

Status of Addressing the Medium-term Management Plan

Electric Power Development Co., Ltd.

April 26, 2019

I . Awareness of the Business Environment

Awareness of the Business Environment Surrounding J-POWER Group



- Sustainable Development Goals (SDGs) have been adopted by UN in Sep. 2015
- The society has largely shifted toward the realization of "decarbonized society" as seen in energy conversion and decarbonization
- Industrial structure innovation is expected in the future with the advance of digital technology
- Make major changes in business environment a growth opportunity based on business philosophy

Climate change issues

- ✓ Movement toward "decarbonized society"
 - Paris Agreement (Dec. 2015)
 - Medium-term target of Japan (Reduce GHG by 26.0% in FY2030 compared with FY2013)
 - Expansion of ESG investment

Advance of digital technology

- ✓ Optimal operation and advanced maintenance of power plants using AI and IoT
- ✓ Decentralization using digital technology

Intensifying competition in the domestic power market

- ✓ Sluggish growth of domestic electricity demand
- ✓ Advance of deregulation and market competition through electricity system reform

Growth of electricity demand overseas

- ✓ Expected growth of overseas electricity demand mainly in developing countries

II . Progress of the Medium-term Management Plan

- J-POWER Group released Medium-term management plan in July 2015
- In April 2018, released a review of efforts undertaken and new forecasts for the next three years
- Earnings in FY2019 is estimated to decrease due to one-off factors including abolishment of Takehara Unit No.2, followed by expected earnings improvement in FY2020 due to commencement of operations of new power plants. Continue efforts toward realization of growth

■ Medium-term Management Plan

	Indicator	Target
Growth	J-POWER EBITDA*	Increase to around 1.5x the level of FY2014 in FY2025 (FY2014 result : 181.8 billion yen)
Soundness	$\frac{\text{Interest-bearing debts}}{\text{J-POWER EBITDA}}$	Improve from level at end of FY2014 by end of FY2025 (End of FY2014 result : 9.5x)

■ Three-year forecasts and results

		Growth indicator	Soundness indicator
FY2015-2017	Forecast	185.0 billion yen/year (FY2015-2017 3-year average)	Maintain same level as results at end of FY2014 (9.5x) at end of FY2017
	Result	186.7 billion yen/year (FY2015-2017 3-year average)	8.0x (FY2017 result)
FY2018-2020	Forecast	≥ 210.0 billion yen (FY2020)	Maintain same level as results at end of FY2017 (8.0x) at end of FY2020

* J-POWER EBITDA= Operating income + Depreciation and amortization + Equity in earnings of affiliates

III. Status of Addressing the Medium-term Management Plan

1. Further Expansion of Renewable Energy

- J-POWER Group owns 8,575MW of hydro and 443MW of wind (as of Mar. 31, 2019), a leader of renewable energy
- Steadily progressing toward FY2025 renewable energy targets **“1GW scale new development”, “0.3TWh/year increase in hydro and 2.5TWh/year increase in wind and others (compared with FY2017)”**
- Established Renewable Energy Business Strategy Dept. in Apr. 2019 to expand business and optimize operation and maintenance while addressing various changes in business environment

■ Efforts in FY2018

Hydro

- Commencement of construction work at Shinkatsurazawa hydro project (22MW)
- Completion of overall renewal at Akiba No.1 and No.2 plants, which has increased capacity by 2MW
- Commencement of construction work at Ashoro plant repowering project (2MW increase)
- Improvement of water intake equipment at Hinoemata and Chinabora intake dams which lead to 27GWh increase

Wind

- Participation in Triton Knoll offshore wind project (860MW) in U.K.
- Commencement of environmental impact assessment procedure at three sites (Wajima, Youra and Kunimiyama) totaling max. 250MW
- Preparation for construction (commencement scheduled in May 2019) at Kaminokuni No.2 (42MW)
- Promotion of construction work at Setana Osato (50MW), Nikaho No.2 (41MW) and Kuzumaki No.2 (44MW) which are scheduled to commence operation in Jan., Jan. and Dec. in 2020 respectively
- Memorandum of understanding signed with ENGIE (France) for collaboration in domestically commercializing floating type offshore wind power, etc.

