

Nuclear Energy Policy Issues after the 3.11 Fukushima Nuclear Accident and its implications for energy policy

Third Annual Griffith Asia Institute
Australian-Japan Dialogue 2013
Energy Security: Challenges and Opportunities
Brisbane, Australia
November 12-13, 2013

Tatsujiro Suzuki

Vice Chairman, Japan Atomic Energy Commission



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
- Issues regardless of the future of nuclear energy



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



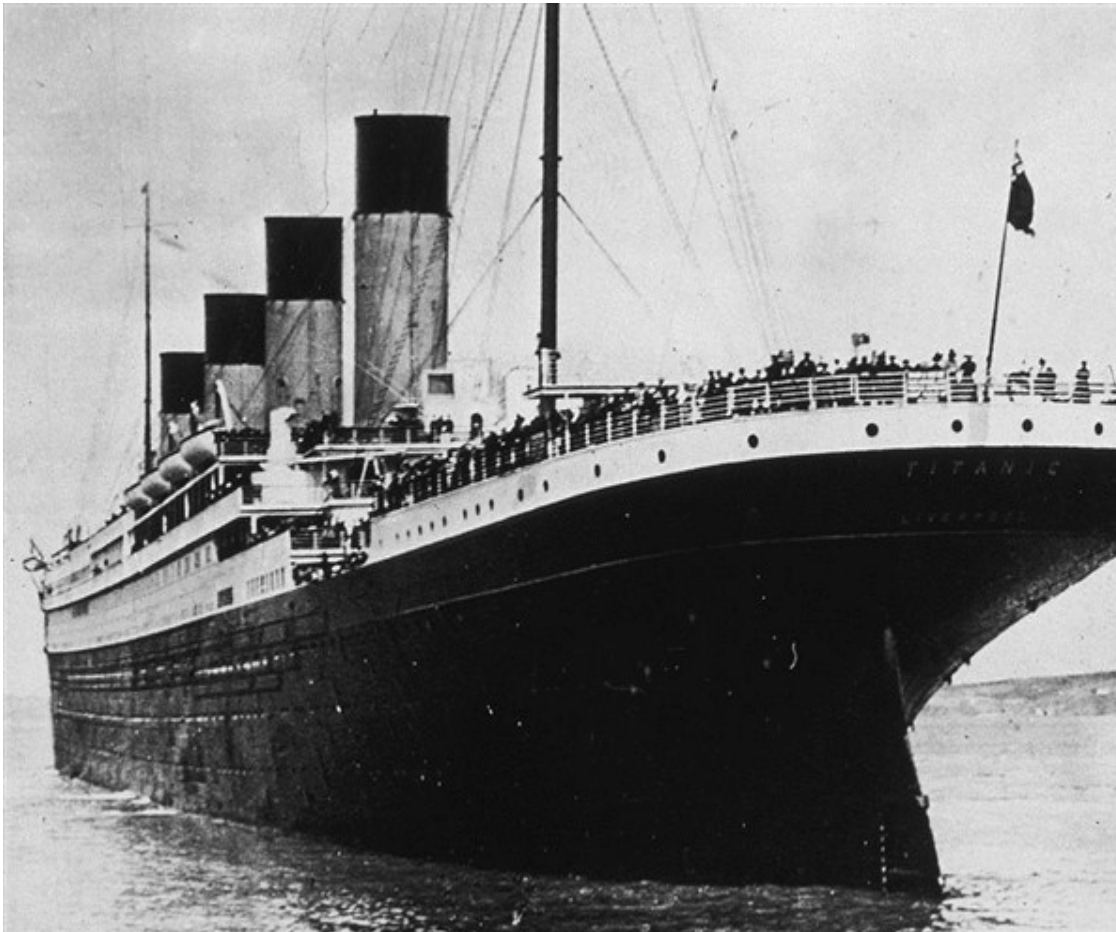
RESIGNED
Commissioner
Dr. Mie OBA



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



PM Abe's assuring speech on Fukushima at the International Olympic Committee (Sept. 7, 2013)

- *"Let me assure you the situation is under control... It has never done and will never do any damage to Tokyo. There are no health-related problems until now, and nor will there be in the future."*

-From Reuter, "Abe helps secure 2020 Games for Tokyo," Sept. 7, 2013

<http://uk.reuters.com/article/2013/09/07/uk-olympics-idUKBRE9860BO20130907>



http://www.kantei.go.jp/jp/96_abe/actions/201309/07ioc_day2.html

Struggling with contaminated water...during the recent typhoon (Sept. 15, 2013)



http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130917_01-j.pdf

"I think the current situation is that it is not under control," by a TEPCO official.

