FY2020

Overview of the Medium-term Management Plan

In order to realize Kyuden Group Management Vision 2030, we formulated the FY2020 Medium-term Management Plan, a concrete implementation plan for the five years from FY2020 to FY2024

In this plan, two years after our management vision was published, we will accelerate developing our energy service business through the stable supply of environmentally friendly energy and the provision of energy services that meet the needs of customers. In addition, we will work together to build a sustainable community by helping resolve a variety of regional and societal issues. We will further strive to strengthen our business foundations so that we can take up these challenges as a unified group. Regarding the COVID-19 pandemic, we will work under our business continuity plan to ensure the stable supply of electricity while preventing the spread of infection, and will take appropriate actions while watching closely the impact on electricity demand.

Positioning of the Medium-term Management Plan



Developing the Energy Service Business Strategy

Providing more prosperous, comfortable livestyles through an attempt to create a sustainable low carbon society.

Continually supplying reasonably priced stable eco-friendly energy

Stable Supply of Environment-friendly Energy

While considering the S+3E⁽⁷⁾ perspective, we are pursuing an optimal energy mix, and by improving the efficiency of thermal power plants and increasing the proportion of our energy that comes from renewable or nuclear energy, we are contributing to the reduction of Kyushu's carbon footprint. (*) S+3E refers to the four pillars of Japan's basic energy policy, which aims to simultaneously achieve Energy security, Economic efficiency, and preservation of the Environment, while maintaining Safety.

Through the use of nuclear power and renewable energy, non-fossil fuel power sources account for 44% of our power source composition (excluding 14% FIT electricity).



- non-customers. As a result, these CO₂ emissions from electricity are regarded as the national average of CO₂ emissions from electricity, including that generated through sources such as thermal pow
- * Subject to powers generated by solar, wind, hydroelectric (below 30 MW), geothermal, and biomass (*2) Power procured from wholesale power exchange
- This electric power includes hydroelectric, thermal, nuclear, FIT, and renewable energy powers

(*3) Others

- Includes power procured from other companies for which the power station cannot be specified. (*4) Numbers differ from those in achievement plans under the Act on the Promotion of Use of Non-fossil Energy Sources and Effective Use of Fossil Energy Materials by Energy Suppliers.
- * Calculated and announced based on "The Guidelines Concerning the Management of the Electricity Retail Business" by the
- Ministry of Economy, Trade and Industry * Calculated on the basis of power generated by Kyushu Electric Power and volume of power purchased from other companies
- (excluding remote islands)

FY2019 CO₂ emissions were 25.7 million tons; CO₂ emissions per kWh of electricity sold (CO₂ emissions coefficient) were 0.370kg-CO₂/kWh. These levels are lower than those of other power companies, including in the USA, Germany, and other countries.

CO₂ emissions per kWh of electricity sold





Materials by Energy Suppliers



Comparison of CO₂ emissions per kWh of electricity sold

* Average electric power values are from The Electric Power Council for a Low Carbon Society (ELCS) (Composed of the Federation of Electric Power Companies of Japan, new entrants)

* Average electric power is for FY2018; figures represent FY2019 for Kyuden, FY2017 for other countries Source: Website of The Electric Power Council for a Low Carbon Society (ELCS) IFA "CO₂ emissions from fuel combustion 2019

Expansion of renewable energy businesses

The Kyuden Group is actively developing renewable energy sources that do not emit CO₂, with the goal of developing 5,000 MW of renewable energy in 2030.

While promoting the development of geothermal, hydroelectric, biomass, and other power to achieve the development goal, we are also working on promising areas such as offshore wind power.



Development volume of renewable energy (as of March 31, 2020. Includes overseas.)



