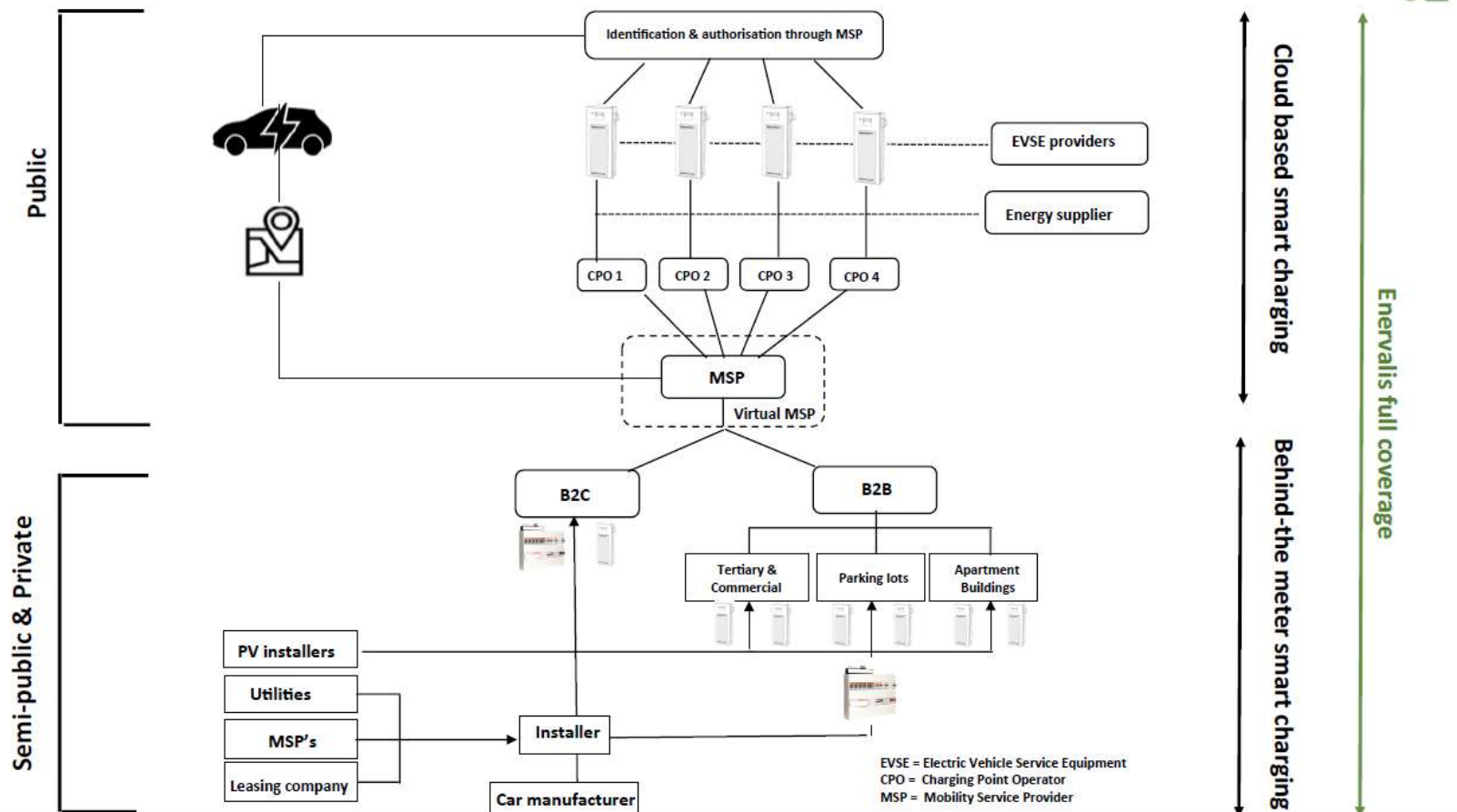


2014 - Vrije Universiteit Brussel



Smartpower
Suite

e-Mobility Landscape



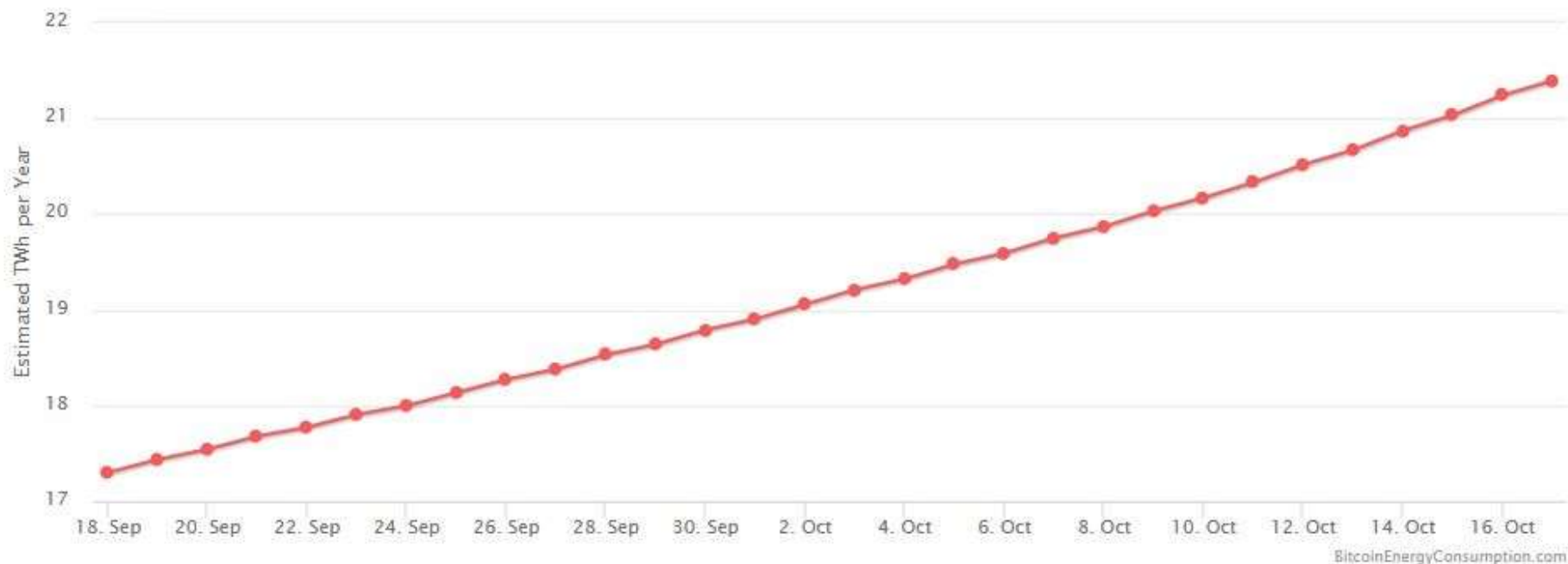
ELECTRICITY CONSUMPTION INCREASES



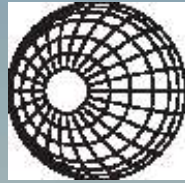
Bitcoin Energy Consumption Index

Bitcoin Energy Consumption Index Chart

Click and drag in the plot area to zoom in



SMART GRID



INTERNATIONAL
POLAR FOUNDATION