-Fukushima 'not under control' – TEPCO official refutes PM's assurances, Reuter, Sept. 13, 2013

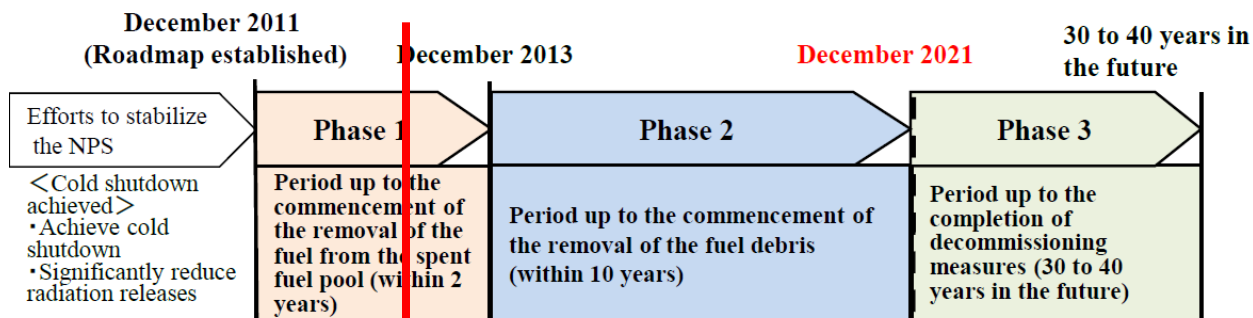
<http://rt.com/news/fukushima-under-control-tepco-819/>



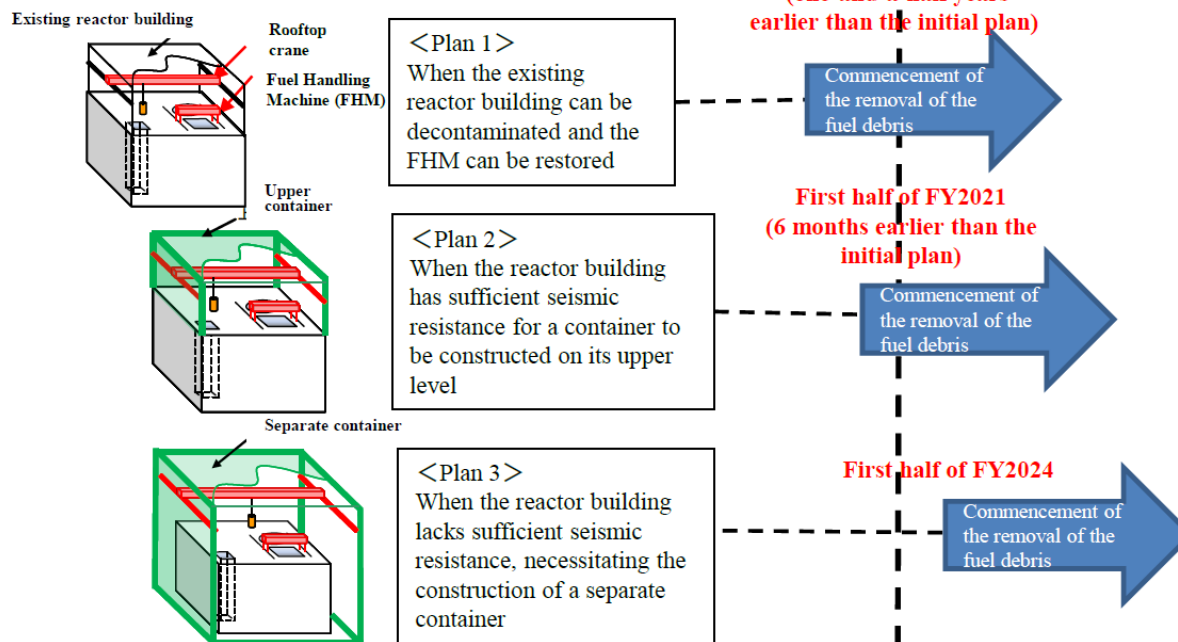
http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20130903_01a.pdf

