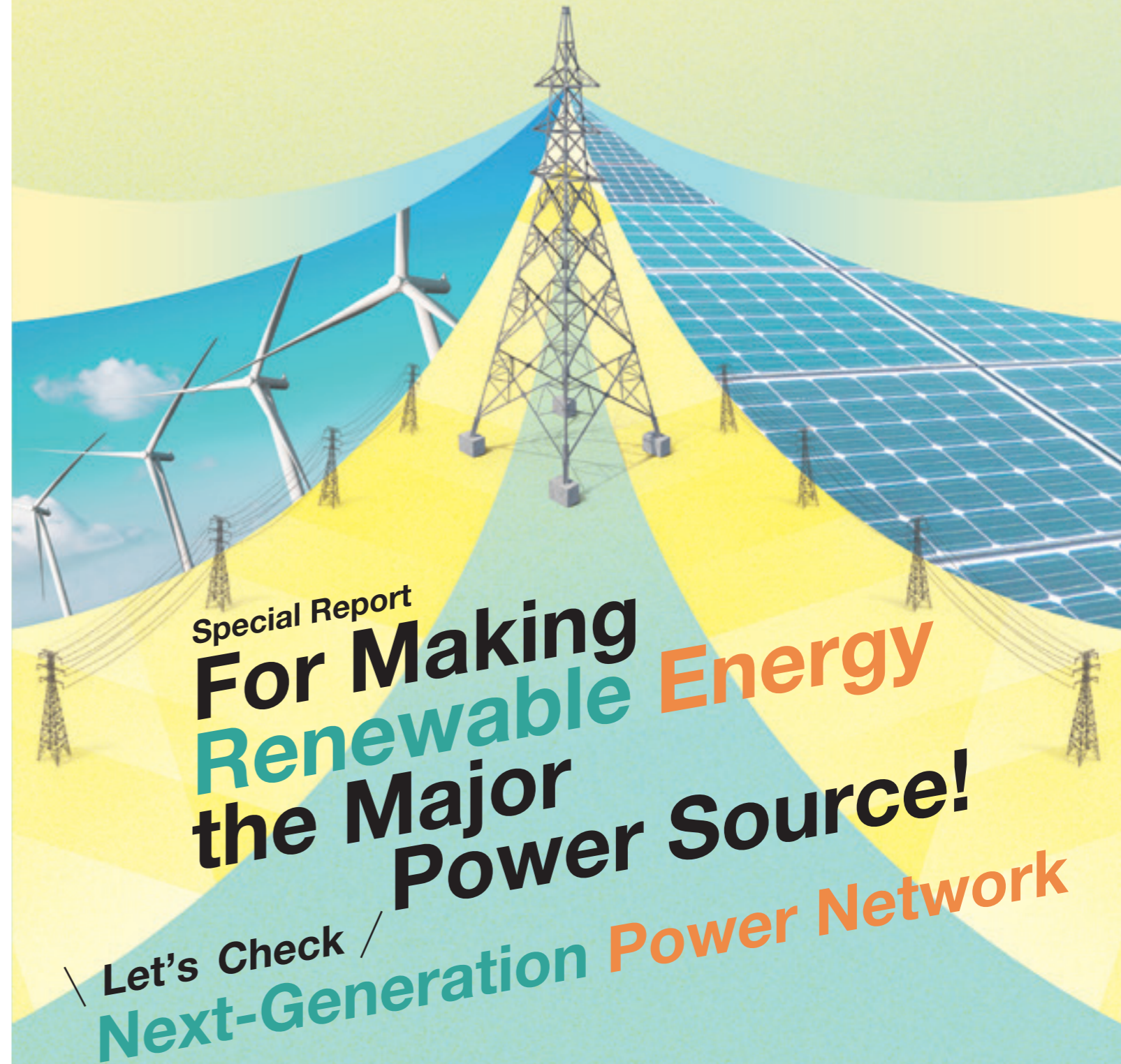




focus²⁰²⁴ No.90 NEDO

Reporting on Today and Tomorrow's Energy, Environmental and Industrial Technologies



Special Report
**For Making
 Renewable Energy
 the Major
 Power Source!**

Let's Check /
Next-Generation Power Network

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Towards New Social Innovation with the "5G Core Network" Offering 2.8 Times Faster Data Processing Speeds than Conventional Networks!

5G services, which have been provided mainly by major telecommunications carriers, will bring significant changes not only to telecommunications networks such as mobile phones but also to a wide range of industries, including transportation, logistics, manufacturing, medical care, education, and tourism. However, the more diverse the use of 5G networks, the greater the volume of communications data will be and the more difficult it will be to plan and manage traffic, which will require greater agility, flexibility, and reliability to cope with these challenges. There will also be a need for an operational system with high capacity and energy conservation that can handle increased traffic and circuits.

