# Challenges and Importance of Discussing Peaceful Use of Nuclear Energy

"Importance of Dialogue in Ares of Nuclear Risk"
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# Lessons and Impact of Fukushima

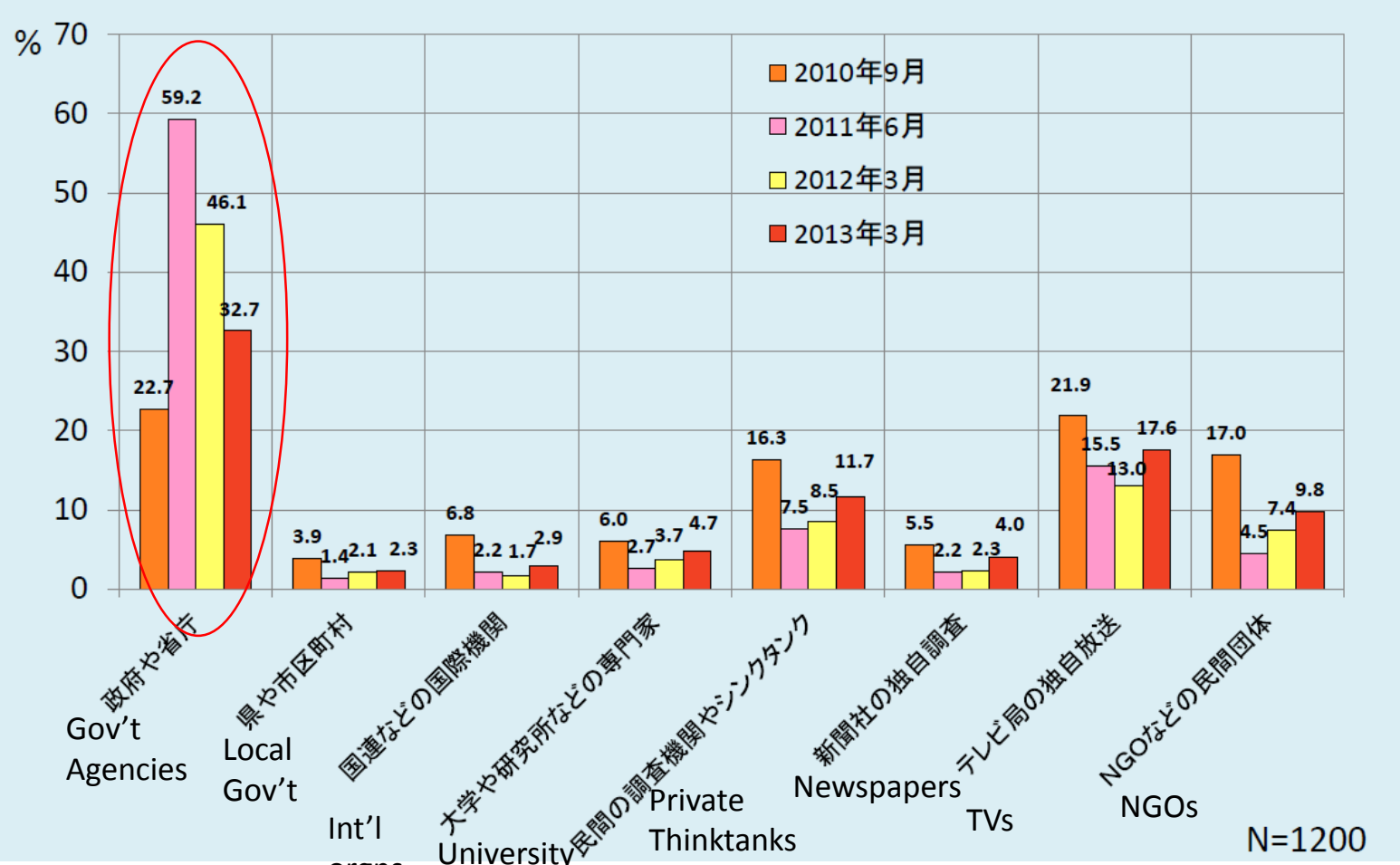
# *Statement by the Japan Atomic Energy Commission after the Fukushima accident*

