ALFEN

Off-grid applications with Alfen’s TheBattery Energy Storage

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ALFEN

POWER TO ADAPT

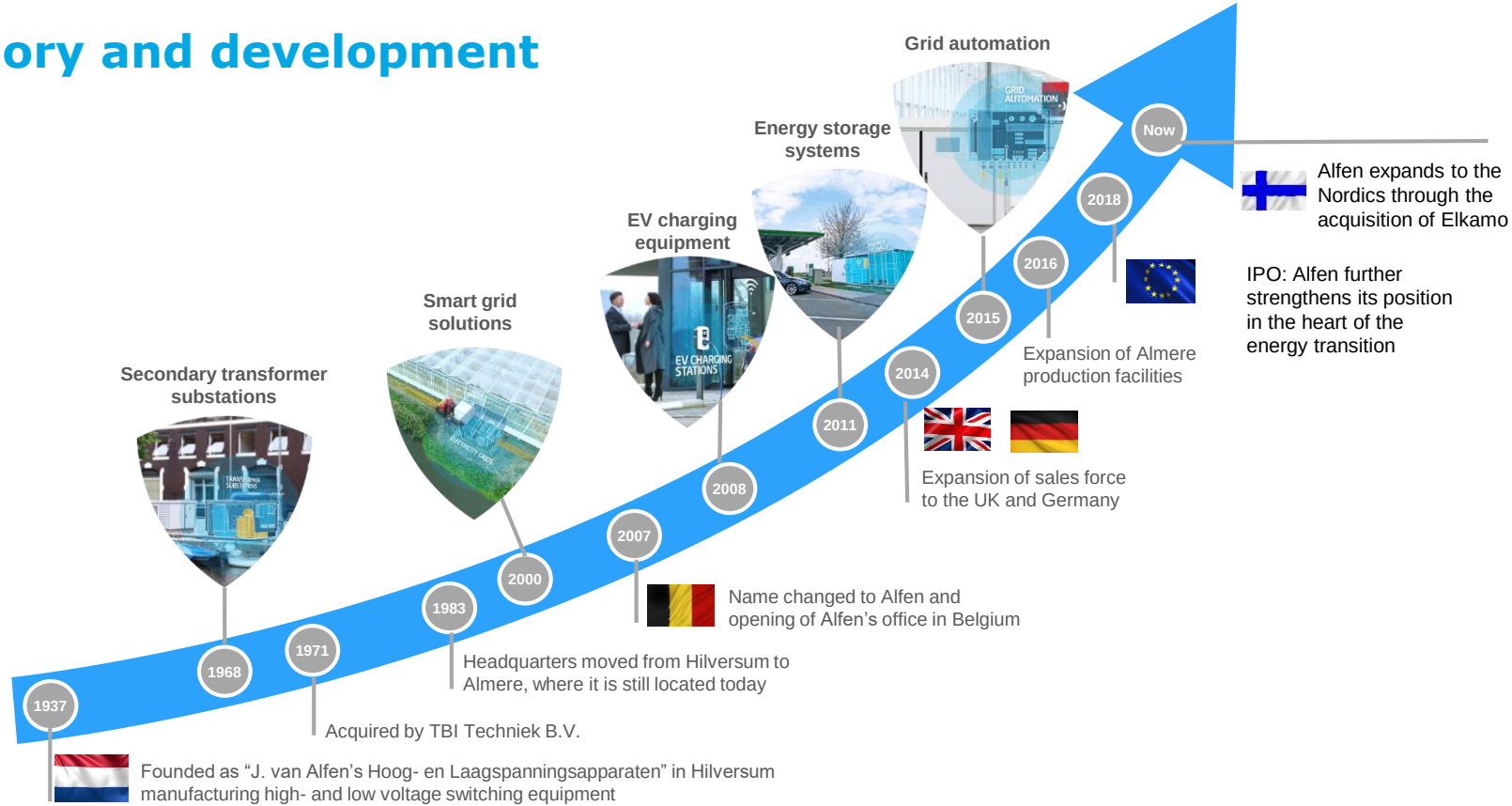
subjects

- Alfen locations and history
- Energy transition
- TheBattery Energy Storage solutions
- TheBattery applications
  - Loadbalancing
  - Trading
  - Frequency Control Reserve
  - Off Grid applications
  - Self Healing Microgrids
  - TheBattery Mobile for events, festivals, etc
  - TheBattery for datacenters
- Examples of projects

Footprint


Sweden Sales department Alfen/Elkamo
HEADQUARTERS ALMERE, THE NETHERLANDS
Finland headquarters Alfen/Elkamo
UK SALES OFFICE
BELGIUM OFFICE
DACH OFFICE

