Section 2 Business Update

Table of Contents

Four Nuclear Units Resumed Operation

- After the startup on March 23, Genkai No. 3 restarted generating electricity on March 25 and resumed commercial operation on May 16.
- After the startup on June 16, Genkai No. 4 restarted generating electricity on June 19 and resumed commercial operation on July 19.
- With the commercial operation of Genkai No. 4, we have successfully achieved four nuclear power station units in operation.

〔Operational Status of Nuclear Power Stations 〕

2018	March	April	May	June	July	August	September	October	November	December ～ March
Genkai No.3	▼3/23 Startup ▼3/25 Restart generating electricity		▼5/16 Returning to commercial operation							
Genkai NO.4				▼6/16 Startup ▼6/19 Restart generating electricity	▼7/19 Returning to commercial operation					
Sendai No.1				▼6/3 Restart generating electricity	▼6/29 Returning to commercial operation					
Sendai No.2		▼4/23 Stop generating electricity					▼8/31 Restart generating electricity	▼9/28 Returning to commercial operation		
Nuclear Power Utilization Rate		FY2018 First half：54.9%※						FY2018 Second half：90.5%※		
		Fiscal Year Forecast：72.6%※								

※Based on 5 units including Genkai unit No.2

Increasing the Efficiency of Thermal Power Plants

- In our composition of total power capacity from all facilities, the proportion of thermal power is 42%（As of end of March 2018/Based on Output /Incl. power purchased from other companies）.
- To ensure the competitiveness of our power sources, we are promoting the development of economical thermal power plants with cutting-edge technologies (for example Shin-Oita No. 3×4 , Matsuura No. 2). Older oil-fired power plants are being decommissioned or will undergo a planned shutdown.
- Matsuura No. 2 is under construction; percentage completed is 81.8% (as of end of September 2018).

〔New construction〕

Fuel	Name of Station	Output	Start of operation
LNG	Shin-Oita 3-4	※480MW	June 2016
Coal	Matsuura No.2	1000MW	December 2019

※Rated output went up 459.4MW to 480MW on July 9, 2018

【Shin-Ohita 3-4】

【Matsuura No.2 under construction】

〔Planned for decommissioning〕

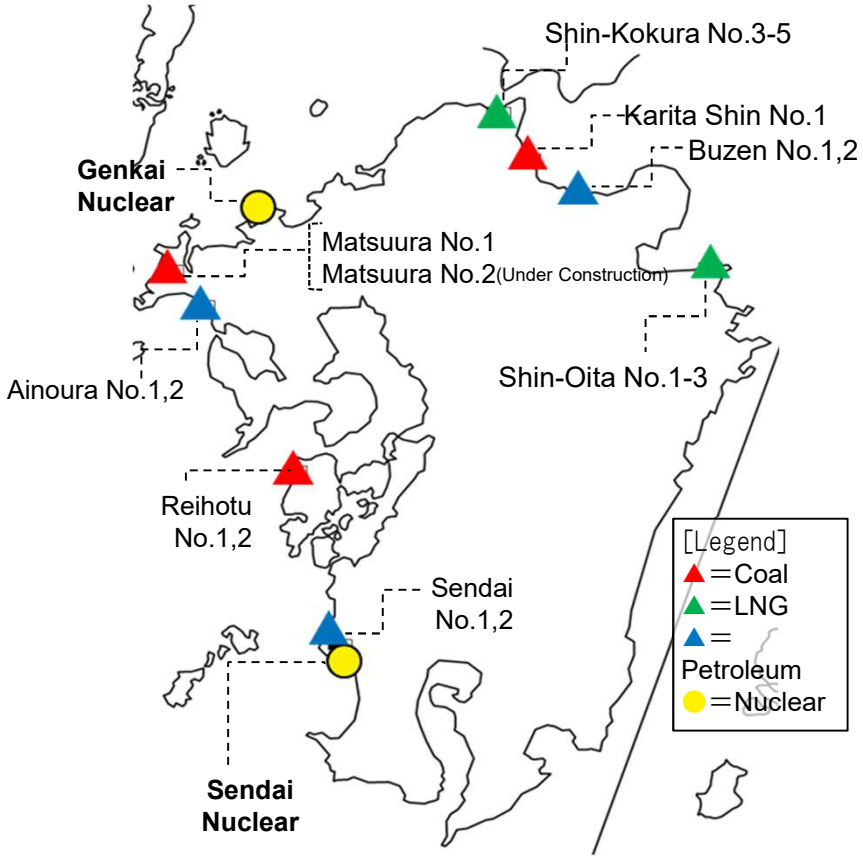
Fuel	Name of Station	Outout	Decomission Date(Planned)
Heavy oil	Ainoura No.1 and 2	875MW	April 2019
	Buzen No.1	500MW	FY2019

