The webinar will start soon – stay tuned

SMILE (Smart Ideas to link Energies) – France

SMILE : a large scale smart-grids deployment

A territory to set up **a showcase for smart-grids technologies & application**

A program tackling a wide range of issues:

- Integration of renewable energy sources,
- Demand management,
- Flexibility for local/national needs
- Electric vehicles (e.g. V2G/V2H, smart charging)
- Energy data management
- Smart-building
- Self consumption
- …

SMILE : a programme with various stakeholders

Lead by regional governments of Bretagne and Pays de la Loire

- Kick-off on april 2016

SMILE aims at supporting emergence, implementation and deployment of collaborative projects in smart grids & energy management

More than 300 stakeholders :

- Companies: from start-ups to national companies, DSO & TSO (electricity & gas)
- Public authorities: Regions, local authorities, cities…
- Clusters, chambers of commerce & innovative centers*
- Research centers
- NGO
- …

SMILE: Various smartgrids projects

89 projects, tackling one of the five following topics:

- Smart grids, flexibility and smart areas
- Collective self-consumption and smart buildings
- Islands and non-connected areas
- Green mobility
- Demand-side management, data and consumer engagement

Around 250 millions euros of investment in the projects

51 millions of investment from the DSO and TSO for electricity grids

SMILE

Recupelec Rezo

Philippe Jacubowski – E4V

RécupélecRézo

Smile 10th Nov'2020

2 fold project:

- **Récupélec**

- Recovery of fatal energy fom battery manufacturing
- Upon final testing: capacity control
  - 1.Batteries are fully charged
  - 2.Batteries are fully discharged
- Energy from discharge
  - Was dissipated
  - Now re-intection in factory network
    - Self consumption in factory
    - Exceedent goes in storage batteries

- **Rézo**

- Service to the grid by a battery buffer (1MWh typically)
- Frequency adjustment
  - Frequency too low,
    ➔buffer gives energy to the grid
  - Frequency too high
    ➔buffer takes energy from the grid
- Grid back up
  - Upon failure of power plant
  - Buffer provides high power during 15-30mn
    - To let a back-up thermal plant ramping

RécupélecRézo

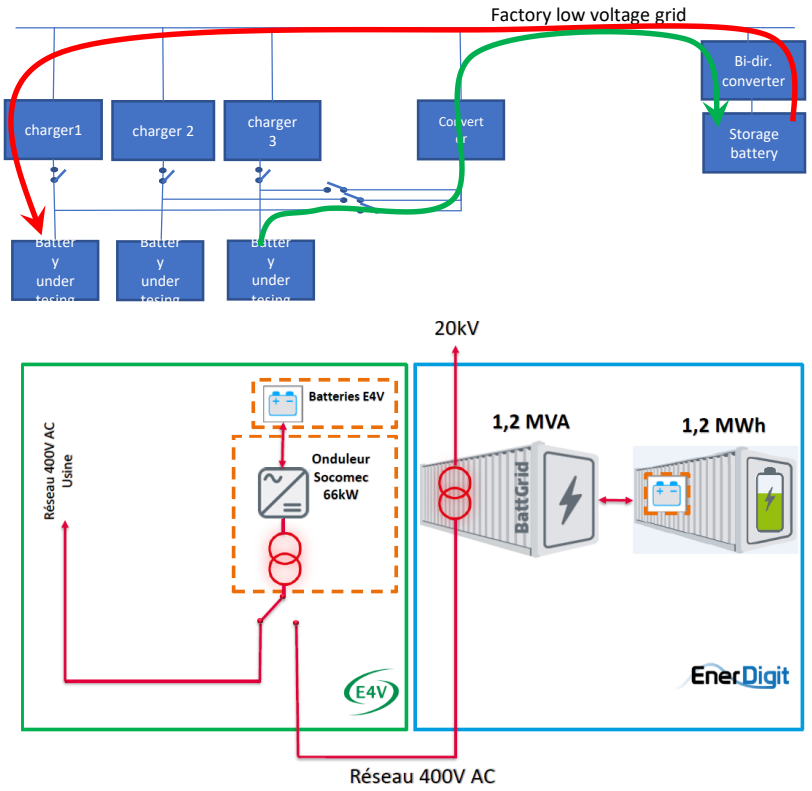
- The battery buffer and associated converters + transformer is an expensive asset
- Daily use for frequency control
  - Use of 20% of battery capability in terms of Energy and power
- Grid back-up is an exceptional event
  - once or twice a year

➔ RecupelecRezo: use of batteries for other purposes

  - Part of battery buffer is used for grid services
  - Part of battery buffer is used for energy recovery in E4V factory

RecupélecRézo implementation

- Recupelec at E4V factory
  - Set up converters and charger with switch matrix for testing
  - Implement a storage battery and bi-directional converter
- Rézo
  - Build-up iso container(s) for battery buffer and converters
  - Install containers at E4V factory
  - Build-up HV connection



About E4V

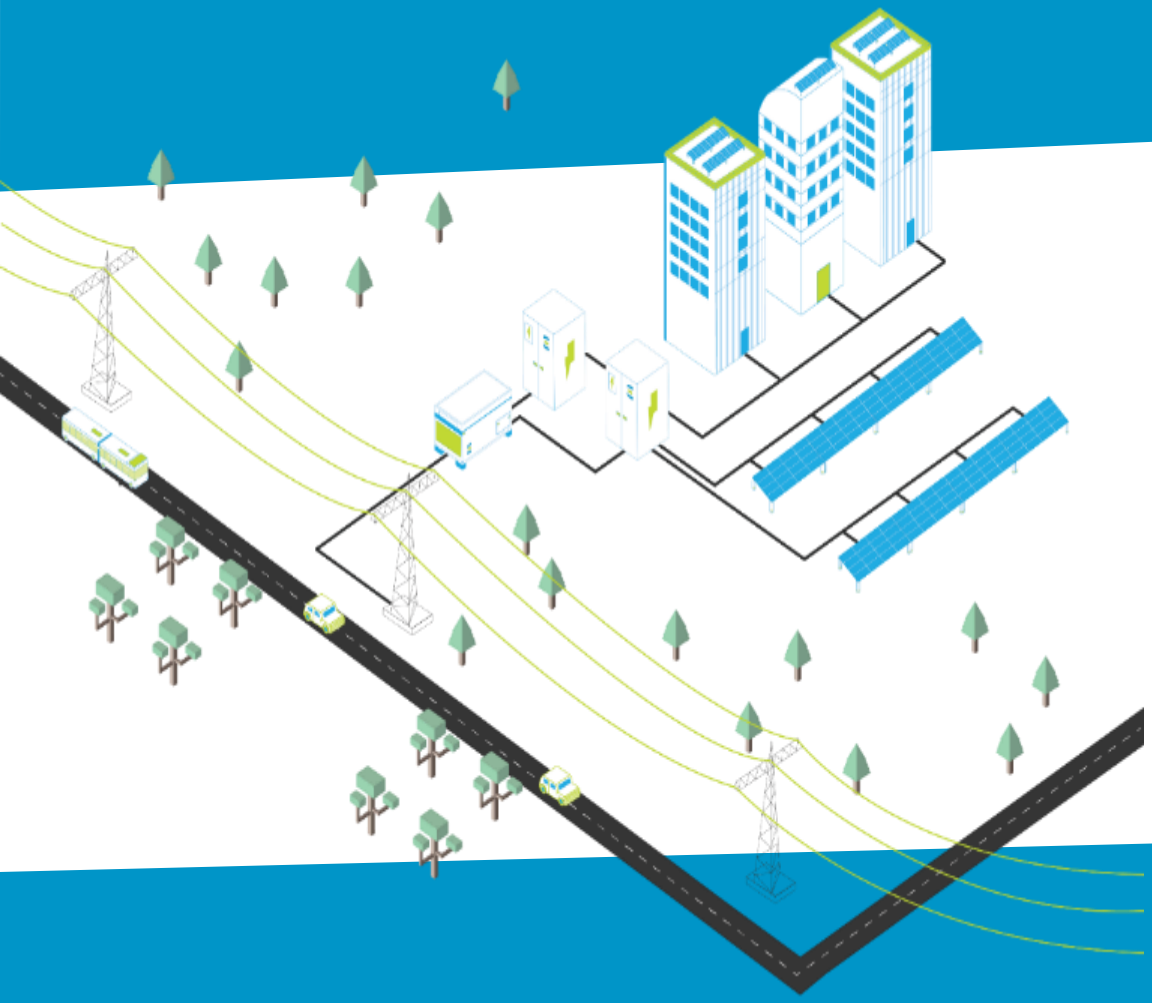
- LFP Li-Ion manufacturer since 2008
- Green technology
  - Ethical & environment friendly
- > 25 000 vehicles powered by E4V
  - Special / professional vehicles
  - License free light cars
- Stationnary applications
  - Grid support, smart grid
  - Renewables, Railways, Hydrogen
- Locations in France
  - Le Mans: Pack factory & design, projects
  - Bordeaux: BMS design (HW, SW, Diag tools and cloud)

SMILE

E-Factory

Laurent Meyer – Entech SE

Introduction to E-Factory project



Entech
smart energies

10/11/2020

Laurent MEYER

Entech SE: @Glance

Energy conversion - Energy Storage – Photovoltaic

With a **wide experience** and **numerous references** in Energy storage and Power conversion solutions, the **multidisciplinary** teams of Entech offer their skills to help and assist the **Industry Leaders** reaching their **Sustainable Development** Goal.

Agile and reactive, Entech smart energies develops long-lasting relations to guarantee the success of your **innovative projects**.

55++ employees

~€10.0M

5000 sqm

ISO 9001 · ISO 14001 · QualiPV · QualiteEnR · QUALIFELEC · E.V.READY · CHAdeMO

Entech smart energies

Entech SE: Business Lines

				
	PHOTOVOLTAIC	**PV UTILITY SCALE**	**ENERGY STORAGE**	**MICROGRID**
Geography	**France**	**France**	**Global**	**Global**
Customers	**C&I, Agricultural, Communities**	**Developers**	**Developers, Grid operators**	**Developers, C&I Communities, NGO**

Entech SE: Innovation as the main differentiator

Innovation and R&D

Innovation and expertise in the **electrical conversion chain** remain the differentiating markers of Entech smart energies.

Entech smart energies has created and built very complex energy conversion systems for various applications such as **marine energies** or **second life batteries**.

Geps TECHNO · sabella ride the tide · GUINARD ENERGIES · KEMIWATT Your energy bank · BlueSolutions Bolloré

Entech smart energies

Project genesis

Stage: FAT completed

Energy Storage Systems in French Guyana

Application: load shifting & enhanced frequency response

- 1st project: 5 MVA / 5,1 MWh dedicated to frequency regulation services
- 2nd project: 5 MVA / 8,5 MWh to daily arbitrage purposes
- Design, integration and installation
- Response time < 200ms
- Compliance with EDF SEI standards
- Samsung Li-ion batteries (NCM 111) & Danfoss air cooling drives
- Scope of supply: PCS + PMS + EMS + SCADA + O&M

10 MVA
conversion

13,1 MWh
storage NCM

voltalia

Entech smart energies

Entech SE: Special applications & Prototypes

Stage: Commissioned

Storage prototyping – 2nd life EV Batteries

Application: energy shifting & frequency regulation

- 1st project: 30kVA / 80kWh @ 60% SOH (confidential customer)
- 2nd project: 80kVA / 80kWh @ 60% SOH (mix Nissan and PSA EV batteries)
- Design, integration and installation
- Architecture DC/DC + DC/AC
- Implementation of the monitoring and supervision system
- Scope of supply: PCS + PMS + SCADA + O&M

120 kVA
conversion

Danfoss

160 kWh
storage LMO

NISSAN Zero Emission

PSA GROUPE

2nd project funded by:

ADEME

Entech smart energies

Entech SE: PV plants utility scale

Stage: Under construction

Montmorillon construction project (CRE 4.5)

Ground : landfill

- Location : Vienne department - FRANCE
- Gabion foundation for PV tables
- String inverters
- EPC : Design, procurement and installation
- 4170 MWh/an

3,618 MWp
photovoltaic

9504
solar panels

Entech SE: Prototyping Key References

Realization of a customized EV charging station for Entech SE's vehicles

- Smart charging station (compatible **V2G**)
- Charge algorithm limitating the power demand on the network
- Supervision system

22 kVA conversion

Realization of a fast charging station for a client

- Charge up to 350kW – 1000VDC
- CCS and Chademo protocol
- Confidential architecture

350 kVA conversion

Our certifications:

CHAdeMO E.V.READY

Entech smart energies

Our vision → E-Factory

Entech
smart energies

E-Factory

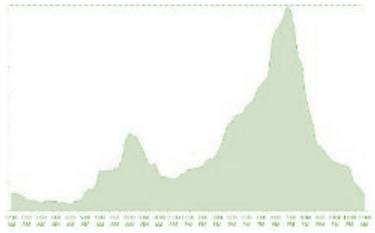
- ✓ New Entech SE headquarter in Quimper, France
- ✓ Industrial innovation demonstrator to prove technical and economical interest for **combined production, storage, charging stations and industrial comsumption**, providing **services to electrical grid**
- ✓ Investment : 3 M€

Passive building under construction of 4200 m², consisting of 1000 m² of offices and 3200 m² of production workshop

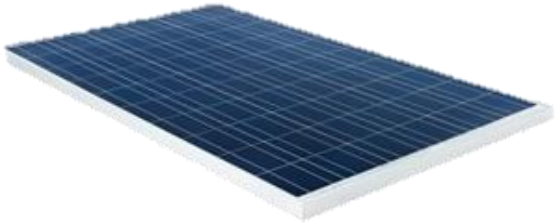
Design and assembly of **integrated** energy production, conversion and **storage solutions**.

