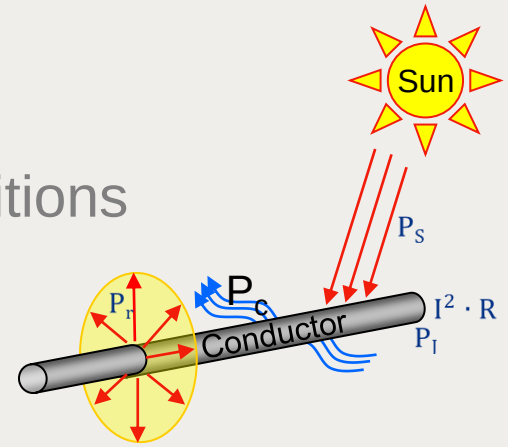
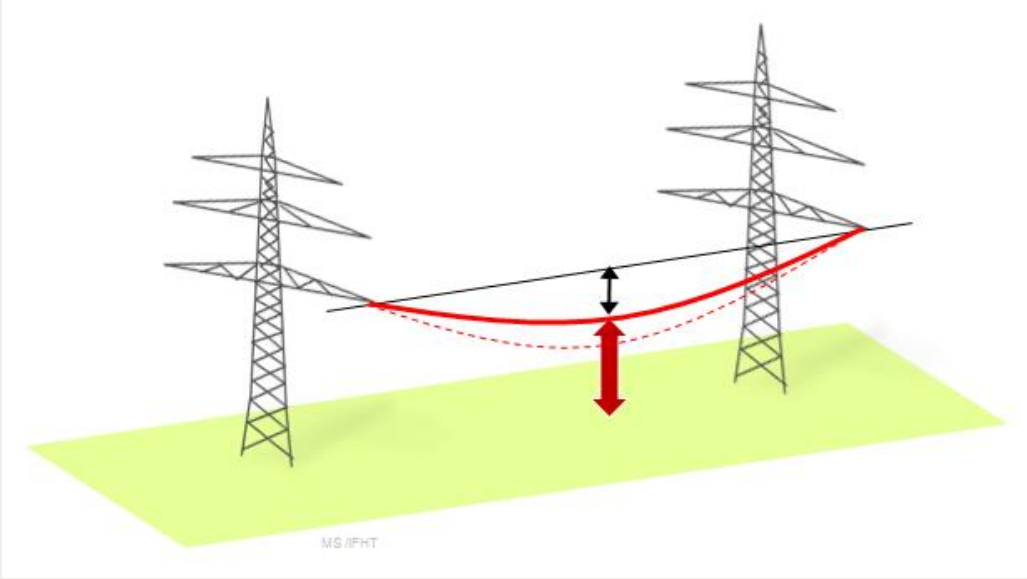
Data and load flow management in dynamic line rating

What is DLR?

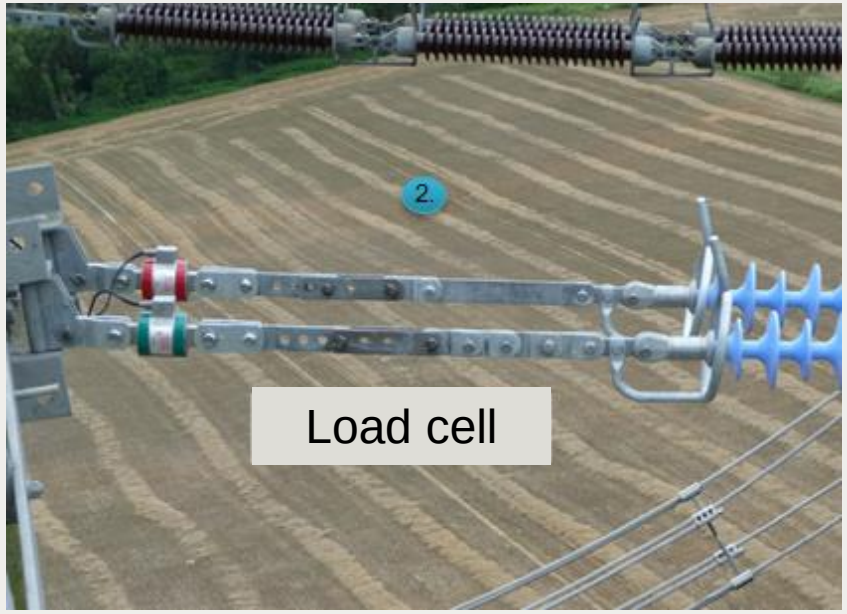
- DLR = Dynamic Line Rating
- Static ampacity is calculated under mid-summer weather conditions
- => Knowledge of conductor temperature or sag is important