Mid-Long Term Roadmap for Fukushima Dai-ichi

Targets under the Initial Roadmap



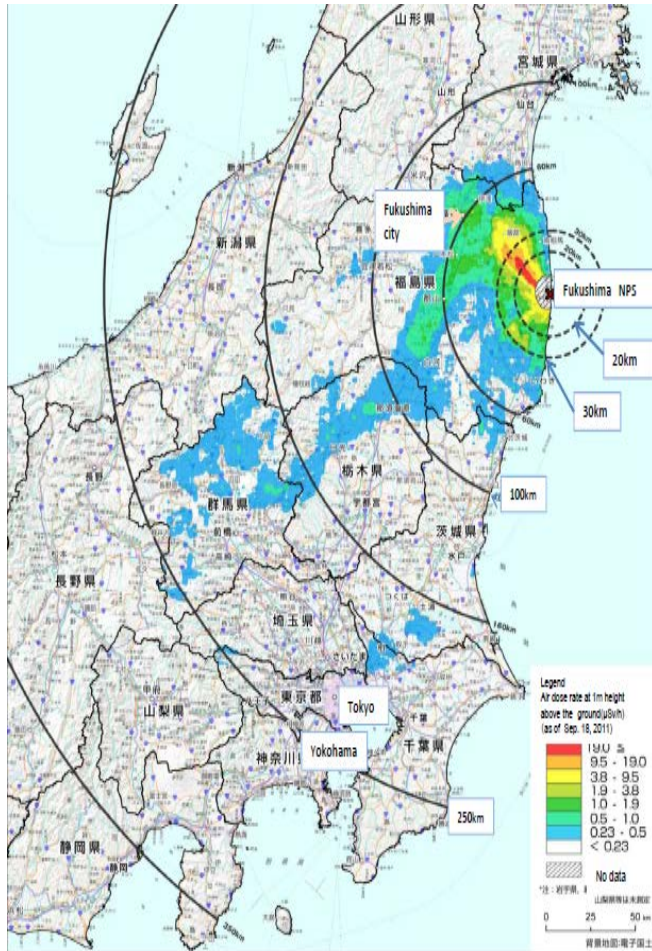
Plan under the Revised Roadmap (example: Unit 2)



Source: Agency for Natural Resources and Energy, Announcement of the Revised Version of the Mid-and-Long-Term Roadmap towards the Decommissioning of TEPCO's Fukushima Daiichi Nuclear Power Station Units 1-4, June 2013,
http://www.meti.go.jp/english/press/2013/0627_01.html

Evacuation Area

as of Sept. 18, 2011



As of the end of June, 2013

Ahead of the decontamination in the Special Decontamination Area, Decontamination Plans are to be elaborated taking into account the progress of rearrangement of the Restricted Areas and Deliberate Evacuation Area.

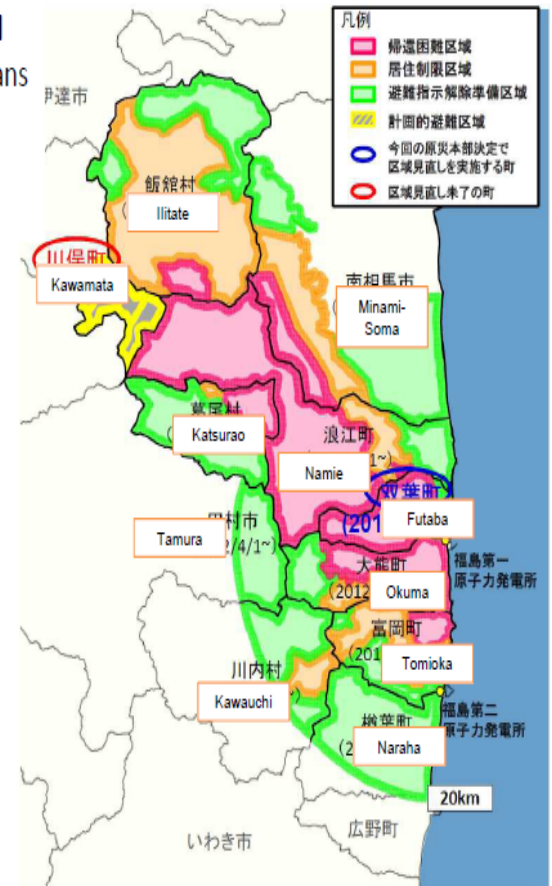
Area 1: <20mSv/yr
Evacuation orders are ready to be lifted:

