Reform in nuclear energy policy after 3/11: Issues and Challenges

Learning from Fukushima: Improving Nuclear Safety and Security after Accidents

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Note: The views expressed here are of my own and do not necessarily reflect those of the JAEC nor the government.

Issues and Challenges

- Fukushima Daiichi Decommissioning and Restoring life in Fukushima area
- Restoring Public Trust in Nuclear Safety and Energy Policy
- Major Issues remain to be solved regardless of future of nuclear energy (with emphasis on nuclear safety and security)
  - Spent fuel management
  - Plutonium stockpile management

Japan Atomic Energy Commission (JAEC)

○The Role of Japan Atomic Energy Commission

The Japan Atomic Energy Commission is set up in the Cabinet Office and has five commissioners. Its mission is *to conduct planning, deliberations, and decision-making regarding basic policy for research, development, and utilization of nuclear energy, including the formulation of the Framework for Nuclear Energy Policy except matters related to nuclear safety regulation*. When the JAEC deems it necessary as a part of its assigned mandate, *JAEC can recommend and demand reports of the head of relevant administrative organization through the Prime Minister*.

Members: 5 (appointed by the Prime Minister with the consent of the House of Representatives and House of Councilors)

Chairman
Dr. Shunsuke KONDO

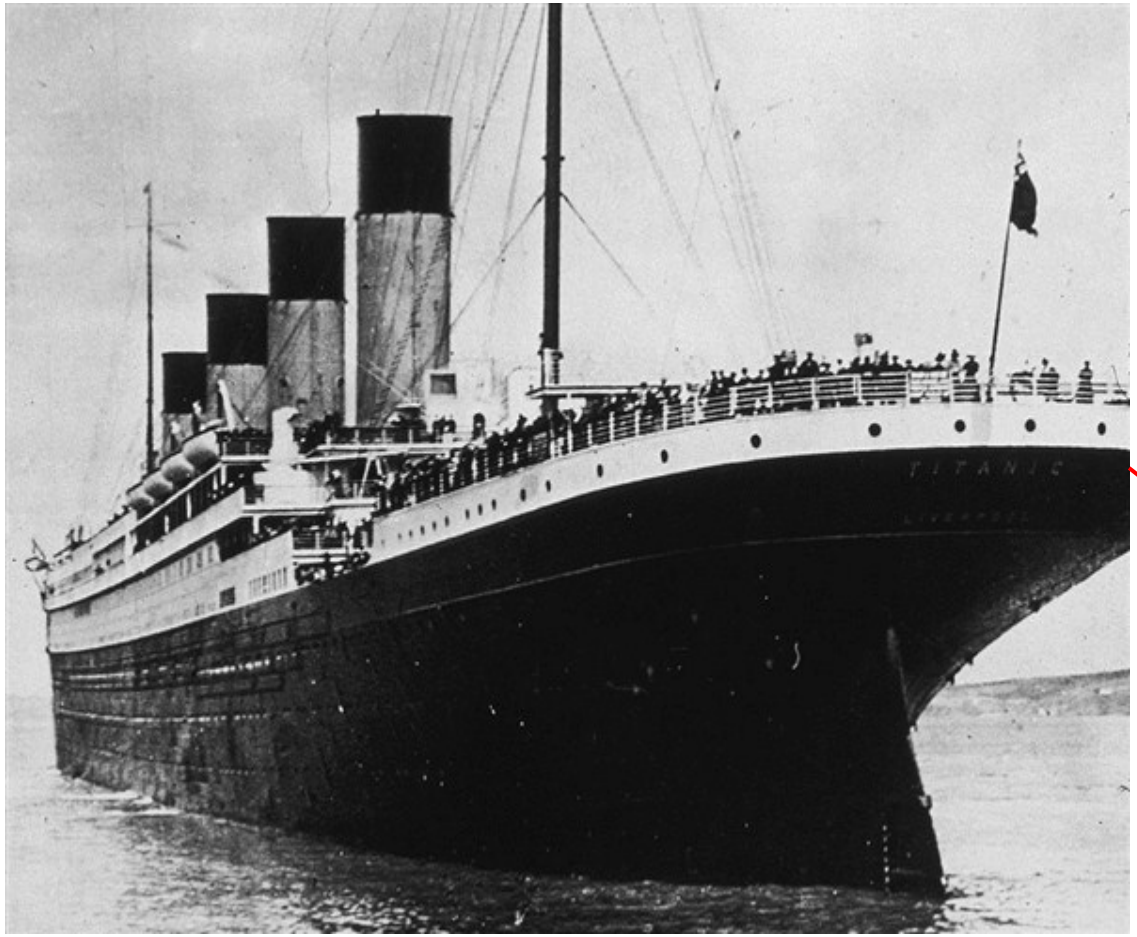
Vice Chairman
Dr. Tatsujiro SUZUKI

Commissioner
Ms. Etsuko AKIBA

RESIGNED
Commissioner
Dr. Mie OBA

RESIGNED
Commissioner
Dr. Akira OMOTO

Role of JAEC (??)
- A small tag-boat for a giant Titanic? -

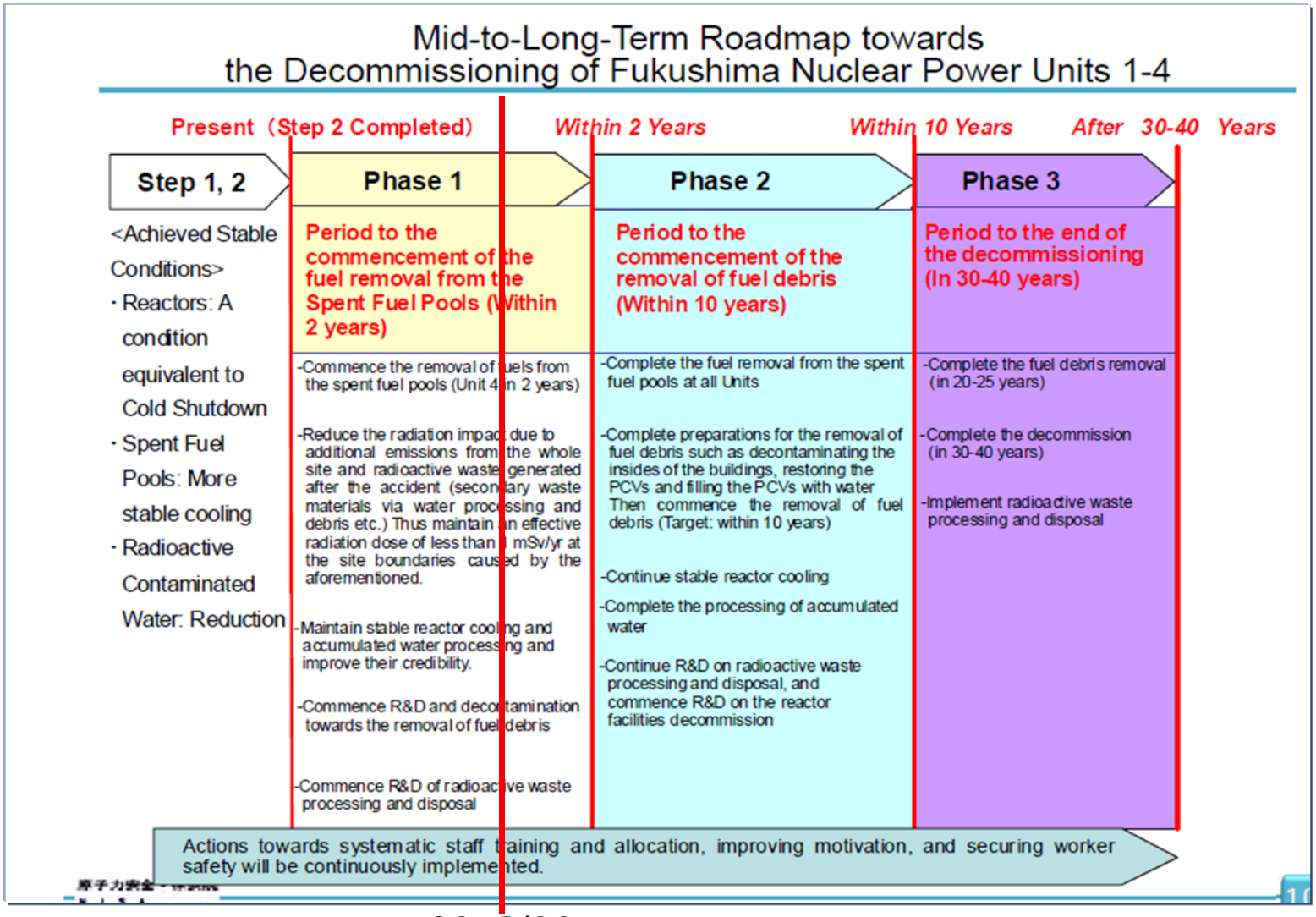


Fukushima Daiichi Decommissioning and Restoring life in Fukushima area

Most Important Lessons Learned from Fukushima: "Thinking Unthinkable" and "Resilience"

- "*The Investigation Committee is convinced of the need of a paradigm shift in the basic principles of disaster prevention programs for such a huge system, whose failure may cause enormous damage.*"- from the Interim Report by the Gov't investigation committee (Dec. 2011)
- "Thinking unthinkable" is essential in preparing for safety emergency and for nuclear security.
- "Resilience" beyond "defense in depth" is needed for preparing "unexpected crisis".
  - Resilience means a capability to respond to "unexpected crisis" as well as to restore safe and secure status of the social system.