History and development



Where we are today



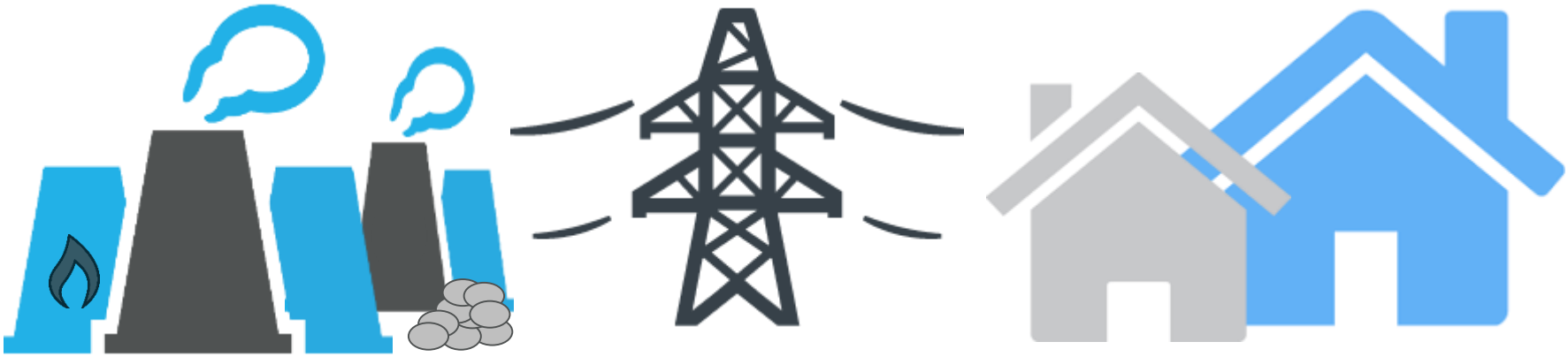






Energy transition

Current situation



gas and coal-fired energy production

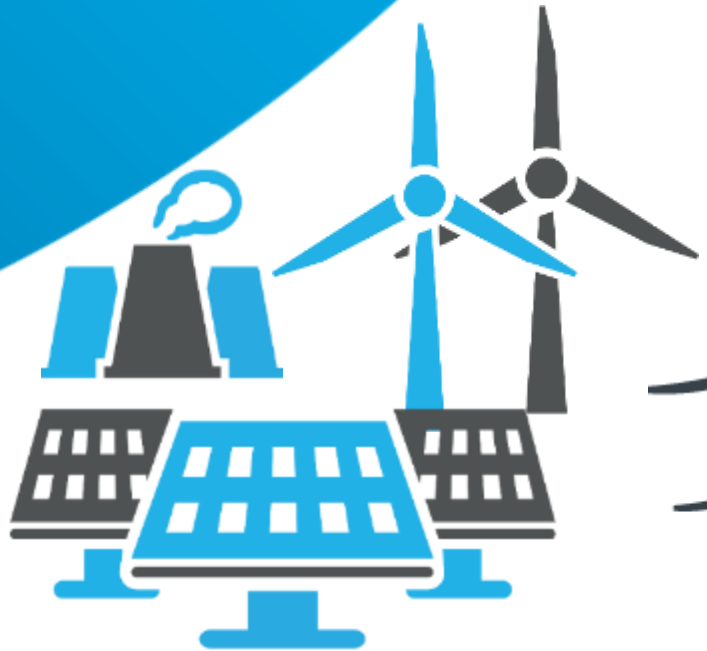
Energy transition

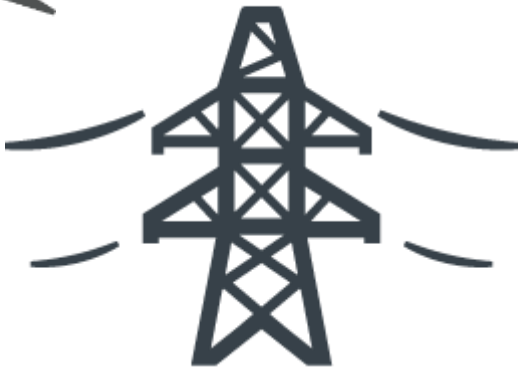
Future situation

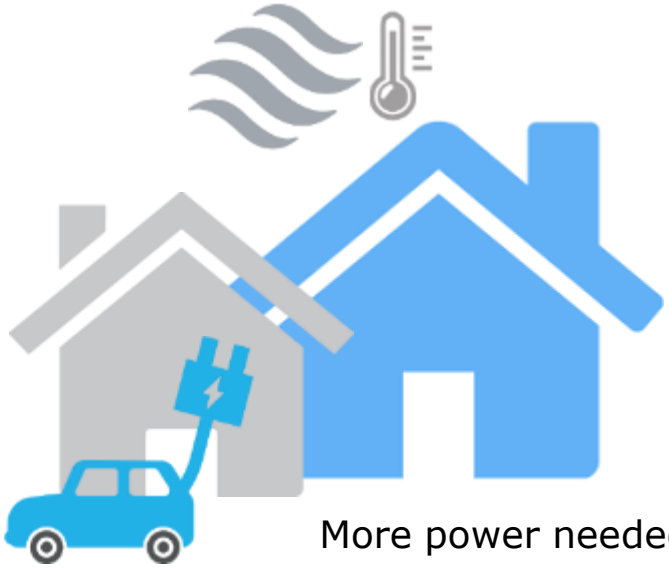
~~gas and coal-fired~~ energy production