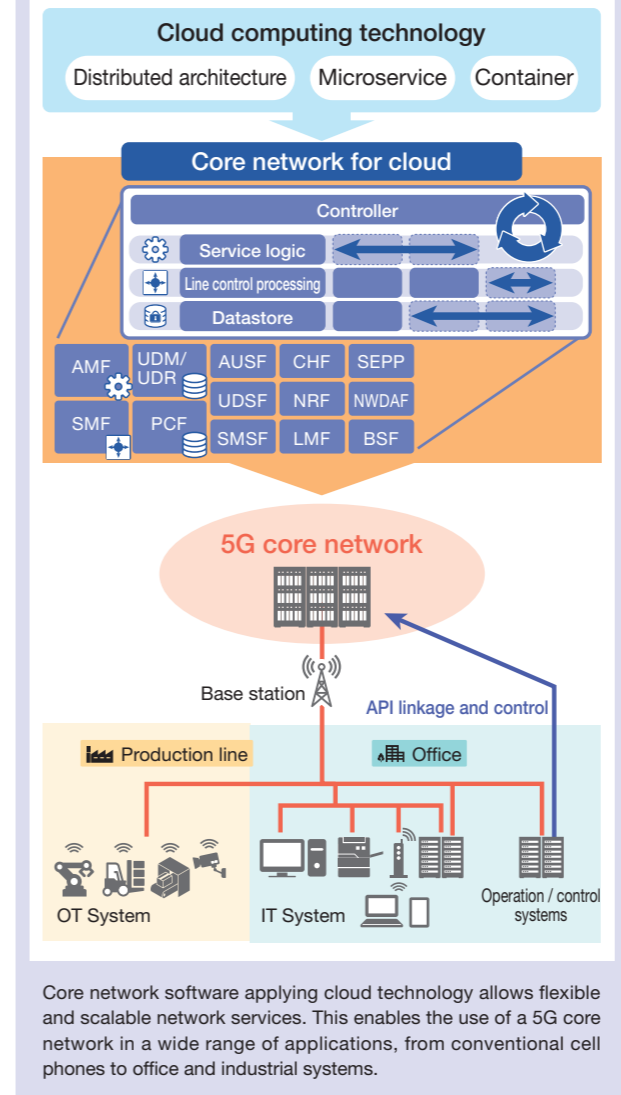
NEDO and NEC Corporation have successfully developed a 5G Core Network (5GC: 5th Generation Core Network) for industrial IT systems through the initiative "Research and Development on Cloud Technology Extensions that Combine High Reliability and

Flexibility to Realize Mobile Core in the Post-5G Era."

In this project, services and communication processes are divided into units of microservices using cloud technology. This cloud technology can flexibly respond to the diversification of services and the growth of traffic. It also includes Open API* that can be accessed from external network systems to configure and control the network. In addition, the cloud technology is equipped with a system that can update functionality without interrupting services and a system that does not go down even when excessive load is concentrated, which ensures the high reliability essential for telecom networks that form the social foundation.

On the other hand, traffic growth brings about a problem of increased power consumption. To solve this problem, we have developed technology to transfer packets at high speed by utilizing hardware and load detection technology that dynamically controls hardware resources. These technologies offer 2.8 times larger data

5G Core Network and Its Application to Industrial Systems



transferring volume (throughput) per unit of power consumption than conventional networks. At the same time, power consumption can be reduced by up to 20% when the traffic is free.

Various services, networks, and applications must be integrated to optimize the entire system in the future. NEDO aims to develop core technologies for information and communication systems for Japan's post-5G era and strengthen manufacturing infrastructure to realize a network infrastructure that connects all people and things.

*Application Programming Interface

Please scan here to view NEDO News Release:
https://www.nedo.go.jp/news/press/AA5_101680.html



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EDITOR'S VOICE

A Few Words from the Editor

No. 90 With the title of "For Making Renewable Energy the Major Power Source!" this edition features initiatives of the Grid Interconnection Group, Smart Community and Energy Systems Department, and NEDO, which aims to develop technologies for the large-scale introduction of renewable energy by the team. This edition will introduce the current status of the "Japanese-Version of Connect & Manage," which "Team GRID" is working on.

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Team GRID!

The Interconnected System Group
Smart Community and Energy Systems Department
NEDO

Special Report

For Utilizing Renewable Energy as the Major Power Source!

Let's Check Next-Generation Power Network

With all the team's efforts Challenge to Develop Technologies for the Mass Introduction of Renewable Energy!

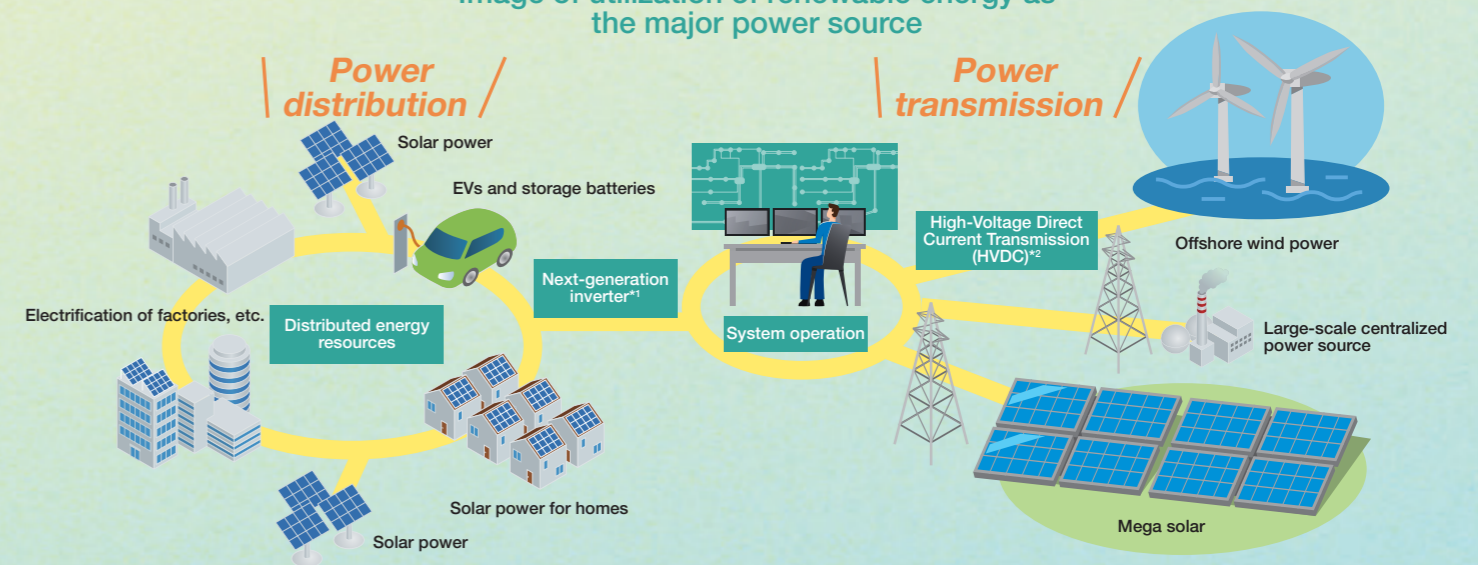
The mass introduction of renewable energy is an essential element towards carbon neutrality. However, some issues must be solved to make renewable energy the primary power source. Outside of cost and environmental impact, the most important factor for a stable supply of power is to achieve a balance between demand (the amount of power to be used) and supply (the amount of power to be generated). If this balance is broken, it can lead to a massive blackout in the worst-case scenario. In addition, since the amount of electricity generated from renewable energy sources is easily affected by weather and climatic conditions, the amount of electricity generated is currently adjusted by thermal power generation and other methods to prevent an imbalance between supply and demand. Therefore, to accept more renewable energy into the existing power transmission and distribution grids, it is necessary to solve various issues, including balancing supply and