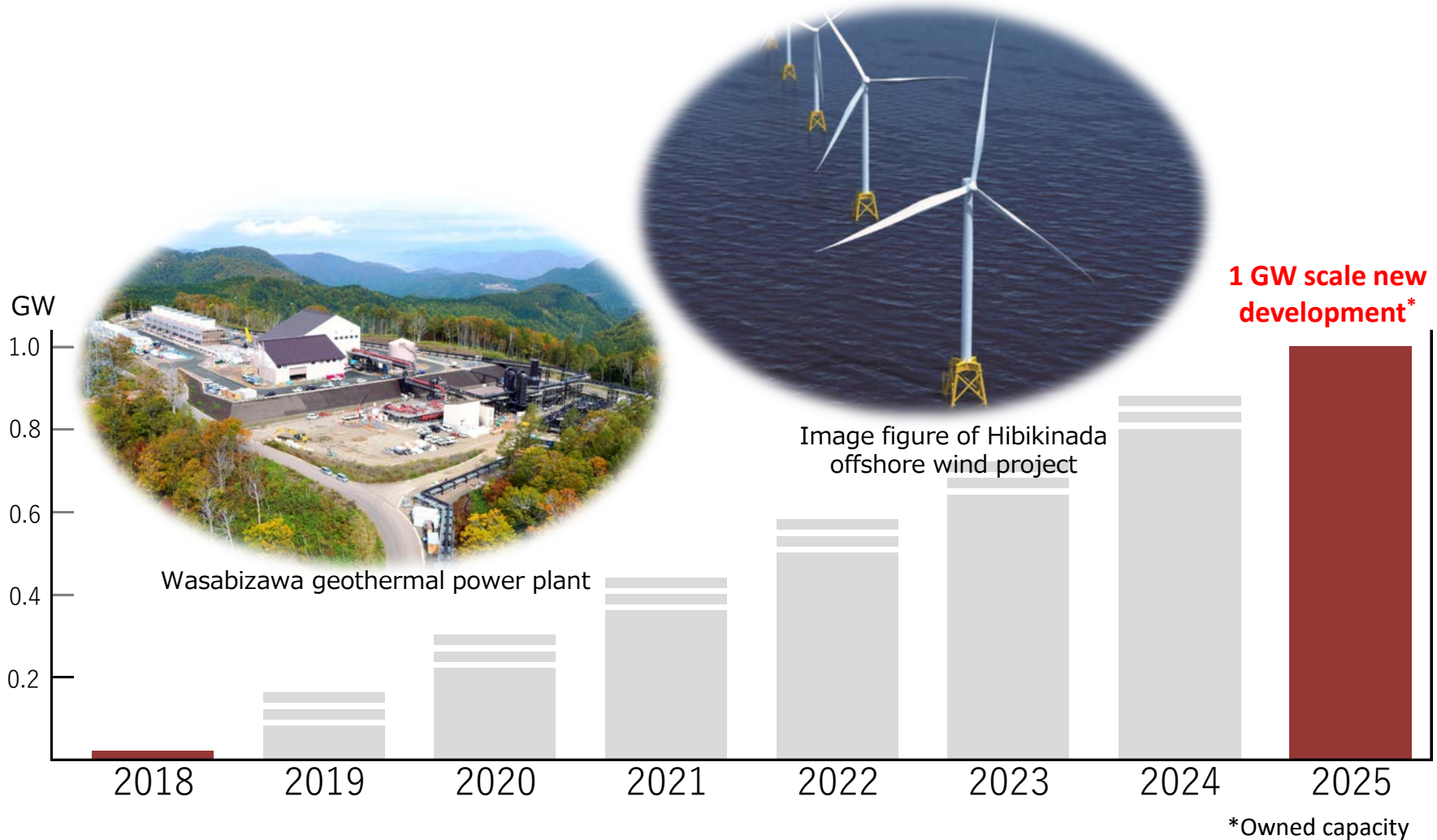
Geo-thermal

- Promotion of construction work at Wasabizawa geothermal (42MW) which is scheduled to commence operation in May 2019
- Commencement of construction work at Onikobe geothermal replacement project (15MW) in April 2019
- Promotion of commercialization of Appi geothermal (15MW)

