Initiatives for Japan's Electricity Business and Nuclear Power Generation

May 8th, 2018

The Federation of Electric Power Companies

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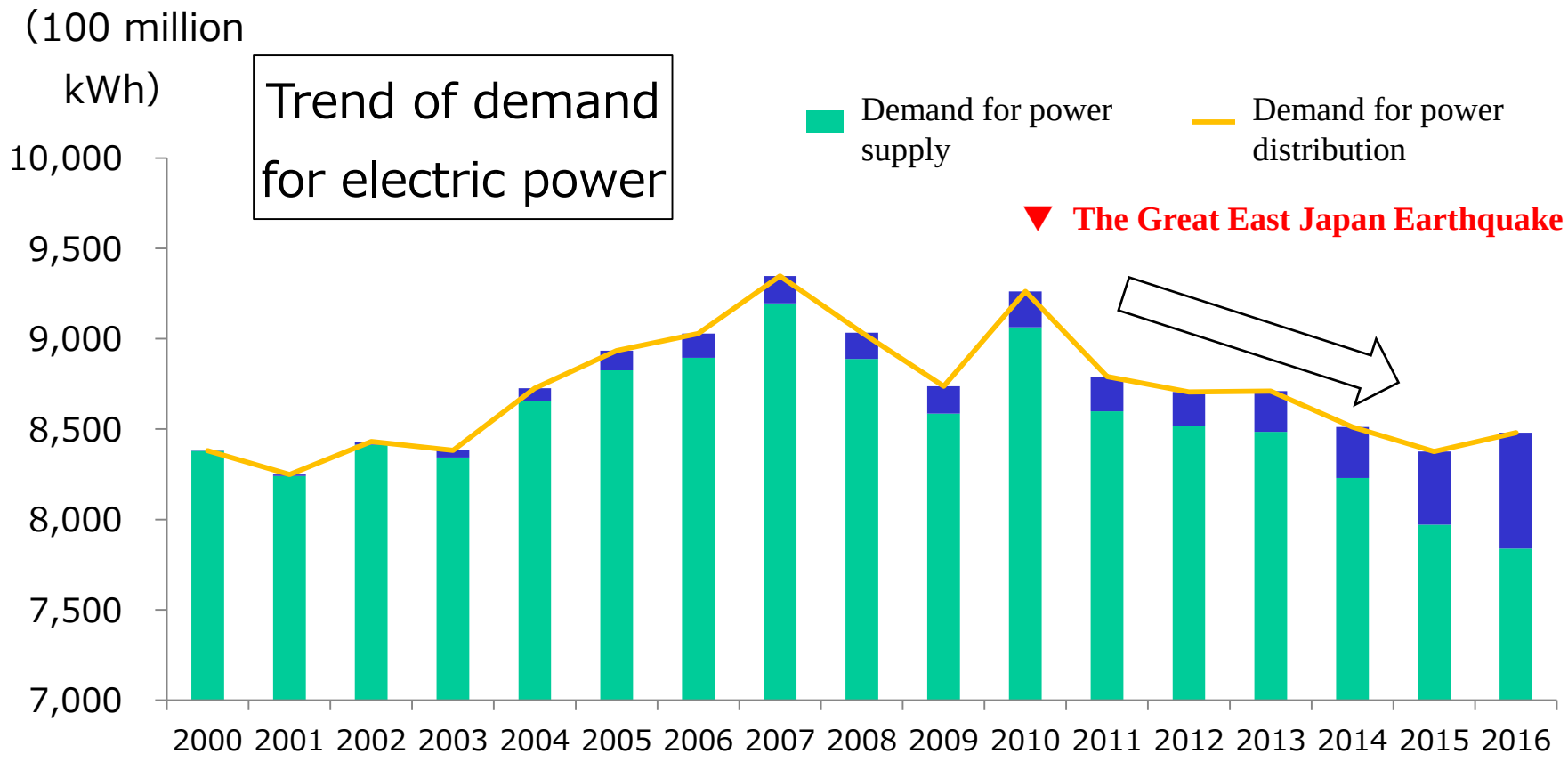
1. Current Environment Surrounding Japan's Electricity Business

Trend of the demand for electric power in Japan

- ○ Since the Great East Japan Earthquake, the demand for power distribution (total of 10 electric power companies + new power operators) has decreased.
- ○ The demand for power supply (total of 10 electric power companies) declined in FY 2016. Deregulation of electric power has contributed to this as well.
- ○ Taking the initiatives for power saving, decrease in population, and other factors into consideration, the demand is likely to continue to decline in the future as well.