demand.

NEDO has launched a variety of projects, and team members are working together to solve the issues for achieving carbon neutrality in 2050 to introduce renewable energy on a mass scale. In particular, the Interconnected System Group of the Smart Community and Energy Systems Department oversees areas related to power grids. They conduct research and development on next-generation power network technologies for the mass introduction of renewable energy.

From page 6, NEDO will introduce a project called "Next-Generation Power Network Stabilization Technology Development for Large-Scale Integration of Renewable Energies," which started in FY2019, among four projects that are currently undergoing research and development. The theme of Japanese Version of "Connect & Manage" will be explained in an easy-to-understand manner. This is an effort to develop and demonstrate control systems that maximize the use of existing transmission facilities to use the power from renewable energy sources at a cost as low as possible.

Image of utilization of renewable energy as the major power source



Representative Projects Currently in Progress

Next-Generation Power Network Stabilization Technology Development for Large-Scale Integration of Renewable Energies	Project period: FY2019 to FY2023
Research and Development of a Multi-Purpose and Multi-Terminal HIGH Voltage Direct Current Transmission System (RIGHT Project)	Project period: FY2020 to FY2025
Future-Generation Power Network Stabilization Technology Development for Utilization of Renewable Energy as the Major Power Source (STREAM Project)	Project period: FY2022 to FY2026
Development of Flexible and Distributed Energy Resources Control Technology to Mitigate Congestion in Power Systems (FLEX DER project)	Project period: FY2022 to FY2026

*1 Equipment to convert DC power into AC power by using the switching action of semiconductor devices for power.

*2 A system that uses high-voltage "DC" for power transmission.

It has low transmission loss, can transmit large amounts of power over long distances, and is also suitable for interconnecting grids with different frequencies.

Next-Generation Power Network Stabilization Technology Development for Large-Scale Integration of Renewable Energies / Development of Control System for the Japanese-Version of Connect & Manage

For the Japanese Version of "Connect & Manage," A Big Step Toward Decarbonization



What Is the Japanese Version of "Connect & Manage"? Why Do We Need It?

Ogasawara: Although renewable energy generation is now familiar to us all, there are still various challenges to be addressed in order to further expand the introduction of renewable energy sources toward carbon neutrality by 2050. One of them is the "constraints on capacity for power transmission." The existing power grids have a fixed "capacity" for the power flow, so even if one would like to promote renewable energy generation business, insufficient capacity limits the ability to transmit the electricity produced.

Kishi: Many people may think that we should reinforce the grids if there is limited capacity. However, the reinforcement of grids costs a great deal of money and time. The cost will eventually be covered by consumers who use the electricity. Therefore, to be accepted by the electricity market, we must be able to introduce renewable energy at as low a cost as possible at the earliest point.

