

Japan's new Nuclear Energy Policy

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1. Key Items in Japan's new nuclear energy policy
2. Japan's commitment to the global civil nuclear use
3. Future vision of Japan-U.S. cooperation

Process to decide Japan's new energy strategy

June 2011 The “Energy and Environment Council” consisting of related Ministers was established .



July 2011 The Council begun discussion on possible scenarios to decrease nuclear power dependence.



June 14, 2012 3 options were presented for nationwide discussion;
1) Nuclear power generation ratio 0% by 2030
2) 15% by 2030
3) 20 - 25% as of 2030



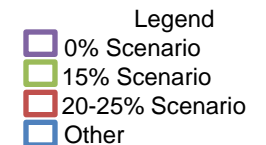
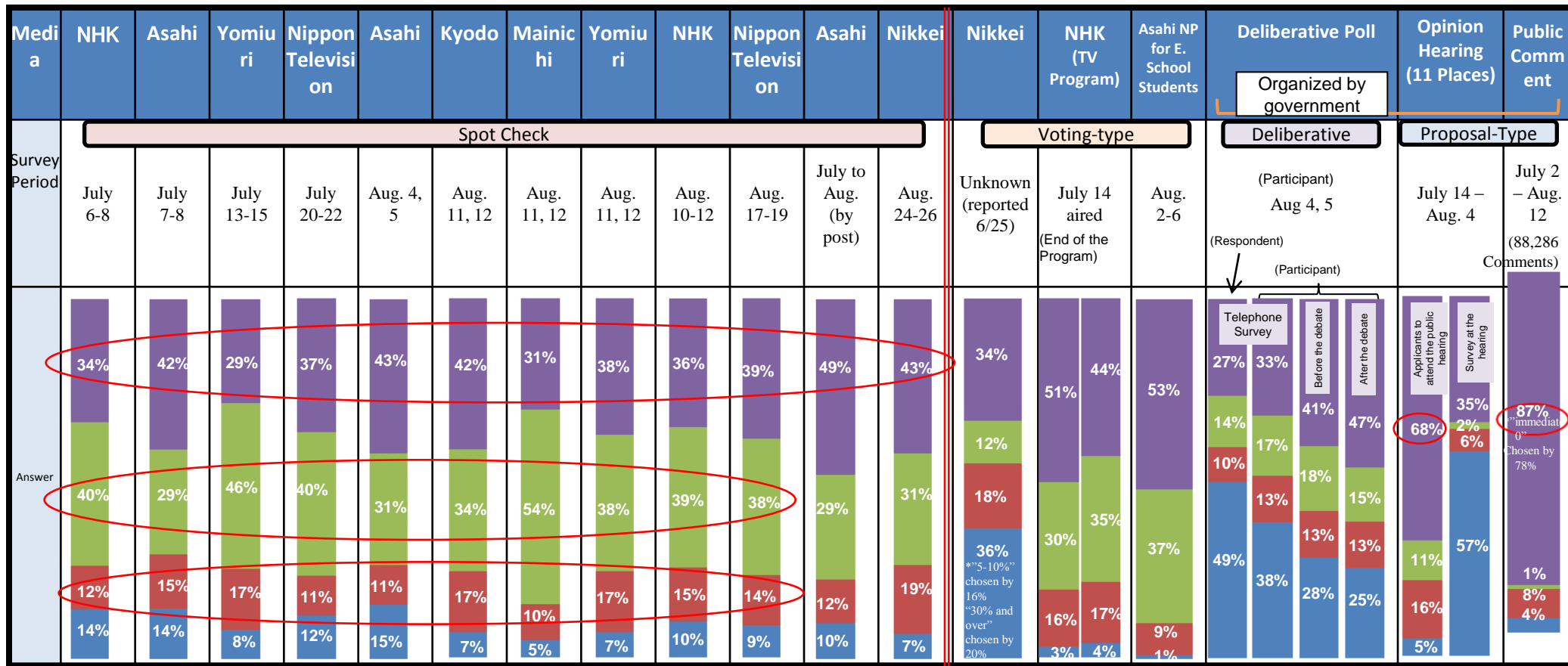
Sep. 14, 2012 The “Innovative Strategy for Energy and the Environment” was decided by the Council (i.e. related Ministers).



Sep. 19, 2012 The “Future Policies for Energy and the Environment” was decided by the Japanese Cabinet.

Public Opinion Research

- In the opinion research organized by the government, more than half of the public choose a society not dependent on nuclear power.
- On the other hand, there is a wide split on how quickly to achieve this goal.



Cabinet Decision (September 19, 2012): Future Policies for Energy and the Environment

“The Government of Japan will implement future policies on energy and the environment, taking into account “the Innovative Strategy on Energy and the Environment” (the decision of the Energy and the Environment Council on September 14th, 2012), while having discussions in a responsible manner with related local governments, the international community and others, and obtaining understanding of the Japanese public, by constantly reviewing and reexamining policies with flexibility.”

●Three Pillars of the Strategy

- ✓ Realization of a Society not Dependent on Nuclear Power
- ✓ Realization of a Green Energy Revolution
- ✓ Stable Supply of Energy

●Three Guiding Principles

- (1) To strictly apply the stipulated rules regarding forty-year limitation of operation
- (2) To restart the operation of nuclear power plants once the Nuclear Regulation Authority gives assurances of safety
- (3) Not to plan the new and additional construction of a nuclear power plant

➤ The Government of Japan will mobilize all possible policy resources to such a level as to even enable zero operation of nuclear power plants in the 2030's.

