Research Facilities

On the spacious 78,000 m² site, various testing facilities for renewable energy for social implementation have been established.

● Solar cell production line

We have established an integrated thin-film crystalline silicon solar cell production line and are developing mass production technology for solar cell modules that combine high efficiency, low cost, and high reliability. This line is capable of producing cells with conversion efficiencies equal to or greater than those of the manufacturer's mass-produced products.

● Electromagnetic wave anechoic chamber in the Smart System Research Facility

This facility can test and evaluate power electronics equipment, megawatt-class large power conditioners, etc., which are indispensable for smart distributed power generation for the mass introduction of renewable energy, under various power systems and weather conditions. The anechoic chamber in the photo is one of the largest of its kind in Japan, with an area equivalent to about five tennis courts.

Collaboration Activities

We provide technical assistance and human resource development related to renewable energy to companies, universities, and high schools located in the areas affected by the Great East Japan Earthquake.

● Results of technical assistance to companies in the affected areas

We provide technical assistance to companies in the affected areas with the aim of creating a new renewable energy industry in the region. Many projects and products have been commercialized to date.

● Outreach lectures to high schools and universities

We focus on fostering industrial human resources who will lead the renewable energy field in the future by holding lectures at high schools and universities and accepting students for study tours.

NATIONAL INSTITUTE OF
ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY

Fukushima Renewable Energy Institute, AIST (FREA)

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TEL 024-963-1805
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● **FREA Official Website**
https://www.aist.go.jp/fukushima/en/

AIST
Create the Future, Collaborate Together

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Fukushima Renewable Energy Institute, AIST

FREA

NATIONAL INSTITUTE OF ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY

About the Fukushima Renewable Energy Institute, AIST (FREA)

The world is beginning to move toward carbon neutrality. In the midst of this trend, expectations for renewable energy continue to rise. FREA opened in April 2014 as a new research center of the National Institute of Advanced Industrial Science and Technology (AIST), with two major missions: open, world-leading research on renewable energy and support for recovery from the disaster through the integration of new industries, based on the basic policy of recovery from the Great East Japan Earthquake. One of FREA's unique features is its large-scale demonstration fields located at its research sites. Taking advantage of this field, we conduct research for commercialization and product realization in collaboration with industry and universities. We are committed to developing innovative technologies and conducting research for social implementation so that we can contribute to the realization of a sustainable society with FREA's technologies.

Research Sectors

- General Affairs Office
- Collaboration Affairs Office
- DER Facility Operating Office

Research Promotion Organization

Department of Energy and Environment
Renewable Energy Advanced Research Center

- ○ Wind Power Research Team
- ◆ Perovskite Solar Cells Research Team
- ◆ Tandem Photovoltaic Research Team
- ◆ Compound Solar Cells Research Team
- ○ Photovoltaic Module and Application Research Team
- ◆ Photovoltaic Calibration, Standards and Measurement Research Team
- ○ Photovoltaic System and Application Research Team
- ○ Energy Network Research Team
- ○ Hydrogen Energy Research Team
- ◆ Hydrogen Energy Carrier Utilization Research Team
- ○ Geothermal Energy Research Team
- ○ Shallow Geothermal and Hydrogeology Research Team

(○: FREA ◆: AIST Tsukuba)

