

***From Hiroshima to Fukushima:  
Evolution of Japan's nuclear policy***



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# Self-Introduction

- PhD in Law (2010: Diplomatic history)
- Diplomatic historian (2011-)
- Researcher at the governmental agency (2009-2010)
- Consultant for nuclear industry and power company (2002-2008)

# Prologue

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Sadako Sasaki  
Statue in Seattle

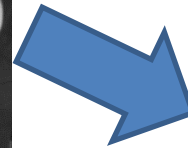


Participants  
will light  
and float lanterns  
on the Green  
Lake for pray

Hanford Site, **WA**  
H-Reactor for  
producing  
Plutonium for A-  
Bomb



# Hanford Plutonium Production Reactor



Queen at the opening ceremony of the Calder Hall NPP

Tokai No.1 Nuclear Power Plant from the U.K.(Same type Reactor)

# Themes of this presentation **1**

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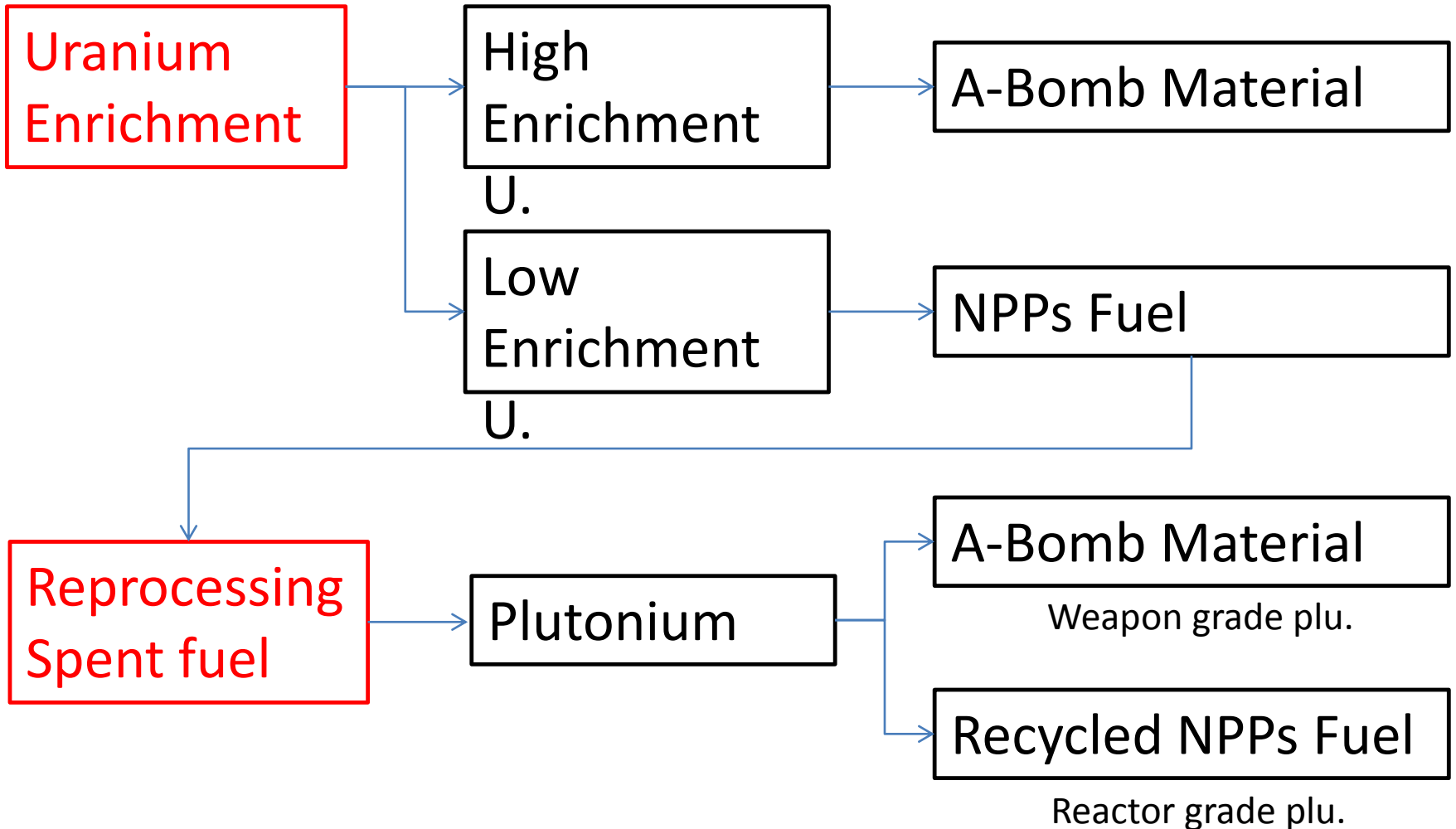
Evolution of Japan's policy about nuclear **weapons** and nuclear **power plants**, whose technologies are **overlapping**