〔Planned shutdown〕

Fuel	Name of Station	Output	Period
Heavy oil	Buzen No.2	500MW	FY2018~
	Sendai No.1 and 2	1000MW	FY2018~
LNG	Shin-Kokura No.4	600MW	FY2020

Location of Plants

As of September 2018



Rate Plan for Corporate Customers (Extra-High / High Voltage)

“Renewable ECO Plan” for Corporate Customers

～Utilizing renewable energy sources (hydro / geothermal) to support customers’ CO2 emission reduction goals～

Background: The plan was created in response to an increasing number of corporate customers acknowledging environmental measures and management as key issues amid increase in environmental initiatives such as SDGs and ESG investments

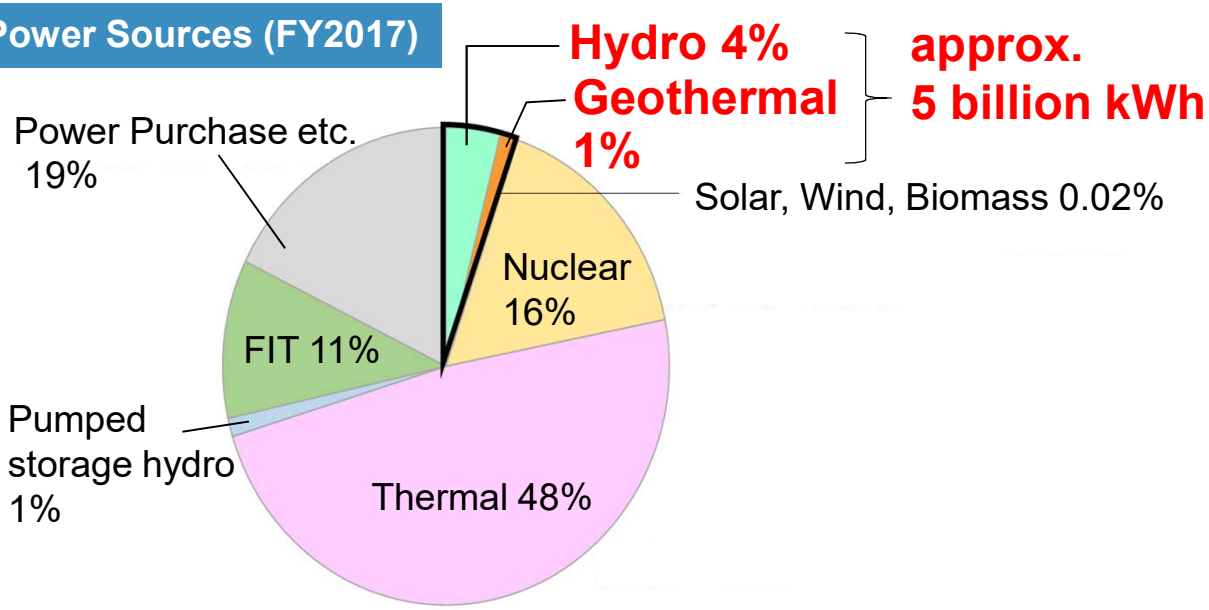
Note: Businesses whose combined annual energy consumption (crude oil equivalent) is greater than 1,500kl are required to report their CO2 emission volume to the government

✓ Kyuden Group’s Renewable Energy Capacity
→ **approx.5 billion kWh** (Hydro 1,280MW; Geothermal 210MW)

✓ Zero C02 emission factor from power supplied by the plan

Note: Non-fossil certificates will be purchased to ensure that CO2 emission factor will not increase for our customers

Power Sources (FY2017)



Note: Includes power generated by Kyuden and purchased from third parties (excl. isolated islands)

Hatchobaru Geothermal Plant

Hitotsuse Hydro Plant

Plans for General Customers（Low Voltage）

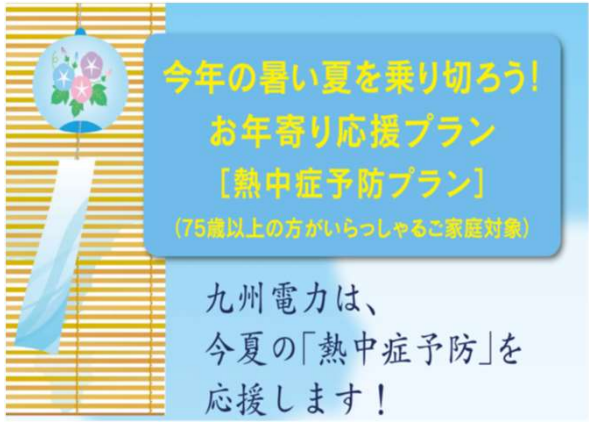
Heatstroke Prevention Plan – for General Customers

～10% discount limited to August and September 2018～

Background : During hot summers there is an increased risk of heat strokes, especially for the elderly at home. The daily use of air conditioning is expensive and with a discount we encourage the use of air conditioning.