- In the meantime, the operation of nuclear power plants whose safety is assured will be restarted as an important power source.
- Present nuclear fuel cycle policy will be continued.
- Securing nuclear safety is a matter of the highest priority.
 - ➡ strengthen human resources and technology on nuclear power
- Contributing to strengthening nuclear safety worldwide
 - ➡ offer safe nuclear technologies to those foreign countries which wish to utilize Japan's nuclear technologies
- Fukushima Daiichi Nuclear Power Station
 - ➡ undertake measures on the decommissioning, decontamination and healthcare

➤ **The Government will continue its present nuclear fuel cycle policy.**

- What should seriously be taken to heart, regarding the nuclear fuel cycle, is the valuable co-operation rendered by Aomori Prefecture in shouldering roles to offer facilities for uranium enrichment, a reprocessing plant and a low-level radioactive wastes storage.

- Commitments made to Aomori Prefecture should be honored.

- ✓ Nuclear fuel cycle policy must be promoted consistently and steadfastly in the medium and long term
- ✓ Aomori Prefecture must not become a site of final disposal of radioactive wastes, equivalent to geological disposal
- ✓ If reprocessing projects should be found extremely difficult to surely implement, necessary and appropriate steps be swiftly taken, which include relocation of spent fuels by Japan Nuclear Fuel Limited (JNFL) to outside its facilities

- Engage in reprocessing projects with assuming responsibility for the international community.

- Have discussions responsibly in communicating with related local governments and with the international community

Plutonium use in existing light water reactors

- Japanese electric power companies have aimed to utilize MOX fuel in 16 to 18 nuclear reactors (LWR). (MOX fuel has already been loaded in 4 reactors)

Dec.2011

Already loaded※

got the approval of local governments

before getting approval of local governments

※Using MOX fuel treated in France and UK.

JAPC Tsuruga (1 reactor)
(Tsuruga city, Fukui pref.)

Kansai Electric Power Co.Oi
(1~2 reactors) (Fukui pref.)

Kansai Electric Power Co.Takahama-3
(Fukui pref.)

※Operation started in Jan, 2011

Kansai Electric Power
Co.Takahama-4 (Fukui pref.)

Chugoku Electric Power
Co.Shimane-2 (Shimane pref.)

Kyusyu Electric Power Co.
Genkai-3 (Saga pref.)

※Operation started in Dec, 2009

Hokkaido Electric Power Co.
Tomari-3 (Hokkaido pref.)

Hokiriku Electronic Power Company
Shika-1 (Fukui pref.)

Shikoku Electric Power Co.
Ikata-3 (Ehime pref.)

※Operation started in Feb.2010

J-POWER
Ohma (Aomori pref.)
(under construction)

Tohoku Electric Power Co.
Onagawa-3 (Miyagi pref.)

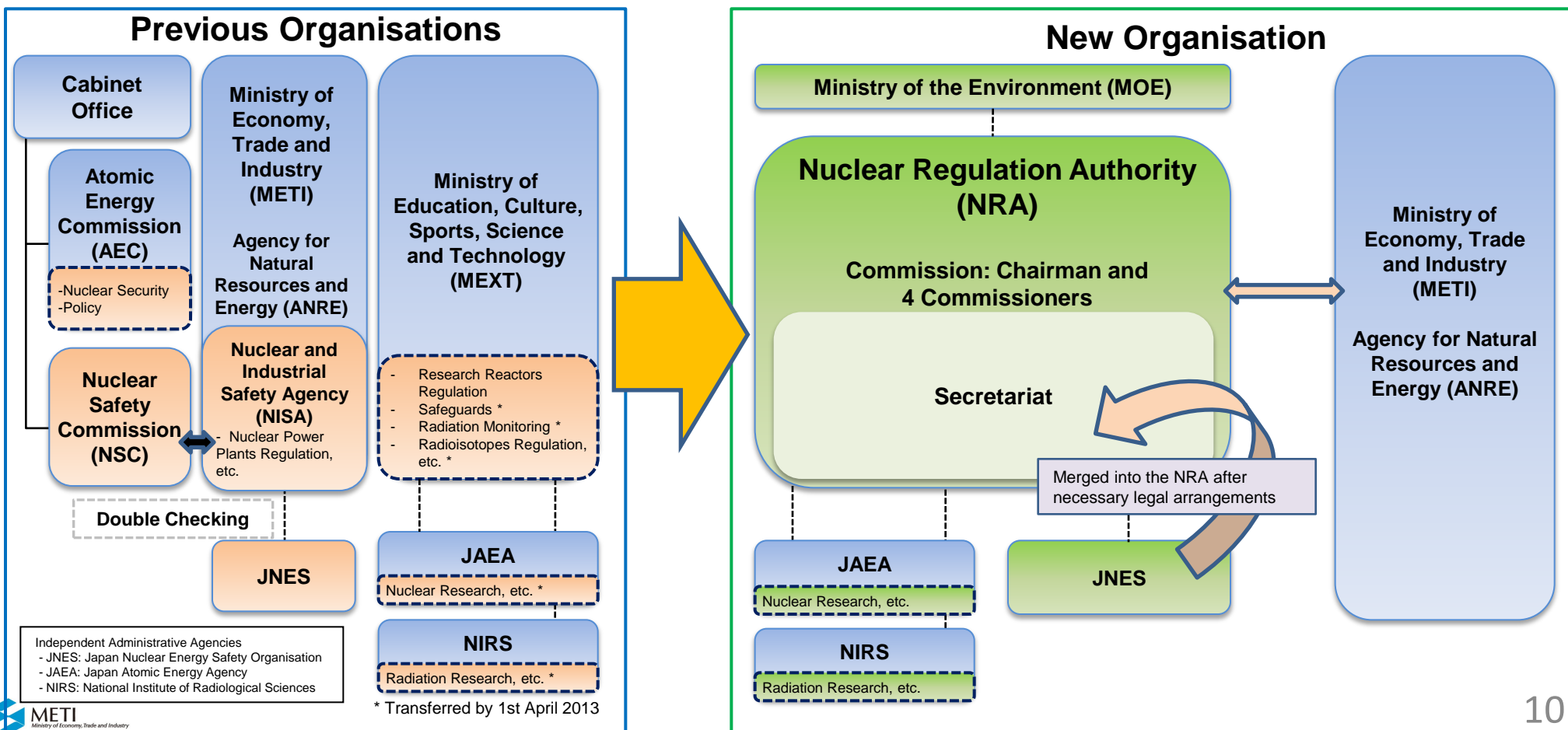
TEPCO started to use MOX fuel in Fukushima-Daiichi-3 in Oct.2010, but stopped with the Tohoku Earthquake in 2011. In Mar., 2011, TEPCO announced their decision to decommission Fukushima-Daiichi 1-4.