Three viewpoints concerning investigation of Energy Mix

Ensuring safety (major premise of investigation)

<Self-sufficiency rate> = Stable energy supply

FY2030

Only 6% at the time of earthquake ⇒ [Target] Approx. 25%, exceeding the pre-quake level (about 20%)
(Expected to improve to about 24.3%)

<Electricity cost> = Improvement of economic efficiency

Electricity rates have risen substantially since the earthquake
(Industrial users = about 30%, households = about 20%)
The renewable energy surcharge in FY 2015 was 1.3 trillion yen
(2.7 trillion yen if all of the approved capacities start operation)

⇒ [Target] To bring it down from 9.7 trillion JPY of FY 2013 by comparison of variable expenses such as fuel cost and renewable energy surcharge
(Fuel cost 9.2 + Renewable energy surcharge 0.5 trillion yen)
(Expected to be reduced by 2 to 5%)

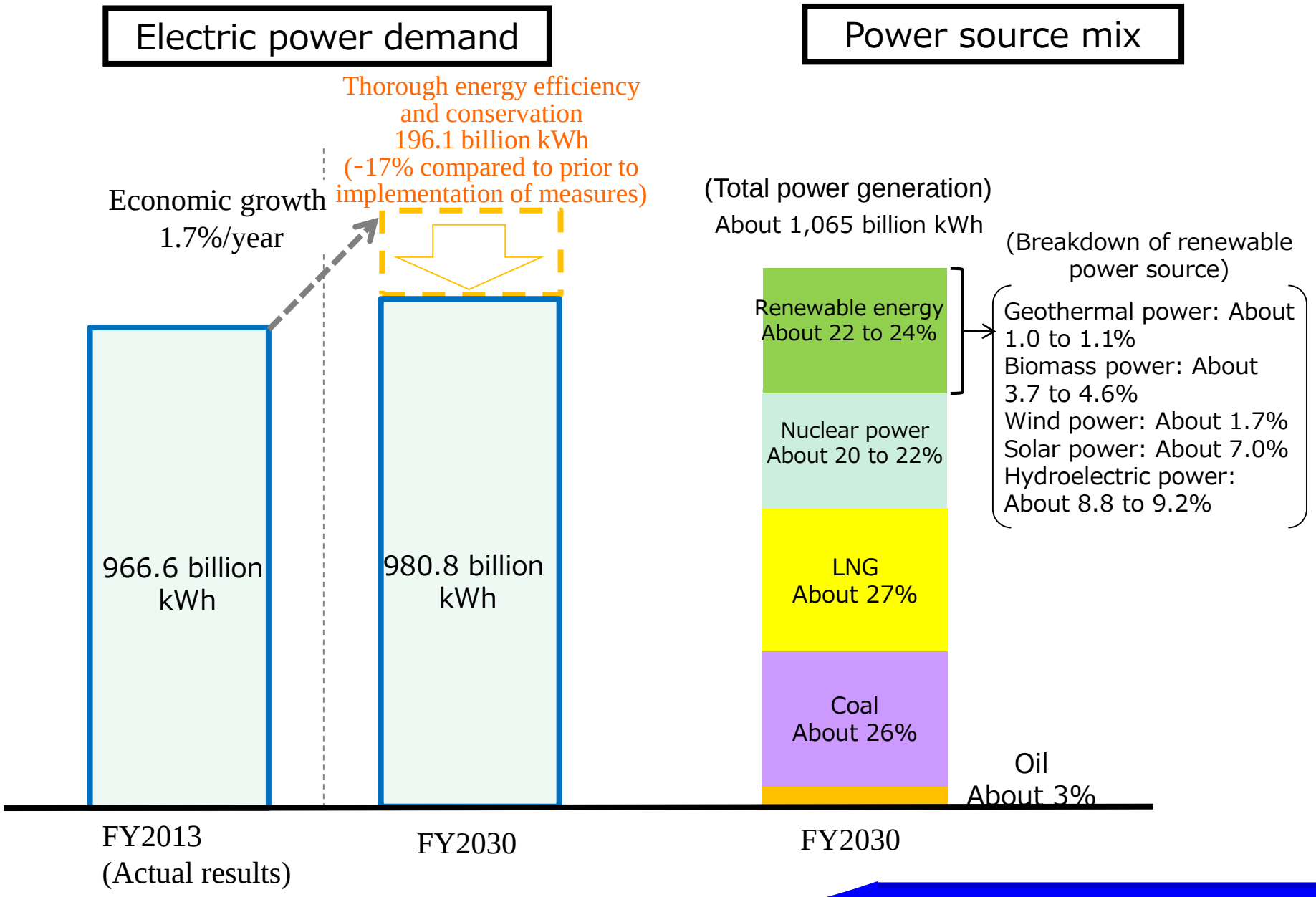
<Greenhouse gas emissions> = Environment conservation

