EU house, July 6, 2018

Japan Atomic Energy Commission and Basic Policy for Nuclear Energy

Yoshiaki OKA
Chairman
Japan Atomic Energy Commission (JAEC)

The views expressed here do not necessarily reflect those of JAEC nor the government

Contents

- Japan Atomic Energy Commission
- Basic Policy for Nuclear Energy
- Collaboration Program of Nuclear Power related Organizations
- Building Infrastructure for Communication
- White Paper on Nuclear Energy
- Global Warming and Nuclear power

Japan Atomic Energy Commission

- **Atomic Energy Basic Act** was enacted on December 19, 1955: **activities are limited for peaceful purposes**, to be conducted securing the safety, under democratic administration, independently, making the results available to the public, actively contribute to international cooperation
- **Atomic Energy Commission** was established on January 1, 1956: The Commission plans, deliberates and makes decisions on, (1) matters relating to **nuclear research, development and utilization policies,** (2) matters relating to the **coordination of the activities** of the Government agencies engaged in such activities, (3) matters relating to the **collection of information** and conducting of surveys concerning such activities, and (4) matters tasked by laws to the Commission and such **other important matters** relating to nuclear research, development and utilization.

JAEC’s tasks and commissioners

- Commission may make recommendations to the heads of the relevant Government agencies in accordance with the Act to Establish the Atomic Energy Commission.
- Three Commissioners, appointed by the Prime Minister with the consent of the Diet.
- The Office of Atomic Energy Policy of the Cabinet Office serves as Secretariat.

Yoshiaki Oka
chairman

Toshio Sano

Tomoko Nakanishi

Administrative Organizations for Nuclear Energy Policy

Cabinet Office

Japan Atomic Energy Commission (JAEC)

Discuss and form a plan on:

- **Policy on nuclear energy research, development and utilization**
- **Important policy matters on nuclear energy utilization e.g., coordination among relevant ministries on nuclear energy research, development and utilization**

Basic Guidelines, Decisions, Statements, Views etc.

Ministries that own individual policy matters

Cabinet Office	*MOFA*	*MEXT*	*METI*	*MOE* *NRA*
•Nuclear Disaster Prevention	*·Foreign policy on nuclear science and Peaceful use of nucle energy*	*·Policy on nuclear science* *·Nuclear fusion and nuclear applications*	*·Policy on nuclear energy* *·Nuclear fuel cycle* *·High level RW* *·Fukushima Daiichi*	*·Nuclear regulation* *·N. Security Safeguards*

JAEC's activities

- Regular meeting: weekly, open to the public
- Basic Policy for Nuclear Energy: every 5 years
- White Paper on Nuclear Energy: annually
- Decisions, statements and Views: R&D policy, Human resource development, Fast reactor development, Light water reactor utilization, Improving knowledge base, View on the mid-term implementation plan for spent nuclear fuel reprocessing, View on future research reactor facilities, Statement on Nuclear Test by North Korea, Opinion on the Plutonium Utilization Plans of Electric Power Companies, Report on the Next Mid and Long Term Goal of the Japan Atomic Energy Agency, Report on the basic concept for the Designated Radioactive Waste Final Disposal Act etc.
- Policy information: Plutonium utilization in Japan

Nuclear Power Utilization in Japan

- 42 operable LWR plants; BWR and PWR
- 9 utilities (TEPCO, Kansai, Chubu etc.) and JAPC and J-Power(EPDC)
- First LWR demo (JPDR, 12MWe BWR) in 1959
- First commercial plant (GCR) in 1965, LWR in 1970
- 3 Manufacturers; Hitachi/GE, MHI and Toshiba
- 3 nuclear fuel manufacturers; GNF-J, Mitsubishi NF, NFI
- Commercial nuclear fuel cycle program by JNFL (enrichment, spent fuel reprocessing and low level radioactive waste disposal) in Rokkasho-mura
- Only for peaceful use, no nuclear weapon by law

Nuclear R&D institutes in Japan

- **Japan Atomic Energy Agency (JAEA)**
  - Experimental fast reactor JOYO
  - High temperature test reactor HTTR
  - Research Reactors and critical assemblies: JRR-3,NSSR and STACY
  - Thermal hydraulic test loops, hot labs. etc.
  - Nuclear fuel cycle (backend) facilities
  - J-PARC (proton accelerator)
- **Japan Agency for Quantum and Radiological Science (QST)** from April 2016

  Merger of
  - National institute of radiological science(NIRS):Heavy ions etc.
  - Fusion program of JAEA: JT-60, ITER and Broader approach etc.
  - Takasaki Advanced Radiation Institute(JAEA Takasaki):Ions and Co60 etc.
  - Kansai Photon Science Institute(KPSI) of JAEA: Photons and Lasers etc.
- **Central Research Institute of Electric Power Industry(CRIEPI) etc.**

Basic Policy for Nuclear Energy

- First policy paper on nuclear energy after the TEPCO Fukushima accident, characterized as:

An articulation of policy directions and ultimate goals for cross-cutting issues of overall nuclear policy

Guideposts for JAEC itself and the relevant government ministries, agencies in performing their respective roles and responsibilities

An indication of long-term policy directions, incorporating a wide variety of viewpoints surrounding nuclear energy

It is to be reviewed, as necessary, basically every five years or so

Changing Environment Surrounding Nuclear Energy

Impact of the Fukushima Accident

◆ Essential **to sincerely face up to the public distrust and anxiety** about nuclear energy and **rebuild social confidence**.

Environment surrounding nuclear energy use

◆ With full liberalization of the retail electricity market, it is pointed out that **the new competitive electric power business** has made it difficult to make reliable prediction about the future of nuclear power business.

Environment surrounding the global warming issue

◆ Japan's INDC intend to reduce greenhouse gas emissions by **26.0% relative to the FY2013 level by FY2030**.

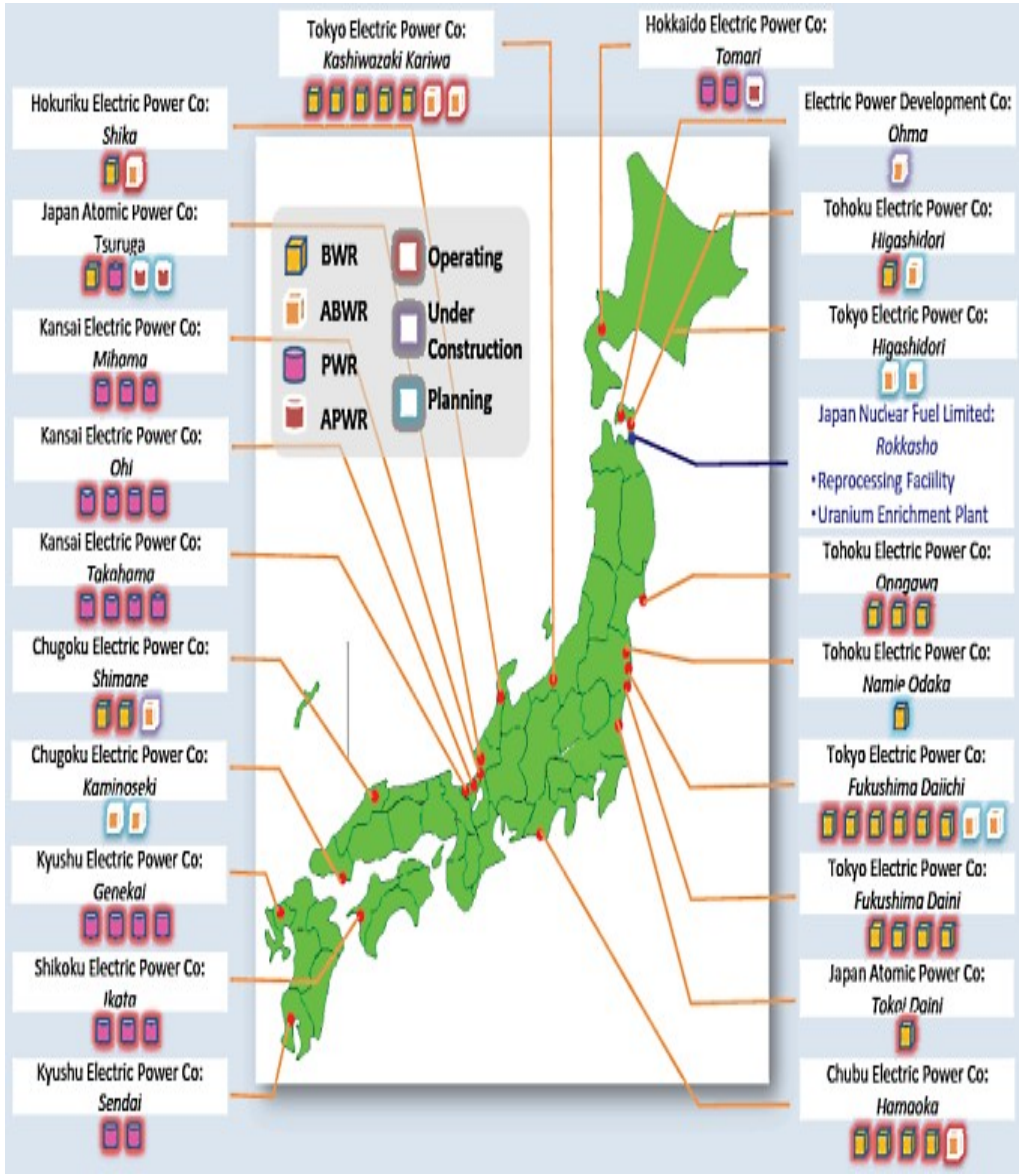
Energy issues that affect the livelihood and economic activities