Energy transition

Future situation



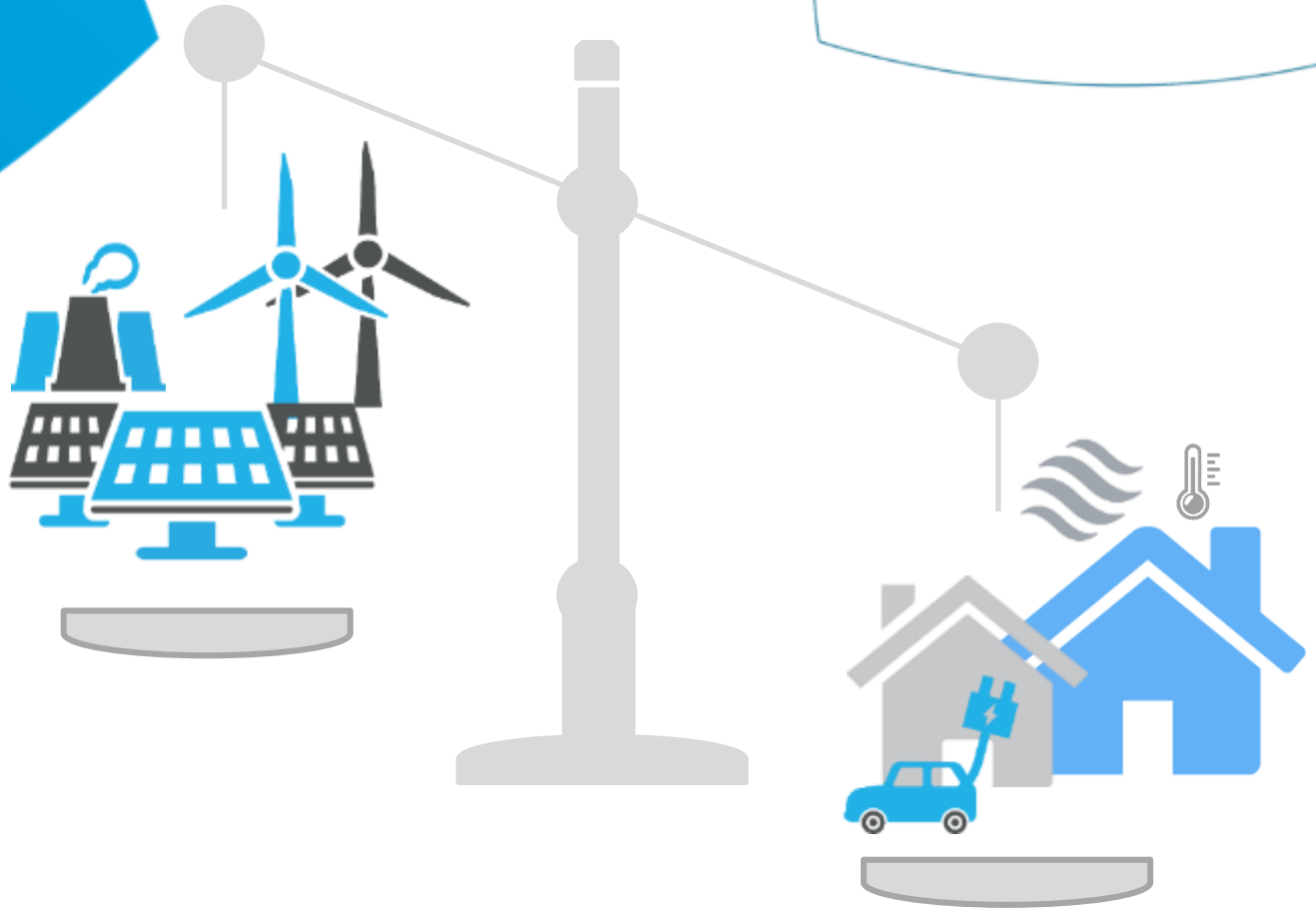




More power needed

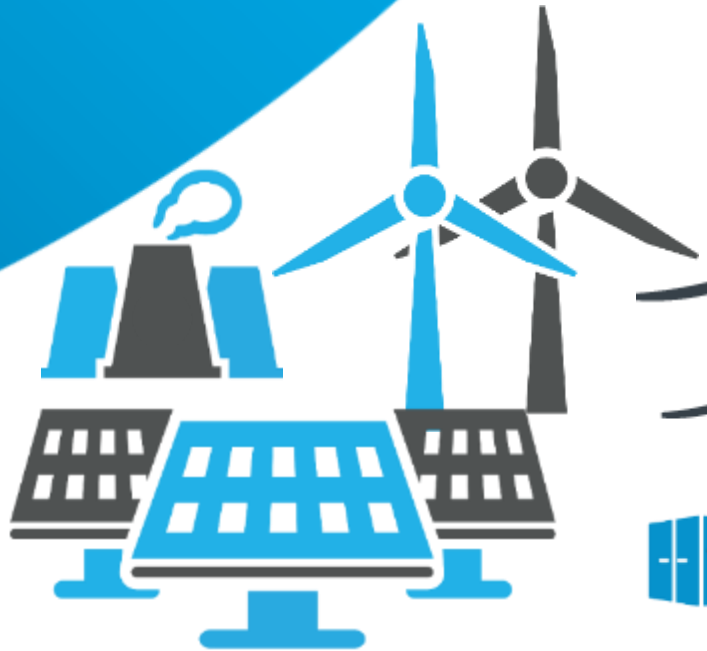
Renewable energy production

Energy transition



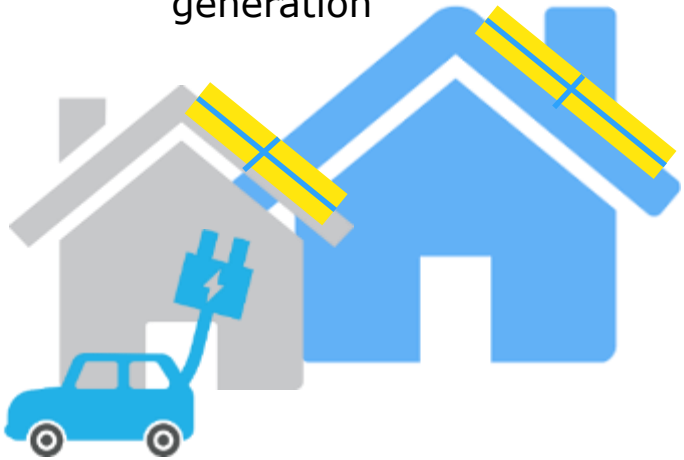
Energy transition

Future situation



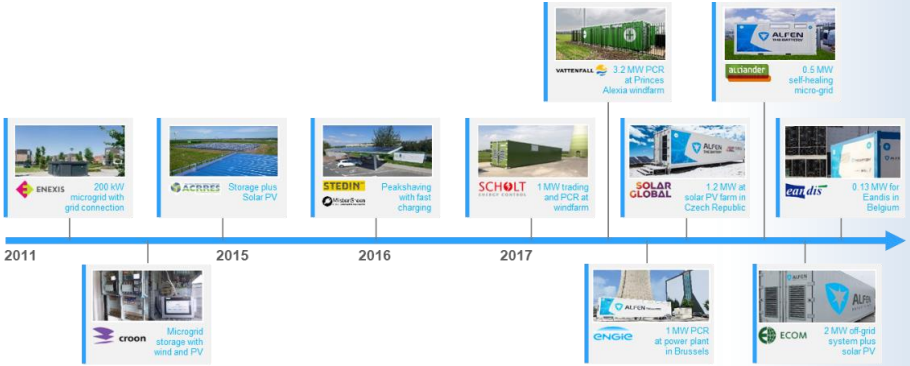
Energy Storage

Decentralized power generation



Energy transition means decentralizati

2018: Explosive growth Battery Storage projects



SCHOLT ENERGY CONTROL — 0.8 MW Integrated EV charging hub

1.1MW + 250KW DC Charger peakshaving

Mobile festival storage solution

Eneco — 2MW PCR, Trading at Peleman Industries

Elaadnl — 138 kWh integrated storage solution EV charging test site

10 FT mobile solution off-grid/microgrid

Greener — 9 x 10FT systems for festivals and construction sites

bam — 200kWh community battery

1.2MW peakshaving and trading

BMW Korea 0,43 MW Peakshaving

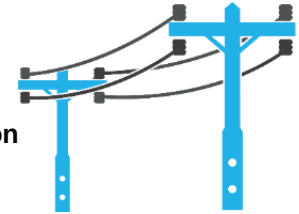
GREEN CHOICE — 10MWh wind farm output energy smoothing

