

# Business Outline

In the fiscal year 2019, Central Research Institute of Electric Power Industry (CRIEPI) formulated a new medium- to long-term strategy to set the future direction of the institute and produce a consistent pipeline of insightful research publications, which can cater to the evolving needs of the electric power industry and society.



## OUR VISION FOR TOMORROW

In response to the changing dynamics in energy supply and demand patterns, including but not limited to decarbonization initiatives, digital transformation, and population decline in Japan, we have created a medium- to long-term research plan to drive innovation in energy technologies and systems. **Seven goals** for the future were set (see page 2), based on the realization that it is paramount for Japan to achieve the vision of "Energy System for Sustainable Society" by 2050.

Envisioning our seven goals for 2050, we have started reviewing of our research line-up and optimizing of our existing organizational structure. We will relentlessly strive to produce highly relevant contents, while enriching our knowledge in the current critical areas of research. Furthermore, we will also identify new research areas that need to be taken up in a phased manner to shift the entire research portfolio to achieve the seven goals.

At the same time, as society becomes increasingly complex, we intend to focus on the challenges and issues of the electric industry that cannot be solved simply by applying a single technology. We will integrate the advanced expertise that has been developed in the individual fields and take a bird's eye view of the entire system to address these complex needs.

Through this holistic approach, our research can be effectively adapted and scaled up to derive societal benefits. To this end, we have begun to strengthen our research offerings, focusing on topics such as "Ensuring Stability of Entire Electric Power System", "Establishment of Energy Conversion & Storage Systems", "Establishment of Wide-Area Disaster Countermeasure Technology", and "Quantification of Nuclear Safety".



## WE ARE THE ANSWER...

During the fiscal year 2019, we invested our internal resources in developing research needed to solve the complex challenges in the electric power industry in Japan. In the nuclear sector, we worked on quantifying the safety of nuclear power plants, including developing a probabilistic risk assessment (PRA) guide for internal fire incidents at nuclear power plants. In terms of renewable energy (RE) sources penetration, we developed a “Supply-Demand Operation Simulator” to assess the impact of increased RE sources integration into the grid. We have also developed a frequency control technology to cope with large generator tripping due to intermittent RE from the power grid.

Research activities funded by government agencies are important part of our business to contribute to the promotion of energy-related policies and to the development of the industrial codes and standards. These activities offer us valuable opportunities to acquire new knowledge to incorporate into overall research and development in the electric power industry. Our major projects in the fiscal year 2019 include “Technology development for the improvement of nuclear power safety” funded by the Ministry of Economy, Trade and Industry (METI) and “Technology development for the stabilization of the power grid of next-generation under the massive adoption of renewable energy sources” funded by the New Energy and Industrial Technology Development Organization (NEDO).

## WE ARE PREPARED...

The research ability of young scientists is central to CRIEPI’s research power. We encourage young scientists to tackle new subjects to enhance their capability and inspire passion. Our scientists undertake long-term assignments at overseas institutions and/or domestic electric power utilities to equip themselves with a high degree of expertise and deep understanding of the electric power industry. [See "Personnel" on p. 62](#)

Investment in experimental facilities is another critical aspect of CRIEPI’s research capability. We continuously invest resources to introduce new, original, and, in some cases, large-scale experimental facilities to obtain results that can directly contribute to solutions to resolve industry concerns. The “**High Reliability Test Facility for Lithium-ion Batteries (Charge/Discharge Testing Facility)**” is one such facility we introduced in 2019, where we expect further contributions to improve the lifetime assessment and better understand the safety parameters of commercial batteries for power applications.



## WE ARE PASSIONATE...

We participate in various committees of the government and academic societies and contribute to the formulation of energy-related standards and criteria as well as policy planning by utilizing our knowledge and technologies.

To make our research insights widely available to the electric power industry and society, we publish research reports and academic papers. Moreover, we develop, license, and implement various patents and software.

See "Research Reports and Papers" on p.59, "Patents" on p.60, and "Software" on p.61

We are developing a free version (CPATFree©) of CPAT© for overseas use, which is the de facto standard for power system analysis in Japan.

We contribute to the development of technical personnel who have a critical role to play in shaping the future of the energy field by dispatching visiting professors and accepting internships based on cooperative graduate school agreements.

We conduct short-circuit tests on transformers and other power equipment at our high-power test laboratory on behalf of power companies and manufacturers.

See "High Power Short-Circuit Tests" on pp. 48-50

In addition, as a "PD qualification testing organization" under the PD (Performance Demonstration) certification system, we continue to conduct qualification testing of ultrasonic inspection engineers for nuclear power equipment.

We are working to build an environment that encourages collaboration in different fields and allows researchers to demonstrate their comprehensive research capabilities. In particular, we are improving the development of research bases, with the Yokosuka area as a "base for energy industry technology research" and the Abiko area as a "base for natural and environmental science research".

See "Locations" on p.63

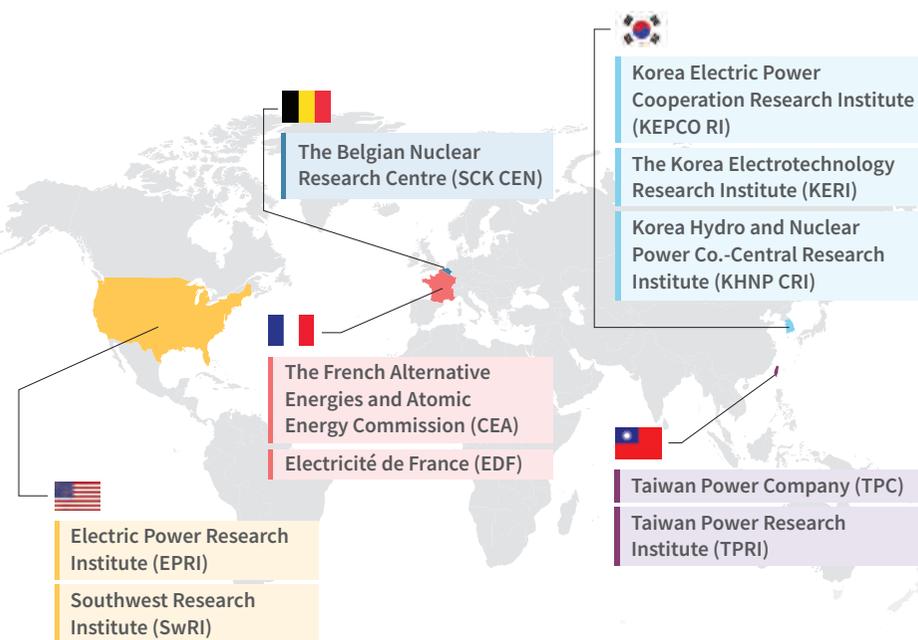
## ...AND WE ARE NOT ALONE

We continue to maintain and strengthen **our research network** with leading Institutions across the world (see below).

CEA (France), EDF (France), EPRI (United States), KEPCO RI (Korea), KERI (Korea), KHNP CRI (Korea), OECD/NEA (International Organization), SCK-CEN (Belgium), SwRI (United States), TPC, TPRI (Taiwan)



Annual meeting with EDF



Organisation for Economic Co-operation and Development/Nuclear Energy Agency (OECD/NEA: International Organization)

Partners for Research Cooperation Agreements