## Background Information

- Despite harrowing experiences in Hiroshima + Nagasaki, Japan has deployed 48 operational reactors
- 2 reactors under construction
- More than 10% of all installed nuclear capacity in the world
- Hold sensitive technologies

# Sensitive technologies: Why they are sensitive

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# Themes of this presentation **2**

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**How has Japan taken advantage of the “dual use” aspects of nuclear power?**



# Historical Background



# Japanese nuclear technologies and Japan-US relations

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**Historically,** Japanese development of advanced nuclear was attributed mainly to the Post WWII American assistance.

## 1950s

- Japanese interest in Atoms for Peace
- US nuclear aid as a countermeasure to Soviet propaganda

# People Republic of China's first nuke test motivated the US to help Japan

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## 1964 Chinese nuclear Test:

# 1960s

- Japanese fear↑
- Japanese interest in nuclear armament↑

## Johnson Administration was determined to provide Japan with:

- Nuclear umbrella to alleviate Japanese fear
- Assistance in the field of space exploration and civilian nuclear power

# The government of Japan's “Four-Pillars of Nuclear Policy” in 1968

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- To entertain the Non-Nuclear Principle (for the military use )
- To promote the peaceful use of nuclear power (and a variety of its technologies...)
- To work toward global nuclear disarmament,
- To rely on the extended U.S. nuclear deterrent

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**In return of giving up developing its own A-Bomb, Japan could gain privileged access to sensitive technologies in the civilian field.**

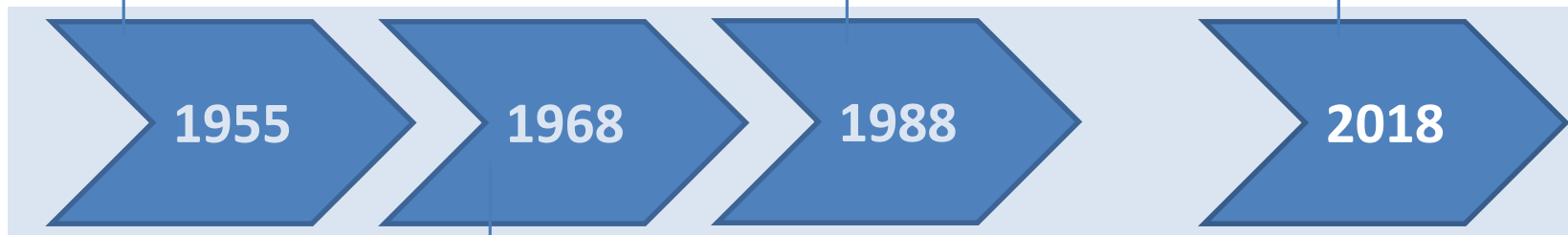
# The evolution of US-Japan Nuclear Relationship

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US-Japan  
Research Agreement

**Milestone** US-Japan  
Revised Agreement

New US-Japan  
Agreement ?



