Japan's Nuclear Industry – Opportunities for Eastern Europe

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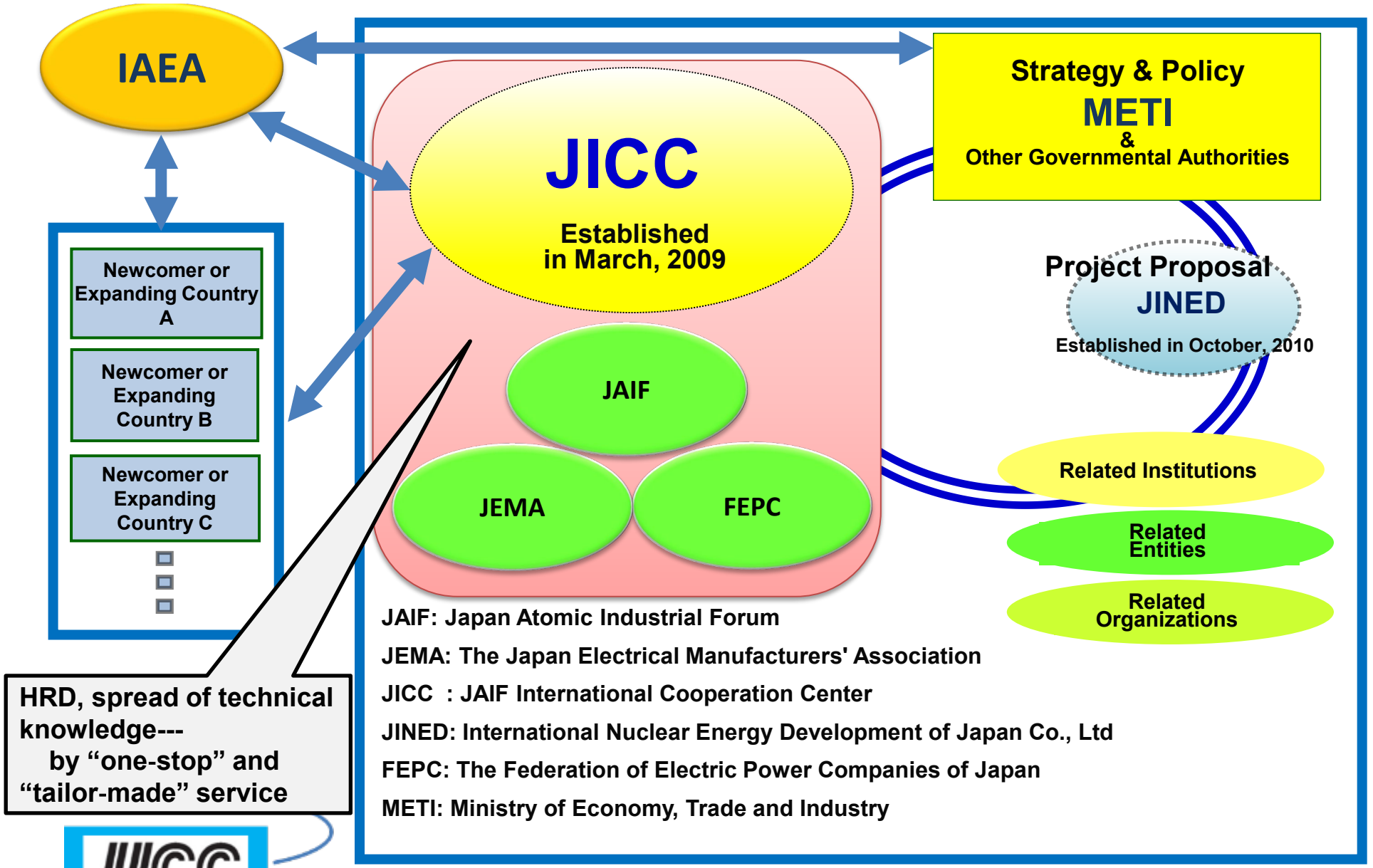
JAIF International Cooperation Center