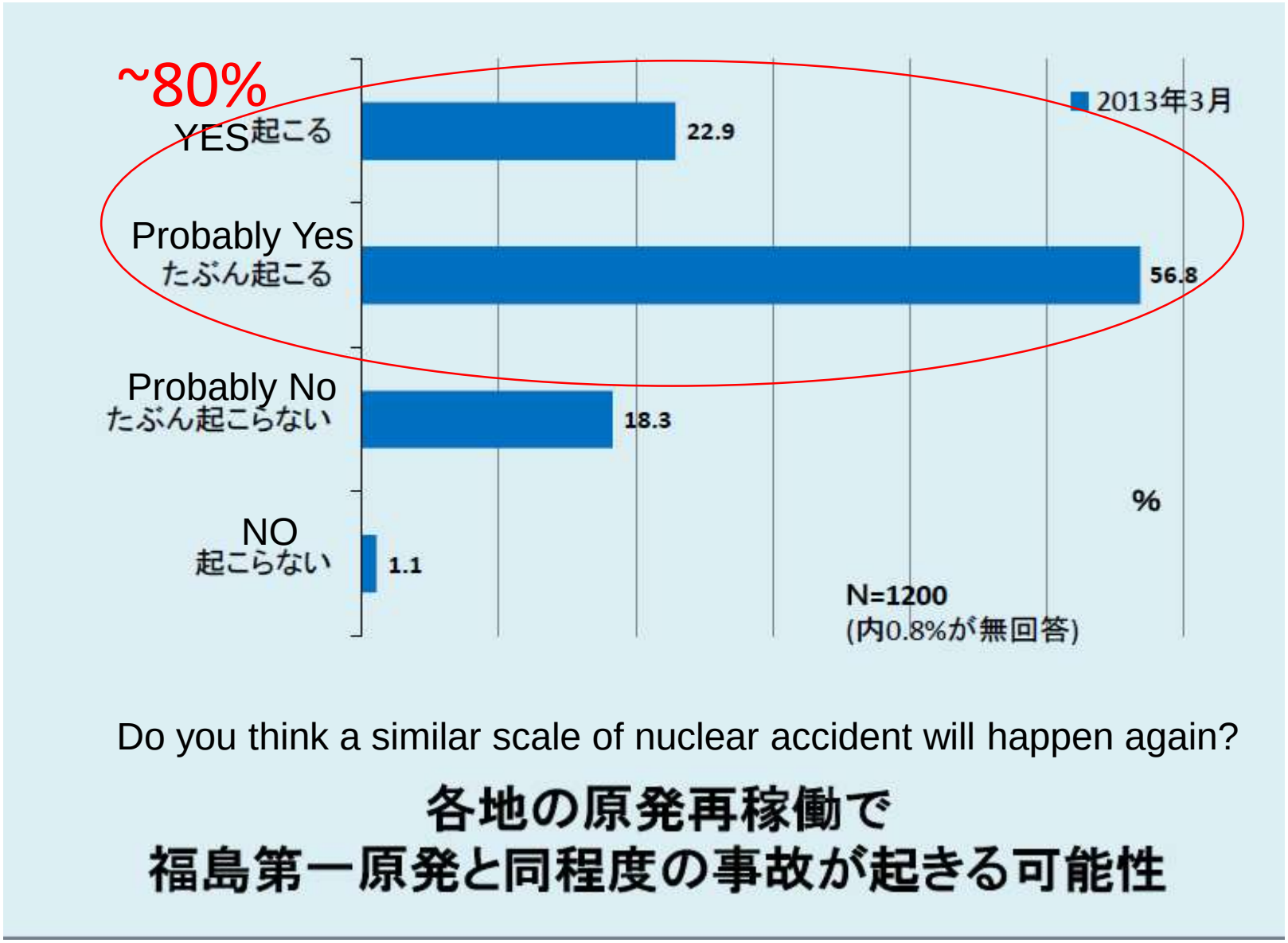
***"We are gravely concerned about this accident which can fundamentally undermine public trust in safety measures, not only in Japan but also in other countries"***

***- Japan Atomic Energy Commission, "Statement on Measures Responding to The Tokyo Electric Power Fukushima Daiichi and***

***Daini Nuclear Accident Caused by the Great East Japan Earthquake", April 5, 2011.***
***http://www.aec.go.jp/jicst/NC/about/kettei/seimei/110405_e.pdf***