$P_{\text{load}} > 3 \times P_{\text{production}}$

... leading to the realisation of
the zero-emission energy systems of the
Princess Elisabeth station in Antarctica

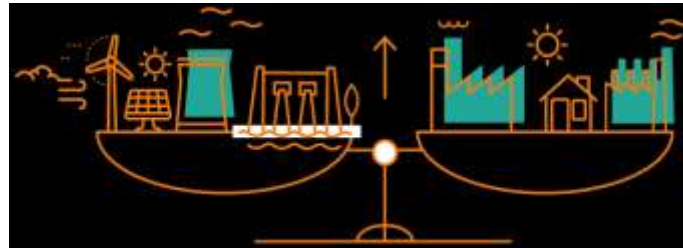
ENERGY MARKETS



Needs

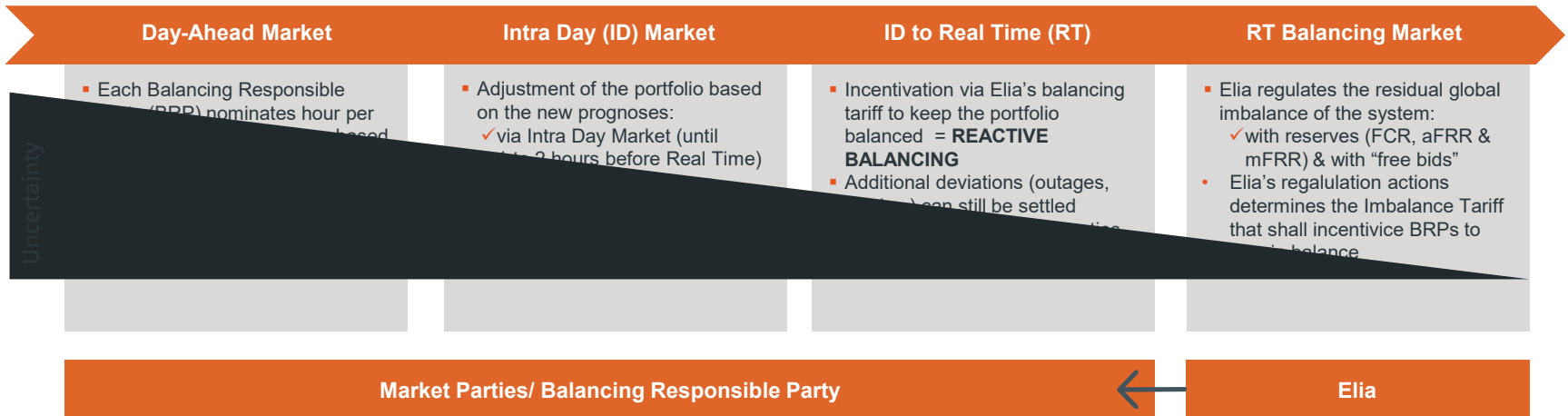
- Variability of the consumption
- Variability of the production, especially renewable sources
- Production incidents

