Outline

Personnel　268 (Research 246, Administration 22; As of January 2022)

Site area　170,000m²

History

1951 Electric Technology Research Institute was established in Komae City, Tokyo.

1952 Institute was renamed to the Central Research Institute of Electric Power Industry (CRIEPI).

1957 Agricultural Electricity Laboratory was established in Abiko City, Chiba Prefecture.

1970 Civil Engineering and Geology Research Department were transferred from Komae area to Abiko area and expanded to form Technology Laboratory II.

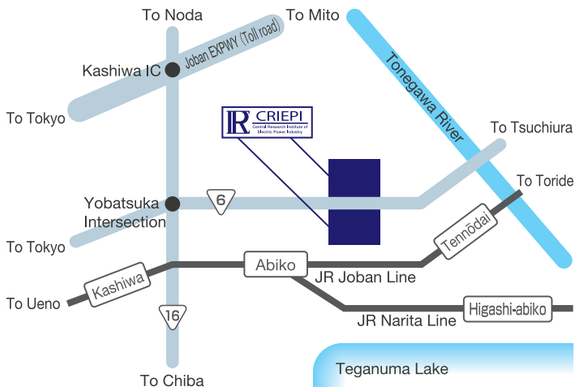
1975 Technology Laboratory II and Agricultural Electricity Laboratory were renamed to Civil Engineering Laboratory and Bio-Environment Laboratory.

1986 Civil Engineering Laboratory and Bio-Environment Laboratory were consolidated into Abiko Research Laboratory.

2004 Abiko Research Laboratory and Komae Research Laboratory's Atmospheric Science Department were reorganized into Civil Engineering Research Laboratory, Environmental Science Research Laboratory and Abiko Operation and Service Center.

2021 Civil Engineering Research Laboratory and Environmental Science Research Laboratory as well and Radiation Safety Research Center that was transferred from Komae area were reorganized into Sustainable System Research Laboratory.

Access



- A 30-minute drive from the Kashiwa Interchange of the Joban Expressway.
- A 20-minute walk or 7 minutes by taxi from JR Abiko Station on the JR Joban Line (JR Abiko Station is approximately 35 minutes from Ueno Station when using the rapid line).
- A shuttle bus for commuters departs from the North Exit of JR Abiko Station on weekdays only.

Shuttle Bus Timetable

Central Research Institute of Electric Power Industry
https://criepi.denken.or.jp/en/
Contact: Abiko Operation and Service Center
1646 Abiko, Abiko-shi, Chiba 270-1194, Japan
Phone: +81-4-7182-1181　Fax: +81-4-7184-1336

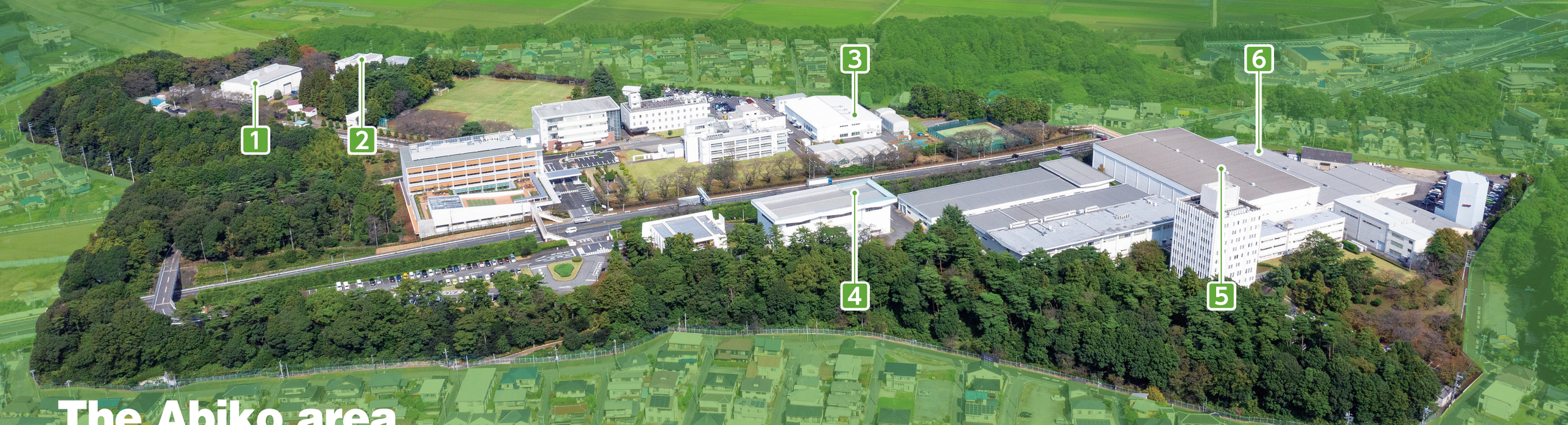
For details, please visit our website.
CRIEPI Search