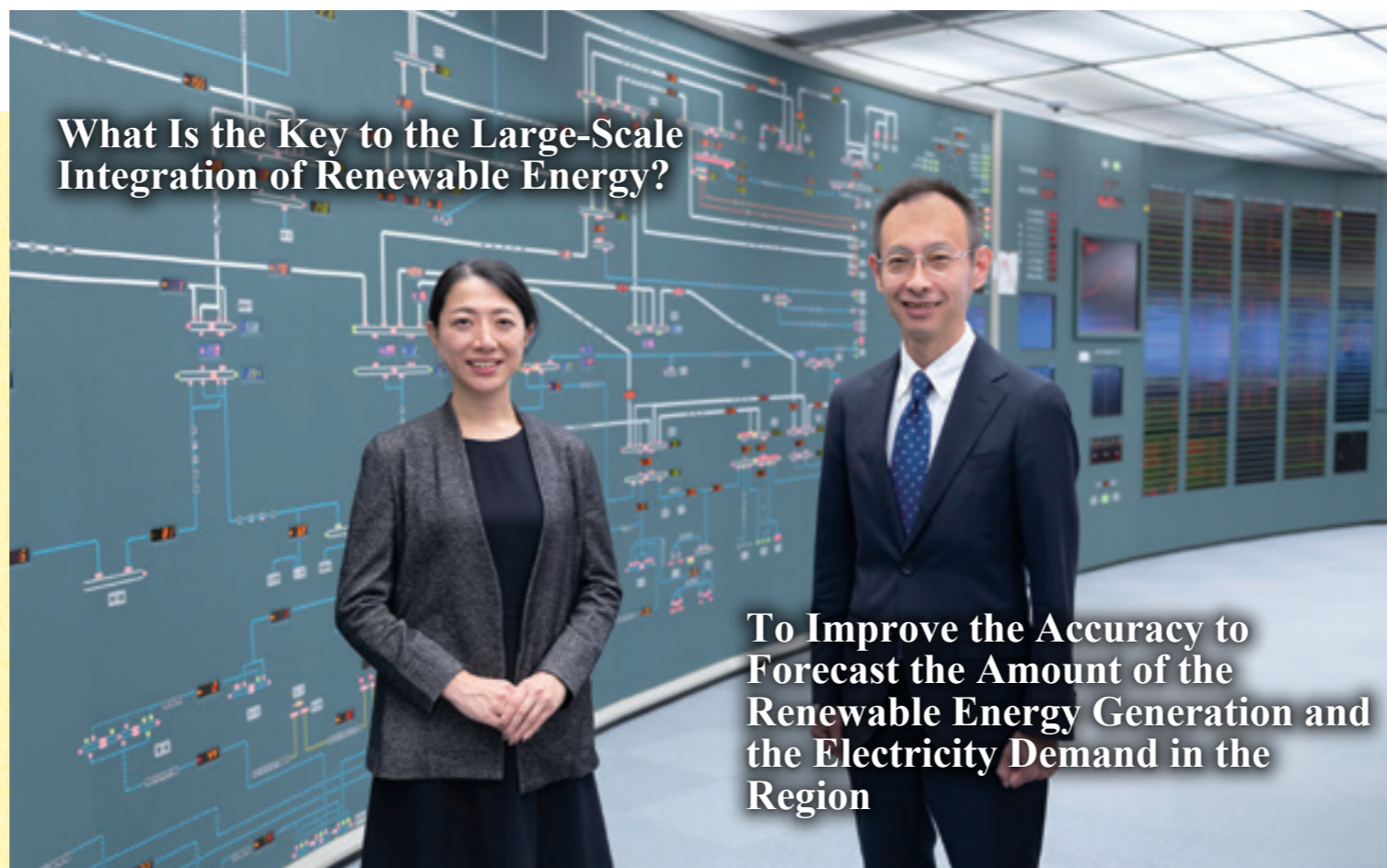
Ogasawara: This problem led to the initiative, Japanese Version of "Connect & Manage," which aims to maximize the use of existing transmission facilities by connecting them first and then managing them. The concept of it originally started overseas, we call it "Japanese Version" because it is a unique system based on Japanese situation including electricity market.

Developed Control System for "Non-firm Connection" to Take Advantage of Remaining Capacity on the Grids

Ogasawara: The Japanese Version of "Connect & Manage" was studied under the leadership of the national government in three projects: "Rationalization of Assumed Power Flow," "N-1 criterion based generation trip"¹, and "Non-firm Connection"². The first two, which can be handled by existing control systems, have already been applied in all areas, but the remaining one was the "Non-firm Connection." In Japan, the grid's capacity for the power flow has been secured in advance, but it is not always the case that



Project Manager
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What Is the Key to the Large-Scale Integration of Renewable Energy?

To Improve the Accuracy to Forecast the Amount of the Renewable Energy Generation and the Electricity Demand in the Region

100% of the capacity has been used. Therefore, "Non-firm Connection" connects new power sources such as renewable energy. It does not secure the grid's capacity in advance (non-firm) and utilizes the remaining capacity on the grids when it is available. When there is no more remaining capacity on the grids, the access contract is concluded on the premise that "output curtailment" of the power generation will be carried out.

Kishi: This allows the existing transmission facilities to be used effectively. Still, as the renewable energy generation continues to expand more and more, the amount of electricity that can flow to the transmission facilities will be exceeded, which could result in damage to the transmission facilities. In this situation, the project has been developing a control system to realize the Japanese Version of "Connect & Manage" as fundamental technology necessary for the next-generation grid stabilization to flow the renewable energy power into the grids as much as possible. The point is how to improve the accuracy of forecasting renewable energy generation and power demand in the local area. Since solar

and wind power generations, which are the mainstay of renewable energy, vary in output depending on weather conditions, it is necessary to control the output by forecasting the amount of electricity that flows to the facilities and the amount of generated electricity based on weather forecasts that change from time to time.

Overcome Challenges including System Specification Changes at the Midpoint of the Project Period with Teamwork for Breakthroughs

Ogasawara: This project has been proceeding in parallel with discussions at the national level. As a more rational approach was pursued for the society, the result of discussions at national councils led to a change in the method of output curtailment and the target to be curtailed. This forced project members to adopt significant changes in the middle of the project period, including changes in the specifications of the control systems they had been

developing.

Kishi: At one point, it was doubtful that the project would be completed within the time frame, but everyone involved worked hard to meet the deadline by holding numerous meetings over a short span of time to confirm progress and manage any potential risks. With the enormous cooperation by control system development vendors of Hitachi, Ltd., Shikoku Instrumentation Co., Ltd., and TEPCO SYSTEMS Corporation, this project can be completed on time. We could make it because of our aim to contribute to carbon neutrality even more. We all shared our goals and worked as one, making it possible for us to overcome a high hurdle.



Head of Research and
Development
KISHI Eiichirou
General Manager
Power System Operation
Department
TEPCO Power Grid, Inc.

Ogasawara: We sincerely thank everyone for their efforts. We consider the control system developed in this project to be very advanced also on a global scale. NEDO will continue to provide support, including public relations to deliver the results of this project both domestically and internationally.

Kishi: We will first share basic control system specifications with other transmission system operators in Japan and take steps toward nationwide deployment. Furthermore, we hope to be able to proactively make proposals overseas as well if there is a need. In addition, in order to achieve carbon neutrality by 2050, we believe it is important to organize issues such as current needs and future requirements, with a view to the future of the electric power supply.

Ogasawara: To further expand the amount of renewable energy introduced and familiarize it, as a first step, we would like to cooperate with all stakeholders to complete this project and start operating the control system from April 2024. Last but not least, we would like to continue to carry out necessary activities hereafter with eyes to the future.

^{*1} A calculation method that assumes power source operation in line with actual conditions according to demand.