Challenging load profile : peak demand for testing multi MW storage systems, grid tied or of grid former

Peak consumption 1000 kVA (350 kW building + 650 kVA test bed)



~470 kWp



Systems :

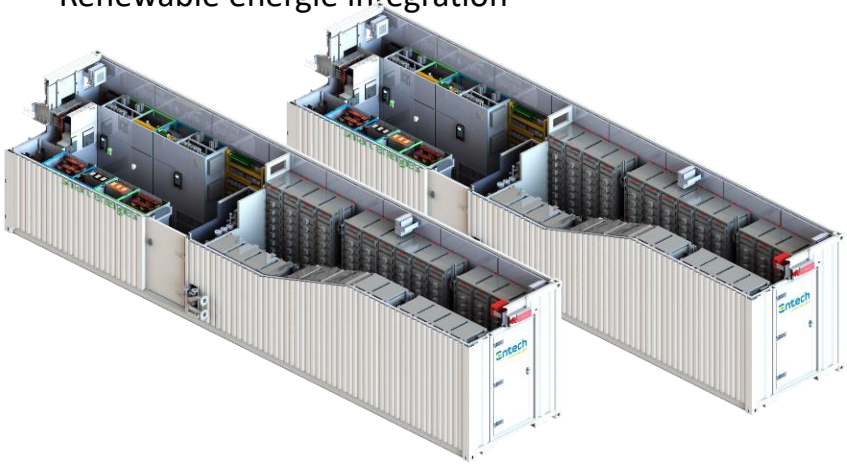
- Rooftop
- sun-breaker
- parking shelter

Application :

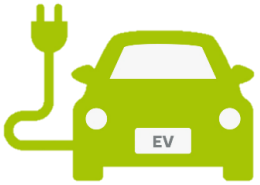
- **Collective self-consumption**
- 3 to 6 Neighbors

2,5 MW / 2,5 MWh

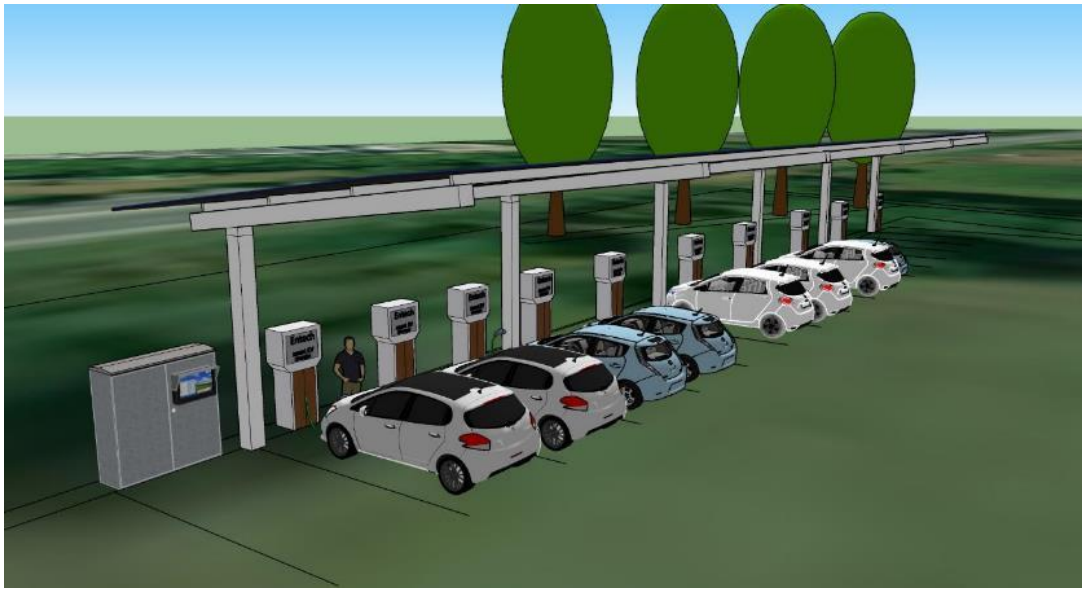
- Energy storage with different technologies, including 2nd life EV batteries :
- Applications :
  - Grid services : FCR, voltage stabilisation, islanding,
  - Renewable energie integration



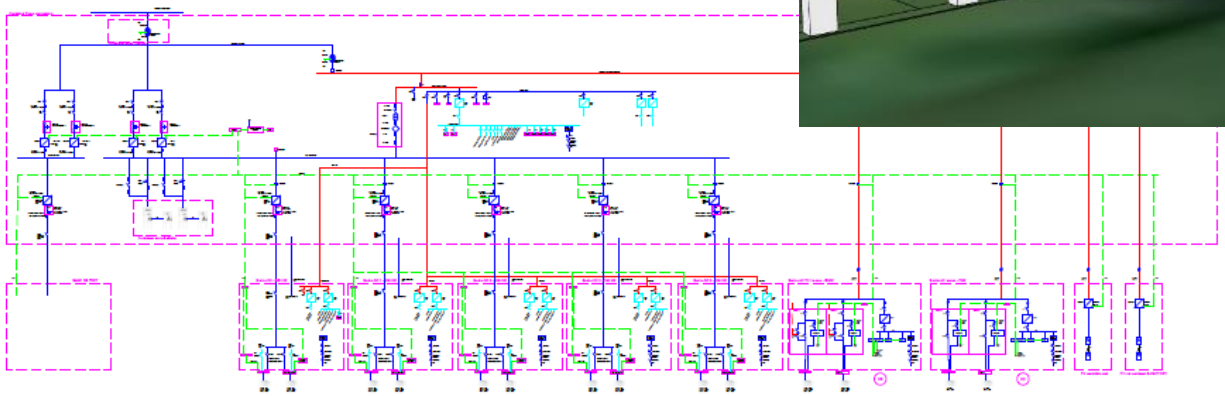
1 MW



- **Ultra-fast charging** (1 x 350 kW) associated with storage system
- **Smart charging** point : 4 x 100 kVA DC + 10 x 22 kVA AC + 4 x 7 kVA AC modular charging
- All DC charger are bi-directionnal for **V2G** (5 points) providing grid services
- Particular and company fleet



- Production : PV 470 kWp
- Storage : 2 x 1,25 MWh / 1,25 MW
- Consumption : 1000 kVA
- EV :
  - 1000 kVA = 1 x 350 kW DC + 4 x 100 kVA DC + 10 x 10 kVA AC + 4 x 7 kVA AC modulable charging



- Building and equipment under construction, will be done by Q1 2021

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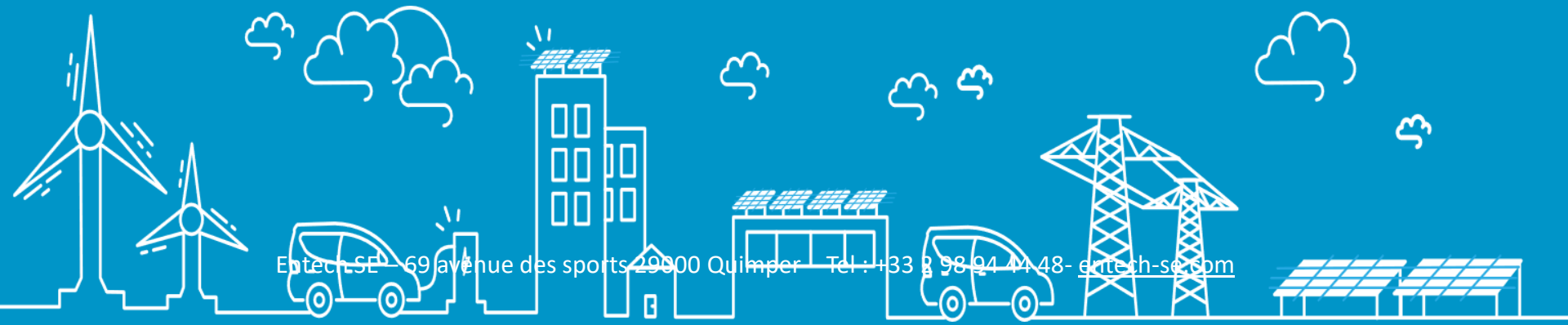
smart energies

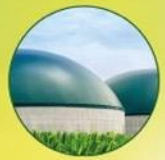
Energy conversion and storage



Entech SE – 69 avenue des sports 29000 Quimper – Tel : +33 (0) 98 94 44 48- entech-se.com

Cluster TWEED - Wallonie

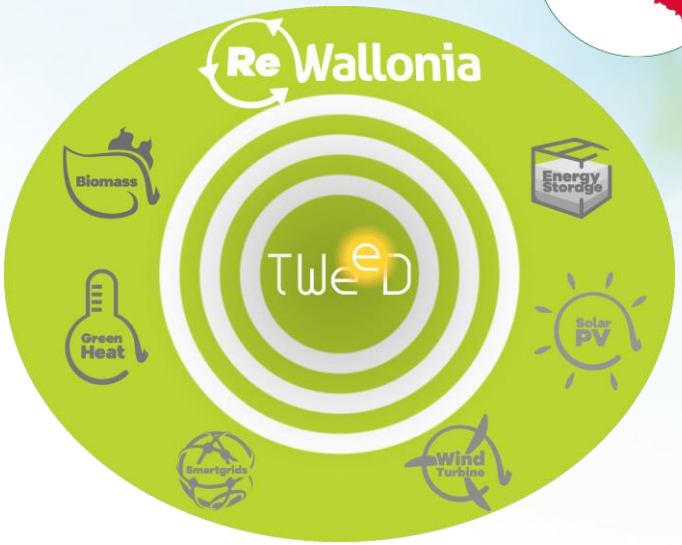
Energy Storage in Wallonia : regional ecosystem & ongoing projects



Cluster TWEED

TWEED, Energy Cluster in Belgium, Wallonia/Brussels

- Created in 2008
- TWEED = 140 premium members (88% are companies) developping technologies in the Energy sectors to ensure a global Sustainable Development. + More than 400 players/technologies in our ecosystem
- #Networking #Support #Projects #Studies #ValueChain #Roadmap #Promotion #Information #International #Energy Marketplace,…
- Discover all the players - and hopefully your future partners - thanks to a structured navigation and a search engine, very easy to identify and contact an organization, : www.rewallonia.be !



Low-carbon mobility

Energy efficiency in buildings

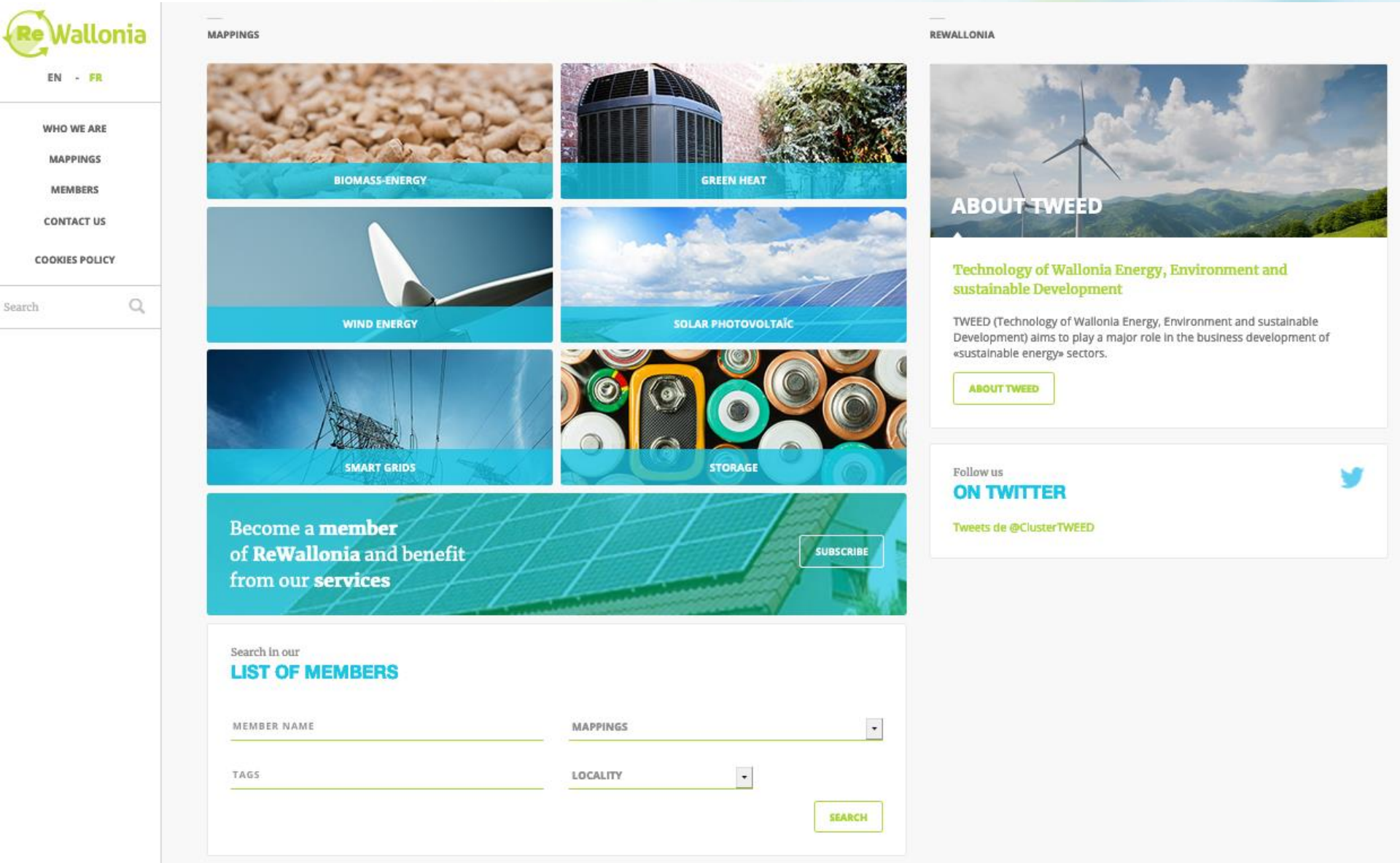
Energy conversion and storage **Smart grids**

Energy efficiency in industry

Renewable energies mix

Microgrids

Search for partners in Wallonia or Brussels ?
Visit ReWallonia



ReWallonia – Players (> 350)

ReWallonia

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WHO WE ARE

MAPPINGS

MEMBERS

CONTACT US

COOKIES POLICY

Search

COMET TRAITEMENTS

groupecomet

Come Traitments SA is active in the treatment and recycling of residue from metallic waste shredding: End-of-Life vehicles (ELVs), Waste Electrical and Electronic Equipment (WEEE), scrap metal, etc. We have several facilities that allow us to treat more than 150,000 tons of shredding res

Tags

Solar industry | Silicium | Horizontal chain | Recycling | Vertical chain | Raw material supply | Steel | Aluminium | Polymers

Storage | Horizontal chain | Dismantling & Recycling | R&D | Vertical chain | Electrochemical - conventional batteries | Lead-Acid Battery (LAB) | Lithium-ion (Li-ion) | Domestic / Industrial | Industrial Storage | Stationary / Embedded | Stationary storage | Not connected to the network

We have several facilities that allow us to treat more than 150,000 tons of shredding residue per year, in order to reuse the ferrous and non-ferrous metals, plastic materials, and mineral components.In addition to our production activities, Comet Traitments also has an R&D unit that allows us to industrialize processes adapted to new types of waste in our industry and which include end-of-life photovoltaic panels. What's more, Comet Traitements has a partnership with the Solarcycle project that was approved as part of the Walloon Marshall Plan, and seeks to reuse end-of-life PV in the silicon sector.

Chemical storage

- From the pyrolysis of residues of grinding synthetic fuels

ENTERPRISE

Comet Traitements Plc.