DIGITAL ENERGY SOLUTIONS — 2.2MW grid and wind power supply stabilisation

WEERT ENERGIE — 617kWh first storage system for Dutch cooperative

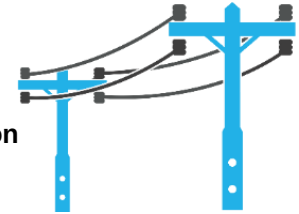
BMW US BMW China

Load balancing



Limited grid connection

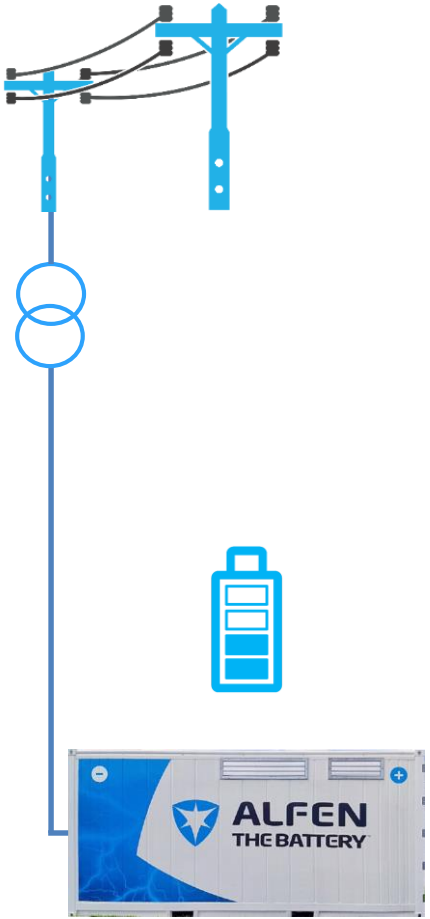
Load balancing



Limited grid connection

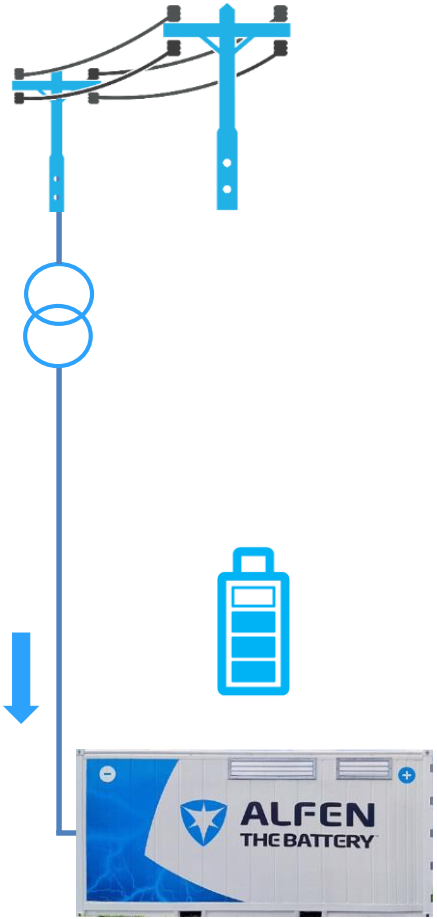
Trading

€ MW/h



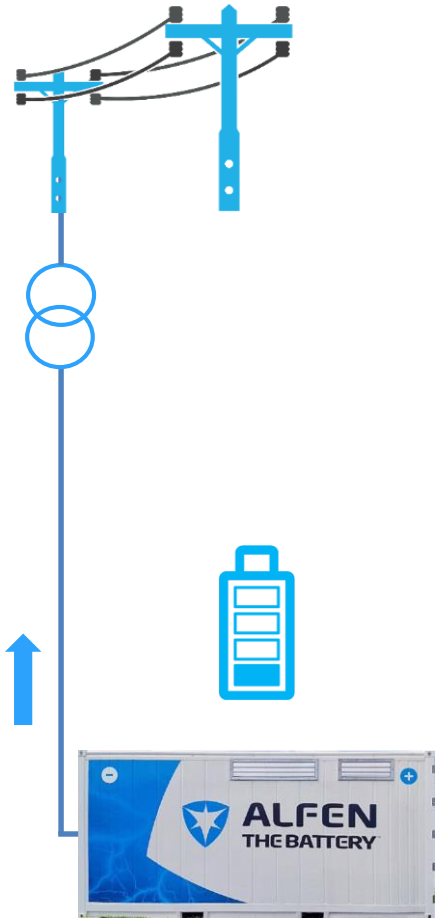
Trading

€ MW/h

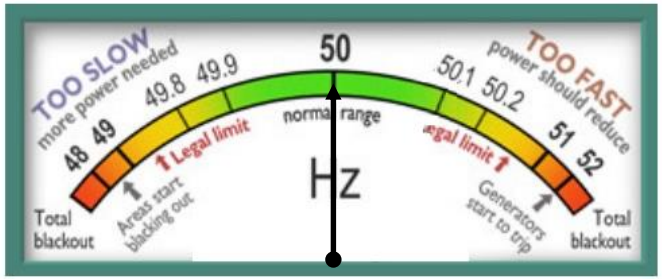