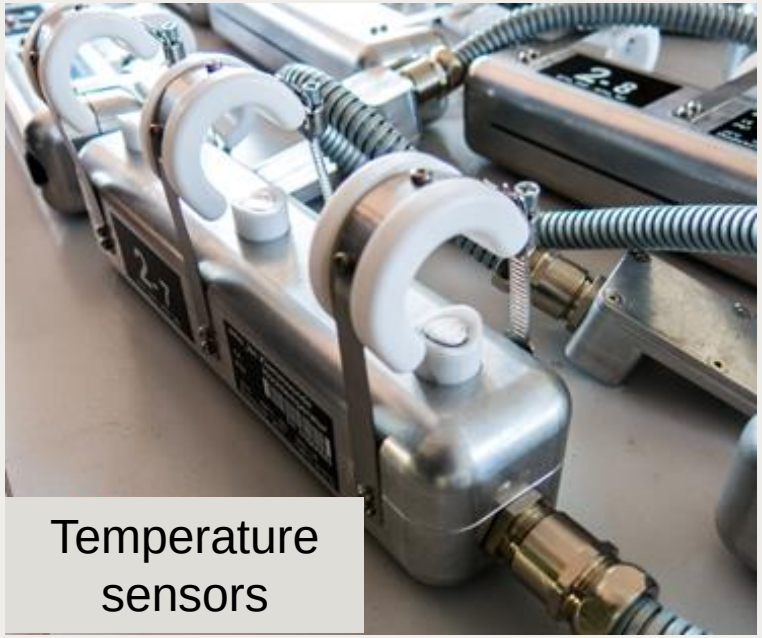
Determination of sag or conductor temperature I

- Indirect measurements:
  - Load cells
  - Weather stations
  - etc.

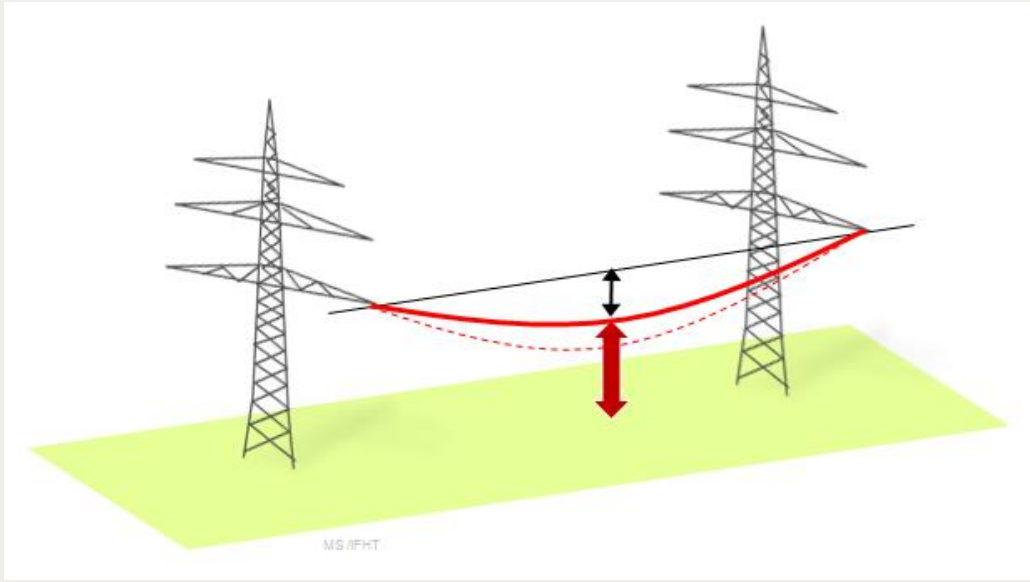


Determination of sag or conductor temperature II

- Direct measurements:
  - Sag measurement via distance to ground
  - Temperature sensors on the line

