



Virtual Power Plants key to unlock decentralized flexibility

BestRES workshop February 11th 2019

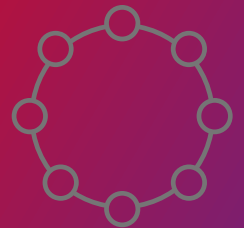
Elias De Keyser, Next Kraftwerke Benelux



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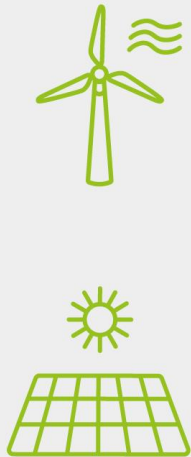
Why we need more flexibility



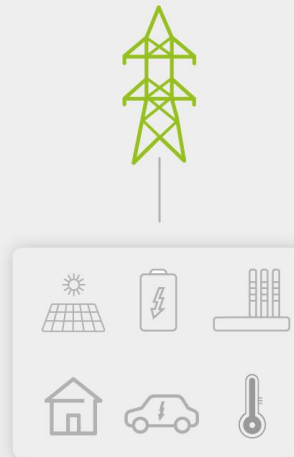
THE ENERGY LANDSCAPE IS CHANGING

- Three ‘megatrends’ in the energy sector:

Rise of intermittent generation



Rise of decentralised power production



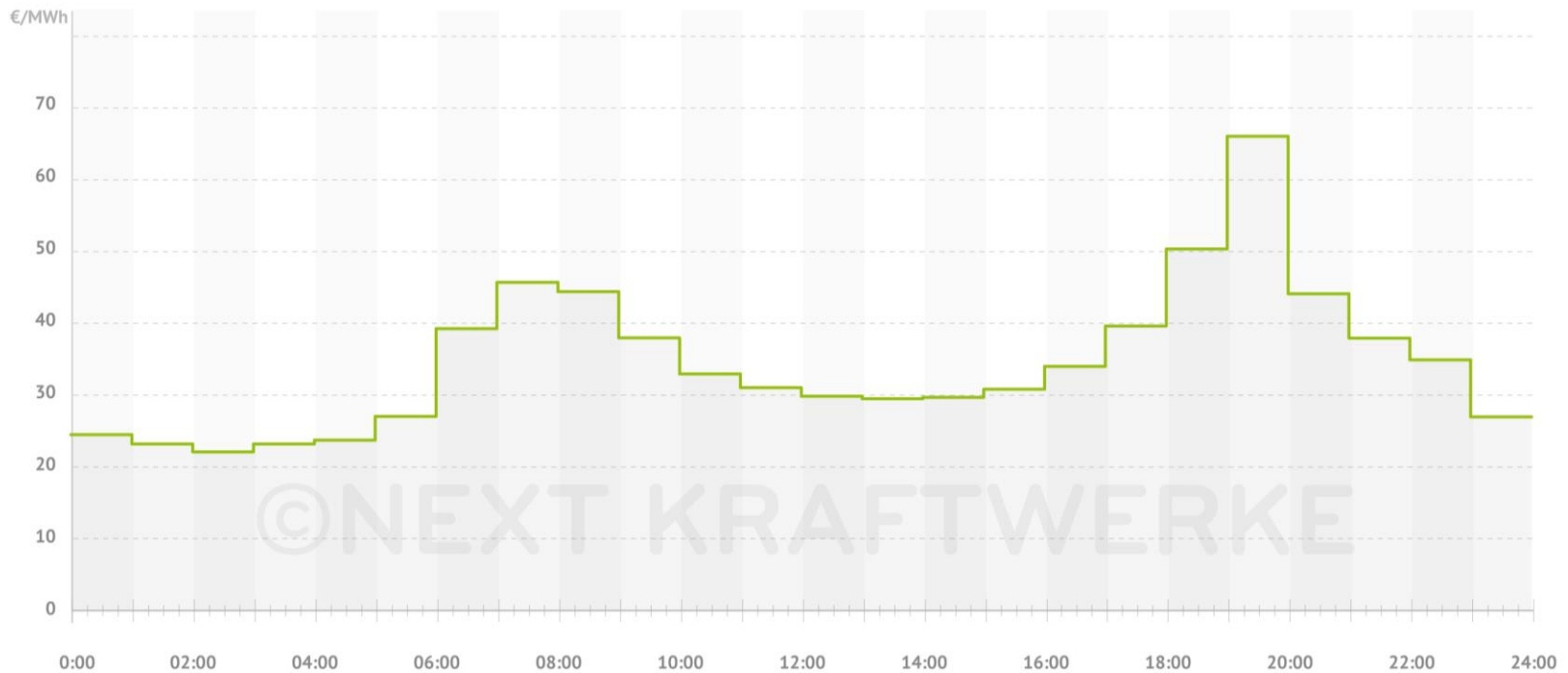
Regionalisation of the electricity sector