March 2022

CRIEPI
Central Research Institute of Electric Power Industry

ABIKO Area

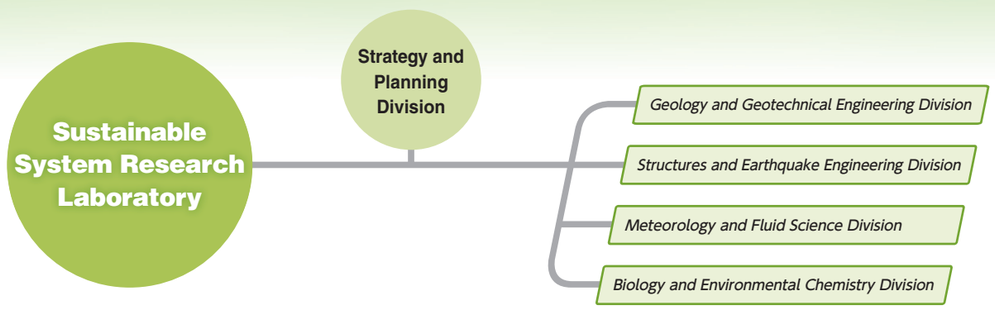
- ◆ Sustainable System Research Laboratory
- ◆ Abiko Operation and Service Center
- ◆ Procurement Center



The Abiko area is the research base of Natural and Environmental Science.

Sustainable System Research Laboratory

The Sustainable System Research Laboratory (SSRL), headquartered in the Abiko area, is a group of experts in areas such as civil engineering, earth science, environmental chemistry, biology and agricultural science. Major aims of the SSRL include reinforcing the resilience of electric power facilities and equipment through effective disaster prevention, operation and maintenance; supporting the siting and operation of electric power facilities based on environmental impact and risk assessment; realizing the stable and sustainable use of nuclear power through research and development relating to the radioactive waste disposal and radiation safety. The SSRL also engages in technology development on offshore wind power generation and other forms of renewable energy, and on carbon and resource recycling with a view to realizing carbon neutrality.



Abiko Operation and Service Center

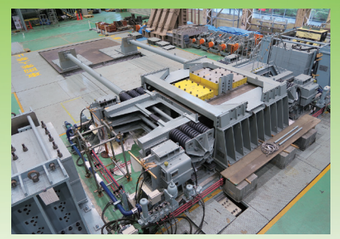
The Abiko Operation and Service Center conducts various business related to the management and operation of the Abiko area, such as general affairs, disaster-preventive, safety and health measures and regional support.

Procurement Center

The Procurement Center formulates policies and rules relating to CRIEPI's procurement activities and engages in related work tasks (procurement contracts, etc.).

Main facilities and equipment in Abiko area

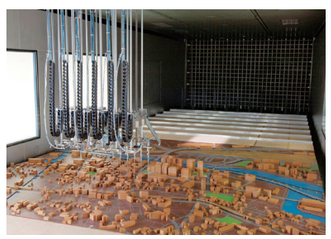
1 Geotechnical Centrifuge System



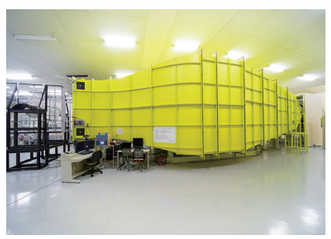
4 Strong Shake Generation -Resonance type shaking table-

2 Experimental Animal Facility

5 Large-Scale Tsunami Physical Simulator



3 Environmental Wind Tunnel System



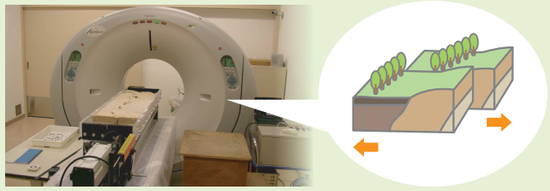
6 Eiffel-Type Wind Tunnel

Main Research by Sustainable System Research Laboratory

Technology to Protect Electric Power Facilities from Natural Disasters

Earthquake-resistant/tsunami-resistant design techniques and countermeasure technology are developed through various experiments and on-site observations in order to protect power plants; power transmission, distribution and transformation facilities; etc. from natural disasters such as earthquakes and tsunamis.