Due to NPS shutdowns and the increase of thermal power generation, the CO2 emissions in FY2013 were the worst ever (490 million tons)

⇒ [Target] Reduction target at par with Europe and U.S.
(Amount of CO2 emission from energy sources is expected to -25%)

※The status evaluation of the aforesaid 3 items shall be during the investigation of Energy Mix

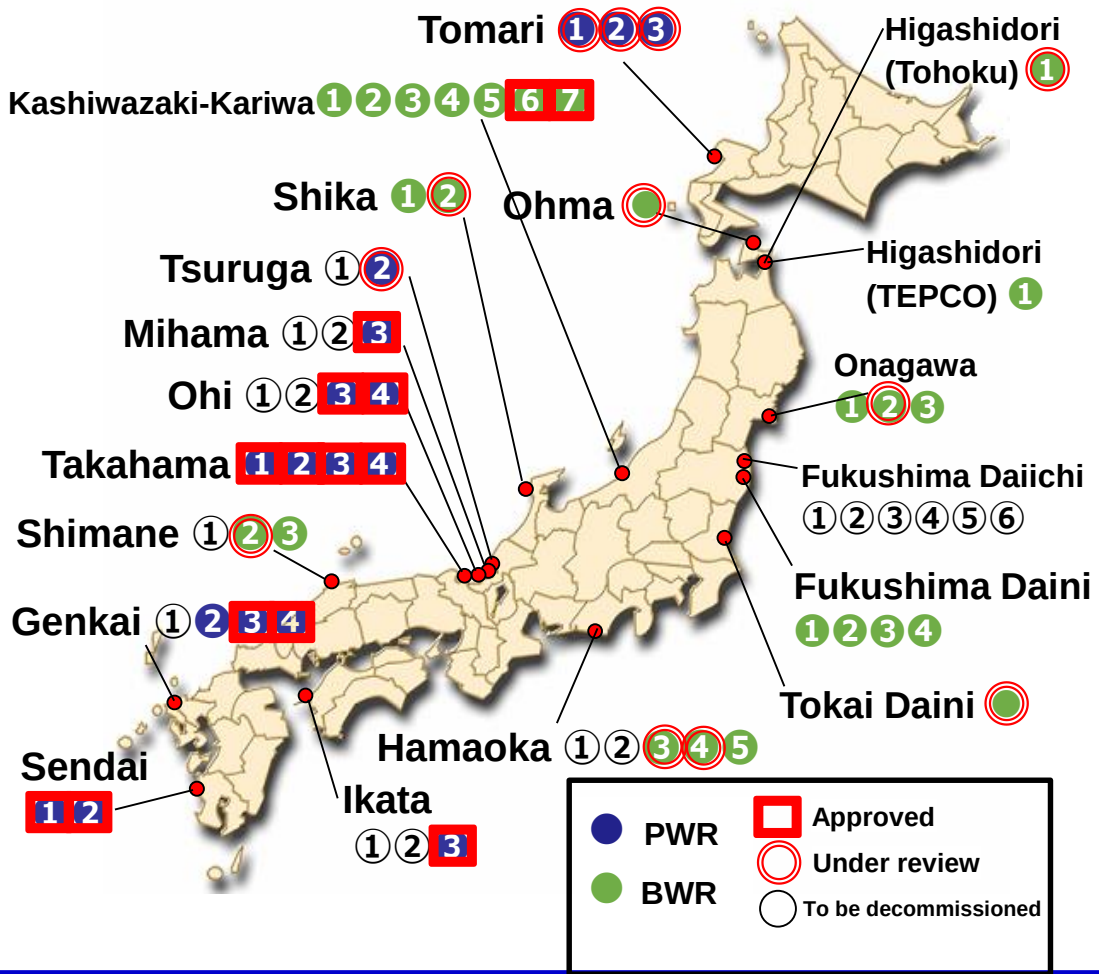
Energy Mix of FY2030



2. Operation Status of Nuclear Power Stations

Restart of Nuclear Power Stations（1）

- Many Japanese nuclear power stations are still in the course to comply with new regulatory requirements, and only 7 units have restarted so far. The utilities are facing difficulty in terms of power supply and financial situation.
- The nuclear power generation is important power source in Japan. We **focus on restart of the plants as well as improvements in availability after the restart with ensuring safety as indispensable condition. By achieving Safety, Energy Security, Economic Efficiency and Environmental Suitability (S+3E), we will contribute to Japanese economy.**