^{*2} Efforts to utilize the capacity left open for emergencies by instantly stopping power generation in the event of a single equipment failure (N-1 contingencies) in the transmission and substation facilities.

Challenge in Our Generation: Next-Generation Power Network

2050

2030

2023



What Are the Thoughts of the Young Engineers Participating in the Project about the Realization of Japanese Version of "Connect & Manage" and Their Future Prospects?

Difficult and Rewarding Experiences Thanks to a Challenging Project

Yamamoto: First of all, please tell us how you were involved in this project and its achievements.

Nagano: Power System Operation Department of TEPCO Power Grid, Inc. (TEPCO PG), oversees frequency control, operation of transmission facilities, and other works. I was mainly responsible for examining control system logic and modifying existing control systems in the project. For TEPCO PG, the major achievement is that it can start generating renewable energy without delay and manage congestion by thoroughly calculating the entire grid.

Ikeda: I am in charge of organizing this project, coordinating schedules, and compiling reports on the results as administrator office.

Nakajima: I design and develop a control system for the power field. In this project, as a project leader within Hitachi, Ltd., I oversaw communicating the compiled specifications to the production side to build the control system. We have currently started receiving online data in TEPCO PG's building and have come to be able to make predictions on the grids.

Yamamoto: Mr. Koshirae, I think you are in a slightly different position from everyone else.

Koshirae: When I was a university student, I studied on the development of methods for evaluating the PV power performance, but since I started to work for ITOCHU Techno-Solutions Corporation, I have been engaged in forecasting wind power generation. I am truly dedicated to the Connect & Manage project. In the process of verifying with various observation data in the project, we were once again able to obtain results showing that the use of various types of data is effective in improving the accuracy of

forecasting each wind power plant.

Yamamoto: What parts of the project did you find most rewarding?

Ikeda: The scale of this project was large in terms of its budget and the number of members involved. It was very challenging, but also worthwhile. We expect this project will help increase the acceptability of power system for variety of power sources.

Nagano: It's been nine years since I started working for the company, but this is by far the largest business I've been involved with. I am frankly happy that this has allowed me to be involved in most of the control systems related to the grid and that these control systems have come to fruition.

Nakajima: As I faced many challenges in this project, which was the first of its kind in Japan, I could feel myself grow. I feel proud to be involved in a business that has both social significance and future potential.

Koshirae: I feel that I have been involved in the electric power system, which is one of Japan's most vibrant industries.

Yamamoto: Renewable energy is difficult because it depends on location and weather conditions. Were there any challenges that you saw in this project?

Koshirae: I realized how difficult it is to verify what data is needed and how to apply the forecasting flow. Also, since data acquisition is costly, I thought that it was necessary that power generating companies understand data's benefits.

Yamamoto: How about from the standpoint of system development?

Nakajima: It requires processing large amounts of data to forecast power generation. We had considerable discussions and deliberations to integrate the existing control systems, which were operated separately, and to achieve high processing performance for real-time calculation and control.

Nagano: There were many hurdles from a practical standpoint, such as considering how to link multiple control systems from different manufacturers that were originally owned by TEPCO PG in exchanging data and coordinating the schedule for control system modifications at the same time.

Nakajima: Also, in the middle of the project, the control system was changed from non-firm connection to re-dispatch*. We had to change the specifications. It was difficult to adjust the schedule and costs, but we managed to overcome the difficulties.

Importance of Location Incentives and Demand/ Supply Balance

Yamamoto: I think it was highly difficult to deal with corresponding regulations and develop the system at the same time. What initiatives are necessary in the future?

Nagano: I think that in order to efficiently increase renewable energy, it will be important to have location incentives that

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to achieve in 2050 and the vision for the future.

Nagano: It is difficult to achieve carbon neutrality simply by increasing renewable energy. I think it is essential to control the balance between power supply and demand as we utilize a wide variety of power sources. If we can do this on a large scale and smoothly, carbon neutrality can be achieved.

Ikeda: The balance between energy demand and supply is important not only for the environment but also for the economy. It is also necessary to consider factors such as declining population in the future and to create power facilities that are adapted to the times.

Nakajima: Ideally, we will solve the problems we are facing today and be able to use inexpensive power sources with peace of mind. I believe that the Connect & Manage system will be even more com-

plex in the future as power storage technology, hydrogen energy, and other methods become common. As a manufacturer, we would like to continue to offer systems that are both cost-effective and highly reliable.

Koshirae: As in this project, I believe it is important to conduct not only research and development but also demonstration research and development regarding social implementation hereafter.

Yamamoto: Thank you very much for your many valuable contributions.

*A method to control the output of power plants in congested grids and relieve the congestion by increasing the output of power sources in other grids.

EXPERT MESSAGE

Toward Carbon Neutral Society, the "Future" of Power

A Major Step toward the Realization of Next-Generation Power Network. Expect More Progress in the Future

The Japanese Version of "Connect & Manage" project has considerable significance. It is not an empty theory, but rather an attempt to increase the amount of renewable energy introduced based on the current situation. I have tried to work for the Japanese future from a neutral standpoint, and I think one of the reasons why I could work so smoothly was that I was able to communicate closely with the project manager at NEDO. Promoting technological development for the national interest through active discussions among the parties concerned, such as power suppliers, manufacturers, and neutral organizations, is rarely seen overseas and is therefore appropriate for NEDO's project. The technology developed this time can be applied not only in Japan but also in foreign countries, and if the technology is widely used, the reputation of Japan must be further enhanced. Research and development of High Voltage Direct Current (HVDC)*1 and Flexible and Distributed Energy Resources Control Technology are also underway. However, there are still many issues to be addressed to achieve the renewable energy introduction target in 2030, and I really look forward to the future progress of NEDO's projects.