● Fault



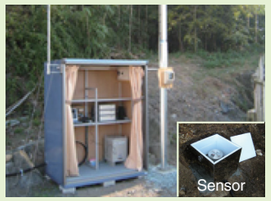
Analysis of three-dimensional fault process using a helical X-ray CT device (strike slip fault)

Ground surface displacement along the Yunodake fault caused by earthquake triggered by the 2011 off the Pacific coast of Tohoku earthquake

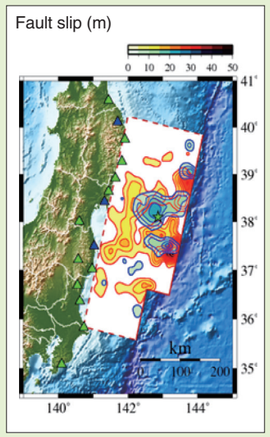
Trench survey

● Earthquake and Seismic Motion

Mobile seismic array observation unit

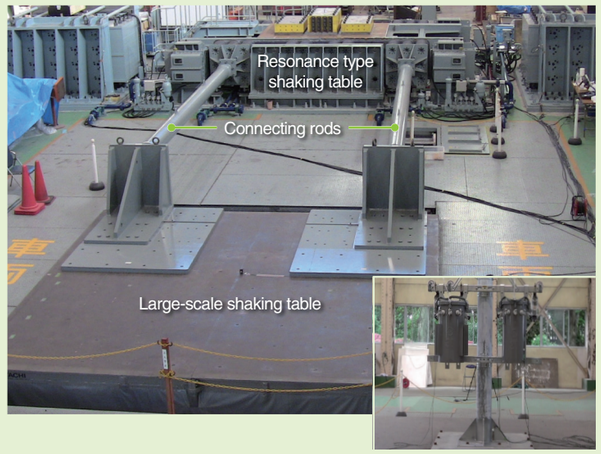


Strong-motion earthquake observation point on an outcropping rock (Ishinomaki)



Analytical results of fault slip in the 2011 off the Pacific coast of Tohoku earthquake

● Earthquake Resistance



Transformer vibration experiment using a large-scale shaking table

● Tsunami

Collision experiment using flotsam

Active fault model experiments and investigations

The magnitude scale and ground surface displacement fractured by the active fault are evaluated.

Earthquake observation and analysis

Sophisticated earthquake observation and analysis technologies are applied to design earthquake decision of electric power facilities.

Large-scale shaking table and resonance type shaking table

The main equipment of experiment, a large-scale shaking table (maximum seismic wave of 2G) and a resonance type shaking table (maximum sine wave of 20G), are applied to earthquake resistance evaluation of electric power facilities.

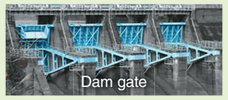
Experiments using large-scale tsunami physical simulator

This facility faithfully reproduces a giant tsunami flooding into land on a large scale. The obtained results are used to decide countermeasures against disasters. (Maximum flow rate: 10 t/s; maximum flow velocity: 7 m/s)

Maintenance Technology for Electric Power Facilities

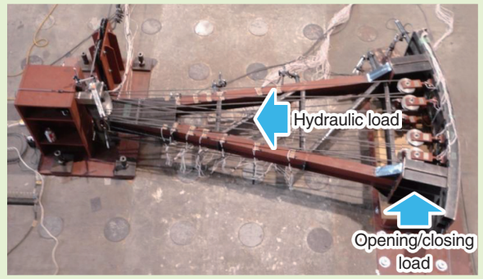
Experiments, on-site observations, and numerical simulations are performed to maintain and ensure the integrity of electric power facilities such as hydroelectric dams, power transmission facilities, etc.

● Hydroelectric Power Generation



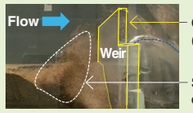
Strength tests of dam gate

Structural experiments for evaluating the residual proof stress of gates are performed aiming for service extension of existing gates.



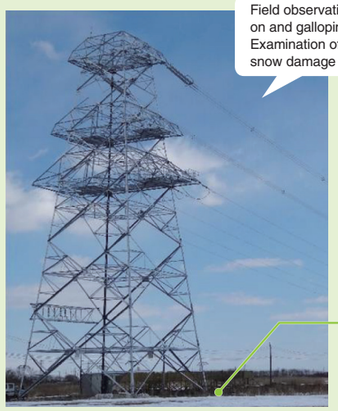
Hydraulic model experiments of sediment scouring

This model experiment reproduces the situation when the sediment accumulated near the gate is scoured out by a strong current caused by the dam gates opening.