JAPC Tokai-Daini
(Tokai village, Ibaraki pref.)

Chubu Electric Power Co.Hamaoka-4
(Shizuoka pref.)

Administrative Reform of Nuclear Regulatory Organisations

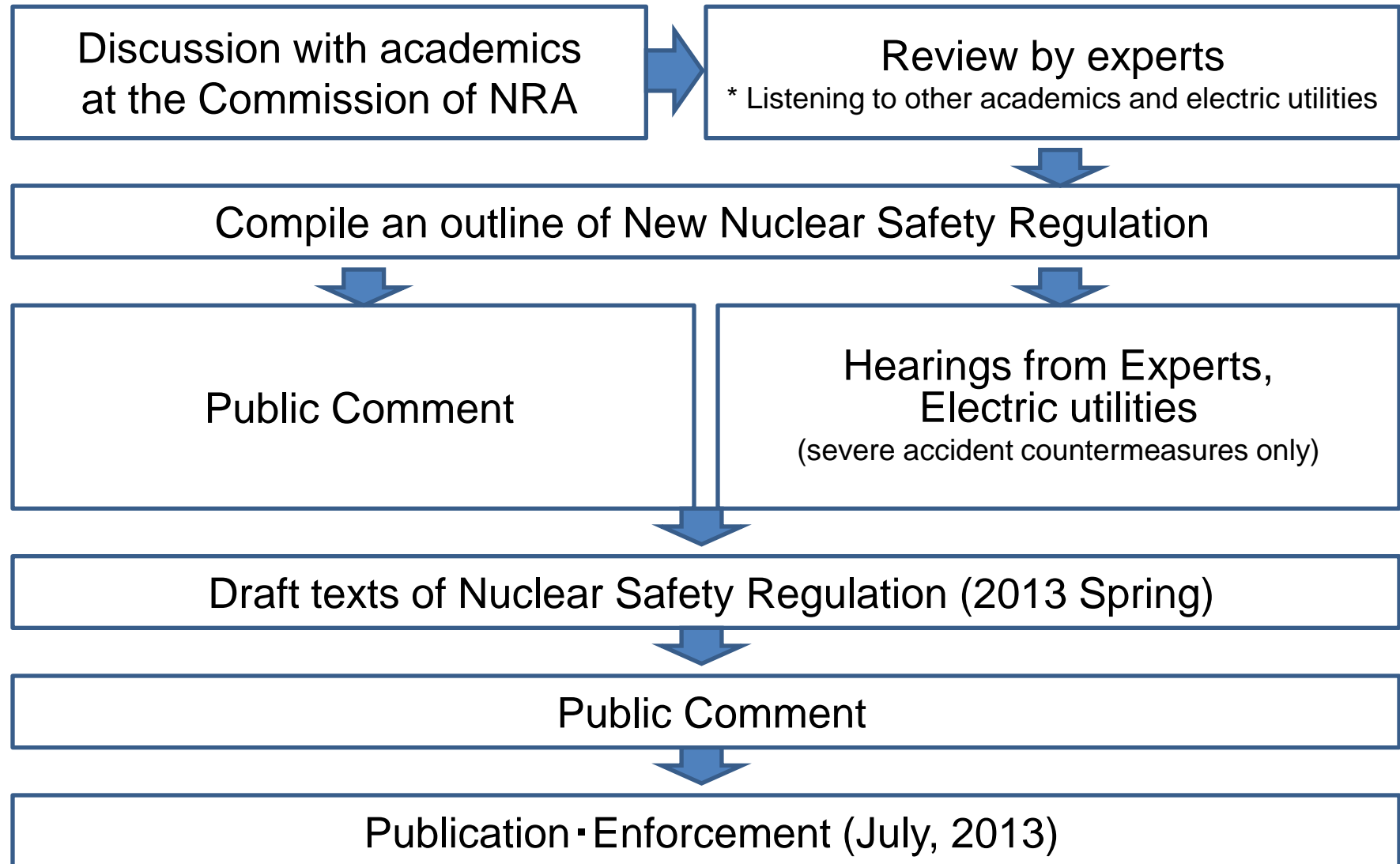
- **Independence:** Separate nuclear regulation function from nuclear promotion function and establish the “Nuclear Regulation Authority (NRA)”, as an independent commission.
Chairman and Commissioners are appointed by the Prime Minister after the approval of the National Diet.
Introduce the so-called “no-return rule,” forbidding NRA managing staff from being transferred to any government organization under the jurisdiction of promotion agencies (with a 5-year transitional period following the establishment).
- **Integration:** Integrate nuclear regulation functions, namely, nuclear safety, security, safeguards, radiation monitoring and radioisotope regulation, into the NRA.