Project Leader
Professor Emeritus
Waseda University
Doctor of Engineering
IWAMOTO Shinichi



To Achieve More Efficient and Stable Electric Power Supply



Professor Emeritus
the University of Tokyo
Doctor of Engineering
YOKOYAMA Akihiko

Highly Reliable Systems Evaluated through Industry-Academia-Government Collaboration

I think that the Japanese Version of "Connect & Manage," which aims to establish fundamental technology as well as develop control systems for the mass introduction of the renewable energy, requires industry, academia, and government to work together to solve problems, and that NEDO's role in this process is extremely important. I have been paying attention to this project since the beginning, and although the system is not in constant operation such as "non-firm connection" and "N-1 criterion based generation control," I feel that the system is very reliable and is steadily producing results.

What must be solved in the future is to reduce costs. The problem is how to minimize the burden on the public. Although it is a difficult issue, as the development of the fundamental technology for HVDC has shown that it can reduce costs by more than 20% compared to existing AC transmission systems, I expect that such efforts will be made in other areas as well.



See NEDO's Projects as Opportunity to Focus on Challenging Themes

Since the early 2000s, I have been working on the theme of the Japanese version of smart grids that would stabilize the power grids at low cost, however, at the time, the electric power sector was considered technologically saturated. Since then, I have experienced the Great East Japan Earthquake and faced issues to achieve carbon neutrality by 2050, which I feel is now a challenging field to work in again. This is an opportunity for researchers to engage in realistic issues, and for the younger generation to experience growth in this theme.

More than twenty years ago, there was no concept to utilize the demand side as a coordinated source of power in foreign countries. As a result, that NEDO has taken an initiative to plant seeds overseas, many countries are currently trying to build a common platform that utilizes local flexibility*2. I believe that there are still opportunities for Japan to take the initiative by taking advantage of the technology Japan has built up prior to other countries. I would like to support NEDO's future efforts to establish a good system at cost as low as possible.

We Would like NEDO to Lead the Way toward Decarbonization from Comprehensive Perspective with Focus on Goals

Regarding the development of "Firm and non-firm connections" in this project, there was a difficulty that we had to respond flexibly to changing circumstances with developing it because the detailed regulatory system that was the premise for the project was being created and the technology was being developed at the same time. Furthermore, after the project is completed in FY2023, the technology must be implemented in society immediately from April in 2024, which I believe put considerable pressure on the project implementers. Under such circumstances, I have tried to provide advice to ensure that there are no mistakes in the direction of technological development from a perspective which includes the power distribution system. The development of the "Next-generation power network" covers a wide range of related fields, and it is important to have a comprehensive perspective on everything, including goals for each development project, consistency with the total system and market demands. The social needs in 2050 may be even completely different from those at present, and I would like NEDO to play a role in considering what should be done now by calculating backward from the goal so that the systems we have developed will not be in vain.

Sub-project Leader
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NARA Koichi



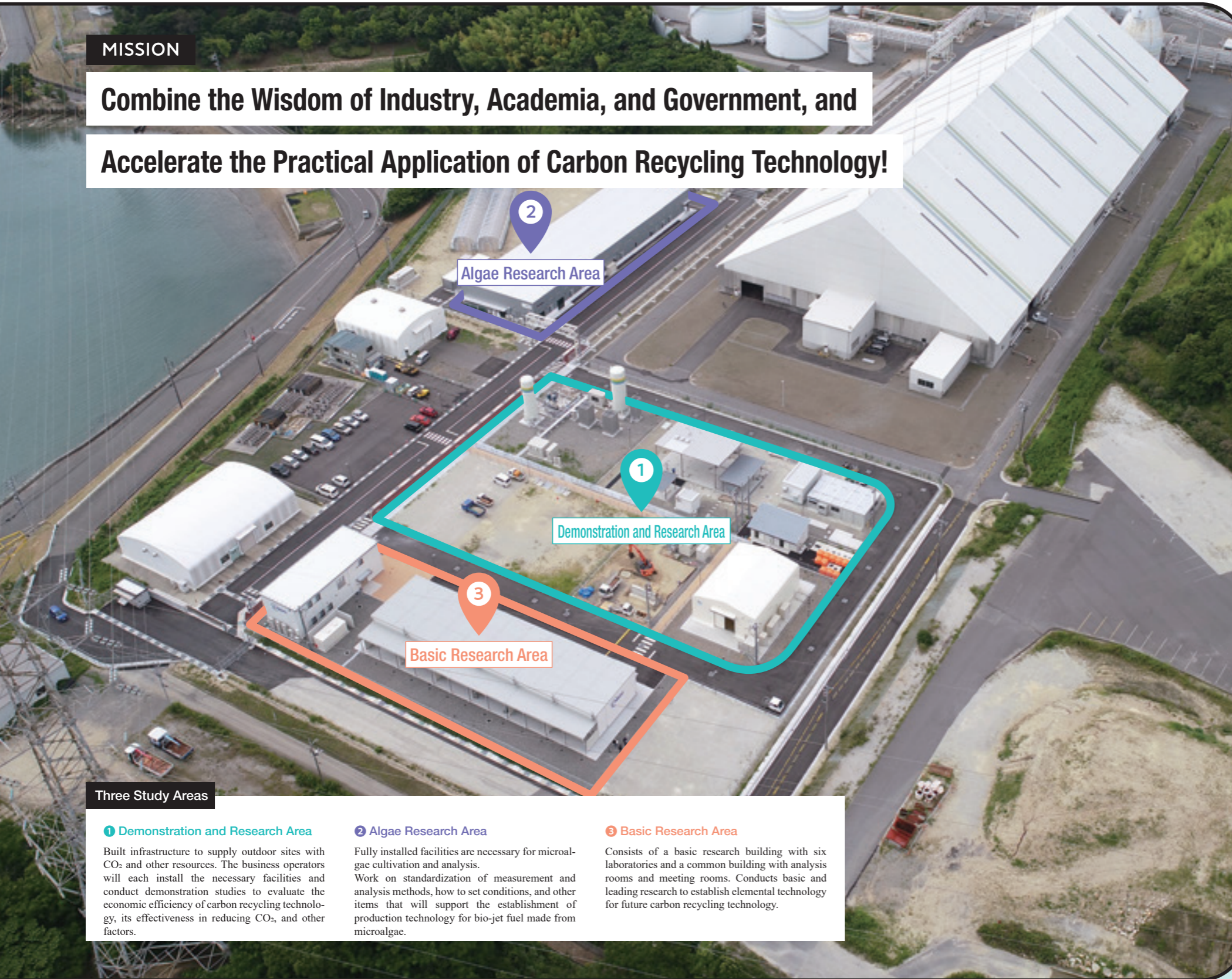
*1 A system that uses high-voltage "direct current" for power transmission. It has low transmission loss, can transmit large amounts of power over long distances, and is also suitable for interconnecting grids with different frequencies.
*2 Ability to balance supply and demand by flexibly utilizing distributed energy resources in the region, such as solar power generation and storage batteries for households and businesses