- Agreement b/w US-Japan  
On Civil uses of Nuke.
- Japan's Four-Pillars of Nuke.  
Policy

**Japan is now the only Non-Nuclear country being allowed to carry out sensitive technological works. esp. reprocessing**

# Japanese nuclear policy as an intersection between the US and Japan's intentions

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- The US successfully dissuaded the government of Japan nuclear armament, while Japan gained sensitive technology
- With sensitive technologies Japan could display to Communist China its latent capability to develop nuclear weapons

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**Political message**, “China, don’t take an aggressive posture toward Japan, otherwise Tokyo will reconsider its non-nuclear choice”

# Side-Effect

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- The Japanese possession of nuclear sensitive technologies even in the civilian field could add side-effect
- In hindsight, **this might have persuaded Japanese nationalist not to persist in seeking the possibility of nuclear armament.**

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One key policymaker, who participated in the confidential study of the Japanese nuclear armament in 1968 and 70, recognized this side effect. His name was **Ryukichi Imai.**



# Suggestion Ryukichi Imai made in 1972

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- *“The **potential capability** for nuclear weapon is (now )all too apparent...(in Japan) “*
- *We need to **intentionally** maintain the approximately 2 year gap between the nuclear weaponization and industrial capability ... in order to prevent the transient power from conceiving an imprudent idea of having a nuclear weapon”*

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**This means...**



# Implication of the sensitive technology of just a couple of years' behind the nuclear armament

- **long enough** for the US to be able to acquiesce to Japanese nuclear policy
- **sensitive enough** for the potential enemies to refrain from taking aggressive attitudes toward Japan
- **advanced enough** for the Japanese nationalist to stay quiet, not loudly claiming nuclear armament

# After

# Fukushima



# Japanese nuclear development is at crossroads for the three reasons (1)

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## Difficulty to justify having sensitive technologies esp. reprocessing spent fuel to get plutonium for recycle

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- Japan officially has a policy to not save up plutonium that does not have a specific end-use
- Plutonium from the spent nuclear fuel no longer has place to go; Japan's existing stockpiles of separated plutonium are "far exceeding the potential and current peaceful use"
- The distance between nuclear weaponization and industrial capability could be too near

# The implication of the current U.S.-Japan-China relations

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- Still, in the age of a rising China, the U.S. could also make use of Japanese nuclear potential to persuade China to take a milder policy stance in East Asia, by telling them that Beijing bellicose attitude could topple the first domino of nuclear armament race in this region which could be detrimental to China as well.
- So as far as the U.S. is concerned, it can place Beijing in its debt if Washington only “recalled” the surplus separated plutonium from Japan( actually we already did on the most sensitive part! ), but without altering the Japanese privilege to hold sensitive technologies given that is still an important ally.
- This policy course require caution to maintain the subtle balances. How the U.S. government and congress handle the complex, simultaneous analysis equations could affect the development of Japanese nuclear policy.

# Japanese nuclear development is at crossroads for the three reasons (2)

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## Japan could undermine the efforts of nuclear nonproliferation

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- While no nuclear power plant is in operation, only Japan still enjoys a privilege of using sensitive technologies.
- It could be considered unfair by all other nations which want to get the same rights, e.g. South Korea
- The Japanese privilege can be justified only when its large scale of the civilian nuclear program is operating normally.

# Japanese nuclear development is at crossroads for the three reasons (3)

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**Fukushima crisis showed us how nuclear meltdown could destroy our society, causing serious social unrest.**

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- Demonstrated the vulnerability of our nuclear facilities and materials are to terrorist attack as well

# Conclusion 1

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**Japan has historically taken advantage of the technological nexus between military-civilian uses in the nuclear field**

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- This is a consequence of the evolution of the US-Japan relationship.
- The existence of sensitive technologies has given a plausibility, or “reality,” to the potential threats.
- Sensitive technology can be a “bottle-cap” as well in terms of dissuading nationalists from taking a more aggressive stance. We might need to keep this “appeasement” effect in mind.

# Conclusion 2

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**Its privilege does not sound correct now though, unless Japan restarts a large scale of nuclear program**

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- If too much plutonium is accumulated, the probability of Japan's nuclear armament looks too "real".
- That is why Prime Minister Abe is now trying to hurriedly restart the operation of nuclear power plants.
- Resuming nuclear power plants will supply a reasonable reason for Japan to maintain sensitive technologies.