◆ Increased use of existing thermal power stations and introduction of a feed-in tariff (FIT) system for renewable energy **have led to electricity tariffs higher**.

◆ The rise in electricity tariffs has had a major negative impacts on people's livelihood and economic activities.

Nuclear Power Plants in Japan (June 2018)

- 9 plants restarted after rigorous safety review of NRA.
- 5 plants passed the review.
- 12 plants are under review.
- 16 plants have not yet applied the review.
- 18 plants were shut down permanently, including 4 plants which were shut down before the TEPCO Fukushima Daiichi accident.

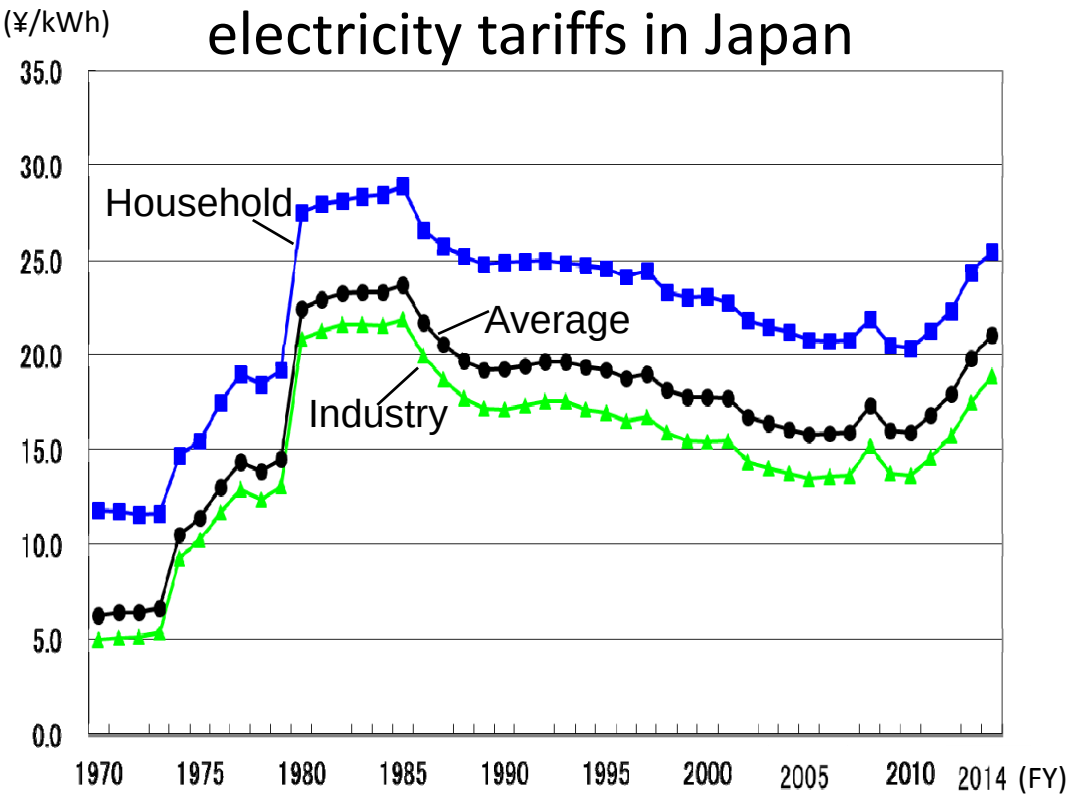


Source: METI and http://www.world-nuclear.org/information-library/country-profiles/countries-g-n/japan-nuclear-power.aspx

Electricity Tariffs and Fuel cost

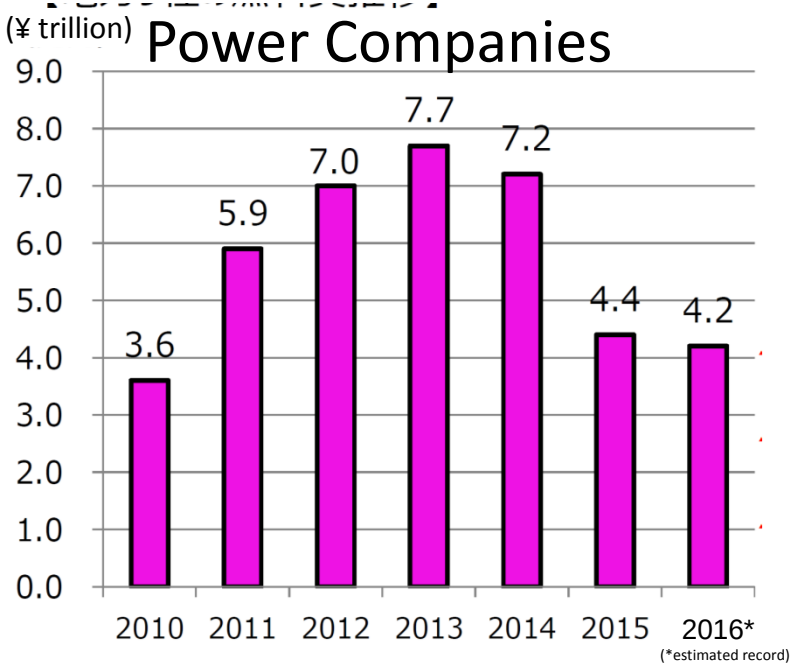
- After the Fukushima accident, **electricity tariffs raised by about 30% for industry and by about 20% for household**.
- **Fuel cost increased by $90 billion due to higher dependency on thermal power generation** as a result of the suspension of nuclear power generation after the Fukushima accident.

