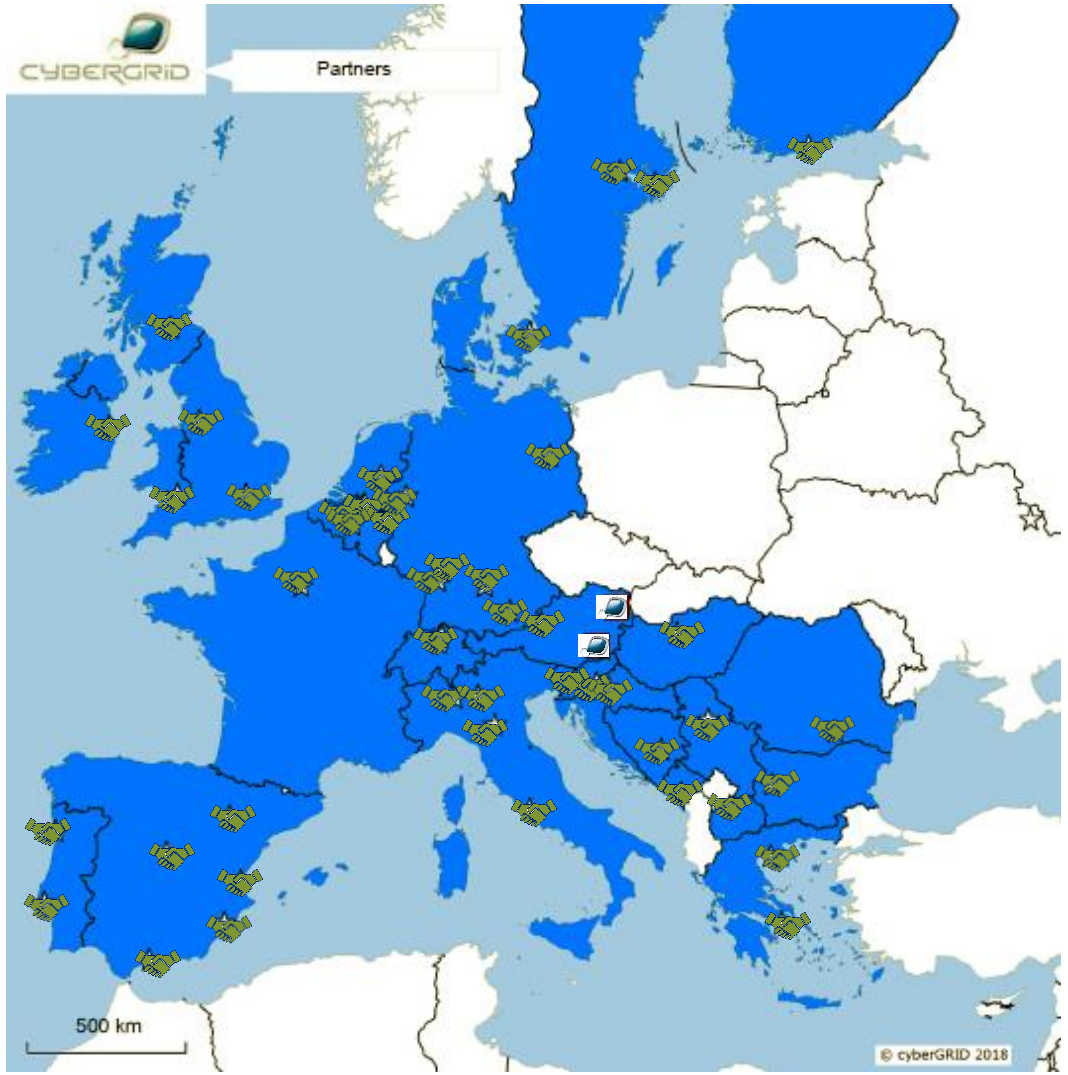
A Link for Flexible Energy Resources

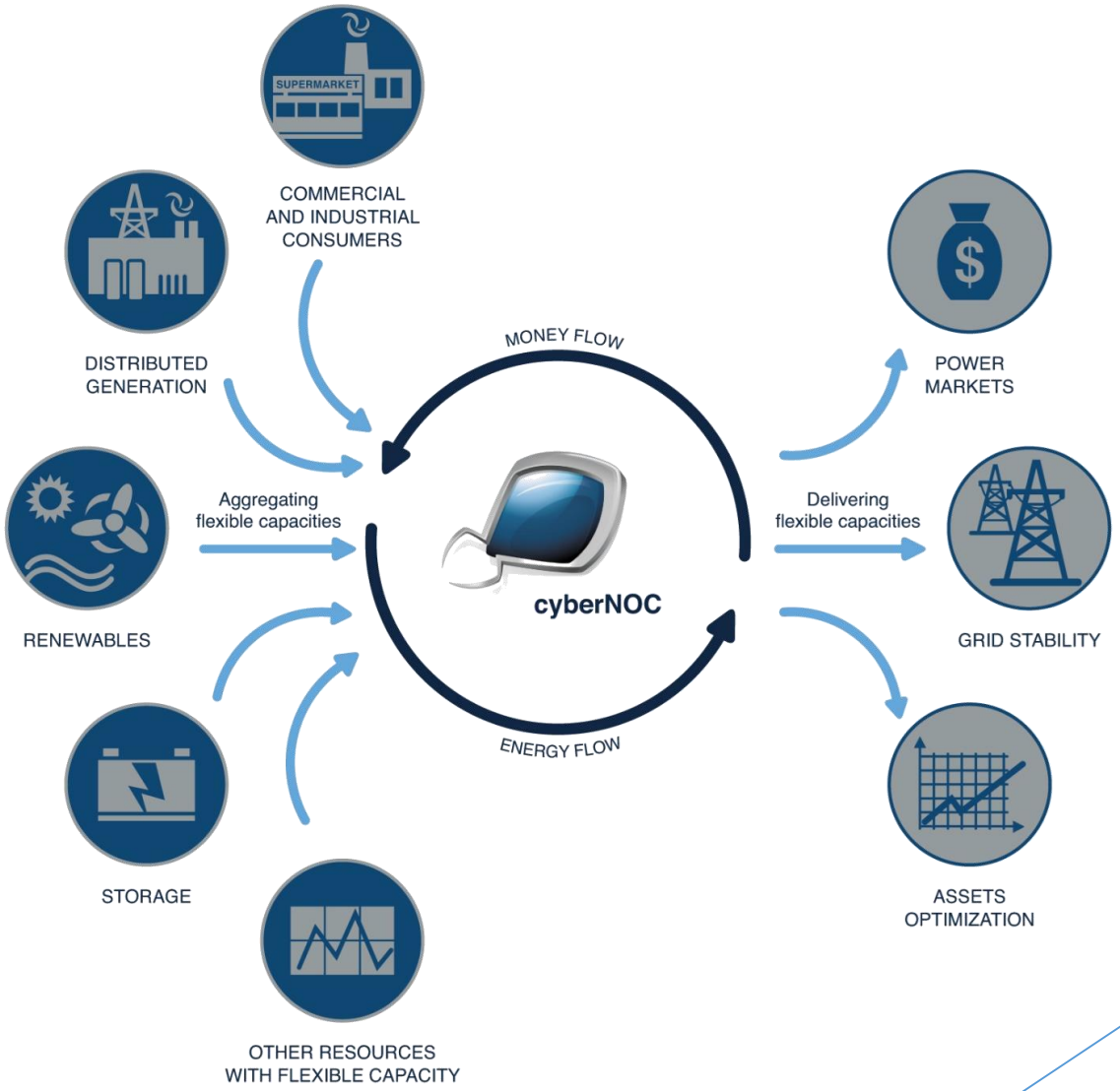
Mag. Marko Svetina, CEO

About cyberGRID