Enterprise number : 0477841596

ADRESSE

Comet Traitements Châtelet

Rivage de Boubier 25
6200 Châtelet
Belgique

CONTACTS

Pierre-François Bareel
Téléphone : +32 71 24 00 82
Email

ReWallonia – Mapping Storage

ReWallonia

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WHO WE ARE

MAPPINGS

BIOMASS-ENERGY
GREEN HEAT
WIND ENERGY
SOLAR PHOTOVOLTAÏC
SMART GRIDS
STORAGE

MEMBERS

CONTACT US

COOKIES POLICY

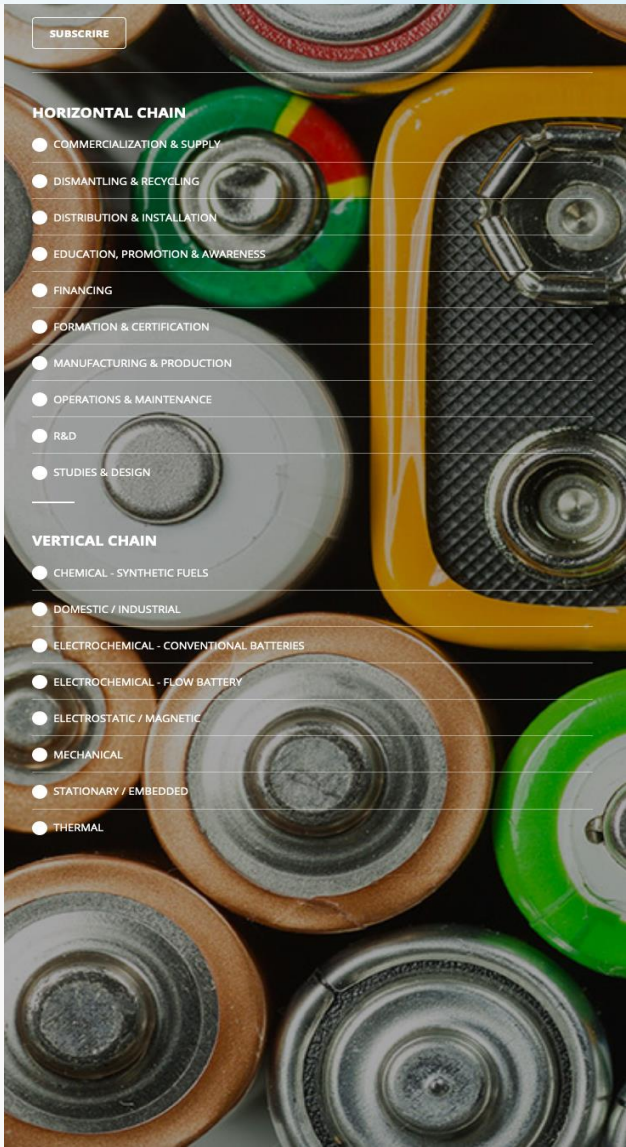
Search

Energy Storage Wallonia

STORAGE MAPPING

Nearly **65 organizations** are listed in mapping storage.
These last are classified both in the value chain horizontal, related to **jobs**, and in the vertical value chain, related to **technologies** and subdivided as follows:

- **Electrochemical – conventional batteries**
  - Lead-Acid Battery (LAB)
  - Nickel-Cadmium (NiCd)
  - Nickel–Metal Hydride (Ni-MH)
  - Sodium-Sulfur (NaS)
  - Lithium-ion (Li-ion)
  - Lithium-Sulfur (Li-S)
  - Metal-air
- **Electrochemical – flow battery**
  - Zinc-Brome (ZBR)
  - Vanadium Redox (VRB)
- **Chemical – Synthetic Fuels**
  - Fuel : Liquid Hydrogen
  - Fuel : Hydrogen gas
  - Fuel : Methane
  - Fuel : Hythane
  - Application : Power to gas
  - Application : Proton Exchange Membrane Fuel Cells (PEMFC)
  - Application : Solid Oxide Fuel Cells (SOFC)
  - Electrolyser : Proton Exchange Membrane (PEM)
  - Electrolyser : Electrolyser alkaline
- **Electrostatic / Magnetic**
  - Supercapacitor
  - Superconductor Magnetic Energy Storage (SMES)
- **Mechanical**
  - Compressed Air Energy Storage (CAES)
  - Gravity Hydraulic (STEP: Station of Transfer of Energy by Pumping)
  - Flywheel
- **Thermal**
  - Sensible heat
  - Latent heat
  - Heat of reaction (thermochemical storage)
  - Seasonal thermal energy storage (STES)
- **Stationary / Embedded**
  - Stationary storage
    - Connected to the network
      - Curative (related to the production, transport and distribution of electricity, for example STEP)
      - Palliative (activated in case of network deficiencies ; backups)
    - Not connected to the network
  - Embedded storage
    - Cars
    - Public transport (buses, trams, subways, trains, ...)
    - Phones
    - Computers
- **Domestic / Industrial**
  - Domestic Storage
  - Industrial Storage



ReWallonia – Mapping Storage

ReWallonia – Projects

ReWallonia

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QUI SOMMES-NOUS

ACTUALITÉS

EVÉNEMENTS

CARTOGRAPHIES

MEMBRES

FILIÈRES

SECTEURS

PROJETS WALLONS

LIENS UTILES

echerche

SOTHERCO

SOTHERCO

SOTHERCO

STATUT: Terminé

TYPE: International

DÉBUT: 2013

FIN: 2017

DURÉE: 4 ans

DESCRIPTION

Conception et développement d'un système de stockage thermochimique intersaisonnier.
Sotherco fait suite au projet Solautark. L'objectif est de modéliser, dimensionner, concevoir, contrôler et évaluer un système de **stockage thermochimique par sorption** intersaisonnier et compact capable de répondre à la demande de chauffage d'un bâtiment basse énergie. En plus de tests à l'échelle du laboratoire, deux prototypes sont intégrés dans des systèmes complets capables d'**assurer la demande d'un bâtiment basse énergie**. Ces prototypes sont testés de manière semi-virtuelle sur une longue période.
Sotherco est un projet de niveau de recherche TRL 3-6. Il a reçu des fonds du septième programme-cadre de recherche et de développement technologique de la commission européenne (FP7).

PARTENAIRES

Energy Storage in Wallonia

Ongoing projects

Zoom in Storage Expertise in Wallonia, from Lab to market (examples)

Recycling of batteries from EV's vehicles (96% recycled) : second life batteries (Comet Traitement)

Phosphate-based cathode materials (LiFePO4) for use in lithium-ion (Li-ion) rechargeable batteries (Prayon – BeLife)

Innovative plug-and-play 2,2 KWh residential storage solution (Orison & CET Energrid)

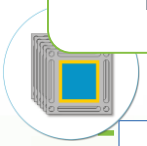
TRL 9
TRL 8
TRL 7
TRL 6
TRL 5
TRL 4
TRL 3
TRL 2
TRL 1

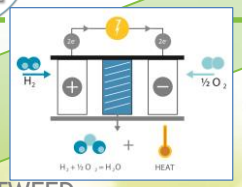
Carbon nanotubes for containing Lithium Ion (Nanocyl, validated for IPCEI)

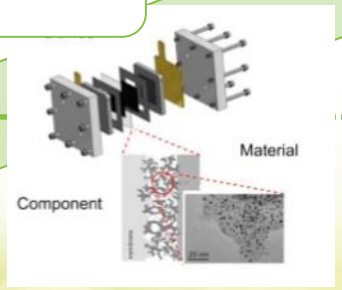
Thermal energy storage by thermochemical sorption reactions Lab Unit (Be-Sol, Umons

Fuel Cell

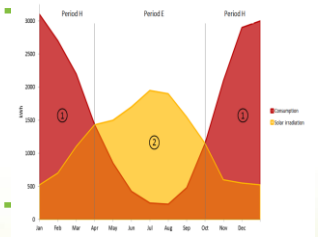
Test bench (Uliège)







New type of Li-ion batteries applicable ("painting") on the surface (BatWal)

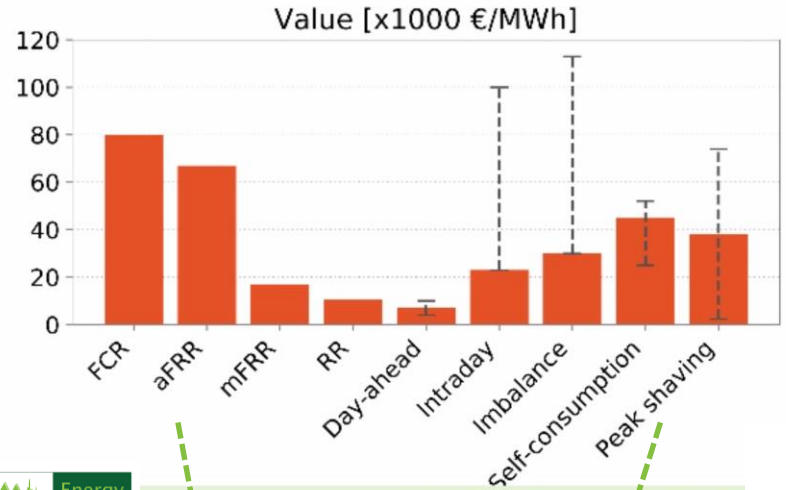


H2 solid storage (Certech, porous materials lab)

Applications

Battery Storage Applications

High level revenue estimation in the German market per year

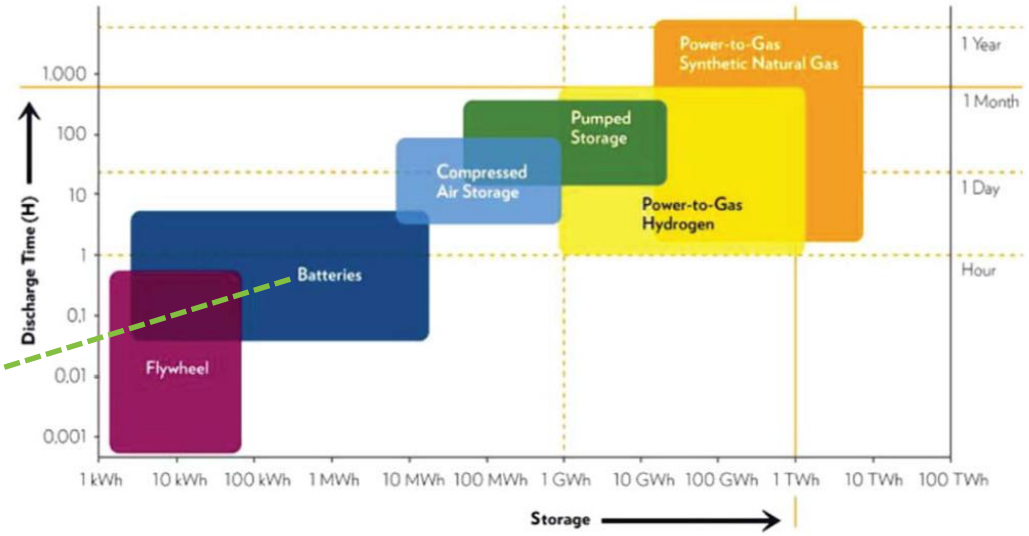


source: [J. Engels, Integration of Fle

Need for value stacking

Various technologies & market models for short to long Term applications

Ex : Virtual Power Plant



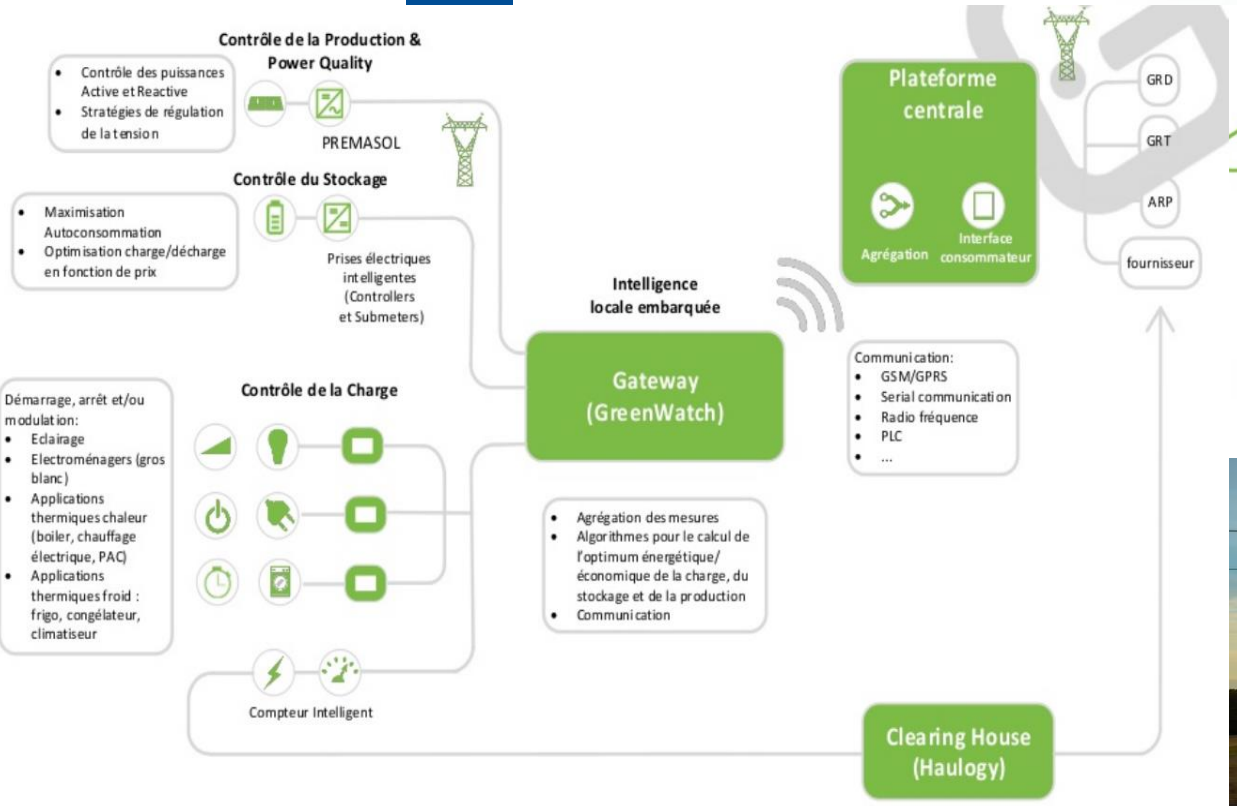
Short-Term Hours

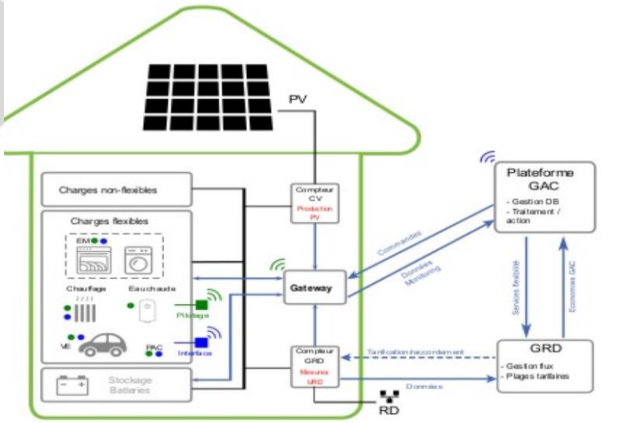
GAC / Smart ACC

Aggregate & Demand Side Management for Households/Tertiary

GAC project want to mobilize the flexibility of demand. In order to establish this new system, a new actor – aggregator – is created. His role? To aggregate / federate a large number of consumers ready to make their flexibility available. SmartACC project go one step further mixing residential and SME's flexibility

cetic – Your Connection to ICT Research
GreenWatch – Power control & services
haulogy – The Energy IT Company
ULB
ARELIAL – Association des Réseaux Wallons



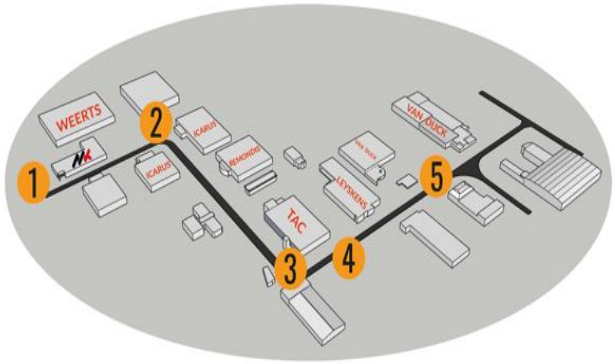


Short-Term Hours

MiraCCle

DC MicroGrid at Business Park Level

MiraCCle project aim si to design and implement a pilot DC microgrid in the industrial park between 7 SME's and a shared storage unit