electricity tariffs in Japan



Source: Energy Annual Report 2015

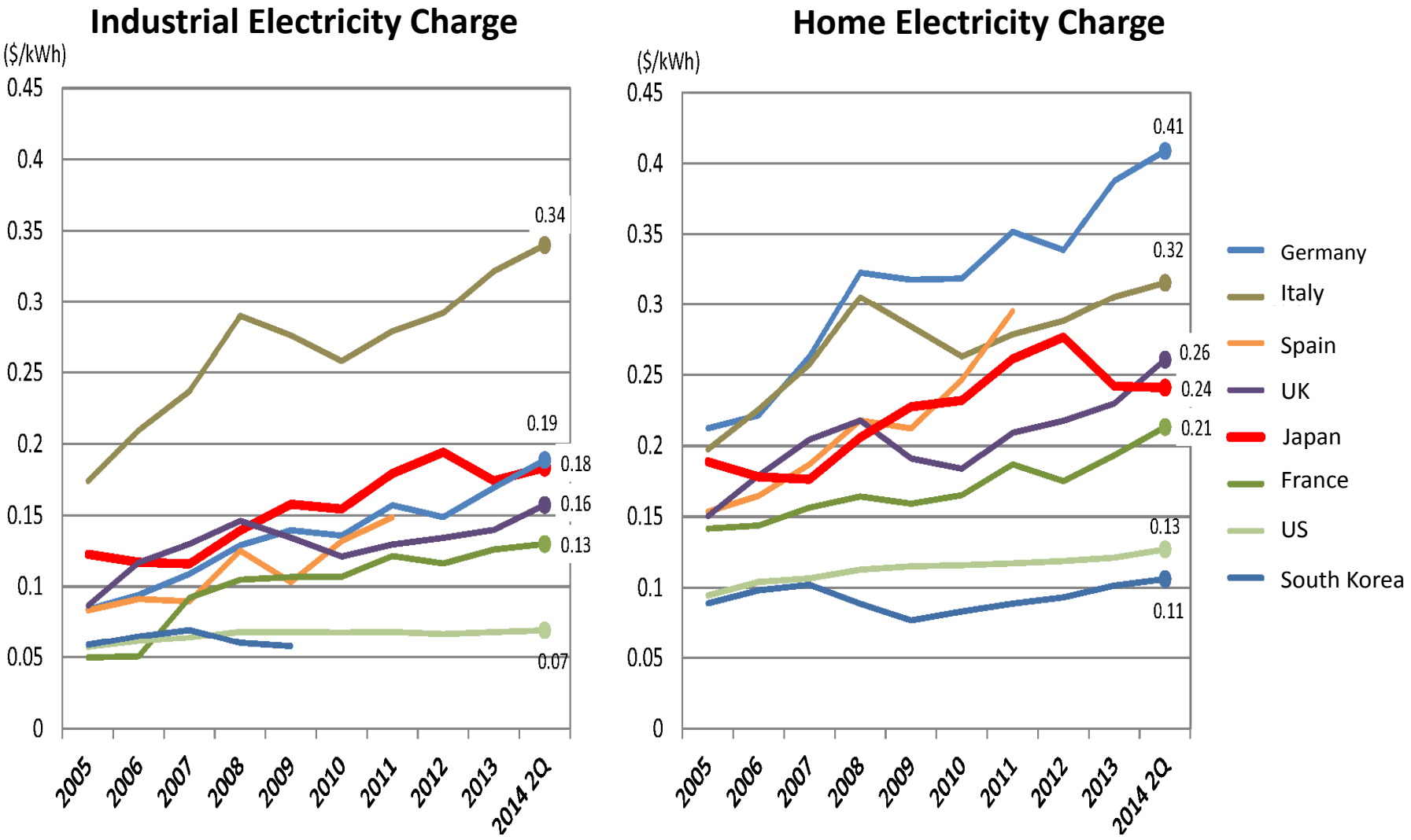
Fuel Cost of Japanese Electric Power Companies



FY	2010	2011	2012	2013	2014	2015
Thermal (%)	61.7	78.9	88.3	88.3	87.8	84.6

Source: Federation of Electric Power Companies of Japan

Comparison of Electricity Charges with foreign countries

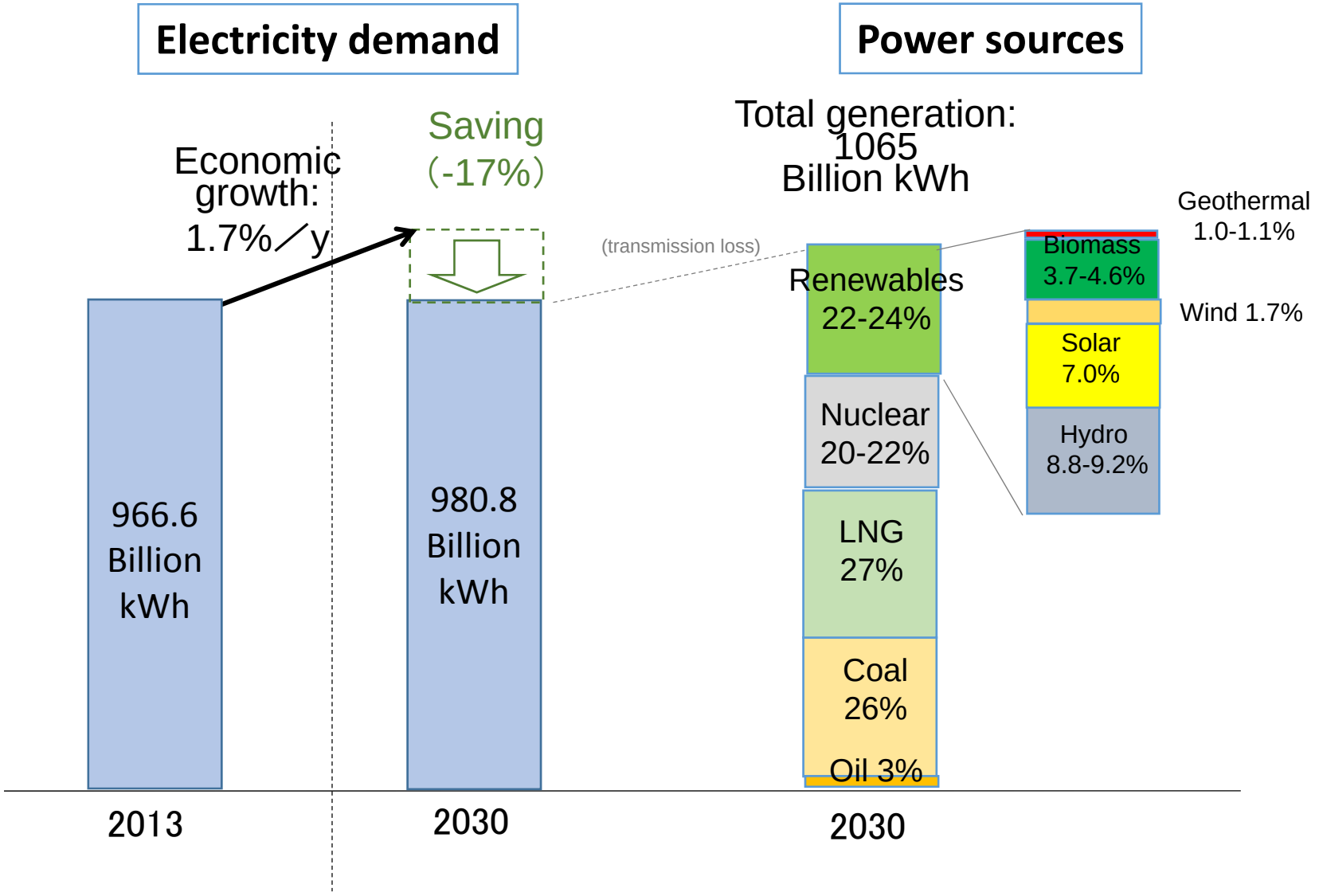


The value of France sharply rising in 2007 is due to the Change of the source of French data used by IEA

Electricity rates in Japan have risen since the earthquake, but this graph reflects the impact of foreign exchange rates as it is written in dollars

Source: IEA Energy Prices and Taxes

Electricity demand and supply outlook in 2030



Source; Long-term energy supply and demand outlook, July 2015 METI

Fundamental Issues Ingrained in Nuclear Energy-related Organizations

- National culture is embedded in values and social structures and affects the work methods of individuals and the activities of organizations.
- The unique mindset and groupthink in Japan, the pressure to conform tacitly or forcibly to the opinion of the majority, and the tendency to maintain the status quo are all very strong, and they can be a problem.
- As a result of the sub-optimization of information sharing in terms of the contents and scope, Truly needed information does not get appropriately shared.
- Recognizing those characteristics, nuclear energy-related organizations have to take drastic steps to improve their way of conducting their works.

Basic Objectives of Nuclear Energy Use

Appropriate use of nuclear energy is necessary, while **thorough risk-management by responsible regime is precondition**.