Main activities of the Nuclear Regulation Authority (NRA)

	2012 Sep.	2013 Apr.	July	Dec.
Nuclear Safety Regulation	Revision of Nuclear Reactor Regulation Law Commercial power reactor → ●Jul.18 (deadline for enforcement) Fuel cycle facilities → Dec.18 (deadline for enforcement) ●			
Disaster Prevention	●Oct.31 Set Guideline for the Nuclear Emergency Preparedness ●March 18 (deadline for related local governments' completing regional NEP)			
Investigation of Fracture Zone (active fault or not)	●Oct.17 Investigation of Ohi NPP ●Nov.14 Investigation of Tsuruga NPP ●Nov.20 Investigation of Tohoku-Higashidori NPP			
International matters	●Sep.17-21 IAEA Plenary International Nuclear Regulators Association in Japan ●2013 ●Dec.15-17 The Fukushima Ministerial Conference on Nuclear Safety			
Organization	●Sep.19 Established the Nuclear Regulation Authority (NRA) ●April1 NRA integrate Radio Isotope regulation, Safe Guard for nonproliferation, environmental monitoring from MEXT.			

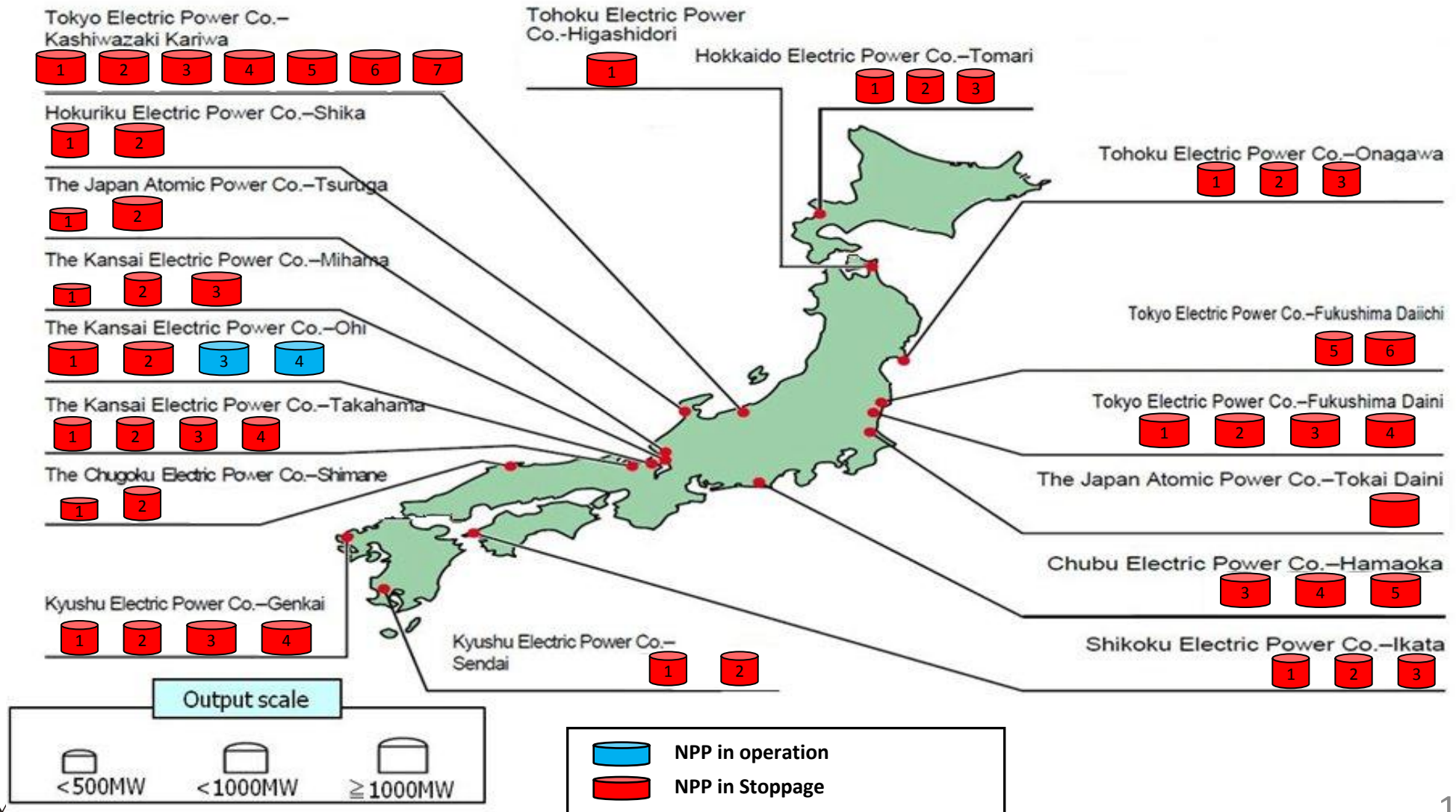
Schedule of the Introduction of the New Nuclear Safety Regulation



“Nuclear power plants whose safety is assured will be utilized as an important power source.”

