Voltage Control in the Transmission Grid

New Planned Voltage Remuneration Scheme

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Analysis of Voltage Violations in 2016

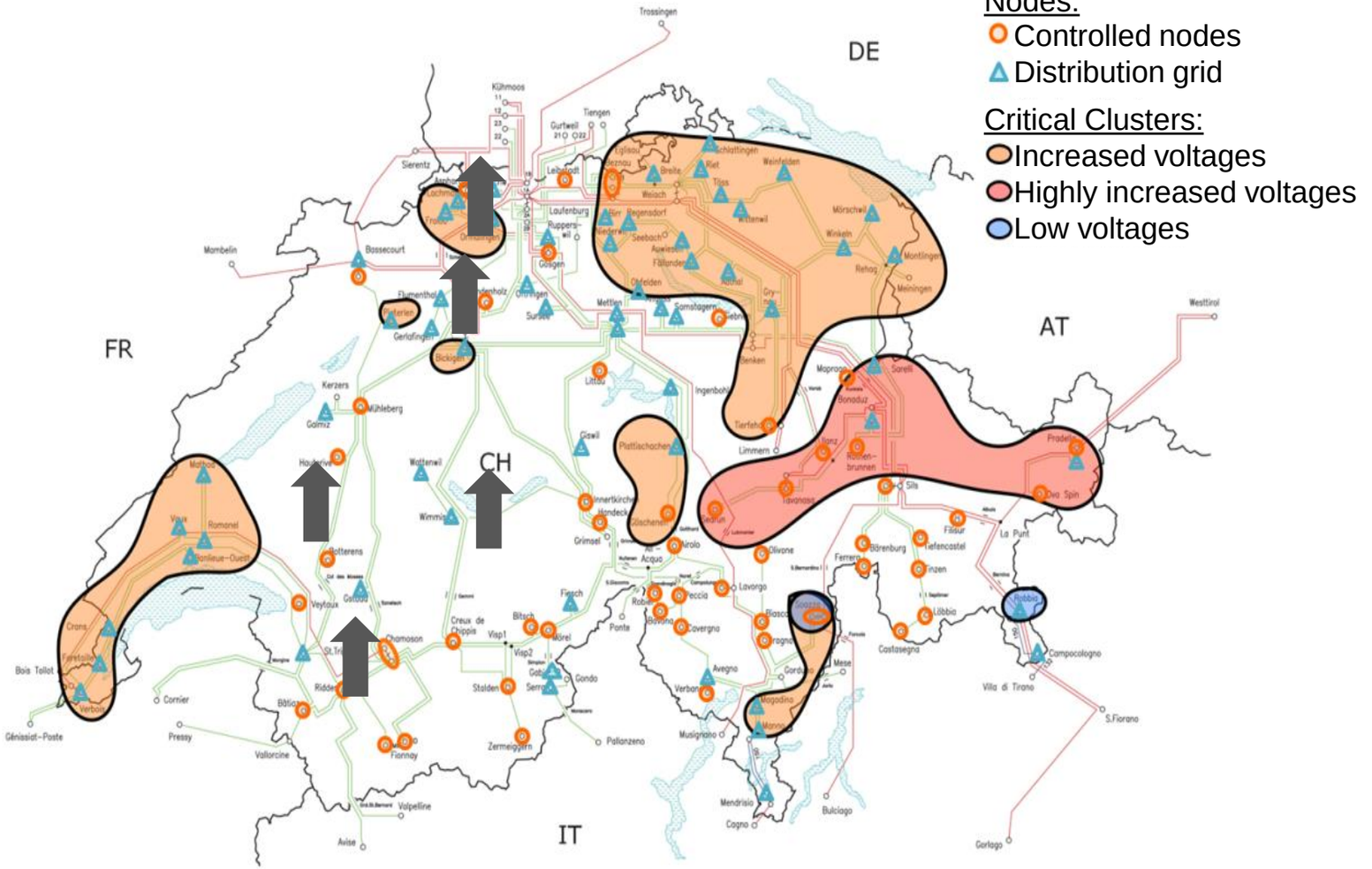
- Swissgrid observes higher voltages and more voltage violations in the 220 kV level
- Distribution grids changed their behaviour from mainly inductive exchange to capacitive exchange