A STABLE ELECTRICITY GRID

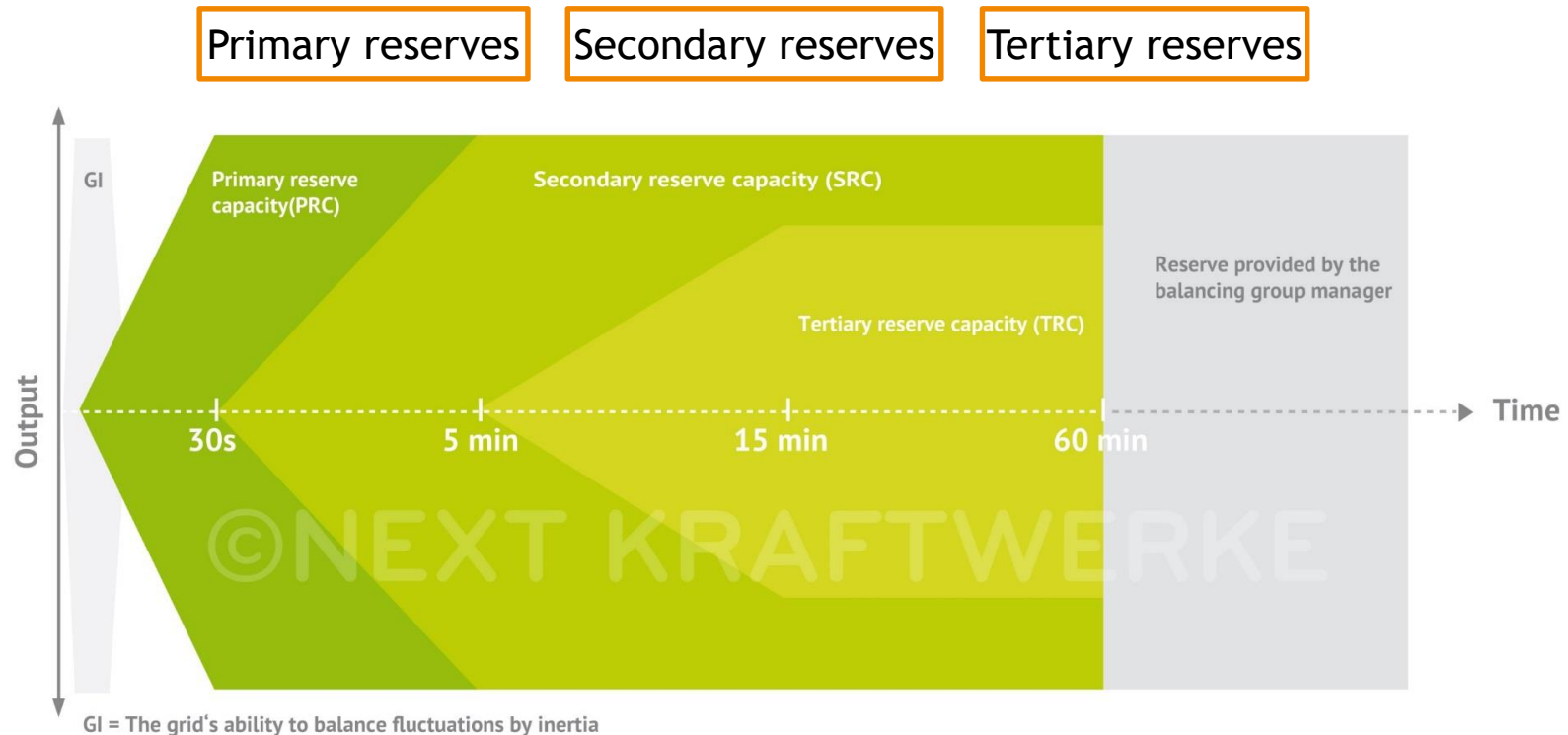
- In every AC-grid, a stable frequency is primordial
- Unwanted energy exchanges with neighbouring control zones are to be limited
- National grid operators are responsible to safeguard the balance
 - Ensure access to the grid to accommodate liquid day-ahead and intraday markets
 - Enforce balanced positions via BRP role
 - Organise markets to procure balancing power: FCR, aFRR, mFRR