# Conclusion 3

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## Difficult problems remain

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- The Japanese public opinion shifted to anti-NPPs
- There is growing risk and vulnerability of nuclear facilities exposed to terrorist threats
- While the South Korea government keeps demanding its right to reprocess the nuclear spent fuel to utilize plutonium, the US and Japan nuclear agreement will expire in 2018.

# Closing Remark...

Japanese nuclear development is a political and historical outcome of the evolution of the US-Japan relationship.

But we have to have in mind it couldn't have been done without the mutual confidence between Japan and the United States. Optimization of risk and benefits is necessary in reshaping the Japanese nuclear policy.

It would be useful for policy circles in both states to maintain close tie with one another.

***Additional and/or backup  
Information***

Thank you very much!

# Plutonium And HEU

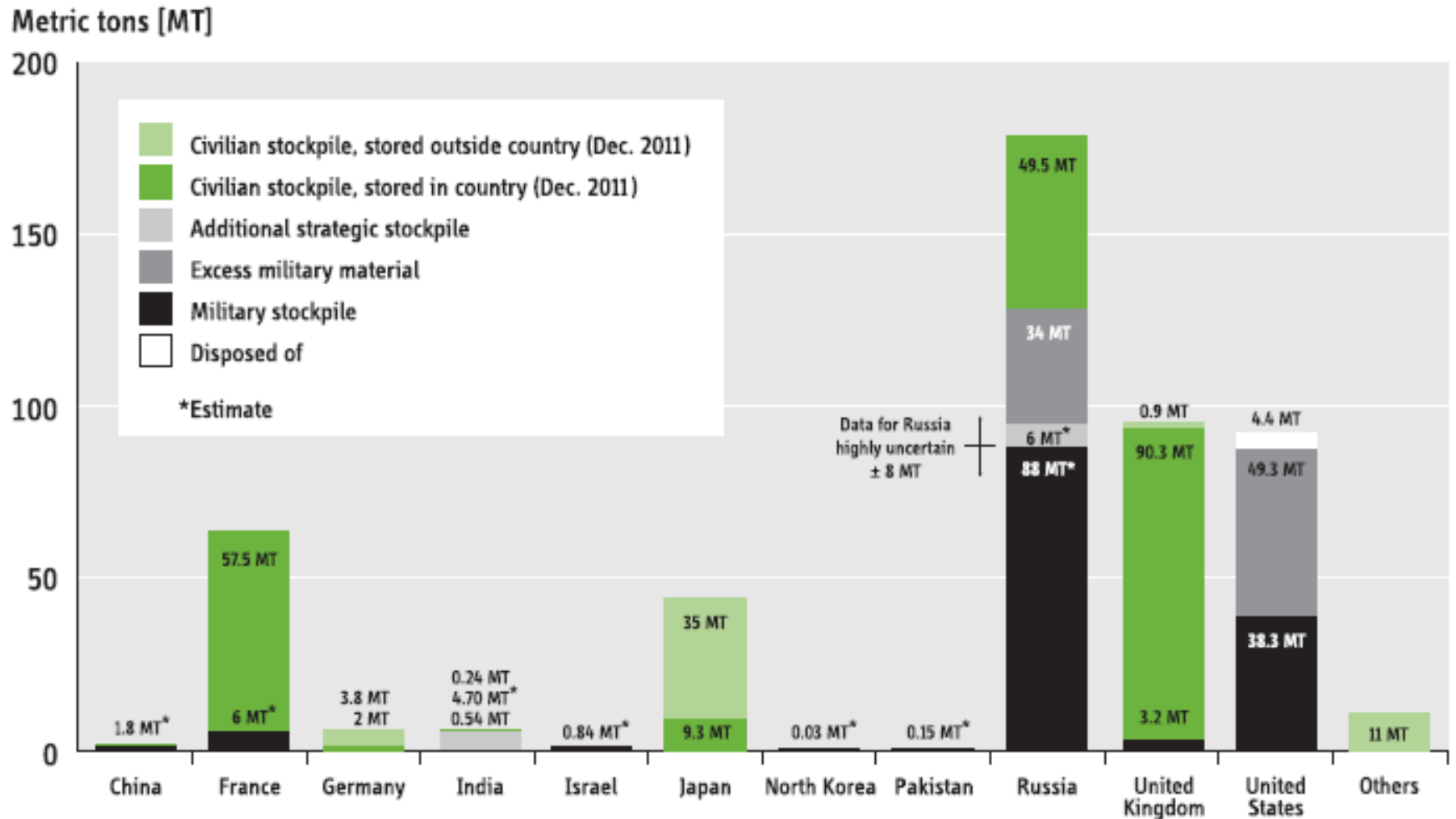
# Conceivable paths for the Japanese Government to maintain legitimacy in holding sensitive technologies

