ICT-ENERGY-LAB:
NEXT-GENERATION
ELECTRICAL ENERGY SYSTEMS

Background
The European Energy Systems have developed over the last decades and have been optimized upon technical and economical boundary conditions.

For some time now, there has been a dramatic change evoked by the liberalization of the energy markets and measures taken to allow cost-effective, environmental friendly and sustainable supply and use of energy. Consequently, new business models with extensive electronic and communication processes arise and therefore, an increase in competition for economical, effective and safety process control.

These new challenges should be mastered and they demand suitable strategies and tools. Therefore, ICT-Technologies will play a vital role. For example, management-systems for optimal design and industrial management as well as portfolio management systems, virtual power plants with decentralized energy suppliers and smart metering with demand-side-management functions.
Key Aspects

- Innovative ICT-Technologies and concepts for control, monitoring and guidance of energy systems in deregulated energy markets
- Technologies for a holistic energy management for electricity, gas, heating and cooling
- Virtual power plants by coordinated industrial management of distributed inducers like wind power plants and solar power systems
- Real time acquisition and management of large quantities of data for optimal integration of energy consumers and changing energy producers
- Analysis and development of ICT-Technology for the Demand Side Management and for the stockmarket inclusion of private households
- Home portal interfaces for accounting and visualization of the energy use
- Digital process control and safeguard technology, particularly for decentralized energy systems
- Test platform for industrial suppliers and training for electrical energy systems in special cases

Concept

The ICT-Energy-Lab for intelligent energy systems is located at the Fraunhofer Application Center System Technology AST and at the Ilmenau University of Technology department of Electrical Engineering. The Fraunhofer Institute UMSICHT (North Rhine-Westphalia) with their self-developed device DAVID (Data Acquisition and Visualization Device), the public utilities of Erfurt and the solar village of Kettmannshausen provide the laboratory with most of the data. The emphasis of the Fraunhofer AST is on the analysis of tasks related to the energy business, mainly energy management, energy data management and automated-metering.

For this purpose, the ICT-Energy-Lab has modern IT-Systems, as those used in municipal and regional energy supply companies in the areas of measurement, distribution, procurement and networking. They provide functions like automatic data entry, remote control as well as prediction and optimization. This enables the analysis of a wide range of R&D-topics like virtual power plants, isolated networks, demand-response and demand-side-management, which are the most important duties of the ICT-Energy-Lab.