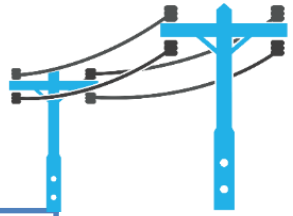
Trading

€ MW/h



Frequency Control Reserve (FCR)





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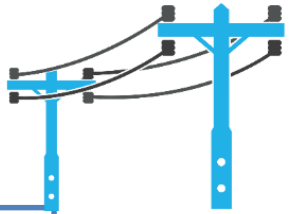

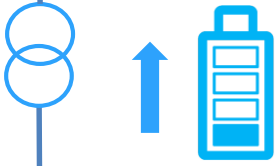

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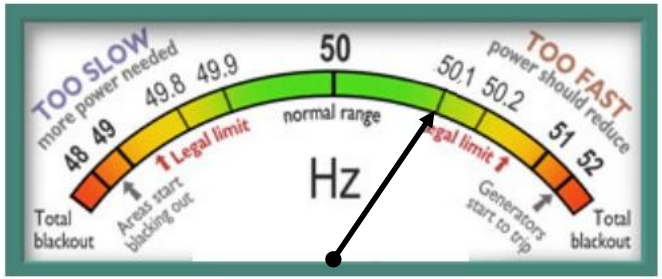
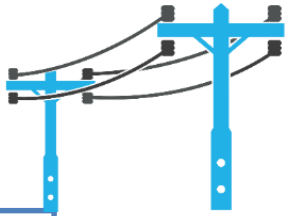
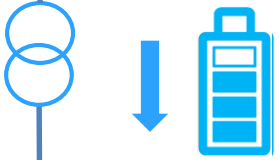
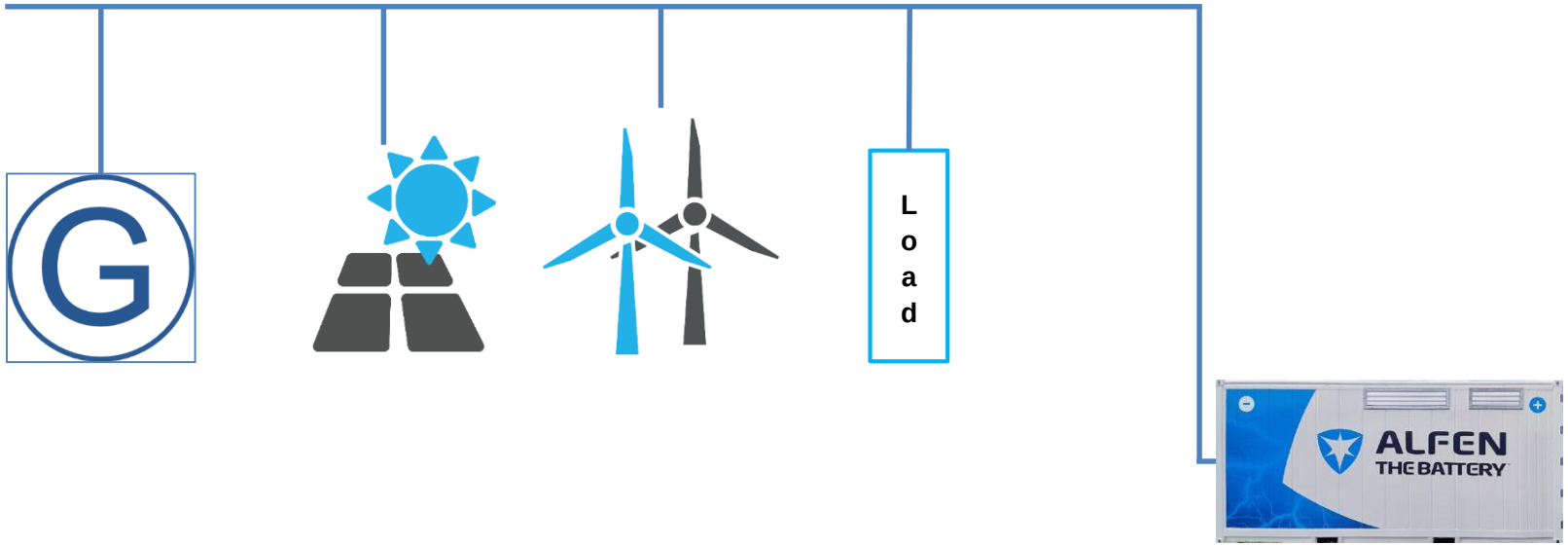