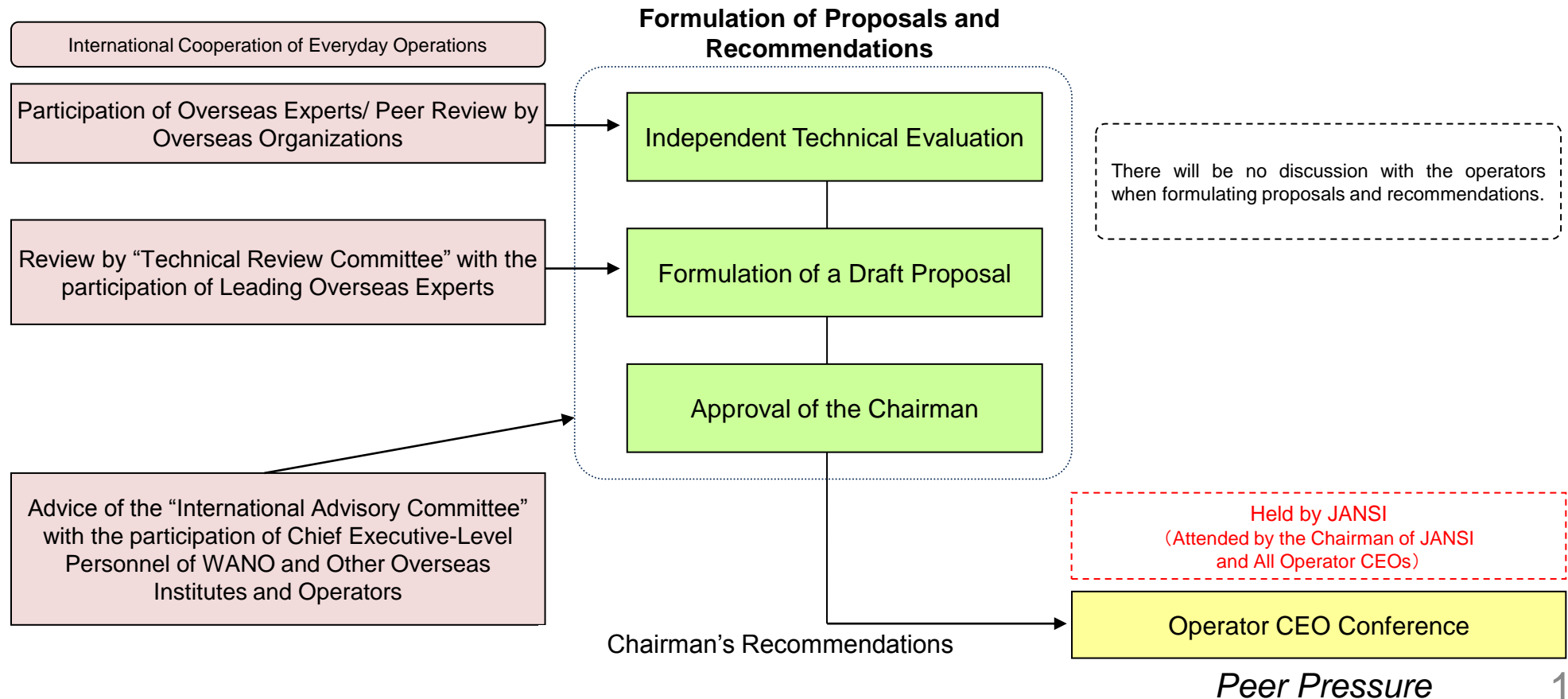
Nuclear Power Plants in Japan

- There are 50 units of nuclear power plants in Japan.
- **48 units (in red)** are in stoppage, and **2 units of them (in blue)** are now in operation.



Establishment of the Japan Nuclear Safety Institutes (JANSI)

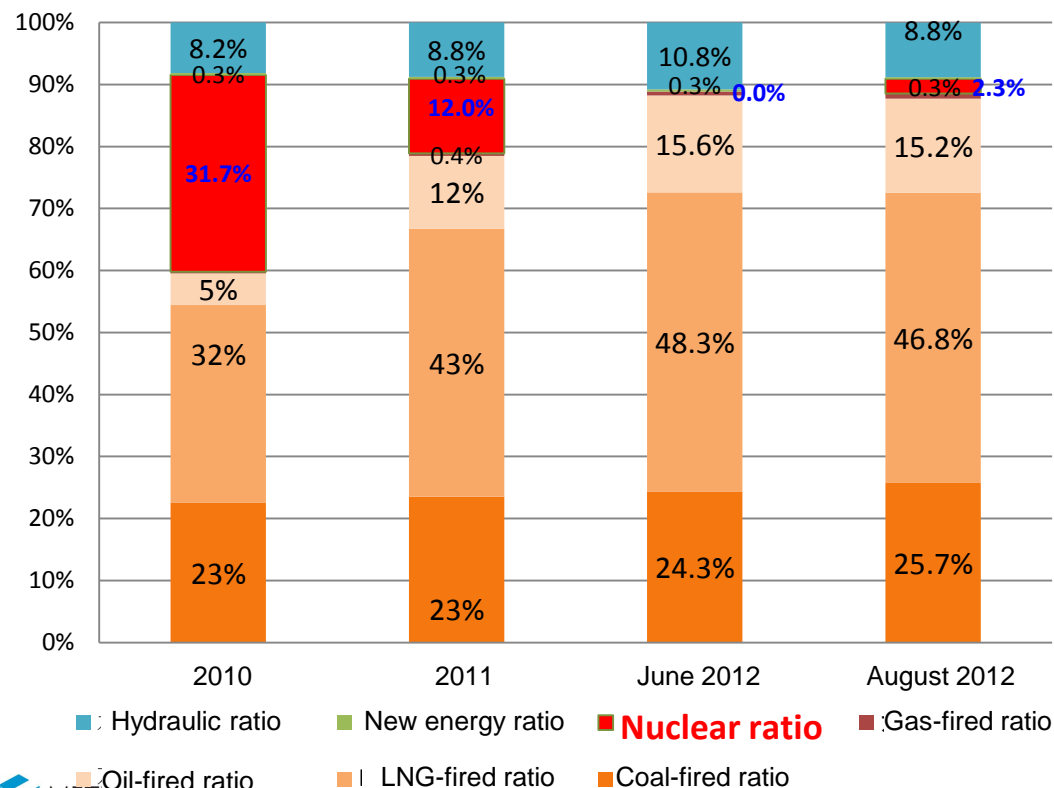
- In light of the Fukushima Daiichi Nuclear Power Plant accident of March 2011, in order to raise nuclear power plant safety including bolstering countermeasures for severe accidents, the Japan Nuclear Safety Institute (JANSI) has been newly established.
- JANSI will create mechanisms and systems for independence in technical evaluation that will not be influenced by the operators as well as providing operators with objective evaluations, recommendations, and advice.