We received 164,000 applications

※This service is only limited to customers who have a Smart Family Plan.
(Smart Family Plan is cheaper when signing a two–year contract)



Other Sales Efforts

▲Service for Kyuden gas customers only

・This service offers help when there is trouble with your gas equipment.（Service started from October 15, 2018）
・Established for customer's safety and security.
・Cumulative total applications of Kyuden gas is approximately 67,000.
（As of end of September 2018）

▼Campaign of "All-Electric"

・Customers who bought "All-Electric" participate in a raffle.
・All over Kyushu region IH cooking courses were given by entertainers.
・Cumulative total applications of "All-Electric" is more than 1.06 million households.
（As of end of September 2018）

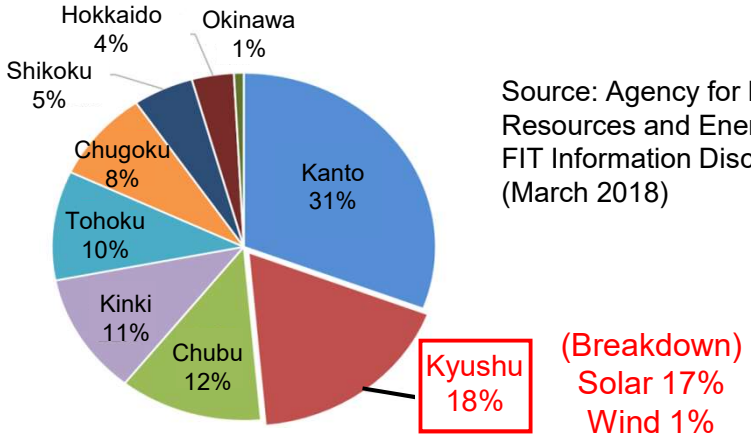
▲ In Kanto area sales target has been met

・Target of 10,000 applications has been met.
・ In addition to the two existing plans, a variant has been introduced from September 2018 targeting low usage customers ("Basic plan S" and "JAL Mile Plan S")

Current Status and Future Expansion of Renewable Energy

- Solar generation in Kyushu increased rapidly following the enforcement of the FIT Act in July 2012.
- Due to favorable conditions for renewable energy generation, especially in terms of sunlight conditions, solar power in Kyushu has developed more rapidly compared to other areas (8,120MW as of Sep 2018).
- To increase renewable energy generations even further, we will control / adjust output from thermal power and pumped storage hydro plants, while installing large-scale batteries and developing interconnection technologies required to distribute a larger volume of electricity to other regions.

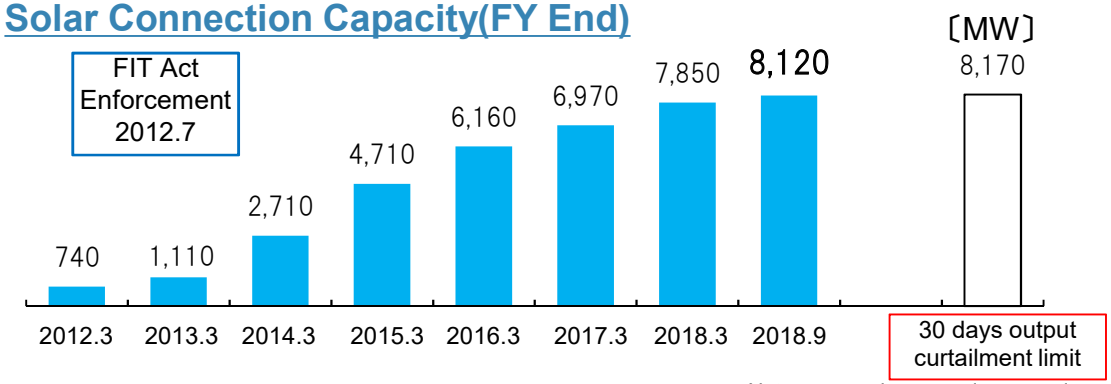
Breakdown of National Solar / Wind Generation Capacity



Source: Agency for Natural Resources and Energy “Website for FIT Information Disclosure” (March 2018)

(Breakdown)
Solar 17%
Wind 1%

Solar Connection Capacity(FY End)