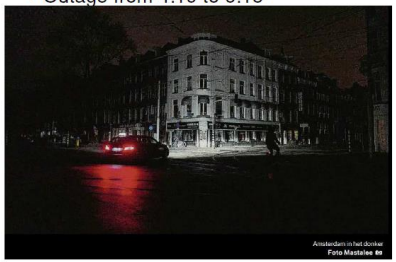
Off grid



Self healing cellular microgrids

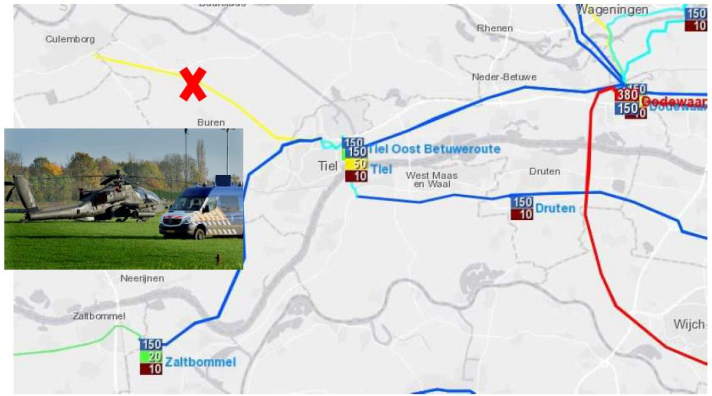
Amsterdam (17 January 2017)

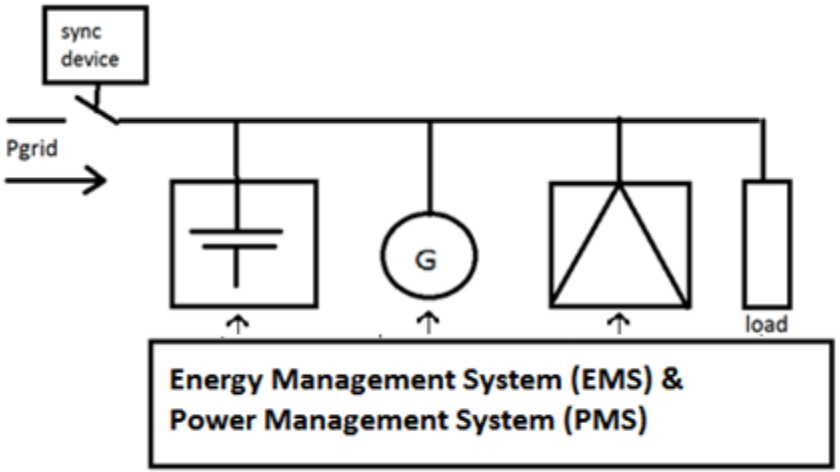
- Outage from 4:19 to 6:15



14 November 2017

- Apache causes blackout for about 50,000 households for 6 hrs





Normally connected to the main grid

- Storage to reduce imbalance in the main grid (energy trading, frequency response)
- Demand side management (EV, heatpumps, etc)
- Virtual Neighbourhood storage

Self healing and self controlling in case of grid outage

- Battery Storage to generate microgrid
- Local power generation (renewable / conventional)
- Using grid frequency as reliable Demand Side Management control method
- Working together with other cells
- Building main grid back from bottom up