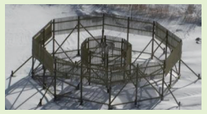


Strength tests of dam gate and hydraulic model experiments of sediment scouring

● Power Transmission Facilities



Field observation of snow accretion on and galloping of conductor, Examination of measures against snow damage



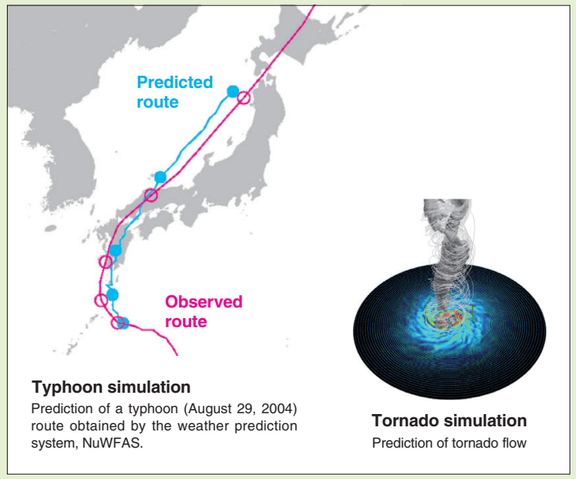
Weighing type rain gauge with double fence

Observation of behavior of steel pipe pile foundation

On-site observation of power transmission facilities

The behavior of snow accretion on power transmission facilities and shaking overhead transmission lines under natural wind/snow environments are observed. Furthermore, the fundamental behavior of pile foundation supporting transmission tower under earthquake is observed. The obtained results of these observations are applied to the maintenance of power transmission facilities.

● Weather



Typhoon simulation

Prediction of a typhoon (August 29, 2004) route obtained by the weather prediction system, NuWFAS.

Tornado simulation

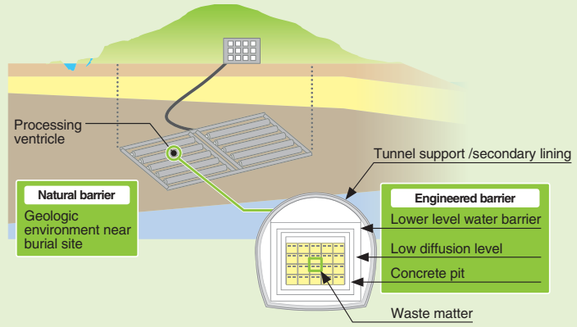
Prediction of tornado flow

Typhoon and tornado simulation

Global weather (typhoons) and local weather (tornados) are predicted; the obtained results are used for disaster prevention and maintenance of electric power facilities.

Technology for Radioactive Waste Disposal

It is believed to be appropriate to first seal radioactive waste in an engineered barrier, then bury it in a stable stratum (natural barrier). We are developing technology for investigating and evaluating the long-term safety of radioactive waste disposal facilities.



Natural barrier

Technology to investigate the characteristics of stratum and groundwater as well as the future stability of geological environments