Negative impact of “Immediate Zero scenario of NPPs”

- Immediate Zero operation of NPPs;
 - tighten electricity supply-demand due to 30% loss of electricity source.
 - Increase of the Fuel cost by approx. 3.2 trillion yen per year (equal to 20% of electricity price) due to the substitute use of thermal power.
- Should oil prices increase as a result of tension in the Straits of Hormuz, electricity prices would increase further.

Electricity source ratios after the disaster



Fuel cost increase due to NPP suspension (prediction)

→ Add around 3.2 trillion yen/year
(followed by electricity price raise, eventually burden on Japanese public)

Source	Fuel costs	Influence(trillion\)
Nuclear	\1/kWh	−0. 3
Coal	\4/kWh	+0. 1
LNG	\10/kWh	+1. 4
Oil	\16/kWh	+2. 1
total	—	+3. 2

※Even if decrease of maintenance cost for NPPs (\ 0.4 -1.1 trillion) is set off, the additional cost would result in \2.0-2.7 trillion.

The situation of the Increased Electricity tariff

	Regulated retail market (under 50kW)	Liberalized retail market (more than 50kW)	Remarks
	<u>Implemented</u>		
Tokyo Electric Power Co.	8.46%	14.90%	<ul style="list-style-type: none"> • Regulated: Effective on September 1, 2012 • Liberalized: Effective from the contracts renewed after April 1, 2012
	<u>Under examination</u>		
Kansai Electric Power Co.	(11.88%)	(19.23%)	<ul style="list-style-type: none"> • Regulated: Applied for increase electricity rate on November, 2012 • Liberalized: Intended to increase tariff from the contracts renewed after April 1, 2013
Kyushu Electric Power Co.	(8.51%)	(14.22%)	<ul style="list-style-type: none"> • Regulated: Applied for increase electricity rate on November, 2012 • Liberalized: Intended to increase tariff from the contracts renewed after April 1, 2013

- ✓ Stable supply of energy to Japan
- ✓ Realistic step to expand green energy
- ✓ Implications for global warming
- ✓ Competitiveness of Japanese industry

Image of expansion of renewable energy

2010

2015

2020

2030

Prospect for introduction in 2012

Photovoltaic power:

2 million kW/year

Wind power:

0.38 million kW/year

The following is required annually on average after 2013 until 2030

Photovoltaic power: **Approx. 3 million kW/year**

Wind power: **Approx. 2 million kW/year**

Output: 180 billion kWh

Accumulated investment

amount: ¥16 trillion

Output: 300 billion kWh

Accumulated investment

amount: ¥38 trillion

Output: 140 billion kWh

Accumulated investment

amount: ¥8 trillion

Output: 110 billion kWh

-2015 Expansion of introduction based on the current technology and costs

- (1) Launch the development of power grids to promote introduction of wind power generation
- (2) Expand introduction by the feed-in tariff system (mainly for photovoltaic power generation, etc.)
- (3) Promote investment in wind and geothermal power generation through reform of land use regulations, etc.

-2020 Promotion of technology development and development of environment

- (1) Feed-in tariff system
- (2) Expand introduction through development of power grids, etc. (wind power generation, etc.)
- (3) Promote investment in wind and geothermal power generation through reform of location regulations, etc.
- (4) Put offshore wind power generation, etc. into practical use and expand its introduction
- (5) Reduce costs for storage batteries which contribute to stabilizing the system (Goal: ¥23,000/kWh (on a par with pumped storage power generation (¥40,000 to 200,000/kWh at present)))
- (6) Expand the effective utilization of unused heat and heat from renewable energy sources

