The Supplier´s new role in energy transition

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innogy Energie – Innovations

innogy · HIGREEW · 2.3.2022

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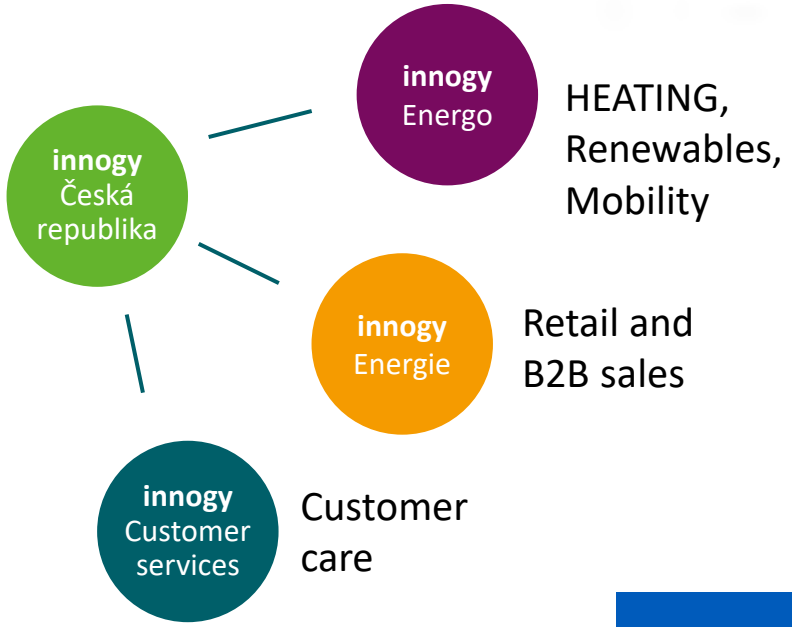
- Introduction of innogy
- Assumptions
- Business to Business use cases
- Retail use case

Short introduction of innogy

innogy is mainly a natural gas and power utility.
After the merger of German RWE(innogy) and E.on some foreign assets of RWE had to be sold.

In 2020 innogy Czech republic become part of the Hungarian based MVM Group.

- 45 % of NG market in CZ
- 8-9 % market share in electricity



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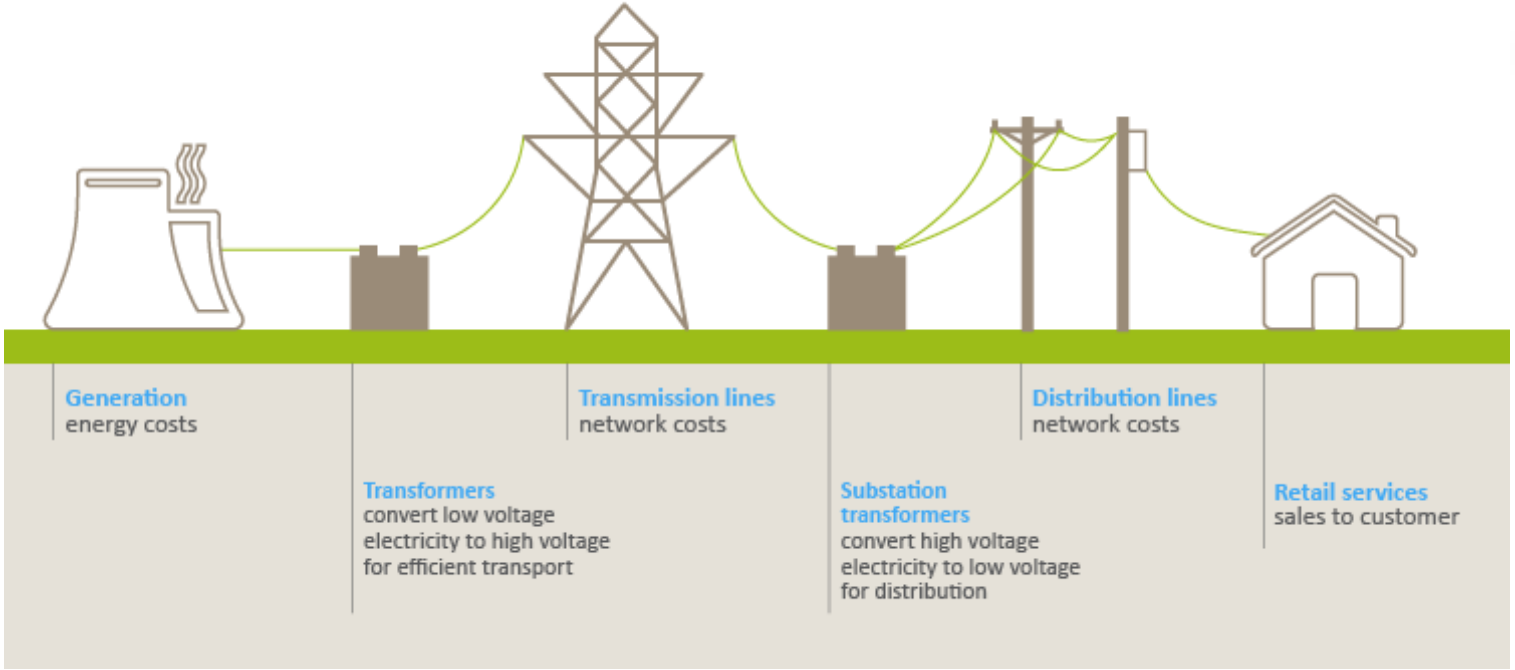
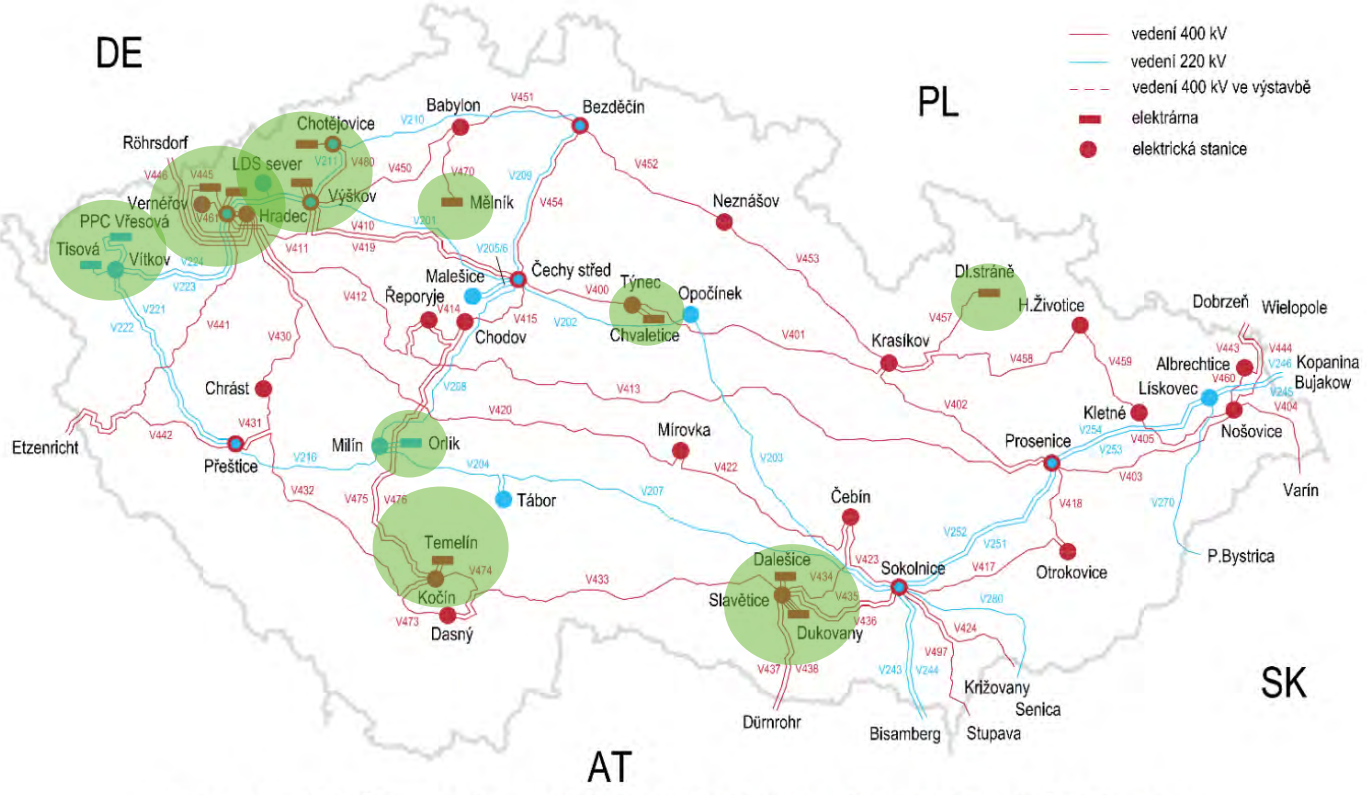
Assumptions