50 Hz



Sources

- Flexible set up of production units
- Flexible demand (demand response)
- Interconnections
- Storage



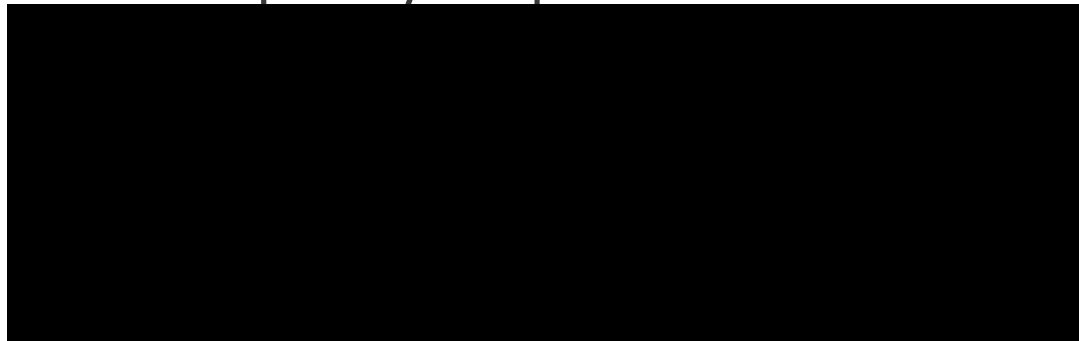
Imbalance Tariff



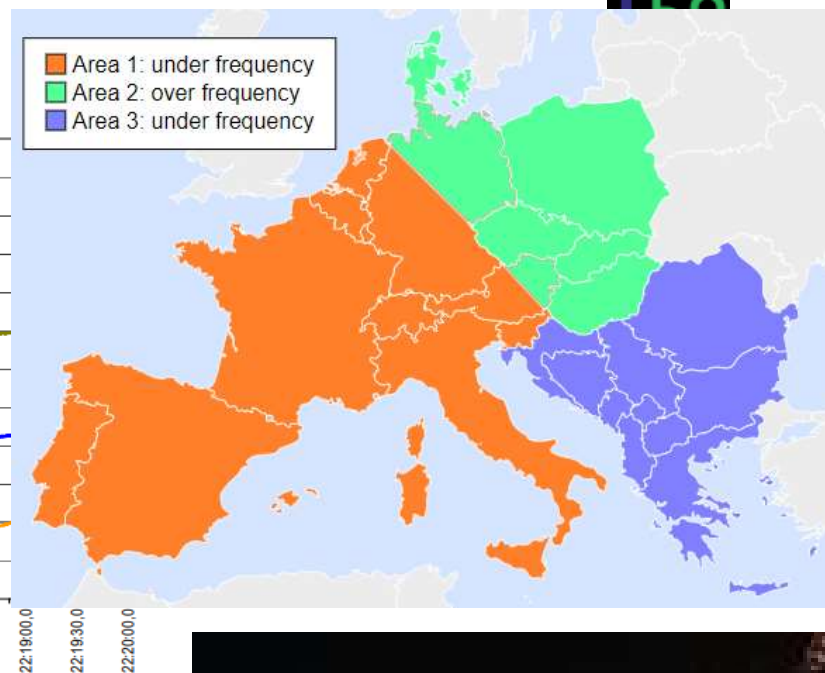
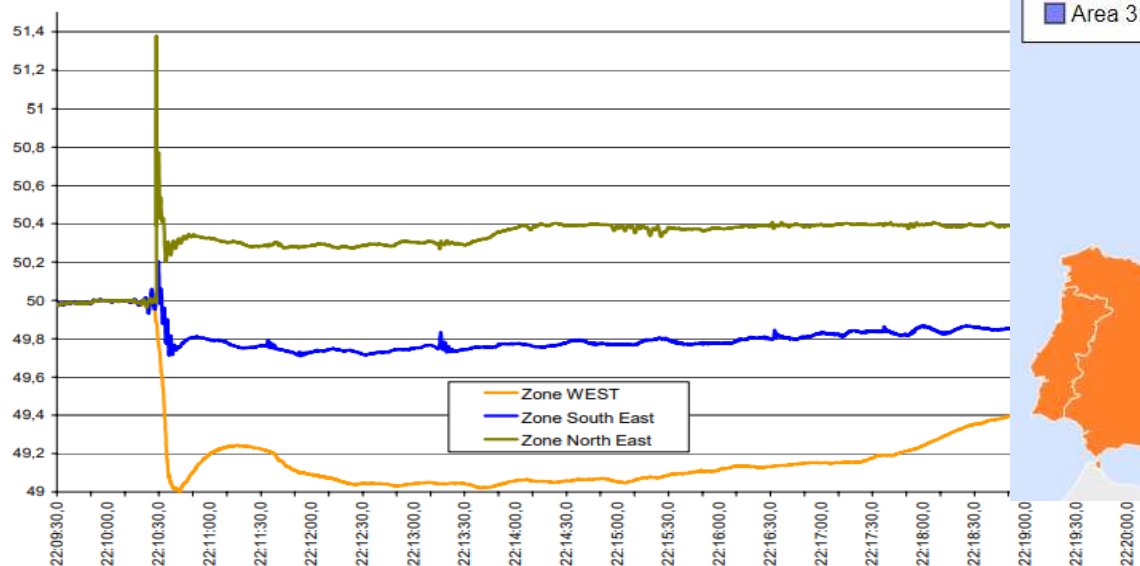
BALANCING THE GRID - TSO