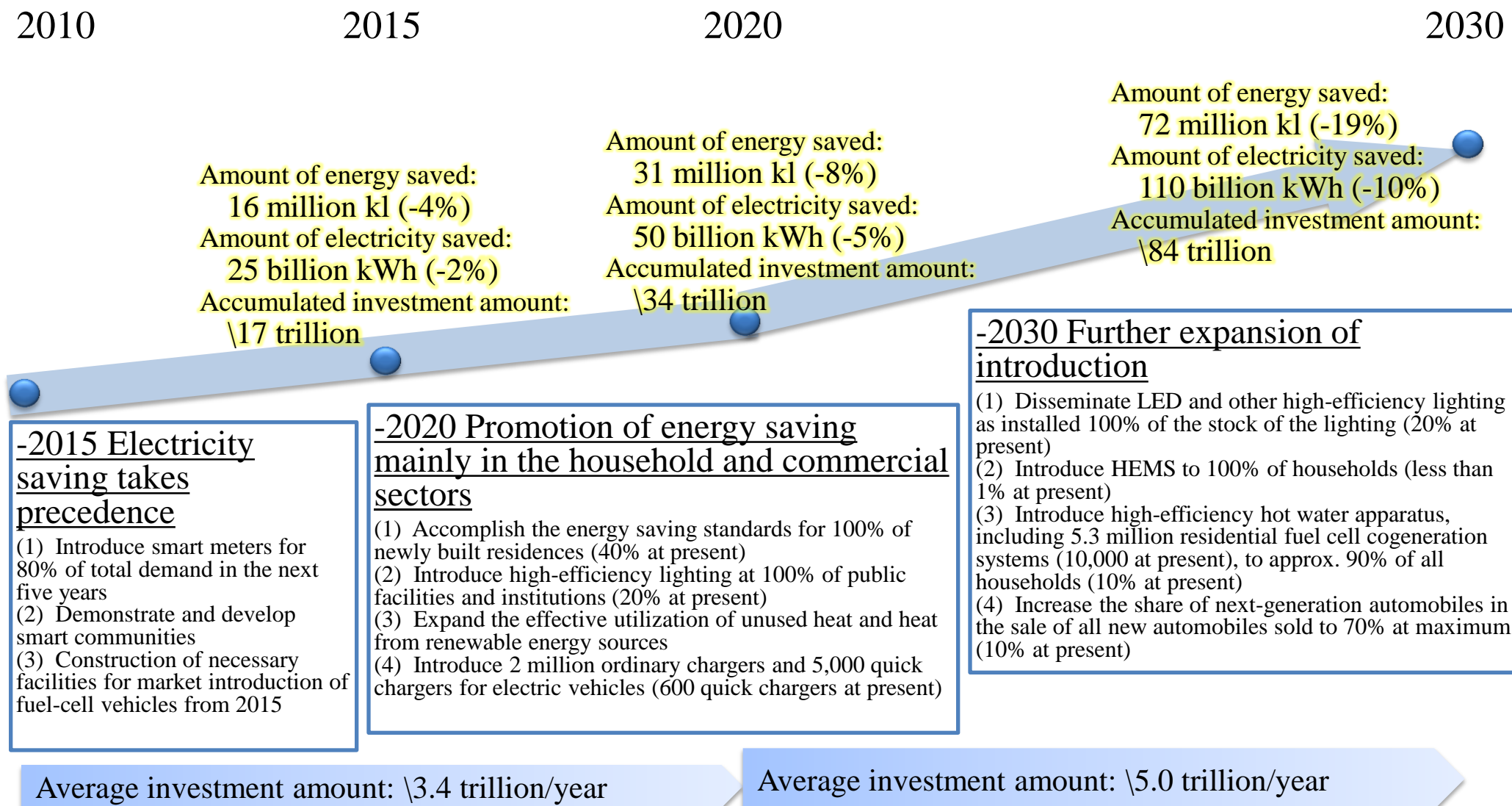
-2030 Expansion of introduction through cost reduction by enhancement of the system and mass production effect, etc.

- (1) Expand introduction through development of power grids, etc. (wind power generation, etc.)
- (2) Expand introduction through price reduction owing to mass production effect
- (3) Expand introduction through utilization of the outcome of research and development and demonstration

Average investment amount: ¥1.6 trillion/year

Average investment amount: ¥2.3 trillion/year

Image of expansion of energy saving



Note: The amount of energy saved/electricity saved is compared to 2010.

➤ Japan will proceed with the international nuclear energy cooperation.

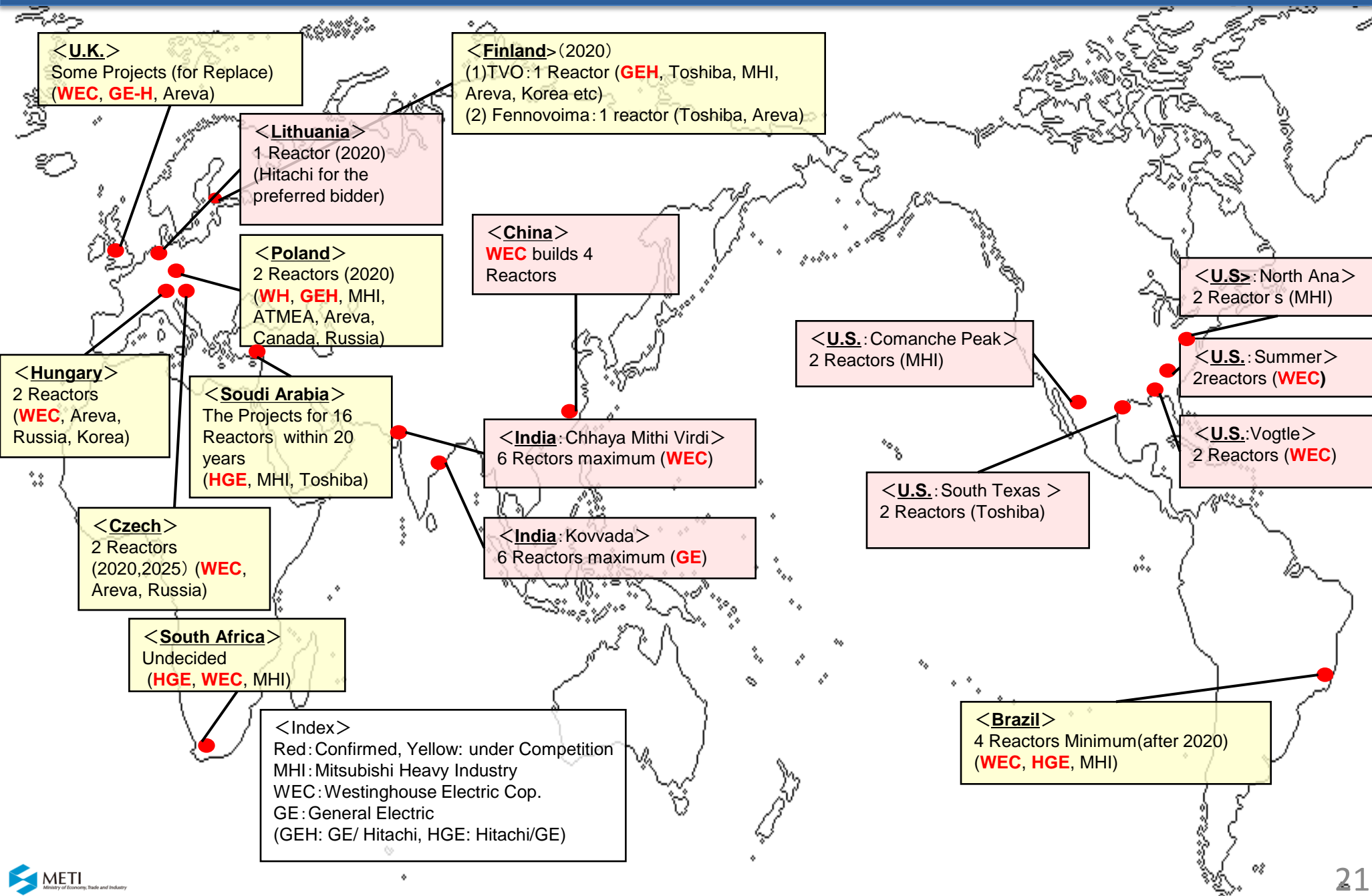
● Maintaining and strengthening human resources and technology