# Gov’ts are most untrustworthy
## - Which institutions are most untrustworthy?

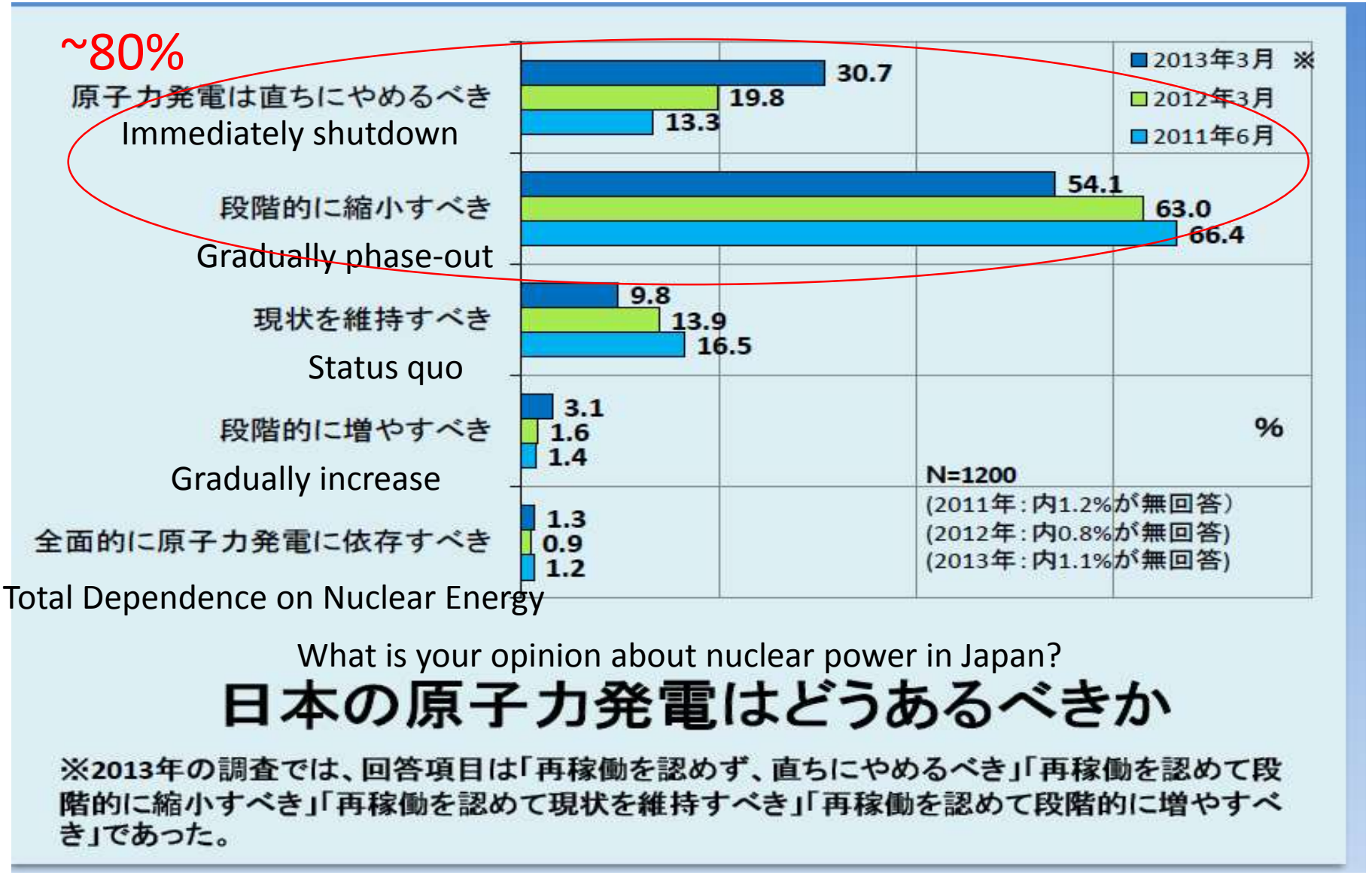





Do you think a similar scale of nuclear accident will happen again?

**各地の原発再稼働で**
**福島第一原発と同程度の事故が起きる可能性**

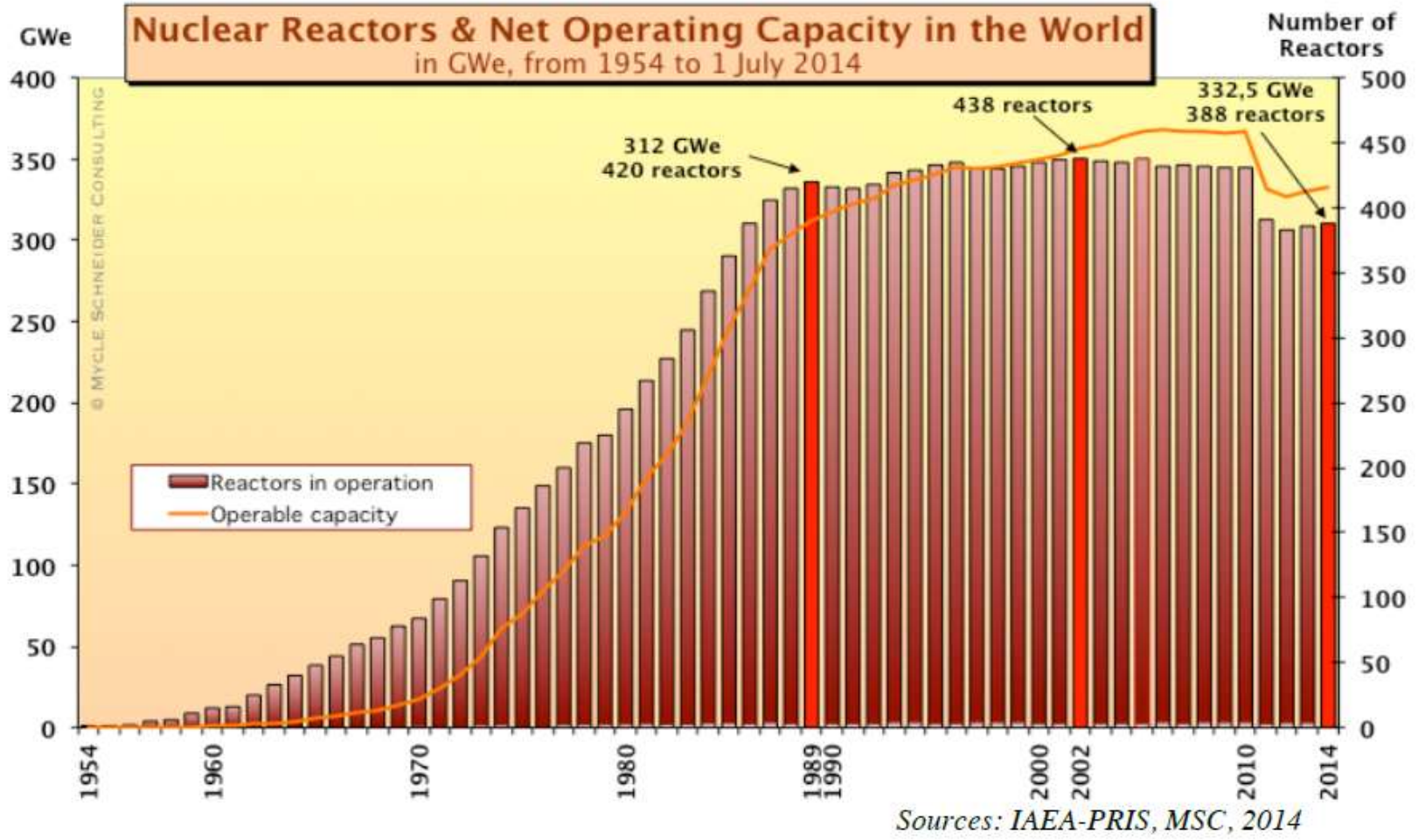
Source: Prof. Hirotada Hirose, "Changes of Public Opinion about Nuclear Power," Presented at Japan Atomic Energy Commission, July 17, 2013
http://www.aec.go.jp/jicst/NC/iinkai/teirei/siryo2013/siryo27/siryo2.pdf




