Networks, energy and process engineering

Together with our clients and research partners, we design plants ranging from simple test facilities to large performance classes, implement our designs in practice and optimise plant operation. We simulate processes, plants and their components, design systems and their components based on these simulations, and develop complex control strategies. Our work also focuses on sector coupling.

Dipl.-Eng. Christoph Nolden

"We are driving the transformation process in the fields of industry and energy supply with the help of future-proof concepts for heat, natural gas and hydrogen."

christoph.nolden@ieg.fraunhofer.de

Our competencies are

- Process engineering
- Natural gas, hydrogen & material infrastructures
- Heat grids 4.0
- Thermodynamic converters

Control, Automation & Operation Management

The transformation of today's energy systems requires profound changes in operational management, control and automation. We research and develop flexible operation, control and monitoring strategies based on distributed, intelligent and digitally networked subsystems for the implementation of sector coupling. These challenges are addressed by combining new methods of artificial intelligence with modern concepts of automation, control and monitoring technology.

Prof. Dr. Johannes Schiffer

"This transformation is only possible with the help of increasing (distributed) intelligence, networking and digitisation."

johannes.schiffer@ieg.fraunhofer.de

Our competencies are

- Monitoring and artificial intelligence
- Energy management and control
- Automation of energy systems and plants
- Data-based energy services

Fraunhofer IEG

Fraunhofer IEG is both a pioneer in the energy transition and an independent mediator between science, business and politics. Working in close collaboration with its partners, Fraunhofer IEG provides the expertise needed to decisively develop innovative technologies in the fields of hydrogen, sector coupling and geothermal energy through its six business units.

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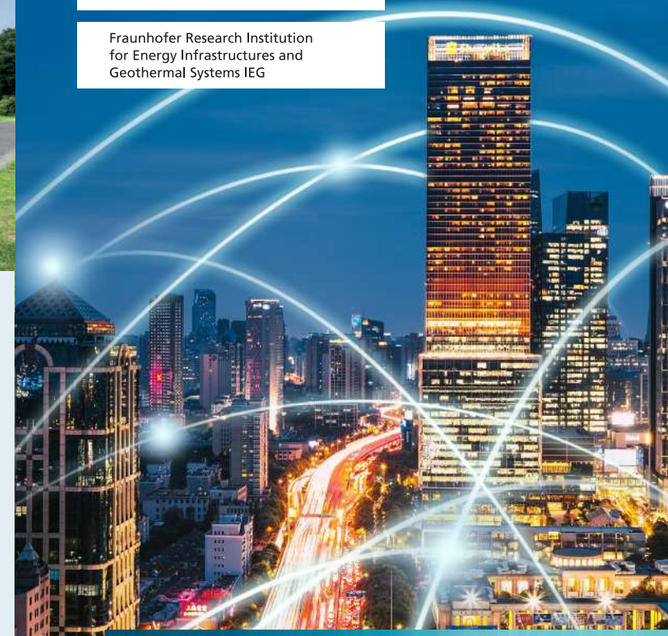

The A-Z of Energy

Shaping the climate-neutral energy systems of the future

Integrated planning of infrastructure, neighbourhoods and buildings

We develop individual models, methods and solutions for the analysis of sector-coupled infrastructures thereby supporting politics and corporations along with planners and developers of neighbourhoods. Through our models, we analyse both European transport networks and municipal distribution networks for electricity, heat, natural gas and hydrogen. By integrating infrastructure into planning and operation, we efficiently couple supply and demand and tap into flexibility potential. The goal is to better understand the market impact of, and the solutions for, the energy transition.

Our competencies are

- Integrated energy infrastructures
- Integrated neighbourhood planning
- Building energy supply/integration
- System transformation and technology transfer

Dr. Benjamin Pfluger

"We develop strategies for sector-coupled energy infrastructure in integrated neighbourhood planning to treat infrastructure as a critical cornerstone of the energy transition."

benjamin.pfluger@ieg.fraunhofer.de

Storage & underground systems

We develop innovative solutions for underground and aboveground extraction and storage systems as well as their coupling to local to municipal supply infrastructures. Our services include research-oriented site analyses and feasibility studies for energy technology applications to determine the basic suitability, design and economic viability of planned geothermal plants. Subsequently, concepts for heating and/or cooling are developed based on site factors and building characteristics.

Dipl.-Geophys. Gregor Bussmann

"Even after the end of the fossil energy age, underground storage will play a crucial role. We want to use this efficiently for future networked energy infrastructure."

gregor.bussmann@ieg.fraunhofer.de

Our competencies are

- Post-Mining exploitation
- Deep geothermal energy and borehole systems
- Near-surface geothermal energy
- Storage for materials and heat

Geotechnologies

In close cooperation with industry and research institutions, we develop innovative thermal, hydraulic and mechanical drilling methods and apply these in industry. We also develop reservoir and risk models based on seismic exploration, laboratory tests or borehole geophysical measurements. Analyses are supplemented by field tests along with production and injection tests on the hydraulic properties of the reservoirs.

Dipl.-Eng. Dirk Boernecke

"Utilising the ground beneath our feet through wells or mines is a long-standing tradition. This can also be used in the energy transition through geotechnologies."

dirk.boernecke@ieg.fraunhofer.de

Our competencies are

- Innovative drilling methods
- Deep drilling technology and completion
- Reservoir Engineering
- Geo risks and risk management

Georesources

In our project work, we offer development and innovation in surface and borehole geophysics exploration methods, advanced reservoir simulation and management techniques, sustainable reservoir thermal performance estimation and underground storage and retrieval process optimisation, including the management and control of potential geohazards. Our laboratories test physical changes in rocks against water, saline solutions and gasses at depths of several thousand metres.

Our competencies are

- Exploration and reservoir simulation
- Geothermal geology
- Global Georesources
- Raw materials and resource management

Prof. Dr. Florian Wellmann

"We integrate digital data management in geoscientific modelling and simulation, seismic exploration, uncertainty analysis and reservoir geophysics."

florian.wellmann@ieg.fraunhofer.de