Note: connection capacity assuming annual renewable energy output curtailment limit of 30 days

Buzen Battery Substation

Overview

	Buzen Battery Substation
Output	50MW
Capacity	300,000kWh
Site	Buzen Power Station Premise (Buzen, Fukuoka)

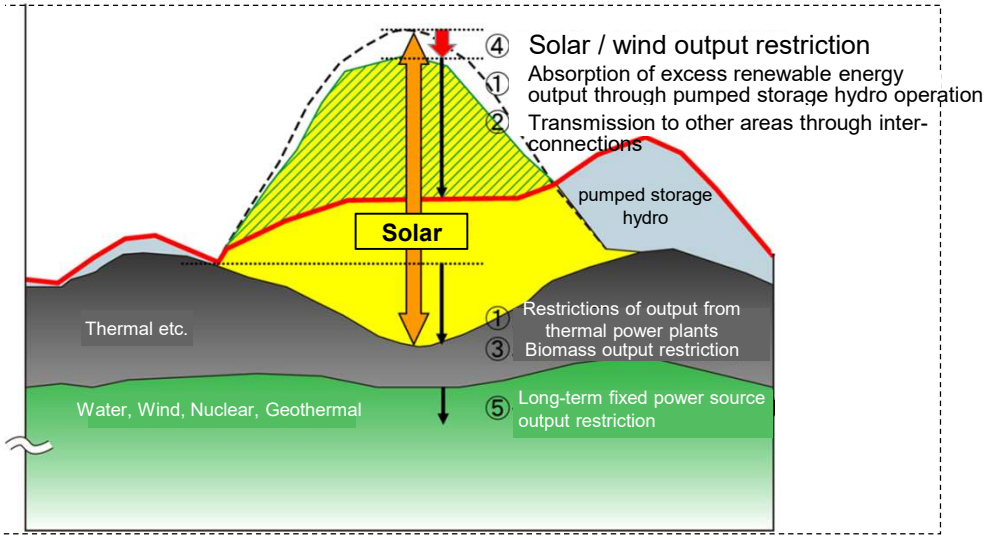
Renewable Energy Output Restriction in Kyushu

- On October 13, 2018, renewable energy supplies were restricted for the first time in Kyushu mainland as estimated power supply exceeded demand despite implementation of certain countermeasures including thermal power output restrictions and utilization of pumped storage hydro plants.

Renewable Energy Restrictions based on Priority Dispatch Rule

Order of Output Restrictions, etc.

1. Absorption of excess renewable energy output through pumped storage hydro operation and restrictions of output from thermal power plants, etc.
2. Transmission to other areas through interconnections (Kanmon interconnection)
3. Biomass output restriction
4. Solar / wind output restriction
5. Long-term fixed power source (hydro, nuclear, geothermal) output restriction



Renewable Energy Output Restrictions in Kyushu (October 2018)

	1st	2nd	3rd	4th
Date	Oct 13 (Sat)	Oct 14 (Sun)	Oct 20 (Sat)	Oct 21 (Sun)
Time of Restric-tion	9:00~16:00			
Output Restric-tion	380MW	540MW	520MW	930MW

Note: Time of restriction during maximum renewable energy output restriction

Number of Facilities / Capacity by Solar Output Restriction Rule (September 2018)

	Former Rule	New Rule
500kW～	**Restriction (manual)*** (without compensation up to 30 days/years) 【approx. 2,000】 【approx. 3,300MW】	**Restriction [PCS with output restriction function]** (without compensation unlimitedly) 【approx. 23,000】 【approx.1,000MW】
10kW ～ 500kW	No Restriction	
～10kW	【Total approx. 418,000】 【Total approx. 3,800MW】	Currently No Restriction (Originaly Restricted)