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

# Nuclear power development trends (1954-2014)

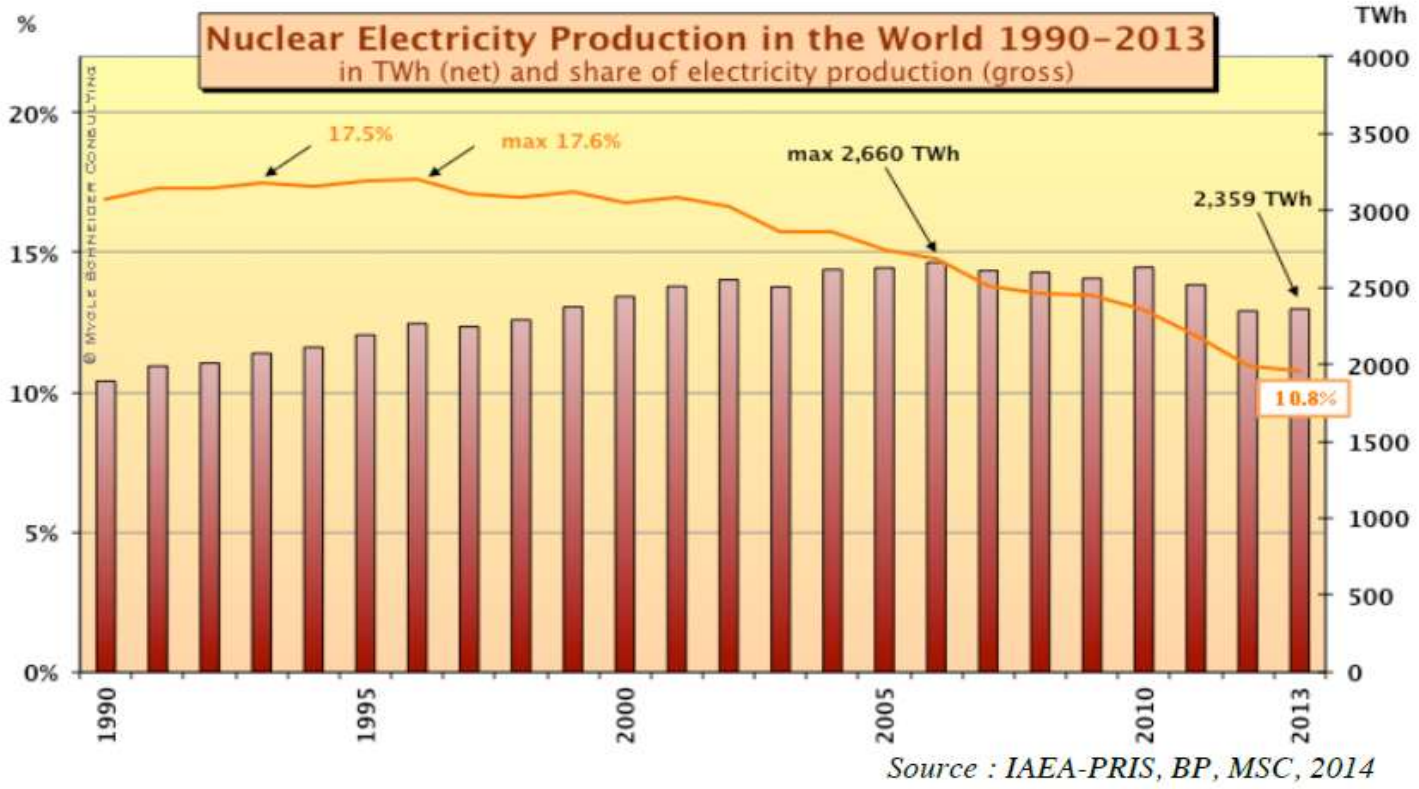
**Figure 5. World Nuclear Reactor Fleet, 1954–2014**




http://www.worldnuclearreport.org/

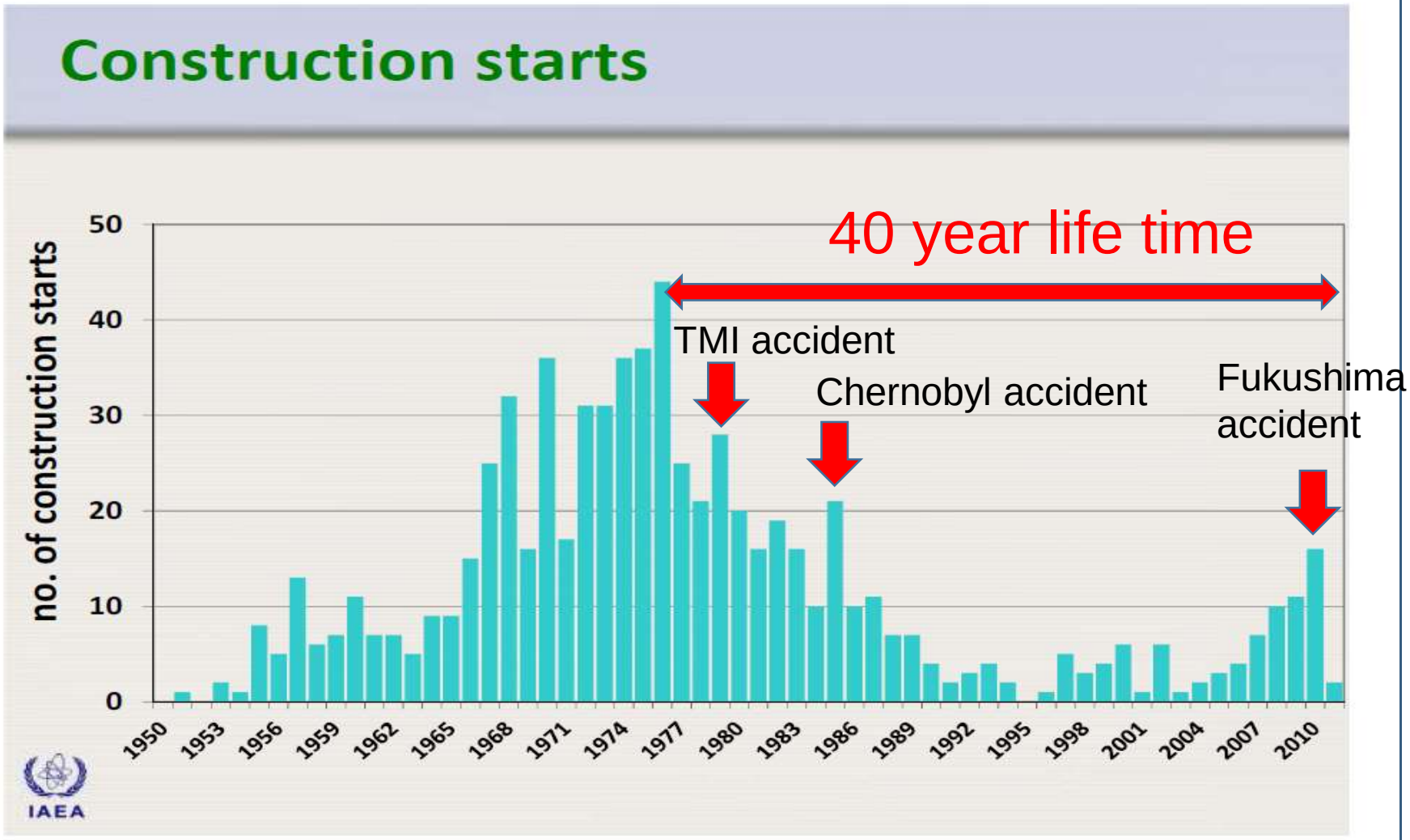
# Global nuclear power production and its share are in decline