Geothermal power generation FY2019 CO₂ emissions reduction due to geothermal power generation approx. 390,000 tons

The Kyuden Group, which has long engaged in the development of geothermal power generation, owns about 40% of all geothermal power generation facilities in Japan, including Hatchoubaru Geothermal Power Station, the largest facility in the country. Utilizing our technological capabilities, we are investigating regions that promise abundant resources in Kyushu, throughout Japan, and overseas. We engage in development in collaboration with the local community, comprehensively taking into consideration technological aspects, economic efficiency, site environments, and other factors.

At present, the Otake Power Station in Kokonoe, Oita Prefecture, which began operation in 1967 as Japan's first commercial geothermal power station, is undergoing renewal of aging power generation facilities, with construction scheduled for completion in October 2020.

Geothermal power generation (as of March 31, 2020)			
Output			
Existing (approx. 218,000)	Otake	12,500	
	Hatchoubaru	110,000	
	Yamagawa	30,000	
	Ogiri	25,800	
	Takigami	27,500	
	Hatchoubaru Binary	2,000	
	Sugawara Binary (*1)	5,000	
	Yamagawa Binary (*1)	4,990	
Planned (2,000)	Otake (*2)	+2,000	

*Calculated using FY2018 CO2 emissions coefficient

(*1) Development/operation by Group companies (*2) "+2,000 kW" represents the increase in output due to the renewal of power generation facilities at the Otake Power Station

Hydro power generation FY2019 CO₂ emissions reduction due to hydro power generation (excluding pumped storage power) approx. 1,140,000 tons

*Calculated using FY2018 CO2 emissions coefficient

Hydroelectric power generation (as of March 31, 2020)

143 sites

Inaba ("

Shin-Takeda

Tsukabaru

(*1) General hydroelectric (excluding pumped hydroelectric storage power generation;

Kyuden and Group companies engage in development of hydroelectric power generation in coexistence with the local community, comprehensively taking into consideration technological aspects, economic efficiency, site environments, and other factors. We are proceeding with new development that makes effective use of unused energy, and development through the renewal of existing hydroelectric power stations that have become old.

In August 2019, we began commercial operation of the Shin Kosa Power Station in Kosa, Kumamoto Prefecture

Solar power generation FY2019 CO₂ emissions reduction due to solar power generation approx. 20,000 tons *Calculated using FY2018 CO₂ emissions coefficient

Utilizing sites such as the old power stations of Kyushu Electric Power, we are engaging in the Mega Solar power generation business through Group companies (Kyuden Mirai Energy, etc.).

We have developed about 89,000 kW so far.



Solar power generation (as of March 31, 2020) (kW			
	Omuta Mega Solar (*)	1,990	
	Omura Mega Solar "	17,480	
Existing	Sasebo Mega Solar (*)	10,000	
(approx. 89,000)	Installation at business offices, etc.	approx. 2,300	
	Other Mega Solar (")	approx. 57,600	
(a	Planned approx. 60,000		

Outout		(1(11)
wer generation (as of March	31, 2020)	(kW)

March 31, 2020) _{(kW}		(kW)
	Output	
r ⁽¹⁾	1,99	0

Output

1.282.391

+420

+8 300

+4 000

r ⁽¹⁾	1,990
r ^(*)	17,480
r ^(*)	10,000
Iess	approx. 2,300

(*1) Development by Group companies

(*2) Co-combustion at existing coal-fired thermal power stations (*3) Development by special-purpose company (SPC) in which Group companies are investors

Wind power generation FY2019 CO₂ emissions reduction due to wind power generation approx. 20,000 tons

On promising sites where long-term stable and economical wind power generation is possible, we are undertaking development through Group companies (Kyuden Mirai Energy, etc.), taking into account harmony with the surrounding environment.



Station (Germany)

TOPICS

Kyuden and E.ON of Germany concluded a cooperative agreement on a joint study of fixed-bottom offshore wind power generation.

In April 2019, Kyuden Group company Kyuden Mirai Energy concluded a cooperative agreement with German energy company E.ON SE (currently RWE Renewables GmbH) to jointly research fixed-bottom offshore wind power generation business in Japan.