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- Resume more NPPs, which meet the new safety requirements, to the extent that it does not contradict the policy of reducing dependency on nuclear energy, though its political cost increased
- Shrink the scale of operation of the reprocessing plant
- Consider the internationalization option of the reprocessing plant (\*Ford Administration once requested Japan to internationalize the Tokai Reprocessing plant, \*according to Shin Tomotsugu's Study)
- Consider the new option of fabricating fuel by using the separated plutonium for the new concept “Integral Fast Reactor” in the long term ( e.g. former IEA director Tanaka Nobuo argued)

**Combination**

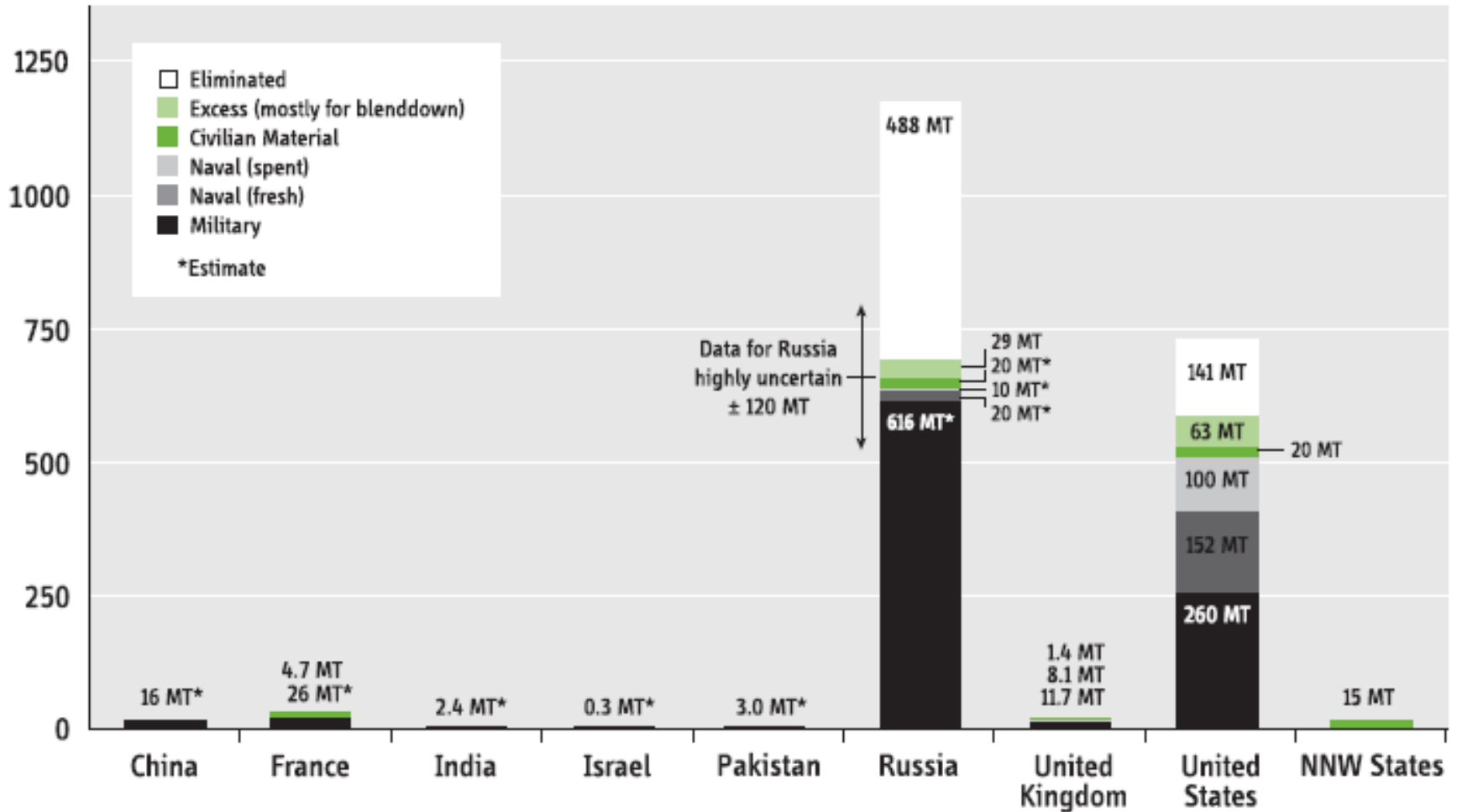
# Separated Plutonium Stocks



Source: International Panel on Fissile Material, *Global Fissile Material Report 2013*

# HEU Stocks

Metric tons [MT]