1. Further Expansion of Renewable Energy

■ Effort expanding renewable energy

- ✓ Sea area surveys outside port area for offshore wind power
- ✓ Geothermal resource surveys at Takahinatayama site (Osaki city, Miyagi prefecture)



2. Strive toward Zero Emission in Coal Use

- Basic Energy Plan estimates 26% share for coal-fired thermal power in FY2030 in Japan
- Afterward, stream from carbon reduction to decarbonization in fossil fuel use may get larger due to significant increase in renewable energy and further progress of decentralization caused by utilization of digital technology
- In such an environment, coal, which is cheap and has excellent procurement stability, is essential for Japan's energy security, so it is necessary to continue using it while making it compatible with the climate change issues
- As a leading company in coal use technology, J-POWER Group will strive to achieve zero emission in coal use through such as carbon recycling based on its technology, and contribute to the realization of a “decarbonized society”

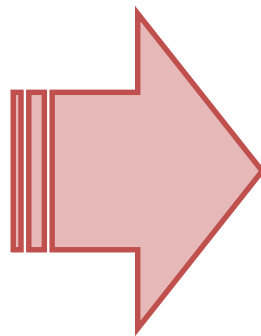
■ Initiatives toward zero emission in coal use

Features of oxygen-blown IGCC*¹ under demonstration at Osaki CoolGen

- Highly efficient
- Best suitable to CO₂ separation and capture
- Available for multi purpose other than power generation
- High load tracking ability
- Technological verification completed at Osaki CoolGen



Oxygen-blown IGCC demonstration testing plant (Hiroshima prefecture)



Carbon recycling

- Use and storage of CO₂ separated and captured (CCUS)

Contribution to hydrogen society

- Demonstration tests of IGFC*² which utilize fuel cell at Osaki CoolGen

Manufacture of diverse products

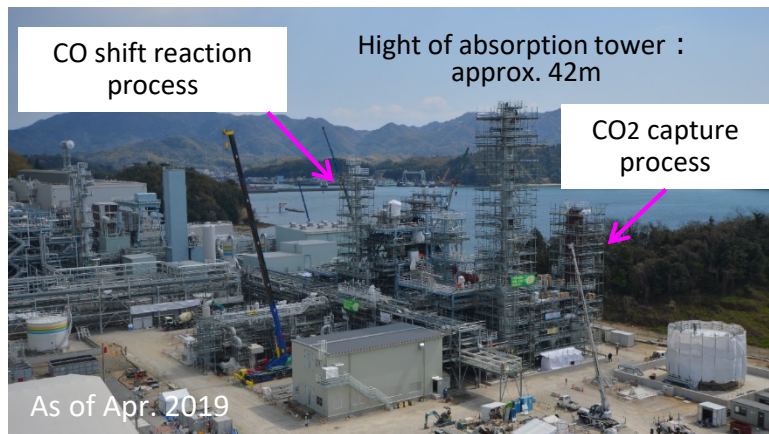
- Development of products using recovered CO₂

2. Strive toward Zero Emission in Coal Use

■ Initiatives for carbon recycling

- Demonstration tests of IGCC with CO₂ capture is scheduled to commence around Dec. 2019 at Osaki CoolGen
- Examine the use of captured CO₂ while grasping its properties as gas

Osaki CoolGen (Demonstration plant of IGCC with CO₂ capture)



Example of using captured CO₂ to be examined (Agricultural use)



With CO₂ captured from IGCC, increase the concentration of carbon dioxide in the agricultural greenhouse and promote crop growth to improve agricultural productivity.

■ Participation in Australian brown coal hydrogen pilot test project

- Aiming to build and commercialize a CO₂-free hydrogen supply chain, J-POWER is participating in a pilot test project to produce hydrogen by gasifying Australian brown coal, an abundant, underutilized resource, and transport it to Japan.
- When this supply chain is commercialized, plans call for utilizing CCS to store the CO₂ produced during the manufacture of hydrogen from brown coal, avoiding its release to the atmosphere and thus achieving CO₂-free operations.