The companies are currently studying the commercialization⁽⁷⁾ of offshore wind power generation in the Hibikinada district of Kitakyushu, Fukuoka Prefecture, but are also investigating the possibility of offshore wind power development in other regions. By concluding the agreement, we hope to make maximum use of the knowledge and management resources of both companies, connecting these to the expansion of our offshore wind power generation business in Japan.

(*) Hibiki Wind Energy Co., Ltd. was established by five companies including Kyushu Electric Power Company, Incorporated, and is currently engaged in studies aimed at commercialization

Biomass power generation FY2019 CO₂ emissions reduction due to biomass power generation approx. 40,000 tons

Biomass power generation that makes use of the heat from burning wood, combustible trash, and other materials is carbon neutral, in that the burning does not impact amounts of CO₂⁽⁷⁾. For this reason, we are working to promote the technology through development by Group companies and electricity purchasing from power generators.

(*) The concept holds that in the carbon cycle, CO₂ emitted from burning biomass fuel is CO₂ that had originally been absorbed by plants; the total amount of CO₂ does not increase as the net change from emission and absorption is zero.

Biomass power generation (as of March 31, 2020)

		Main fuels
	Miyazaki Biomass Recycle (*1)	Chicken manure
	Fukuoka Clean Energy (*1)	General wastes
Existing (approx 165,000)	Reihoku ^(*2)	Wood chips
(approval recipied)	Matsuura ^(*2)	Sewage sludge
	Nanatsu Island Biomass Power (13)	Palm kernel shells (PKS), wood pellets, etc.
	Buzen New Energy (*3)	Palm kernel shells (PKS), wood pellets
	Fukuoka Wood Pellet Biomass (*1)	Unused materials, lumber remnants
	Soyano Wood Power (13)	Unused materials, lumber remnants
	Kanda Biomass Energy ("3)	Palm kernel shells (PKS), wood pellets, etc.
Planned	Okinawa Uruma New Energy ("3)	Palm kernel shells (PKS), wood pellets
(approx. 368,000)	Shimonoseki Biomass Energy (*1)	Wood pellets
	Hirohata Biomass Power Generation (*3)	Palm kernel shells (PKS), wood chips
	Oita Biomass Energy (13)	Palm kernel shells (PKS), unused materials
	Ishikari Bioenergy (*3)	Palm kernel shells (PKS), wood pellets

Omura Mega Solar Power Station

(*) Development by Group companies

Existing (*1

Planned

(approx. 12,720)

including development by Group companies

(*3) Increase in output due to renewal of power generation facilities

(*2) Development by Group companies

*Calculated using FY2018 CO2 emissions coefficient

Wind power generation (as of March 31, 2020) (kW				
		Location	Output	
	Koshiki-jima	Satsumasendai-shi, Kagoshima Prefecture	250	
Existing approx. 65,000)	Nagashima ⁽¹⁾ Nagashima-cho, Kagoshima Prefecture		50,400	
	Amami Oshima (*)	Amami-shi, Kagoshima Prefecture	1,990	
	Washiodake (1)	Sasebo-shi, Nagasaki Prefecture	12,000	
Planned	Kushima ⁽¹⁾	Kushima-shi, Miyazaki Prefecture	64,800	
(92,000)	Karatsu/Chinzei "	Karatsu-shi, Saga Prefecture	27,200	

(*) Development by Group companie



*Calculated using FY2018 CO2 emissions coefficient

	(kW)
Output	
11,350	
29,200	
(combustion with maximum by weight)	1%
(approx. 800 t/year)	
49,000	
74,950	
5,700	
14,500	
74,950	
49,000	
74,980	
approx. 75,000	
approx. 22,000	
51,500	



Conceptual image of completed Shimonoseki Biomass Energy Co., Ltd. (scheduled to begin operation in January 2022)

The use of nuclear energy

We make use of nuclear power as a non-fossil fuel power source in order to stably secure energy in the long term and address global environmental issues, provided that safety is ensured.