- ✓ The development of human resources and technology is essential for the peaceful uses of nuclear energy, technical support for the safe management and decommission of nuclear power plants in emerging nations.
- ✓ We will develop plans for maintaining and strengthening human resources and technology, recognizing it as its responsibility.

● Cooperation with the international community

- ✓ Re-examination of its policy to realize a society not dependent on nuclear power will be made through close consultation and collaboration with international organizations and other countries.
- ✓ In that process, we understand it is the responsibility of Japan to contribute to strengthening nuclear safety worldwide by sharing with the world its experience and lessons derived from the nuclear accident.
- ✓ We also think as the responsibility it should be offered its nuclear technologies of the highest standard in safety in the world to those foreign countries which wish to utilize nuclear technologies of our country, taking into account the situation and will of those countries.

Nuclear Power Plant Projects to be realized by the Japan- U.S. Alliance



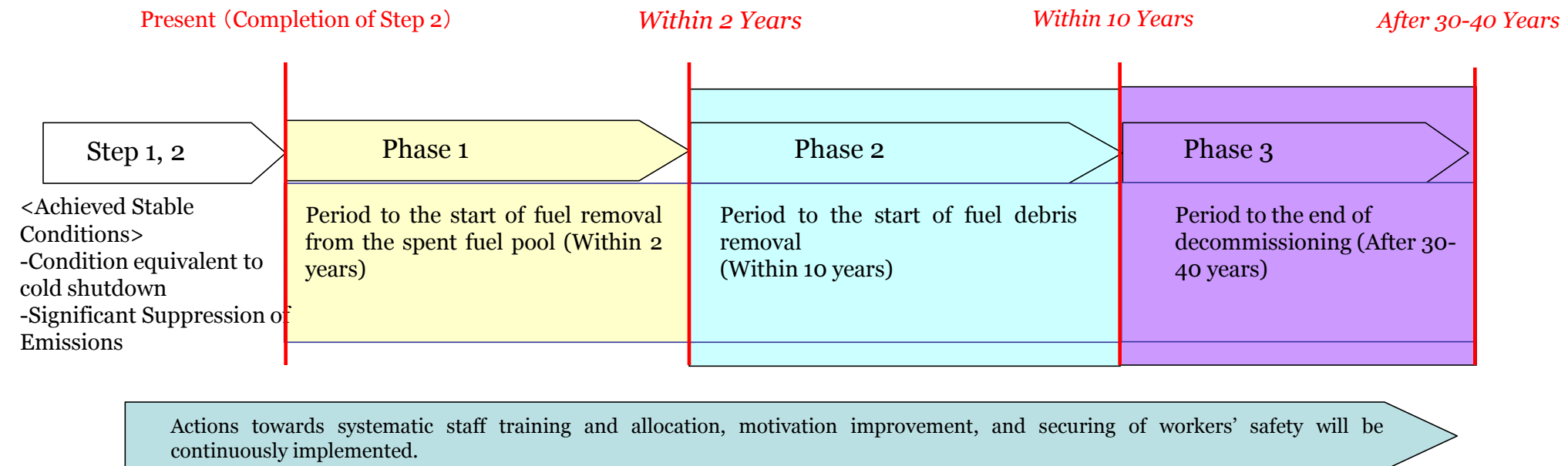
● Mid-and-Long term Roadmap towards the Decommissioning of Fukushima Daiichi NPP

<Primary Target>

- Present all possible schedules pertaining to the main on-site works and R&D.

<Target Timeline and Holding Points>

- Established all possible target timelines in the upcoming 3 years, which are updated and released on a yearly basis.
- Regarding the schedules after 3 years, established holding points, which are significant to judge whether to go ahead in accordance with the schedule, to implement additional R&D, or to re-schedule the process.



Japan intends to;

- Maintain dialogue and share strategies with U.S. as the primary partner.
- Cooperate with U.S. to improve nuclear safety standard based on lessons learned from the accident at TEPCO's Fukushima Daiichi, to accelerate the decommissioning of the plant, and to make progress in joint R&D activities for future civil nuclear use.
- Continue the existing nuclear fuel cycle policy having discussions with the international society, in particular, with the U.S.
- Remain committed to peaceful uses of nuclear energy in the world , through industrial collaboration with the U.S., including construction of NPPs with higher safety in emerging countries.