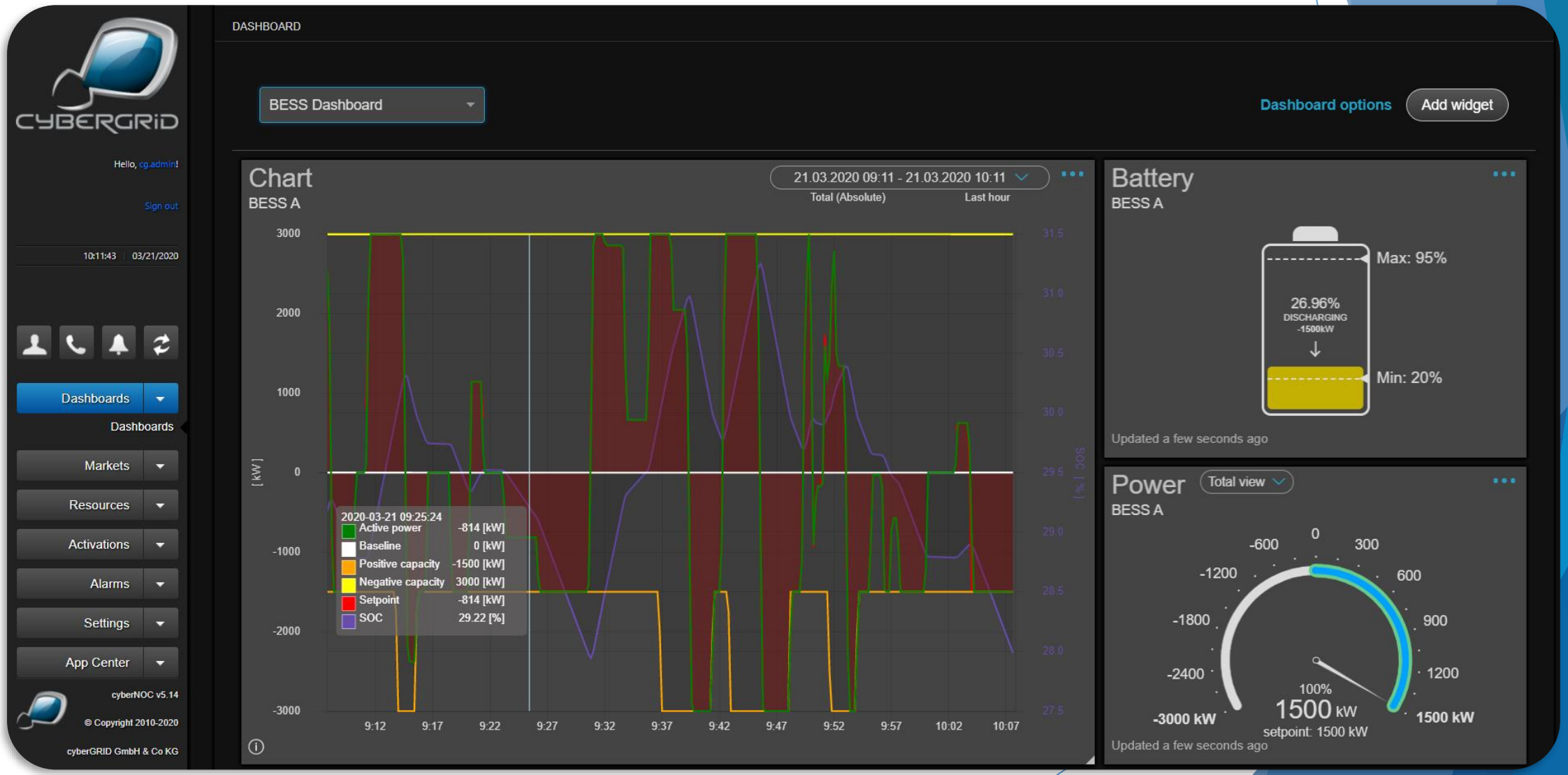
- Utility partner since 2010
- Toshiba period 2012-2015
- Innovation period 2015 -2018
  - Over 120 partners across Europe
  - Our technology cyberNOC enables the **integration** of loads, renewable energies, storage devices, and energy markets.
- Commercialization 2018 –
- Patent application 2019/20



