

## PRESS BRIEFING

# Smart Grid LAB Hesse tests stability and resilience under real conditions

The Smart Grid LAB Hessen physically replicates what the "street of the future" looks like in a residential neighborhood. The performance data of the individual buildings, which function as prosumers, are measured and evaluated in the smart grid of the real laboratory and used to control the energy flows. As a model, the LAB demonstrates the future dynamic, efficient and secure energy infrastructure. It is adaptable and can also represent and analyze grid situations in other countries.



*Beaming faces at the public presentation of the real lab (from left): Thomas Blumenthal (QGroup), Matthias Pfeffer (Ingenieurbüro Pfeffer), State Secretary Jens Deutschendorf (Hessian Ministry of Economics), Prof. Dr. Ingo Jeromin (Darmstadt University of Applied Sciences), Prof. Dr. Peter Birkner (House of Energy), Dr. Ralf Bucher (Tractebel), Heinz Saure (JEAN MÜLLER) Photo: Milton Arias*

**Rödermark, September 27, 2022:** In the recently commissioned laboratory "Smart Grid LAB Hessen", the project partners Ingenieurbüro Pfeffer, JEAN MÜLLER, QGroup and Tractebel are researching various scenarios of the electricity system of the future under the leadership of Darmstadt University of Applied Sciences. The EFRE-funded project is accompanied and supported by the House of Energy. The

laboratory, in which a real, intelligent power grid (smart grid) is set up, is located on the premises of Ingenieurbüro Pfeffer in Rödermark. The investigations provide important answers for the practical introduction of the smart grid: How can grid stability be ensured if many electric vehicles are to be charged on days with low power generation? How can a grid collapse be prevented if, for example, storage systems fail? How can it be detected that hackers manipulate the data and possibly cause a blackout?

In the Smart Grid LAB, what happens in the grid is monitored in real time, and the flow of electricity is controlled according to supply and demand. A paradigm shift is needed to intelligently manage the ever-growing demand for electrical energy with minimal grid expansion. Statically dimensioned grids must become dynamically operated ones. Prof. Dr. Peter Birkner from the House of Energy emphasizes: "Due to the powerful and volatile energy generation as well as the increasing electrification on the application side, the sole grid expansion is far too expensive and requires a far too long implementation time. In addition, the direction of power flow in distribution grids will change regularly in the future."

The project has developed various scenarios under which the Smart Grid LAB will operate. These include the establishment of prosumers. These are customers who temporarily generate and temporarily withdraw electricity. The smart grid collects the energy data, analyzes it and decides autonomously how best to distribute the electrical energy. Flexibilities are used for this purpose. These can be represented by active network elements, such as voltage regulators, or by changing customer load behavior.

Prof. Dr. Ingo Jeromin, Head of the Department of Electrical Power Supply, Renewable Energies and Energy Efficiency at Darmstadt University of Applied Sciences, emphasizes: "Due to the increasing data flows caused by smart components and the high complexity of the power grid, grid management is becoming more and more demanding. It is enormously important to ensure the highest possible protection for all processes and sensitive data. Data security and resilience are central."

Therefore, one focus in the project is on analyzing data security. All energy sources and consumptions are modeled on real-life examples. This means that challenging network situations can also be simulated without risk. The results will be used to derive requirements for use in a real distribution grid in Hesse.

State Secretary Jens Deutschendorf from the Hessian Ministry of Economics points out the great importance of the Smart Grid LAB for Hessen and praises the "experimental space" for the energy system of the future: "Such projects with pioneering character create solutions for an innovative and networked energy system and ensure that the energy transition works technically and is secure. Smart grids are very important for the integration of a higher share of renewable energy sources and thus for the decarbonization and resilience of the energy sector."

Hessian experts from the fields of research, engineering, IT security and the manufacture of electro-technical switching and measuring components are working together on an interdisciplinary basis in the project. Project partner JEAN MÜLLER develops and manufactures networkable low-voltage switchgear and systems and integrates them into the smart grid infrastructure. Multilevel security manufacturer QGroup is looking at resilience and segregation requirements with regard to IT/OT test sites, the operating equipment used, their networking and control across security boundaries. In this way, risks can not only be reduced in the event of a cyber attack, but also effectively limited. In addition, the project partner Tractebel contributes its experience from international energy infrastructure projects and transfers what it has learned from the Smart Grid LAB Hessen to the national and international context.