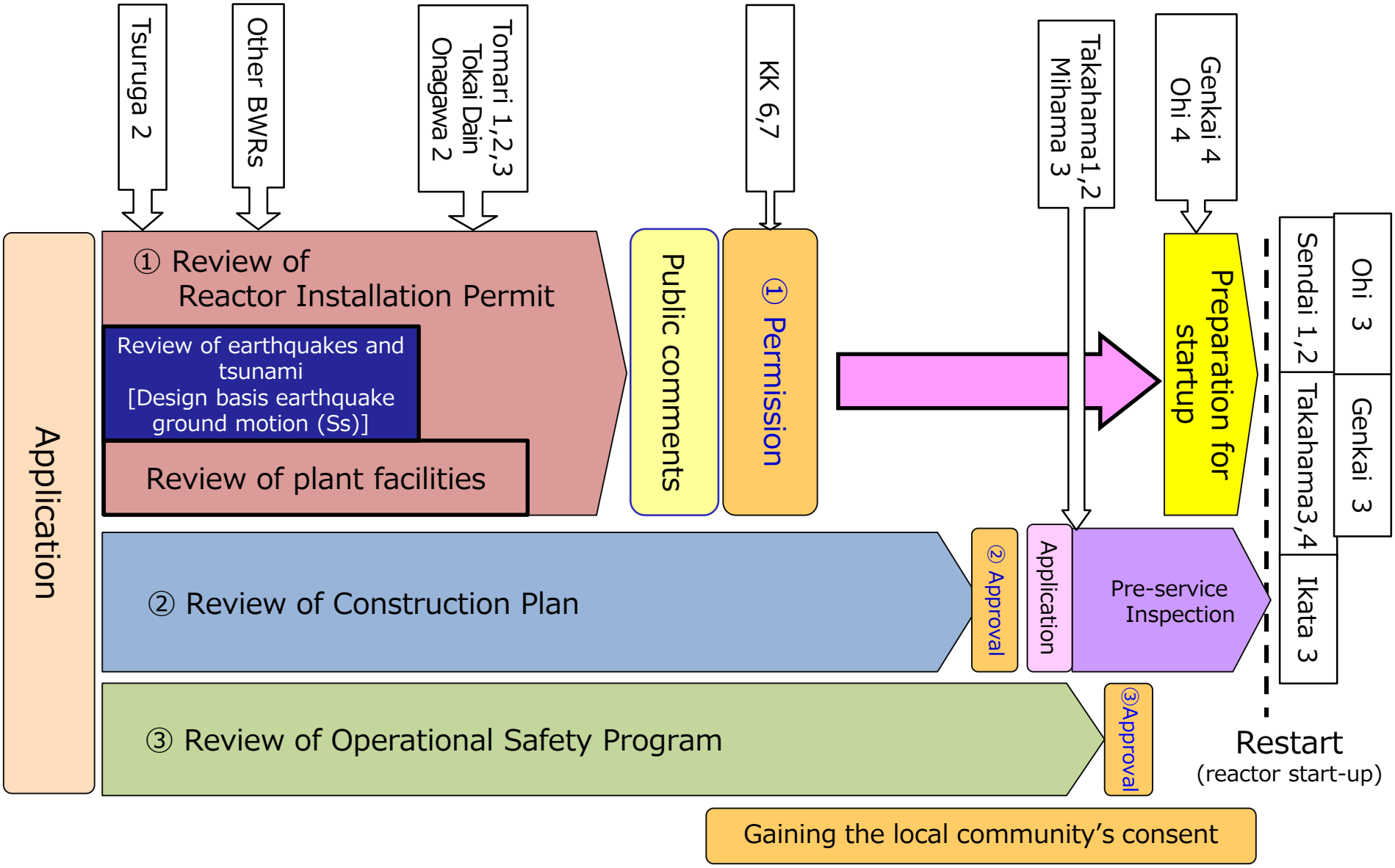


Review status under new regulatory requirements	PWR (●)	BWR (●)	Total
Approved (□)	**12**	**2**	**14**
Under review (◎)	4	8	12
Not filed	1	15	16
