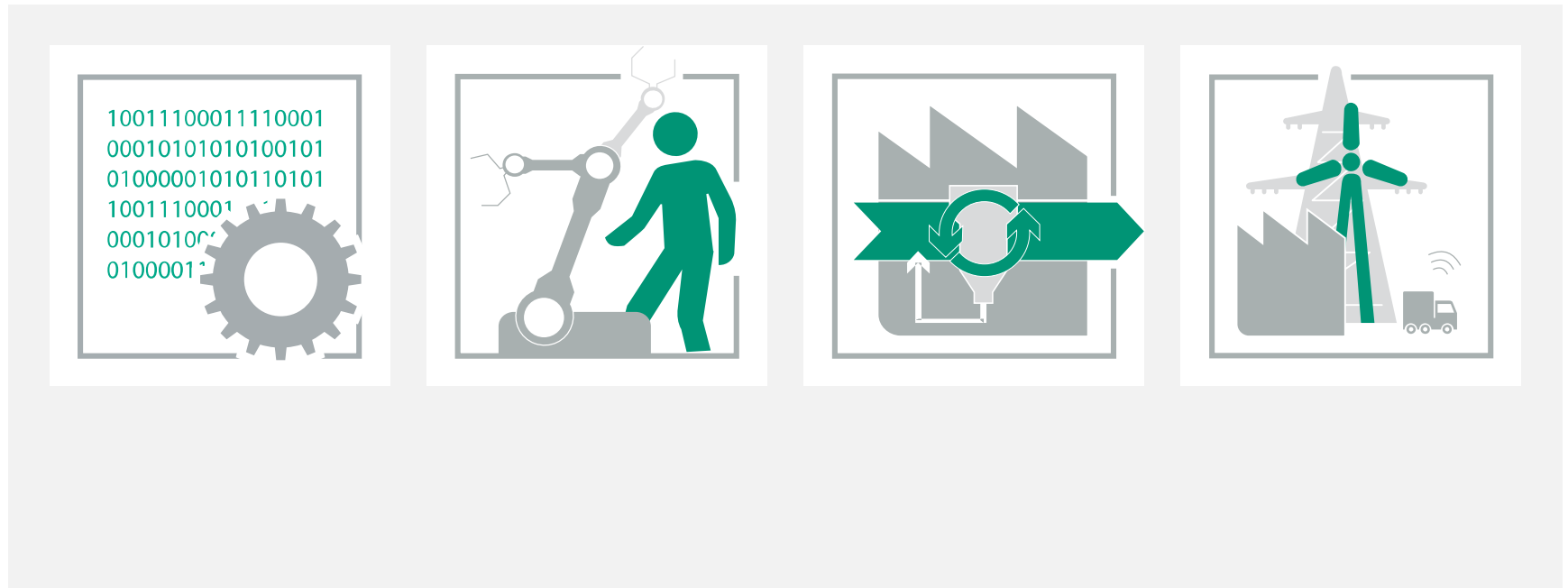

FRAUNHOFER IFF MAGDEBURG

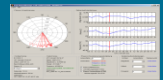
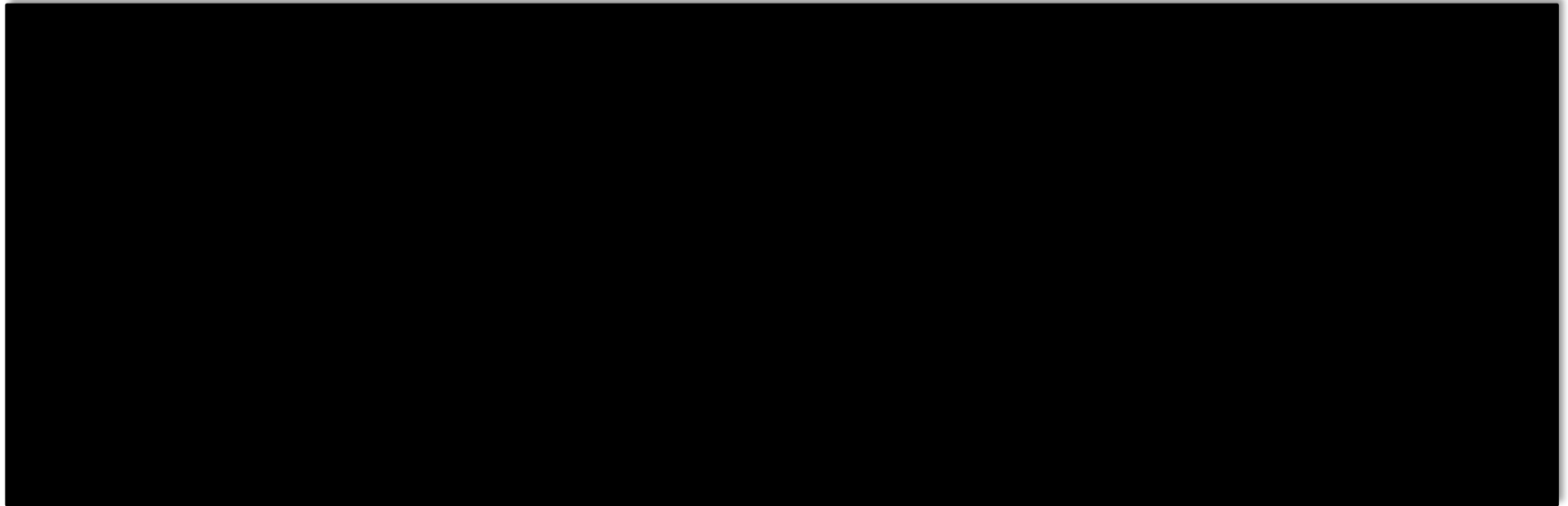
APPLIED RESEARCH FOR POWER SYSTEM