Power delivery – physical „layer“



Starting point – centralized power generation

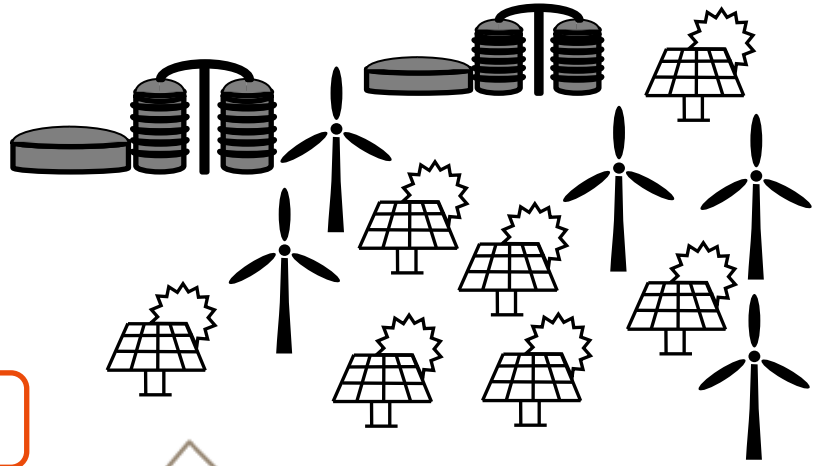
Example Czech Republic – generation hot spots

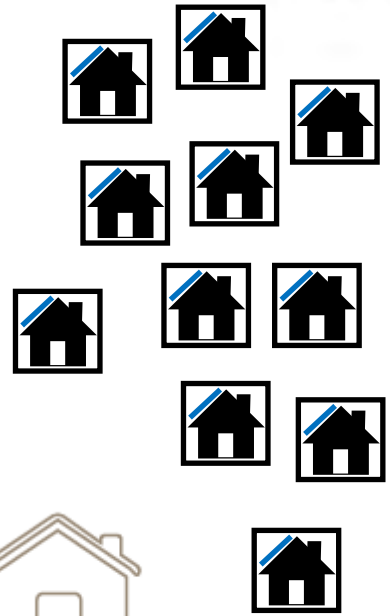


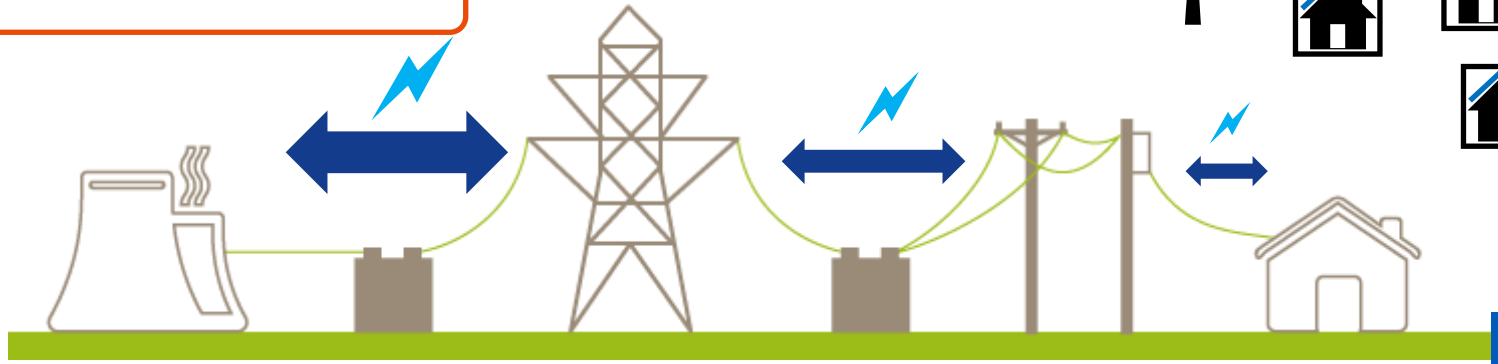
Obr. 2.1 – PS ČR – schéma sítí 400 a 220 kV k 31. 12. 2017 (Zdroj: ČEPS, a.s.)