Total	18	25	42

The above includes plants (3 units) under construction.

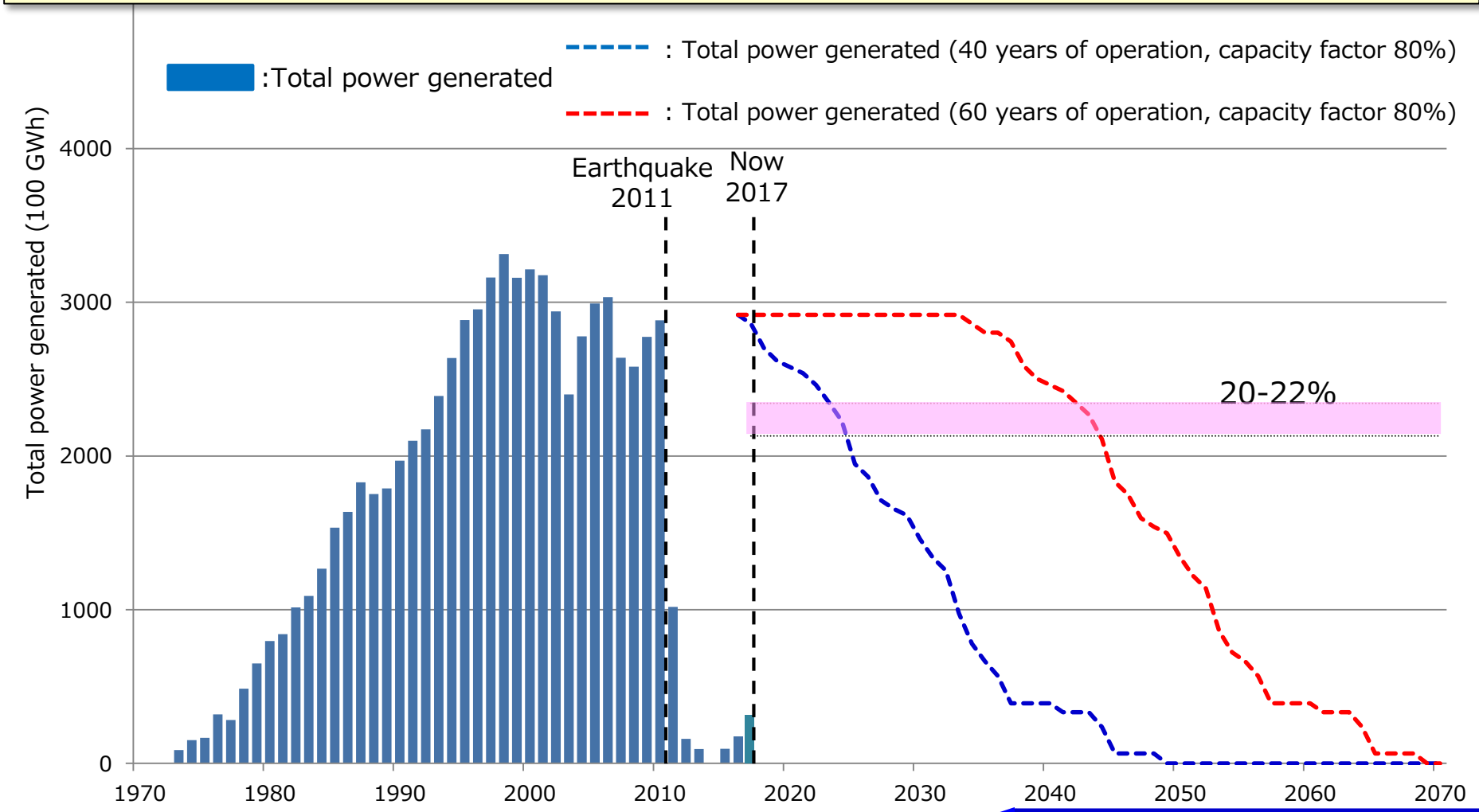
Status of decommissioned units	PWR	BWR	Total
Decommissioned (○)	7	10	17