Area 2: 20 – 50 mSv/yr
Areas in which residents are not permitted to live:

Area 3: >50 mSv/yr
Residents will face difficulties in returning for a long time:

Restricted Area:

Deliberate Evacuation Area:



Source: Ministry of the Environment, "Progress on Off-site Cleanup Efforts in Japan"

http://josen.env.go.jp/en/documents/pdf/workshop_july_17-18_2013_01.pdf



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



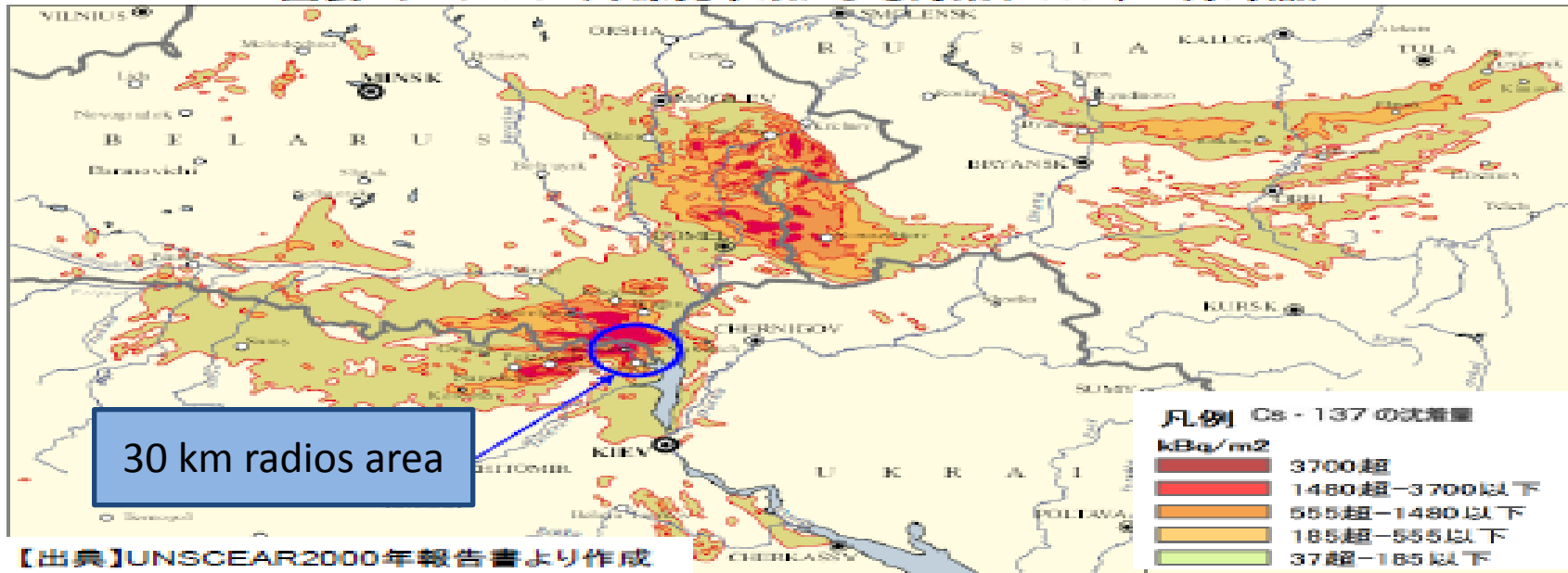
<http://www.asahi.com/special/10005/images/TKY201204190192.jpg>



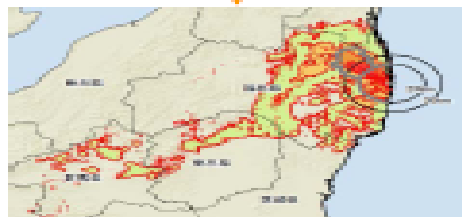
<http://img.47news.jp/PN/201204/PN2012041901001125.-.-.CI0003.jpg>

Compared with the Chernobyl accident

図表 チェルノブイリ原発事故による汚染(1989年12月時点)



両図を同縮尺
で記載



図表 東電福島第一
原発事故による汚染
(2011年11月時点)

【出典】文部科学省発表資料(2011年11月)より作成

図表 汚染地域の面積

汚染濃度 (kBq/m ²)	汚染地域の面積(km ²)		
	Chernobyl	Fukushima	F/C
> 1,480	3,100	200	6 %
555 - 1,480	7,200	400	6 %
185 - 555	18,900	1,400	7 %
37 - 185	116,900	6,900	6 %
合計面積	146,100	8,900	6 %

3



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 the emergency and for energy 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.