Demonstration Facility..... "Osakikamijima R&D and Demonstration Base for Carbon Recycling"

MISSION

Combine the Wisdom of Industry, Academia, and Government, and Accelerate the Practical Application of Carbon Recycling Technology!



Three Study Areas

1 Demonstration and Research Area

Built infrastructure to supply outdoor sites with CO₂ and other resources. The business operators will each install the necessary facilities and conduct demonstration studies to evaluate the economic efficiency of carbon recycling technology, its effectiveness in reducing CO₂, and other factors.

2 Algae Research Area

Fully installed facilities are necessary for microalgae cultivation and analysis. Work on standardization of measurement and analysis methods, how to set conditions, and other items that will support the establishment of production technology for bio-jet fuel made from microalgae.

3 Basic Research Area

Consists of a basic research building with six laboratories and a common building with analysis rooms and meeting rooms. Conducts basic and leading research to establish elemental technology for future carbon recycling technology.



Osakikamijima in Hiroshima Prefecture is floating in the picturesque Seto Inland Sea. In June 2022, the "R&D and Demonstration Base for Carbon Recycling," a demonstration facility that aims at the early practical application of carbon recycling technology, was completed at this site toward the realization of carbon neutrality by 2050.

The term "carbon recycling" is to recycle carbon dioxide (CO₂) as a carbon resource (carbon) by collecting it, although carbon dioxide (CO₂) has been regarded as a cause of global warming.

Promoting carbon recycling reduces CO₂ released into the atmosphere, while at the same time helping to ensure a stable supply of resources.

NEDO has been conducting demonstration research on next-generation thermal power generation, such as the Integrated Coal Gasification Combined Cycle of CO₂ Separation and Recovery Type, at the Osaki Power Station of the Chugoku Electric Power Co., Inc., which is in Osakikamijima, within Osaki CoolGen Corporation.

Based on the "Carbon Recycling 3C Initiative" announced by the Ministry of Economy, Trade and Industry in September 2019, R&D and demonstration base development for carbon recycling began at the Osaki Power Station in 2020.

The base consists of three areas. CO₂ separated and recovered in the demonstration study of next-generation thermal power at the Osaki Power Station can be transported directly to the base via pipelines and can be used for research and development of carbon recycling technology. In other words, the base enables research and development to be conducted in an environment with the assumption that carbon recycling technology will be put into practical use in the power stations. Currently, in the "Demonstration and Research Area," research and development is underway on a process to generate useful substances from CO₂ using microorganisms, including technology and other items to produce aviation fuel from microalgae in the "Algae Research Area." Algae is a catalyst for selectively synthesizing raw chemical materials from CO₂. Also, in the "Basic Research Area," which consists of six laboratories, basic and leading research on carbon recycling technology is being conducted.

The ability to bring together the knowledge and technologies of companies, universities, and other organizations that aspire to realize a decarbonized society and conduct intensive and cross-sectional development of elemental technologies and empirical research will be a major contribution of this base. NEDO will accelerate innovation and early commercialization of carbon recycling technology at this base to help solve global environmental problems.

Promising NEDO Startups

Startups growing into the future with NEDO's support

Innovator File.28

Aiming for the Plant Factory with Next-Generation Zero Emissions by Maximizing the Use of Renewable Energy

This research aims to develop a remote island model of the plant factory with next-generation zero emissions that does not depend on the existing power system and does not emit waste (CO₂ and wastewater) by making maximum use of renewable energy abundantly available in rural area. We set up an experimental plant factory on Miyakojima Island that run on renewable energy and collected and evaluated data on environmental changes within the factory and the impact on plants when Demand Response*, which adjusts the power supply and demand balance, is activated and during power grid outages. We also built the technological infrastructure to operate the plant with fluctuating renewable electricity.

*Changing electricity demand patterns by allowing consumers to control their electricity usage wisely. This can balance the supply and demand of electricity.

Website in Japanese
<https://www.nextems.co.jp/>



NEXTEMS, Inc.
HIGA Naoto
 President



The experimental plant factory.

To revitalize the economy, it is important to nurture entrepreneurs with "new technology" as a competitive advantage. Therefore, NEDO has been supporting startups from various angles. Among them, NEDO will introduce startups that have been attracting attention as they continue to grow toward the future.