Conceptual rendering of the completed brown coal gasification facilities



3. Promotion of the Ohma Nuclear Power Plant Project, with safety as the major prerequisite



- Through the use of MOX fuel, play a central role in the nuclear fuel cycle and contribute to energy security
- Contribute to realizing “decarbonized society” as a CO₂-free energy source

(Details of initiatives)

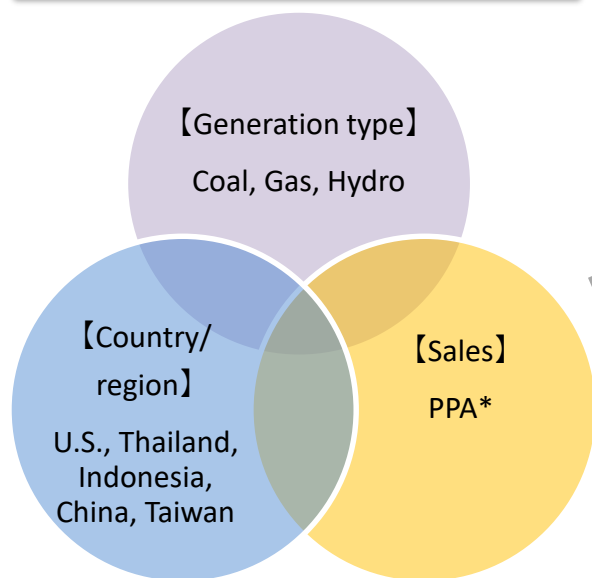
- Pursue further improvements in safety continuously
- Sincerely and appropriately respond to compliance reviews and aim to restart full scale construction work quickly
- Strive for more polite information communication and mutual communication so that we can gain the understanding and trust of the community

Overview of the Ohma Nuclear Power Project	
Location	Ohma-machi, Shimokita-gun, Aomori Prefecture
Capacity	1,383MW
Type of nuclear reactor	Advanced Boiling Water Reactor (ABWR)
Fuel	Enriched uranium and uranium-plutonium mixed oxide (MOX)
Start of construction	May, 2008
Start of operation	To be determined
Status	In December 2014, J-POWER submitted to NRA an application for permission for alteration of reactor installment license and an application for construction plan approval in order to undertake review of compliance with the new safety standards

4. Expansion of Overseas Business

- Westmoreland thermal power station (926MW) in U.S. has commenced operation in Dec. 2018
- Steadily promote construction work at Central Java coal-fired thermal power (2,000MW) in Indonesia and Triton Knoll offshore wind power (860MW) in U.K.
- Promote the introduction of high-efficiency thermal power and renewable energy to support sustainable growth in countries and regions overseas where power demand is expected to grow, especially in emerging countries