MAKING SUPPLY MEET DEMAND



markets organized by independent market operator (EPEX, NordPool)

RESTORING THE BALANCE WHEN IT GOES WRONG



Very fast common European reserves to stabilize frequency deviations.

Fast automatic reserves to restore the balance of the control area.

Slower manual reserves to free up aFRR.

THE KEY: FLEXIBILITY

Flexible *adjective*

flex·i·ble | \ 'flek-sə-bəl \

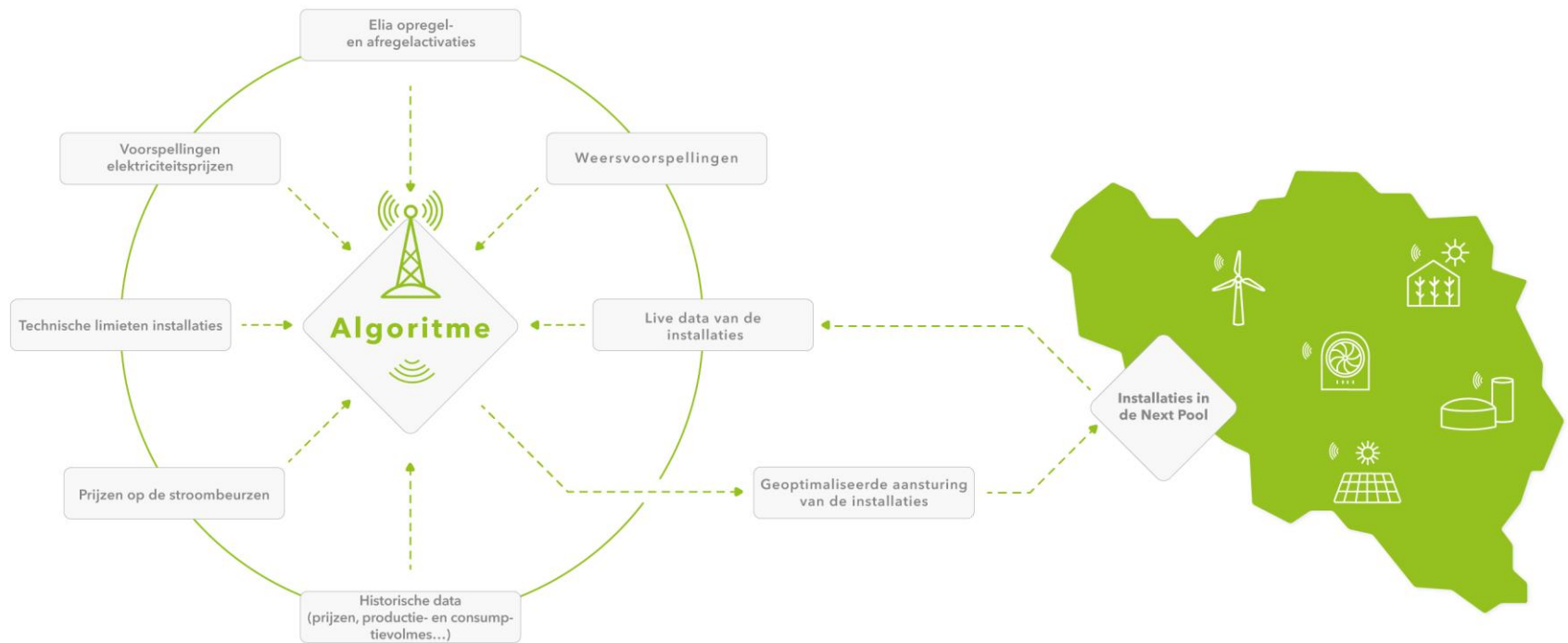
characterized by a ready capability to adapt to new, different, or changing requirements