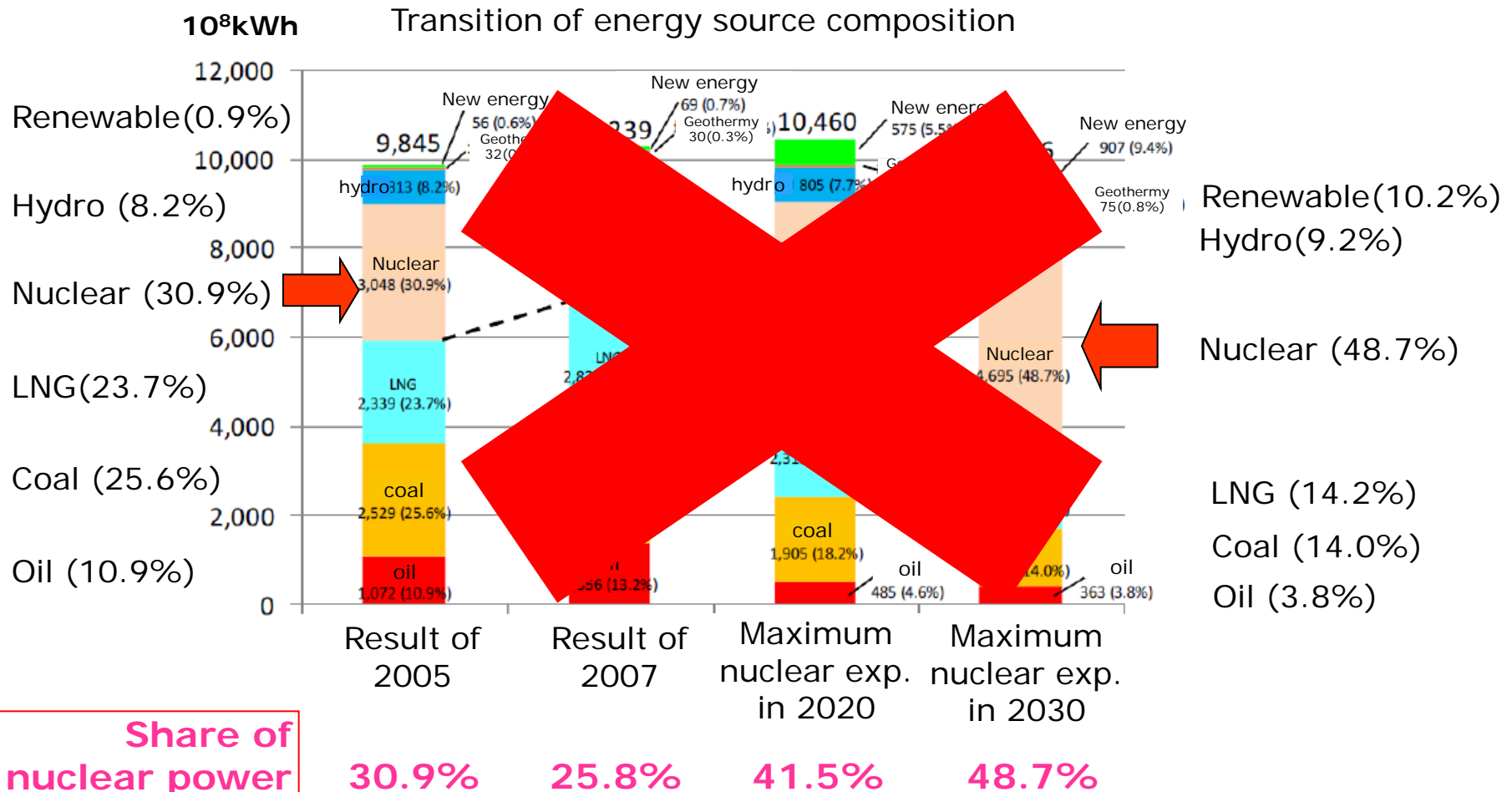


Restoring Public Trust in Nuclear Safety and Energy Policy



Goal of Power Production Mix in 2030

Before 2011/3/11



Source: Institute of Energy Economics, March 2010

~80-85%

原子力発電は直ちにやめるべき
Immediately shutdown

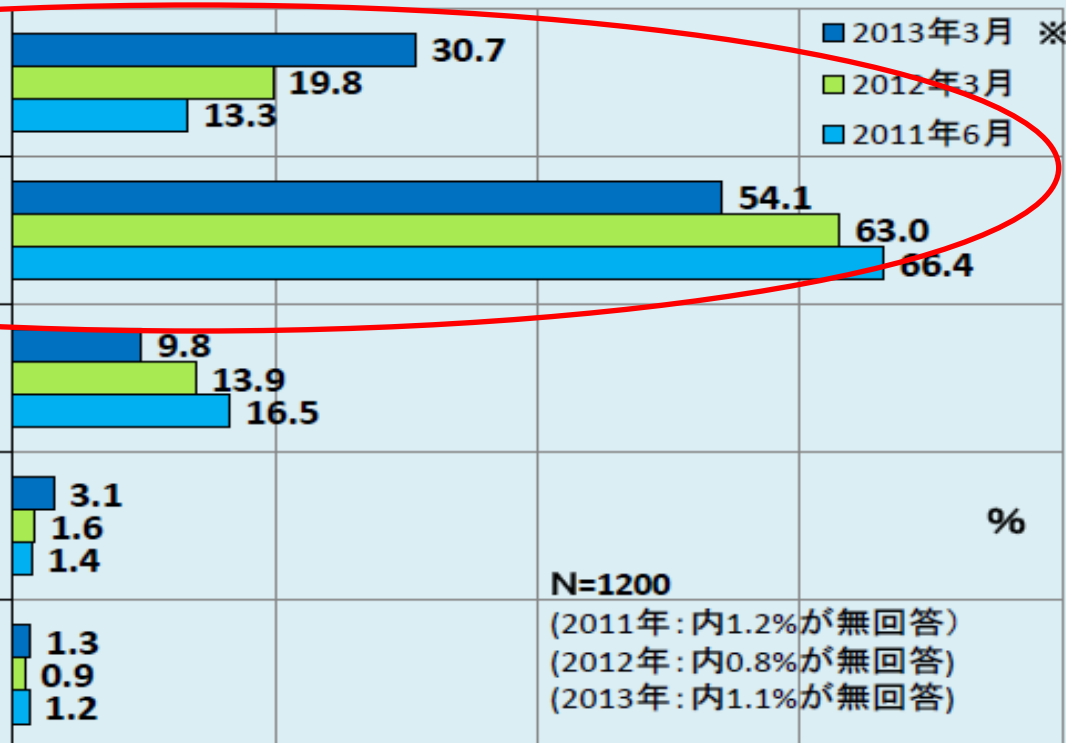
段階的に縮小すべき
Gradually phase-out

現状を維持すべき
Status quo

段階的に増やすべき
Gradually increase

全面的に原子力発電に依存すべき

Total Dependence on Nuclear Energy



What is your opinion about nuclear power in Japan? 日本の原子力発電はどうあるべきか

※2013年の調査では、回答項目は「再稼働を認めず、直ちにやめるべき」「再稼働を認めて段階的に縮小すべき」「再稼働を認めて現状を維持すべき」「再稼働を認めて段階的に増やすべき」であった。

Source: Prof. Hirotada Hirose, "Changes of Public Opinion about Nuclear Power,"
Presented at Japan Atomic Energy Commission, July 17, 2013

<http://www.aec.go.jp/jicst/NC/iinkai/teirei/siryo2013/siryo27/siryo2.pdf>



PM Abe's Statement at Diet on Energy Policy (2013/02/28)