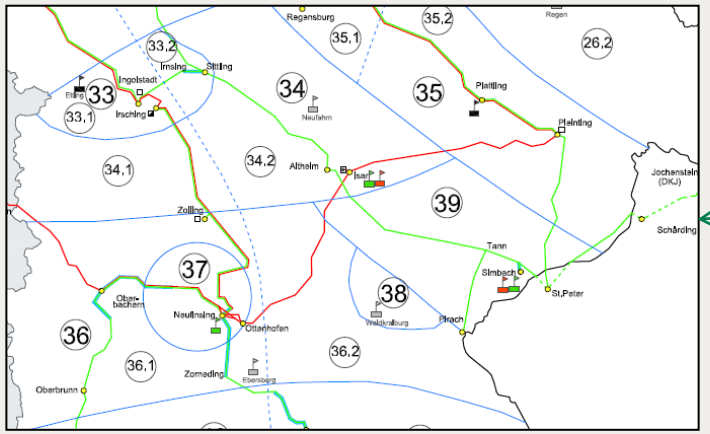


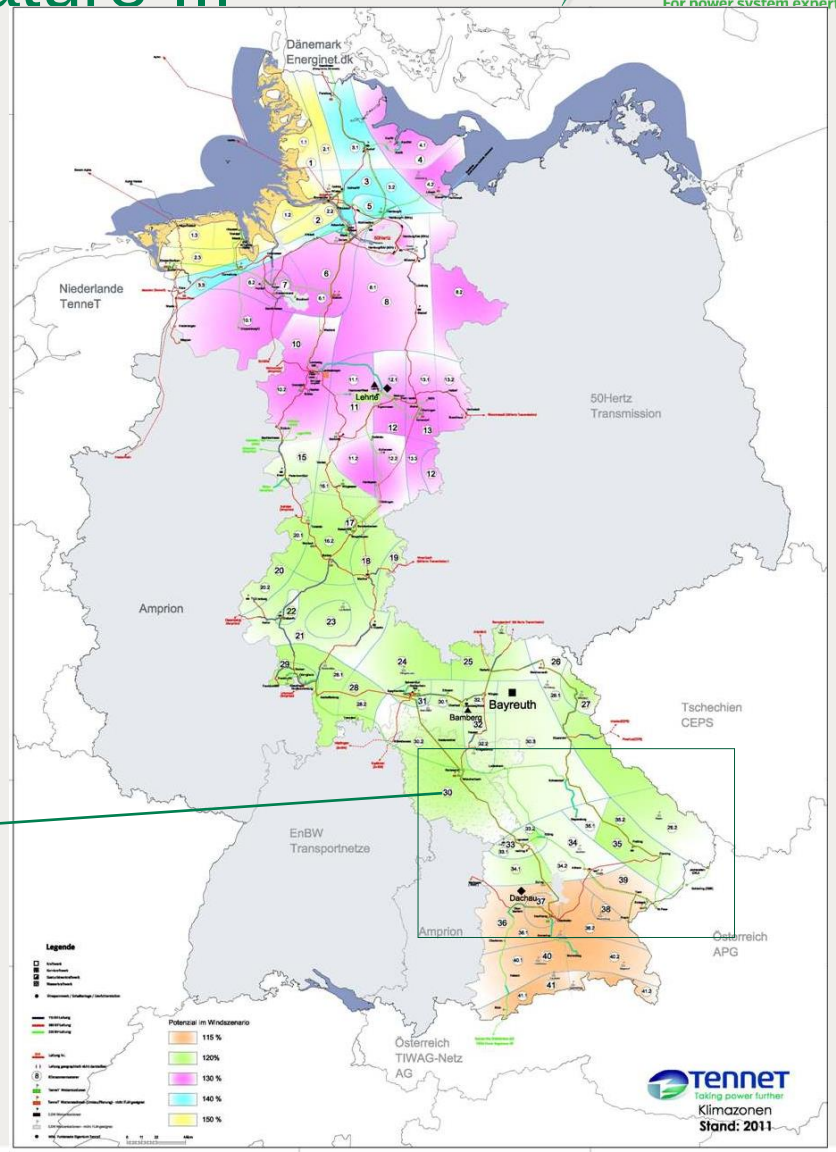
Temperature sensors



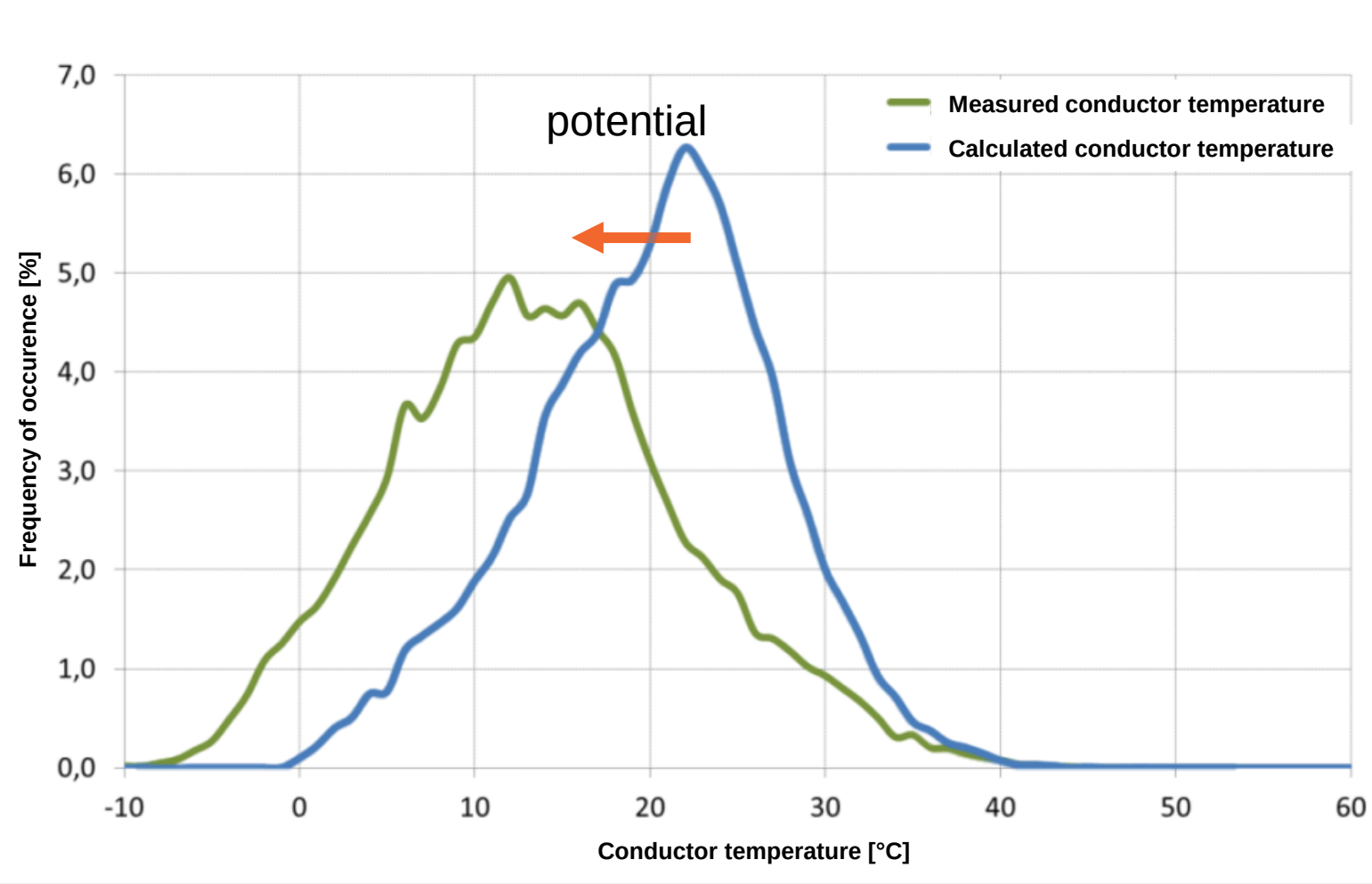
Determination of sag or conductor temperature III

- Grid area is divided in climate zones
- At least one weather station in every climate zone
- Weather stations in sub stations



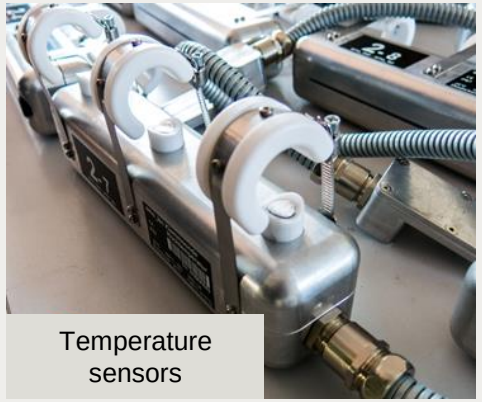


Validation of the concept



Future grid acceleration with DLR

- Combination of direct and indirect measurement methods
- Distributed measurements especially in Hotspots
- Combination of TATL and DLR
- Dynamic rating of other components (busbars etc.)



Temperature sensors

Weather stations

Challenges

- Handling of “Big Data”
- Climatical and topographical changes
- Integration in EMS
- Security of the infrastructure

Possible solutions

- Usage of machine learning algorithms
- Continuous studies of weather data and topography
- Collaboration in projects like Innosys
- Investment in security infrastructure (IT and local)

Summary

- DLR is a cost-effective way of enhancing an existing grid
- Possible optimisation with more sensors and measurements
- Big data challenges have to be overcome

Questions?

If you have questions, please don’t hesitate to get in touch with me:

christoph.kandlbinder-paret@tennet.eu