DECENTRALISED RENEWABLES & FLEXIBILITY ARE THE SOLUTION NOT A TREATH

- Reduce imbalances of renewables by pooling
- Provide system services with small-scale flexibility

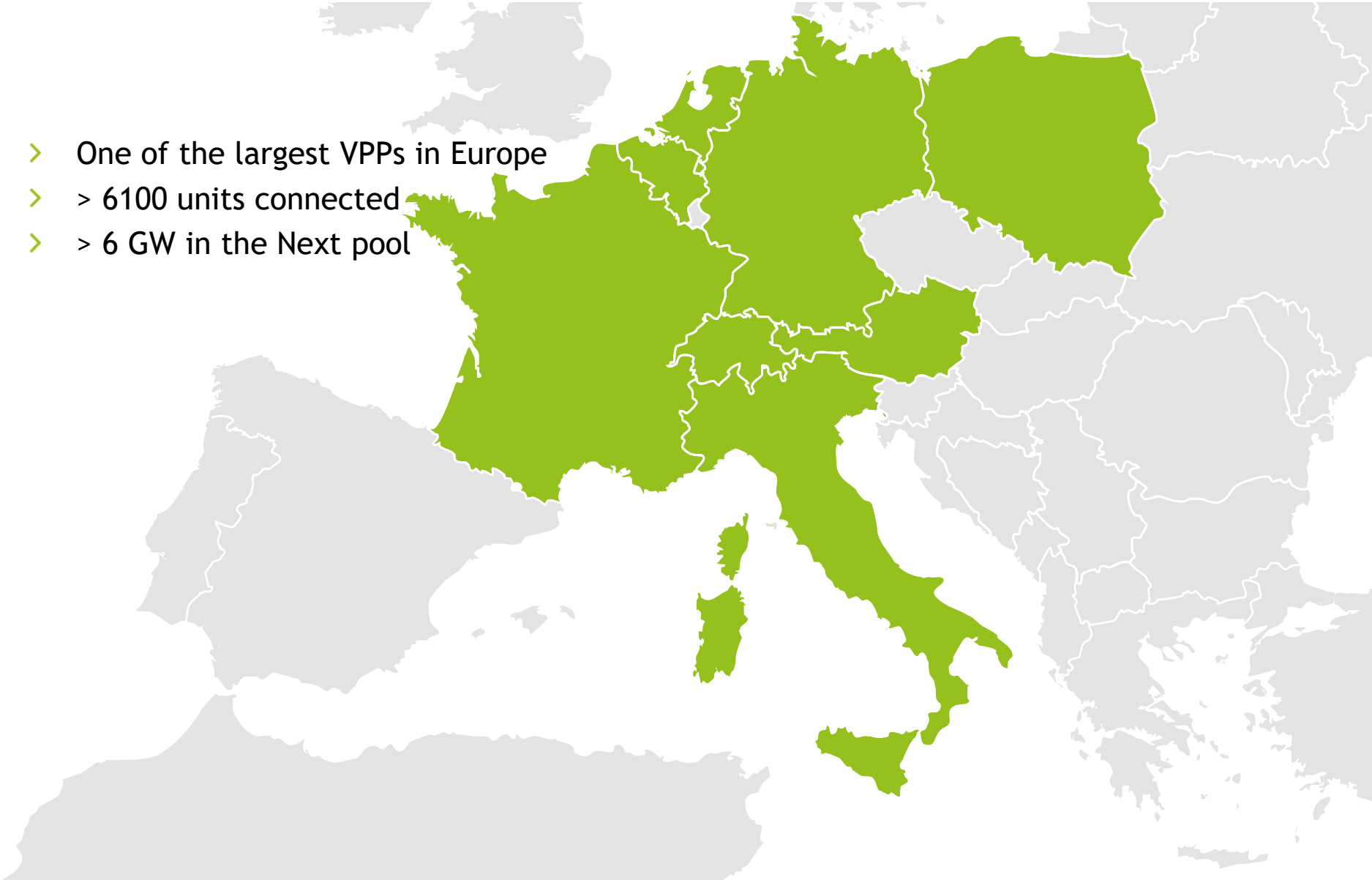


AGGREGATION BY DIGITALISATION



A LEAN PLATFORM ALLOWS SCALING

- > One of the largest VPPs in Europe
- > > 6100 units connected
- > > 6 GW in the Next pool