What's JICC

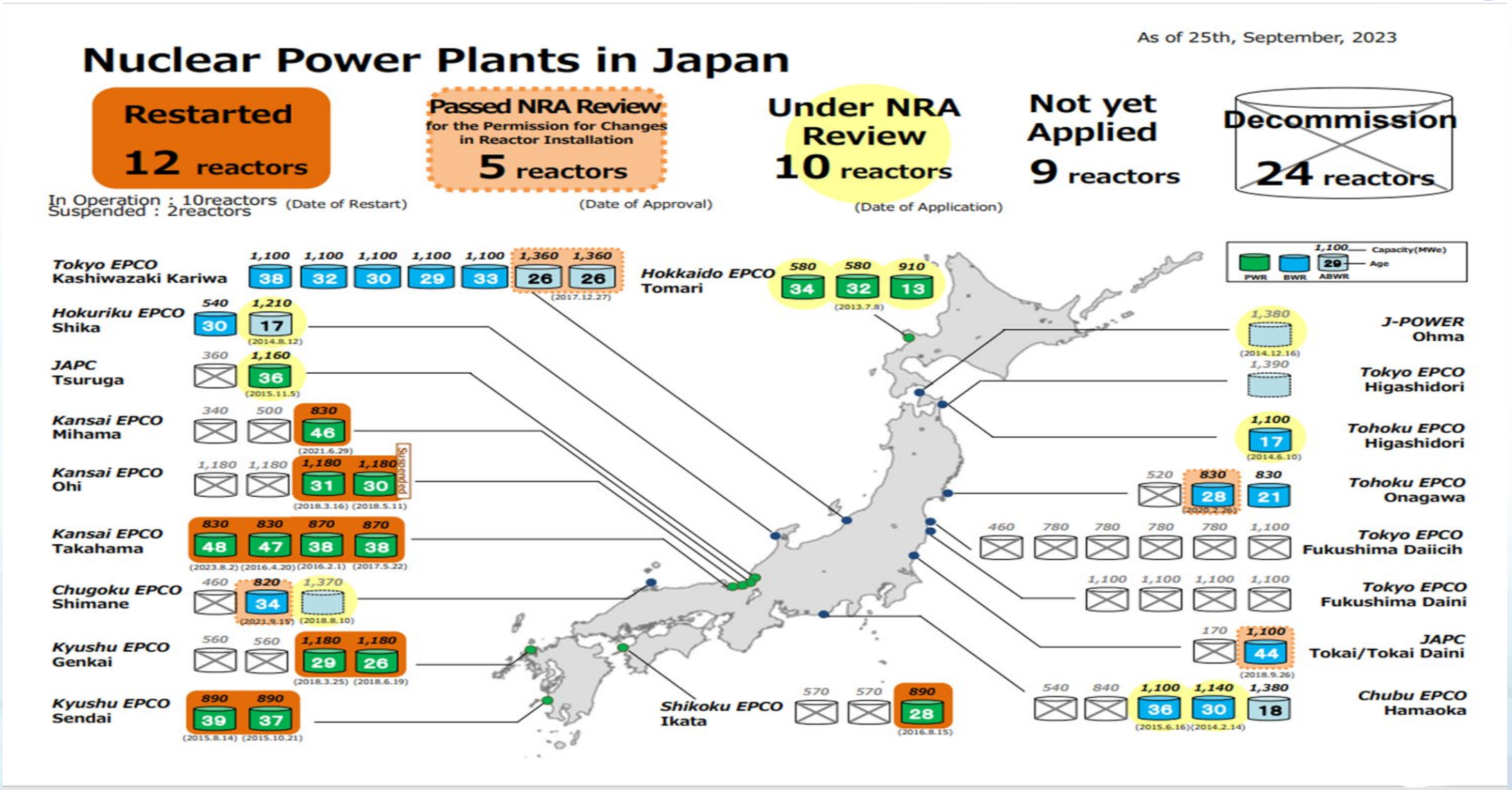


1. Japan’s Nuclear Power Plants and Nuclear Policies
2. Current status of Nuclear Industry in Japan
3. Opportunities for eastern Europe
4. Summery