Restart of Nuclear Power Stations（2）



Restart of Nuclear Power Stations（3）

- Restart, operation extension beyond its 40 years and replacement are essential to achieve and maintain nuclear power's share of 20 to 22% in Energy Mix as national policy.



3. Operator Initiatives Regarding Nuclear Power Generation

Promotion of Safety Improvement Initiatives by Nuclear Operators (1/2)

Countermeasures implemented immediately after the accident

Emergency Safety Measures

Securing the power source

Deployment of power supply cars

Securing cooling methods

Deployment of portable pumps and hoses

Flooding countermeasures

Installation of a water stop seal to the penetrations

Additional safety improvement measures

Still continually being implemented (examples of countermeasures)

Deployment of air cooled emergency power generators

Seismic evacuation center

Water canon

Deployment of portable large capacity pumps

Deployment of reserve sea water pump motors

Switch to watertight doors

Installment of a sea water pump in the watertight building

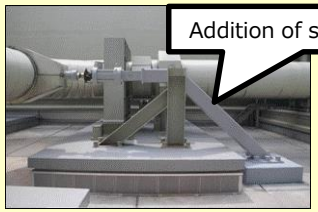
Establishment of a tide embankment

Promotion of Safety Improvement Initiatives by Nuclear Operators (2/2)

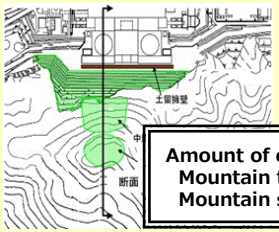
Additional Safety Improvement Measures – Natural events countermeasures

Earthquake measures (examples)

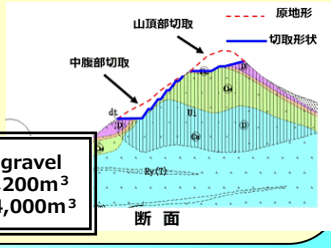
①Example of seismic reinforcement of piping support



②Stabilization of surrounding slopes



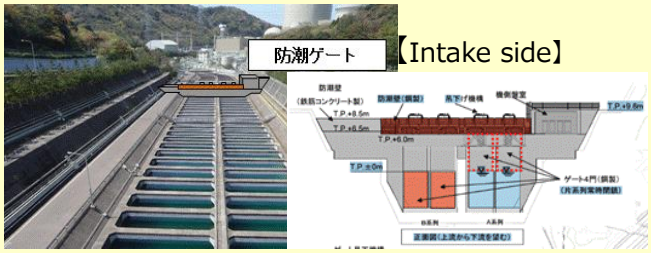
Amount of excavated gravel
Mountain top : 60,200m³
Mountain side : 34,000m³



Tsunami measures (examples)

①Establishment of a tide embankment

②Establishment of a tide gate



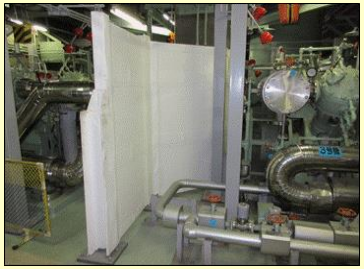
③Installment of emergency sea water intake equipment
(Installment of a sea water pump in the watertight building)

Strengthening of fire control measures (examples)

①Installment of sprinklers, etc.