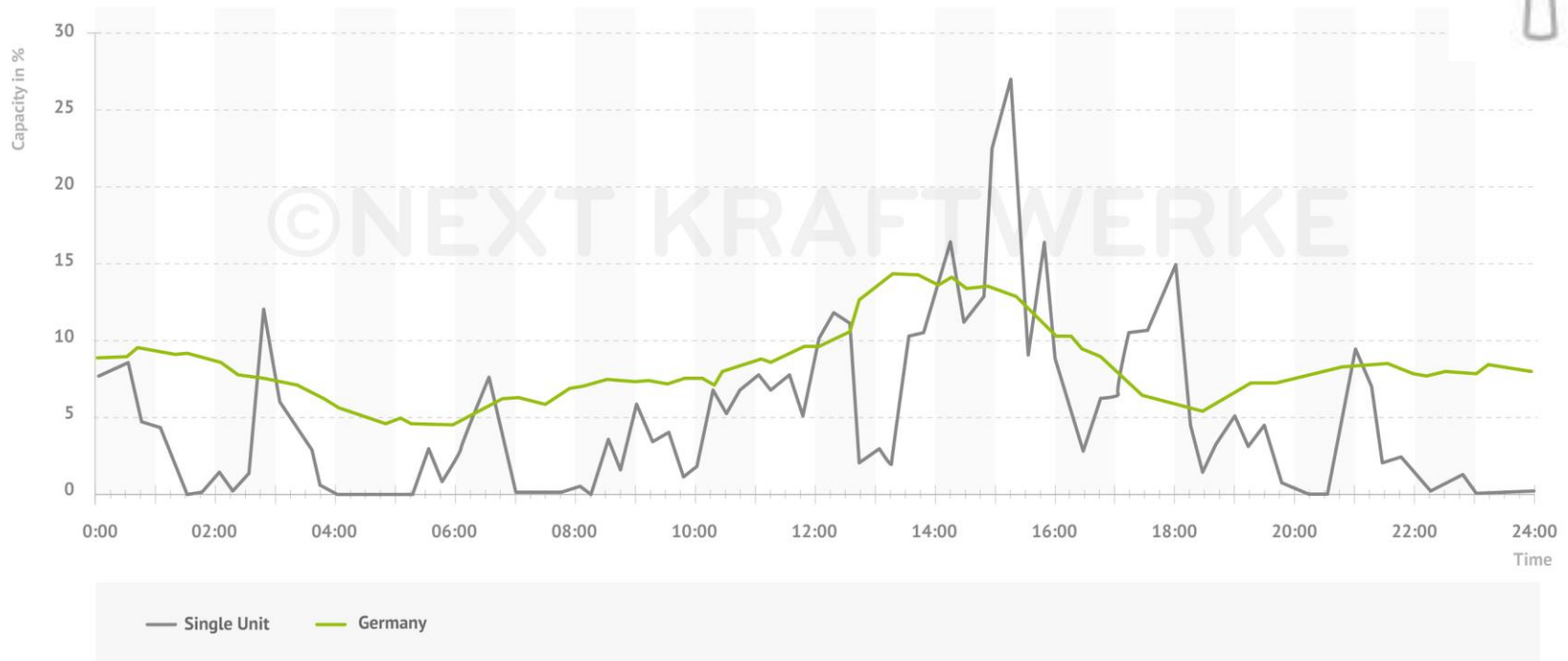


SOME EXAMPLES

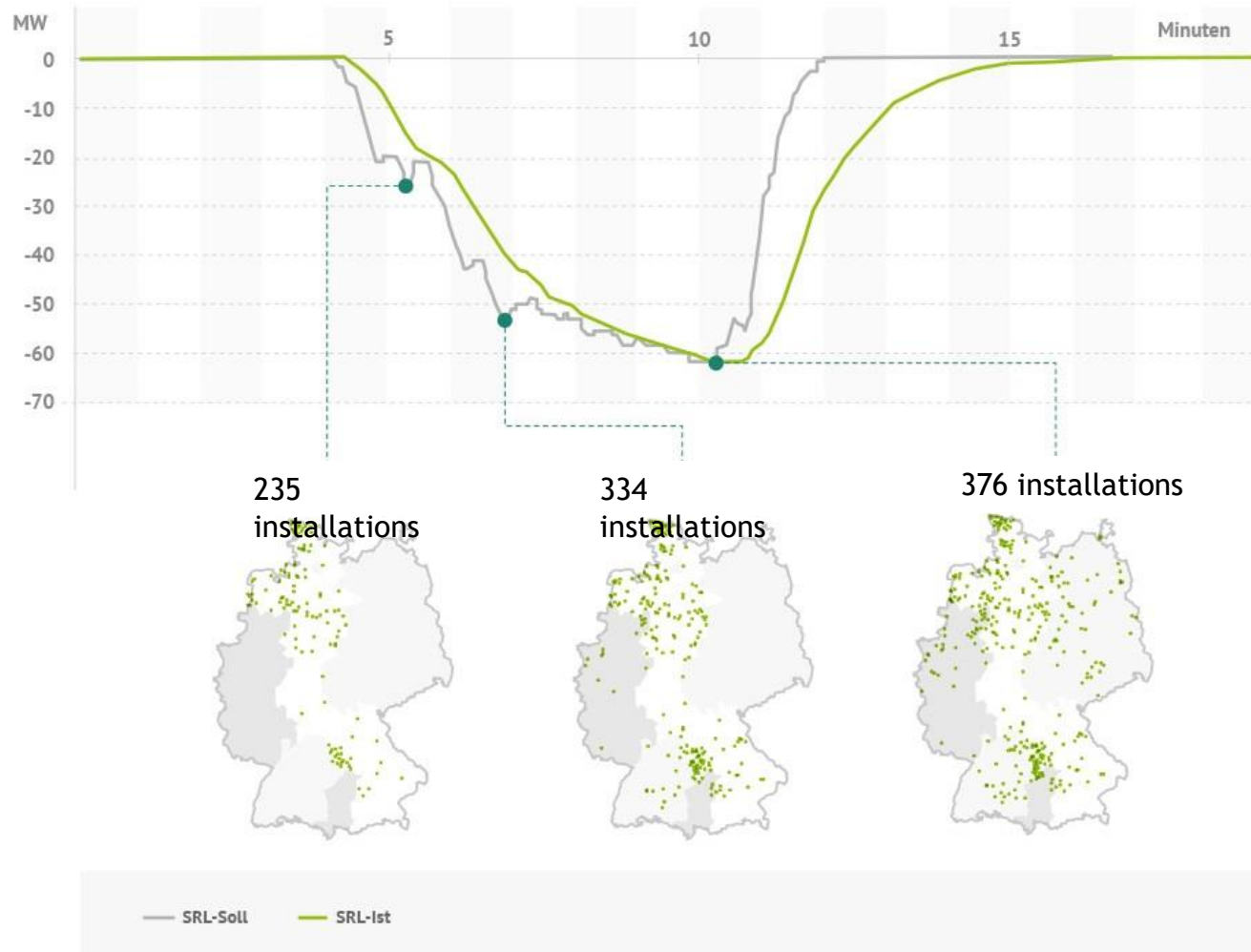
RES POWER TRADING ON SPOT MARKETS

Typical Feed-in of Wind Power

on a given day



ANCILLARY SERVICES (SECONDARY RESERVE)



FCR IN BELGIUM



- 2 MW - 2 MWh battery
- The site:
 - Factory
 - Local wind production
- Applications:
 - FCR
 - Self consumption wind
 - Imbalance price steering

PARTICULARITIES OF THE BELGIAN MARKET



- Usually long term PPAs
- Regional subsidy schemes
- Solar PV mostly small-scale
- Ancillary service markets not fully opened
- Rules are biased towards certain technologies
- Tedious prequalification process



Conclusion

WRAP UP

- THE PROBLEM: electricity system requires flexibility, conventional providers are disappearing
- THE SOLUTION: we can use decentralized renewable assets to provide that flexibility
- THE ENABLER: the VPP clusters them and automatically dispatches

FOLLOW US ONLINE!