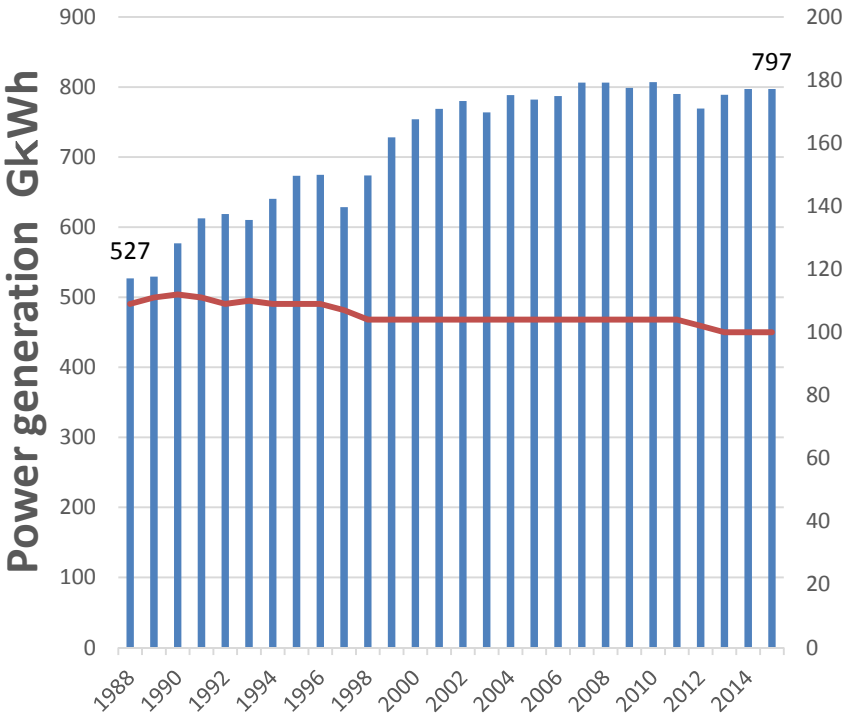
1. Fukushima Accident: Seriously reflect on the accident and **lessons learned.**
2. Nuclear energy, addressing **global warming issues and people's livelihood and the economy**
3. Nuclear energy in the **global context**
4. **Peaceful use of nuclear energy**: enhancing non-proliferation and security regimes
5. **Rebuilding public trust**, as a major precondition
6. Steadily pursuing **decommissioning and radioactive waste disposal**
7. **Improving quality of life** through the use of radiation and radioactive isotopes
8. **Strengthening the foundations** for the use of nuclear energy

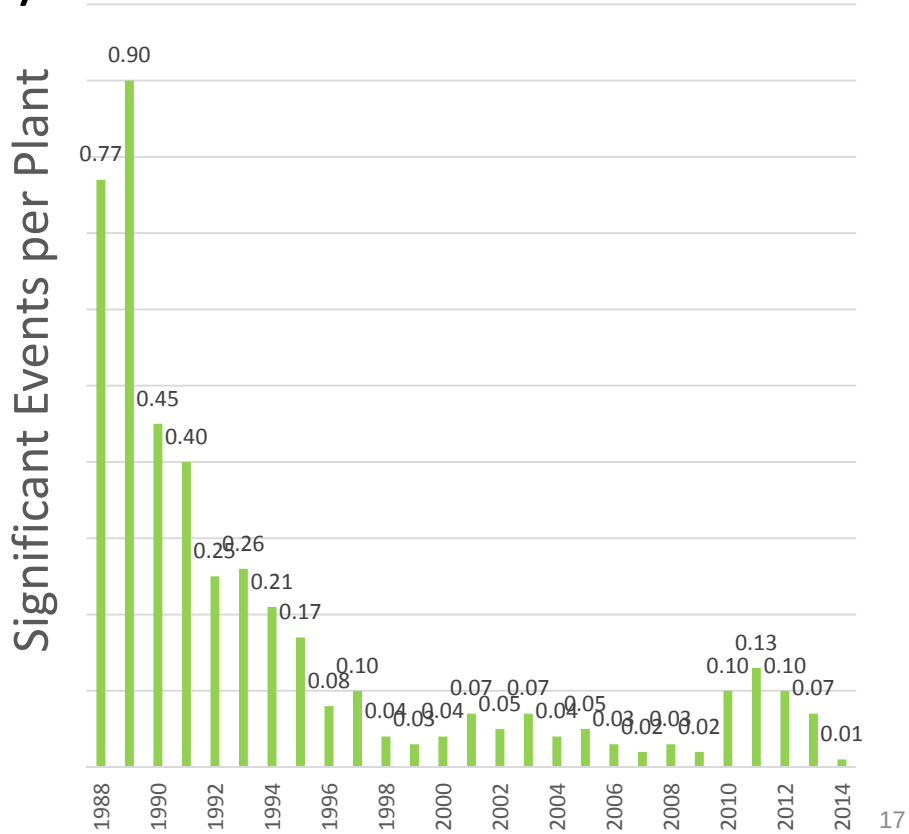
Important initiatives and directions

Continuous improvement of safety

Economic and safety improvement coexist in USA by Industry's risk management and improvement of regulation

US nuclear power generation increased 50% and reactor accidents decreased 1/30th since 1989, 10 years from the TMI accident.

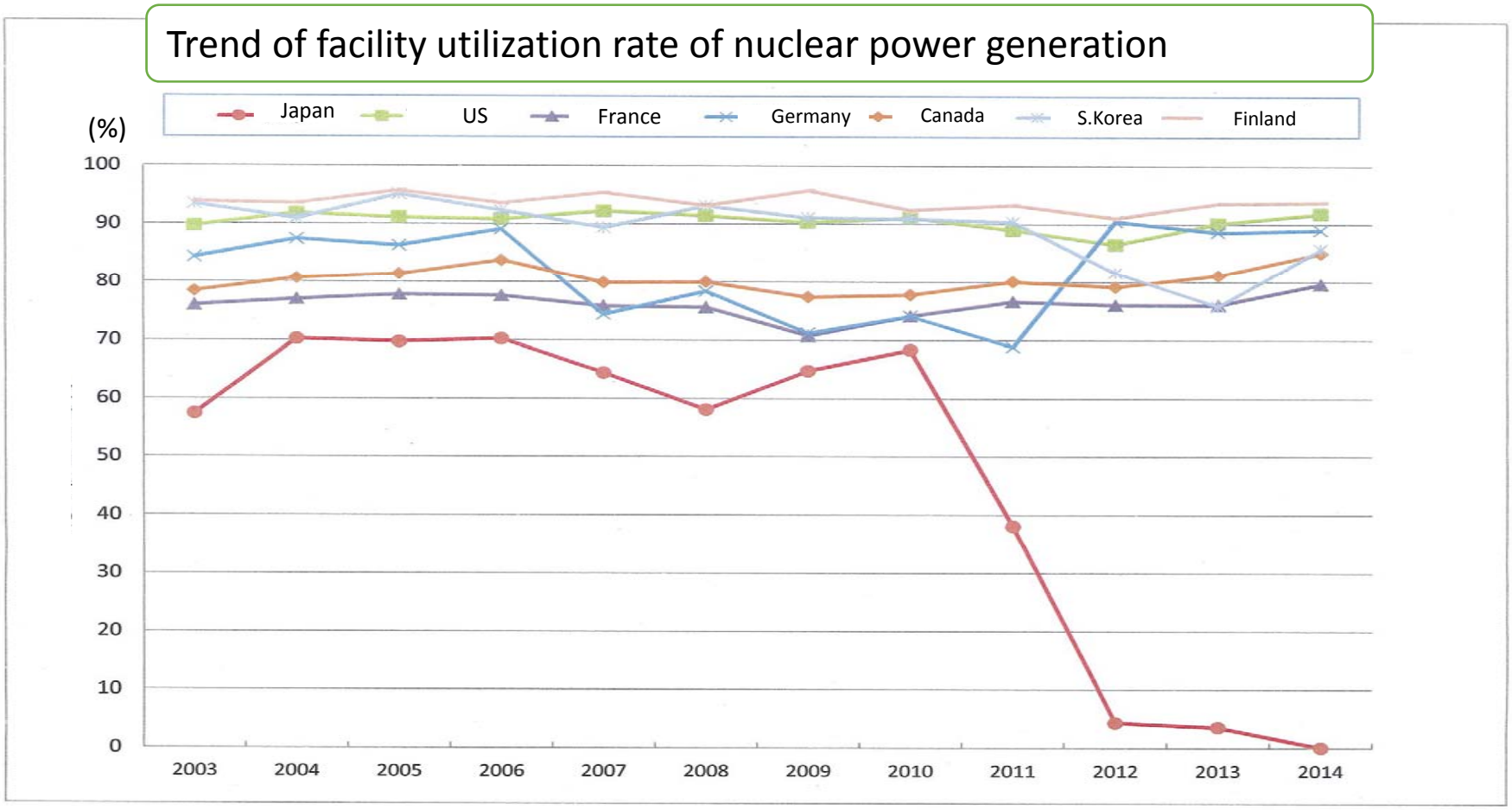




International comparison of Facility Utilization Rate

- In the United States and South Korea, the facility utilization ratio of nuclear power generation is about 90%.
- the utilization rate of Japan before the Fukushima Accident is about 70%.