Mid-Long Term Roadmap for Fukushima Daiichi



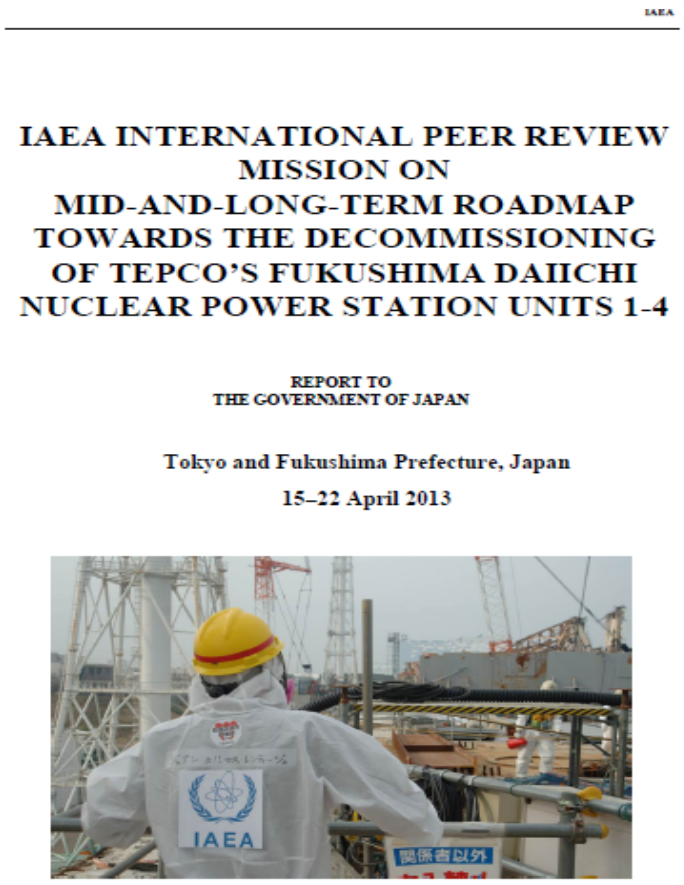
Source: M. Yasui, Nuclear and Industrial Safety Agency (NISA), March 2012, http://www.nsr.go.jp/archive/nisa/english/files/en20120321.pdf

Mid to Long term Measures for Fukushima Daiichi Site(JAEC, 2012/11/27)

- The government is also obliged to strive to maintain transparency of operations throughout the work so that the domestic and international communities correctly understand that the medium- and long-term measures are carried out in this manner.
- The government should establish an independent (third party) organization with overseas experts as members to assess and audit the medium- and long-term measures based on the above criteria, with the authority to make recommendations to the government on improvements as required.

http://www.aec.go.jp/jicst/NC/about/kettei/121127-1_e.pdf

17 Advices from IAEA Review Team(selected) (2013/05/23)



IAEA

IAEA INTERNATIONAL PEER REVIEW MISSION ON MID-AND-LONG-TERM ROADMAP TOWARDS THE DECOMMISSIONING OF TEPCO'S FUKUSHIMA DAIICHI NUCLEAR POWER STATION UNITS 1-4

REPORT TO THE GOVERNMENT OF JAPAN

Tokyo and Fukushima Prefecture, Japan

15–22 April 2013

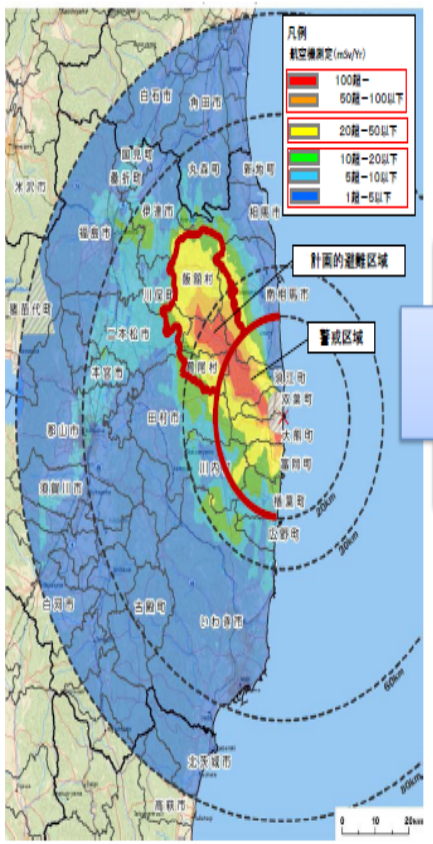
- Discuss the end-state of the Fukushima Daiichi NPS decommissioning strategy in close cooperation with other stakeholders.
- Cooperate and collaborate to promote stakeholder involvement and communication in a more transparent and systematic manner
- Conduct a comprehensive assessment of its current procedures for reporting to concerned parties and for communicating with the public
- Take more proactive approach for licensing for decommissioning of the Fukushima Daiichi NPS