Now and Future – Decentralized generation

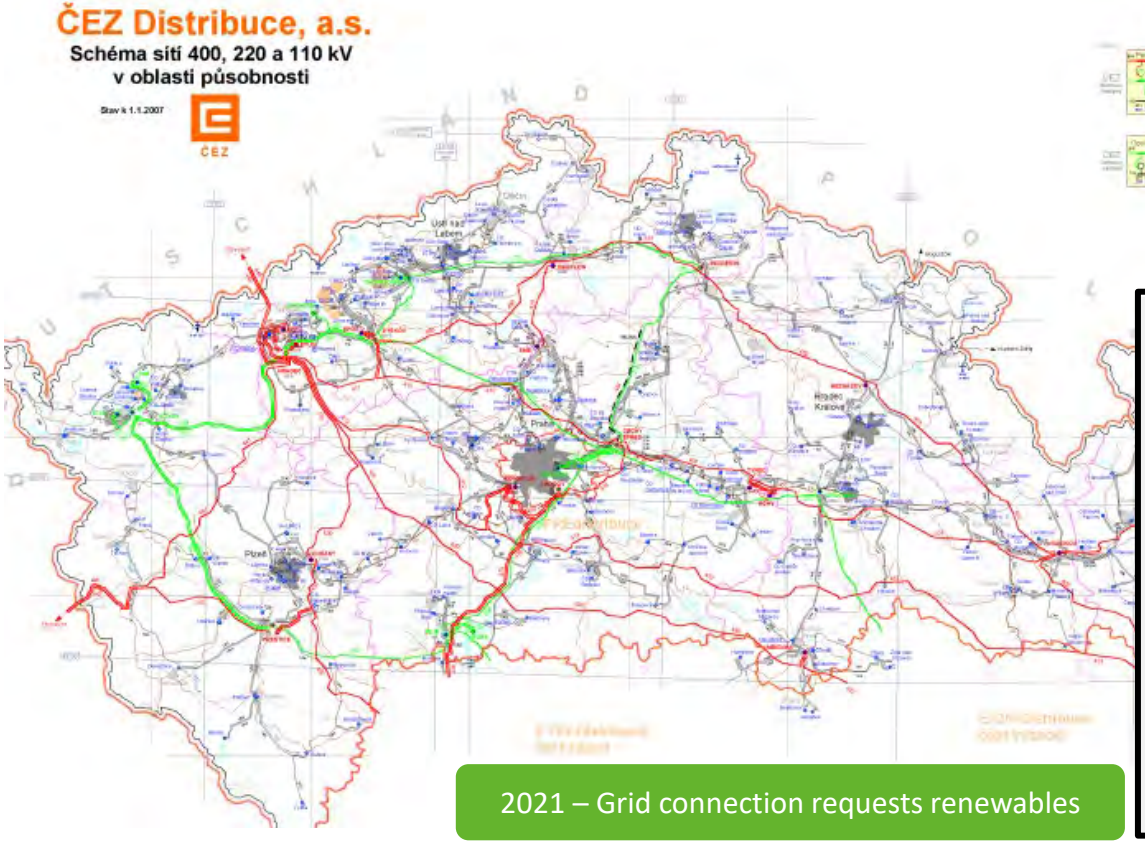
!!! Decrease of balancing volume !!!

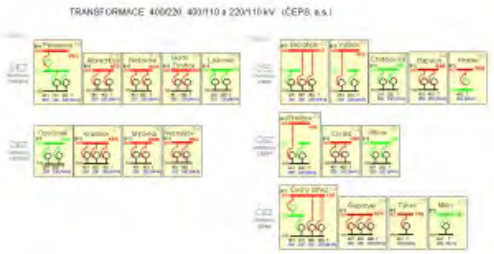


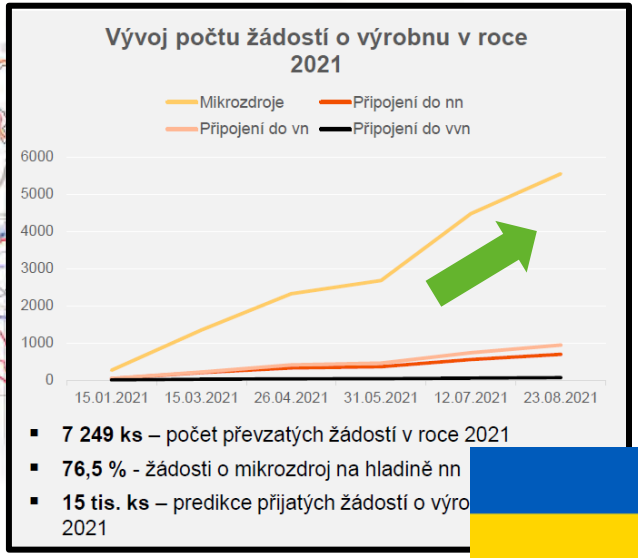




Example distribution Grid – ČEZ Distribuce







2021 – Grid connection requests renewables

Challenges of Renewables installations

The red areas indicate where grid operators can no longer connect large green power generators

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Use cases B2B
Balancing Services

Balancing Services

Balancing Services are reactive short-term means to level out frequency deviations in the power grid. Balancing Services (sometimes also called control reserve) is one out of many ancillary services that system operators have to provide a secure power supply. Frequency deviations are reliable indicators of imbalances between Generation and Consumption.

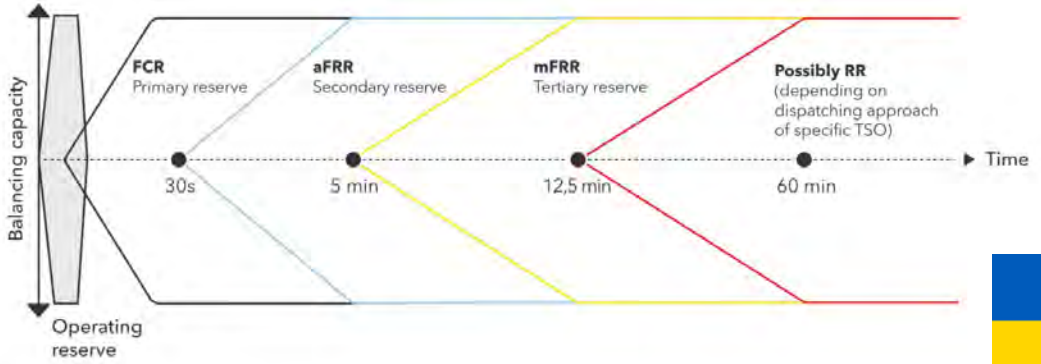
FCR – Frequency Containment Reserve

aFRR – Automatic Frequency Restoration Reserves

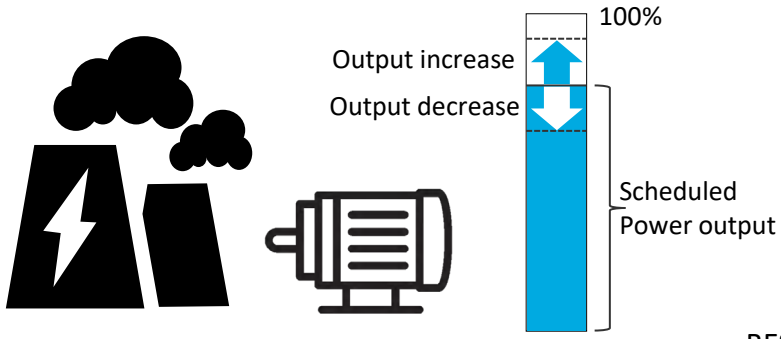
mFRR - Manual Frequency Restoration Reserves