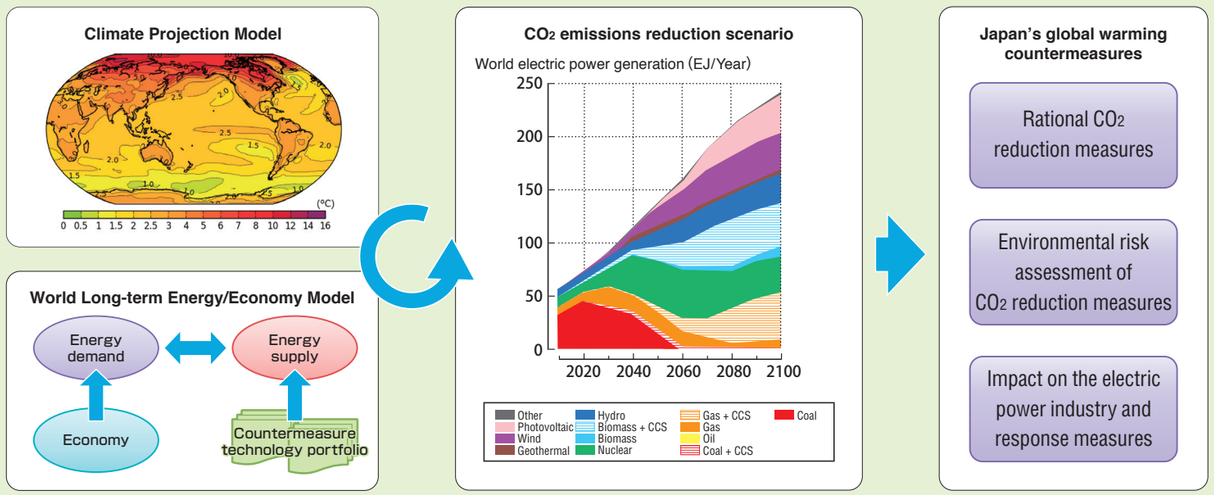
Engineered barrier

Technology to investigate the long-term performance of engineered barrier materials (bentonite/cement)

Conceptual example of intermediate disposal facility for low-level radioactive waste

Response to Global Warming Issues

We evaluates the validity of emissions reduction targets of both Japan and the entire world, based on the latest climate science and energy technology knowledge. We evaluate the feasibility and risk of emissions reduction technology such as CO_2 capture and storage technologies, as well as the impact of global warming on society and the electric power industry, and disseminate information in order to establish rational global warming countermeasures.

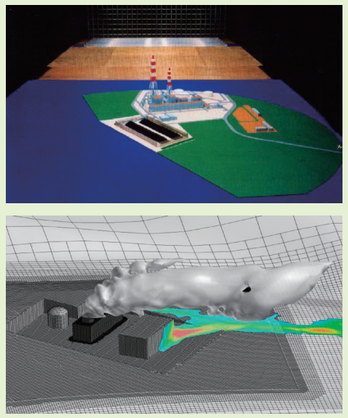


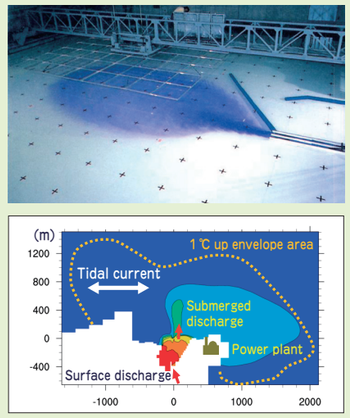
Integrated assessment of climate, energy and economy to establish global warming measures

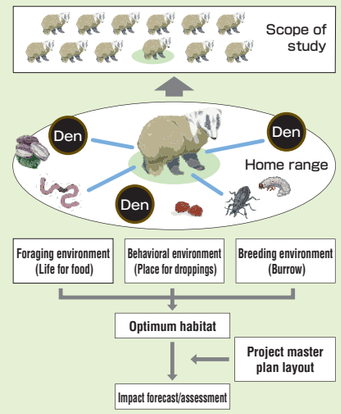
We integrate the climate projection model and energy/economy model and investigate feasible scenarios for CO_2 emissions reduction from the perspective of climate science and energy technology.

Environmental Impact Assessment of Power Plants

Utilizing the impact assessment experience and technology of atmospheric environments, coastal environments and biological/ecological systems that were accumulated to date, we develop assessment methods and numerical models responding to the primary environmental impact consideration, which newly emerged as an issue after the amendment of the Environmental Impact Assessment Law, as well as responding to the simplification and acceleration of assessments, etc.







Exhaust gas dispersion forecast based on a wind tunnel experiment (top) and numerical model (bottom)

We utilize dispersion forecast knowledge based on wind tunnel experiments to develop 3D numerical models and PC-based simplification simulation methods with the aim of shortening assessment timeframes, reducing costs, etc.

Prediction of warm water dispersion; a hydraulic experiment (top) and a numerical model (bottom)

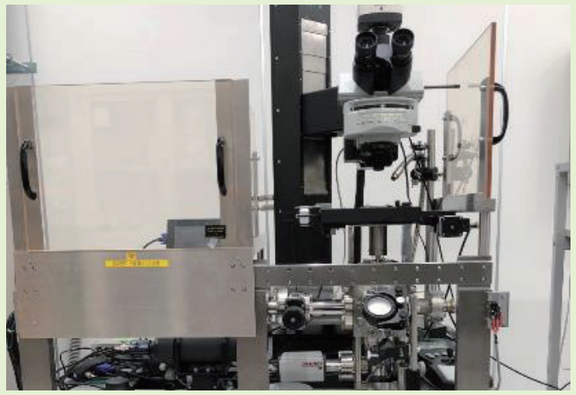
We develop 3D numerical models and PC-based simple simulation method to predict the warm water dispersion, utilizing the experience and knowledge of hydraulic experiment.