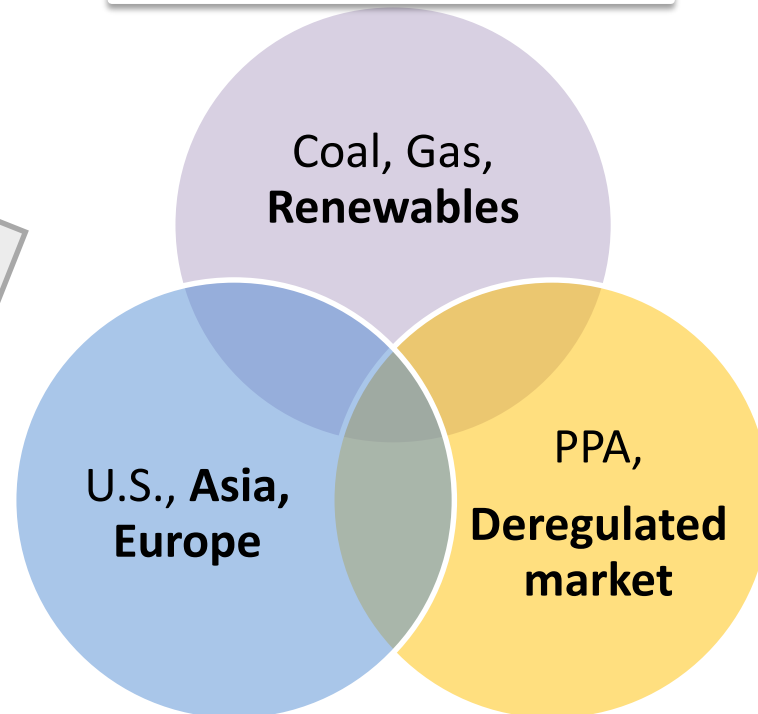
Overseas business current asset



6,898MW as of Mar. 31, 2019

Further growth of generating asset

FY2025



Overseas owned capacity 10GW

*Power Purchase Agreement: Contract parties determine price, volume and other conditions of electricity delivered

5. Value Maximization of Current Assets

- In the midst of intensified competition as a result of deregulation, J-POWER Group maximizes its corporate value through enhancing competitiveness of its generating assets, making advantage of newly established markets and diversifying ways of sales

Strengthening production function

- With stable supply and ensuring safety as the major prerequisite, strengthen cost competitiveness by utilizing digital technologies and other ways
- Improve flexibility of operation and optimize maintenance to meet market needs

Diversifying ways of sales

- Adapt to market competition brought about by deregulation and maximize corporate value through diversifying ways of sales such as investment in ENERES Co., Ltd. and Suzuyo-Power Co., Ltd., and making advantage of newly established markets including baseload market and capacity market

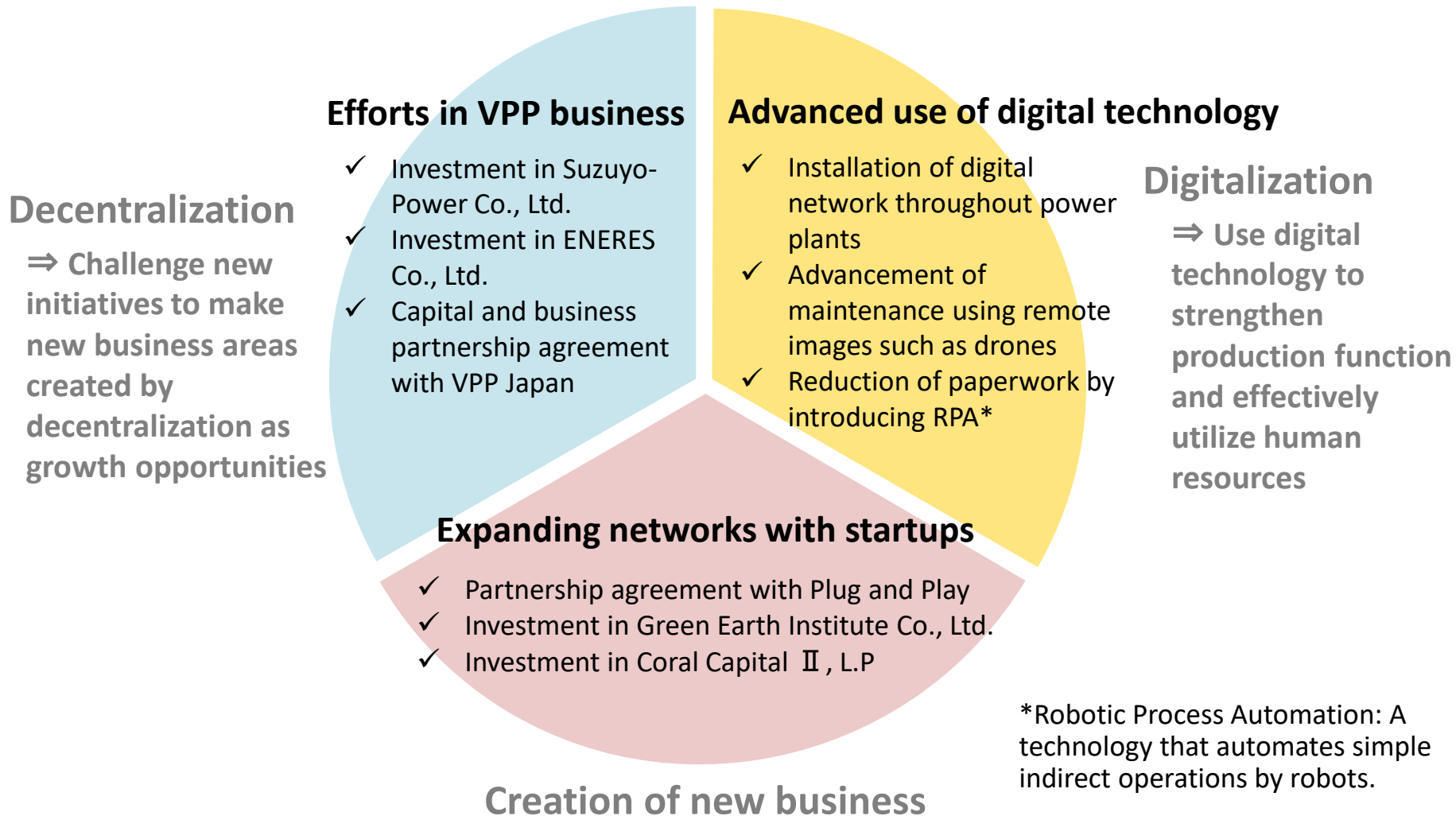
Enhancing reliability and nationwide improvement of power grid