*partially through installation of PCS with output restriction function

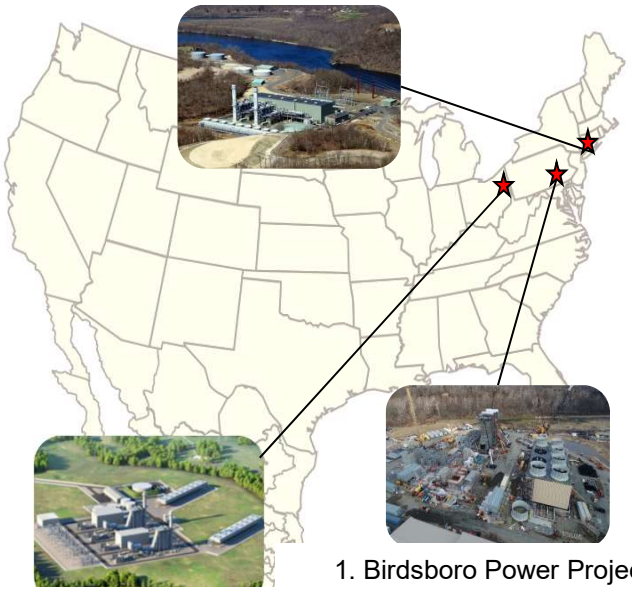
Enhancement of Overseas Energy Business

New participations in US Gas-Fired Power Projects in 2018

- We are participating in three gas-fired power projects in the US, including Birdsboro Power Plant (participation in December 2017), Kleen Gas (May 2018) and South Field Energy (August 2018)
- We expect stable earnings generation due to the capacity market regulation and the chance to apply a further understanding of such regulation in domestic future business.
- We aim to expand our overseas business by actively engaging in projects in the US where we can get the abundant participation opportunities due to growing needs to replace deteriorated coal-fired with gas-fired plants.

Net Capacity of Overseas Energy Business：1,975MW(As of end of October 2018)
【Target : 2,400MW(as of 2018) / 5,000MW(as of 2030)】

2. Kleen Energy Power Project



1. Birdsboro Power Project

3. South Field Energy Power Project
(post-construction image)

Overview of US Projects

	1. Birdsboro	2. Kleen Gas	3. South Field
Planned Project Site	Birdsboro, Berks County, Pennsylvania	Middletown, Connecticut	Columbiana, Ohio
Generation Capacity	488MW	620MW	1,182MW
Generation Type	Natural gas combined cycle		
Business Description	Supply of electricity through the wholesale market		
Participation	Dec 2017	May 2018	Aug 2018
Ownership	11.1%	20.25%	18.1%
Operation Commence-ment	2019 (planned)	Jul 2011 (operating)	2021 (planned)

（This page is intentionally left blank）

Initiative for Innovation ～KYUDEN i-PROJECT～

- “KYUDEN i-PROJECT” is an initiative to create future businesses through innovation in order to create new growth pillars and create new services that add value for our customers and society.
- Through various innovative activities across the Kyuden Group and open innovation with other companies, we are currently considering the commercialization of 22 projects.
- In July 2018, we set up an “Incubation Lab” for quick and flexible decision-making. It promotes innovation by developing structured ways to facilitate concept creation and sharing information via workshops and via a special internal website.

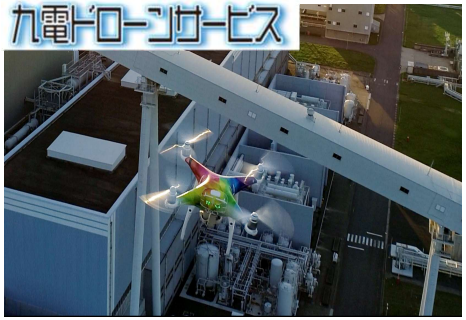
【Example】

① 「QUUN」【 On Sale】
IoT service with original voice-capable AI engine

② 「OSUSO」【 Demonstration Phase】
Agricultural products marketing service

③ 「Qottaby」【 Demonstration Phase】
Monitoring service showing information on location

④ 「Kyuden Drone Service 」【 Demonstration Phase】
Drone Aerial photography service



▲President Ikebe engages with employees via a special site

President Ikebe talks about the importance of innovation and creative thinking to tackle today’s challenges.
Employees have been involved in cross-organization workshops and to challenge their thinking in new business creation concepts.

Participating in Fukuoka Airport Redevelopment Project

- In August 2018, Fukuoka International Airport Company, a company formed by a consortium led by Fukuoka Airport Holdings (Fukuoka Airport HD Group*), signed an agreement with Japan's Ministry of Land, Infrastructure, Transport and Tourism (MLIT) for the operation of Fukuoka Airport.
  * Consortium comprised of Nishi-Nippon Railroad, Mitsubishi Corporation, Changi Airports International and Kyushu Electric
- Conveniently located close to the city center and appealing for business and leisure travelers, the consortium aims to facilitate the revitalization of the airport and its surrounding areas, with the goal of stimulating Kyushu's economy and tourism.

Future image of International Terminal

Future image of Domestic Terminal

Future Image of Fukuoka Airport in 30 Years

Source: MLIT homepage

Initiatives for Urban Developments

- In February 2018, to strengthen our urban development business, we established a unit specifically to develop strategies and ideas. The business will invest in large scale development projects in Fukuoka and other areas of Kyushu.
- In March 2018, a consortium composed of Mitsui Fudosan, Nishi-Nihon Railroad and Kyushu Electric Power group, applied for the redevelopment project of "Fukuoka Fruit and Vegetable Market Site". In July of the same year, we have been selected prospective developer.
- Aiming to open business at the end of 2021, we promote facilities development and land acquisition. By its convenient location, we hope to contribute to Kyushu's economy in multiple ways.