Dr. Przemyslaw Komarnicki
Magdeburg, June 27, 2017



Energy System and Infrastructure

Research Area and Topics



Network Monitoring, Control and Protection Applications



Network simulation and modelling



Dynamic Energy Management Systems for Industry



Conformity and Performance Test Platforms for SG

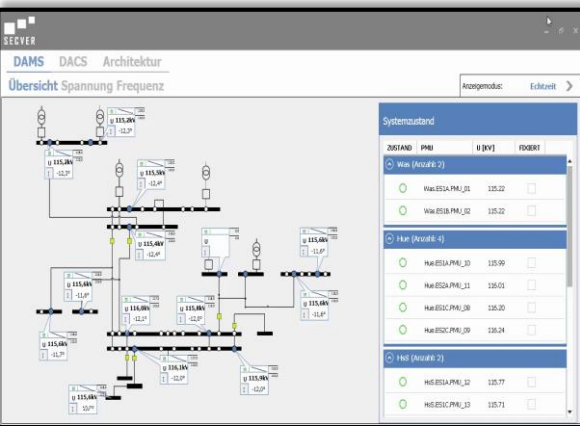


Hardware and Software Development for Power System



Network Monitoring Application

Wide Area Monitoring System for DSOs



Grid Monitoring and Operation



Development and Engineering of Power System Monitoring Application by dynamic system behaviour



Fully Automated Application for Real Time and Synchronized Power System Monitoring and Disturbance Detection



Increasing of security of supply and system operation efficiency

Early Detection of Power System Problems



Network Monitoring Application Regional Area Control System



Generation Unit Control and Operation



Development and Engineering of Algorithms of control operation of renewable energy sources



Fully Automated Application for control of biogas plant to support regional system operation



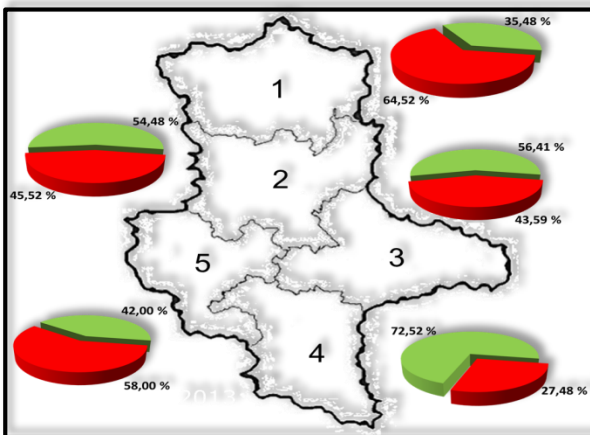
Increasing of reliability of regional grid

New business models for RES Owners



Network Studies

Development of RES in Saxony Anhalt 2033



Power System Planning with RES 2033



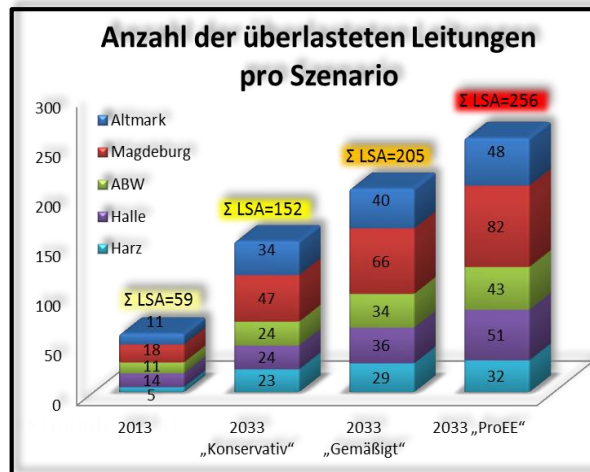
Identification of possible critical areas of the network in 2033 in Saxony Anhalt