Leading Innovation Company



Support for large- and small-scale BESS



Flexible energy has many uses

Commercial and Industrial (C&I)	Transmission System Operators (TSO)	Distribution System Operators (DSO)	Communities (e.g. owners of PV, EV)	Suppliers, Traders, BRPs
• RES use optimization	• Primary reserve	• Voltage levels	• P2P trading and market access	• Backup Capacity
• Peak shaving	• Secondary reserve	• Power quality	• Integration and optimal use of RES	• Intraday Trading
• Power quality	• Tertiary reserve	• Reactive power	• Energy independence	• Data Services
• Clean emergency supply	• Cross border	• Integration of RES		
• Tariff optimization	• Re-dispatch			

C&I Use Case: the Ngen Project, Slovenia

Meet one of the largest operational energy storage systems in Europe.

C&I Use Case: the Ngen Project

- STEEL MILL

2019:
22.2MWh /12 MW Tesla Batteries

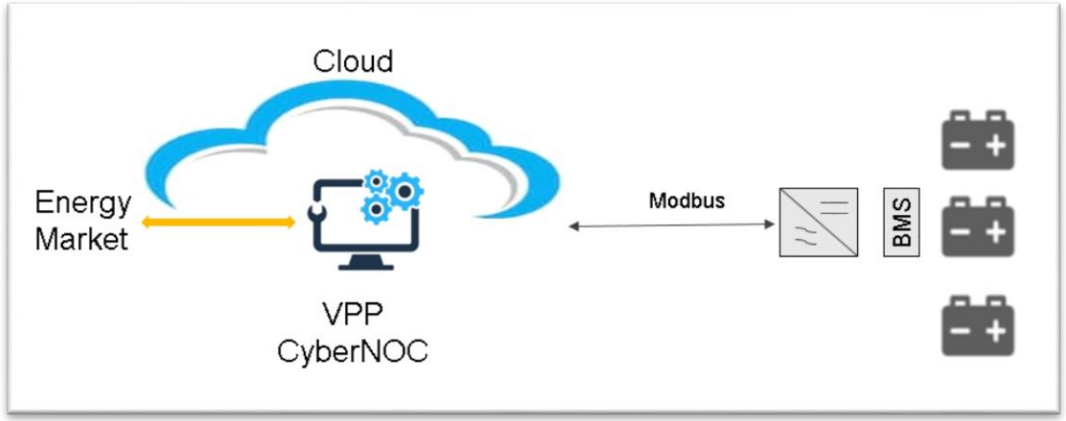
+

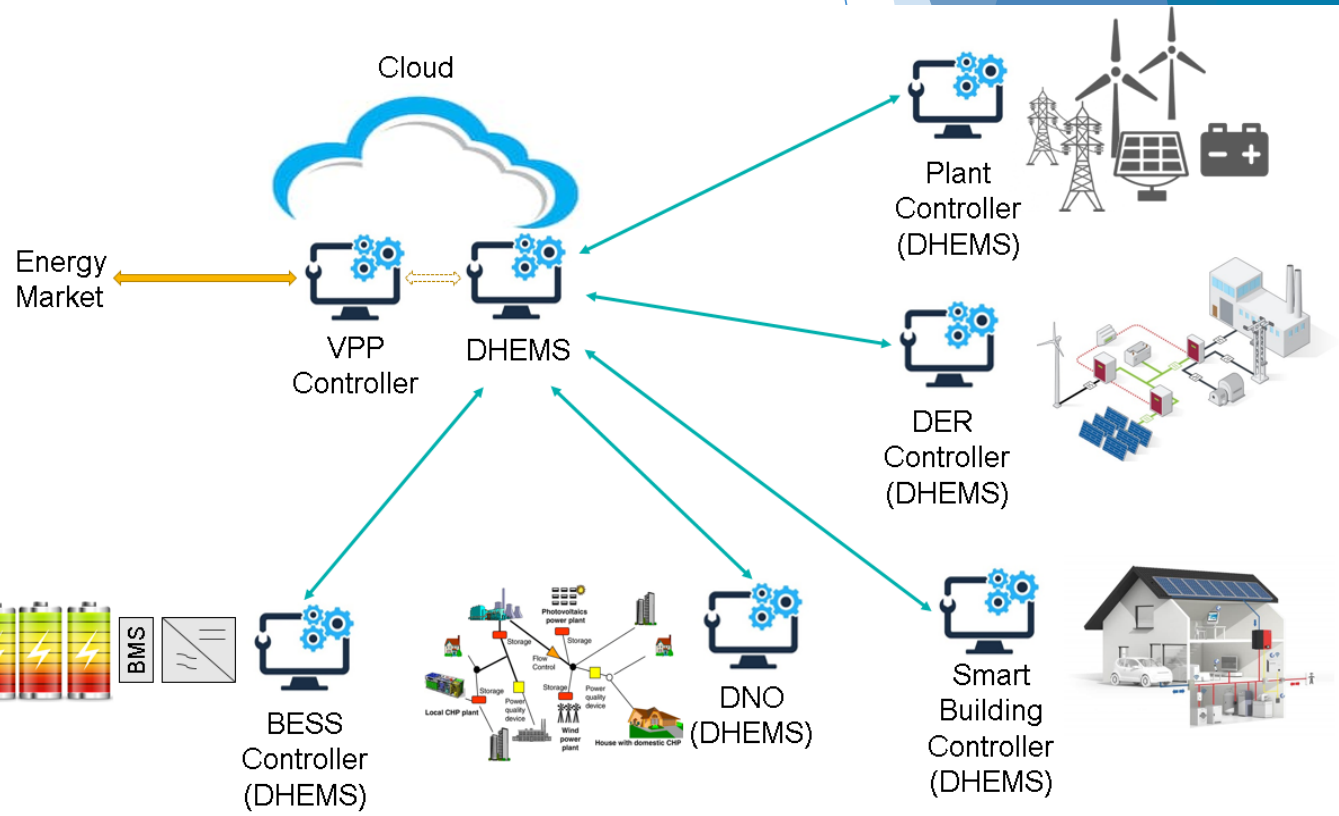
cyberGRID software

Flexible energy has many uses

TALENT

COST EFFECTIVE TECHNOLOGICAL DEVELOPMENTS FOR ACCELERATING ENERGY TRANSITION





This Project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement N. 864459

CROSSBOW Cross border management of variable renewable energies and storage units enabling a transnational Wholesale market

This Project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement N. 773430

BESS integration to the Intraday SPOT market ensures **best results** to even the **most demanding balancing services**

Deployment and adoption of IoT standards and platforms

Accelerate a wider deployment and adoption of IoT standards and platforms in smart homes and buildings in Europe and development of secure, cost-effective and sustainable IoT ecosystems and related business models.^

Energy apps, services and connected devices and appliances

Increasing number of energy apps, services – energy (ex: building energy efficiency, electrical mobility, renewable integration) and non-energy (comfort, convenience, security, privacy) - and connected devices and appliances.

User acceptance and demonstration of concepts

Validation of end user acceptance, as well as demonstration of viable concepts that ensure privacy, liability and trust in connected data spaces.

Marketplace for news services in EU

Demonstrate that IoT platforms lead to a marketplace for new services in EU homes and buildings with opportunities for SMEs and start-ups.