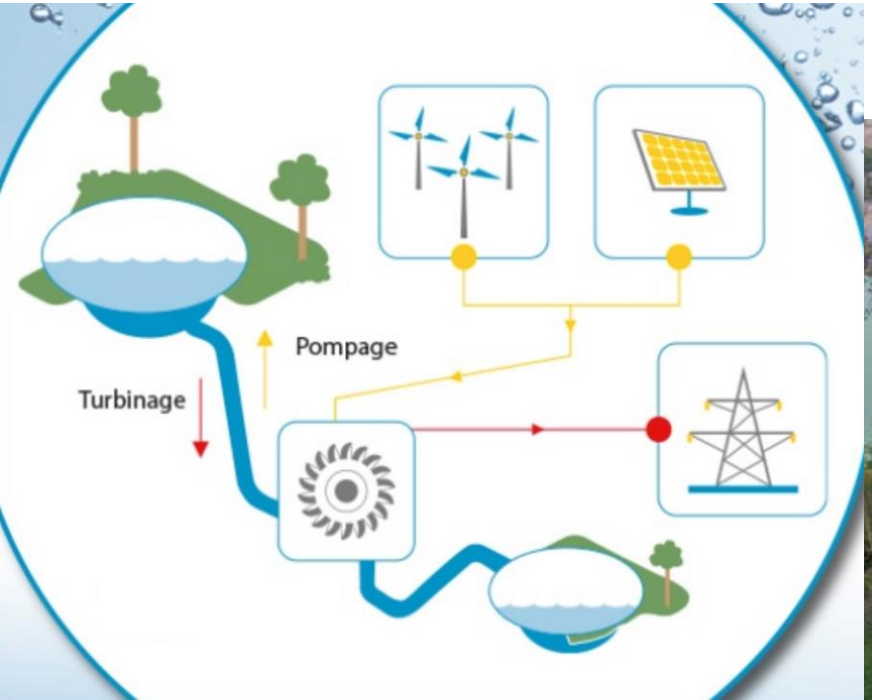


Short-Term Hours

PEPS

Mini pumped hydro storage (PEPS) in Wallonia

Innovative concept of mini pumped hydro storage (PEPS) with pre-sized components in mines and quarries, coupled with renewables on sites : modular concept, easily reproducible, piloted and monitored remotely in a 4.0 approach of operations and maintenance. Target a production time of 2 to 4 hours depending on the space available and a range of 1 MW to 5 MW



Short-Term Hours - Days

Accutherm

STORAGE OF (COLD) THERMAL ENERGY WITH REFRIGERATION INSTALLATIONS

Desimone

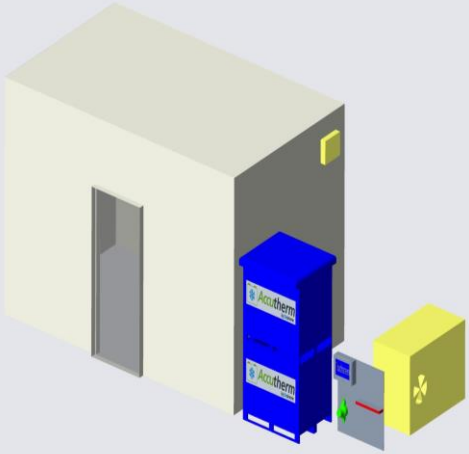
LEBRUN Cooling Industry

CSL

CRM GROUP

ACCUTHERM aims to use integrated phase change materials within a complete cold storage system with the final objective of proposing an advantageous alternative to electric batteries that maximises the use of renewable forms of energy (intermittent by definition). ACCUTHERM allows for the shifting of peak energy consumption to times when energy is far less in demand and therefore cheaper: 90% of energy needs are concentrated within a period of 8 hours out of 24

Accutherm by Desimone



Short-Term Hours - Days

Industore

Energy Storage/Flexibility Potential for Industry

InduStore has quantified and leveraged the potential of energy flexibility in industrial sites, using advanced analytic methods such as optimization. By reducing energy costs and providing new sources of profit, InduStore allows industrial sites to increase their competitiveness. 5 types of levers are teken into account (Load Shedding, Load Shifting, Load Rescheduling, Fuel Switching, CHP

N-SIDE OPTIMIZING YOUR DECISIONS

ICEDD

INSTITUT MONTEFIORE Département d'Electricité Electronique & Informatique

UCL Université catholique de Louvain

InduStore

InduStore targets a **global optimization approach** for energy flexibility

Flexibility Levers

Load Shedding | Load Shifting | Load Rescheduling | Fuel Switching | CHP

Temporal Horizon

Weekly | Daily | Intra-day | Real-time

Flexible Processes

Discrete process | Continuous Process | Utilities | CHP

Valorization approach

Price-based Demand Response

Incentive-based Demand Response

Long-Term
Days - Weeks

H2 Coop Storage

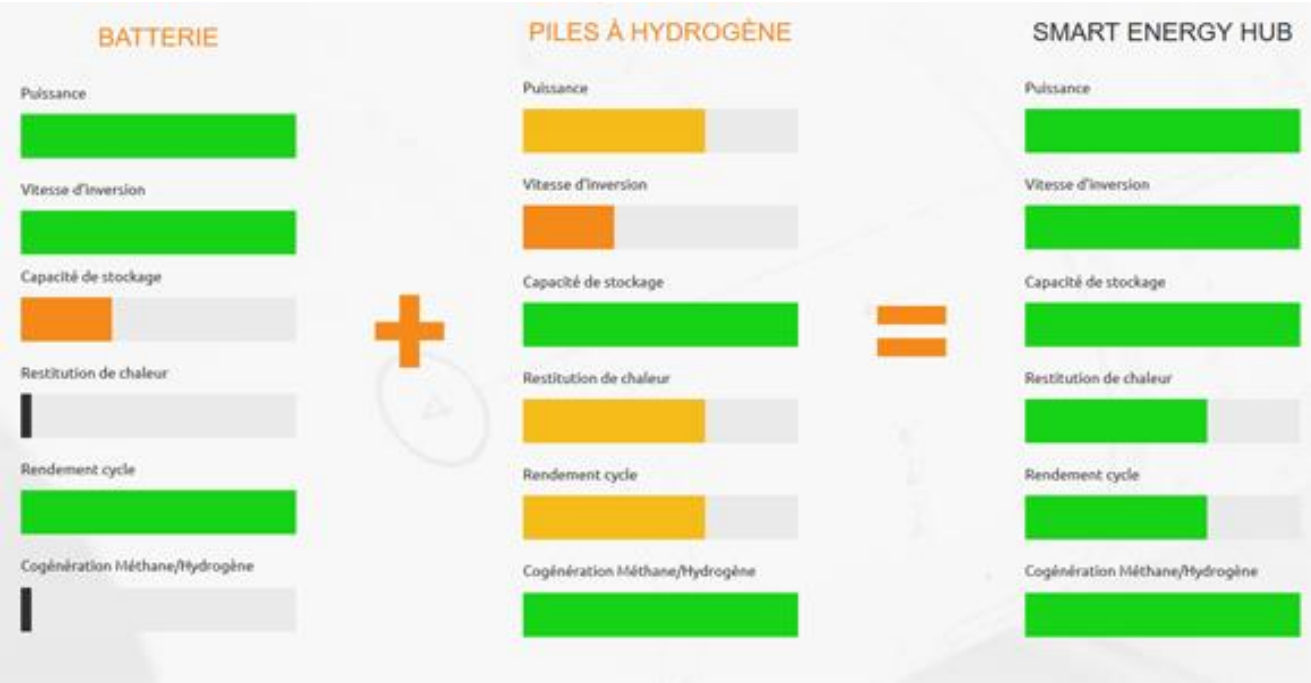
TWeED

Energy Community with hybrid storage (H2)

Development of tools enabling the deployment and management of a multi-energy Renewable Energy Community with hybrid storage community

Cenaero · CLEF · GreenWatch Power control & services · ENGIE Fabricom · ULB

Smart Energy Systems ERA-Net



Long-Term
Days - Weeks

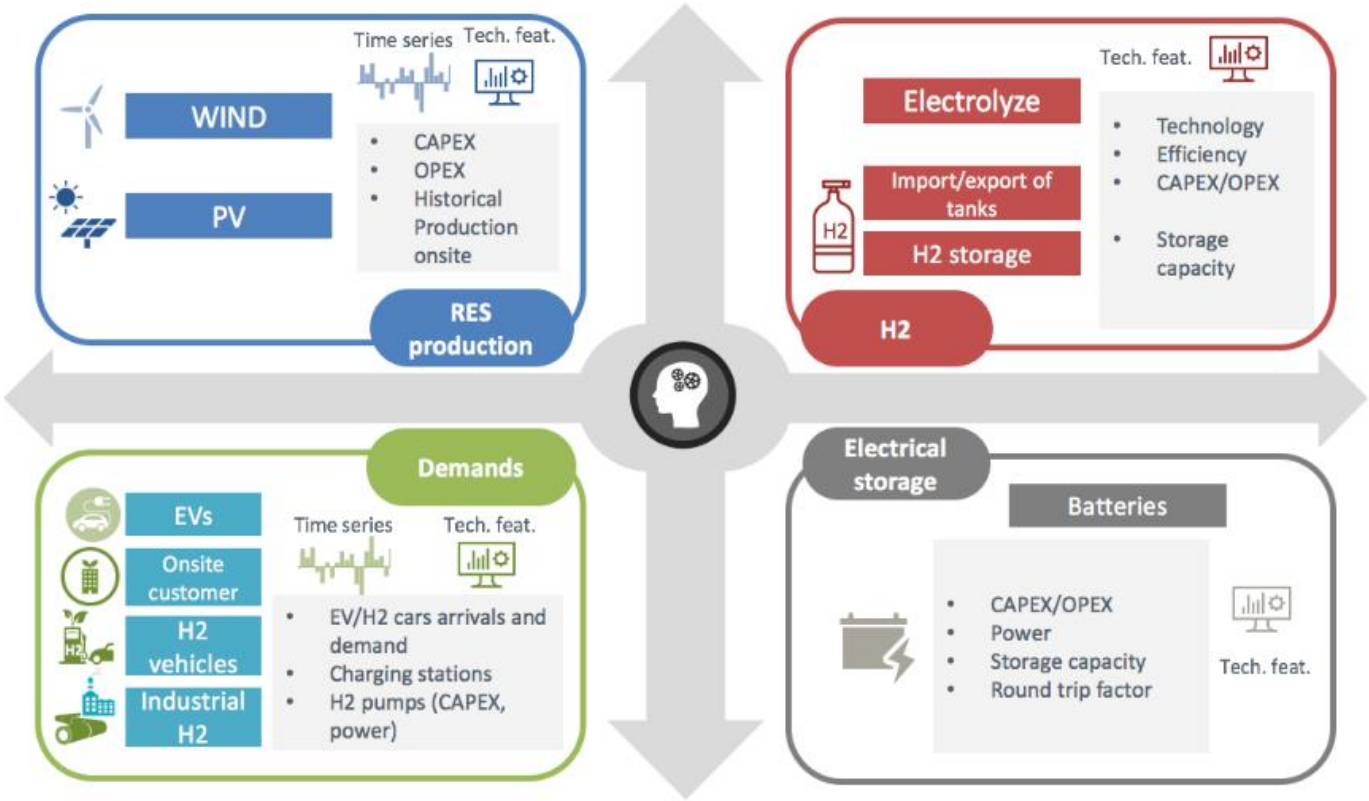
Interest

Integrated refuelling stations with EV & H2

INTERESTS aims the creation of an optimization tool allowing the definition, the sizing and the management of "integrated stations" of production, storage and consumption (refuelling) of renewable energy (electricity / hydrogen)

Certech
R&D partner in chemistry

N-SIDE
OPTIMIZING YOUR DECISIONS



www.clustertweed.be

Cluster TWEED

Rue Natalis 2 • 4020 Liège • Belgique

Contact : Cédric Brüll • Director • cbrull@clustertweed.be

TWEED

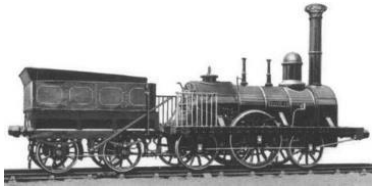
MiRIS

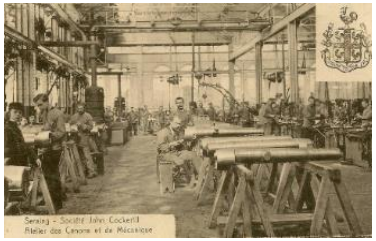
François Henry – John Cockerill

John Cockerill Energy
MiRIS Project

Cockerill

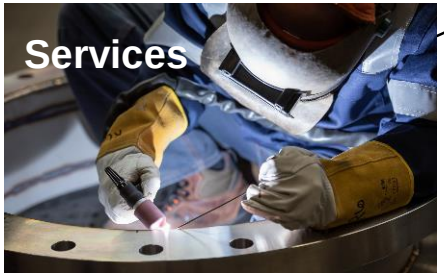
200 years of industrial experience…
To respond to the needs of our time





Learning from the past to build a better future.

Our sectors of activity



John Cockerill Energy

Heat Recovery Steam Generators

- Combined gas-steam cycle power plants (CCGT/CHP)
- Integrated solar combined cycle power plants (ISCC)
- Cogeneration (Cogen)
- Boilers for FLNG

Tower Receivers and heat accumulators

- Thermo-solar power plants (Concentrated Solar Power-CSP)

Industrial Boilers

- Industrial process
- Combined heat & power (CHP)
- Biomass applications

IRS Energy Storage

- Renewables integration
- Energy autonomy / security
- Micro-grid/Island-grid
- Design
- EPC

Hydrogen solutions

- Production of renewable hydrogen by electrolyser
- Application for mobility, energy, industry

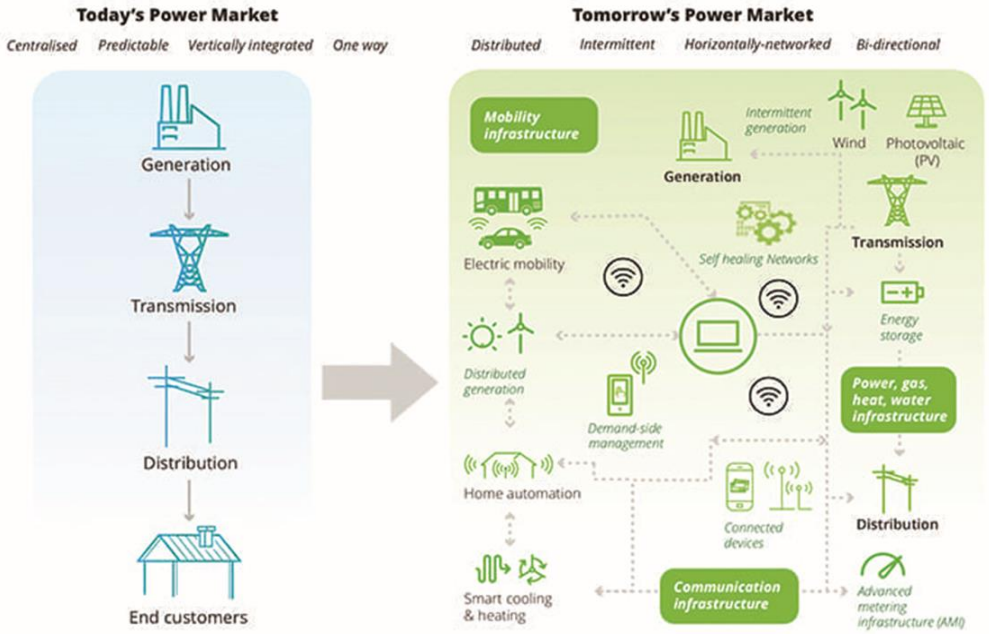
Welding Expertise Center

- All welding techniques
- Procedures, specifications, testing (new materials)