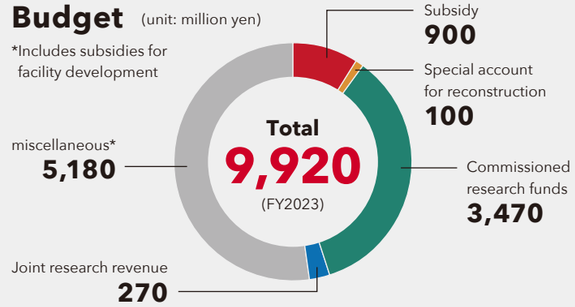
Personnel

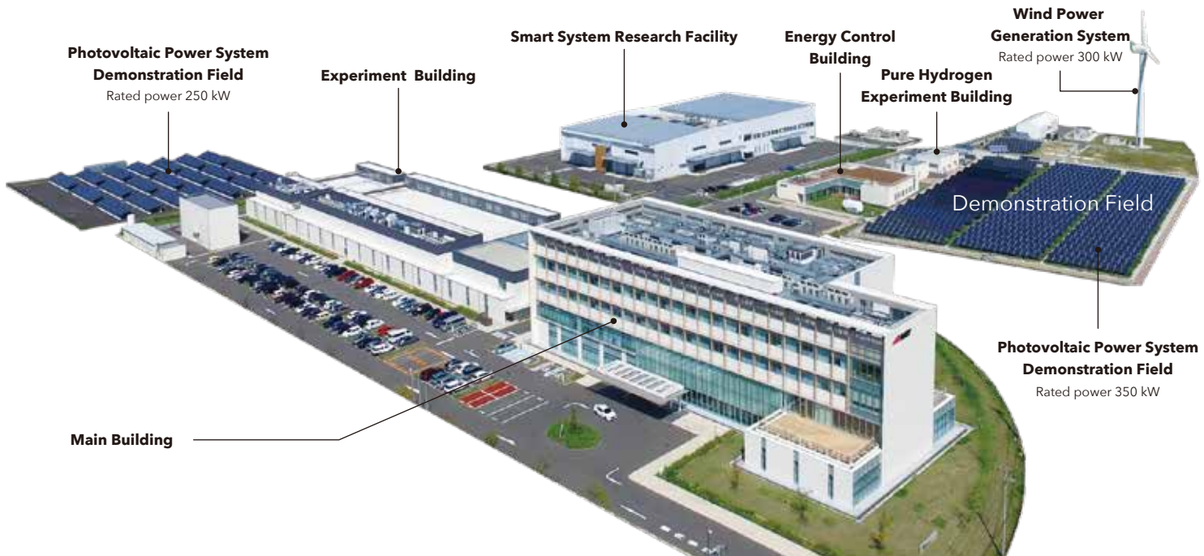
Total
304
*As of the end of March 2025.

Researchers	47
Administrative employees	17
Technical Employees	1
Contract employees (Including postdoc)	81
Others	158

Budget (unit: million yen)

*Includes subsidies for facility development



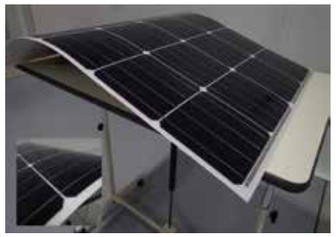


Research Outline

The Renewable Energy Advanced Research Center (READ) is the research unit engaged in R&D of renewable energy technologies in FREA. From core elemental technology to system integrations, from basic research to applications, we are working on quite wide aspect of R&D in renewable energy.

Expansion of Utilization of REs and Development of O&M Technologies for the Establishment of a Sure and Major Power Source

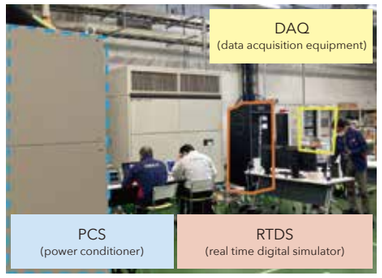
Research on photovoltaic operation and maintenance (O&M) technologies



Research on glassless lightweight and flexible modules for multiple applications

Research on technology to prevent deterioration (erosion) of wind turbine blades caused by raindrops, etc.

Next Generation Energy Network Technologies toward Carbon Neutralization

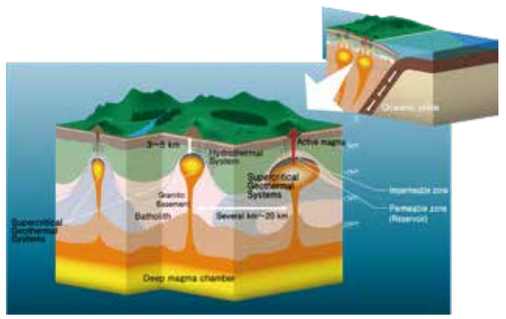


Development of hardware-in-the-loop (HIL) simulation environment for actual equipment

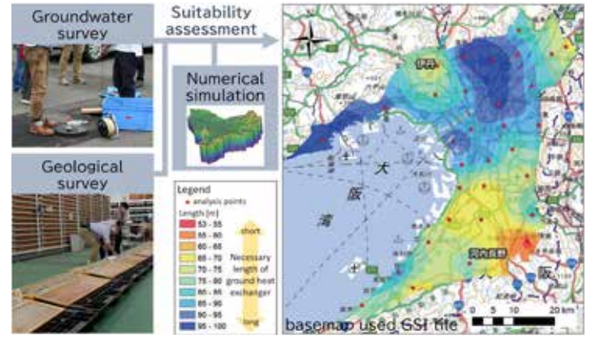
Development of building-attached hydrogen energy utilization system (Hydro Q-BiC®)

Development of a 100 % hydrogen engine for a 1 megawatt-class power generator

R&D and Construction of Databases for Expansion of Proper Utilization of REs



Supercritical geothermal systems with their origins in oceanic plate subduction



Creation of a geothermal heat potential map (closed-loop system) for the Osaka Plain