Research for Energy Transition and Climate Protection

Tackling climate change is not only a societal obligation but also one of the greatest economic opportunities of our time.

Guided by our »Smart Energy Systems« strategy, we at the Fraunhofer Institute for Energy Economics and Energy System Technology IEE have spent more than 35 years researching an energy supply based on renewable energy sources, both nationally and internationally.

We develop solutions to technological and economic challenges with the aim of safeguarding supply, cutting costs still further, driving digitalization in the energy sector and facilitating new business models for the energy transition.

Fraunhofer IEE

Director
Prof. Dr. Martin Braun

Human resources and revenue
- approx. 470 research scientists, staff and students
- approx. 40 million euros per annum

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Research Fields

Grid planning and grid operation
How can energy grid infrastructures be intelligently designed and operated to guarantee a resilient, safe and cost-effective energy supply both now and in a future decarbonized energy system?

Grid stability and power converter technology
How can power converters and drives, electrical grids and their operating equipment be further developed and controlled so that power systems function stably, efficiently and safely?

Energy process technology and storage
Which technology enables thermal, electrical and biochemical conversion processes to be integrated into energy systems both efficiently and economically?

Thermal energy technology
How and with which technologies can we structure the innovative implementation of the heat transition in buildings and cities?

Energy informatics
How can information technology support energy sector processes and ensure that the energy system functions even when most of the energy is generated decentrally?

Energy meteorology and geoinformation systems
How much potential is inherent in renewable energy and how can its spatial and temporal behavior be modeled and predicted?

Energy economics and system analysis
How should transformation pathways leading towards a decarbonized energy system be designed if we are to achieve the best possible techno-economic and socio-economic results?

https://www.iee.fraunhofer.de/en/research-fields.html

Our lead topics

- **Resilience**
  Stability and flexibility of the energy system
- **Energy systems integration**
  Hydrogen, heat grids, e-mobility
- **Digitalization**
  Smart processes, automation, AI
- **Transformation**
  Robust integrated transformation pathways

Fraunhofer IEE



Fraunhofer Institute for Energy Economics and Energy System Technology

Smart Energy Systems



At Fraunhofer IEE, we develop solutions for the safe and efficient operation of sustainable energy grids based on renewable energy sources.

We are making a major contribution to the transformation of energy supply systems by developing forward-looking innovations and putting them to practical use in cooperation with partners in science and industry.

We take an interdisciplinary approach and combine cost-efficient, technically advanced methods with the aim of continually optimizing the design of energy systems and enabling them to operate largely automatically.

We focus on a holistic, systemic perspective with resilience as a key design criterion. Our vision is to endow energy systems with cognitive capabilities using artificial intelligence.«

Prof. Dr. Martin Braun
Director Fraunhofer IEE

Fields of Application

Within its fields of application, Fraunhofer IEE bundles services, expertise and offerings in order to effectively and purposefully shape the transfer and scaling of scientific innovations in business, industry and society.

The spectrum ranges from techno-economic analyses and scenarios to the planning and operation of energy supply structures. We support our clients and partners at all stages from field testing to the optimization of energy system components.

An important role is played by the progressive integration of renewable, decentralized generators and the conversion of grid infrastructures such as electricity and heat grids. During this process, we take into account the changing requirements arising from the sector coupling of electricity, heat, gas and transportation.

Our goal is to balance fluctuating generation with flexible demand.

Services and solutions

The institute's services range from collaborative research in the context of consortium projects to contract research for industry.
Fraunhofer IEE also provides testing and consulting services for specific issues, develops prototypes and functional models and evaluates field tests.
We also make our extensive expertise in processes, algorithms and software solutions available to companies in the form of individual licenses.

Energy Forecasts

Analyses and forecasts of energy consumption, generation and feed-in from renewable energies, site assessments.

Energy Grids

Full range of services for the planning, development and operation of energy transition-compliant supply grids.

Energy Economics

Analysis, digitalization and optimization of safe, sustainable and efficient energy management processes.

Energy System Technology

Services and solutions for the safe and efficient development, simulation, optimization and integration of components and systems into the energy system.

More about our fields of application:
www.iee.fraunhofer.de/en/application-fields.html