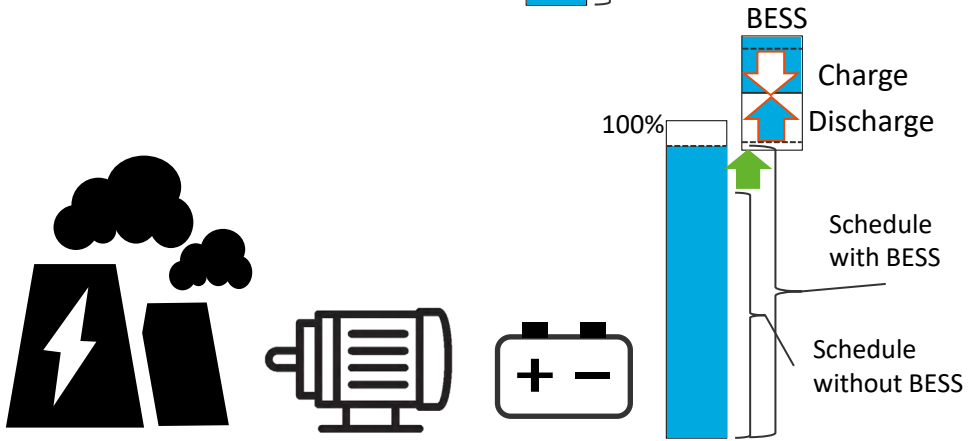
RR – Replacement Reserve

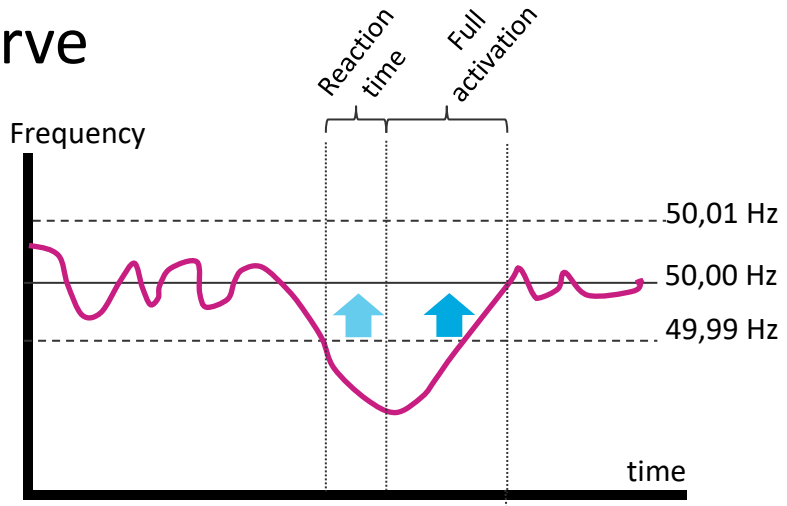
Balancing Services According to the System Envisaged by ENTSO-E

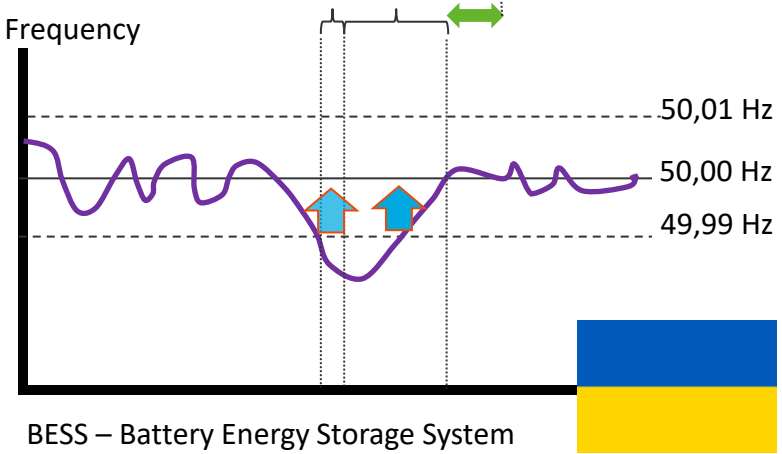


FCR – Frequency Containment Reserve









BESS – Battery Energy Storage System

FCR – example BAART project

Capacity: 2,8 MWh

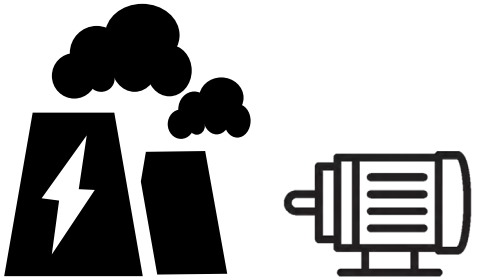
Power output: 4 MW

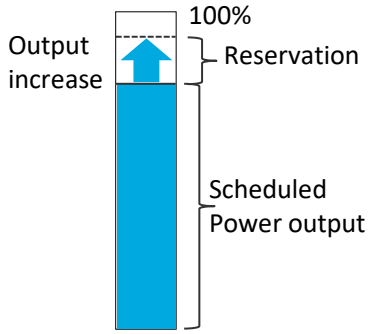
Output reserved for state of charge management: 0,75 MW