In Japan all nuclear power stations were temporarily shut down following the Great East Japan Earthquake. Sendai Nuclear Power Station Unit 1 was the first to meet the new national regulatory standards and restart normal operation in September 2015, with all four of our stations returning to normal operation by July 2018. Currently, four of the nine total nuclear power plants in Japan that have been restarted are units of ours, giving us a high utilization rate compared to other operators.

For FY2019, we estimate the effect of nuclear power generation on reducing CO₂ emissions at about 10 million tons.

Sendai Nuclear Power Station Units 1 and 2 began periodic inspections in March and May 2020, respectively, to install facilities for dealing with Specific Safety Facilities (). The units are scheduled to resume power generation in December 2020 and January 2021, respectively. At Genkai Nuclear Power Station Units 3 and 4, we will leverage knowledge gained at the Sendai Nuclear Power Station Units, and will make utmost efforts to complete installation of the facilities within the deadline while ensuring safety during construction.

(*) Facilities with functions that prevent damage to the reactor containment vessel in the event that reactor cooling functions are lost and the reactor core is seriously damaged, due to acts of terrorism such as intentional aircraft collision with the reactor auxiliary building, etc



Nuclear power generation (as of March 31, 2020)

Station name	Output	Start of operation	Туре
Genkai	Units 3, 4: 1,180 MW each	Unit 3: March 1994 Unit 4: July 1997	Pressurized
Sendai	Units 1, 2: 890 MW each	Unit 1: July 1984 Unit 2: November 1985	(PWR)

*Operation of Genkai Unit 1 ended in April 2015, Genkai Unit 2 in April 2019

Effect of nuclear power generation by Kyushu Electric Power Company, Incorporated on reducing CO₂ emissions



Improving the efficiency of thermal power generation

The Kyuden Group is working to maintain and improve total thermal efficiency in order to reduce fuel consumption and CO₂ emissions.

Kyushu Electric Power maintained a high 44.1% (power generation end) total thermal efficiency for thermal power stations through the decommissioning and scheduled shutdown of aging oil-fired thermal power (2,880 MW in FY2018-2019) and the operation of LNG/coal-fired power stations with high thermal efficiency in FY2019.

In December 2019, Matsuura Power Station Unit 2 began commercial operation as a highly efficient pulverized coal-fired power station. Unit 2 uses cutting-edge technology to improve power generation efficiency and reduce CO₂ emissions, and features high output adjustment capabilities to address the increases in output fluctuations associated with the increased use of renewable energy. Accordingly, we believe that the power station can aid in flexibly adjusting to supply and demand.

high heat and pressure





Overview of Matsuura Power Station Unit 2





Start of commercial operation of Matsuura Power Station Unit 2 on December 20, 2019 (front side)

Develop energy-related technologies, such as those that store or control electricity

We will adapt to the spread of distributed power sources and diversification of electricity transactions, and will work to harness storage cell technology and optimize electric power control. At the same time, we will work to develop the technology required to produce the next generation of power sources.

Utilization of reusable storage batteries

We are collaborating with NEXT-e Solutions Co., Ltd. and Kyuden Mirai Energy on a project to demonstrate mechanisms for reusing electric forklift lithium-ion storage batteries in large-scale stationary storage systems.

Through the study, we will confirm the performance and cost of the reused storage batteries, and build a power storage system that enables the effective use of resources at low cost.



In FY2020, we will undertake demonstration tests to control electric buses, stationary storage batteries, heat pump water heaters, and other energy resources, in addition to passenger EVs.

(*1) "Demonstration Project for the Construction of a Virtual Power Plant Utilizing Demand-Size Energy Resources," Ministry of Economy, Trade and Industry

(controls) demand volume by customers in order to maintain balance between electric power demand and supply

Trial facilities



Move rapidly to respond to environmental changes including changes in energy 1 markets and the diversification of customer needs, developing our energy services

Energy Services Suited to Our Customers' Needs

We are expanding our personable style of marketing, offering a selection of pricing plans catered to increasingly diverse lifestyles or living patterns, as well as supplying gas alongside electricity or other services that make us a one-stop service for our customers.