- Enhance reliability of interconnecting lines such as Hokkaido-Honshu HVDC Interconnection Line and major transmission and transformation facilities which J-POWER owns
- While expanding Sakuma frequency conversion facilities* and related facilities, contribute to stable supply, enhanced resilience, and furthermore, nationwide improvement of power network

*Frequency converter station which links east Japan (50Hz) with west Japan (60Hz)

6. Strive toward Further Growth

- In anticipation of future changes in the business environment and industrial structure, we will continuously challenge new efforts to make change an opportunity for growth



IV. Contribution to SDGs based on Corporate Philosophy - ESG Initiatives -

- We will continue to contribute to sustainable development while making the corporate philosophy the foundation of our business activities.

Corporate Philosophy of J-POWER Group

We will meet people's needs for energy without fail,
and play our part for the sustainable development
of Japan and the rest of the world

Established in September 1998



Adopted in September 2015

- Take actual steps toward “harmonizing energy supply and the environment”

Environment

❑ Contribution to realizing “decarbonized society”

- ✓ Stable operation and expansion of renewable energy
- ✓ Strive toward zero emission in coal use
- ✓ Promotion of the Ohma Nuclear Power Plant Project, with safety as the major prerequisite

❑ Addressing local environmental issues

- ✓ Efforts for protecting water, forests and biodiversity

Social

❑ Contribution to realizing the Energy Mix in Japan

❑ Power supply in developing countries which face strong energy demand

❑ Respect for human resources

- ✓ Efforts toward enhanced diversity; Develop working environment where diversified human resources including women and seniors can be more active
- ✓ Continuous improvement of work style named “JPOWER Challenge 30” and promotion of flexible working including working at home and hourly vacation

❑ Contribution to society

- ✓ Cooperation to local community, support for volunteer activities

Governance

❑ Respect for shareholders’ rights; Timely disclosure

❑ Effort for enhanced effectiveness of board of directors; Annual analysis and valuation of effectiveness

[Reference] Status of Major Projects under Development (1)