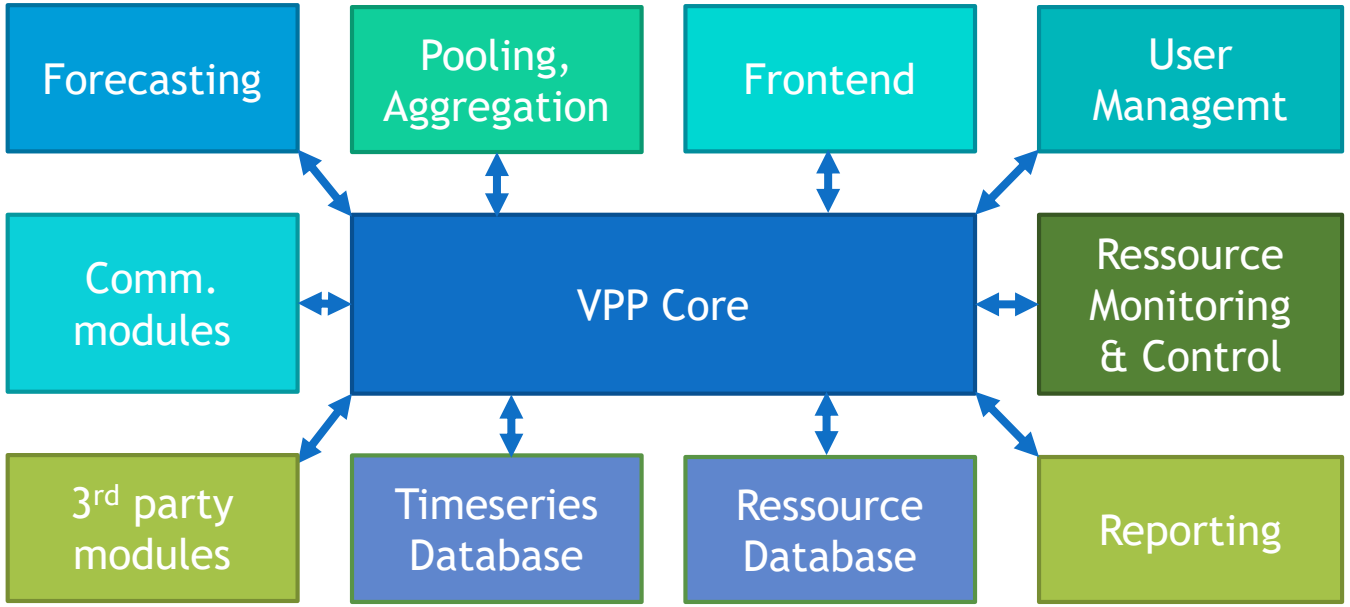
Increase the use of renewables & energy efficiency

Contribute to increase the use of renewables and energy efficiency, offering access to cheaper and sustainable energy for consumers and maximising social welfare.

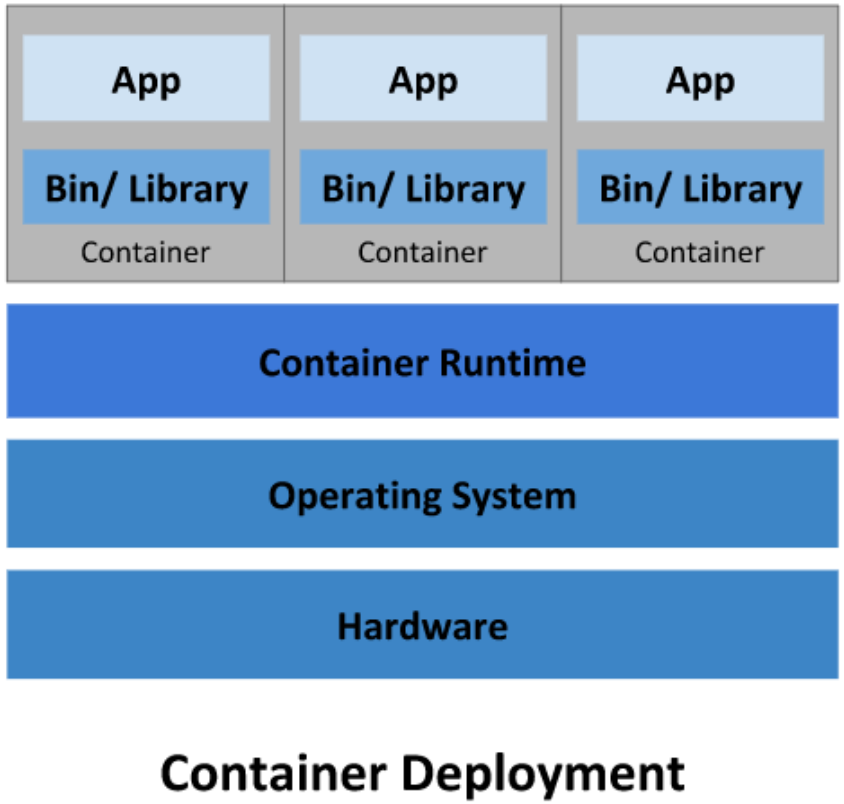
This Project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement N. 857237

Modular Architecture

- cyberGRID's new Virtual Power Plant (release 5) has a modular design based on microservice architecture, simplifying upscaling and integration of 3rd party services and increasing performance.