1. Japan’s Nuclear Power Plants and Nuclear Policies

1. Japan's Nuclear Power Plants and Nuclear Energy Policies

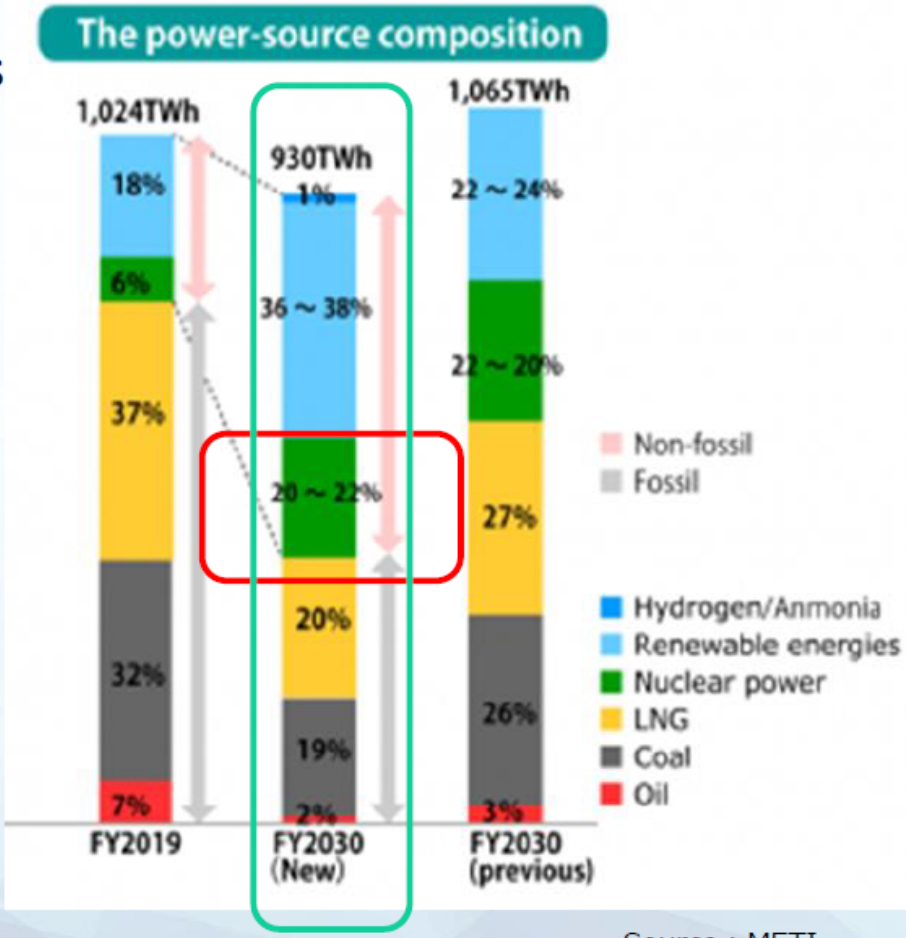
1.1 Plant Status



1. Japan's Nuclear Power Plants and Nuclear Energy Policies

1.2 Current Strategic Energy Plan

- On October 22, 2021, the Japanese Cabinet approved **the 6th Strategic Energy Plan**. In the plan, the importance of "S+3E" is recognized: namely, maintaining environmental suitability while realizing supplies of energy at low cost (energy security), through improved economic efficiency.
- Nuclear power is written as **an important base-load power source**— both low-carbon and quasi- domestic—contributing to the stability of energy supply-demand structure over the long term as well as renewable power.
- Nuclear power will be "**utilized sustainably, on a necessary scale … in order to achieve carbon neutrality by 2050**".
- **20-22% for nuclear power** in the generation mix **by 2030**



Source : METI

1. Japan's Nuclear Power Plants and Nuclear Energy Policies

1.3 GX Implementation Council Conclusion on Nuclear Energy

- **Green Transformation (GX) Implementation Council** is led by the Prime Minister Kishida, which had been deliberating on major reforms in the areas of energy, all industries and economic society, toward the goal of achieving carbon neutrality by 2050.
- **Basic policy aimed at implementing the Green Transformation (GX)** calls for the maximum use of nuclear power for energy security and decarbonization together with renewable energies.

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- ✓ Promotion of restart of existing reactors
- ✓ Additional extensions of reactor operating lifetimes more than 60 years
- ✓ Development and construction of next-generation advanced reactors
- ✓ Promotion of nuclear fuel cycle, decommissioning and HLW disposal
- ✓ Improvement of business environment and support for R&D, HRD and supply chain