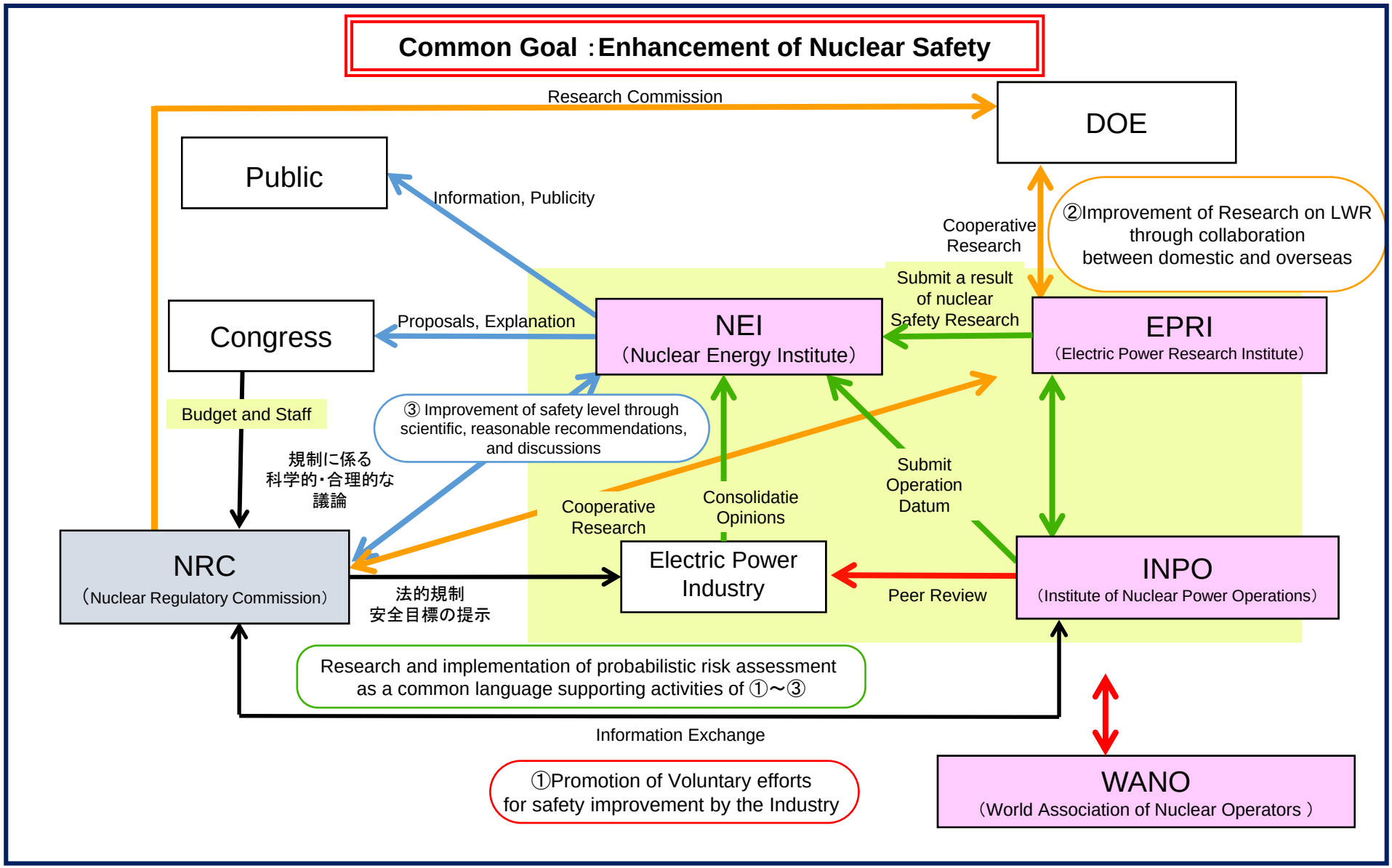
Trend of facility utilization rate of nuclear power generation



Source：IAEA,Power Reactor Information System(PRIS)

Outline of the Utilization of LWR in US

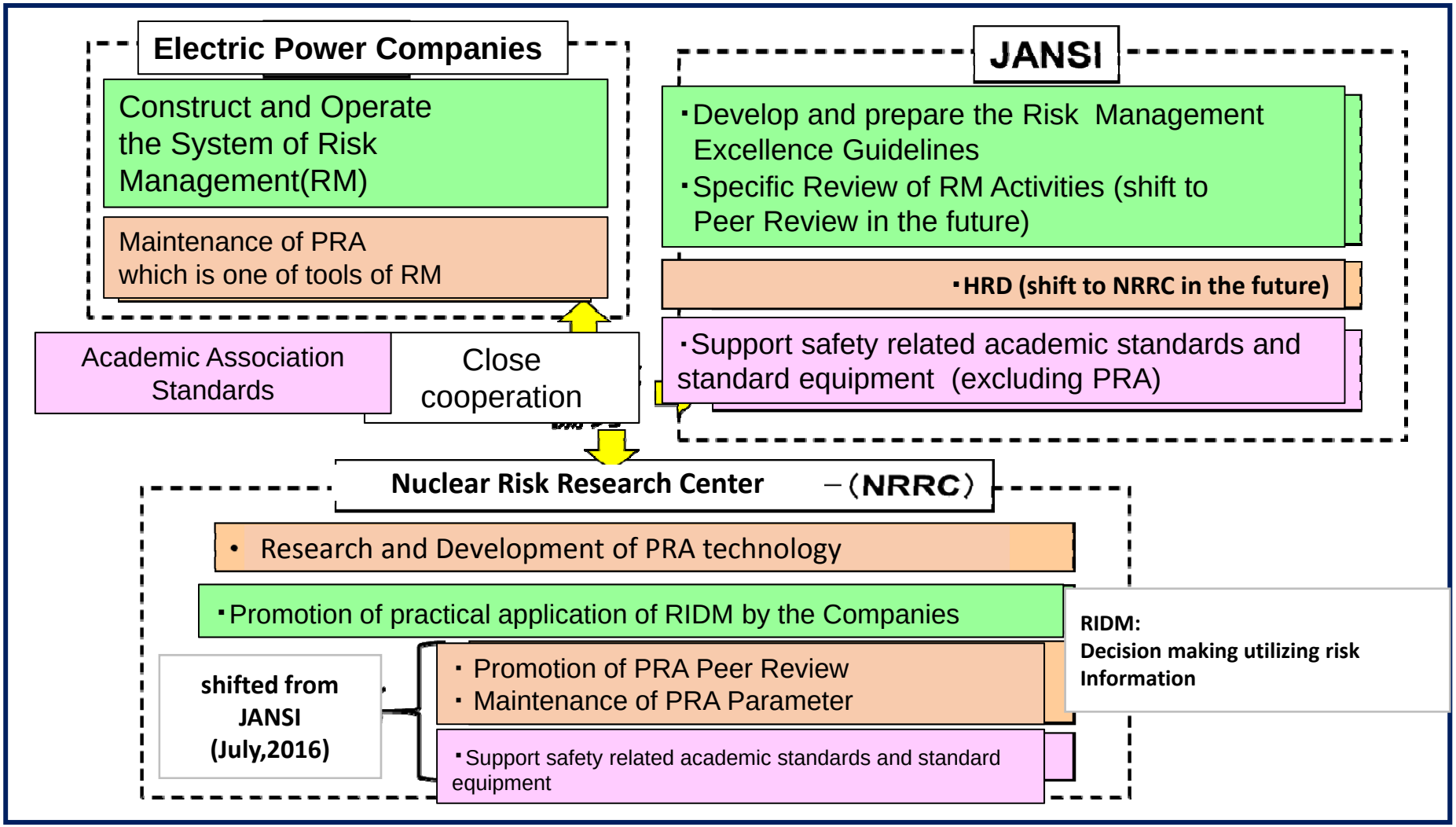
～Structure for Managing risk by US nuclear power companies～