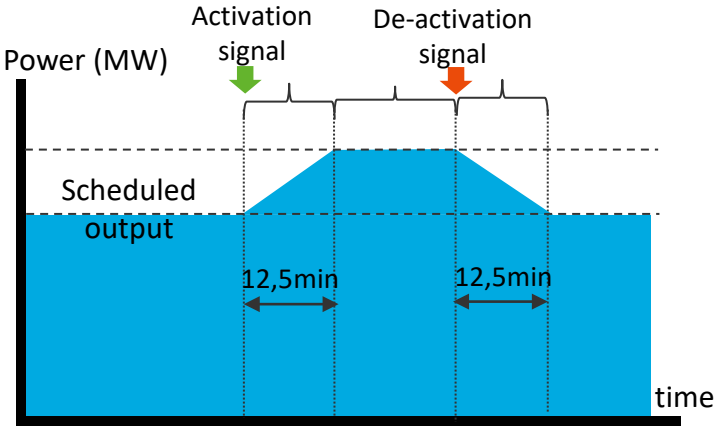
Voltage: 6,3 kV
Output reservation for FCR: 3 MW

https://www.ceps.cz/en/press-releases/news/cez-commenced-operation-of-a-4mw-battery-within-a-joint-pilot-project-with-ceps

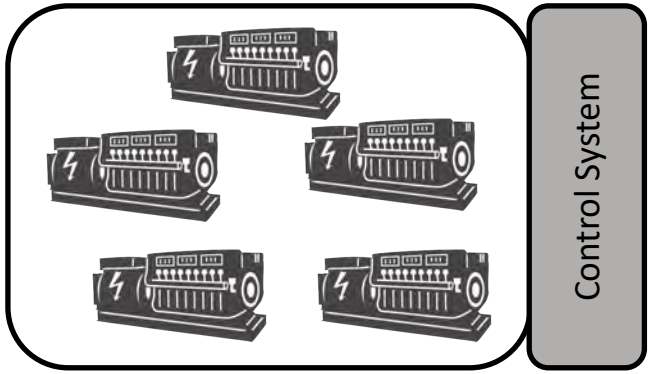
mFRR – manual Frequency Restoration Reserve

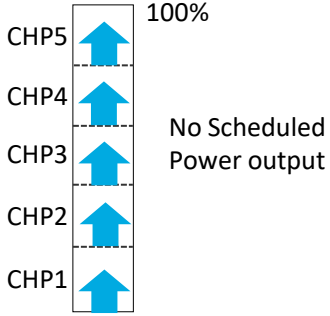


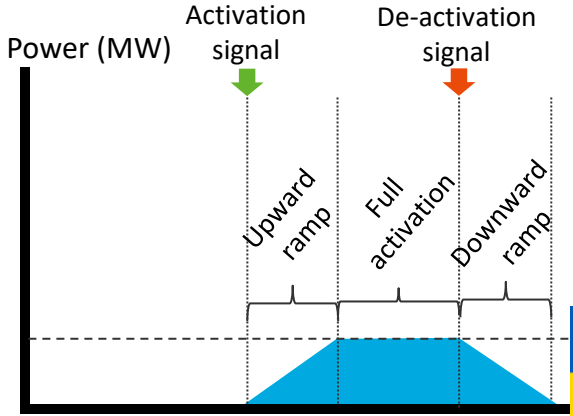




Aggregation bloc of 5 CHPs



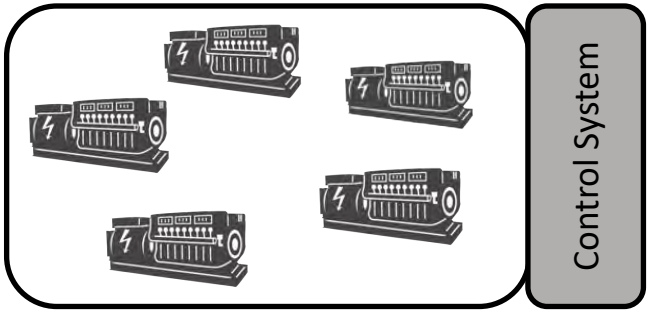




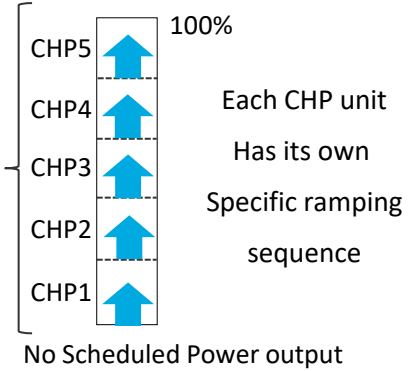
CHP – Combined Heat and Power Generation

mFRR – manual Frequency Restoration Reserve

Aggregation bloc of 5 CHPs

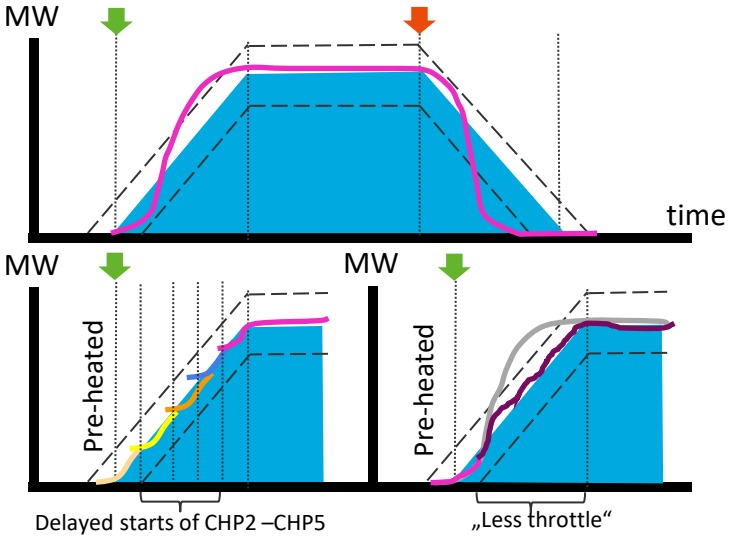


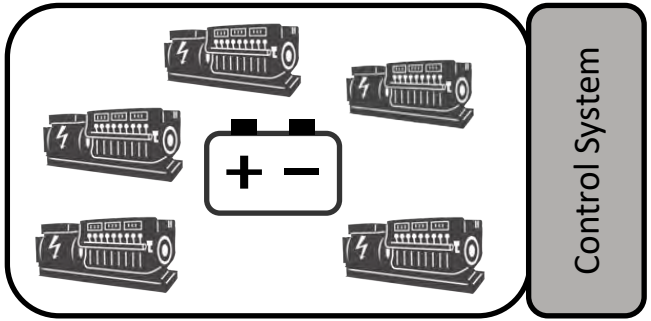
Control System



Each CHP unit
Has its own
Specific ramping
sequence

No Scheduled Power output





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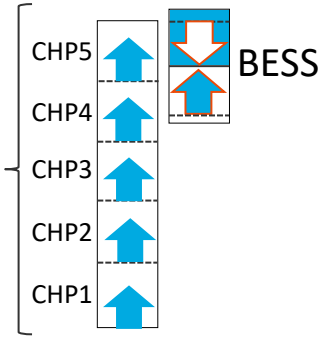
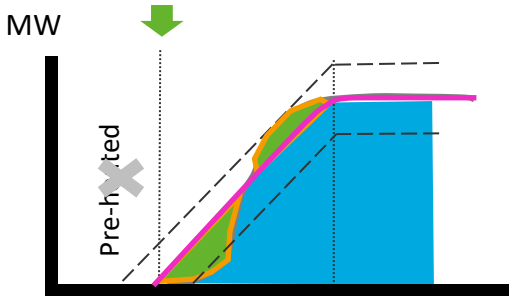