Integrated **R**enewable **S**olutions

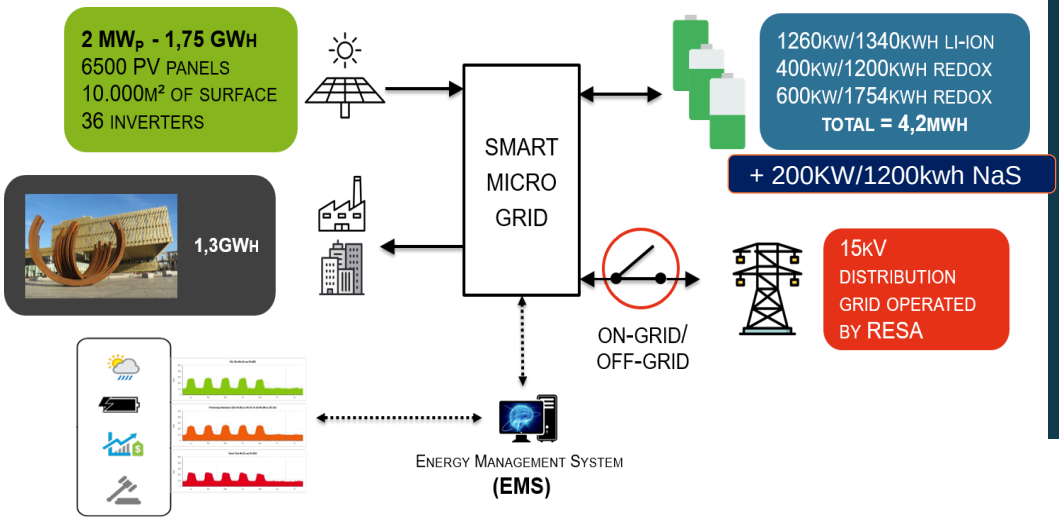
New context in the Energy sector

D³ ecentralisation
igitalisation
écarbonisation

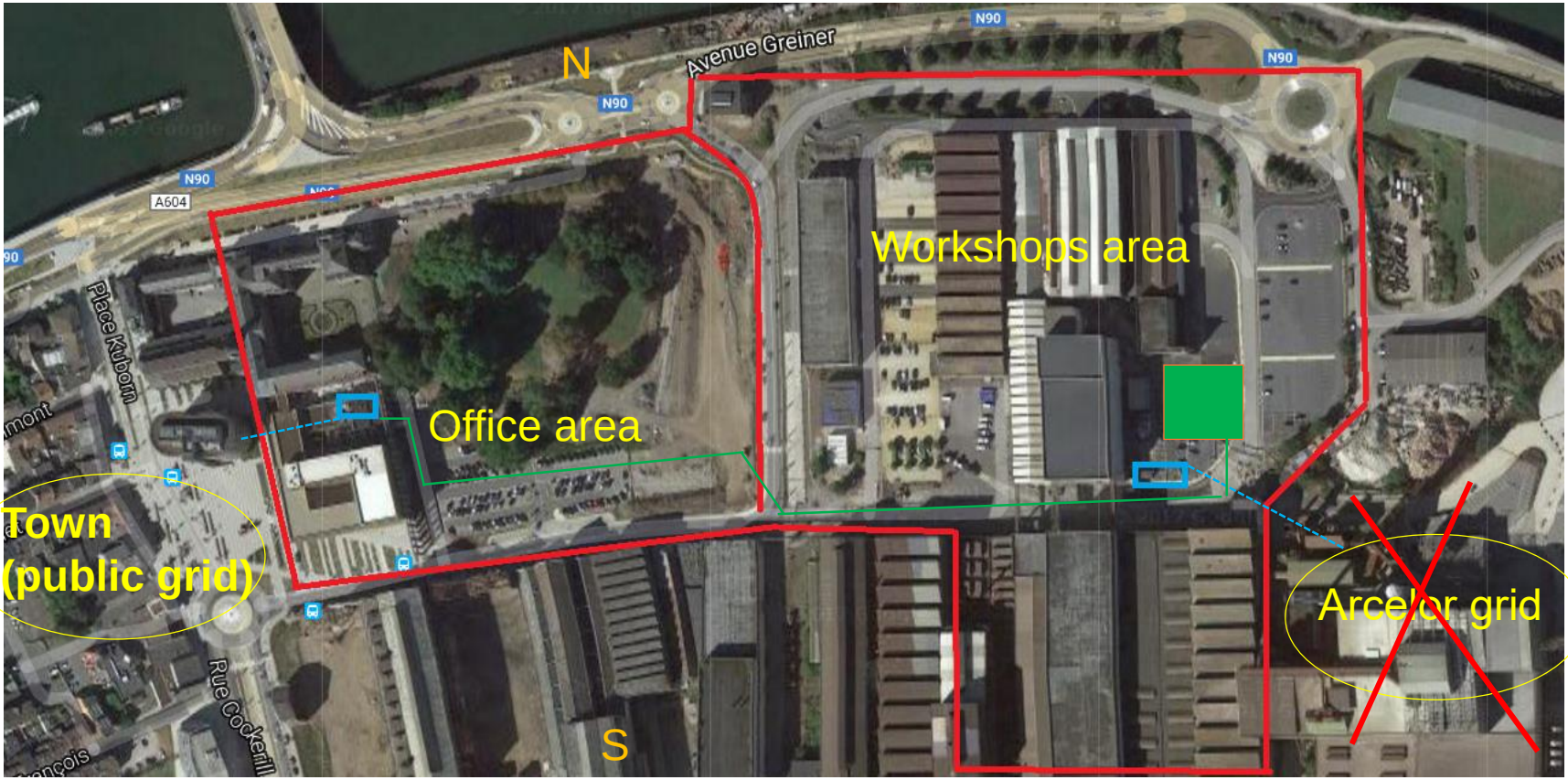


MiRIS project

- Decision in 2017
- Erection started in 2018
- Total investment :10 M€
- Subsidies from Walloon Region & federal government
- Smart micro-grid with multiple configurations
- Testing plateform
- 2 MWp of PV
- 500 kW of diesel generator
- 4 battery technologies
  - 2,5 MW / 5,5 MWh
- Others will come…You ?



MiRIS site @ Seraing (Liège, Belgium)



MiRIS site pictures

PV system

Different kind of roofs (sheds, flat…)
Carports

South + East/West orientation
35 string inverters (3 x 400VAC)

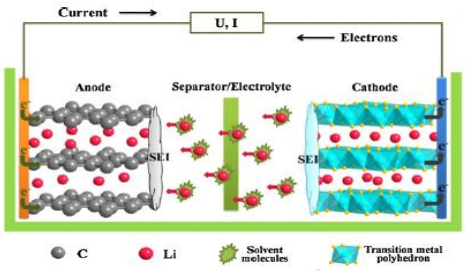
Battery technologies

Open-mind to technologies

The different battery technologies for the best solution based on solid partnership

Li-ion battery (LiFePO4)
1 to 4 h

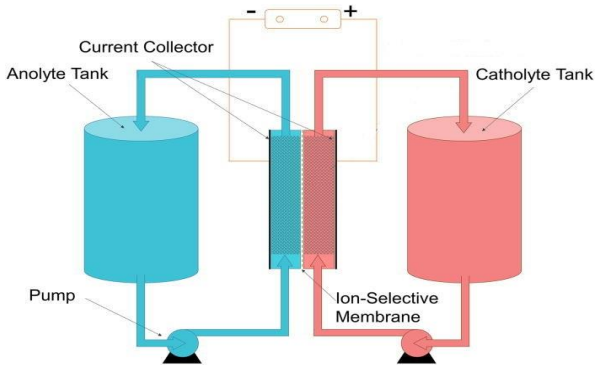
BYD
Build Your Dreams



Competitive price
Many references
security

Flow battery (Va-Va and FeZn)
4 to 10h

SUMITOMO ELECTRIC



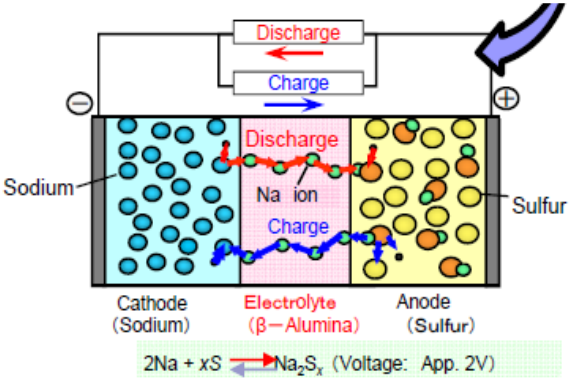
Long lifetime, Environmental,
Suitable for Power and Energy
applications

3 to 4h

ViZn ENERGY

NaS (Sodium Sulfur)
6h

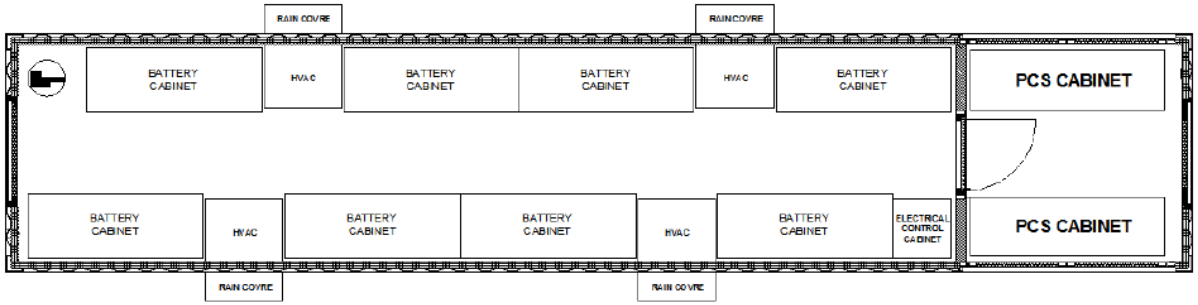
NGK



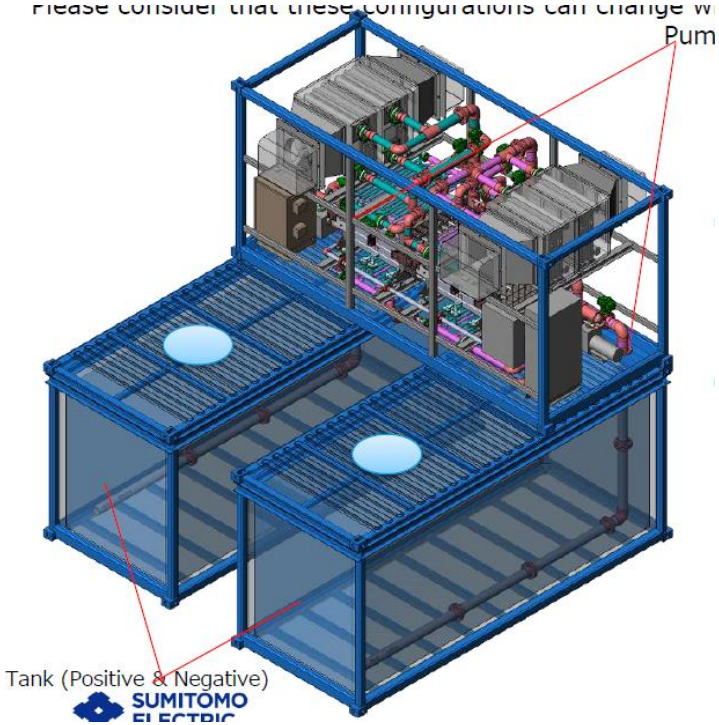
Long lifetime,
Easy instal. & Maint.

Li-ion container from BYD

- One 40 ft container
- Battery & PCS included (no transformer)
- Power : 1260 kVA @ 400 VAC
- Energy capacity : 1340 kWh @ 400 VAC
- Working mode :
  - On-grid : P/Q control
- Efficiency : 89,8%



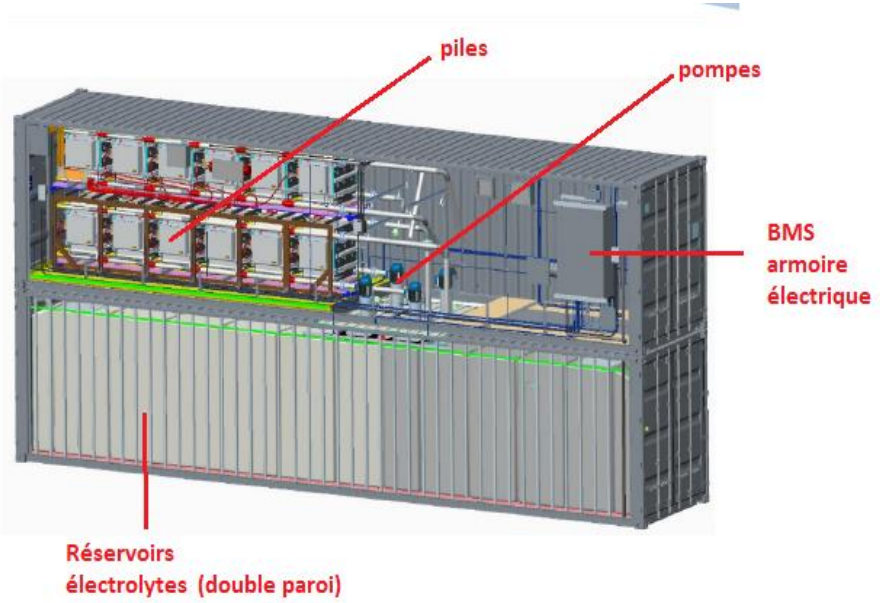
Flow batteries John Cockerill



SUMITOMO ELECTRIC

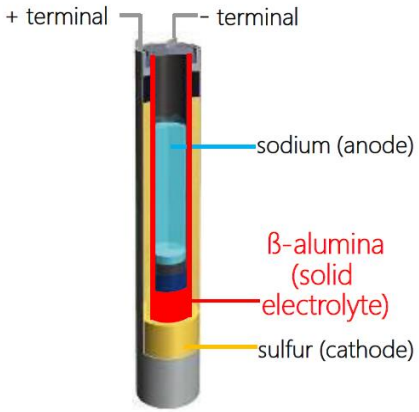
Sumitomo (Va-Va) : 500kW / 1750 kWh / 3,5h
Coupled to AC grid througth grid forming PCS
Electrolyte volume 116 m³
Weight ~ 200 t

Flow Battery ViZN

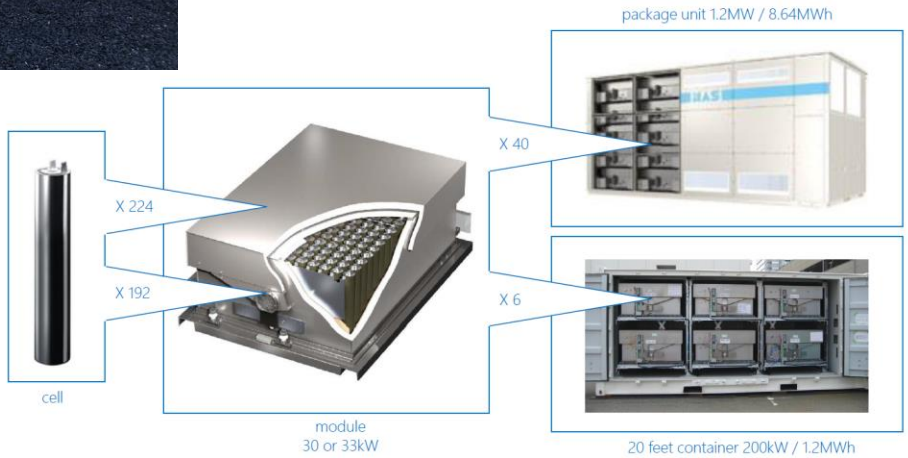


ViZn (Zn-Fe) : 400 kW / 960 kWh / 2,5h

NAS battery from NGK



NAS battery (NGK)
200 kW/1200kWh
Working @ ~ 300°C



All kind of electrical grid configuration
All kind of technologies

All can be tested in real grid environment or in closed grid or islanded grid

Any process tha can be bring to us can be tested !