出典：総合資源エネルギー調査会総合部会第2回会合資料（平成25年4月23日）を基に内閣府作成

Japanese industry efforts on safety improvement

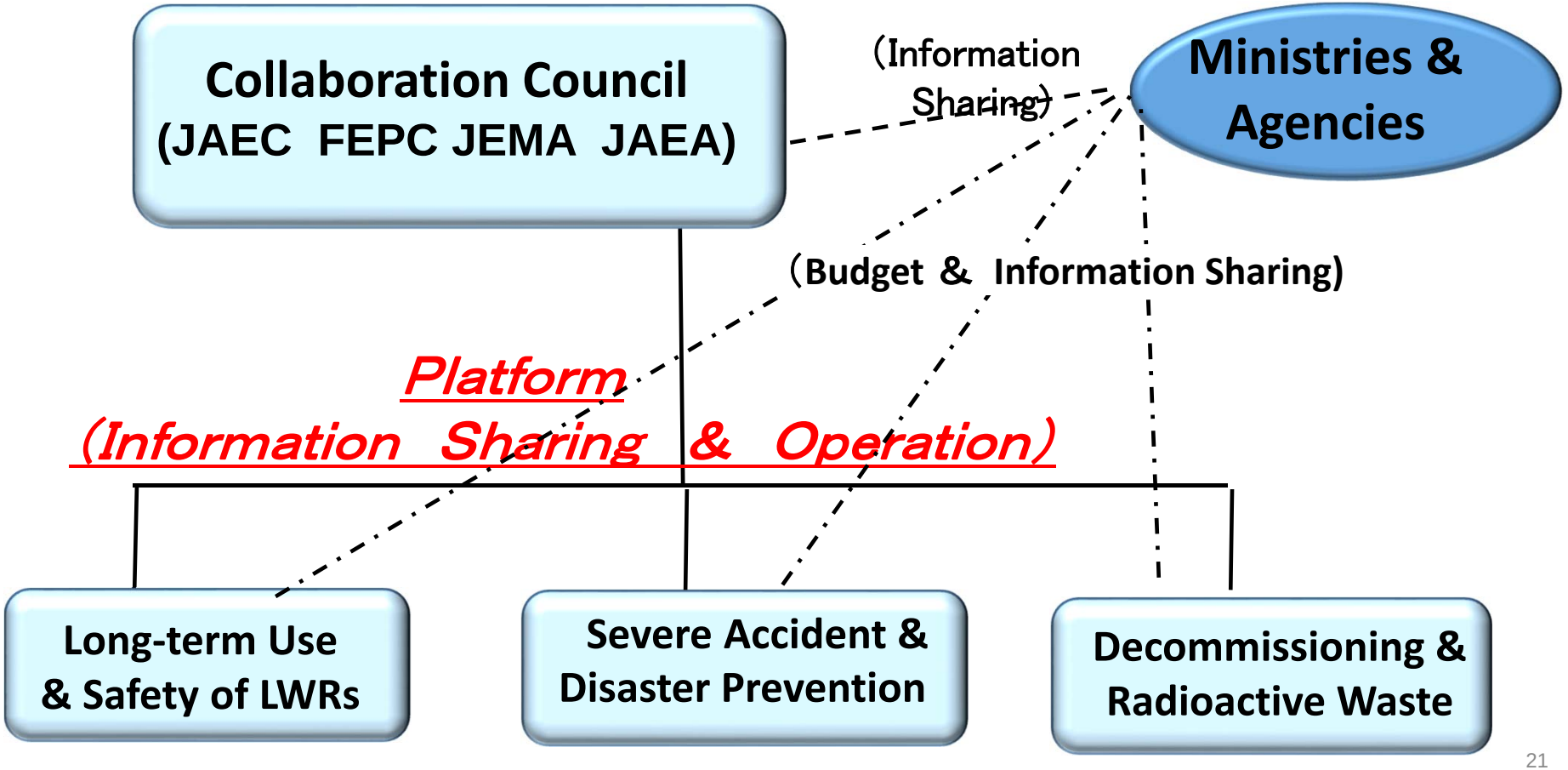
- Nuclear power companies are promoting efforts to improve safety through peer review toward building autonomous systems for improving safety.



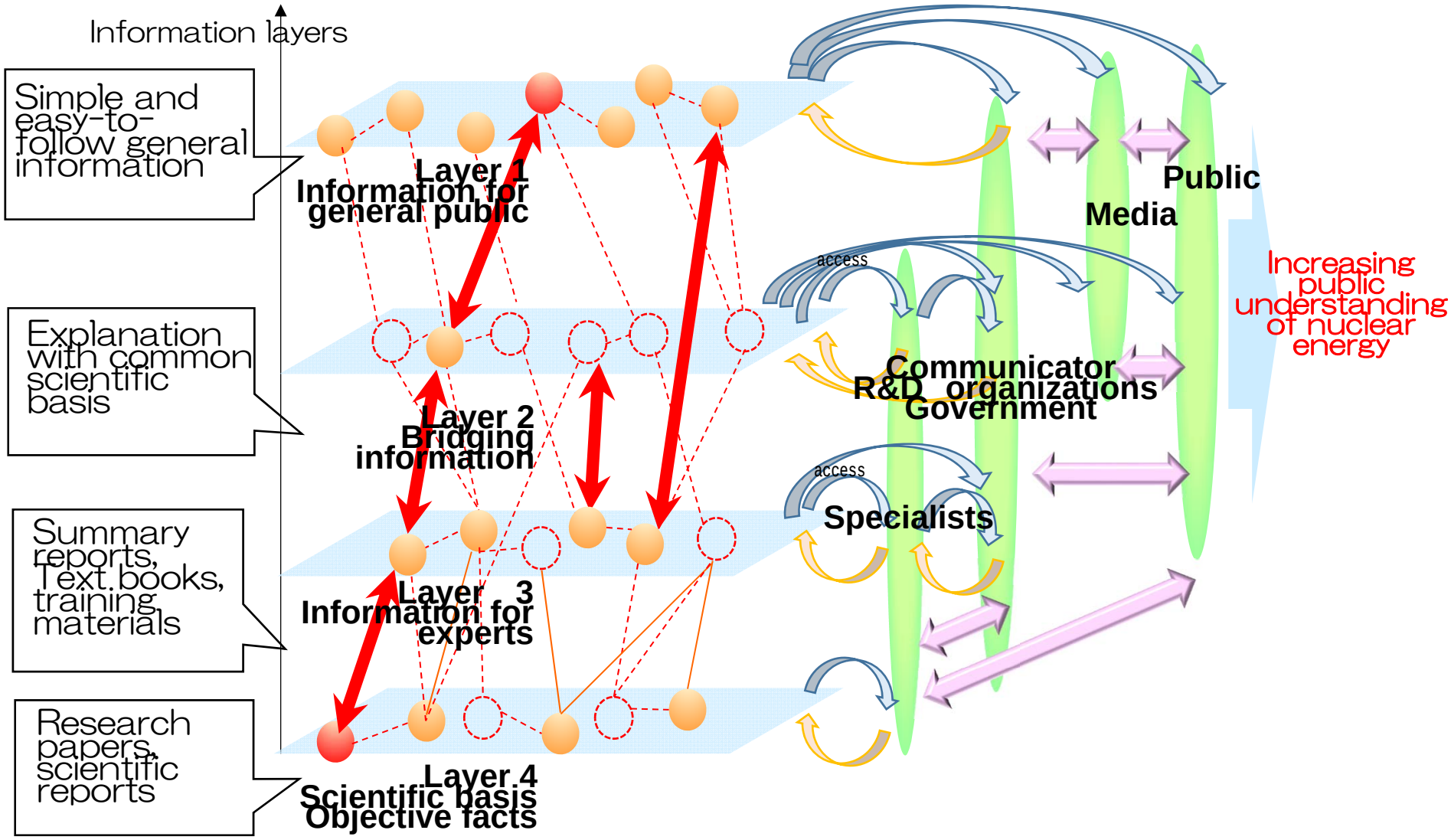
Source: the 40th JAEC Regular Meeting documents (2016)

Collaboration Program of Nuclear Energy related Organizations

Vision : Improvement of Knowledge & Technology Base
Deepening Public and Experts' Understanding
Improvement of R&D Management



Increasing public information with evidence in Japanese



knowledge-based Information network

public communication

Providing Public with Policy Information

- **It is common to provide public with easy-to-understand information regarding nuclear energy policies in the U.S. and the UK.**
- **Such sufficient effort has been not made in Japan.**
- **Each ministry and agency in Japan is also expected to provide policy information on HP etc.**
- **JAEC published "utilization of plutonium in Japan".** (ref.1)

[ref.1] "*Plutonium Utilization in Japan*" :
http://www.aec.go.jp/jicst/NC/about/kettei/kettei171003_e.pdf

Public communication

- Informing the public (push-type activities) does not necessarily promote their understanding.
- Preparing knowledge-based information and evidence-based policy information and making them available to the public constitute the infrastructure for communication.
- Stakeholder* dialog/engagement (pull-type activities) is necessary. It has been conducted in UK for geological disposal facility siting and in USA for environmental clean-up of legacy facilities for nuclear weapon production.
- Learning the lessons will promote our understanding of the complex, multi-disciplinary characteristics of the communication.