- Ensure stable frequency level
 - Balance generation & demand
 - $\text{Generation} > \text{Demand} \rightarrow \text{Frequency} \nearrow$
 - $\text{Generation} < \text{Demand} \rightarrow \text{Frequency} \searrow$
 - Stable frequency = prerequisite for safe system operation!
- Maintenance of the balance is achieved within synchronous zones in Europe
 - BE part of interconnected network of Continental Europe (50 Hz)
- 5 steps to tackle a frequency drop in Continental Europe:



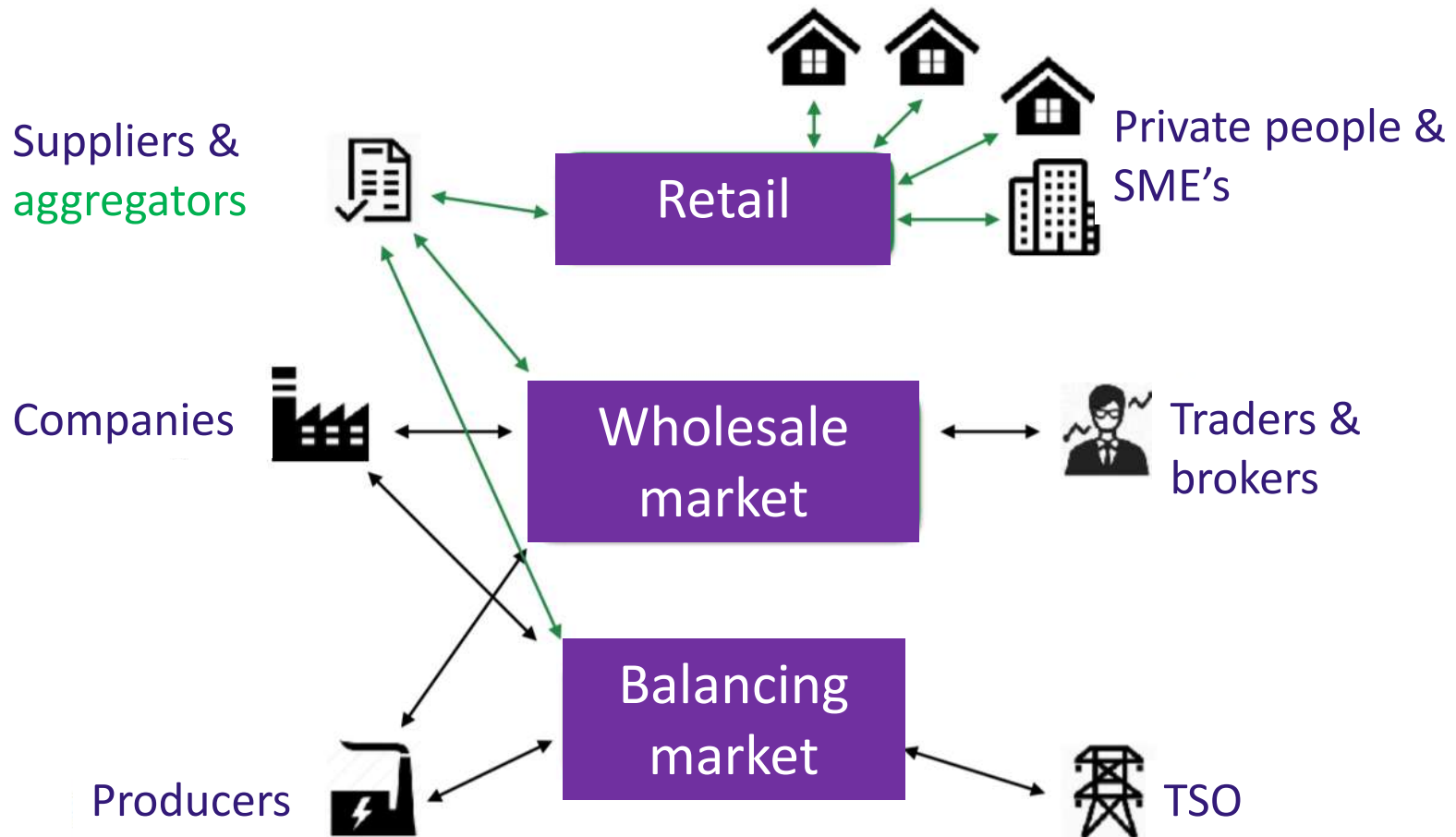
NOVEMBER 4TH 2006 – SPRING 2018



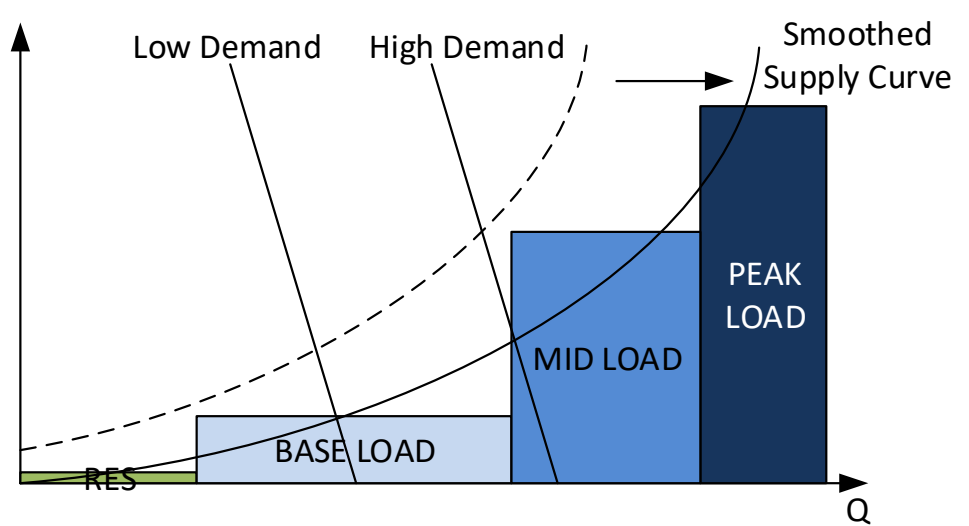
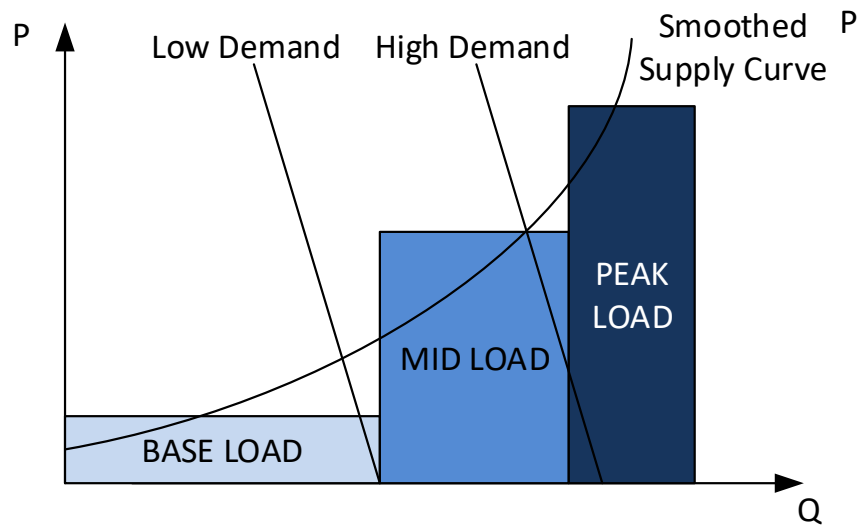
300 seconden. Zoveel liepen de digitale klokken in huis vorige maand achter, door een stroompanne in Zuidoost-Europa, waar er plots geen frequentie van 50 hertz meer was. Dat was het gevolg van een conflict tussen Servië en Kosovo, twee landen die al meer dan twintig jaar met elkaar in de clinch liggen. De ruziënde landen proberen elkaar onder druk te zetten door hun afgesproken portie stroom van 300 megawatt sinds half januari niet te leveren. Dat zorgt voor 'een piepkleine dip' en een terugval naar 49,8 hertz die ervoor zorgt dat klokken zijn gaan achterlopen. En dat had meteen gevolgen over heel Europa.