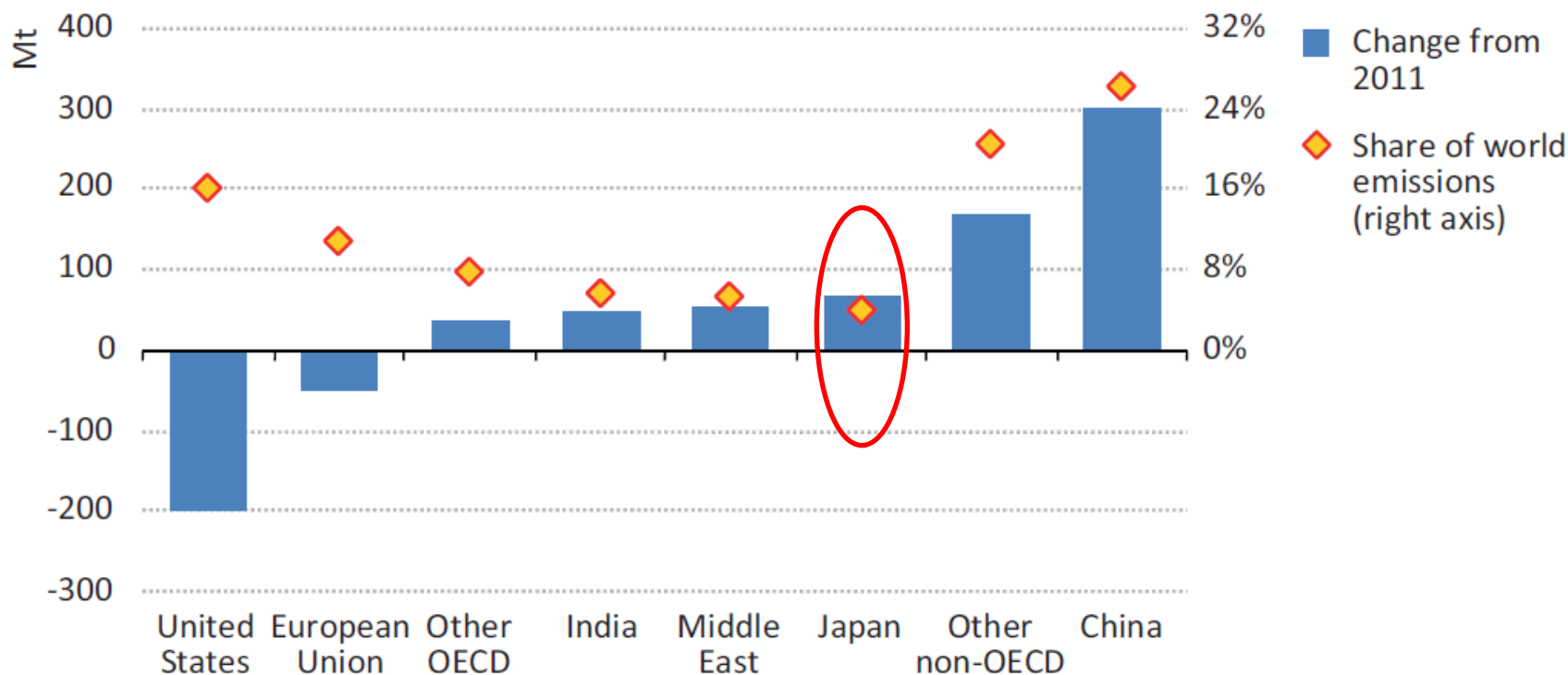
- Reflecting on the accident at Tokyo Electric Power Company's Fukushima Daiichi Nuclear Power Station, under the Nuclear Regulation Authority, **we will foster a new culture of safety that will uncompromisingly enhance the degree of safety.** After doing so **we will restart nuclear power plants where safety has been confirmed.**
- **We will promote the introduction of energy conservation and renewable energies to the greatest possible extent to reduce our degree of dependency on nuclear power as much as possible.** At the same time, we will begin **a fundamental reform of the electric system.**

http://www.kantei.go.jp/foreign/96_abe/statement/201302/28siseuhousin_e.html



Japan's CO₂ emission increased by 70 MT or 5.8% from 2011

Figure 1.8 ▷ CO₂ emissions trends in 2012



Source: International Energy Agency (IEA), "Redrawing Energy Climate Map," 10 June 2013,
<http://www.worldenergyoutlook.org/media/weowebiste/2013/energyclimatemap/RedrawingEnergyClimateMap.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

(As of September 2013, total of 17,335 tons are in storage)

At-reactor storage

Storage capacity: 20,640 tU/17 sites (as of Sept. 2013, 14,340tons ~70% 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 **2,945 tU** as of Sept. 2013)

Construction cost: ¥2.14Trillion

Commission date: not known



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 (postponed)