Source: IAEA International Peer Review Mission on Mid-and-Long term Roadmap Towards the Decommissioning of TEPCO's Fukushima Daiichi Nuclear Power Station Unit 1-4, May 2013, http://www.meti.go.jp/press/2013/05/20130523001/20130523001-4.pdf

Evacuation Area Amended (May 7, 2013)

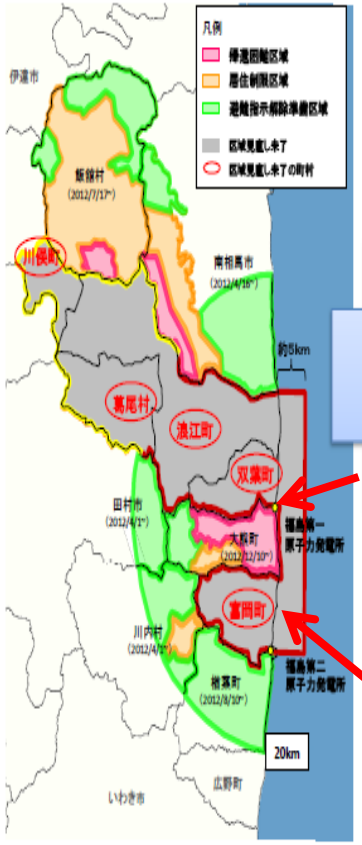
(2012/04/29)

平成23年4月29日時点の線量分布



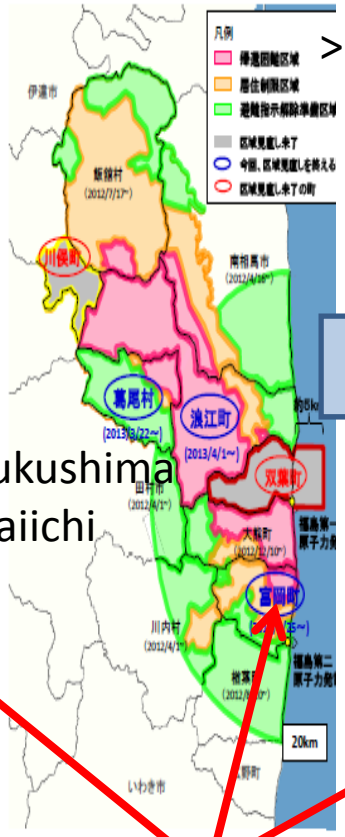
(12/12/10)

平成24年12月10日時点（今回の区域見直し前）



(13/04/01)

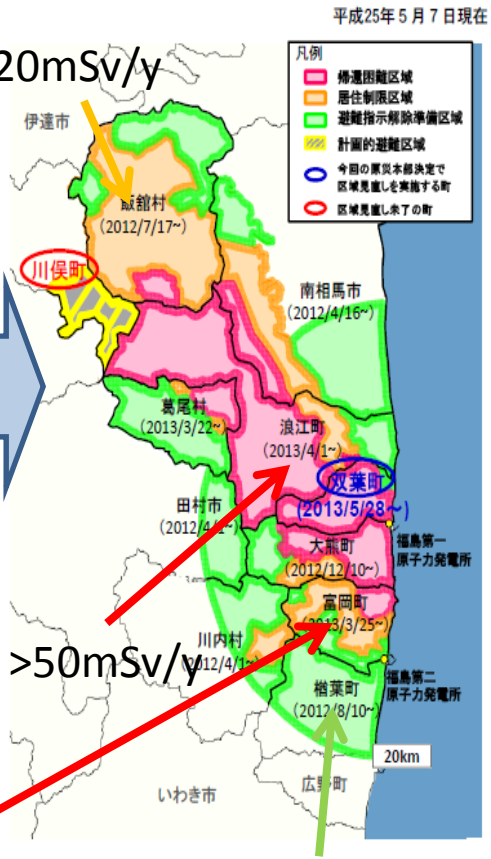
平成25年4月1日以降（今回の区域見直し後）



(13/05/07)