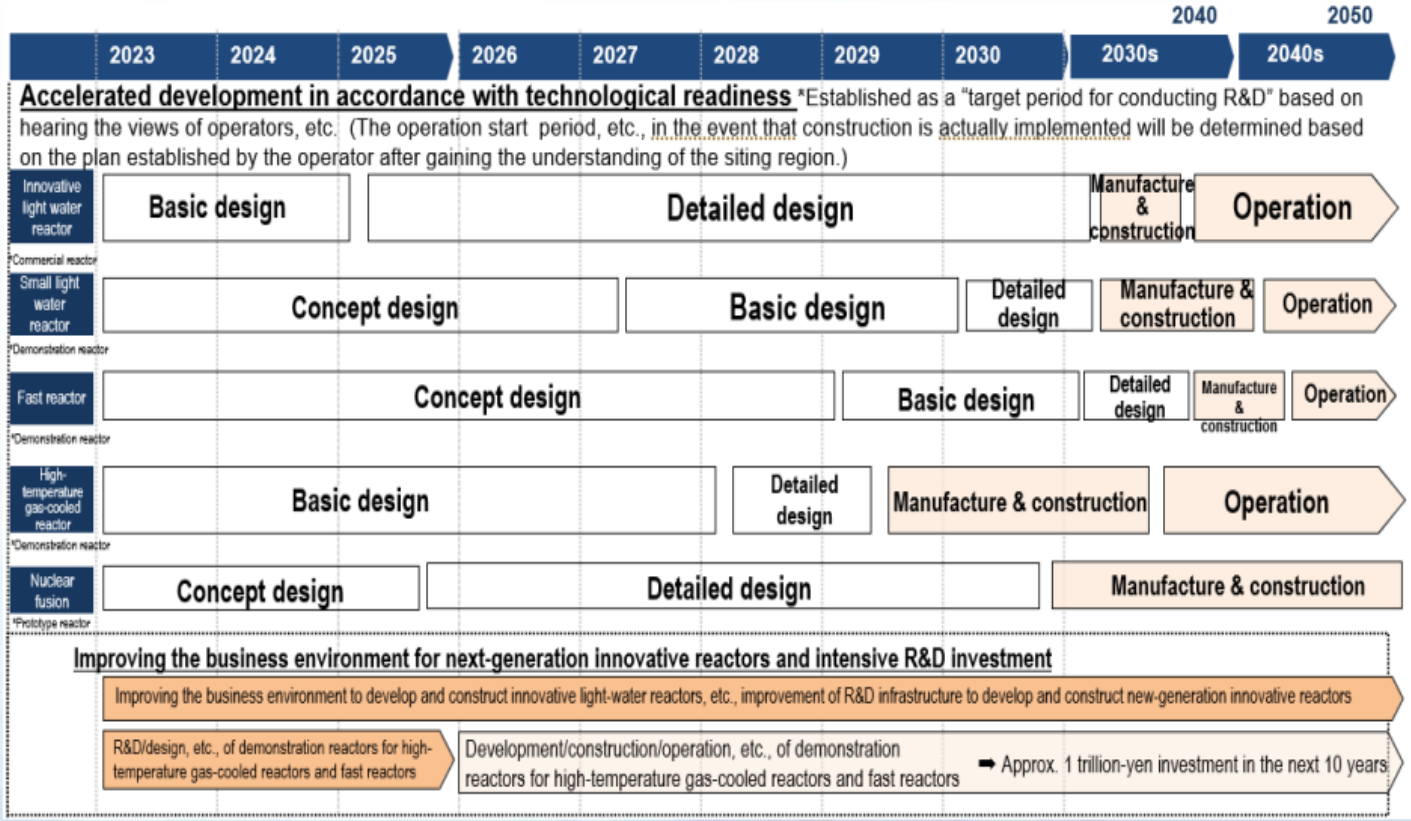
- **GX Decarbonization Power Supply Bill** was approved by the Cabinet as a package of energy-related bills including nuclear energy and was approved by the Diet.

1. Japan's Nuclear Power Plants and Nuclear Energy Policies

1. 4 Government's Technology Roadmap for Innovative Reactor Development

Technology Roadmap for Innovative Reactor Development for 5 types of reactor is published by the governmental committee.