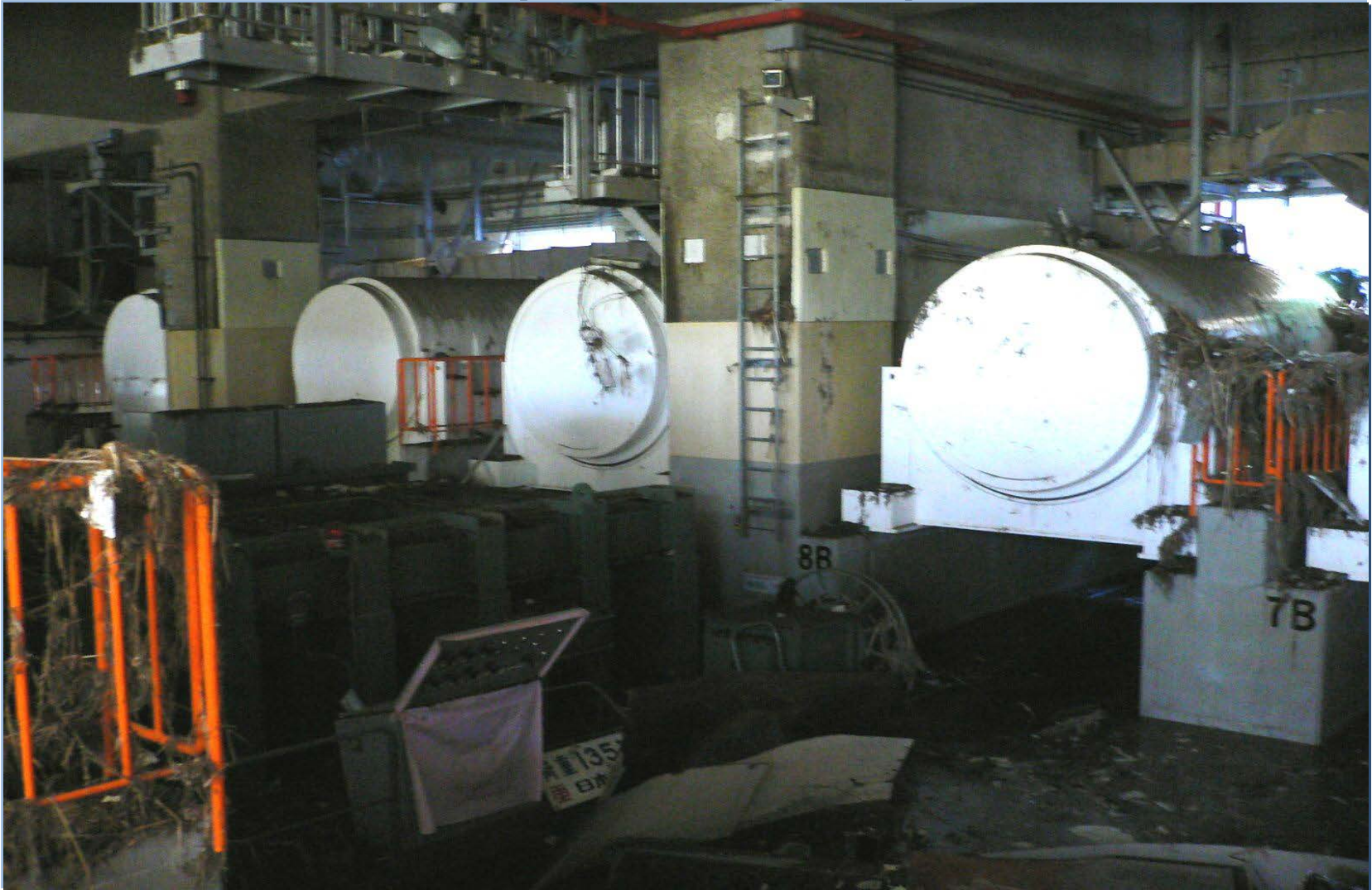
(Status : under construction)

Construction cost: ¥0.1Trillion

(including dry casks)



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



Plutonium Stockpile in Japan (as of the end of 2012)

	2012 (kg)	2011 (kg)
Stock in Japan (Pu total)		
Reprocessing Plants	4,363	4,364
MOX Fuel Plant	3,364	3,363
Stored at Reactors	1,568	1,568
Sub-total (Pu fissile)	9,295(6,315)	9,295 (6,316)
Stocks in Europe (Pu total)		
UK	17,052	17,028
France	17,895	17,931
Sub-total :Pu total(Pu fissile)	34,946 (23,277)	34,959(23,308)
Total (Pu fissile)	44,241(29,592)	44,254(29,624)

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.