**Figure 1: Nuclear Electricity Generation in the World**




http://www.worldnuclearreport.org/

# Global Nuclear Power Plant Construction (IAEA)
# : Replacement of old reactors are coming….




Source: H-HolgerRogner, Head, Planning & Economic Studies Section (PESS)Department of Nuclear Energy, International Atomic Energy Agency, "Energy, Electricity and Nuclear Power Estimates for the Period up to 2030," November 2011.

# Estimates of Nuclear Electrical Generating Capacity : Comparison of estimates in 2013 and 2011

| | Actual in 2011 | Estimates for 2030 Estimated in 2011 | Estimates for 2030 Estimated in 2013 | Estimates for 2050 Estimated in 2011 | Estimates for 2050 Estimated in 2013 |
|---|---|---|---|---|---|
| **World Total** | | | | | |
| Nucl. Capacity (GWe) | | | -13% | | -21% |
| Low Estimate | 368.8 | 501 | 435 | 560 | 440 |
| High Estimate | | 746 | 722 | 1228 | 1113 |
| | | | -3% | | -9% |
| Share (%) | | | | | |
| Low Estimate | 7.1 | 5.2 | 4.5 | 2.7 | 2.2 |
| High Estimate | | 6.2 | 6.2 | 6.0 | 5.6 |
| **Far East** | | | | | |
| Nucl. Capacity (GWe) | | | -18% | | -14% |
| Low Estimate | 79.8 | 180 | 147 | 220 | 189 |
| High Estimate | | 255 | 268 | 450 | 412 |
| | | | +5% | | -8% |
| Share (%) | | | | | |
| Low Estimate | 5.0 | 6.4 | 5.3 | 4.2 | 3.7 |
| High Estimate | | 7.5 | 8.1 | 8.6 | 8.0 |

Source: International Atomic Energy Agency, "Energy, Electricity and Nuclear Power Estimates for the Period up to 2050,"
2011 Edition http://www-pub.iaea.org/MTCD/Publications/PDF/RDS1_31.pdf
2013 Edition http://www-pub.iaea.org/MTCD/publications/PDF/RDS-1-33_web.pdf

# Major Issues remain unresolved

- Competitiveness of nuclear power under liberalized market
- Compensation Scheme for nuclear power accident
- Nuclear waste management (final disposal of High Level Waste)
- Radiological risks and public communication, public participation in decision making process
- R&D and human resource development