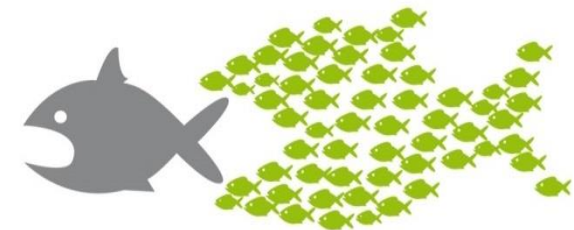
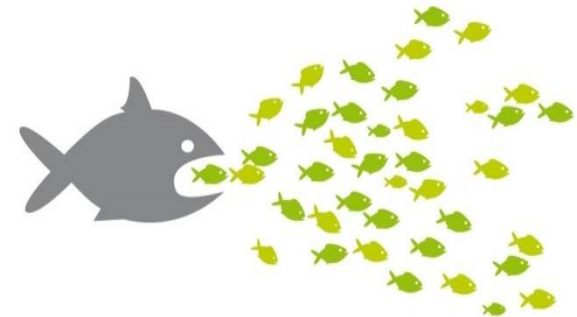
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EXTRA

TECHNOLOGY PLATFORM



Remote controller

Interface with installations
Monitor production /
consumption
Relay dispatch instructions



Communication

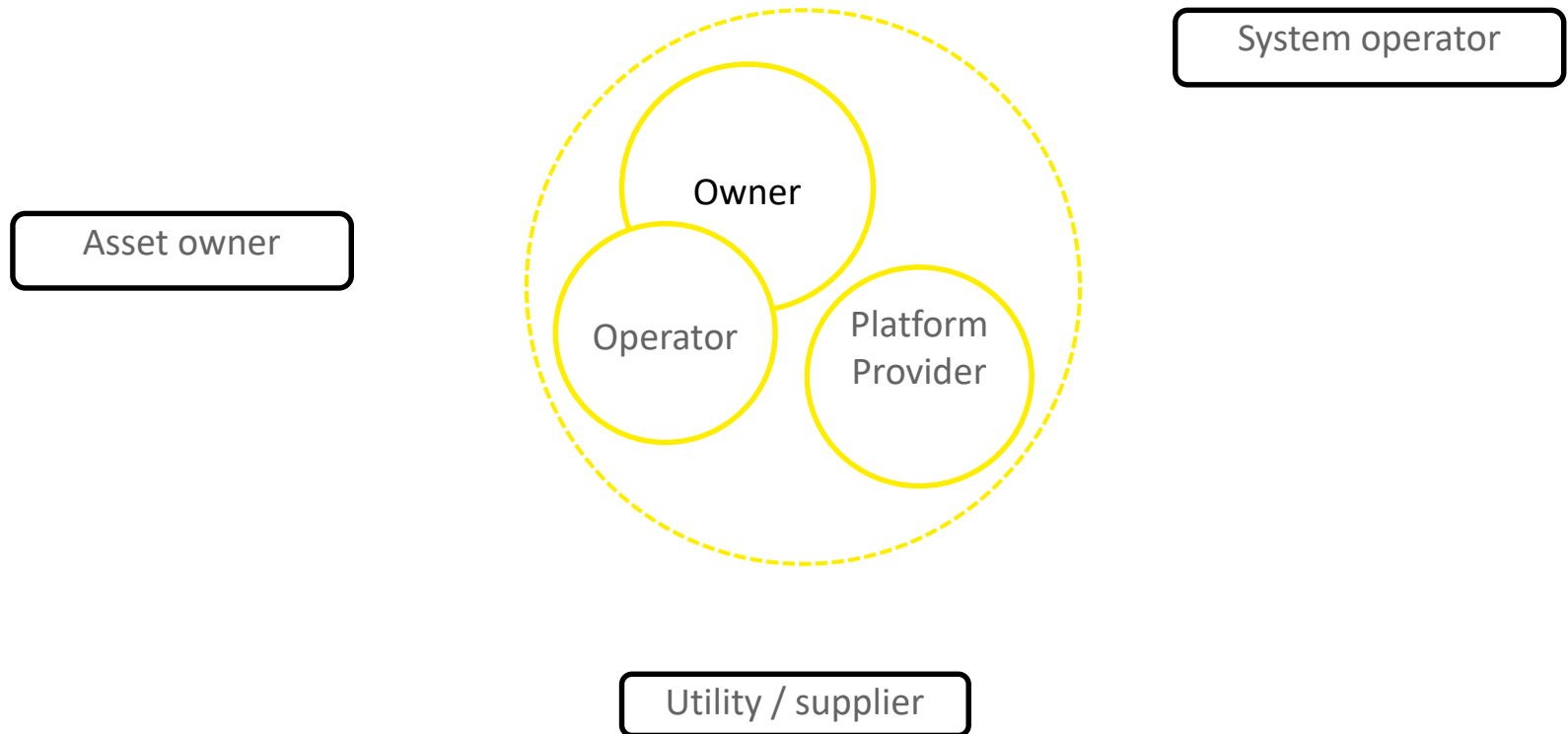
Link between installation and
VPP
Fast and secure
Cellular, built-in electricity
lines, internet