NEW MARKETROLES IN ELECTRICITY



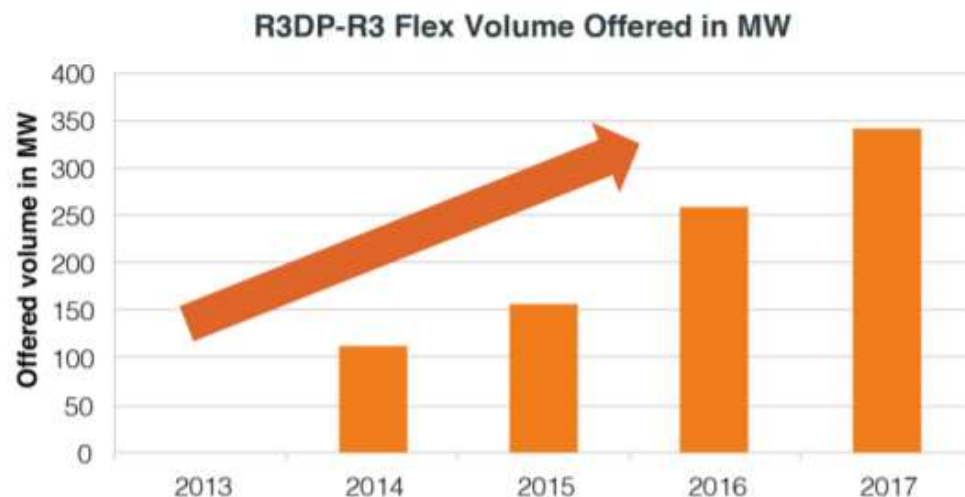
CENTRALISED GENERATION – MERIT ORDER



K De Vos 2015



NEED FOR FLEXIBILITY – INCENTIVE IMBALANCE



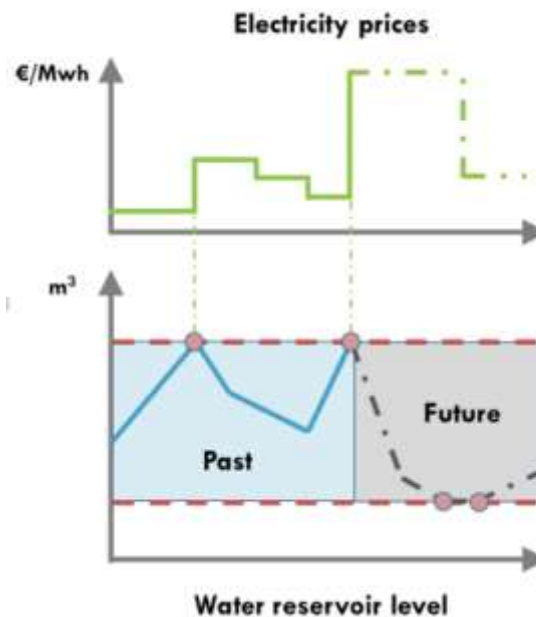
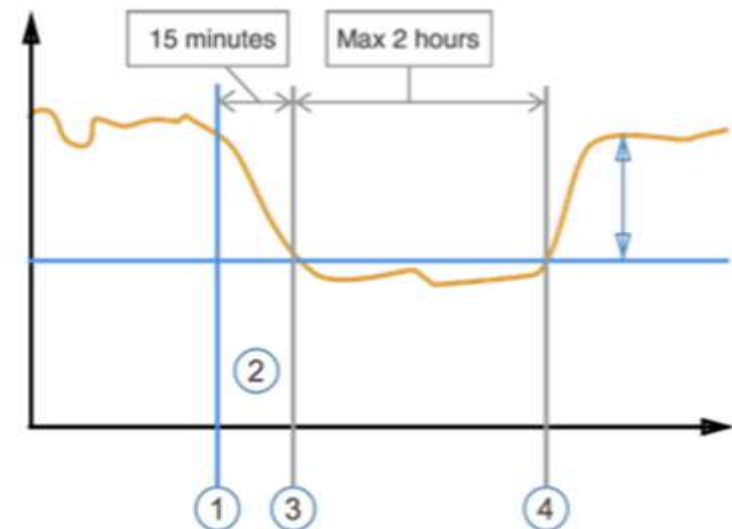
Offered volume of mFRR from Non-Conventional Units (including demand response) has been **growing** over the years, in line with product opening/redesign