Funded by:



Hesse Ministry of Economics, Energy, Transport and Housing



EUROPEAN UNION  
Investing in your future  
European regional development fund

## CONTACT

### House of Energy

#### Marketing

Ivonne Müller  
Universitätsplatz 12  
34127 Kassel

Tel: 0561-51005325

Email: [i.mueller@house-of-energy.org](mailto:i.mueller@house-of-energy.org)

### House of Energy

#### Project

Anja Schaldach  
Universitätsplatz 12  
34127 Kassel

Tel.: 0561-51005-336

Email: [a.schaldach@house-of-energy.org](mailto:a.schaldach@house-of-energy.org)

The **House of Energy** e. V., based in Kassel, which regards itself as a “think tank”, is funded by the private sector, science, universities, higher education institutions and research institutes, as well as the State of Hessen. It works on a transdisciplinary basis and provides conceptual and scientific support for the energy transition in Hessen. As a centre of excellence, communication, coordination and knowledge sharing platform, the House of Energy initiates and supports projects with a technological focus. It is the first innovation cluster in Hessen to receive EU funding support. [www.house-of-energy.org](http://www.house-of-energy.org)

**Darmstadt University of Applied Sciences (Hochschule Darmstadt, h\_da)** is one of the largest Universities of Applied Sciences in Germany. With a student body of over 16,500, it offers around 70 Bachelor, Diploma and Master study programs with a wide range of course options and, on the basis of its doctoral degree-awarding power, the possibility of carrying out doctoral studies at the h\_da or in cooperation with partner universities. The key areas of study and research are engineering, mathematics and natural sciences, sustainability sciences, information science and information technology, economics, social science and social work, and architecture, media and design. Over 350 professors can call on their experience and contacts from their own professional lives. [www.h-da.de](http://www.h-da.de)

**Ingenieurbüro Pfeffer** specialises in the planning, project development and distribution of transformer stations and substations for distribution network operators and industry. Integrated solutions for conventional and smart grid expansion are the challenge and the goal for the company. 45 years of project experience, close partnerships with top-name component manufacturers and scientific collaboration provide the basis for every solution. Ingenieurbüro Pfeffer is an expert consultant and partner for all those faced with the challenges of smart grids. [www.ipi-online.de](http://www.ipi-online.de)

**JEAN MÜLLER** is a leading supplier of fused switchgear, fuses and enclosures for low-voltage distribution systems. At its headquarters in Eltville im Rheingau, over 600 employees develop, manufacture and distribute devices for energy utilities, switchgear manufacturers and major suppliers of electrical products in Europe, Asia, New Zealand and worldwide. The devices comply with all technology standards in terms of operative reliability with regard to safety of persons and operating safety and reliability. The company is also fully dedicated to issues relating to environmental, energy and information security policy, the quality of products and services and occupational health and safety. In order to not just fulfil the state-of-the-art in technology but help to define it, JEAN MÜLLER is actively involved in national and international standardisation bodies and working groups. [www.jeanmueller.de](http://www.jeanmueller.de)

The **QGroup GmbH**, based in Frankfurt am Main, was established in 1993. Since 2000, it has been supplying (advanced) security products to businesses and government and military customers. The IT solutions of the QGroup, such as trusted servers or biometric 3-factor authentication solutions are state-of-the-art products for critical security requirements and close the remaining security gap between kernel and platform of classical IT. QGroup is an established competence centre for high availability and a Centre of Excellence for Multilevel IT Security and thus resilience, hard segregation and security foundations. Its portfolio is rounded off with a wide range of qualified security operation

services for its clients. The QGroup GmbH is actively involved in Hessen-based associations, as well as German and international ones, such as House of Energy, House of IT, Cyber Alliance, Teletrust and Afcea. [www.qgroup.de](http://www.qgroup.de)

**Tractebel**, as an active driver of the energy transition, delivers comprehensive engineering and consulting services covering projects entire life cycle, including development and project management. As one of the world's largest engineering companies, with more than 150 years of experience, our mission is to take an active role in shaping the world of tomorrow. With around 5,000 experts and offices in 33 countries, we develop multi-disciplinary solutions in the fields of energy, water and infrastructure. In December 2014 Tractebel, with headquarters in Brussels, acquired the Lahmeyer Group, following which Lahmeyer International changed its name to Tractebel Engineering GmbH in 2019. [www.tractebel-engie.de](http://www.tractebel-engie.de)