- Innovative LWR
- Small LWR
- Fast Reactor
- High Temperature Gas-Cooled Reactor
- Nuclear Fusion Reactor



Source : Cabinet Secretariat

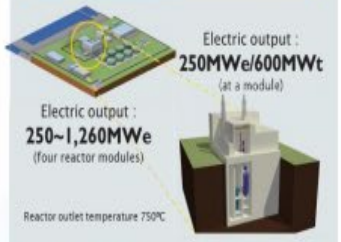
1. Japan's Nuclear Power Plants and Nuclear Energy Policies

1. 5 New Reactor Design

Next Geneartion BWR: iBR

Providing large capacity power inexpensively and safely based on the proven ABWR

High Temperature Gas Reactor



Coexistence with renewable energy due to flexible response by heat storage system

TOSHIBA

Toshiba Energy Systems & Solutions Corporation

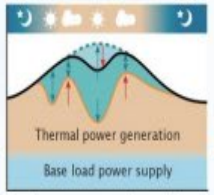


Image of power supply and demand

Source : Toshiba Energy Systems & Solutions Corporation

Next Generation PWR

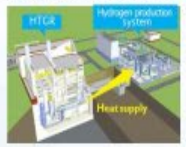
Large and stable power source (~1,200MWe)

Small Modular Reactor (SMR)

Distribution of power supply, connection to small grid (300MWe)

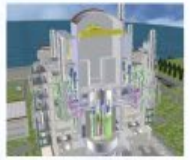
High Temperature Gas cooled Reactor

Stable mass production of hydrogen utilizing high temperature heat (900℃~)



Fast Reactor (FR)

Realizing nuclear fuel cycle for
- reduction of nuclear waste
- effective use of resources



Micro Reactor

Portable reactor for multi-purpose (for remote island, etc.)

MITSUBISHI HEAVY INDUSTRIES, LTD.

Source : Mitsubishi Heavy Industries, Ltd.

BWRX-300

- 300 MWe water-cooled, natural circulation SMR with passive safety systems.
- Hitachi-GE is jointly developing with GE Hitachi, aiming for domestic introduction in Japan in future.

PRISM

- Sodium Cooled Metal Fuel SMR.
- The concept is being designed into the "Natrium" reactor developed by TerraPower.

RBWR

- A light-water fast reactor based on proven light-water cooling technology.

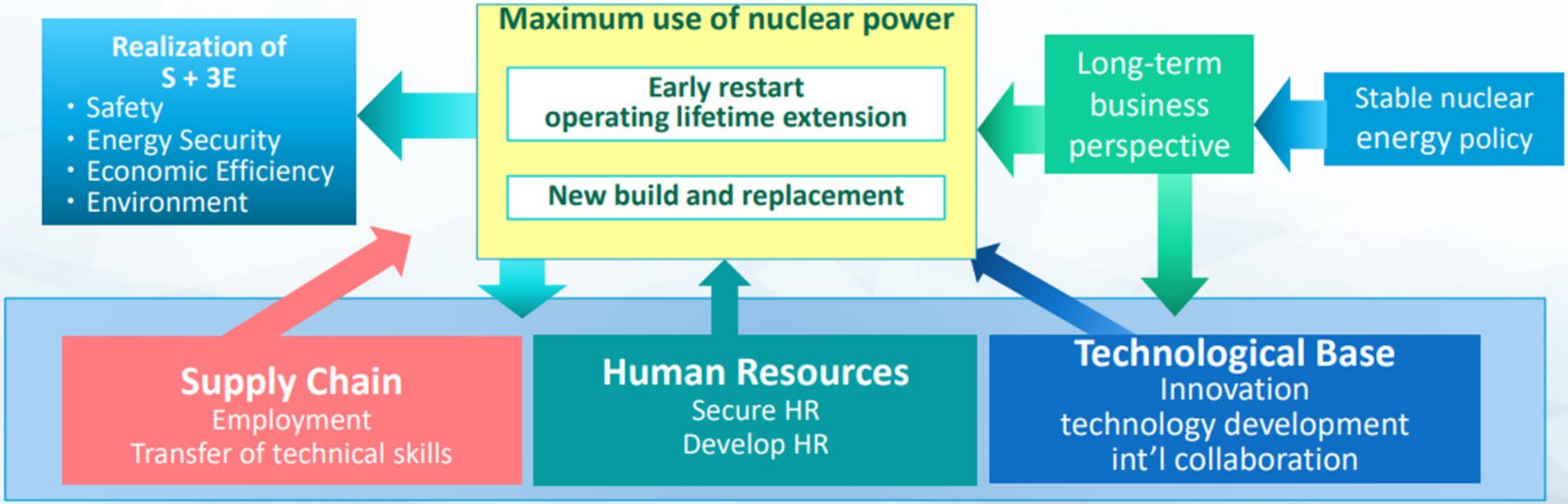
HITACHI

Source : Hitachi-GE Nuclear Energy, Ltd.