Reasons:

- Low line flows due to high intermeshing and N-1 criteria
- Changed behaviour of distribution grids:
  - renewable energy sources
  - cables replace overhead lines

Challenges are:

- Not enough controllable reactive power resources in critical regions
- Increase of controllable reactive power resources in non critical regions



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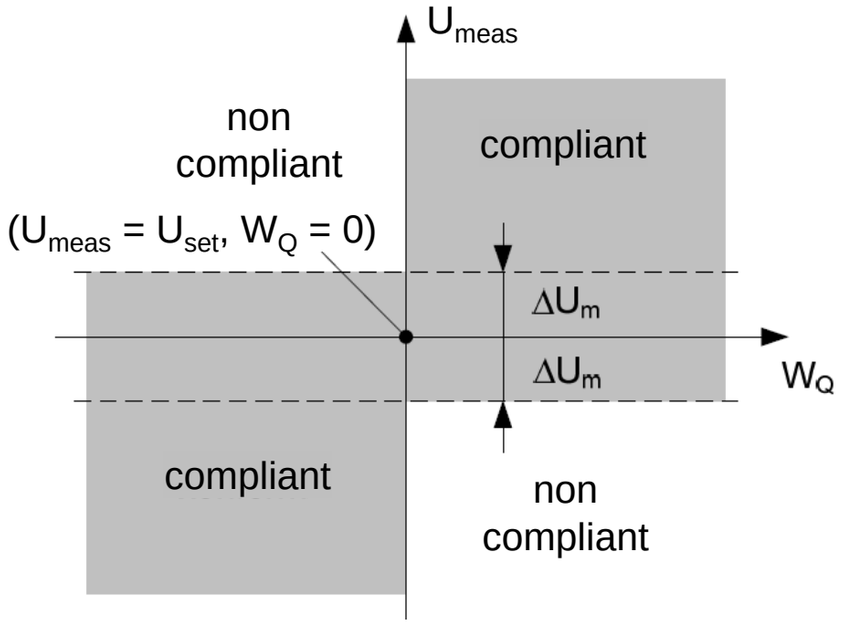
Voltage Remuneration Scheme Today

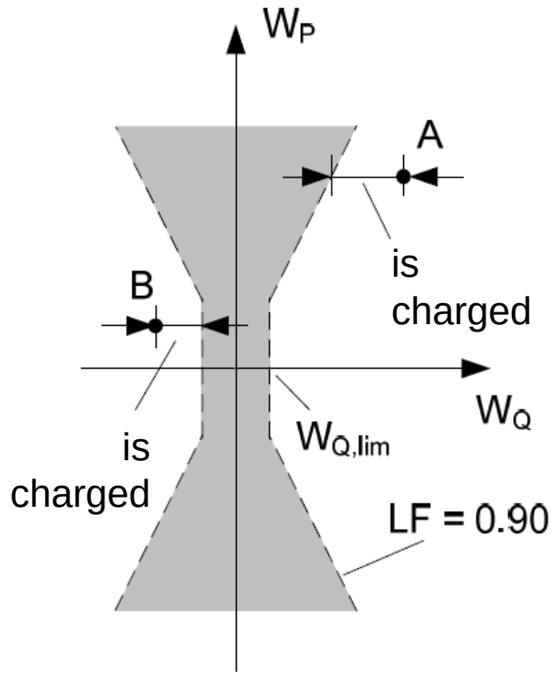
Active Role

- Obliged to provide reactive power for voltage control
- Controls voltage to a given set-point
- Compliant reactive power exchange is reimbursed
- Non compliant reactive power exchange is charged



Passive Role

- No active participation on voltage control
- Cost free area for reactive power exchange
  - Supporting the system
  - Detrimental to the system
- Reactive power exchange is charged outside cost-free area