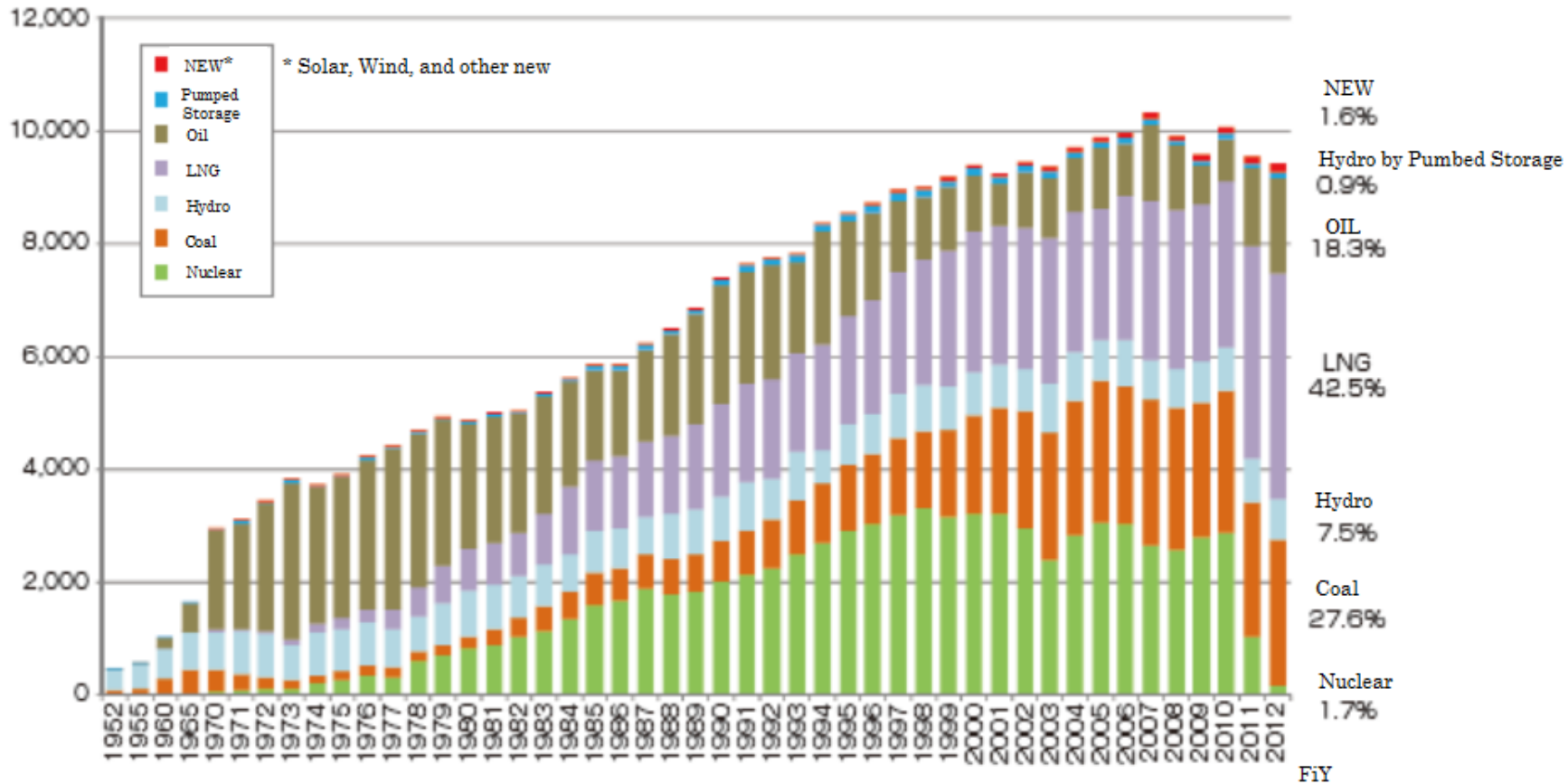


Source: International Panel on Fissile Material, *Global Fissile Material Report 2013*



# Changes in the composition of electrical source

Unit One hundred million kWh



# Public Opinion

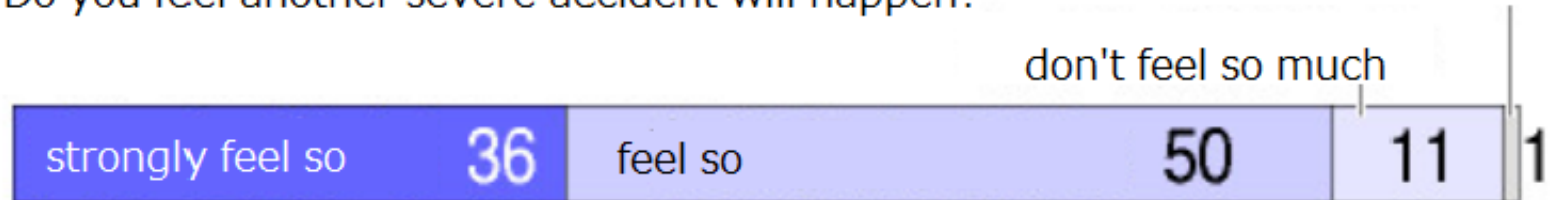
# Resumption of the NPPs' operation

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Do you agree with the resumption of NPPs? < Other answers omitted >