避難指示区域の概念図

平成25年５月７日現在



>20mSv/y

Fukushima Daiichi

>50mSv/y

Tomioka

<20mSv/y

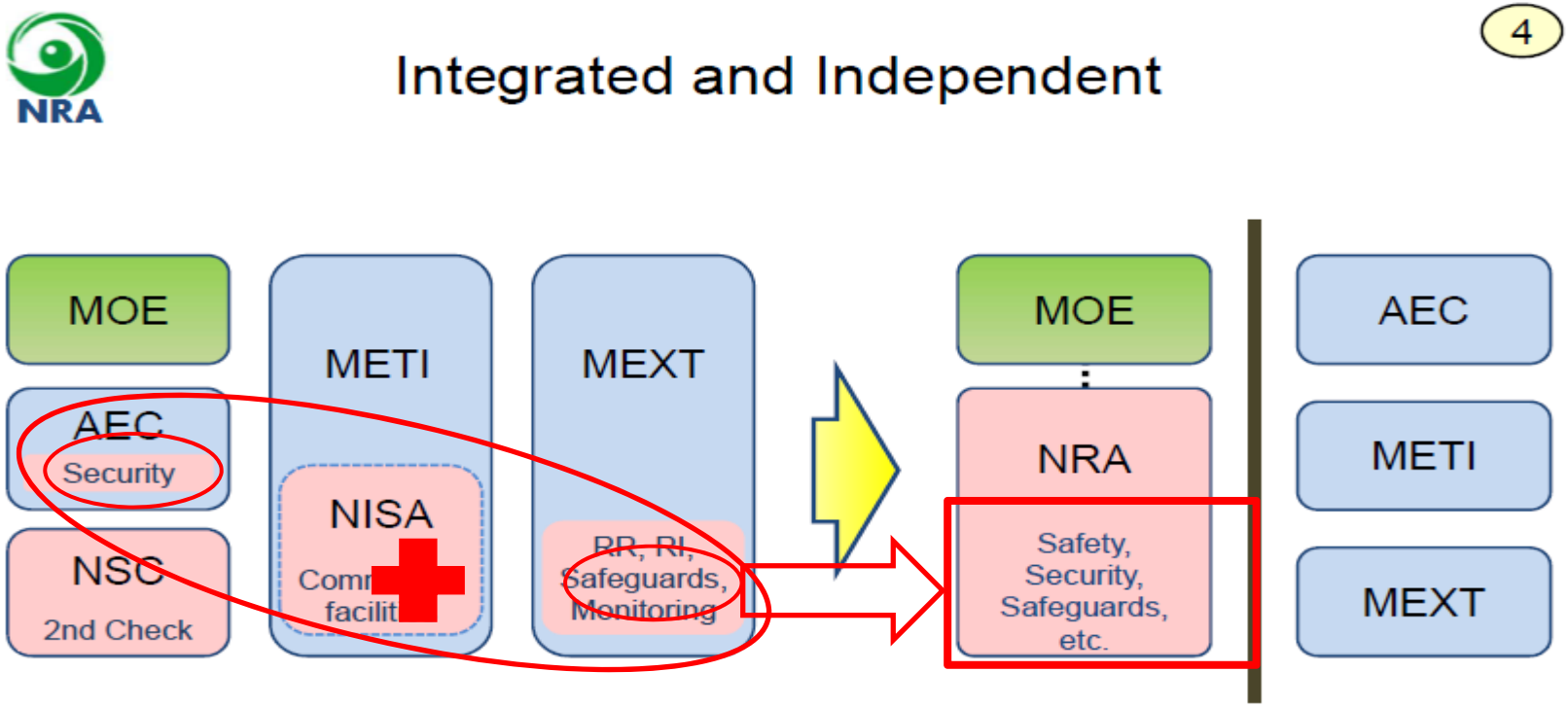
http://www.kantei.go.jp/saigai/pdf/20130307gainenzu.pdf,
http://www.kantei.go.jp/saigai/pdf/20130507gainenzu.pdf

Cherry blossom in Tomioka Town (10 km from Fukushima Daiichi)

http://img2.blogs.yahoo.co.jp/ybi/1/e6/47/pocoyuko2006/folder/581347/img_581347_54615521_0?1335789300

http://www.asahi.com/special/news/images/TKY201304070098.jpg

Establishment of New Nuclear Regulatory Authority (NRA)