Quantitative impact assessments on terrestrial ecosystems

We develop impact assessment methods from the perspective of animal habitats in order to conserve biodiversity.

Effect Assessments for Low-Dose-Rate Radiation

We are working on research to clarify the mechanisms of dose rate effects in stem cells and to estimate radiation risk at low dose rates quantitatively by utilizing experimental systems such as the Microbeam X-Ray Irradiation System, which makes it possible to mimic the situation of cells at low dose rates.

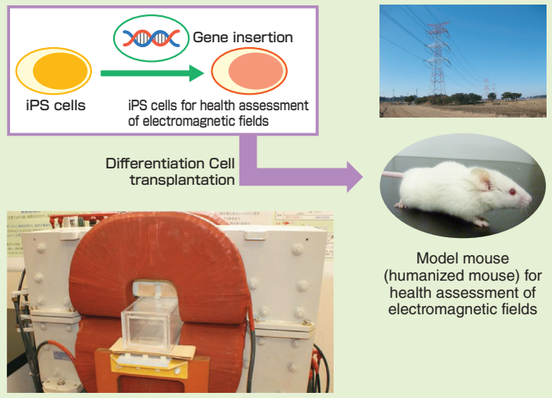


Microbeam X-Ray Irradiation System

We combine a cell culture function, fluorescent microscope and X-ray microbeam irradiation device and utilize them in single-cell-targeted irradiation experiments.

Health Assessment of Electromagnetic Fields

We develop novel assessment technologies using human iPS cells and humanized mice in order to investigate the effect of the electromagnetic field which is generated by power cables, etc., on human health.

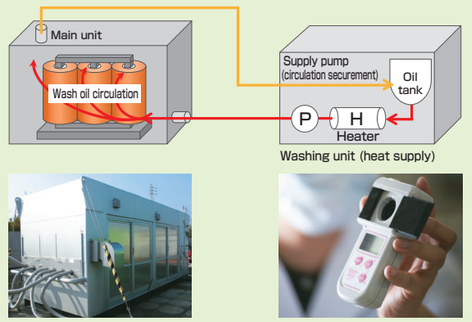


Generation of humanized mouse model (top) and a magnetic field exposure unit (bottom)

The human hematopoietic cells induced from iPS cells are transplanted in mice to create humanized mice. These mice are used to investigate if there is health impact due to exposure to magnetic field.

Treatment of Electric Devices Contaminated with Trace Amounts of PCB

We engage in the development of technologies such as those for simple PCB measurement which identifies the contamination scope and those to economically treat contaminated devices regarding the wide variety of transformers owned by the electric power industry in an attempt to solve the issue of electric devices contaminated with trace amounts of PCB.

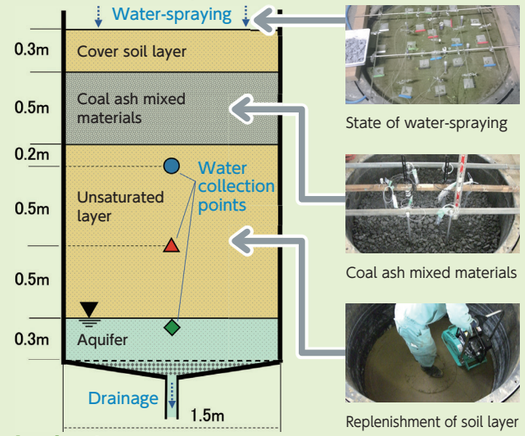


Heated forced circulation washing technology for contaminated transformers (top, bottom left) and a biosensor to simply measure PCB concentration

Heated forced circulation washing targets used transformers and washes out PCB by forcefully circulating heated washing oil. Regarding contaminated transformers still in use, we are developing energized natural circulation washing technology to enable washing during operation. PCB biosensors are already utilized in the pollution assessment of 500,000 transformers.

Assistance with Effective Utilization of Coal Ash

We engage in the development of new uses of coal ash, such as their inclusion in geopolymers, artificial reefs and replanting materials for weed proofing, as well as the development of methods for adequately and swiftly assessing the quality of coal ash and finished products thereof.



Lysimeter

Through constructing a soil layer that contains coal ash mixed materials in its column and watering it with artificial rainfall, we evaluate matter movement behavior within the soil and its effects on groundwater.