# Proliferation Risks of Civilian Nuclear Energy

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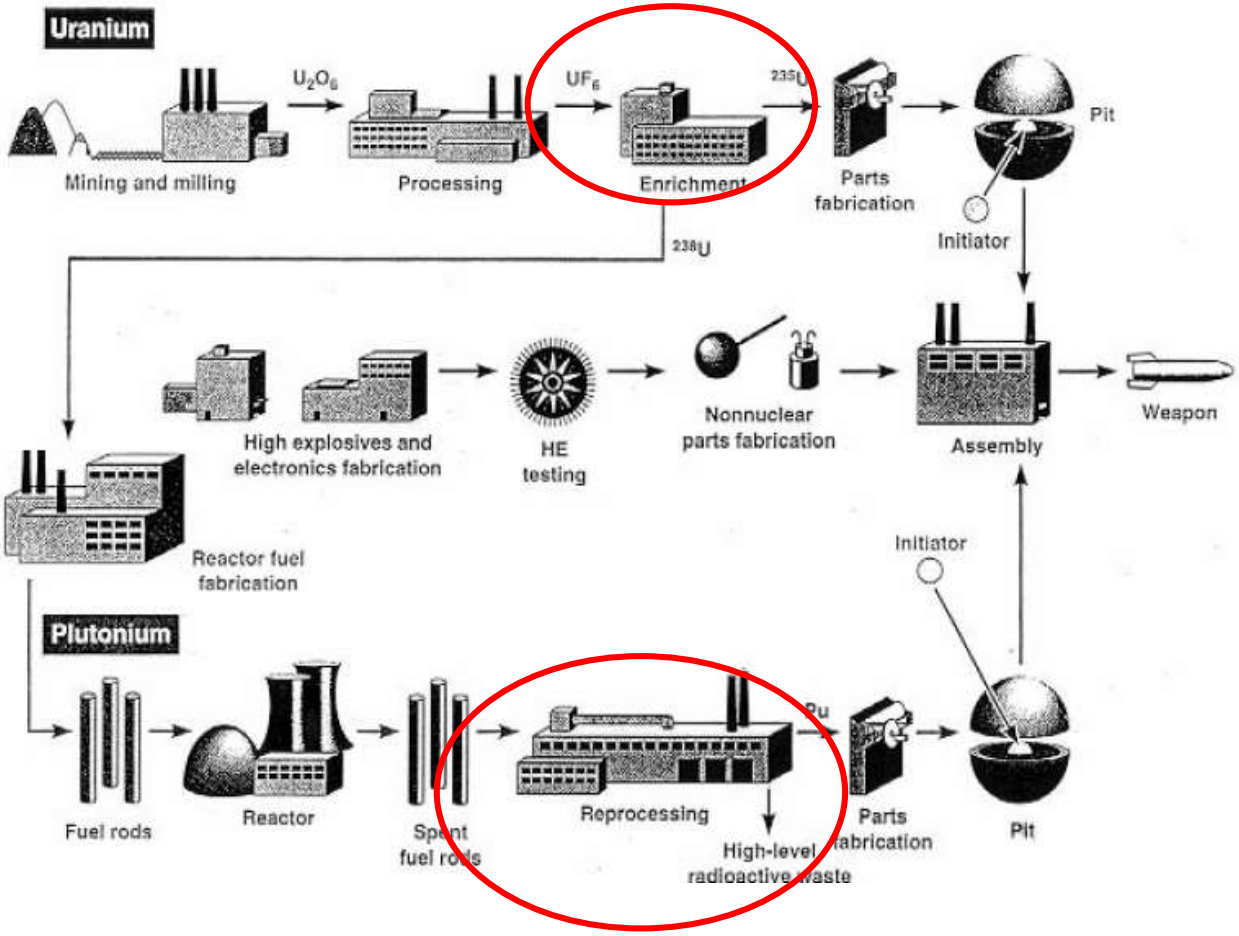
# Technological Path to Nuclear Weapon




Source: IAEA, 2006

# A small enrichment plant can produce HEU in a short period

| Feed | Time | Product | Depleted Tails |
|---|---|---|---|
| 150 metric tons natural uranium | 1 year | 20,000 kg LEU (4%) | 0.2% U-235 |
| 150 metric tons natural uranium | 1 year | 654 kg HEU (93%) (26 bombs) | 0.31% |
| 150 metric tons natural uranium | 40 days | 100 kg HEU (93%) (4 bombs) | 0.65% |
| 20,000 kg 4% LEU | 8 days | 100 kg HEU (93%) (4 bombs) | 3.55% |

A small enrichment plant (which can supply about 1-year demand of LEU for 1 GWe nuclear power plant (130 ton SWU/y) can produce HEU as above in a very short period of time.

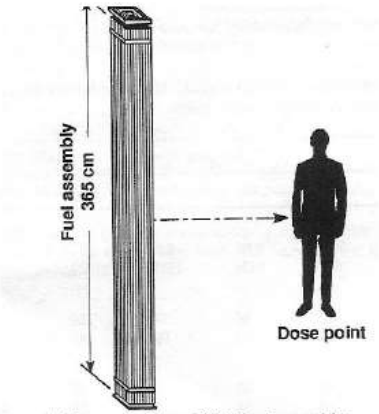
Source: International Panel on Fissile Material (IPFM),"Global Fissile Material Report 2006", http://www.fissilematerials.org/ipfm/site_down/ipfmreport06.pdf

# Risk of Separated Pu vs Spent Fuel

**Separated plutonium**

2.5 kg Pu in light-weight container.
Can be processed in a glove box.
Four cans enough for Nagasaki bomb.