Future image of
Fukuoka Fruit and Vegetable market site

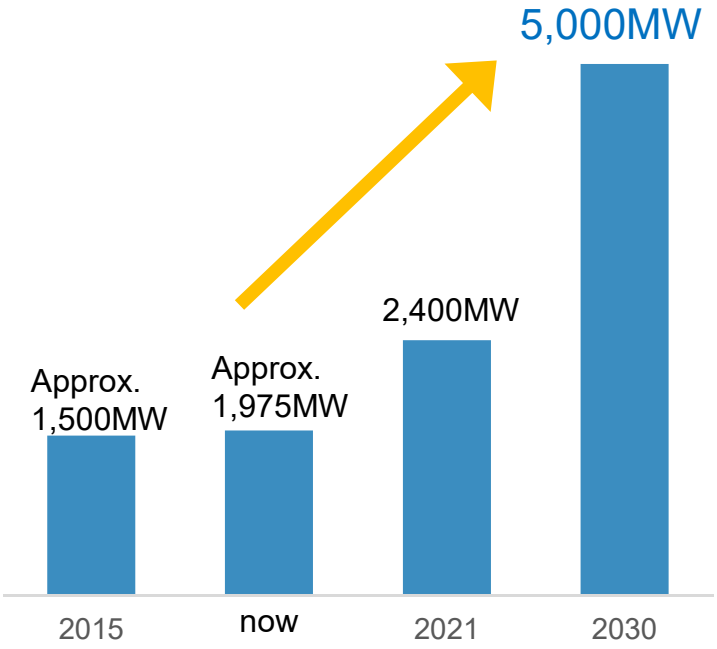
Source: Fukuoka city homepage

Reference

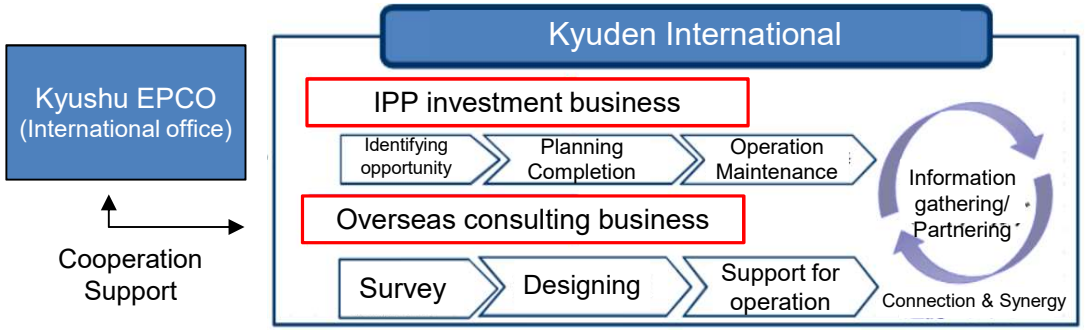
Overseas Energy Business

- Our group reviewed the overseas energy business promotion structure in April 2017. Since then, International office is positioned as main body for constructing a strategic network including outside group, and Kyuden International Co., Inc., which is our wholly-owned subsidiary, as main body for promoting IPP investment and overseas consulting business.
- We are aiming for 5,000MW equity ownership in electricity output in 2030 by developing projects mainly in Asia where electricity demand is expected to increase, as well as North America and Europe.

Target Equity Ownership in 2030



Overseas Energy Business Promotion System



Outline of Kyuden International Co.,Inc.

Location of headquarters	Fukuoka city
Capital fund	23.15 billion yen （Kyushu EPCO CO., INC.100%）
Date of establishment	August 2nd, 1999
Business description	Overseas energy business Overseas consulting business

Business Development Overseas（As of end of October 2018）

Net Capacity：1,975MW（In Operation：1,706MW、Under construction：269MW）

		Project Name	Fuel	Start of Operation /Investment	Gross Capacity	Ownership	Net Capacity
In Operation	①	Mexico: Tuxpan II	Gas	2001/12	495MW	50%	248MW
	②	Phillippines: Ilijan	Gas	2002/6	1,200MW	8%	96MW
	③	Vietnam: Phu My III	Gas	2004/3	744MW	26.7%	199MW
	④	Mexico: Tuxpan V	Gas	2006/9	495MW	50%	248MW
	⑤	Singapore: Senoko Energy	Gas/Oil	[Investment] 2008/9	3,300MW	15%	495MW
	⑥	China: Inner Mongolia	Wind	2009/9	50MW	29%	15MW
	⑦	Taiwan: Hsin Tao	Gas	[Investment] 2010/10	600MW	33.2%	199MW
	⑧	Indonesia: Sarulla	Geothermal	2018/5	330MW	25%	83MW
	⑨	USA : Kleen Energy	Gas	[Investment] 2018/5	620MW	20.25%	126MW

