

ENSURE Is to Condition Grids for the Energy Turnaround

ENSURE Consortium Is One of Four “Kopernikus Projects for the Energy Turnaround” of the Federal Government – EUR 30 Million Funding – Enhancing Compatibility of Central and Decentralized Power Supply



The ENSURE project will focus on efficient and viable grids for centralized and decentralized energy supply. (Photo: Gabi Zachmann, KIT)

Today in Berlin, Federal Minister of Education and Research, Johanna Wanka, presented the consortia that will be funded by the Federal Government as Kopernikus projects for the energy turnaround. Among them is ENSURE – new power grid structures for the energy turnaround. The consortium is led by Karlsruhe Institute of Technology (KIT), core partners are RWTH Aachen, the utility company E.ON, network operator TENNET TSO, and the technology corporations of Siemens and ABB. Another 15 partners have joined the consortium. Work is aimed at developing and testing efficient and viable grid structures combining centralized and decentralized energy supply.

“For the German energy system, the energy turnaround is a change of paradigms that is not only associated with challenges, but also with economic opportunities,” Professor Holger Hanselka, President of KIT and spokesperson of ENSURE (German acronym of New Power Grid Structures for the Energy Turnaround), says. “Our research activities in this area will contribute to the economic success of the energy turnaround and to technology suppliers, infrastructure

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operators, and electricity consumers being able to profit from it.” Holger Hanselka also is research field coordinator Energy of the Helmholtz Association. “We want to demonstrate how we in Germany can integrate decentralized fluctuating renewable sources of energy, such as the sun and wind, into the grid and, at the same time, ensure environmentally compatible, reliable, and affordable energy supply”.

Structures for a Viable Power Grid

In concrete terms, the ENSURE consortium wants to answer the following question: What is a technically, economically, and socially reasonable power grid structure and which fractions of centralized and decentralized supply does it comprise? For this purpose, efficient new system structures, stable system control mechanisms, and the integration of new technologies will be studied comprehensively under the project. Particular attention will be paid to the technical and societal transformation process to be managed. Technologies for power transmission will be in the focus as will information and communication technologies to ensure accounting and stability in the interlinked supply structures.

The ENSURE Kopernikus project will cover three phases. After the first phase for studying fundamentals (2016 to 2019) and the following second phase for implementation on the pilot scale (2019 to 2022), the final third phase (2022 – 2025) will be dedicated to designing a multi-modal grid demonstrator. This large-scale demonstrator is to illustrate, by way of example, future supply of an urban system and its surroundings with power. In addition, methods to enhance flexibility and efficiency, e.g. by the integration of power, gas, heat, and storage systems or by power connections to the medium- or high-voltage level are studied.

Board of Directors and Partners of ENSURE

The ENSURE consortium consists of the six core partners represented in the Board of Directors and another 15 project partners. The core partners are KIT and RWTH Aachen as representatives of research and higher education, the companies of E.ON (utility company and distribution grid operator) and TenneT TSO GmbH (transmission grid operator) as well as the corporate groups of Siemens AG (integrated technology company) and ABB (power and automation technologies). The other project partners are: (a) the technical universities of Dortmund and Darmstadt, the universities of Cologne, Wuppertal, Hanover, Kiel, and Erlangen-Nuremberg, (b) the non-university research institutions of Forschungsgemeinschaft für

Elektrische Anlagen und Stromwirtschaft e.V. (Research Association of Electricity Supply Industry and Electrical Industry), Mannheim, Fraunhofer Institute for Wind Energy and Energy Systems Technology, and OFFIS – Institute for Information Technology Oldenburg as well as (c) the Institute for Applied Ecology, Deutsche Umwelthilfe e.V., DVGW e.V., and (d) the companies of Nexans GmbH and Maschinenfabrik Reinhausen GmbH. Of the planned budget of more than EUR 43 million for the first three years, the Federation will finance about EUR 30 million.

KIT Involved in Another Two Kopernikus Projects

Within the framework of the Kopernikus project “**System Integration and Networking of Energy Supply (ENavi)**”, KIT is represented in the proposing Board of Directors. The project will extend the focus of the “energy turnaround” to cover the transformation process of the whole society, as the transformation of the energy system will result in challenges that will only be managed by a holistic approach on the system level. This project is aimed at obtaining an improved and in-depth understanding of the complex “system of systems” in the energy sector and associated areas, such as industry and consumption, and at generating options for collectively effective measures.

Under the Kopernikus project “**P2X: Investigation, Validation, and Implementation of Power-to-X Processes**”, KIT will coordinate a research cluster focusing on modular and autonomous technologies for the conversion of synthesis gas based on carbon dioxide in hydrocarbons and long-chained alcohols. Research will concentrate on new process technologies for the production of fuels, synthetic natural gas (SNG), and chemicals from alternative energy sources, which are suited for decentralized use. In addition, KIT participates in the clusters of “Decentralized H₂ Logistics: Storage and Distribution via Liquid Hydrogen Carriers” and “Oxomethylene Ether: Fuels and Plastics Based on Carbon Hydroxide and Hydrogen”.

About the Funding Initiative “Kopernikus Projects for the Energy Turnaround”

The 2050 Energy Concept of the Federal Government envisages environmentally compatible, reliable, and affordable energy supply. The funding initiative “**Kopernikus Projects for the Energy Turnaround**” is aimed at making significant steps towards new ways of cooperation of industry, science, and society and at ensuring future efficiency and viability of energy research as part of the high-tech strategy. The underlying idea is that the transformation of the energy system will only succeed, if needs and expectations of the popula-

tion will be reflected adequately and environmental compatibility and economic requirements will be considered.

The initiative “Kopernikus Projects for the Energy Turnaround” is intended to fund technology-oriented research projects based on a systemic and transdisciplinary approach. The projects are to identify technologies relevant to the implementation of the energiewende and to develop them for application on a large scale, i.e. the initiation of innovations for the energiewende. It is planned to study research areas of high complexity, high research risk, and high potential for the transformation of the energy system in an economically profitable manner. Research and development of the Kopernikus projects are to contribute to making use of the opportunities resulting from technical progress on the world market.

Karlsruhe Institute of Technology (KIT) pools its three core tasks of research, higher education, and innovation in a mission. With about 9,300 employees and 25,000 students, KIT is one of the big institutions of research and higher education in natural sciences and engineering in Europe.

KIT – The Research University in the Helmholtz Association

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