

# InnoSys 2030

## INNOVATIONS IN POWER SYSTEM OPERATION UNTIL 2030

Over the last few years, an increasing share of renewable energies and delays in the implementation of grid expansion measures have led to rising costs for congestion management in the transmission grid. Consequently, the four German transmission system operators initiated a research project that aims at investigating measures and operational concepts for a more efficient utilization of the existing network infrastructure. By means of a system-wide, coordinated operation of power flow controlling devices (especially phase-shifting transformers) and flexibility potentials provided by network users and storage facilities, curative measures and a higher degree of automation in grid operation, the goal is to achieve an increased grid utilization without compromising system and grid security. This requires not only new grid technology (primary technology), but also innovative measures and methods for power system operation, including data transmission and information and communication technology (IC).

The research project will carry out a structured review, analysis and evaluation of innovative measures for a higher grid utilization discussed in science, politics and with the network operators, taking into account technical and economic criteria as well as IT and system security. Based on this, new practical measures for system and network operation will be derived, including the coordination between transmission and distribution system. After pre-selection and conception of measures and strategies for power system operation tools are developed to test the concepts in (real-time) simulation environments. Additionally, tests in demonstrators and in field tests in control rooms of participating network operators ensure an application-related trial of the developed concepts and measures. Finally, the results will be assessed and a possible implementation plan will be developed.

Within this framework, IFHT will develop a hybrid simulation environment for steady state and dynamic network calculations to derive preventative and curative measures for power system operation. To this end, suitable (partially) automated measures for the optimized use of market- and grid-related flexibility in normal operation, for curative actions and for stabilizing the grid in case of contingencies will be designed and transferred into suitable operational management tools. By coupling the developed tools with a real-time grid simulation, their effectiveness can be analyzed and evaluated. In order to demonstrate their practical suitability in real operation, an interface for the coupling of the steady state and dynamic simulation with a realistic control room environment will be created.

In addition, the risks arising from the use of new ICT-connected technologies will be analyzed. In this context, the new system management tools will be evaluated with regard to their IT security. The consequences of IT attacks on the reliability of the power supply will be estimated and methods for attack detection will be developed.

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## Project Information



### Partner

- 50 Hertz Transmission, Amprion, TenneT TSO, TransnetBW
- Avacon Netz, EWE NETZ, MITNETZ, Netze BW, Westnetz
- Fraunhofer IEE, Fraunhofer FKIE, FAU Nürnberg-Erlangen, TU Dortmund, TU Ilmenau
- PSI Software AG, Siemens AG



### Facts

- Acronym: InnoSys 2030
- Duration: Oct. 2018 – Sep. 2021



Federal Ministry  
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