Subtotal :1706MW

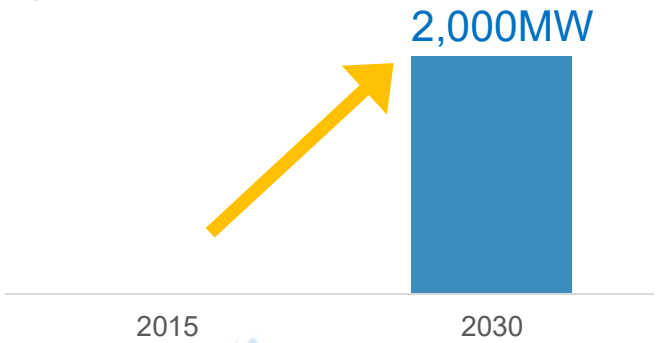
Under Construction	⑩	USA : Birdsboro (Start of Operation: 2019)	Gas	[Investment] 2018/1 Participation 2017/12	488MW	11.1%	54MW
	⑪	USA:South Field Energy (Start of Operation: 2021)	Gas	[Investment] 2018/8	1,182MW	18.1%	214MW

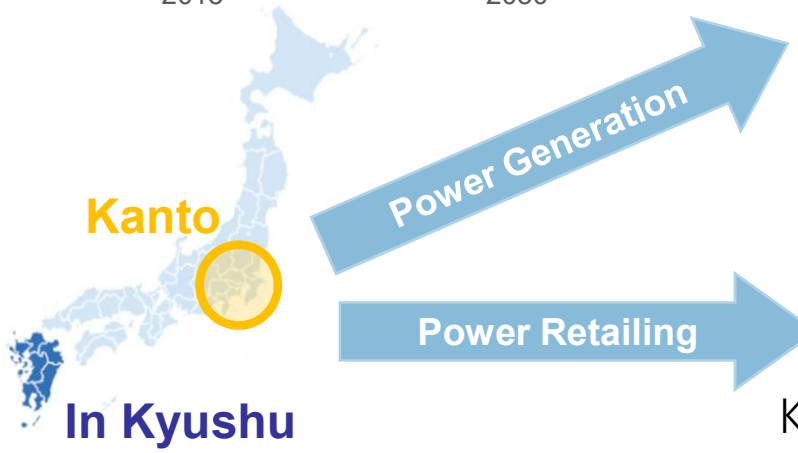
Subtotal 269MW

Energy Business in Japan Outside Kyushu

- We have reached an agreement with Idemitsu Kosan Co., Ltd. and Tokyo Gas Co., Ltd. to form an alliance to carry out studies for a joint development of a coal-fired power plant. As a result, we established Chiba-Sodegaura Energy Co., Ltd. (CSE) in May 2015.
- As part of the environmental assessment procedure, CSE received examination results for “Document Concerning Environmental Impact Assessment” from METI in July 2016, which stated that no recommendation is required. Subsequently, CSE implemented a study of existing conditions (from October 2016 to September 2017), and is currently preparing a “Draft Environmental Impact Statement”.
- In parallel with the environmental assessment, CSE is considering business schemes based on the use of project finance as well as technical studies of power generation facilities.
- Our wholly-owned subsidiary, Kyuden Mirai Energy Co., Inc., has engaged in the retail electricity business in Kanto area since FY2016.

Target Output in 2030





Outline of construction plan

System	Ultra-super critical (USC) power generation
Output	Unit 1: 1,000MW Unit 2: 1,000MW
Fuel	Coal (biomass co-firing is also under consideration)
Start of Operation	Unit 1: FY 2025 [Scheduled] Unit 2: FY 2026 [Scheduled]

Kyuden Mirai Energy

Acquired approx.