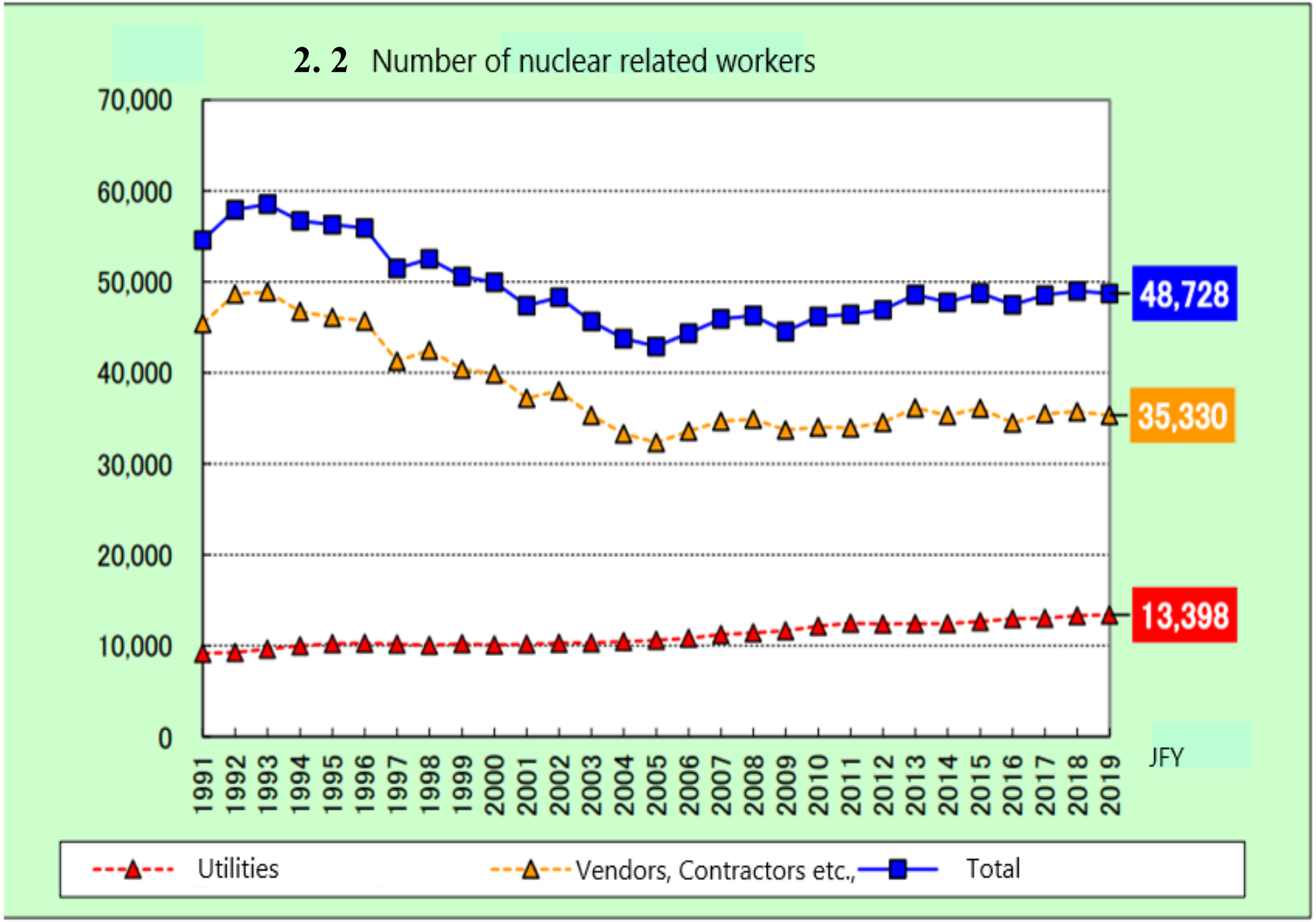
2. Current status of Nuclear Industry in Japan

2. 1 Current Status and Challenges

- JPY1.9 trillion annual sales and 80,000 employees
- 27 reactors have been applied for a conformity review based on the new regulatory requirements. As of today, a total of ten plants have restarted.
- Many companies are concerned about the future of their business because of uncertain prospects for restarting NPP operations and for new construction.