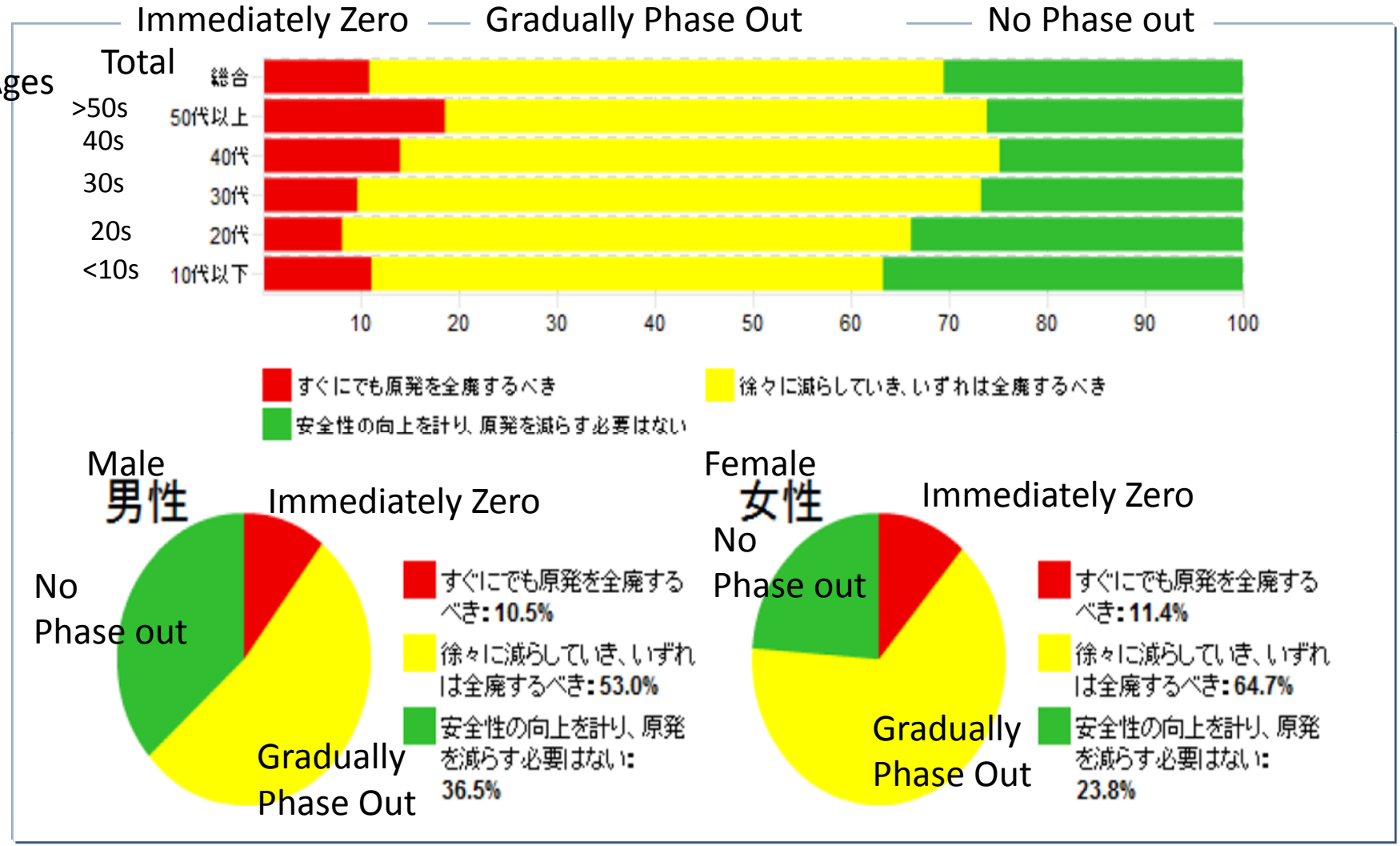
AEC : Atomic Energy Commission
METI : Ministry of Economy, Trade and Industry
MEXT : Ministry of Education, Culture, Sports, Science and Technology
MOE : Ministry of the Environment
NISA : Nuclear and Industrial Safety Agency (abolished)
NSC : Nuclear Safety Commission (abolished)

Source: Toyoshi Fuketa, "Proposed Regulatory Requirements in Japan" March 13, 2013
http://www.nsr.go.jp/english/data/20130313presen.pdf

Restoring Public Trust in Nuclear Safety and Energy Policy

Internet Polling Results (2012/08)

- Sample of more than 1 million people -



http://info.nicovideo.jp/enquete/special/genpatsu/201208/index.html

Transparency: Assuring public trust

- Lack of transparency has resulted in loss of public trust not only in nuclear safety but, more importantly, in overall nuclear governance in Japan.
  - Ex. “Closed meetings” at the JAEC Technical Subcommittee on Nuclear Power and Nuclear Fuel Cycle triggered the issue of “transparency and fair policy making process”