Further promoting all-electric energy for the home

We hope to increase the number of homes using electricity for all their energy needs, which we believe makes users' lives more comfortable, environment-friendly, and economic while also offering peace of mind.



(All-Electric demonstration van)

Retail gas business in the Fukuoka and Kitakyushu areas

In the Fukuoka and Kitakyushu areas, we offer Kyuden Gas with contracts for discounted combined gas and electricity.





*Numbers in parentheses represent rank among new retail electricity companies

(Millions of kWh)

No. of all-electric homes

67

3/2011

Increase of all-electric households: approx. 21%

(10.000)

120

90

60

3/2020

Expanding electricity supply in the areas outside Kyushu

Kyuden Mirai Energy began retail electricity sales in the Kanto area in April 2016. The company has rate plans that include earned JAL mileage, WAON points, and dPOINTs, as well as rate plans for all-electric customers.

In January 2020, the number of subscribers to the plans exceeded 20,000.



Kyuden Mirai Energy



By working to develop power sources away from Kyushu, and by building up our business in fuels, we aim to make ourselves more competitive.

Power source development outside of Kyushu

Energy equivalent of power sources 2,000 MW (Equity ownership in output: 1,000 MW)

We are working on power source development outside of Kyushu to expand profits through the stable and inexpensive supply of power in other regions.

In September 2019, we joined with Tokyo Gas Co., Ltd. to establish Chiba-Sodegaura Power Co., Ltd., and are investigating the feasibility of developing a LNG-fired thermal power plant.

Strengthening of the fuel business

The Kyuden Group is making use of our existing expertise and our alliances with other companies in business areas within the fuel value chain that spans fuel's manufacturing to its transport, and includes receiving delivery and sales. We will work to expand opportunities for new profits, including the business of supplying LNG fuel for ships.

TOPICS

We are developing biomass mixed fuel to reduce CO₂ emissions from existing coal-fired power stations.

Under support from the national government (1), Kyushu Electric Power has joined with Nippon Steel Engineering Co., Ltd. in October 2018 to undertake development of new biomass mixed fuel that utilizes brown coal 12 and unused wood biomass. In April 2019, we concluded a cooperative relationship with the state of Victoria in Australia regarding technological development and resource utilization.

We believe that the development of this new fuel will lead to the reduction of CO₂ emissions from domestic coal-fired power stations, and the securing of fuel resources. (*1) Project commissioned by The New Energy and Industrial Technology Development Organization (NEDO) (*2) Brown coal is the lowest grade of coal, containing a high level of water and impurities.

Overview of R&D



TOPICS

Contributing to the reduction of carbon emissions in the supply chain (coal carriers for our thermal power stations)

On December 25, 2019, Kyushu Electric Power Nippon Yusen Kabushiki Kaisha, and Mitsui O.S.K. Lines concluded a basic agreement concerning long-term transport contracts for two coal carriers, the world's first powered by LNG.

The use of LNG as fuel contributes to the reduction of greenhouse gas emissions, with expected cuts of nearly 100% in sulfur oxides (SOx), about 80% in nitrogen oxides (NOx), and about 30% in carbon dioxide (CO2). Looking ahead, we will work to reduce our environmental impacts worldwide not only through conversion of our own coal carriers to LNG fuel but also through LNG bunkering of ferries, car carriers, and other transport vessels.