Algorithms

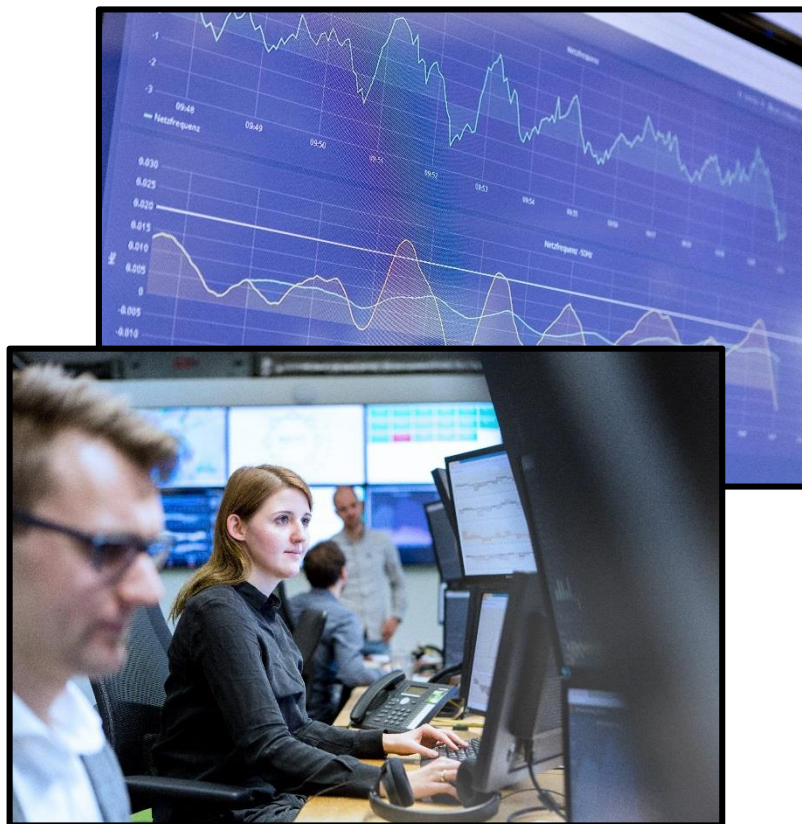
To monitor and forecast aggregated
production and consumption
Dispatch installations optimally

DIFFERENT VPP PLAYERS



THE BRAINS AND THE HANDS OF THE VIRTUAL POWER PLANT

Brains: **algorithms** and experienced traders



Hands: the **Next Box**

