SUCCESS CASE 19.2024

O-One (Ores Operation Network Expert)

DYNAMICALLY ADJUSTING THE CONNECTION CAPACITY OF DECENTRALISED PRODUCTION TO MAXIMIZE THE INJECTION OF RENEWABLES

THE CHALLENGE

In many distribution systems, the increasing penetration of decentralised production can lead an increasing risks of **local and punctual congestion**, especially at times characterized by high wind production and low demand. This can speed up the ageing of devices, such as transformers, and increase the likelihood of load shedding due to the tripping of circuit breakers. As a consequence, there is a need to **dynamically adjust the connection capacity of decentralised production** to maximise the injection of renewables.

THE SOLUTION

The **O-One algorithm**, developed in a collaboration between ORES and Blacklight analytics (ULiège spin-off, now called Haulogy), offers multiple functions:

- Interpreting network topology and measurement data in real time.
- Interpreting producers' contractual data.
- Sending useful information to the Transmission System Operator (TSO).
- Anticipating the risk of congestion (within a 5-minute time frame).
- Calculating the minimum modulation required to remedy congestion, depending on its level of risk.
- If necessary, sending modulation orders to identified producers.
- Providing information on any congestion and the measures taken to relieve it.

MAIN ACHIEVEMENTS

- **15% increase** in the **average production of a wind farm** in Wallonia, thanks to the possibility of offering an added "flexible capacity" in the contract.
- Implementation of the algorithm for 15 substations and 40 producing units (for the moment).
- **302 MW of total estimated capacity controlled** by O-One, with **128 MW** being *flexible* (i.e., contracted so that it can be curtailed without remuneration).

- **1600 MW** (estimated number) **of cumulative flexible capacity modulated** by the algorithm in 2023 to prevent congestion.
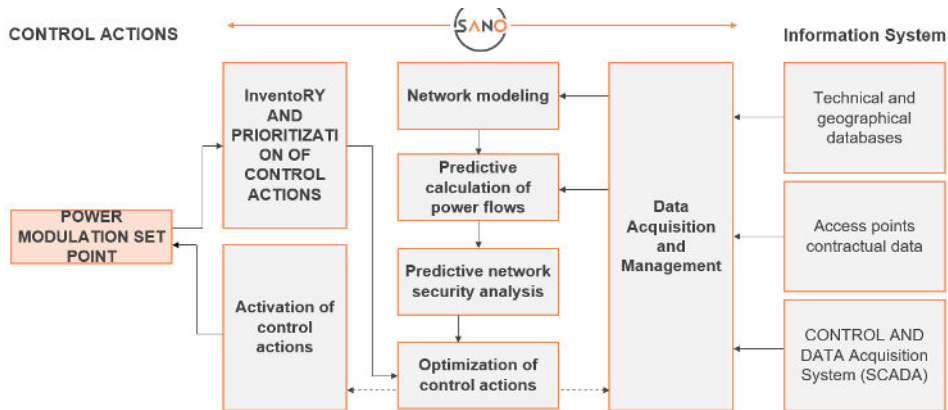
Scheme of information flows used to calculate the modulation setpoint for the O-one tool.

KEY SUCCESS FACTORS

- **Strong collaboration** between the Distribution System Operator (DSO), TSO, academia and industry.
- **Data availability**.
- Implementation **support from producers**.

WAY FORWARD

The next planned step is to roll out the solution on the whole ORES network and all producers (currently not used everywhere).

Possible improvements include:

- Sending **reactive power management signals**.
- Sending a **signal for upward loading to avoid congestion** without curtailing the production, for example, thanks to coupling with battery storage systems.