Stability, Scalability, Redundancy



Container Deployment

- cyberGRID's software is founded on cutting edge micro-service architecture based on Kubernetes (open source since 2014)
- Each functional module runs in an individual container, being monitored and managed
  - Self-healing
  - Secret and configuration management
  - Automatic scaling
- Service discovery and load balancing
- Storage orchestration
- Automated rollouts and rollbacks
- Automatic bin packing

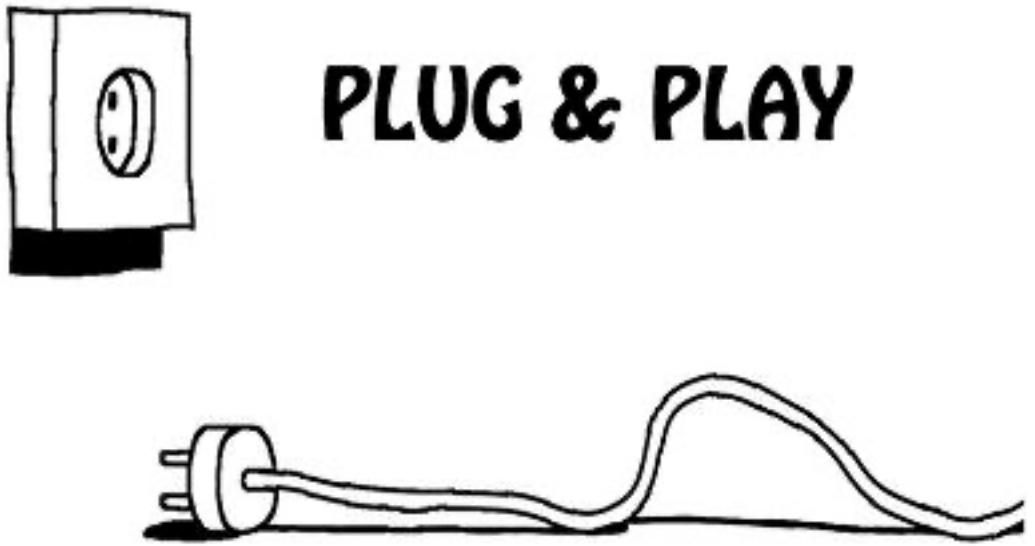
Source: kubernetes.io

cyberNOC

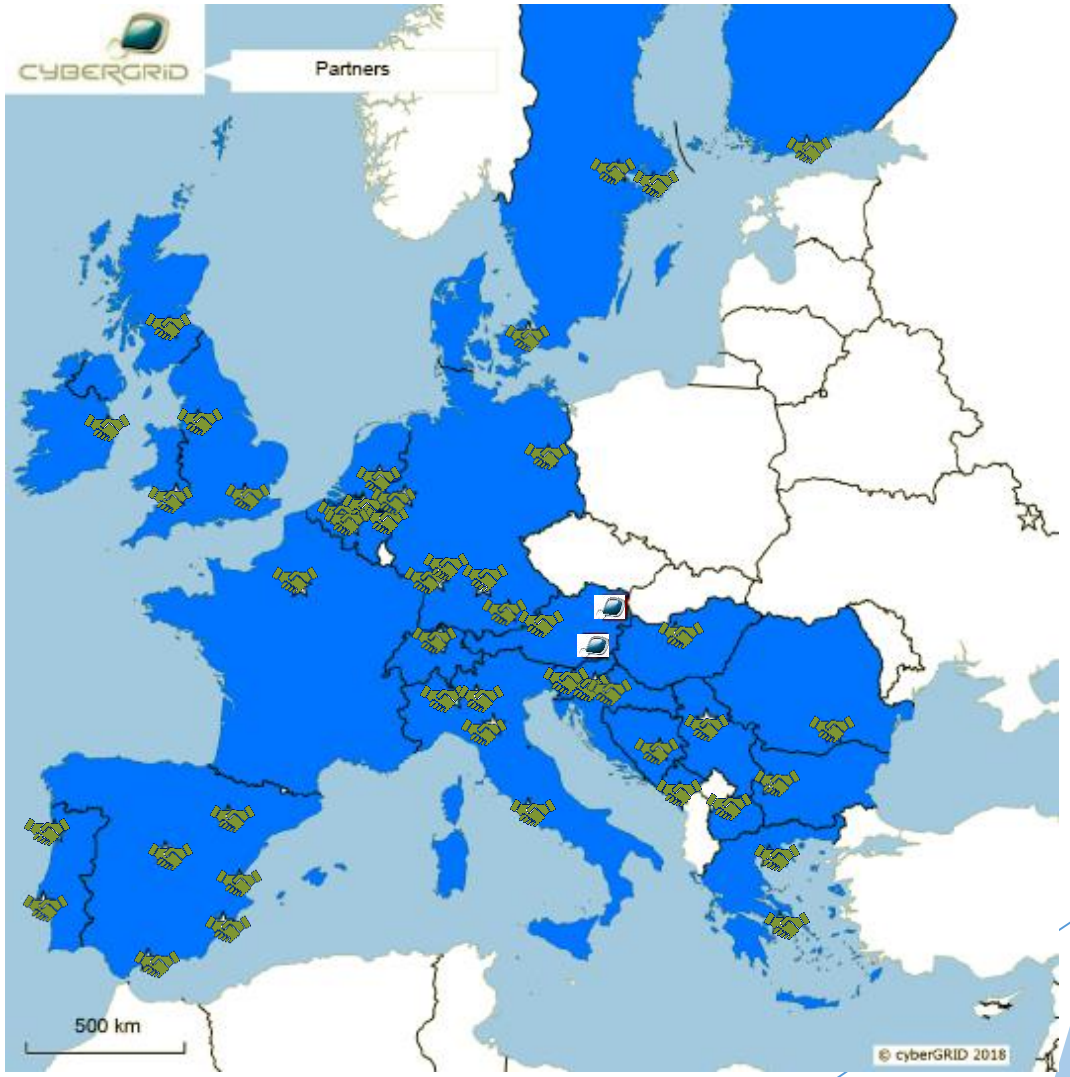
- Proven top-end proprietary technology based on flexible, modular and scalable systems → efficient integration combining cyberNOC, utility and 3rd party modules
- Fully audited by Toshiba Corporation in Q1 2013 → M&A, closing on 30.6.2013
- Eles TSO audit in Q4 2013 → Tertiary reserve provision granted
- APG TSO audit in Q2 2015 → Tertiary reserve provision granted
- Participation in Austrian aFRR system since Q2/2016
- Prequalification for new Slovenian aFRR (ICCP) and mFRR (EccoSP) system until end of 2019

Battery storage within EU Energy markets

Major brands



Internationally



Across markets

Commercial and Industrial (C&I)	Transmission System Operators (TSO)	Distribution System Operators (DSO)	Communities (e.g. owners of PV, EV)	Suppliers, Traders, BRPs
• RES use optimization	• Primary reserve	• Voltage levels	• P2P trading and market access	• Backup Capacity
• Peak shaving	• Secondary reserve	• Power quality	• Integration and optimal use of RES	• Intraday Trading
• Power quality	• Tertiary reserve	• Reactive power	• Energy independence	• Data Services
• Clean emergency supply	• Cross border	• Integration of RES		
• Tariff optimization	• Re-dispatch			

TODAY'S MARKETS AND TOMORROW'S ENERGY ASSETS

cyberGRID provides the link

cyberGRID's award-winning* **software** supports our partners in deploying one of Europe's **largest fleets** of utility-scale **battery storage** - providing a link **between** energy assets and electricity markets to **secure** investments and reduce payback periods.

www.cyber-grid.com

*2019 Network Power Innovation Award from E.DSO & ENTSO-E