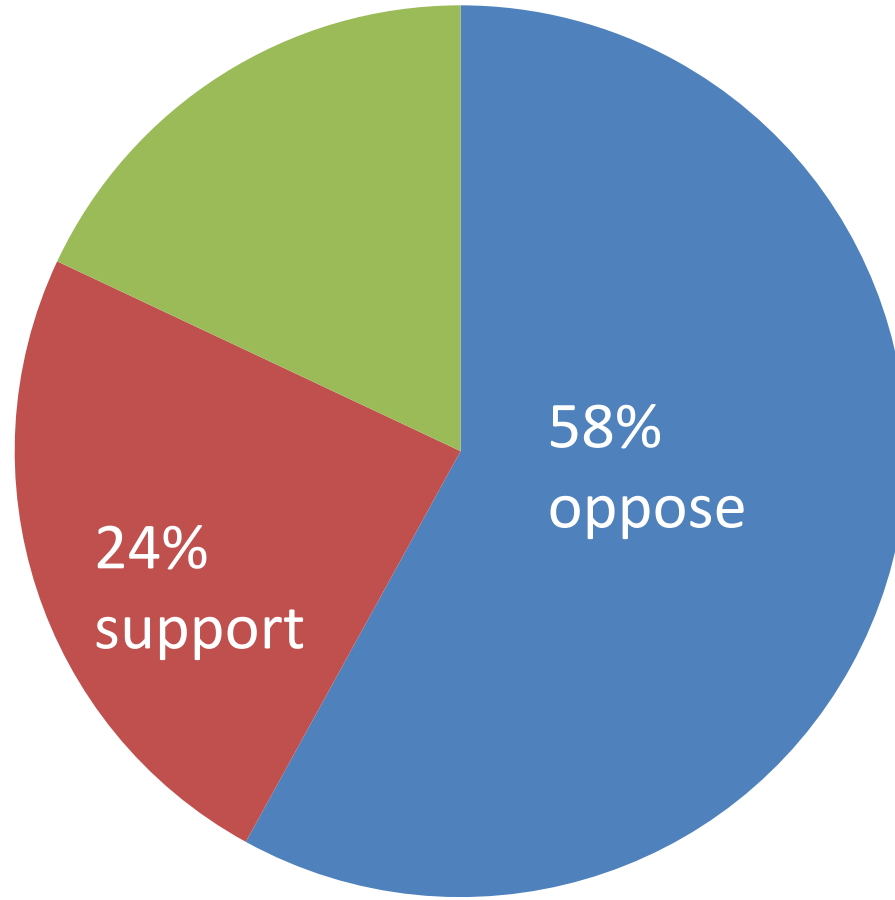


Do you feel another severe accident will happen? don't feel that way at all



# The export of NPPs promoted by the Abe Cabinet

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Poll conducted between 2013 June 7-10

Source: Jiji

# Framework for Nuclear Energy Policy

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*“For the reprocessing spent fuel from LWRs, Japan developed a proliferation-resistant technology of “co-conversion” which removes the processes of handling plutonium oxide powder at the occasion of the US-Japan joint determination coinciding with the start of the Tokai reprocessing plant. “*

*“This technology has also been used in the Rokkasho reprocessing plant.”*

# Framework for Nuclear Energy Policy

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*“In view of the start of the use of plutonium in the form of MOX fuel utilization in LWRs and full operation of the Rokkasho Reprocessing plant, **the Government and the operating entities are required not only to re-acknowledge the importance of maintaining the principle of limit-to-peaceful use** and observing international norms and treaties, but also to present the public and international community a clear picture of carrying out these commitments.”*

(Atomic Energy Society of Japan,  
[http://www.aesj.or.jp/en/about\\_us/ps/AESJ-PS005e.pdf](http://www.aesj.or.jp/en/about_us/ps/AESJ-PS005e.pdf))

# **International Agreements And Trade Issue**

# Convention on Supplementary Compensation for Nuclear Damage (CSC)

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- **Entry into force on April 15, 2015**
- The use of international funds for nuclear accident damage compensation above a fixed amount
- There is a criticism for the exemption of nuclear power technology vendors from liability/responsibility for reparations
- The operator shall not be liable for nuclear damage caused by a nuclear incident caused directly due to a grave natural disaster .



