

280- LARGE PENETRATION OF DISTRIBUTED PRODUCTIONS: DYNAMIC LINE RATING AND FLEXIBLE GENERATION, A MUST REGARDING INVESTMENT STRATEGY AND NETWORK RELIABILITY

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What's the issue ?

Integration of large quantities of DG (especially RES) in areas with limited connection capacity

The **solution tested** is the following combination :
Dynamic Line Rating + Active Network Management
[DLR + ANM]

increases line rating + allocates DG dynamically (priorities, curtailment) on flexible generation

Is it a profitable investment w.r.t. RES?

Yes, our field measurements have given very promising results.

Ampacity (=line capacity) of nearby lines increased with wind power output. Therefore, curtailment of additional flexible generation should be kept to a minimum.

Reduced investment cost for the grid & rapid connection for the RES project promoter → win-win approach.

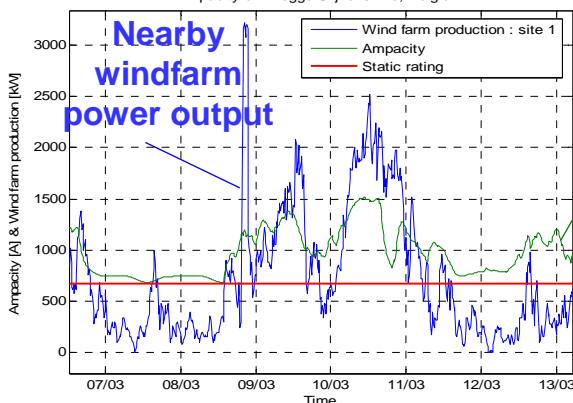
RESULTS

Connection of additional DG would not be possible without the proposed solution.

Tests were performed on a 70kV and a 150kV line in Belgium.

Dynamic rating of the line does increase with wind farm power output

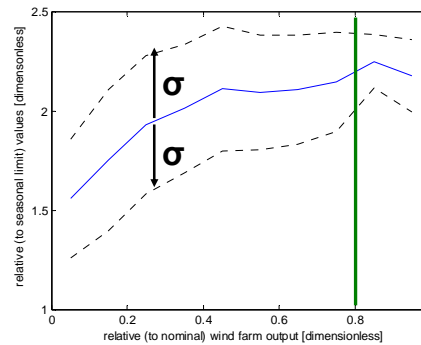
Jan-Mar 2010 : Nearby wind farm production (site 1 : 4MW)
Ampacity on Brugge-Slijkens line, Belgium



real-time Ampacity (Ampacimon sensor)

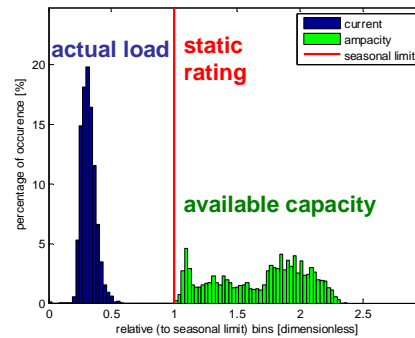
static rating

Jan 2011-Mar 2011. 150 kV line connected to a 21 MW wind farm



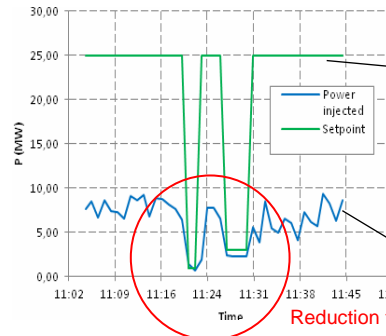
When wind produces 80 % of nominal windfarm power output, it also blows on nearby lines. It roughly allows twice the line capacity in this case.

Dec 2011- Jan 2012. 70kV OVL



Available ampacity is way over static rating

CURTAILMENT TESTS



TSO generates a setpoint = maximum active power that the DSO is allowed to inject

if the communication link fails → DSO opens the circuit breaker

Injected power from wind farm (curtailed in N-1 situation)

CONCLUSION

The proposed solution to large integration of RES in DG involves :

- i) TSO-DSO cooperation ensuring **safe and reliable** operation of the energy system. This has been confirmed by field tests.
- ii) [DLR + ANM] as a **low-cost** and **fast-deployment** solution on flexible production.