2. 2 Number of nuclear related workers



2. 3 JAIF's Recommendations

Recommendations for Maintaining and Strengthening the Nuclear Power Supply Chain

July 22th, 2022

1. Implement all possible measures for **early restart of NPPs**.
2. Clearly state the energy plan, which calls for **construction of new NPPs**.
3. Develop a business environment that **promotes investment in nuclear power**.
4. Expand of governmental **support for technological development and demonstration projects** for innovative reactors, including large LWRs.
5. Provide comprehensive support measures for **promotion of equipment and parts exports.**

2. 4 Industry Activities

- The Japan Atomic Energy Agency (JAEA)
  Mitsubishi Heavy Industries (MHI)
  Mitsubishi FBR Systems (MFBR) :
  TerraPower, LLC - fast reactor (2022)

- JAEA: UK high temperature gas-cooled reactor (HTGR) demonstration program (2022)

- JAEA: Poland's next-generation HTGR development program (2022)

- IHI Corporation (IHI)
  JGC Holdings Corporation:
  NuScale (2021)

©TerraPower

©JAEA

©NuScale

2. 5 Nuclear Supply Chain Platform (NSCP)

- Ministry of Economy, Trade and Industry (METI) established Nuclear Supply Chain Platform (NSCP) to support nuclear supply chain on March 6, 2023.

1. Developing and securing human resources in a strategic way
2. Dealing with supply disruptions of equipment and materials
3. Supporting suppliers to participate in overseas projects

NSCP member companies as of March 6, 2023 (approx. 50)

Source : METI

2. 6 Nuclear Industry Statements

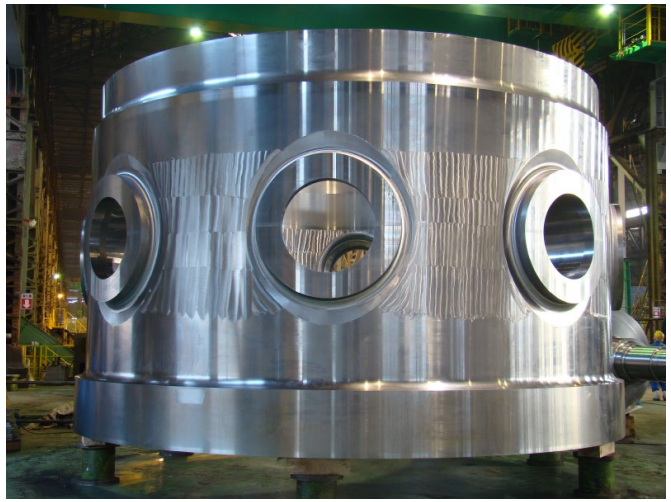
- JAIF and the nuclear industry associations representing the nuclear industry worldwide made recommendations to the G7 Climate, Energy and Environment Minister`s Meeting in Sapporo on April 16, 2023.

1. Maximize the utilization of existing nuclear power plants (NPPs)
2. Accelerate the deployment of new NPPs
3. Support international cooperation and the nuclear supply chain
4. Develop a financial environment that promotes investment in nuclear power
5. Harmonize highly efficient international regulatory standards
6. Support innovative nuclear technology development
7. Promote public understanding of nuclear energy
8. Collaborate internationally to share best practices, including working toward the realization of final nuclear waste disposal
9. Support countries that have newly introduced, or are considering, nuclear energy

3. Opportunities for eastern Europe

3.1 Manufacturing for GⅢ＋ Reactor Components by Japan

- Examples



Monoblock Shell Flanges for Nuclear Reactor Pressure Vessel From JSW

Containment Vessel From IHI
Photo provided by Georgia Power Company

Turbine Rotor From Toshiba
https://www.denkishimbun.com/sp/25018

3.2 2023 JICC's Activities with Countries in Eastern Europa

- Seminars and Invitation program to Japan in 2023

Summery

- Japan has decided maximum use of nuclear power for energy security and decarbonization together with renewable energy
- Japanese nuclear industry keeps its manufacturing capabilities and is playing important role in the supply chain of GⅢ＋ reactors
- Eastern European countries together with Asian countries are most important for Japanese nuclear industries
- JICC has been providing various kind of cooperative activities for Eastern European countries and we can customize them according to your requests

Thank you for your attention!