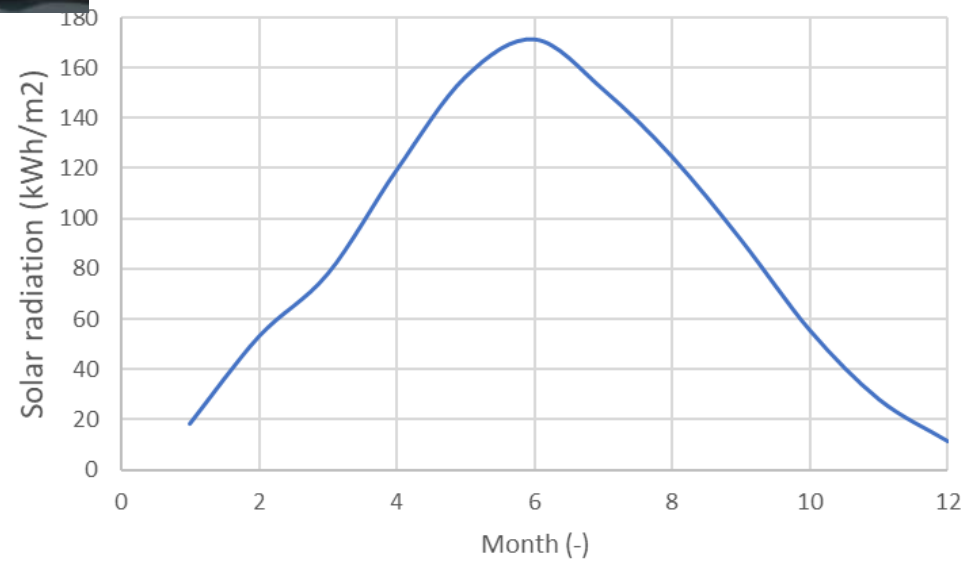
suppliers increases

FCR diversification not only in Belgium but also at EU level

FLEXIBILITY IN PRACTICE



STORY – LIVING LAB



3 PILLARS WITHIN FLUX50



Smart Energy Region

Innovate

Inform

Inter-
national

2017

2018





SPECIFIC TOPICS



Energy Harbors



Microgrids



Multi-Energy Solutions



Energy Cloud Platforms



Intelligent Renovation



SMART ENERGY REGION



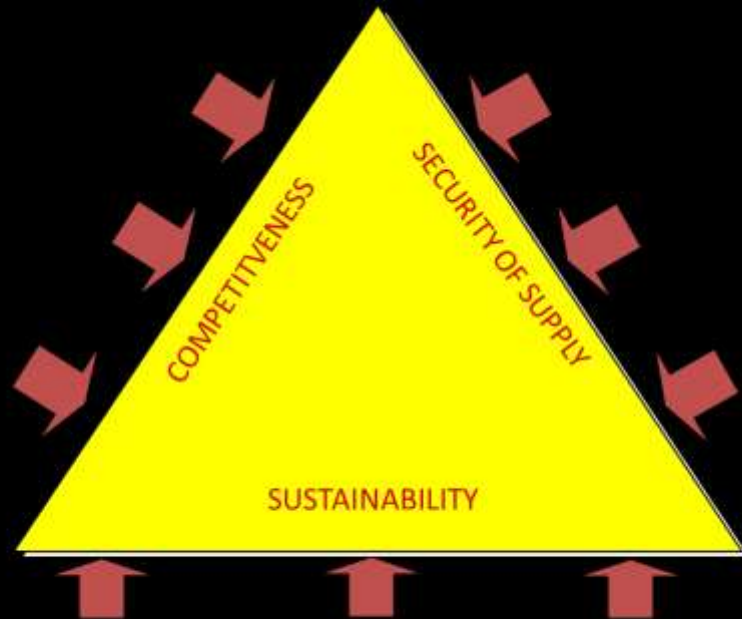
Flanders

[OUR STORY](#) [FOCUS AREAS](#) [VISIT PROGRAMS](#) [COMPANIES](#) [NEWS](#) [CALENDAR](#) [CONTACT](#)

VISIT GREEN Flanders



NOT ONLY ABOUT CLIMATE FOR INDUSTRY...