*Stakeholder: a person, group or organization that has interest or concern.

White Paper on Nuclear Energy 2017

- Published 2016 version for the first time since March 2010. 2017 version in July 2018.
- Describing overall picture of nuclear energy use.
- Publish annually.

Special Chapter: Nuclear Communication

Chapter 1 Recovery and reconstruction of Fukushima and continuous safety improvement

Chapter 2 Nuclear energy utilization and global warming

Chapter 3 International and domestic activities

Chapter 4 Peaceful utilization and nuclear security

Chapter 5 Reconstruction of public trust

Chapter 6 Decommissioning and radioactive waste

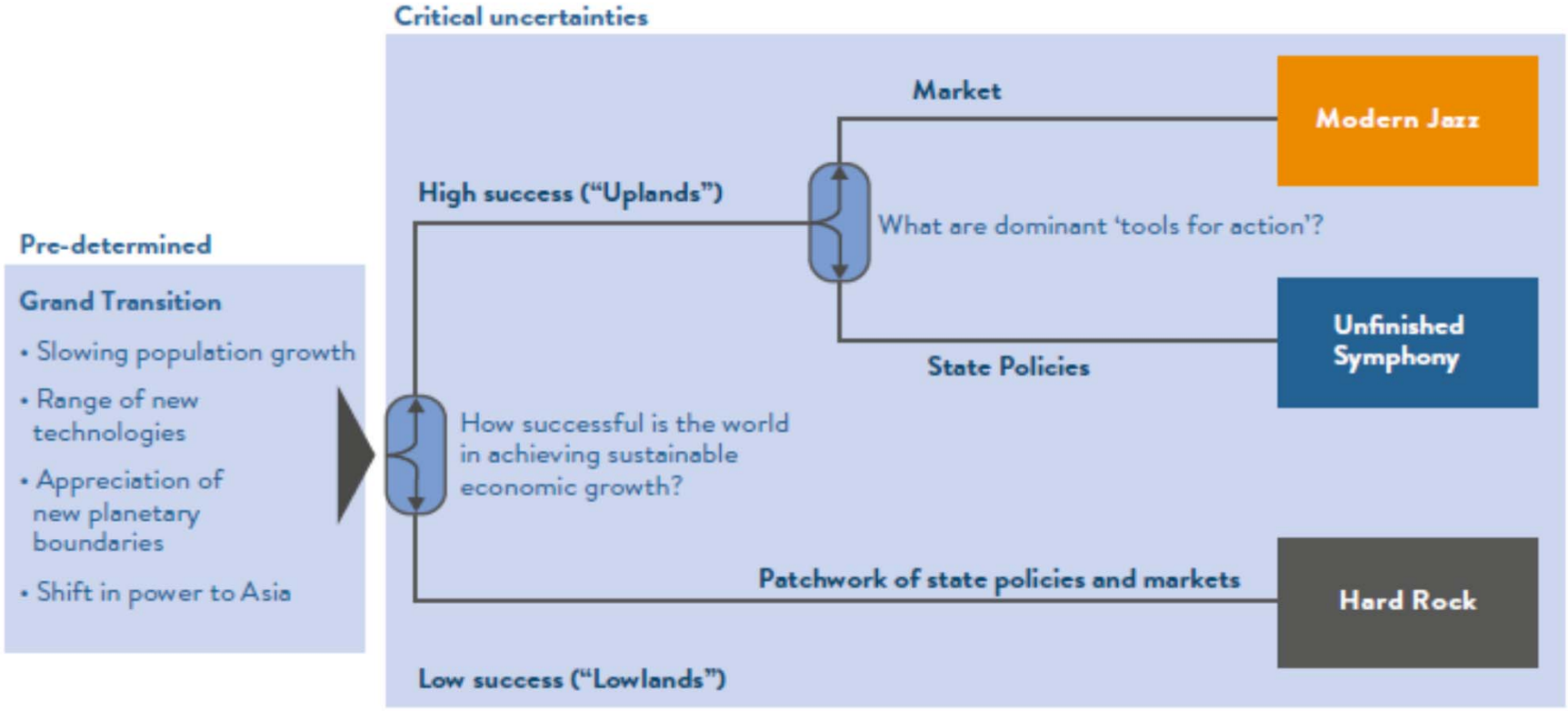
Chapter 7 Utilization of radiation and radioisotopes

Chapter 8 Strengthening the foundation

Reference: http://www.aec.go.jp/jicst/NC/about/hakusho/index_e.htm

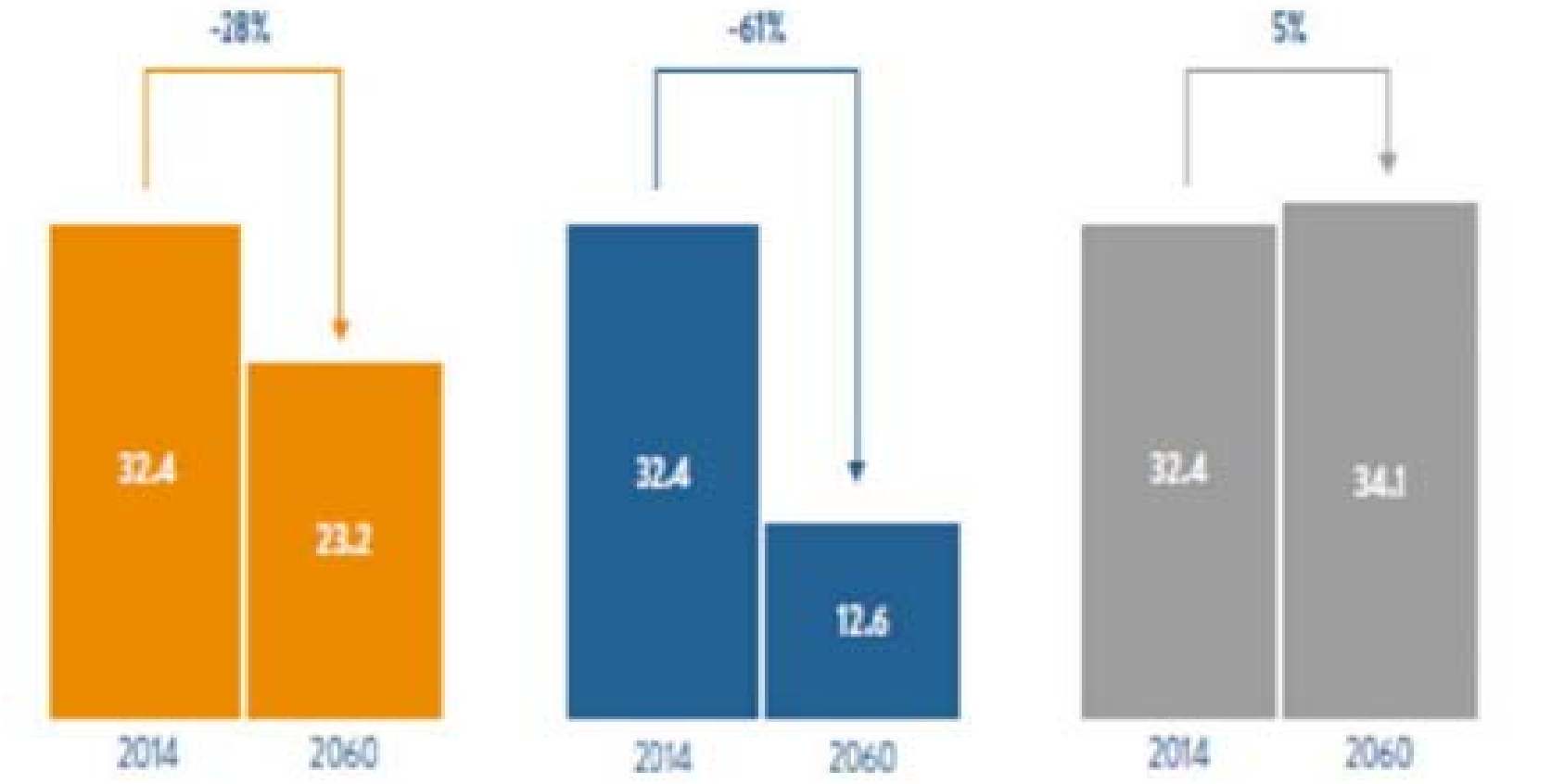
World Energy Scenarios 2016
THE GRAND TRANSITION, 3 scenarios