Electric power sales by Kyuden Mirai Energy

(Created in-house based on published data from the Agency for Natural Resources and Energy)

Development of Power Sources Outside of the Kyushu Region and Strengthening of the Fuel Business





Location map			
Tokyo	Prefecture	\$	~
and the car	Loc mai	ation of in office	Sodegaura-shi, Chiba Prefecture
P LA	stal	ate of plishment	September 2, 2019
Y RELEASE	Exe	ecutives	Dispatch of directors from both companies
Kanagawa Prefecture	Ca ti estal	pital at me of plishment	¥100 million (¥50 million capital, ¥50 million capital reserves)
my the L	Equ	iity ratio	Equal for both companies

Overview of power station plan

Planned site	3-1 Nakasode, Sodegaura-shi, Chiba Prefecture
Format	Gas turbine combined cycle
Scale of power generation	Maximum 2,000 MW
Fuel	Liquid natural gas (LNG)
Fuel	Liquid natural gas (LNG)



Brown coal mining site in Victoria



Photograph courtesy of Oshima Photograph courtesy of Namura Shipbuilding Co., Ltd.



Shipbuilding Co., Ltd.

Expansion of overseas business

To achieve our goal of 5,000 MW output from our equity ownership in overseas businesses in 2030, we will expand our business into new areas including microgrids and power transmission and distribution, and into our existing markets of Asia and North America as well as new areas such as Europe, the Middle East, and Africa.



Note: Consulting indicates results of major activities in recent years : New project participation in FY2019





PowerSource microgrid project (Philippines)



Periodic inspection support by our employees (Tuxpan, Mexico)

TOPICS

Kyuden Group made its first independent acquisition of an overseas company to further strengthen its overseas geothermal power generation business.

On May 29, 2020, group companies Kyuden International Corporation and West Japan Engineering Consultants, Inc. concluded a stock purchase agreement for the acquisition of USA-based geothermal technology services provider Thermochem, Inc.

Thermochem offers advanced geothermal technology services, manufacturing and sales of specialized equipment, research and development, and consulting services. The company enjoys a high level of recognition among geothermal power generation developers and operators worldwide for its high technological capabilities, product development capabilities, and extensive knowledge.

Thermochem made significant contributions, including flow volume measurement during well drilling, at the Indonesian geothermal IPP project in Sarulla, Indonesia. (Kyuden is a participant in the project, which is one of the world's largest geothermal projects with a total output of approximately 330 MW.)

Through the acquisition, Thermochem's advanced technical services will join the geothermal power generation technologies that the Kyuden Group has accumulated regarding development and operation.

Leveraging this strength, we will continue working to realize a sustainable society through the reinforcement and expansion of geothermal development overseas.

Strategy I Developing the energy service business

Initiatives in the power transmission and distribution business

The power transmission and distribution business of Kyushu Electric Power was spun off as Kyushu Electric Power Transmission and Distribution Co., Inc. in April 2020 to enhance the neutrality of the power transmission and distribution network. Following the spin-off, the company will continue fulfilling its mission to deliver stable, high-quality electricity at a low cost to all customers in Kyushu as a member of the Kyuden Group.

Technology development to upgrade power grids

To suitably maintain the aging equipment we use to transmit and distribute electricity, we are putting effort into a number of areas. These include finding an effective means of gathering data about the equipment, such as through the use of drones, and research and development into methods to determine deterioration, such as image analysis and artificial intelligence.



Creating electric power demand in the Kyushu area

We will work to create demand for electricity in Kyushu through measures such as attracting companies in collaboration with local governments, and promoting all-electric energy use during our various contact moments with customers.



Overseas business development leveraging our knowledge of renewable energy adoption

We are working to ensure maximum acceptance of renewable energy through trouble-free connections to the grid and through the utilization of very highcapacity storage battery systems.

We will develop overseas business by utilizing the technology and knowledge that we have built up in our domestic business, including supporting the adoption of renewable energy.





(*) Agency for Natural Resources and Energy Created based on the data from "Feed-in Tariff Scheme Information Disclosure Website" (as of December 31, 2019). Totals may not match due to rounding





Example of activities to promote all-electric energy usage (all-electric fair and demonstration of power supply from electric vehicles)

Ratio of solar and wind power generation adoption in Japan ()



Buzen Battery Storage and Transformer Station