Batteries

Public grid

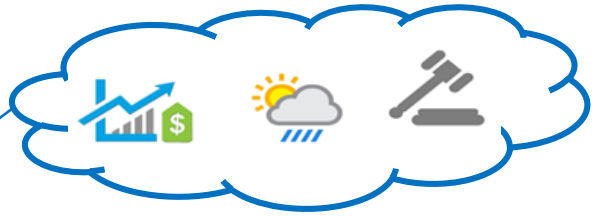
John Cockerill loads
(offices & workshops)

MiRIS

Resistive loads
Diesel generators 500 kVA

Renewable production

Control architecture



« Energy Management System »

Optimisation et forecast (John Cockerill & partnerships)

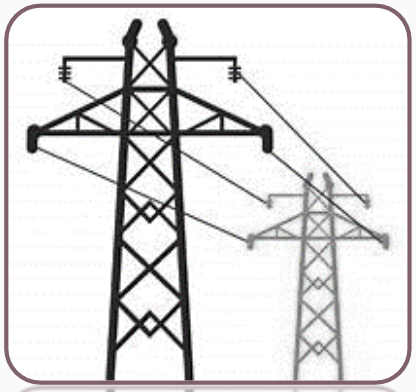
« Site controler »

Safety & equipment sequence control

Equipments / hardware interfaces

HARDWARE

PUBLIC NETWORK



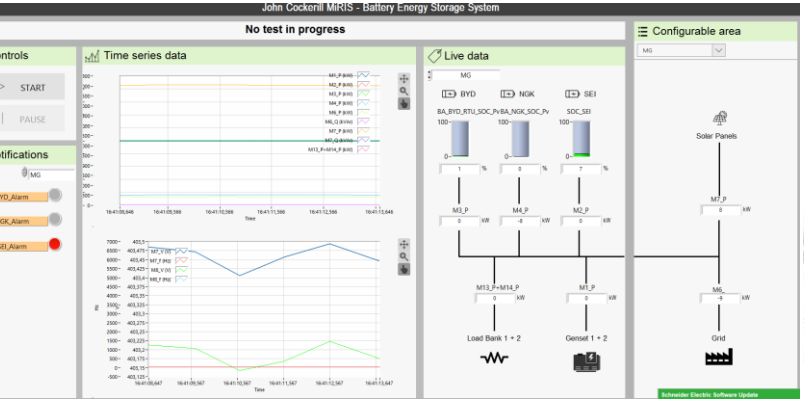
ON/OFF

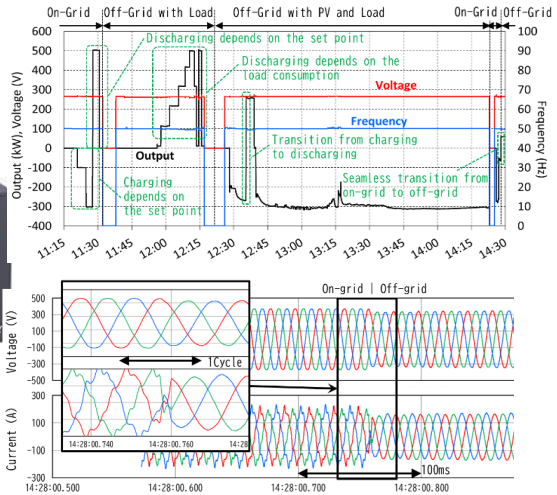
Control architecture : site ,tests management & measurements

- Real time monitoring
- Test bench interface for

grid cycles programming

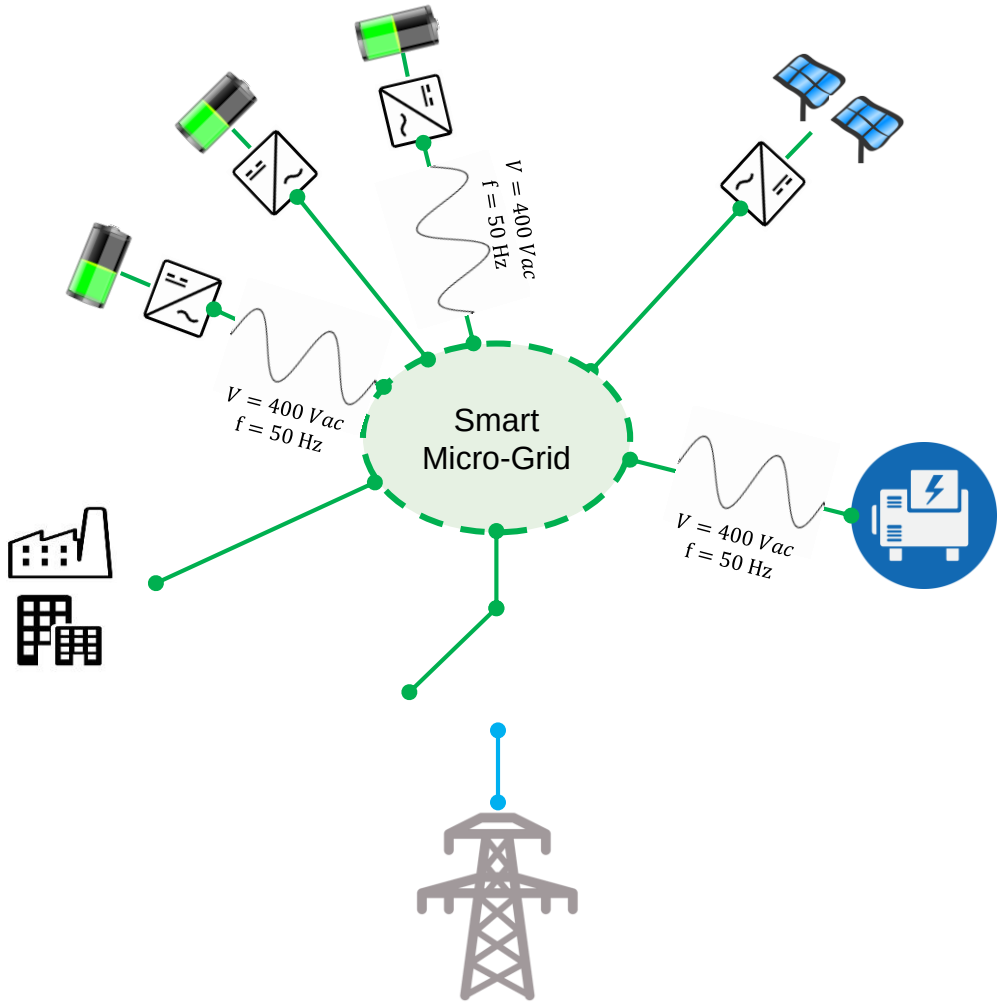
- Grid power quality measurements included





Test example perfomed on MiRIS (off-grid)

With grid-former equipments



Test example perfomed on MiRIS

performance analysis of battery with grid forming PCS

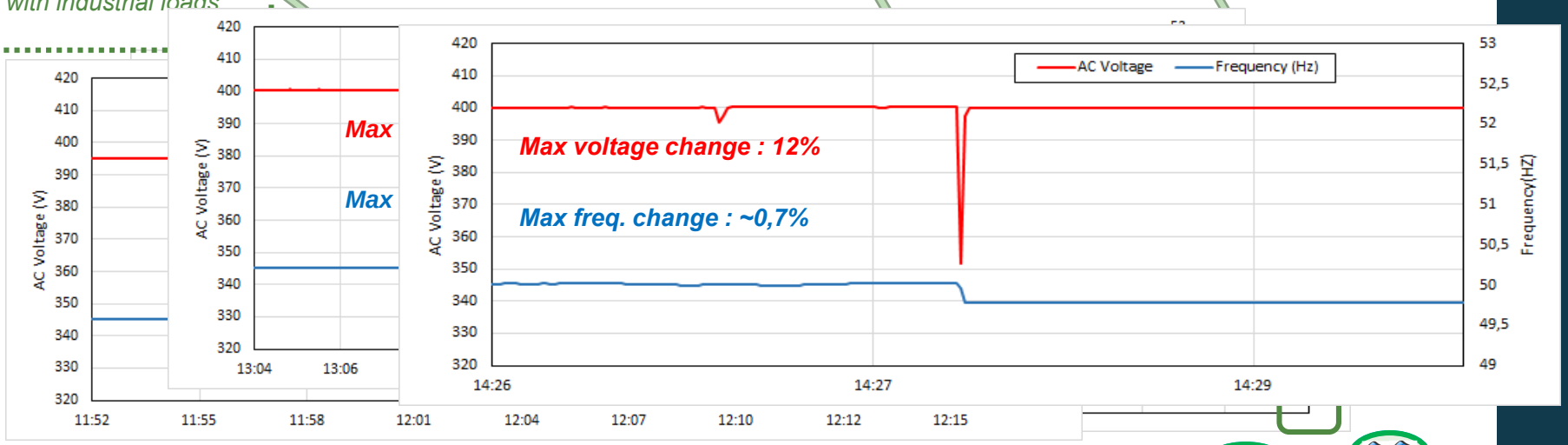
Obj. *:Dynamic response to important load variations*

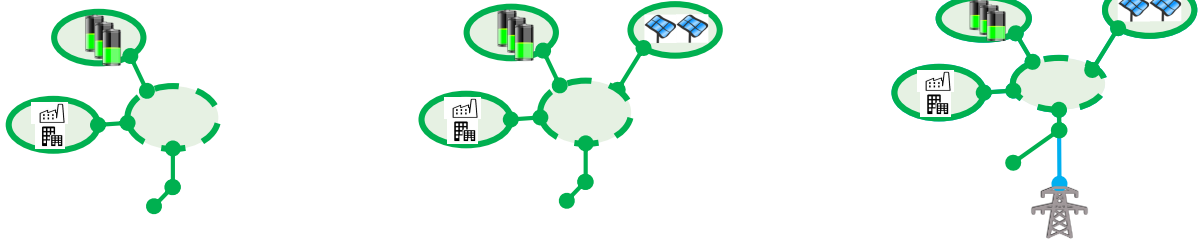
App. *: all off-grid prj.especially those with industrial loads*

Obj. *: reaction to PV production change*

App. *: all off-grid prj*

Obj. *: Seamless transition from on- to off-grid*





Conclusions

- MiRIS advantages and services are multiple
- Highly versatile platform
- Battery storage behaviors analysis
- Multiple microgrid configuration can be tested : On-grid, Off-grid, weak grid
- Investigation of the integration of RE production in electrical grid
- Hybridization between technologies (ex. : genset combining battery, RE & Diesel Generators)
- Grid behavior and power quality analysis tanks to electrical power analyser included
- Testing platform allowing to test electrical equipments (400 VAC grid) and software
- Complete microgrid configurations can be tested with load, processes (simulated & real)
- Ready to welcome you on our testing platform for your specific needs

(any equipement, process or software to be validated on an electrical grid)

Cluster Flux 50 - Flanders

flux50
ENERGISING THE FUTURE

Storage

Frederik Loeckx

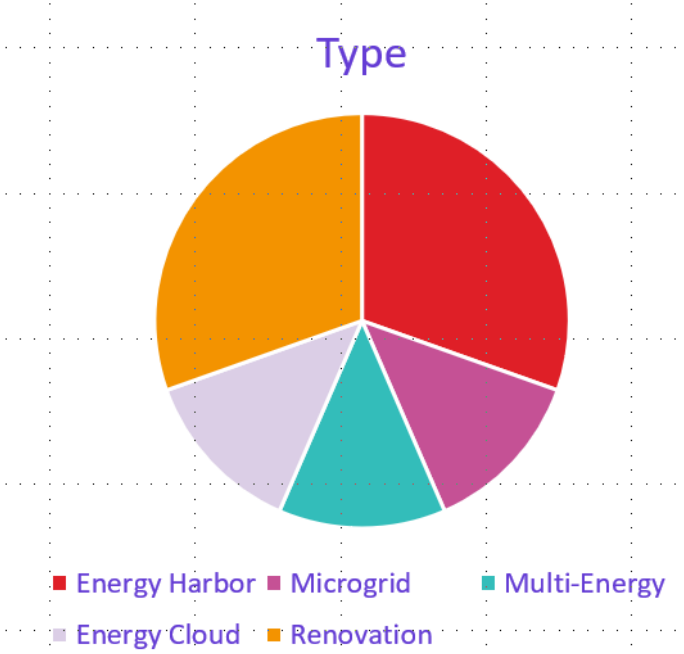
WHAT ARE THE ACTIVITIES OF FLUX50?

Flux$_{50}$ **orchestrates** and **facilitates** the realisation of a **smart energy region**, aiming to create **economical value** for Flemish **companies**.

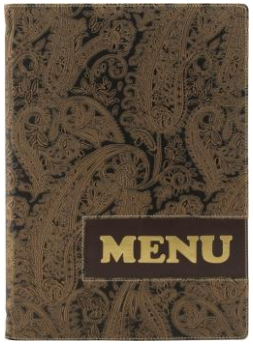
WHAT ARE THE ACTIVITIES OF FLUX50?

INNOVATORZONE

- Energy Harbor 7
  - Goedgekeurd 3 (100%)
  - Ter evaluatie 4
- Microgrid 3
  - Goedgekeurd 1 (50%)
  - Ter evaluatie 1
- Multi-Energy Solutions 3
  - Goedgekeurd 2 (100%)
  - Ter evaluatie 1
- Energy Cloud Platform 3
  - Goedgekeurd 1 (50%)
  - Ter evaluatie 1
- Intelligent Renovation 7
  - Goedgekeurd 4 (66%)
  - Ter evaluatie 1



FOCAL SESSIONS: ENERGY STORAGE



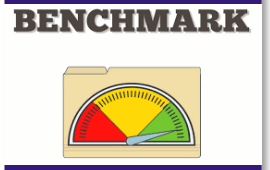
Begeleide analyse-sessie “rendabiliteit batterijen”

(2sessies)

2 kampen battle en informele drink “Power-to-X” projecten in VL the Benelux”

Stakeholder interactie “industriële eindgebruikers ” UPS

Benchmark oefening Impact import energie op Vlaamse industrie



*data indicatief

Interreg
North-West Europe
RegEnergy
European Regional Development Fund

Renewable Energy Regions

Connecting urban demand & rural supply

STEPS STORAGE OF ENERGY & POWER SYSTEMS IN NWE

Interreg North-West Europe

In the last decades, we have seen a tremendous growth of distributed power production from renewable sources on a local and regional level. For stakeholders to maintain grid stability and optimise their business models, they need to invest in safe, affordable and sustainable power storage capacity. Many SMEs in the NWE area have developed these solutions, but they have a hard time validating their products. Transnational action is needed to benefit from their innovations. Otherwise, traditional battery products from overseas corporates will outpace them - they already supply 80% of the mid-size storage market in the EU. STEPS will tackle the two main challenges keeping North-West European businesses from becoming competitive:

Limited access to test beds: Emerging energy storage products often take years to reach pre-commercial TRL. Having access to testing sites is crucial for any SME's pathway to commercialisation and market-access and, ultimately, to drive innovation and job creation in NWE.

Fragmented regulation: Each country has its own energy market regulations which influence a products' technical specifications and the profitability of the business model.

There are three key pillars for creating a transnational environment in which innovative, sustainable and safe energy storage products can be developed more efficiently with maximised commercial usability and international competitiveness:

Regional energy regulation and legislation will be explored to help SMEs tailor their solutions to foreign market conditions.