BESS



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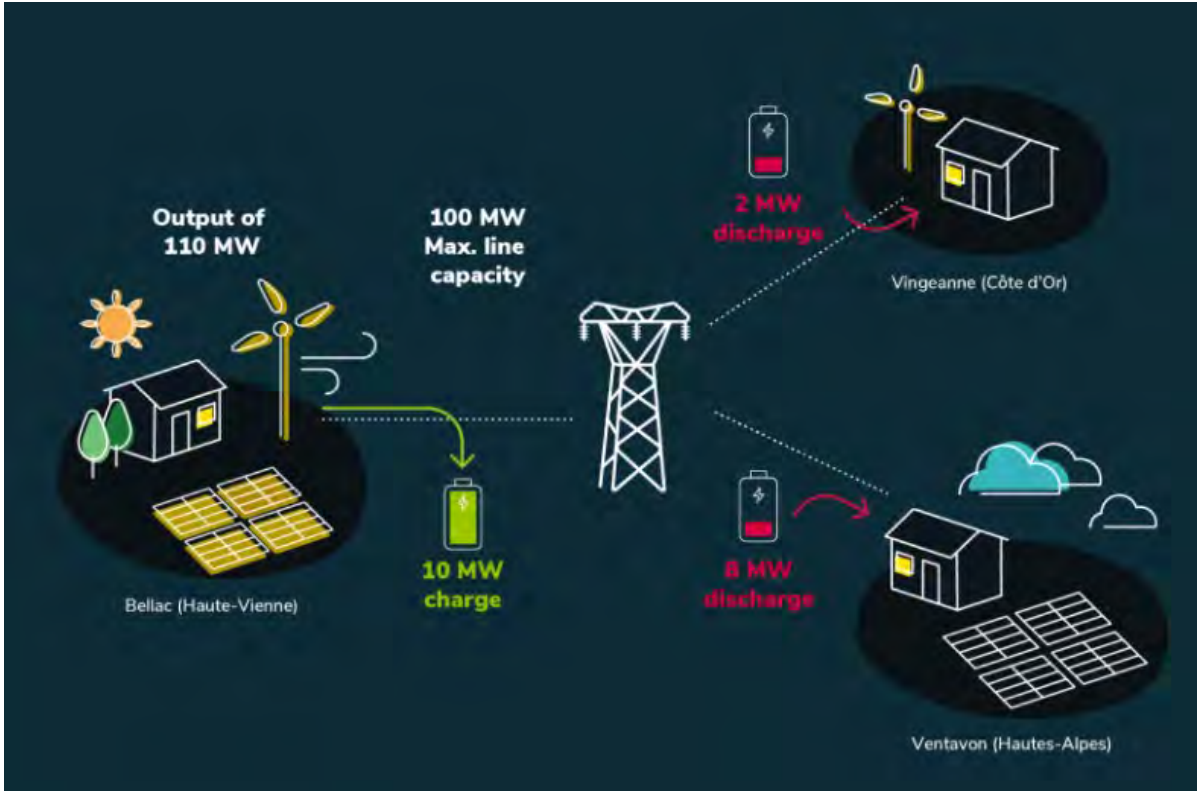
Use case virtual power line

Virtual Power Line – RTE (France), RINGO project



- RTE is piloting a system of software-controlled batteries known as RINGO. The first battery absorbs the excess local renewable-energy output, which is simultaneously released by another battery located in an area that needs it.
- With its 10 MW of storage capacity, tantamount to the output of 5 wind turbines, Ringo helps to prevent losses of renewable power and to curtail the construction of power lines.

https://www.rte-france.com/en/accelerate-energy-transition/rationalised-use-grid

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Retail customer perspective

New customer approach requires Smart meters

Galileo Ferraris
(italian scientist, † 1897)

Galileo Ferraris was an Italian university professor, physicist and electrical engineer, one of the pioneers of AC power system and an inventor of the Two-phase induction motor although he never patented his work..

Static electric meter with LCD

The electricity meter measures other secondary data:
- effective voltage
- effective current
- instant power
- maximum current
- cosϕ in phases

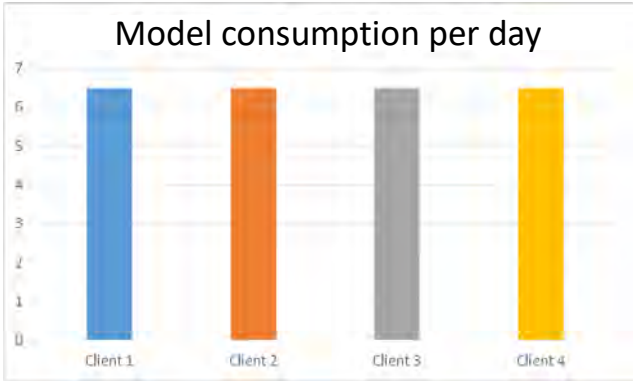
„Smart meter“ Continuous metering

AMM (Automated Meter Management)
- two-way communication
- automated meter reading

Other features such as
- Dynamic tariffs
- connection and disconnection of the supply point
- IT analytical support

Metering period vs. Continuous metering

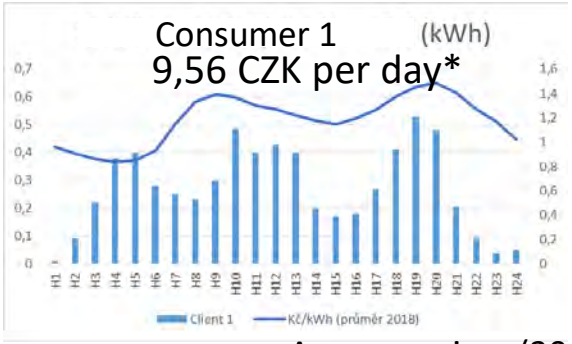
Model example – 4 Customer with daily power consumption of 6,5 kWh