**Spent fuel assembly**
(1000 pounds and 12 feet long)



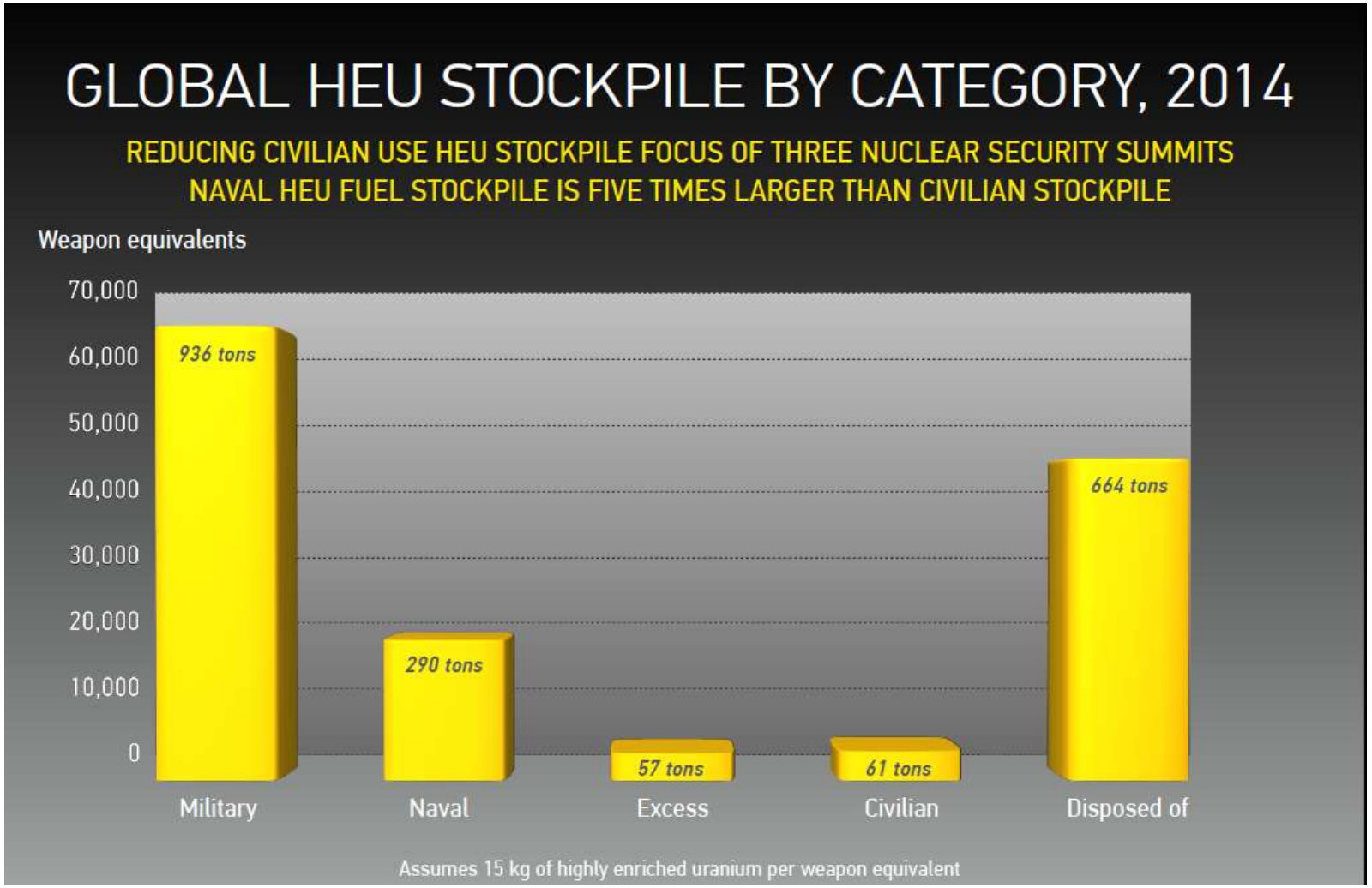

igure 1. Dose rate from a PWR fuel assembly.

5 kg Pu. Lethal gamma dose in 20 minutes 50 years after discharge. Requires 20-ton container to transport & remote handling behind thick walls to recover.



Source: Frank von Hippel, “Management of Spent Fuel in the US: Illogic of Reprocessing,” Presentation at Carnegie Endowment for International Peace Non-proliferation Conference, June 2007.


Source; Zia Mian, Alex Glazer, "Global Fissile Material Report 2015: Nuclear Weapon and Fissile Material Production," presented at NPT ReviewConference, May 8, 2015. http://fissilematerials.org/library/ipfm15.pdf

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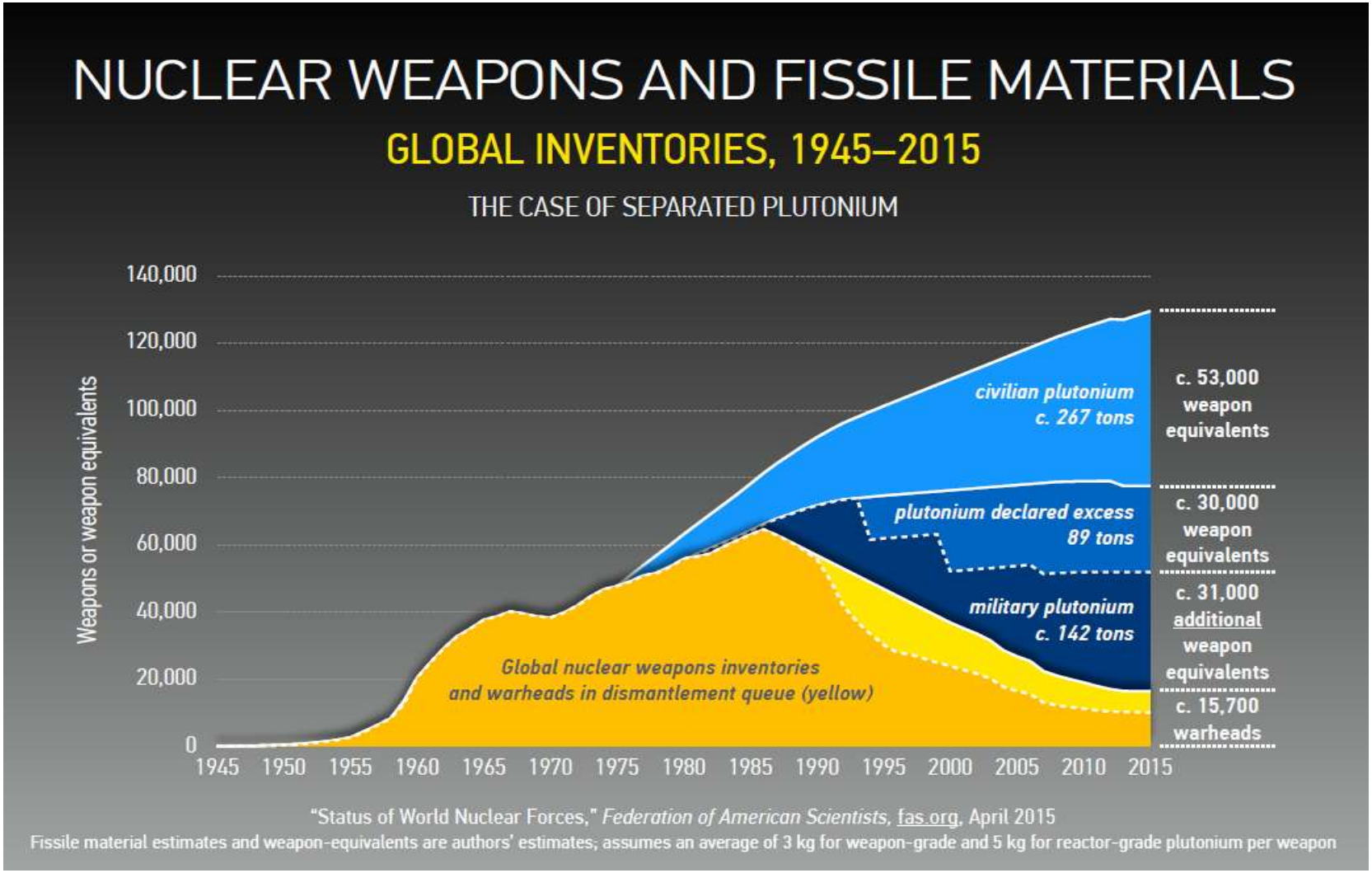