1. Market driven（Modern Jazz）
2. State policies（Unfinished Symphony）
3. Patchwork　（Hard rock）



Source: The World Energy Council

Reduction of CO2 emission
Patchwork (Hard rock) fails the reduction



Modern Jazz　　Unfinished Symphony　　Hard rock

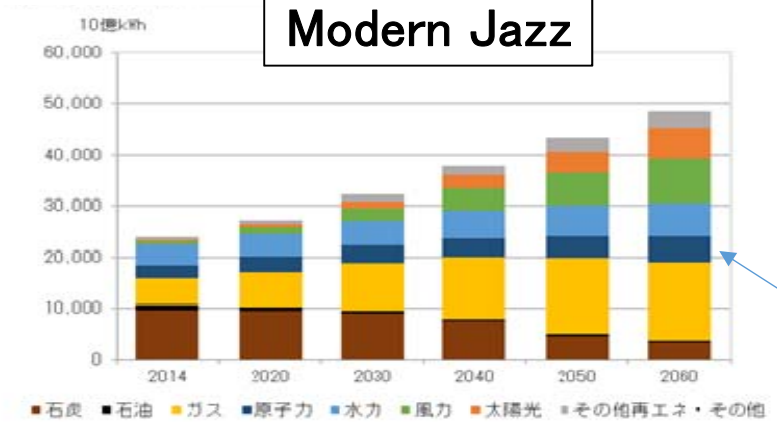
Nuclear power increases for all scenarios

,but smallest by market driven scenario (modern Jazz)

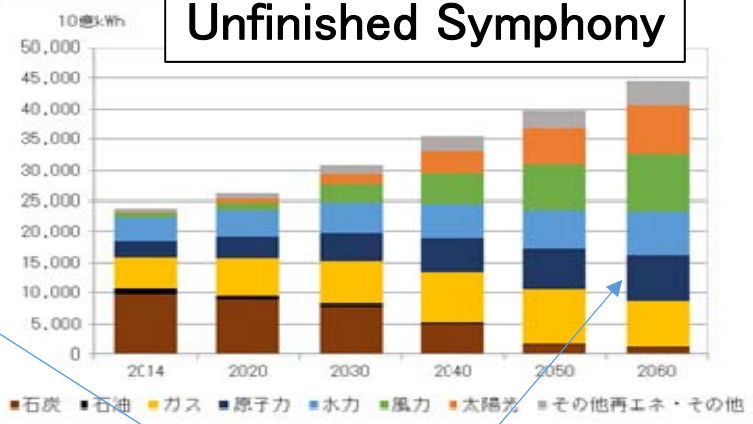
Nuclear power needs policy for recovering large investment

It is not logical to exclude nuclear power, if serious about global warming

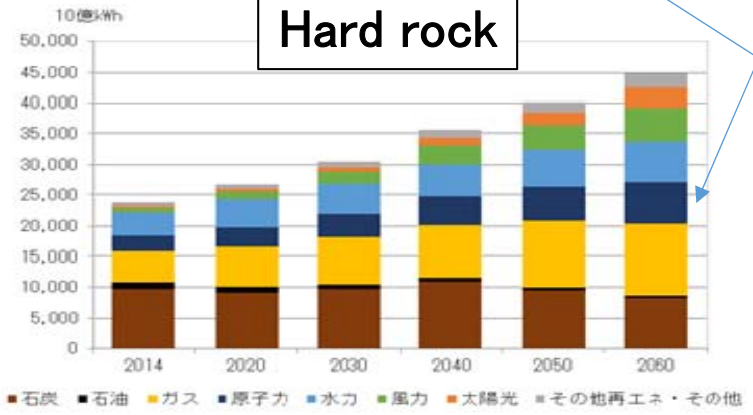
Modern Jazz



Unfinished Symphony



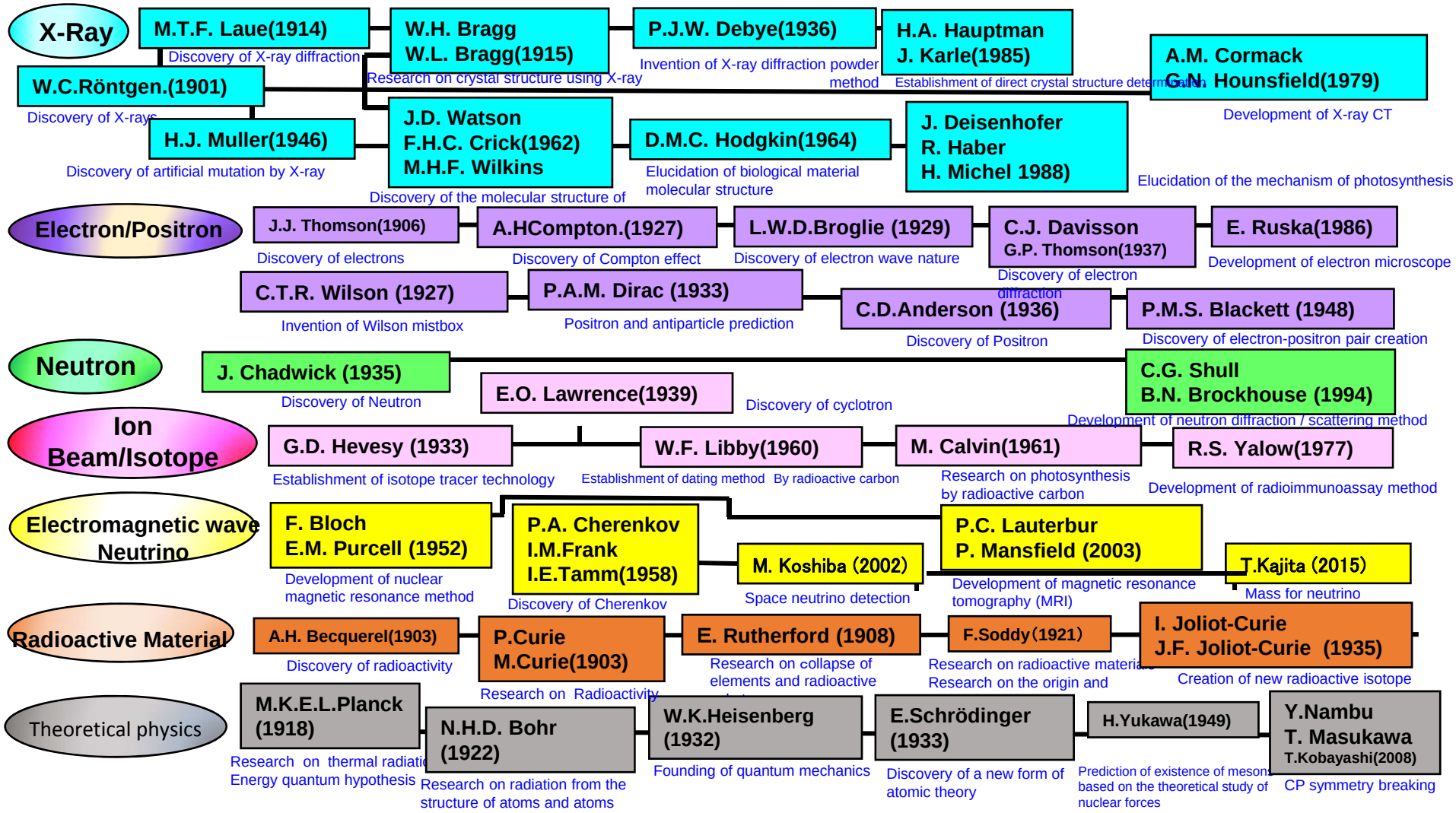
Hard rock



Nuclear power

Nobel prize laureates in Nuclear Field

- Nobel laureates by research in the field of nuclear energy / radiation account for more than 25% in the physics awards and about 15% in the three awards of natural science (physics, chemistry, physiology and medicine). Research in those fields has given a great influence on the development of the science and technology.



Source: S. Okada, the 4th JAEC Regular Meeting documents (2017)

Thank You