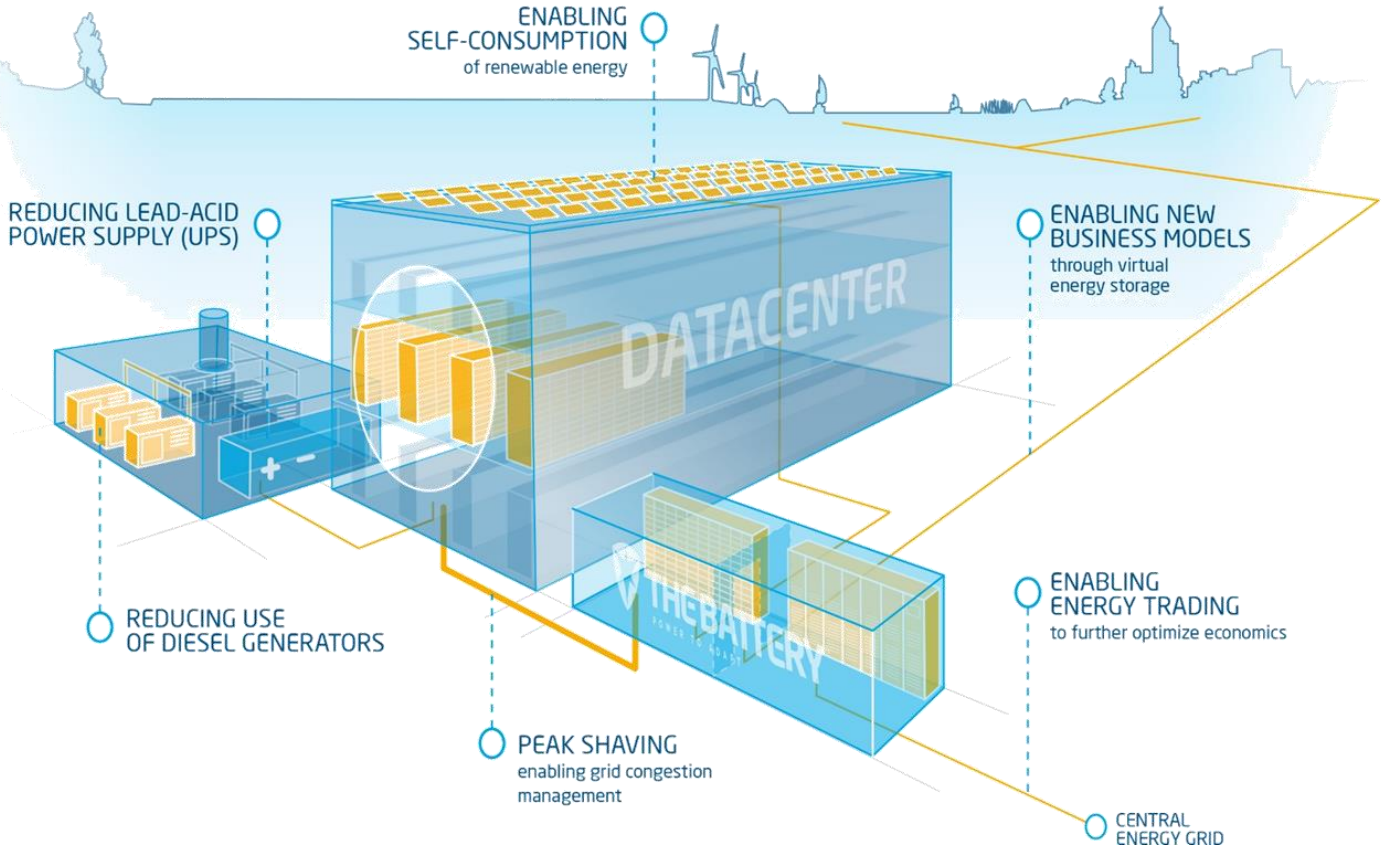
TheBattery Mobile

- Diesel cars are being banned from cities
- What what about diesel generators ?

10FT Mobile Solution

TheBattery Mobile solution for festivals

Recent addition of solutions for datacenters,



Solutions for ultrafast EV charging

- High Power Charging of EV’s:
  - High power during short times
  - Overload of the grid
- Solution:
  - High Power Chargers
  - TheBattery Energy Storage for peakshaving & energy trading /FCR
- Advantages:
  - No grid extension needed
  - Extra income by using storage for trading/FCR

First FCR energy storage system in Belgium

VATTENFALL

Energy storage for FCR @ windmill farm Zeewolde

Energy trading in Czech Republic

STEDIN.NET

MisterGreen
FAST CHARGING NETWORK

Energy storage for EV peakshaving

Peak shaving Eandis Distribution Center

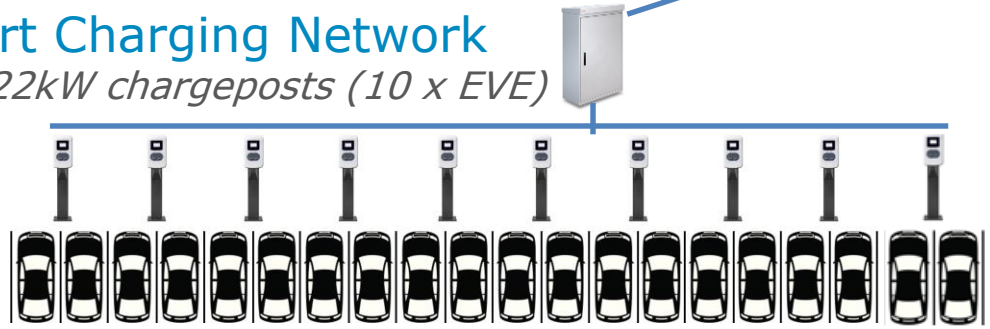
Energy storage makes The Hague football stadium self-sustainable

Alfen TheBattery system

754kWh BESS (0,75 MW)

Smart Charging Network

20 x 22kW chargeposts (10 x EVE)



- ✓ Installation TheBattery
- ✓ Installation charging hub
- ✓ Electrical integration
- ✓ Load balancing platform charging hub
- ✓ Monitoringsystem