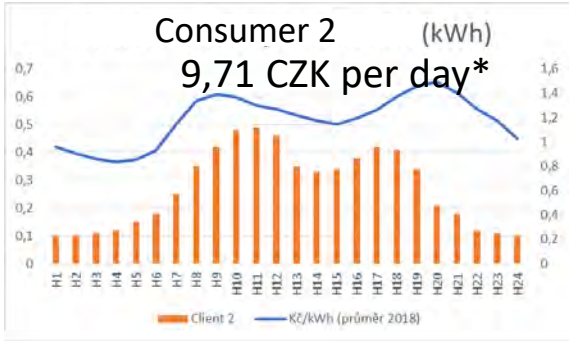


Cost for each client **9,53 CZK** per day
(power price 1,47 Kč/kWh)

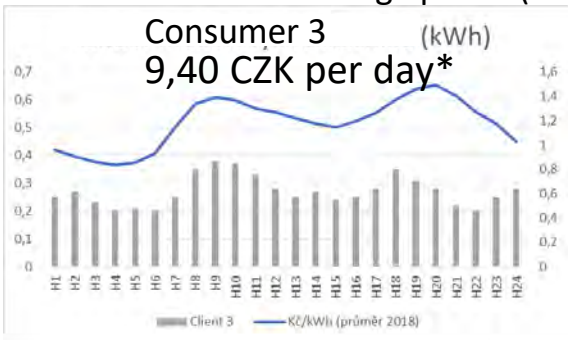
Extreme prices for trading hour (2018)

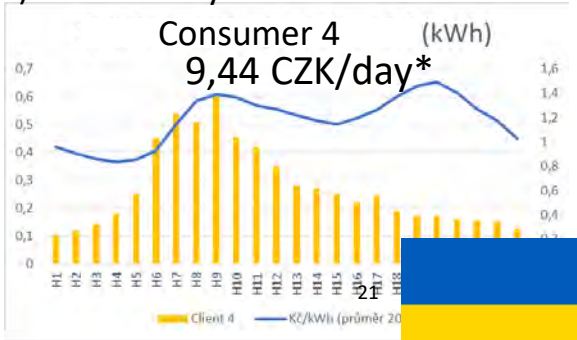
Min:	**- 0,9** Kč/kWh
Průměr:	1,2 Kč/kWh
Max:	**2,8** Kč/kWh





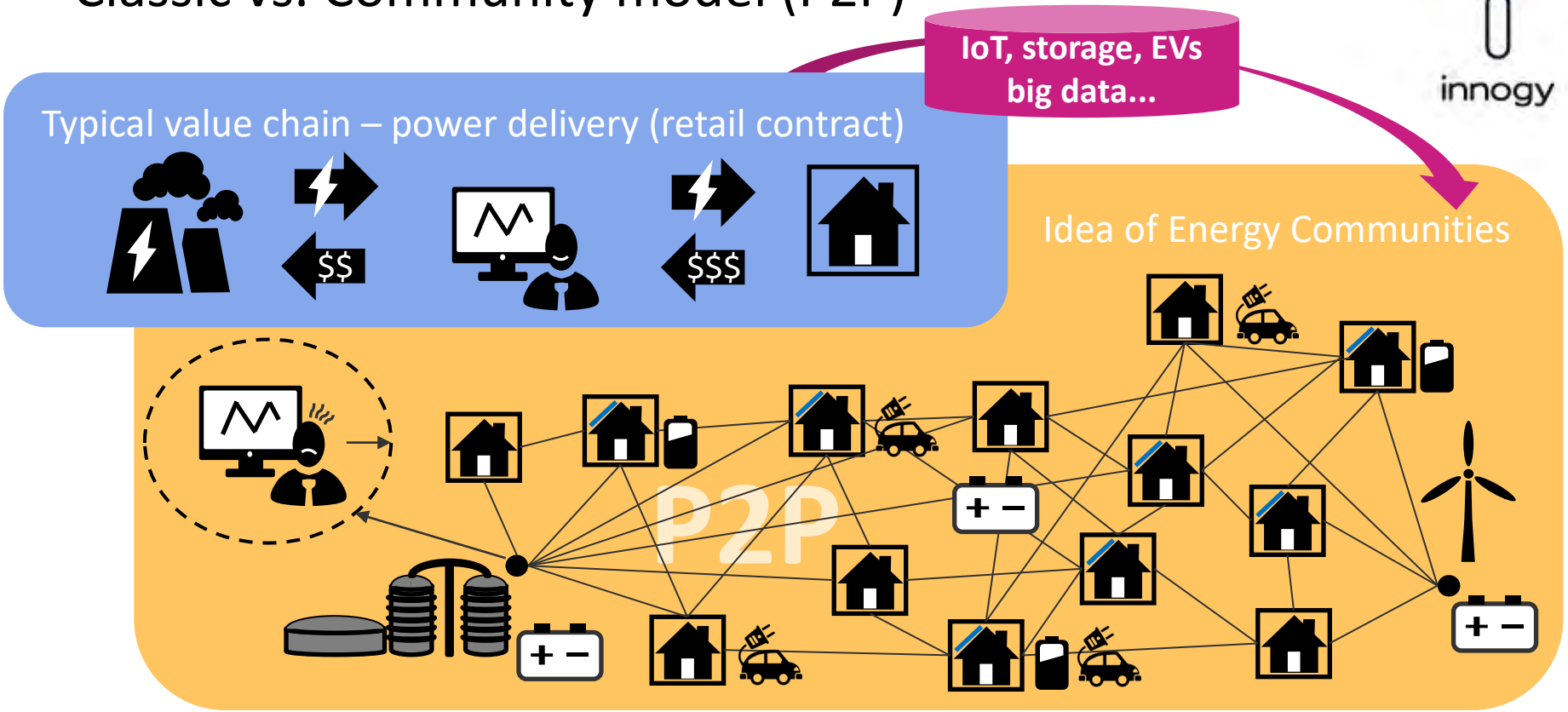
Average prices (2018) from CZ Day-Ahead market





*regulated grid charges/fees not included

Classic vs. Community model (P2P)

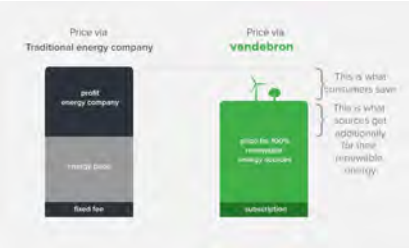


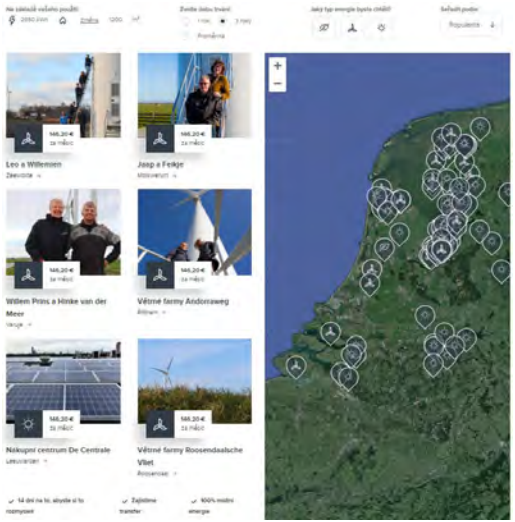
Examples of power suppliers using P2P approach
Vandebron a Powerpeers (Vattenfal/Nuon)

vandebron

od 2013

Vandebron is an energy platform with a mission
We bring the supply and demand of good energy together and offer innovative applications that allow you to use energy in a smarter way. In this way we work together towards 100% sustainable energy.