- Public trust is also important for nuclear security.
  - “*Moreover, public understanding and cooperation are vital to improve the effectiveness of nuclear security. It should be emphasized that related organizations strive to inform the public of the objectives of nuclear security at every opportunity*.” – Report by the JAEC Advisory Committee on Nuclear Security (2012/03/09)

Toward Public Confidence Building Measures (JAEC, 2012/12/25)

- 4 important principles for improving public trust:
  (1) Accountability of policy decision
  (2) Disclosure of accurate information
  (3) Transparency and Fairness and public participation in policy making process..
    - administrative bodies should establish a verifiable decision-making process, namely, from the creation of administrative documents, hearing from experts, interested parties and the public, to final making decisions
  (4) Clear and understandable communication (for the general public)

- The government, with collaboration with local governments and utilities, need to establish a forum where local public and stakeholders can share the information to improve transparency of policy making process and public confidence.
  – Good examples can be seen in Kashiwazaki-Kariwa Citizen Forum and CLI in France

http://www.aec.go.jp/jicst/NC/about/kettei/121225_1.pdf

Major Issues remain to be solved regardless of future of nuclear energy

(with emphasis on nuclear safety and security)

Three types of spent fuel storage capacity

At-reactor storage

Storage capacity: 20,630 tU/17 sites (as of Nov. 2011, 69% full)

On-site dry cask storage is not allowed by local governments (Fukushima-1 & Tokai-2 was allowed).

?

If Rokkasho was cancelled…

Rokkasho reprocessing plant

Storage capacity:**3,000tU**
(storage **2,929 tU** as of Sept. 2012)
Construction cost: ¥2.14Trillion

Mutsu Interim storage site

Dry Cask storage type
Capacity : totally 5,000 tU
1st 3,000 tU, add 2,000tU in future
Operation: October 2013 (or later)
(Status : under construction)
Construction cost: ¥0.1Trillion
(including dry casks)

Dry Cask Storage at Fukushima Daiichi (after 3/11)

http://photo.tepco.co.jp/library/110909_2/110909_69.jpg

Global Civilian Plutonium Stockpile (2010)
- Reprocessing has international security implications -