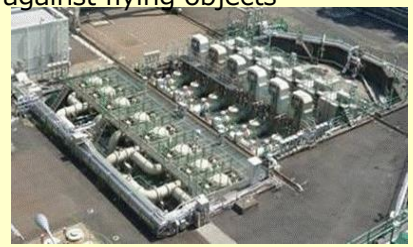
Installment of sprinklers
(approx. 1,600 sprinklers/2 units)

②Installment of fire spread inhibitor walls

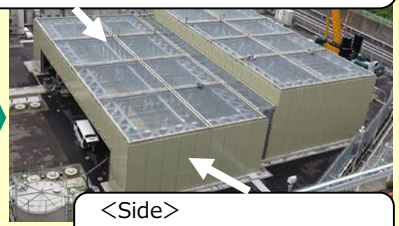


Tornado measures (examples)

①Prevention measures against flying objects



<Top>
Absorbs the impact of the flying objects with a steel net



<Side>
Prevents intrusion with a steel plate

Functions of the Nuclear Emergency Support Organization

- Off-site facility of the Mihama Nuclear Emergency Support Center and equipment for responding to an emergency

Main equipment

Wireless helicopter (information gathering from a height)

Small and large wireless heavy machinery (removal of outdoor rubble, etc.)

Robot controlling vehicles

Heliport (air transport of equipment)

Administrative building Training facility

Panoramic view of the off-site facility for the Mihama Nuclear Emergency Support Center (Mihama, Fukui Prefecture)

Engaging in Dialogue with the Community/Information Dissemination (ex. Chubu Electric)

●Communication between the community and the society at large is fostered through initiatives such as "opinion exchanges," "dialogue through visits," "station caravan," and "station tours."

Opinion exchanges

To continuously exchange opinions with various organizations, plan and hold opinion exchange meetings with local resident groups around the power station and with women's groups among others, as well as participate in opinion exchange meetings held by the government.

・Participation/hosting of opinion exchange meetings

	Sponsored by the government	Held together with local resident groups
Omaezaki City	Held 2 times	(1st round) Held in 7 districts out of 8 (2nd round) Held in 6 districts out of 8
Makinohara City	Held once (a series of4 meetings)	Held in 1 district out of 10
Kakegawa City	-	Held in 8 districts out of 32
Kikugawa City	-	(1st round) Held in all 11 districts (2nd round) Held in 4 districts out of 11

From October 2015 to the end of August 2017

・Opinion exchanges with women "Shaberiba"

Conducted opinion exchanges, providing information about energy during activities popular with women (aromatherapy, yoga, etc.)

Number of Shaberibas held：18 times (January 2016 - end of August 2017)

Opinion exchange meetings

Shaberiba

Dialogue through Visits

Visited homes to engage in dialogue targeting residents of Omaezaki City and the three surrounding cities.
(Visited approx. 84,000 homes <one round in approx. a year and a half>)

2nd round finished in March 2017.
3rd round started in May 2017.
Dialogue success rate: approx. 55% (at the end of the 2nd round)

Station caravan

Set up a booth at regional events, shopping centers and such as Omaezaki City and the three surrounding cities to engage residents in dialogue.

Held at 19 locations in FY2016
Held at 10 locations in FY2017 (as of the end of August)

Station tours

Have residents view power station safety improvement measures on site first hand.

Cumulative number of visitors: 164,756 people (from FY2012 to the end of August 2017)