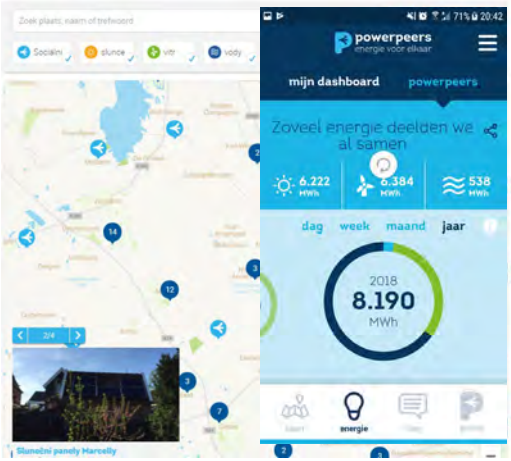




powerpeers
power to the people
VATTENFALL
NUON

od 2016

At Powerpeers you get green energy from other Powerpeers customers with solar panels. If they do not generate enough power, you can choose which local energy sources you want to supplement this with. For example from a solar park near you, a windmill from a farmer, your favorite sports club, or... whatever you choose!



Green Energy 1.0 and 2.0 from GOs to P2P

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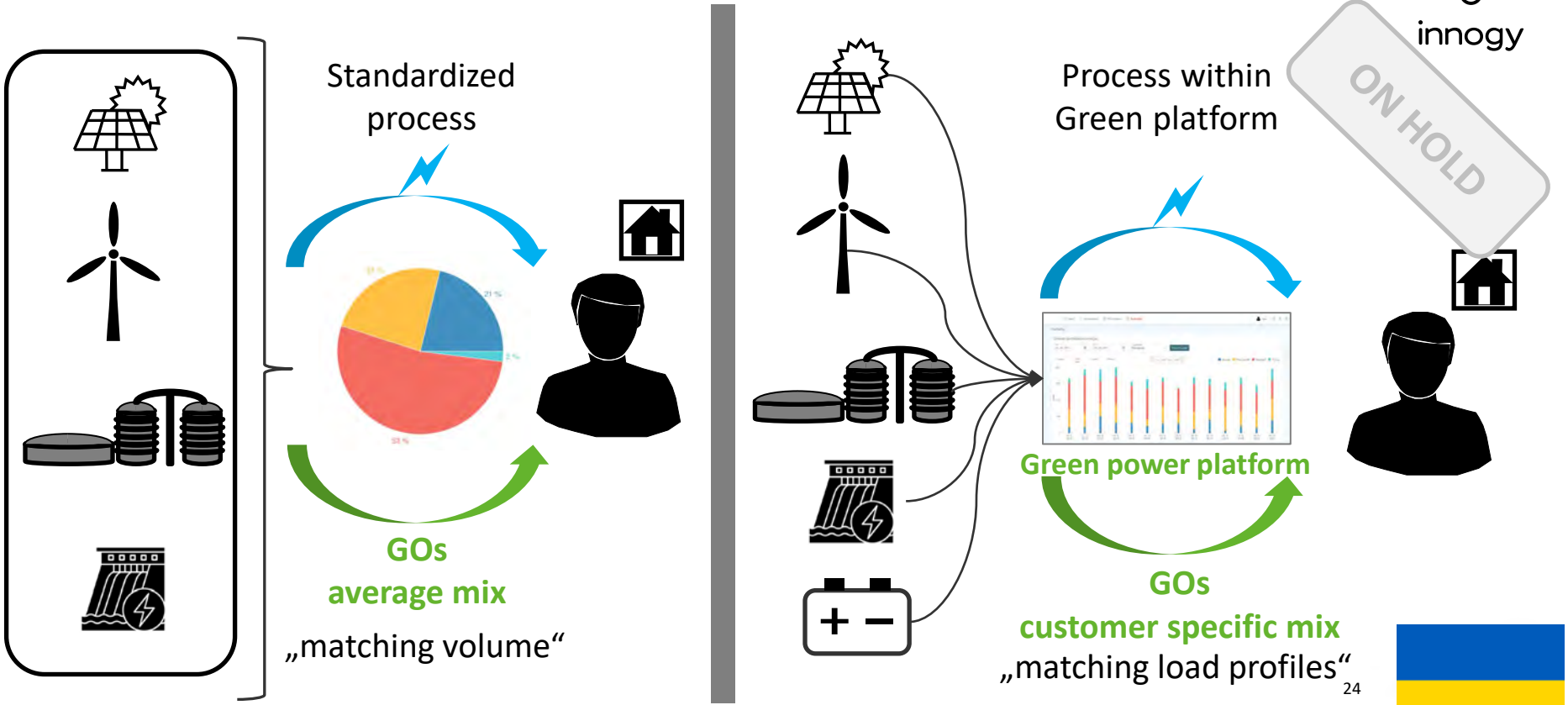
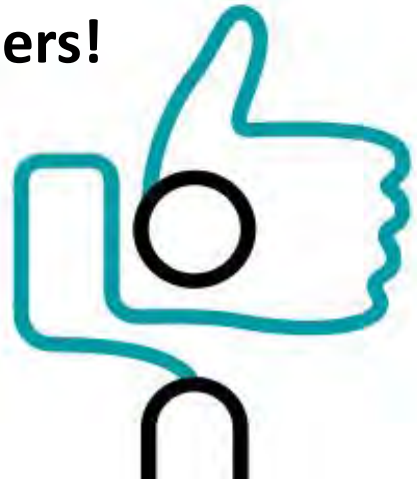


GOs – Guarantees of Origin

So then…what is the new role of power supplier in today´s energy transition?

Utility 's new role is more energy-service based.

Services need to be more consumer-tailored and designed for a wider range customers!



Thank you

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