# NSG waiver in 2008 and India

**The NSG waiver lifts an over three-decade, US-led world embargo on civilian nuclear trade with India.**

- NSG is the “gentlemen’s agreement”.
- 46 member states voluntarily agreed to coordinate their export controls governing transfers of civilian nuclear material and equipment and technology to non-nuclear-weapon states to prevent further proliferation.
- NSG agreed to grant India a unique “waiver” exempting them from the NSG’s rules governing civilian nuclear trade in September 2008, though India doesn’t meet the criteria.

# Disaster Management

# Enforcement of the New Regulatory Requirements

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**The new regulatory requirements, in 2013, were developed taking into consideration the lessons-learnt from the accident at Fukushima NPPs identified by the Diet's and governmental investigations**

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- Design-Basis Safety Standards re-established
- Safety measures against natural disaster and external , man-made hazards strengthened
- Back-Fit Concept adopted
- Based on a concept of “Defense-in-Depth”, essential importance placed on the third and fourth layers of defense and the prevention of simultaneous loss of all safety functions due to common causes

# The International Physical Protection Advisory Service (IPPAS)

Recognizing the valuable to strengthen nuclear security, Japan, in January 2014, officially requested the IAEA to dispatch a IPASS mission for the first time; The team is dispatched by Spring 2015.

- **At the request of a Member State of IAEA, IPPAS assembles a team of international experts to assess the State's system of physical protection. IPPAS teams will:**
  - compare it with international best practices
  - provide peer advice on implementing international instruments, and IAEA guidance on the protection of nuclear material and associated facilities
- **Since the creation in 1996, IPPAS dispatched 61 missions to 39 states for peer review team.**