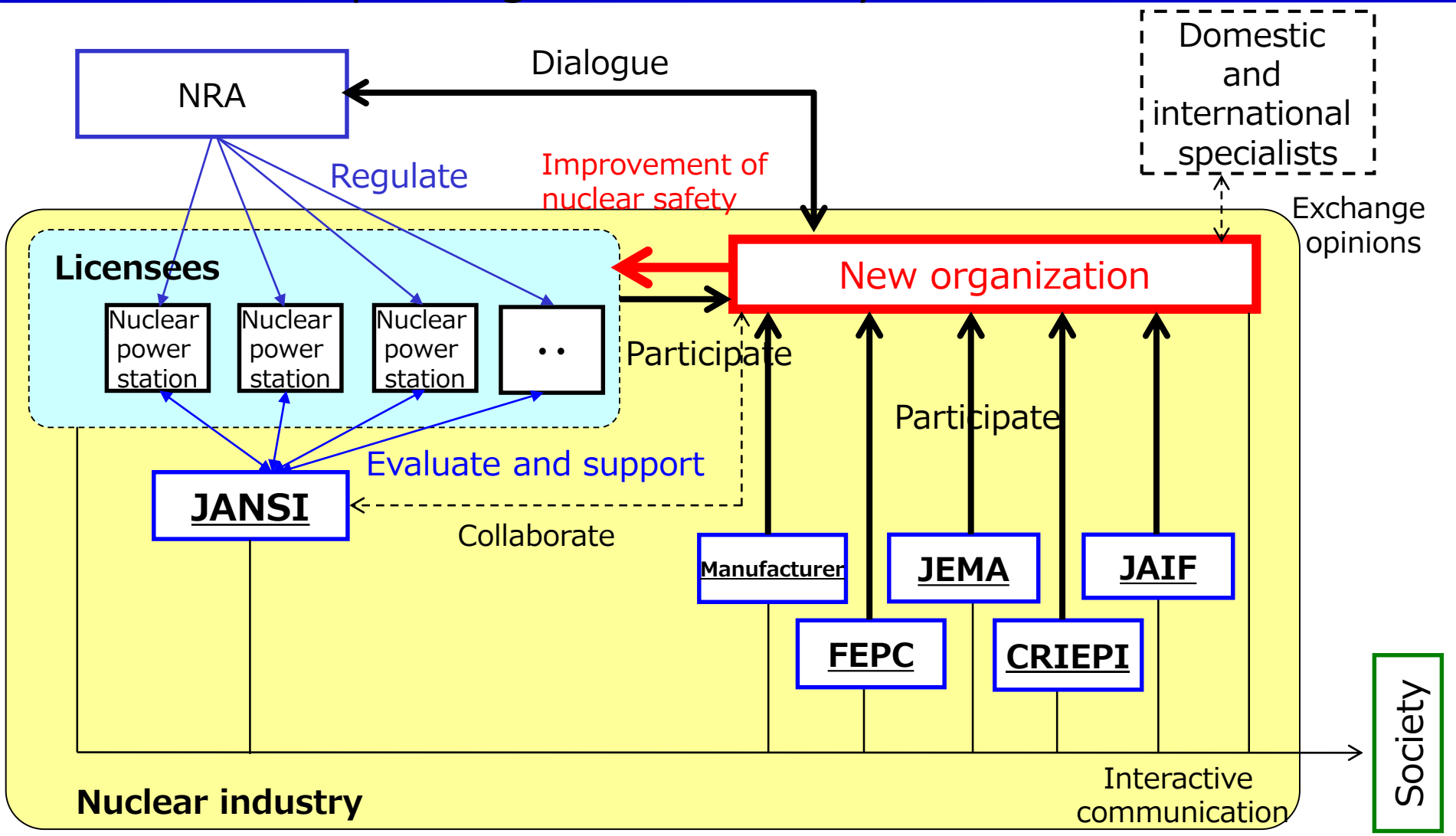
New Organization that the Nuclear Industry will be Participating in (1/2)

- There are discussions of establishing a new organization to draft effective safety measures and to strengthen efforts that will encourage nuclear operators to introduce such measures in the field. The nuclear industry as a whole will effectively use knowledge and resources as well as engage in dialogue with, among others, the regulatory authority.
- Nuclear operators will continuously strive to reduce risk by implementing the measures decided on by the new organization.

<Main activities of the new organization>

- Identify issues to tackle as the nuclear industry as a whole regarding nuclear safety based on the latest knowledge domestic and abroad.
- Coordinate activities among the nuclear industry to jointly discuss issues.
- Discuss issues with the participation of experts that represent the nuclear industry. Engage in dialogue with the regulatory authority regarding the results, and compile and publish a technical report on it.

Image of nuclear industry's roles in improving nuclear safety in the future



JANSI: Japan Nuclear Safety Institute
JEMA: The Japan Electrical Manufacturers' Association
JAIF: Japan Atomic Industrial Forum
FEPC: Federation of Electric Power Companies of Japan
CRIEPI: Central Research Institute of Electric Power Industry

Summary

In the future as well, we will continue to improve the performance of power plants through self-disciplinary power plant management efforts without being limited to the existing safety improvement measures which are already implemented, and contribute to the economy of Japan by gaining the trust from society by improving safety and availability, and by achieving S+3E.

Thank you for your attention.