Engagement with actual end-users will take place in form of regional "user-boards" where individual needs for medium capacity storage are analysed and ideal testbeds identified.

Connecting SMEs with suitable end-users from all across NWE to demonstrate storage solutions at client testing sites, help reshape their business cases and adapt their technology on a cross-regional level.

To accelerate innovation in medium-scale energy storage, STEPS is planning to bring 25 new storage products & solutions to a pre-commercial level.

STEPS will drive down the time energy storage SMEs typically spend on technology demonstration before reaching market maturity from an average of 5 years to 1-2, while maintaining maximum commercial usability.

Powered by: BAX & COMPANY/

Coordinator: Oost NL

Contact:
Joep Koene - joep.koene@oostnl.nl
Giulia Rinaldi - g.rinaldi@baxcompany.com

Partners:

POM · RUHR BUSINESS · meet · S2e2 · UNIVERSITY OF TWENTE. · seai · Insight · flux50

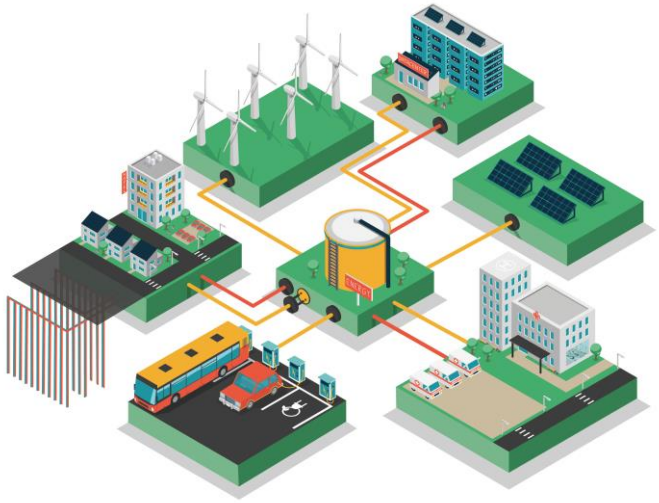
Primeur: wijkbatterij in Oud-Heverlee slaat groene stroom op

In de Ophemstraat in Oud-Heverlee wordt de zonne-energie die overdag geproduceerd wordt opgeslagen in een batterij en vrijgegeven in de avonduren. Het proefproject is een primeur voor België.

Lien Moris | 27 mei 2020

ENERGY GENERATORS

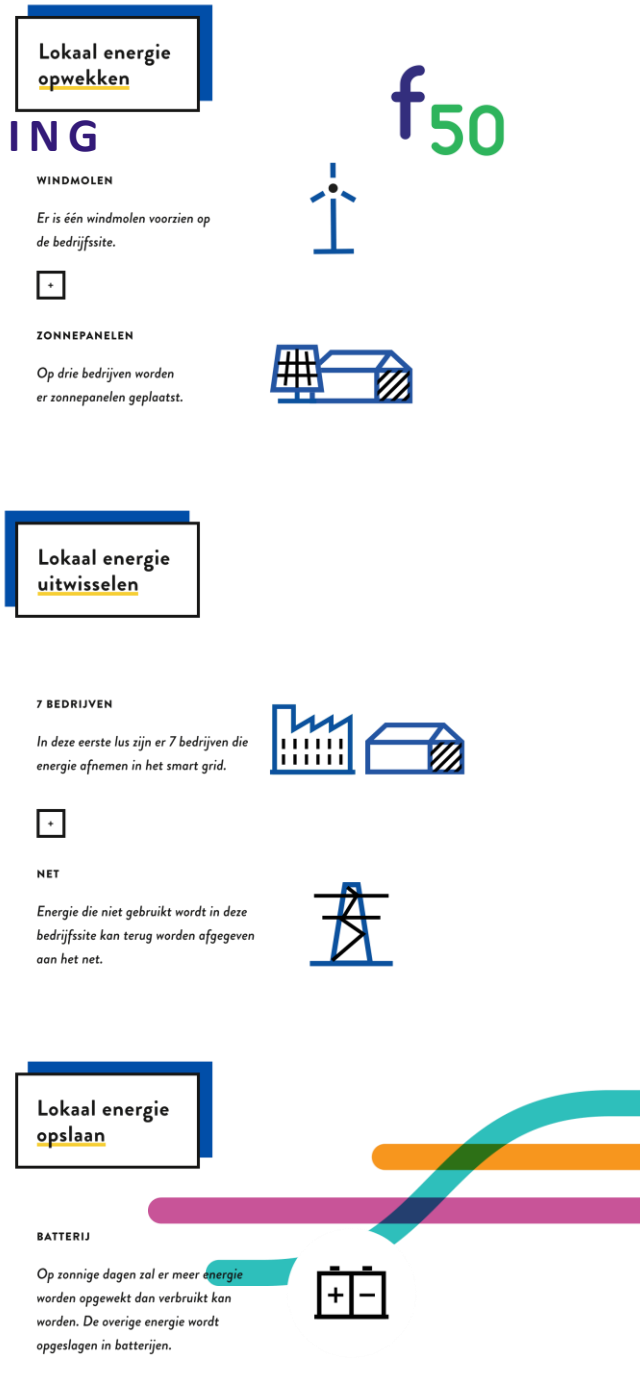
ENERGIEGEMEENSCHAPPEN IN ONTWIKKELING



Green Energy Park / Zellik

De Staak / Opwijk

Hoogveld
Dendermonde



CONTACT

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Clusters for Growth

Flux50

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flux50

Flux50

Green Energy Park

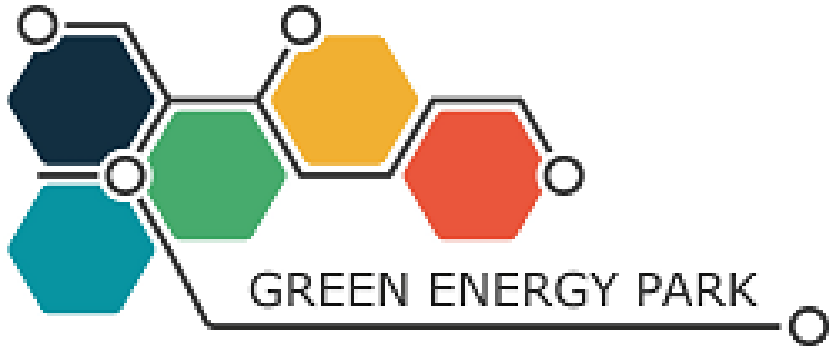
Thierry Coosemans

VRIJE UNIVERSITEIT BRUSSEL

GREEN ENERGY PARK & VUB

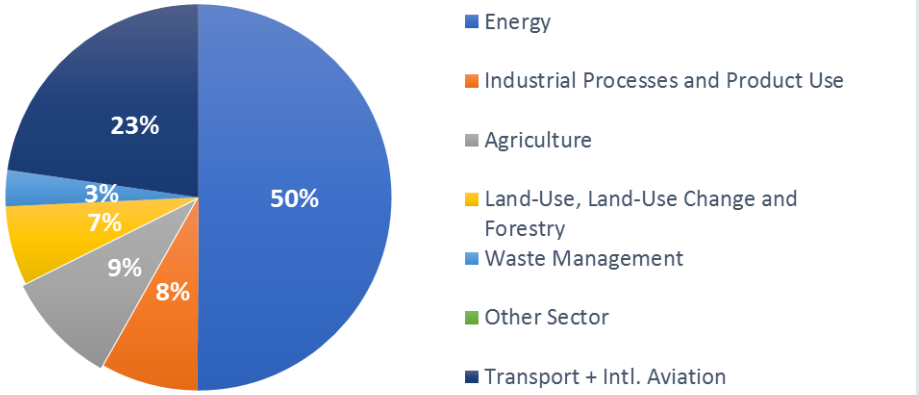
ENERGY STORAGE FOR ENERGY COMMUNITIES: WHAT IS THE

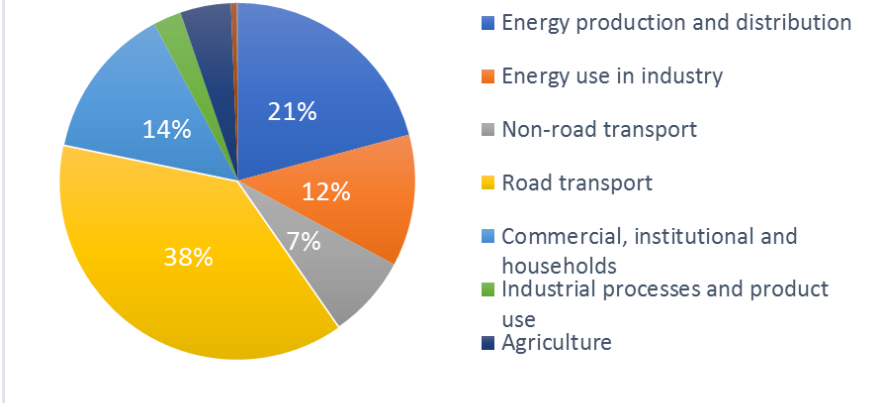
Thierry Coosemans, EVERGi / MOBI



POLLUTION

EMISSION





Source: http://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer

anthropogenic-air-pollutant-emissions

main-

TRANSITION

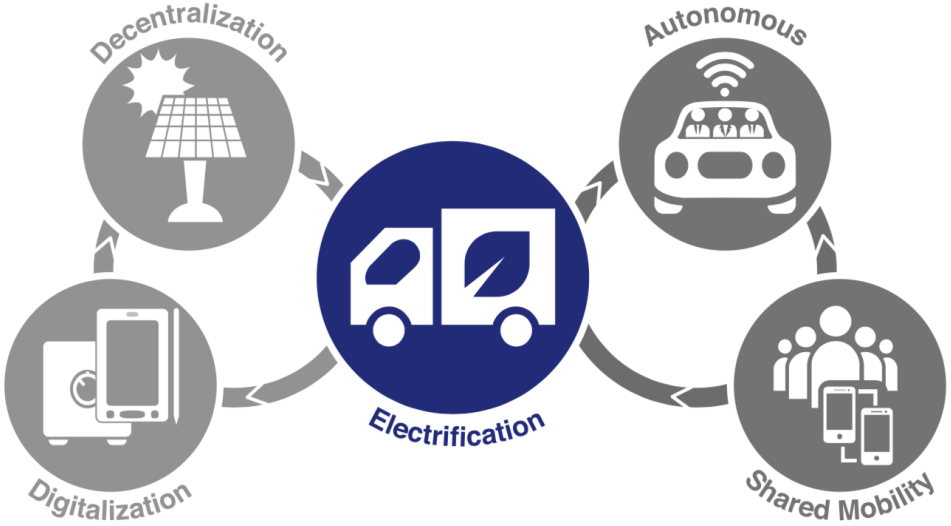
TREND

	Today	Tomorrow
Power generation structure	Few, large fossil and nuclear assets	Many small decarbonized generators
Electricity market	Centralized	Decentralized market
Transmission	Simple transmission structure	Clustering and regionalized balancing
Distribution	One way	Two way
Digitalization	Ferraris meter	Digital multi-metering and IoT
Consumer	End consumer	Prosumers and electrification
Energy vectors	Single	Multi energy vectors

SECTORS

The future of energy will be electric, decentralized and digital

The future of mobility will be autonomous, shared and electric

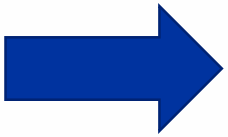


ECOSYSTEM

NEED FOR A DISRUPTIVE TRANSITION

Many challenges:

- Technology
- Economic sustainability
- Social Acceptance
- Legislation
- Multi-stakeholder co-creation and collaboration



Demonstrator Living Lab

- Test and showcase facilities at high TRL

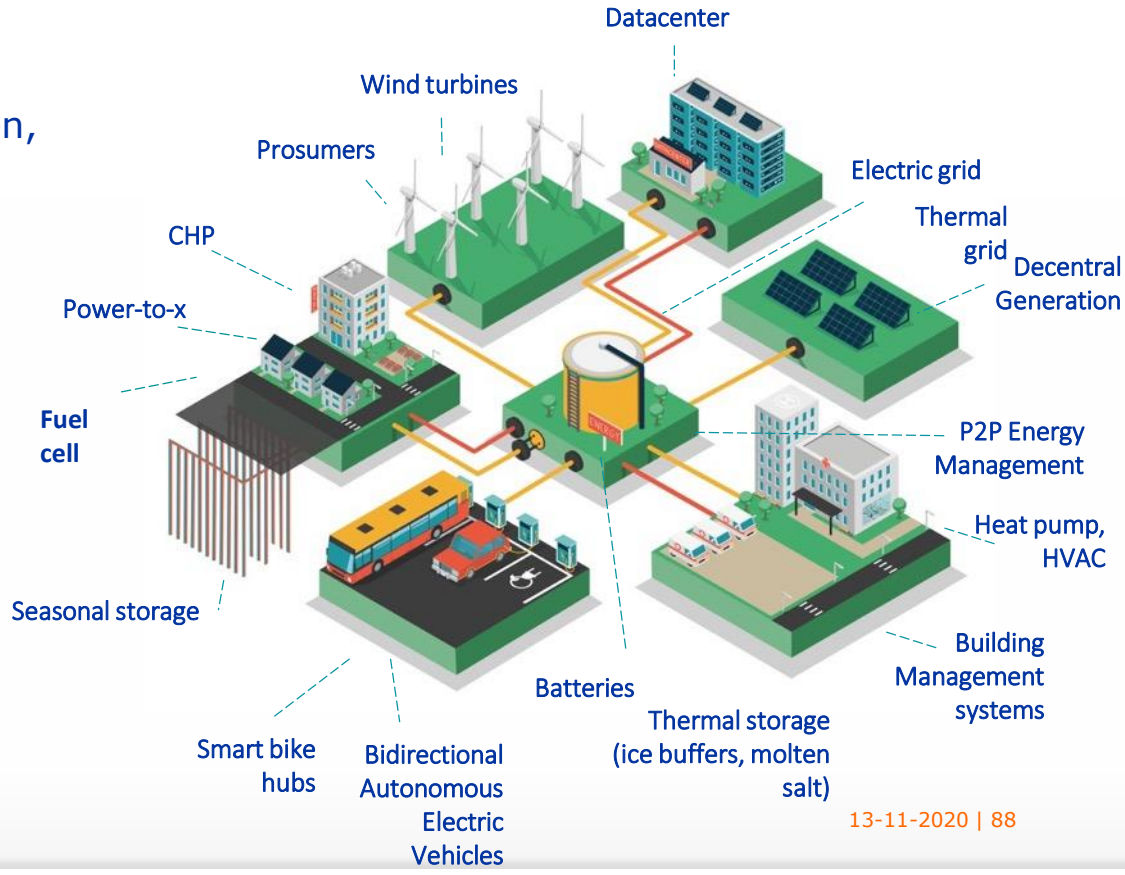
Co-creation ecosystem platform

- Academics
- Authorities
- Industry
- Citizens and end users

STRATEGIC INTERDISCIPLINARY R&D CENTER

Sustainable multi-energy (electric, thermal, cooling, hydrogen, e-fuels, water, data, mobility…).

