

Innovations in system operations up to 2030

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InnoSys 2030 - Innovations in system operations up to 2030









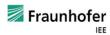




















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SIEMENS

- Project time: October 2018 December 2021
- Head of consortium: TenneT TSO GmbH
- Funded by the German Ministry for Economic Affairs and Climate Action with 9.375 Mio. EUR

Supported by:



on the basis of a decision

Research objective

Higher grid utilization by system wide coordinated use of

- horizontal load-flow control
- curative remedial actions and a
- higher degree of system automation

while not endangering the level of system security

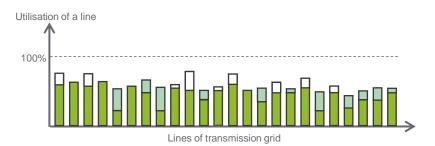
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Mechanism of action – horizontal load-flow control

Load flow controlling assets

- Phase-Shifting Transformer (PST)
- Series Capacitors (TCSC)
- HVDC (not in picture)
- Balancing the load flow in the grid



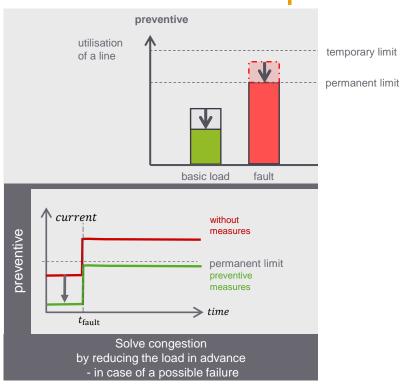


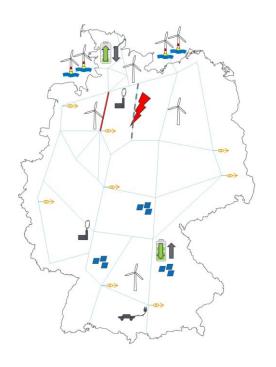
HVDC High Voltage Direct Current Phase-Shifting Transformer

TCSC Thyristor-Controlled Series Capacitor



Mechanism of action – preventive und curative

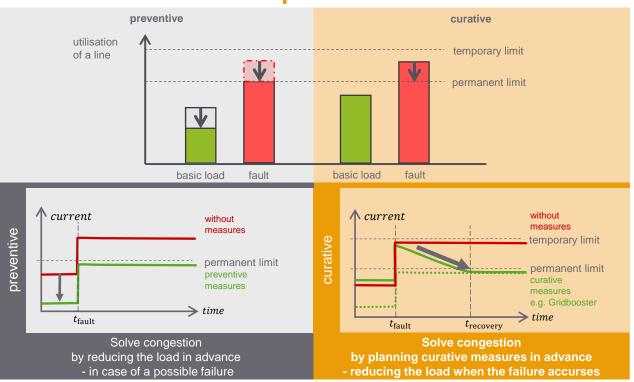


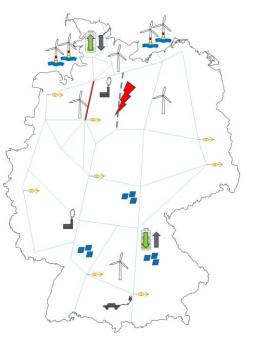


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Mechanism of action – preventive und curative





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Achievements of InnoSys 2030

Going through a creative concept phase with the participation of TSOs, DSOs, SCADA manufacturers and scientific institutes and discuss results with relevant stakeholders Design of one **comprehensive system operation process** to integrate preventive and curative congestion management Concepts of **six curative measures** to realise innovations in system operations (e.g. HVDC, PST, Gridbooster, ...) Showing up the potential of innovations in system operations with target grid 2030 Identifying fields of actions and address stakeholders by InnoSys-Roadmap to start stepwise implementation

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InnoSys-Roadmap – stepwise approach till 2030



- Commissioning and testing of pilots
- · Identification of further actuators

Step 2
achieved:
Raising
curative
potentials

- Commissioning of further actuators in the transmission grid (HVDC, PST)
- Introduction of redundancy concepts
- Further development of tools and processes (national/international)

Step 3
achieved:
Standardised
application

- Frame of distribution flexibility ready
- Optimisation in online operation
- Approved application between TSOs and DSOs



2022

"Grid operators, politicians, manufacturers and researchers must pull together to implement the InnoSys solutions."







































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