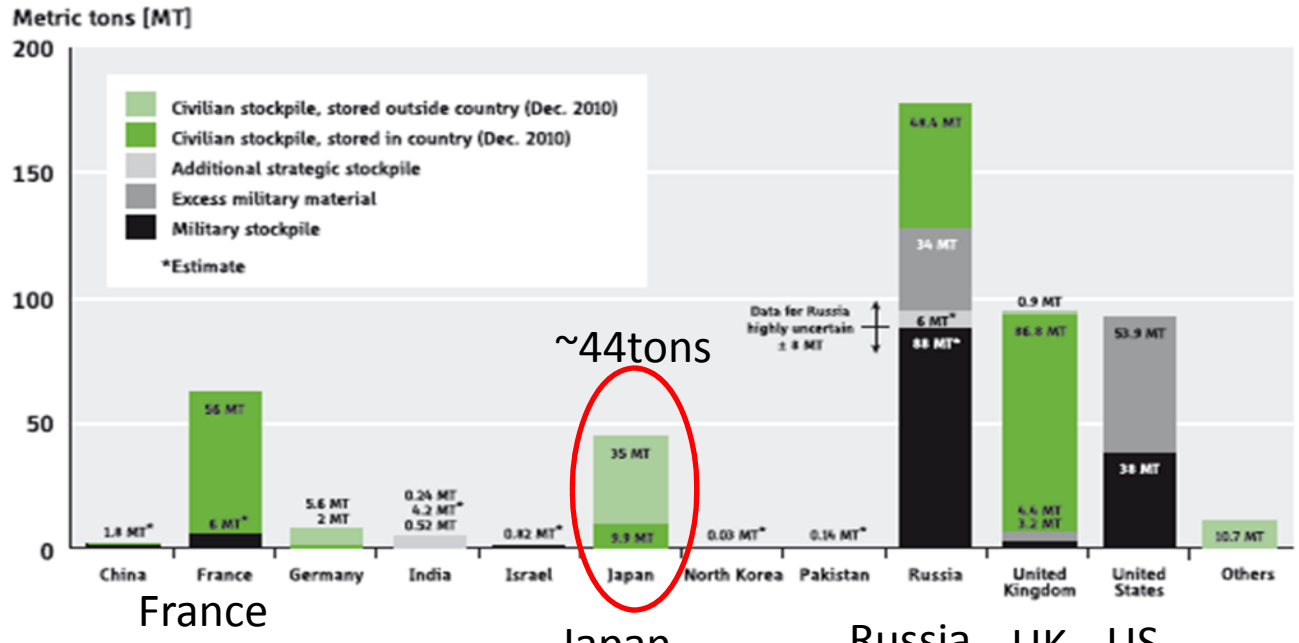


Figure 4. National stocks of separated plutonium. Civilian stocks are based on the most recent INFCIRC/549 declarations for December 2010 and are listed by ownership, not by current location. Weapon stocks are based on non-governmental estimates except for the United States and United Kingdom whose governments have made declarations. Uncertainties of the military stockpiles for China, France, India, Israel, Pakistan, and Russia are on the order of 10–30 %. The plutonium India separated from spent heavy-water power-reactor fuel has been categorized by India as "strategic," and not to be placed under IAEA safeguards. Russia has 6 tons of weapon-grade plutonium that it has agreed to not use for weapons but not declared excess.

Source: International Panel on Fissile Material (IPFM), Global Fissile Material Report 2012, http://fissilematerials.org/library/gfmr11.pdf

Plutonium Stockpile in Japan (as of the end of 2011)

	2010 (kg)	2011 (kg)
Stock in Japan (Pu total)		
Reprocessing Plants	4,362	4,364
MOX Fuel Plant	3,365	3,363
Stored at Reactors	2,208	1,568
Sub-total (Pu fissile)	9,936(6,730)	9,295 (6,316)
Stocks in Europe (Pu total)		
UK	17,055	17,028
France	17,970	17,931
Sub-total :Pu total(Pu fissile)	35,025(23,373)	34,959(23,308)
Total (Pu fissile)	44,961(31,237)	44,254(31,837)

Source: Japan Atomic Energy Commission (2011, 2012) http://www.aec.go.jp/jicst/NC/iinkai/teirei/siryo2012/siryo39/120911e.pdf

US Concern over Japanese Plutonium Stockpile

- **Recommendation: Credible Strategy for Japan's Plutonium Stockpile**

  The disposition of Japan's sizeable plutonium stockpile is an outstanding issue that must be addressed regardless of whether or not Japan decides to move forward with nuclear power. ..*Absent a credible strategy for reducing Japan's plutonium stockpile, nonproliferation and security concerns will grow over time, undermining Japan's international leadership on nuclear nonproliferation*. (US-Japan Working Group, Mansfield Foundation, Sasakawa Peace Foundation)

  Source: "U.S.-Japan Nuclear Working Group Statement on Shared Strategic Priorities in the Aftermath of the Fukushima Nuclear Accident," http://mansfieldfdn.org/mfdn2011/wp-content/uploads/2012/04/US-Japan-Nuclear-Working-Group-Statement.pdf

- U.S. Assistant Secretary of State Thomas Countryman as saying *that if Japan conducts nuclear spent fuel reprocessing while its profitability remains unclear, there is a chance that Japan's international reputation may be significantly damaged*. (Kyodo, 13/04/22)

  Source: Kyodo News, "U.S. officials concerned about Japan's plan to reprocess nuclear fuel." Mon, 04/22/2013

JAEC's "No Pu surplus policy"

- In August 2003, JAEC announced its new guideline for plutonium management
- Utilities are expected to submit **its plutonium usage plan annually *before* separation of plutonium**.
- Its plan should include the information on:
  (1) current plutonium stock
  (2) planned usage of plutonium (name of power plant, or site, insertion period)
  (3) amount of reprocessing (during that year)
  (4) usage of plutonium (during that year)
  (5) MOX contract plan and fabrication amount (during that year).

  – ***"Plutonium stockpile should be reduced regardless of fuel cycle options chosen in the future"*** (Statement in JAEC Subcommittee on Nuclear Power/Nuclear Fuel cycle technologies)
  http://www.aec.go.jp/jicst/NC/iinkai/teirei/siryo2012/siryo22/siryo1-1.pdf (in Japanese)

A Proposal for Plutonium Use Policy - personal opinion -(2013/03/26)

3 new principles should be introduced.

1. Demand comes first: Reprocessing should take place only when plutonium demand(use) is specified.
2. Stockpile reduction: Matching demand/supply is not good enough. Existing stockpile should be reduced before further reprocessing.
3. Flexible plan: Current Pu use plan (MOX recycling in 16~18 units) is no longer certain. Other options (Pu ownership transfer, disposition as waste etc.) need to be pursued. With minimizing cost, transportation and time required to dispose.