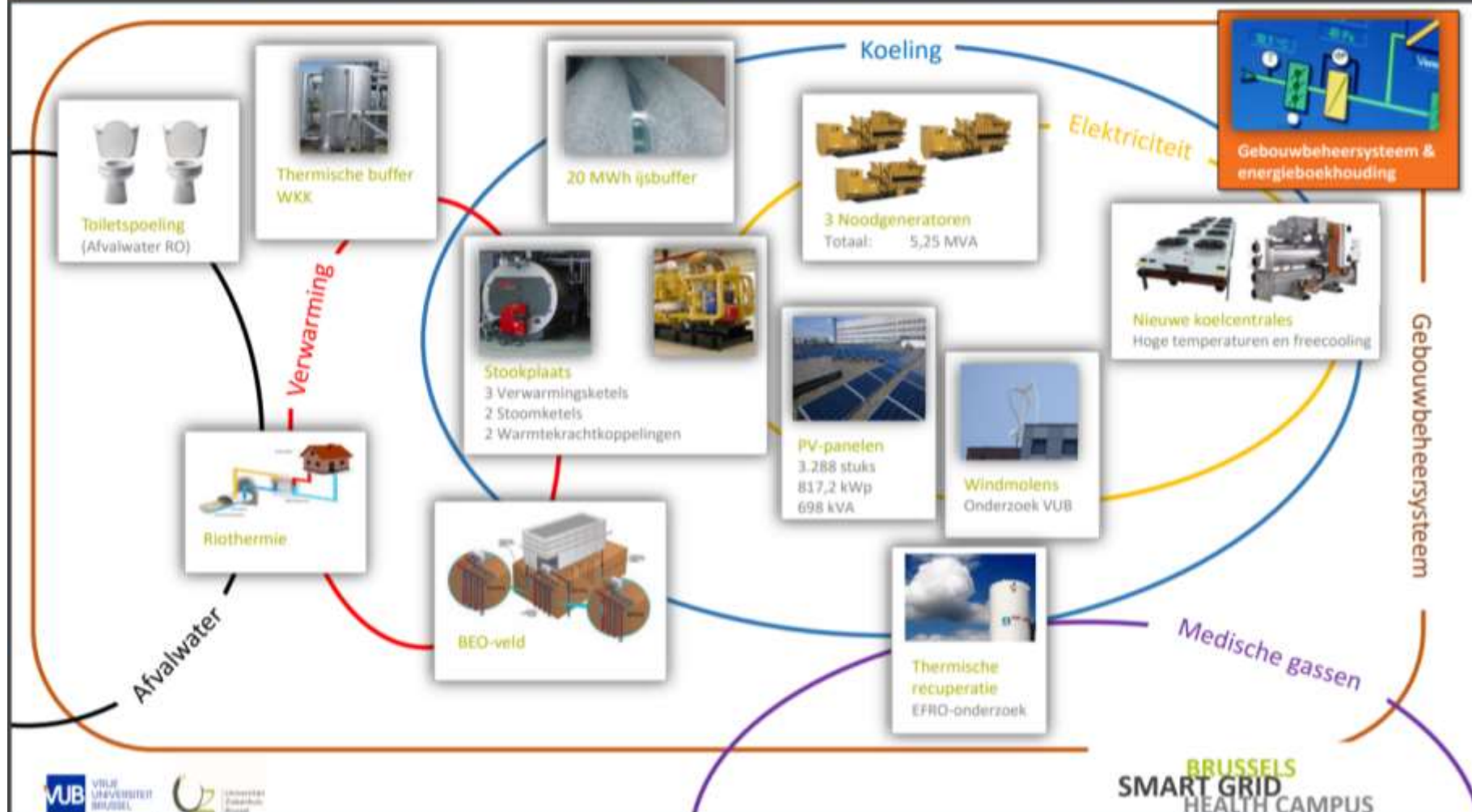
GREEN ENERGY CAMPUS

• 34 transformatoren

• 3.300 PV-panelen

• 3 min hele campus

5 DAGEN AUTONOMIE / OFF GRID



CONTACT



FLANDERS
INNOVATION &
ENTREPRENEURSHIP

flux50

Clusters for Growth

Flux50

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flux50

SHORT HISTORY

- 2016, Sept.: Application
- 9 partners
- Open call by Flemish Government
- Target: create spearhead-cluster “Energy”



**Together for strong growth by
innovating and internationalizing**





ICN PASSPORT

CONNECTION WITH LOCAL KEY CONTACTS

Request assistance when seeking the right project partners or business opportunities at a local ICN cluster in the targeted region.

WELCOMING OFFICES

Be hosted at the work place of another cluster. This service is valid for both clusters and their members.

ICN BENEFITS AND DISCOUNTS

Get attractive discounts for specific events or conferences.