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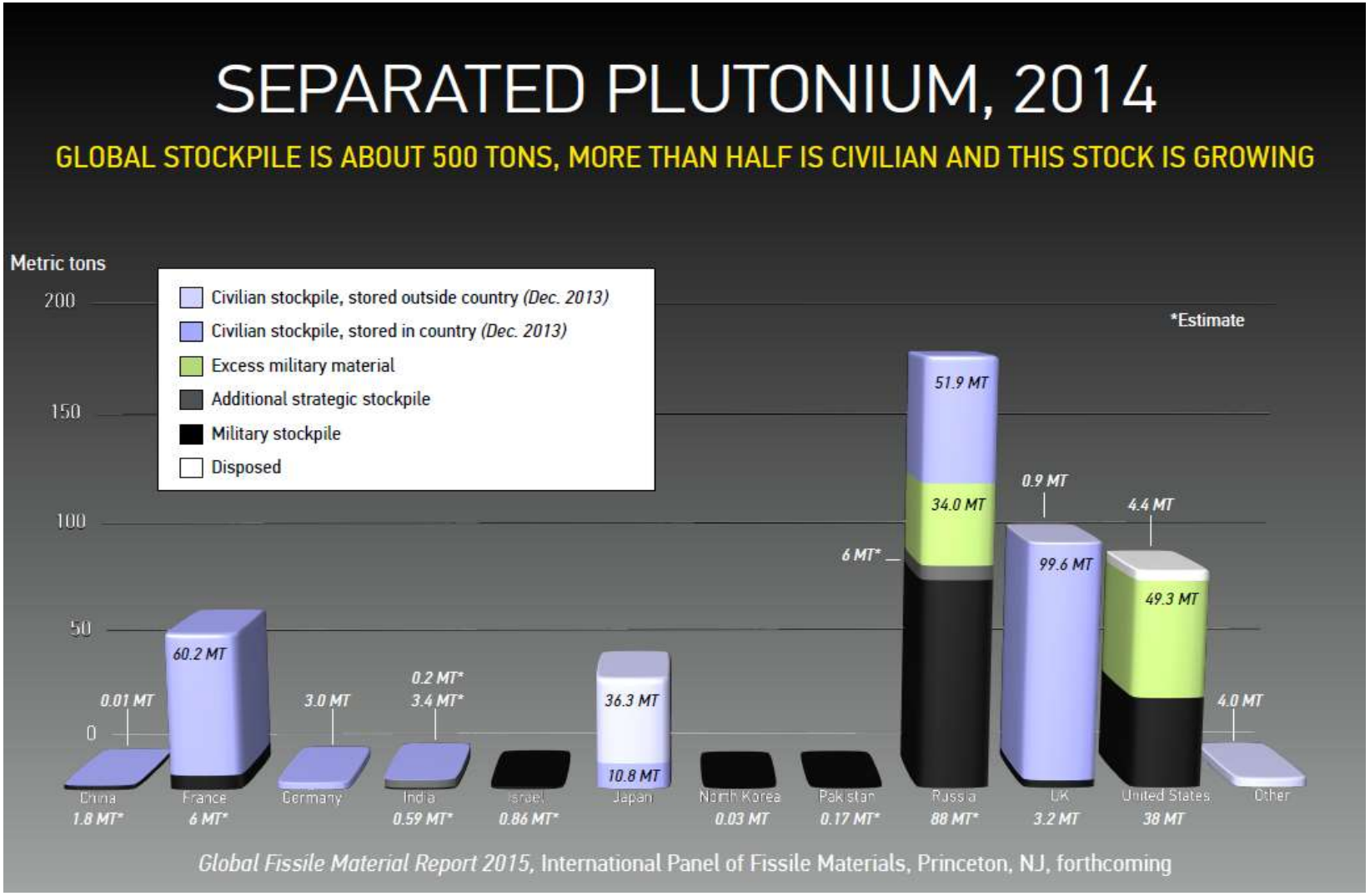


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# Debate at NPT and Possible Solutions - from Main Committee III

- 2. " ..reaffirms that *nothing in the Treaty shall be interpreted as affecting the inalienable right* of all parties to the Treaty to develop research, production and use of nuclear energy for peaceful purposes without discrimination… confirms that each country's choices and *decisions…shall be respected without jeopardizing its policies…for peaceful uses of nuclear energy and its fuel-cycle policies*."

- NPT/CONF.2015/MC.III/CRP.1/Rev.1

http://www.reachingcriticalwill.org/images/documents/Disarmament-fora/npt/revcon2015/documents/MCIII-CRP1-Rev1.pdf

# Debate at NPT and Possible Solutions - from Main Committee III

- "63. ..recognizes the importance of international cooperation under the auspices of the IAEA or other regional or international forums to *develop multilateral approaches to the nuclear fuel cycles,….*Such approaches, *without restricting State parties' rights* under the Treaty *without prejudice to national nuclear fuel cycle policies…."

- NPT/CONF.2015/MC.III/CRP.I/Rev.2

May 13, 2015