	Project	Output capacity	Construction status		Remarks
			In preparation	Underway	
Wind	Setana Osato* ¹	50MW		◇	Start of operation : FY2019 (planned)
	Nikaho No.2	41.4MW		◇	Start of operation : FY2019 (planned)
	Kuzumaki No.2	44.6MW		◇	Start of operation : FY2020 (planned)
	Minami Ehime No.2	Max. 40.8MW	◇		Under environmental impact assessment
	Kaminokuni No.2	Phase I 41.5MW (Max. 120.4MW)	◇		Start of construction work : May 2019 (planned)
	Hibikinada Offshore* ²	Max. 220MW	◇		Under environmental impact assessment
	Seiyo Yusuhara	Max. 180MW	◇		Under environmental impact assessment
	Kita-Kagoshima	Max. 215MW	◇		Under environmental impact assessment
	Wajima	Max. 90.3MW	◇		Under environmental impact assessment
	Youra	Max. 64.5MW	◇		Under environmental impact assessment
	Kunimiyama	Max. 94.6MW	◇		Under environmental impact assessment
	New Tomamae Replacement	30.6MW	◇		Start of construction work : FY2020 (planned)
	New Sarakitomanai Replacement	14.9MW	◇		Under environmental impact assessment
	New Shimamaki Replacement	4.3MW	◇		Start of construction work : FY2020 (planned)

*1 J-POWER's equity ratio: 90% Joint venture with Hokutaku

*2 J-POWER's equity ratio: 40% Joint venture with Kyuden Mirai Energy Company, Hokutaku, Saibu Gas, and Kyudenko Corporation

[Reference] Status of Major Projects under Development (2)

	Project	Output capacity	Construction status		Remarks
			In preparation	Underway	
Hydro	Shinkatsurazawa/ Kumaoui	21.9MW		◇	Start of operation : FY2022 (planned)
	Ashoro Repowering	40.0→42.3MW		◇	Completion of repowering : FY2022 (planned)
Geo-thermal	Wasabizawa* ³	42MW		◇	Start of operation : FY2019 (planned)
	Onikobe Replacement	14.9MW		◇	Start of operation : FY2023 (planned)
	Appi* ⁴	14.9MW	◇		Start of operation : Around spring in 2024 (planned)
Thermal	Takehara New Unit No.1	600MW		◇	Start of operation : FY2020 (planned)
	Kashima Power (Coal-fired)* ⁵	645MW		◇	Start of operation : FY2020 (planned)
	Yamaguchi Ube Power	-			Plan under review
Nuclear	Ohma	1,383MW		◇	Under review of compliance with the new safety standards
T&D	Sakuma Frequency Converter Station and relevant facilities	300MW	◇		Increase of capacity: 300MW→600MW
Overseas	Central Java IPP (Indonesia, coal-fired)* ⁶	2,000MW		◇	Start of operation : FY2020 (planned)
	Triton Knoll (U.K., offshore wind)* ⁶	860MW		◇	Start of operation : FY2021 (planned)

*3 J-POWER's equity ratio: 50% Joint venture with Mitsubishi Materials Corporation and Mitsubishi Gas Chemical Company

*4 J-POWER's equity ratio: 15% Joint venture with Mitsubishi Materials Corporation and Mitsubishi Gas Chemical Company

*5 J-POWER's equity ratio: 50% Joint venture with Nippon Steel Corporation

*6 J-POWER's equity ratio: 34% Joint venture with PT. ADARO POWER and ITOCHU Corporation

*7 J-POWER's equity ratio: 25% Joint venture with innogy SE and Kansai Electric Power

- ✓ Our hydroelectric generation capacity of approx. 8.57GW (61 plants) stands among the top in Japan
- ✓ We possess many dams and large capacity reservoirs with life of 100 years or more, which enables stable generation by CO₂-free energy for a long time to come



Nukabira Dam
(Hokkaido prefecture)



Okutadami Dam
(Fukushima prefecture, Niigata prefecture)