10,100 customers

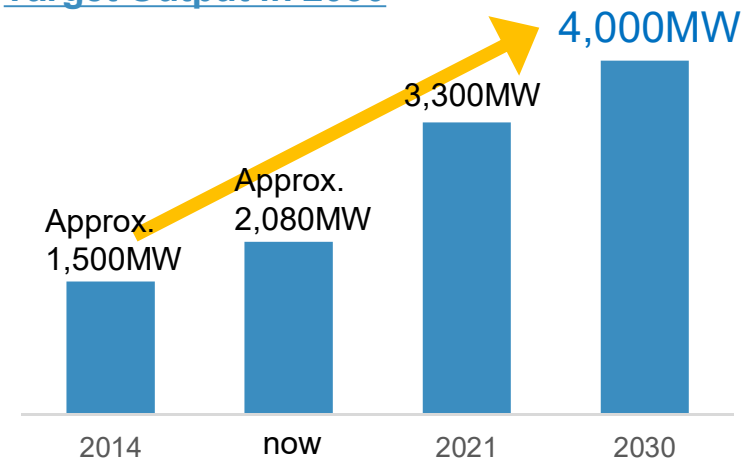
（**Target : 10,000**）

（**As of end of September 2018**）

Renewable Energy business

- We have set approx. 4,000MW of output as a target in 2030 by promoting geothermal and hydroelectric power generation both inside and outside of Japan.
- We have been in close coordination with our group companies such as West Japan Engineering Consultants (West JEC), which has first class technologies, on the development of geothermal power generation.

Target Output in 2030



Breakdown of New Development

Wind	+1,100MW
Geothermal	+800MW
Hydro	+200MW
Others	+400MW
Total	+2,500MW

List of Kyuden Groups Renewable Energy Facilities

(As of end of September 2018)

Solar 92MW

Wind 118MW

Hydro 1,282MW
(except pumping)

Geothermal 548MW

Biomass 41MW

Development plan of renewable energy

（As of end of September 2018）※1Kyuden Mirai Energy Co.,Inc. ※2Kushima Wind Hill Co.,Inc.

	Name	Prefecture	Output(MW)	Notes
Solar	【Oversea】Three vally No.1※1	Oversea	Approx.4,000	Starting operation in January 2019(scheduled)
		Subtotal	**Approx.4,000**	—
Wind	Kushima wind※2	Miyazaki	64,800	Starting operation in October 2020 (scheduled)
	Karatsu Chinzei wind farm※1	Saga	Max. 28,000	Starting operation in 2022 (Under environmental assessment)
	Experimental Study of Next Generation Offshore Floating Wind Power System※1	Fukuoka	3,000	Starting operation in November 2018 [Commissioned project in collaboration with NEDO] （November 2018～March 2022(Demonstration Phase）
		subtotal	**95,800**	—
Geothermal	Otake	Ohita	14,500	Starting operation in December 2020 (scheduled) Update of existing facility（12.5MW→14.5MW）
		subtotal	**14,500**	—
Hydro	Thukabaru No.1~4	Miyazaki	66,600	Starting operation in May 2019 (scheduled) Update of existing facility（62,600kW→66,600kW） （4units→2units）
	Shin-kosa	Kumamoto	7,200	Starting operation in July 2019 (scheduled)
		subtotal	**73,800**	—
Biomass	【Outside Kyushu】 Shimonoseki-Biomass※1	Yamaguchi	74,980	Starting operation in 2021 (scheduled)
	Buzen-biomass※1	Fukuoka	74,950	Starting operation in 2020 (scheduled)
	【Outside Kyushu】 Nagano-biomass※1	Nagano	14,500	Starting operation in 2020 (scheduled)
	Nanatsujima Biomass Power※1	Kagoshima	49,000	Starting operation in 2018 (scheduled)
	Karita biomass※1	Fukuoka	74,950	Starting operation in 2021 (scheduled)
	【Outside Kyushu】 Okinawa uruma※1	Okinawa	49,000	Starting operation in 2021 (scheduled)
		subtotal	**337,380**	—
Tidal	Tidal power generation technology commercialization project※1	Nagasaki	2,000	Expected in 2018～2019 [in construction preparation] Area：Gotou city，Nagasaki prefecture
		Subtotal	**2,000**	—
Total			**527,480**	—

Upcoming Renewable Projects (currently in research stage)

(As of end of September 2018)

	Area	Prefecture	Starting Schedule	Contents of study(planned)
Wind (offshore)	Hibikinada in Kitakyushu	Fukuoka	2017	・Investigation of wind, ocean and ground ・Environmental assessment ・Basic design of generating facilities
Geothermal	The south of Yamashita pound	Oita	2017	・Drilling wells for investigation (in preparation) ・Monitoring hot springs
	Ibusuki	Kagoshima	2015	・Drilling wells for investigation(in preparation) ・Monitoring hot springs （technical support for Ibusuki city）
	Minamiaso Village	Kumamoto	2015	・Drilling wells for investigation(in preparation) ・Monitoring hot springs
	The north of Hiijidake	Oita	2013	・Drilling wells for investigation ・Monitoring hot springs
	The east of Waita mountain	Oita	2017	・Drilling wells for investigation(in preparation) ・Monitoring hot springs