Track Record of Adoption of NEDO's Projects

Adopted in March, 2021

NEDO Feasibility Study Program/ Feasibility Study Program on Energy and New Environmental Technology / Demand Response (DR) Technology and Growth Maintenance System for Plant Factories

Adopted in June, 2022

Future-Generation Power Network Stabilization Technology Development for Utilization of Renewable Energy As the Major Power Source/ Practical Application Development of Virtual Inertia PCS

Adopted in October, 2022

Development of Technologies for Realizing a Hydrogen Society

Adopted in October, 2023

Study on systemization of technologies and its potential for International Smart community Demonstration Project

About the NEDO Feasibility Study Program

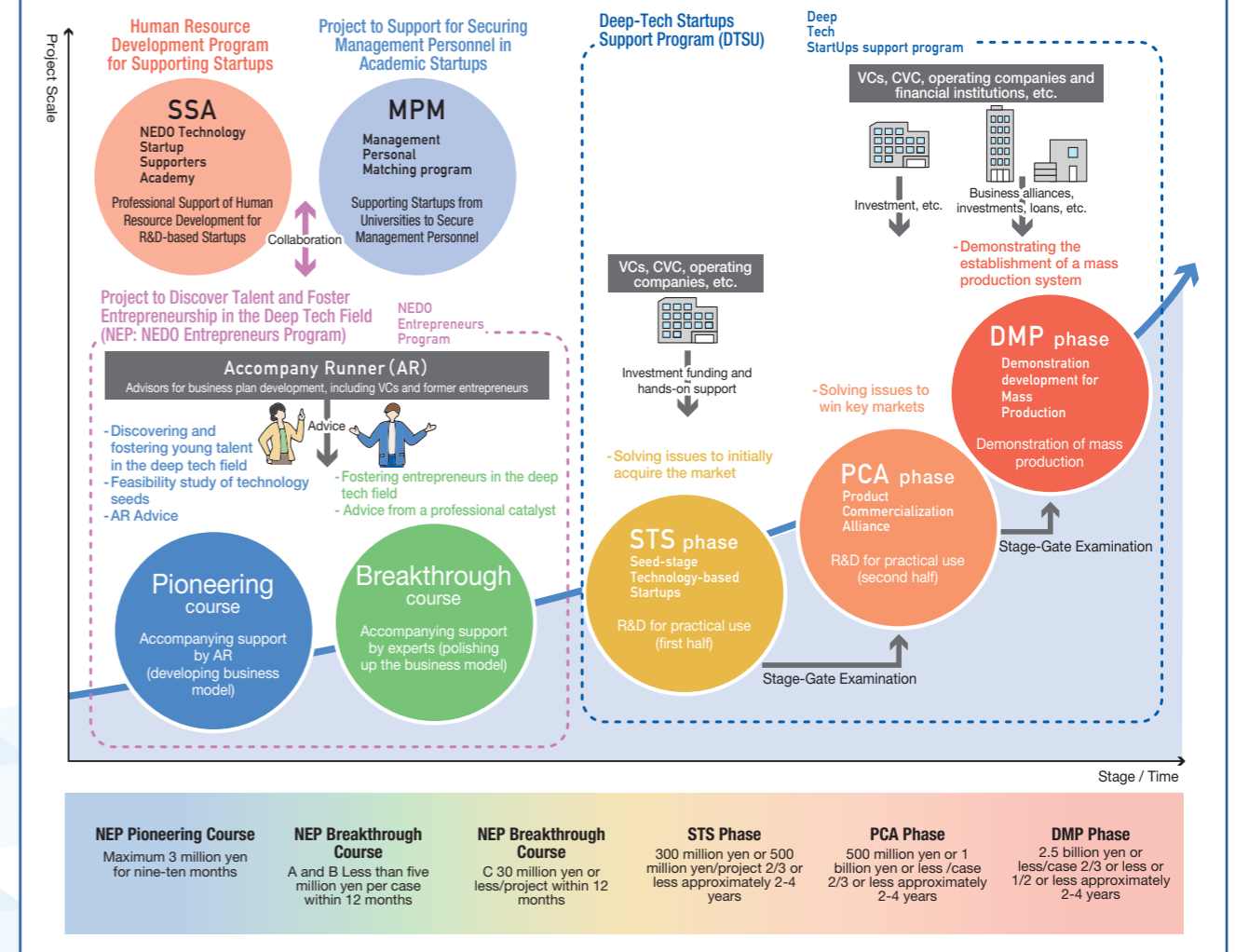
The "NEDO Feasibility Study Program" aims to discover and nurture fundamental technologies expected to be practical and socially implemented after 2040 (more than 15 years from the start of feasibility study). The goal is to promote these technology developments to collaborative research within the academia-industry framework, including national projects, contributing to the realization of decarbonized society and the creation of new industries.



Details of the Program
https://www.nedo.go.jp/english/activities/activities_ZZJP_100100.html



NEDO's Startup Support Program



Q What is the background of NEDO's support project?

In Miyakojima Island, it is expected that the introduction rate of renewable energy will further increase in the future. We decided to participate in the project since we believed that if we could commercialize a zero-emission plant factory that makes maximum use of renewable energy, it would be a leading example that will help us achieve local production for local consumption regarding energy and food.

Q What effect or impact did NEDO's support have?

This project was conducted jointly by the Central Research Institute of Electric Power Industry, Saga University, and our company. In particular, our knowledge of the effects on plant growth and other aspects was not sufficient, and it was essential to have a joint venture with expertise in this area. We worked to clarify the roles of each business operator as we received evaluations and guidance from outside experts as appropriate.

I feel that the NEDO Feasibility Study Program is a very suitable program for conducting joint research in industry-academia-government collaboration.

Q What technologies and products are currently being commercialized?

Intending to package zero-emission plant factories using this technology and deploying them overseas, we applied to NEDO's "Study on systemization of technologies and its potential for International Smart community Demonstration Project," and our application was accepted. We are working toward social implementation as we identify domestic and international needs.

Q What is Nextems' vision for the future?

The zero-emission plant factory can be expanded to other remote islands by packaging it. In the future, we aim to expand to all locations, including non-electrified areas overseas, to contribute to solving food and energy problems in various countries and to disseminate research results originating from Miyakojima Island to the world.