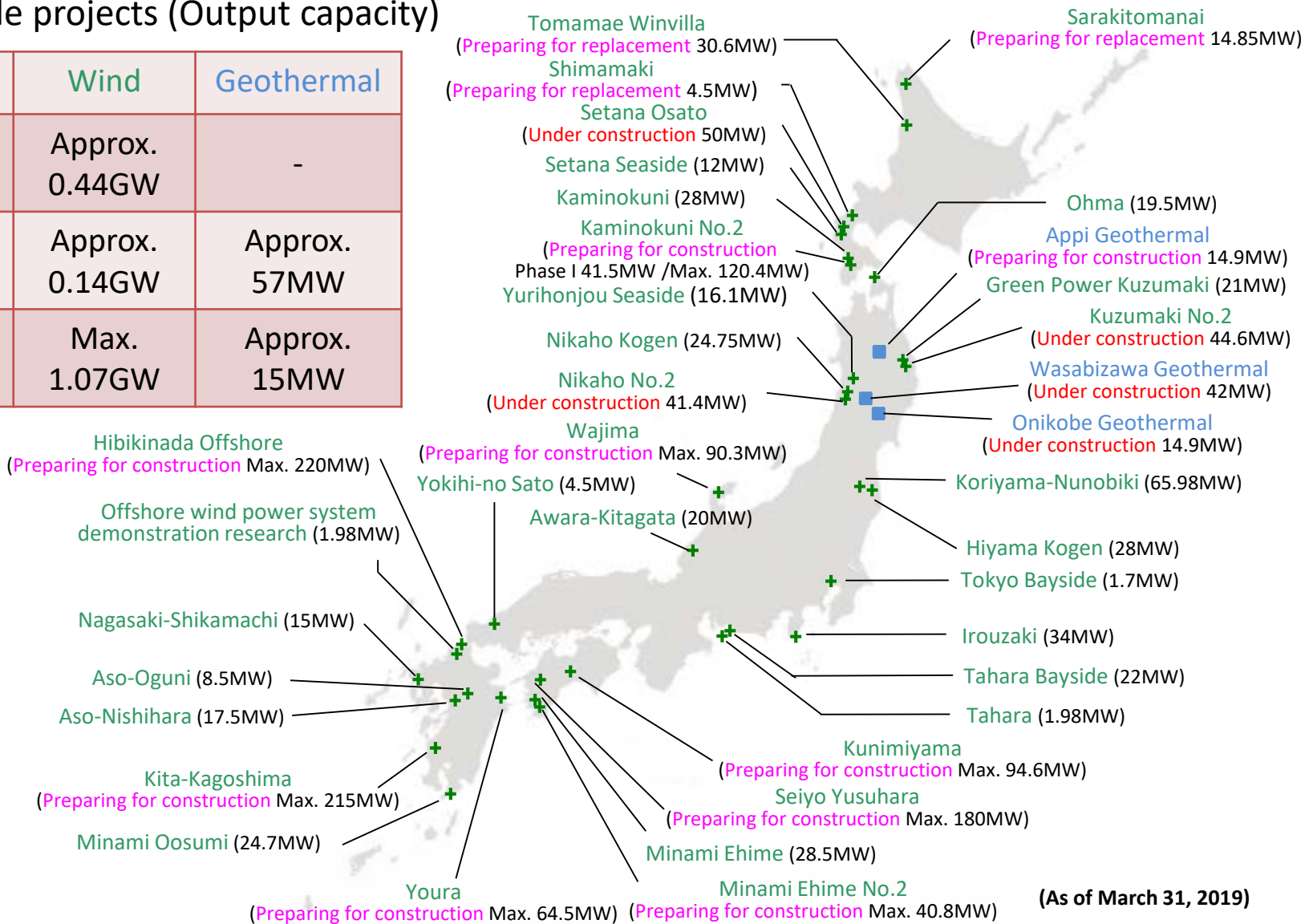
Sakuma Dam
(Shizuoka prefecture, Aichi prefecture)

- ✓ We will continue to contribute to the stable power supply through continuous efforts to operate power plants, making use of the experience and technology we have built up over the past 60 years

[Reference] Renewable Energy of J-POWER (Wind & Geothermal)

✓ Renewable projects (Output capacity)

	Wind	Geothermal
In operation	Approx. 0.44GW	-
Under construction	Approx. 0.14GW	Approx. 57MW
Preparing for construction	Max. 1.07GW	Approx. 15MW



The following contains statements that constitute forward-looking statements, plans for the future, management targets, etc. relating to the Company and/or the J-POWER group.

These are based on current assumptions of future events, and there exist possibilities that such assumptions are objectively incorrect and actual results may differ from those in the statements as a result of various factors.

Furthermore, information and data other than those concerning the Company and its subsidiaries/affiliates are quoted from public information, and the Company has not verified and will not warrant its accuracy or appropriateness.