- Demonstration Living Lab
- Database & monitoring platform
- Data driven Analytics

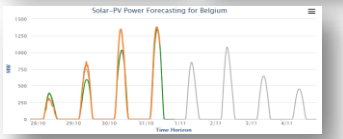


VRIJE UNIVERSITEIT BRUSSEL

BASED ON STRONG TRACK RECORD OF MICROGRID MANAGEMENT

Brussels Health Campus

BRUSSELS SMART GRID HEALTH CAMPUS



Distribute Energy in Time

- Storage in buffers when cheap and/or abundant
- Usage of buffders when grid to expensive
- ICE buffers
- BEO-fields
- Thermal buffers Cogeneration
- Batteries (UPS)

- 3km HV Cables
- Closed loopw with logical selectivity

- 3km Glass fibre
- 14 Dataracks
- 10 Glass Fibre Switches

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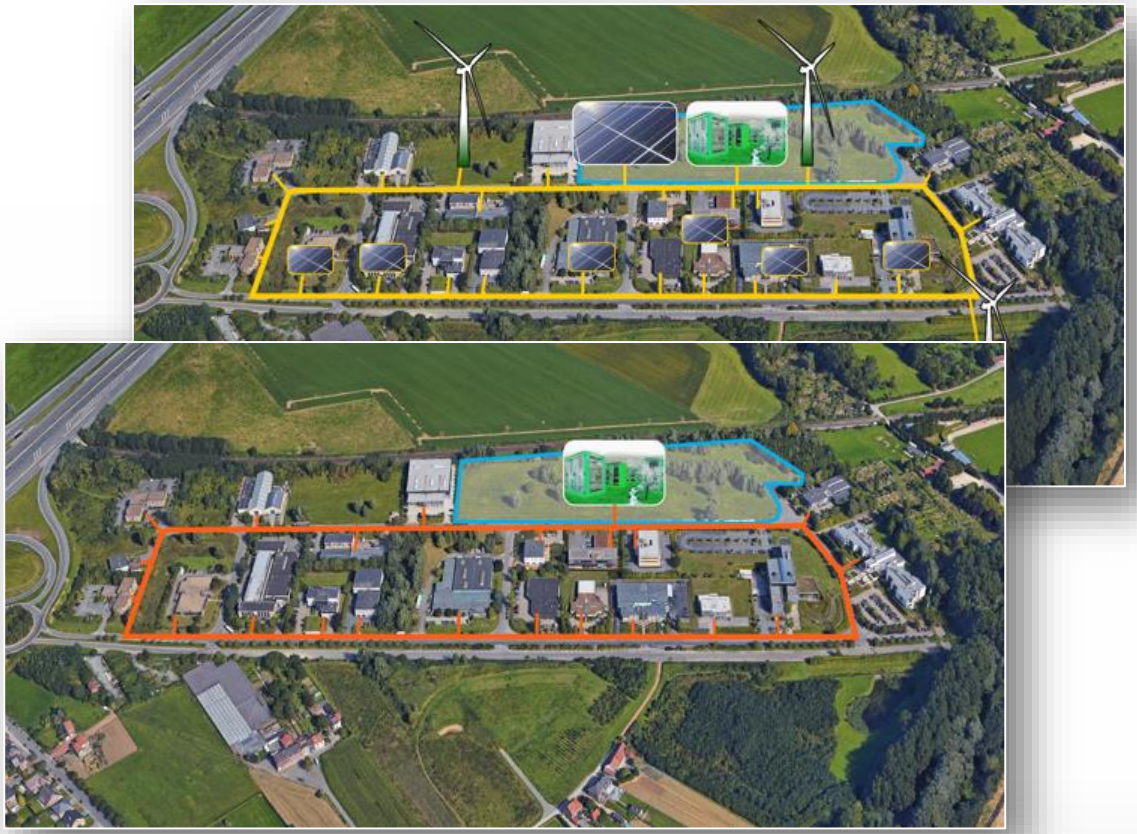
BASED ON STRONG TRACK RECORD OF MICROGRID MANAGEMENT

Electric + Thermal Grid

ELECTRIC GRID

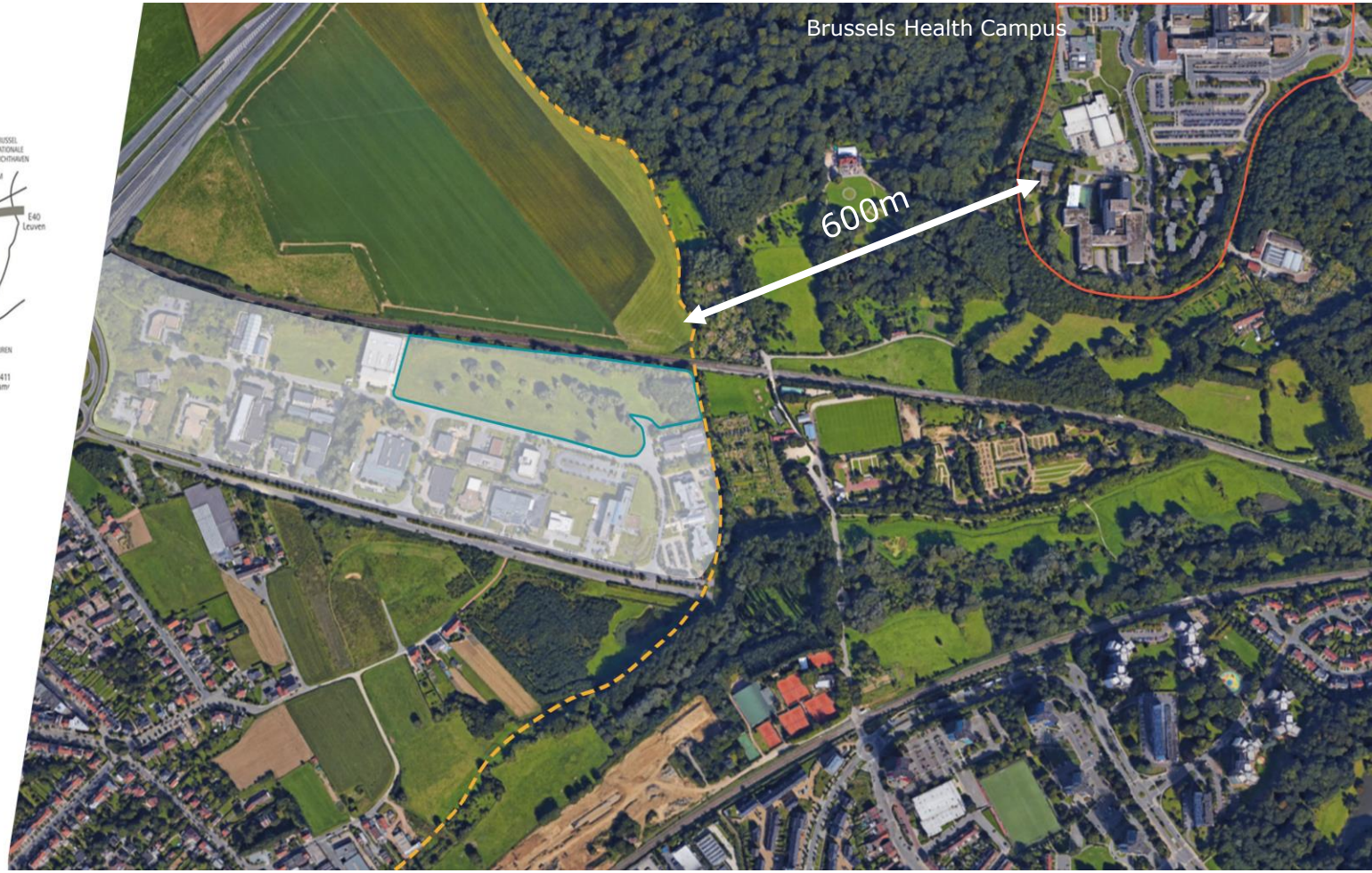
THERMAL GRID



researchpark zellik

21 Buildings
72
Companies

CO_2 neutraal



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GREEN ENERGY PARK

Key Figures

- **50% Off Grid**

- **CO2 neutral**

- **Researchpark Zellik**
- 72 Companies
- 35.000m² building surface
- 2 km road
- Parking 400 vehicles

- **On-site production**
- 4 MW solar
- 9 MW Wind
- 2,5MW Generators
- 500 kW Cogeneration

- **Energy storage**
- 1,5MWh batteries
- 1MWh Borehole Thermal Energy Storage (BTES

- **Thermal grid**
- 2 km
- 22 buildings
- Up to 4MW

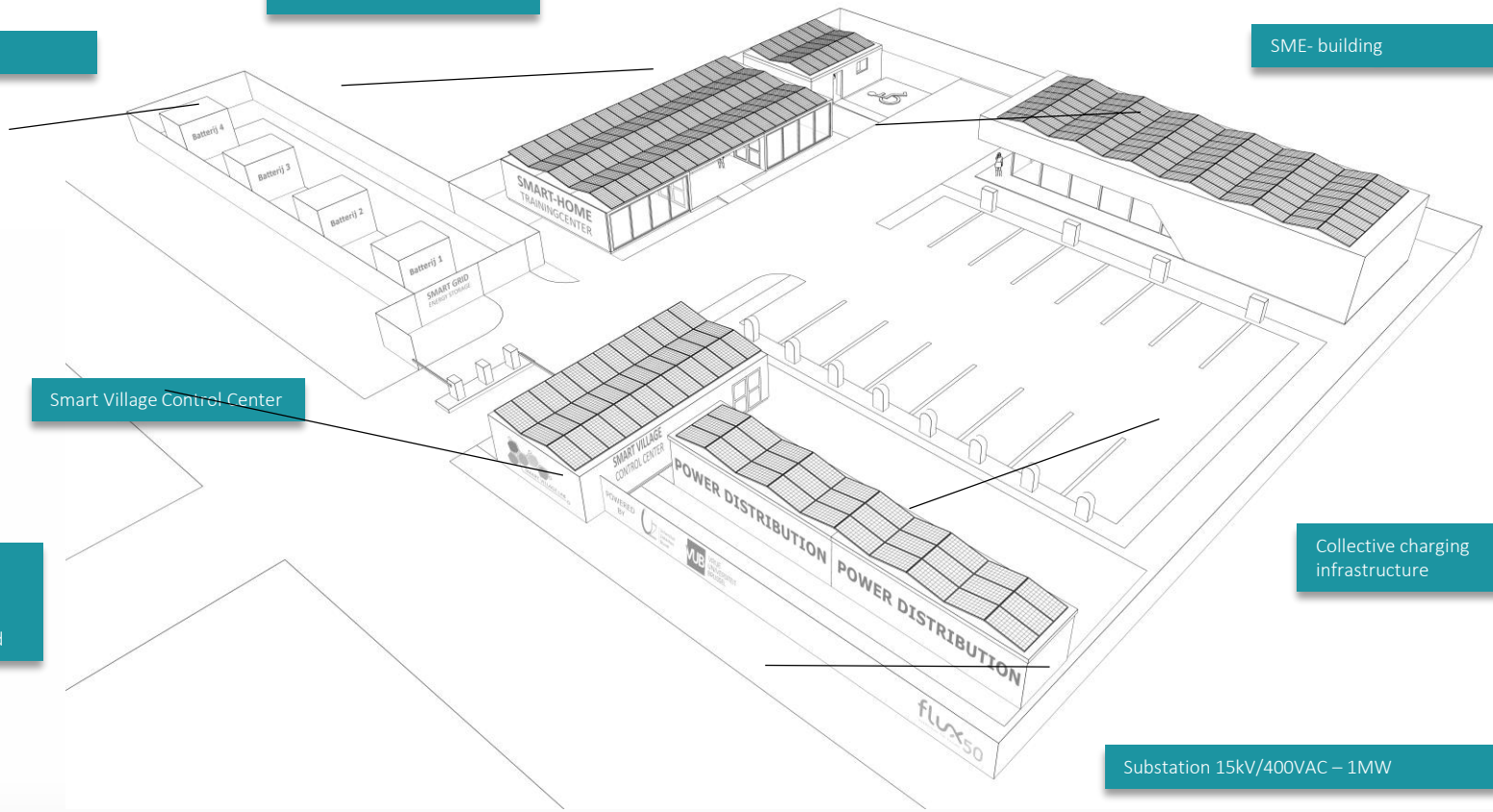
- **Electric grid:**
- 2 X20MW connection
- 3 km electric grid, including partial DC
- 100 charging stations

SMART VILLAGE LAB

Smart Home Lab

Collective Batteries

SME- building



Smart Village Control Center

In development
- Thermalgrid
- Thermal Storage
- H2 production and grid

Collective charging infrastructure

Substation 15kV/400VAC – 1MW

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QUESTIONS?

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https://mobi.research.vub.be

https://www.greenenergypark.be

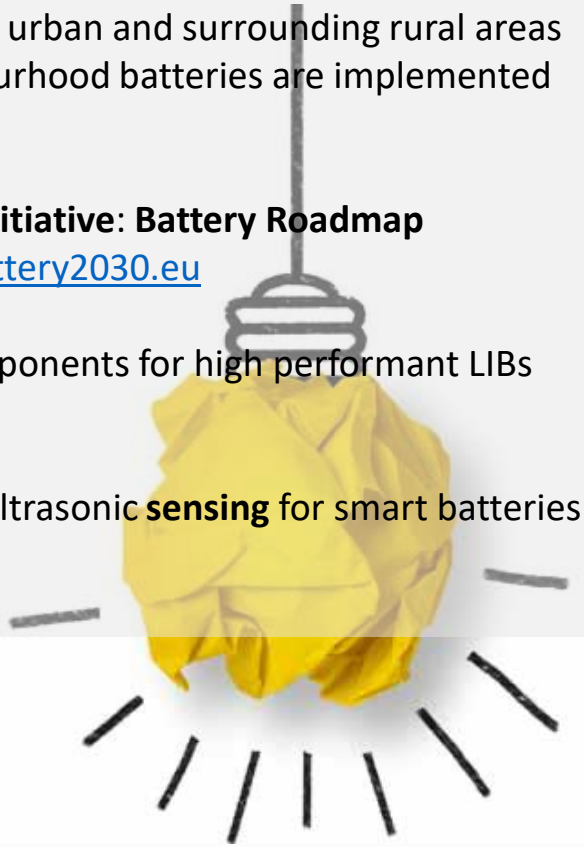
SELECTION OF RESEARCH PROJECTS

Regenergy : RE supply and demand partnerships between urban and surrounding rural areas with an innovative integrated regional approach. Neighbourhood batteries are implemented and validated in a real-life environment.

Battery 2030PLUS: BATTERY 2030+ **large-scale research initiative**: **Battery Roadmap** development . H2020: 1/09/2020 – 31/08/2023 http://battery2030.eu

BAT4EVER: Autonomous Polymer based **Self-Healing** Components for high performant LIBs H2020: 1/09/2020 – 31/08/2023

SPARTACUS: Spatially resolved acoustic, mechanical and ultrasonic **sensing** for smart batteries H2020: 1/09/2020 – 31/08/2023



STATIONARY BATTERIES RESEARCH TOPIC

- **Cost-Effective Battery Solutions**
  - **Lithium Ion, Lead Acid, Redox Flow, Fuel Cell, Hydrogen, Second Life, etc.**
  - Where to use which technology?

- **Smart Grid Storage Technology**
  - **Second-Life** Battery Systems for Smart Grid Applications.
  - **Next Generation Batteries** (Cobalt Free, Nickel Free, Post Lithium & Solid State).
  - **Hybrid** Battery solutions

- **Battery Modules for Stationary Applications:**
  - Embedded **Sensing Technology**
  - Intelligent Battery **Management Strategies** (Machine Learning, AI)
  - **Smart Thermal Strategies**
  - Smart Charge/Discharge scheduling and dedicated modelling for Stationary applications.

- **Digital Twin, Industry 4.0**:
  - Digitalization of Battery Packs and Modules
  - **Safe, Reliable and flexible performance**
  - Manufacturability