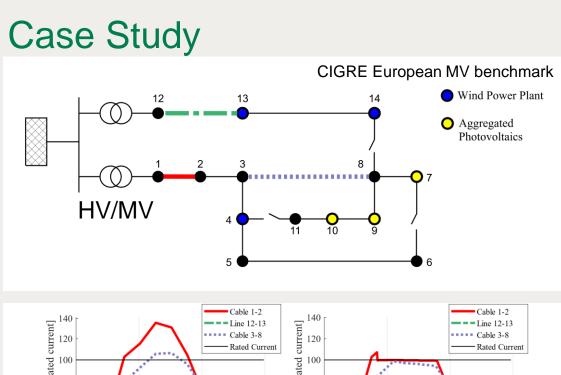# Addressed Challenges

- **Temporary local congestion caused by generation peaks from DERs.**
  - Coinciding small demand and large production that results in reverse power flows with power/current levels exceeding line limits.

- **Increased need for control of reactive power (Q) flows in DNs, at TSO/DSO interface.**
  - In transmission network, Q used for voltage control → penalties for DSOs on excessive Q flows. Minimizing exchange of Q with distribution grid to reduce DSO costs and improve operation of transmission network.

- **DER expansion in DNs fast – network reinforcement slow.**
  - Great need for rapid expansion of renewable energy. Implementing better monitoring and control defer grid reinforcement.

Addressed Challenges and Proposed Solution

- Temporary local congestion caused by generation peaks from DERs.
- Increased need for control of reactive power flows in DNs, at TSO/DSO interface.
- DER expansion in DNs fast – network reinforcement slow.

à Algorithm for coordination of all types of local flexibility resources: converter-interfaced DERs for control of P and Q, also loads, BESSs, EV charging.

à Monitoring of points of potential congestion. If local congestion limit is violated, PI controller(s) determines required flexibility to restore operation within limits.

à New set points for P dispatched to local resources. Coordination of PI controller outputs resolves potential conflicts.

à Flow of Q at TSO/DSO-interface controlled by the same algorithm, using remaining network margin after congestion has been managed.
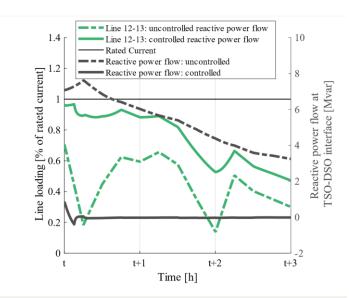
Group Discussion Meeting

Case Study

CIGRE European MV benchmark

HV/MV

- ● Wind Power Plant
- ○ Aggregated Photovoltaics

Uncontrolled   Congestion Management
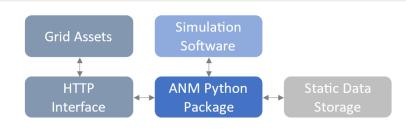
Remaining network margins (dashed green line) utilized by algorithm to control Q at TSO/DSO interface

Deployment

Algorithm in toolbox for use in network planning and operation.

Grid Assets | Simulation Software

HTTP Interface | ANM Python Package | Static Data Storage