Simulation model of Saxony-Anhalt for 2013 and 2033 created depending on the scenario

Increase of the utilization in every region in compare to 2013

Definition of critical areas and network rebuilding needs



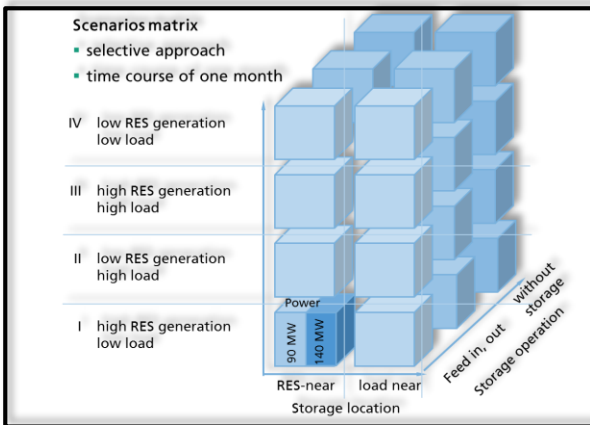
Transparency for long term planning with RES

Definition of critical areas and solutions possibilities



Network Studies

Integration of new components – CAES Storage



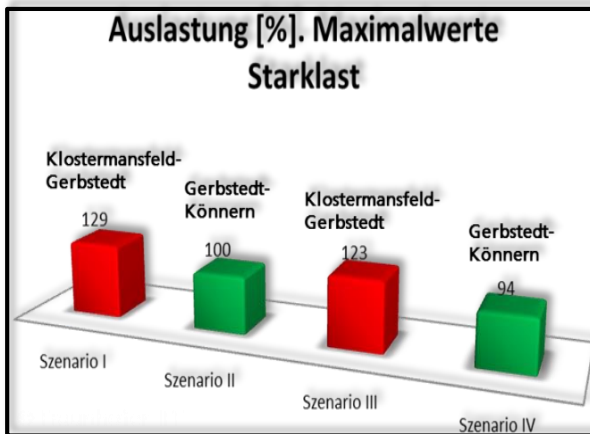
Storage Integration



Development of network model for consideration of different load and generation situations and Detection of storage critical fault cases and optimal operation schedules



Investigation of Influence of storage at market-based operation and during different anticipated future grid situations / scenarios
Development of network model for consideration of different load and generation situations



Critical Case Catalogue

Analysis and definition of technical and economical operation schemes

Network Studies

Integration and operation of new components



Battery Storage Operation



Development of business model to optimized operation of battery storage system connected to large scale renewable



Technical and economical algorithms/models and application to operate a large battery storage systems in combination with renewables



Operation algorithms/ applications/test field

Test field experiences with large battery system components

Future Power System and Market

WINDNODE

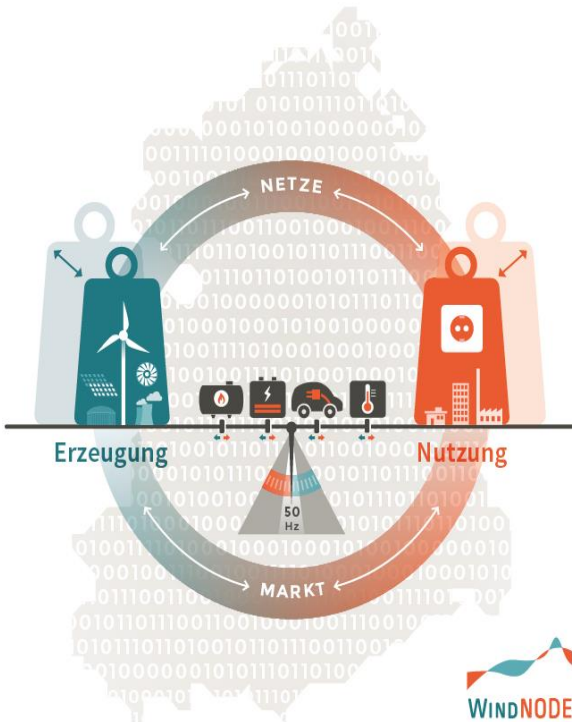


WINDNODE

Flexibility Option for Reliable System Operation from all of components (generation, loads, storage)

? Innovation as a new business model for market players

Range test area and expected results



Lenkung		Beitrag	
Assoziiert			

Thank you for your attention



Fraunhofer Institute for Factory Operation and Automation IFF

Sandtorstrasse 22
39106 Magdeburg

Phone: +49 391 4090-0
ideen@iff.fraunhofer.de
www.iff.fraunhofer.de



Fraunhofer IFF Virtual Development and Training Centre Magdeburg

Joseph-von-Fraunhofer-Strasse 1
39106 Magdeburg