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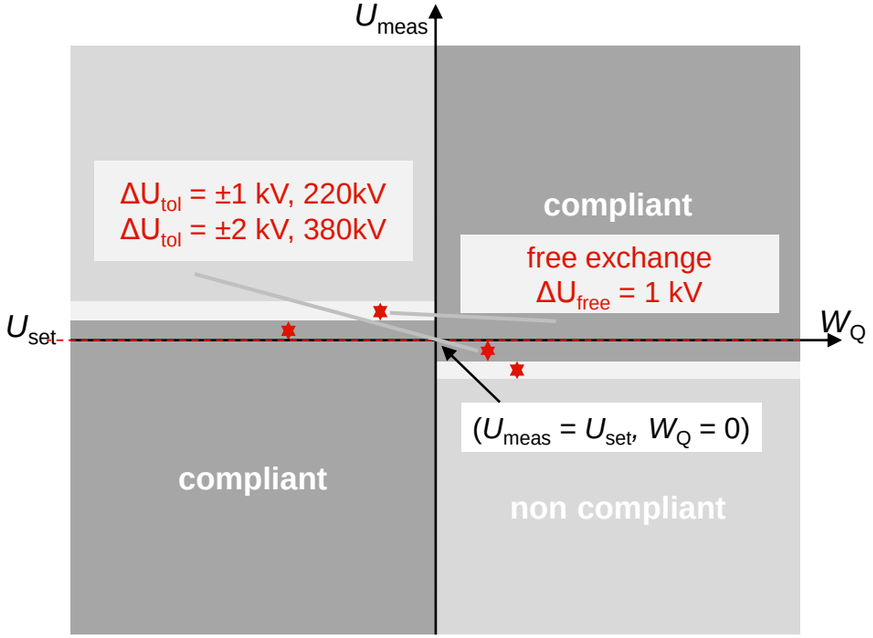
Voltage Remuneration Scheme from 2020

Active Role

Goal: Create incentives to reimburse only reactive power exchange supporting the system

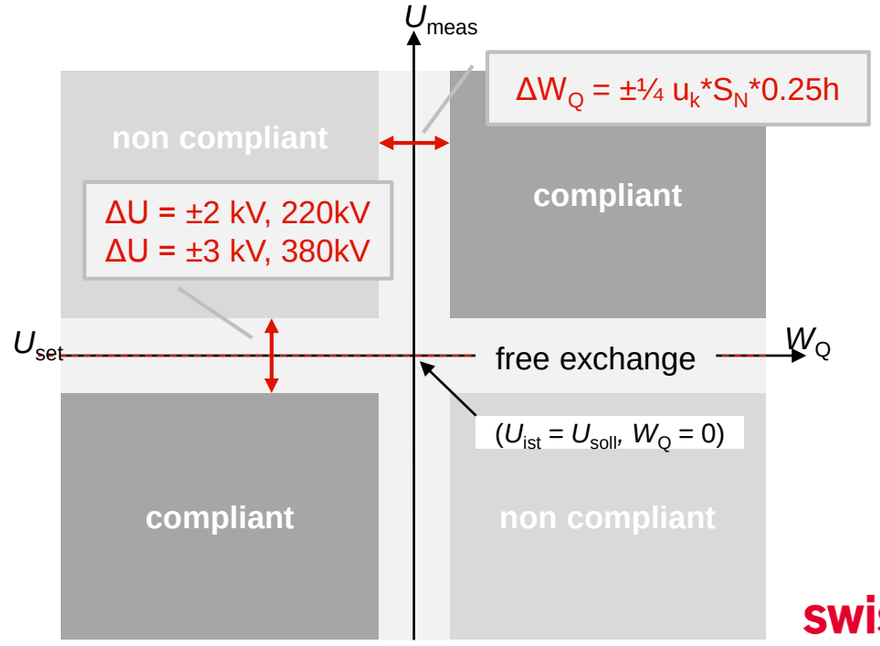
- Splitting the tolerance band in a free and reimbursed area
- No further changes to the active role of today



Semi-Active Role

Goal: Create incentives that participants exchange reactive power supporting the system

- Reactive power exchange supporting the system is reimbursed
- Reactive power exchange detrimental to the system is charged
- Free reactive power exchange at voltage set point
- Participants receive a voltage plan



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Thank you for your interest

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