Implementation of the project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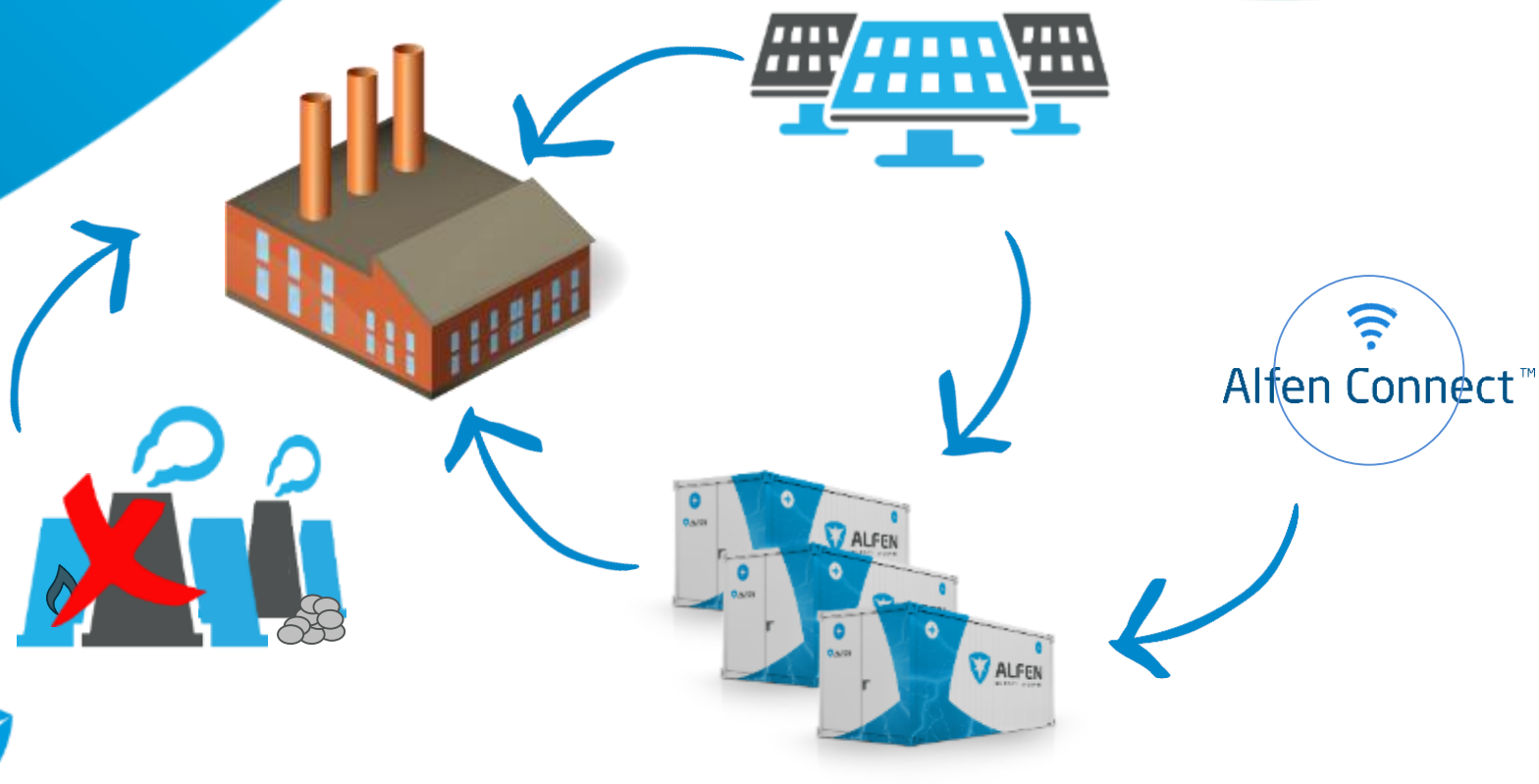
SCHOLT
ENERGY CONTROL
STEDIN

Off grid:
example project Nigeria

- Cocoa factory near Lagos Nigeria
- Electricity off for 80% of time
- 15 year ago grid was disconnected => using diesel generators
- disadvantages: high costs of diesel & maintenance, often supply problems diesel, negative CSR
- New solution: Solar PV + battery storage
  - 2,35 MWp PV
  - 2 MWh/2MW (= daily electricity consumption of 200 houses !)


Alfen Connect™
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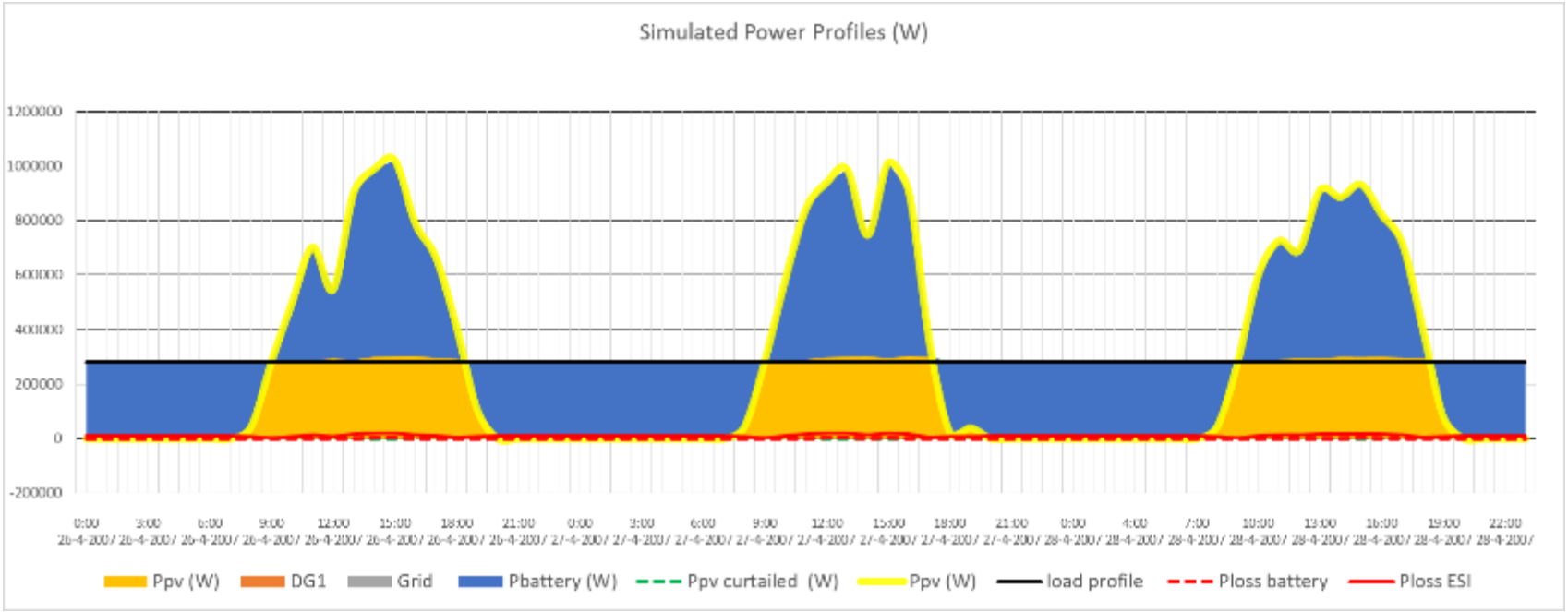
Typical three days of energy flow



Content workshop

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Alfen is in the center of the energy transition !

Thank you !

Questions?