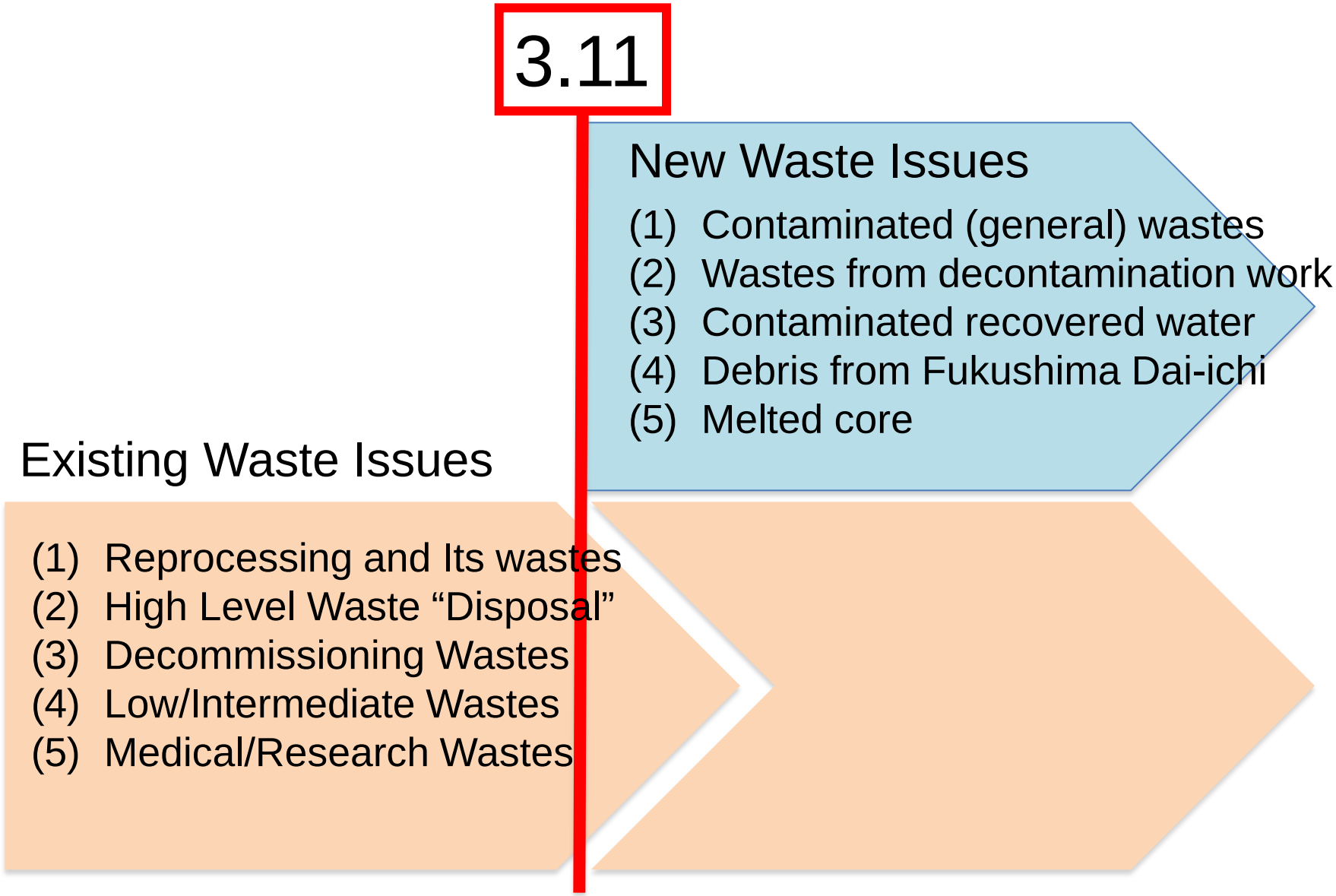
19th REFORM Group Meeting, Salzburg – Sept.1–5, 2014
Low Carbon Markets and the Legacy of Nuclear Power

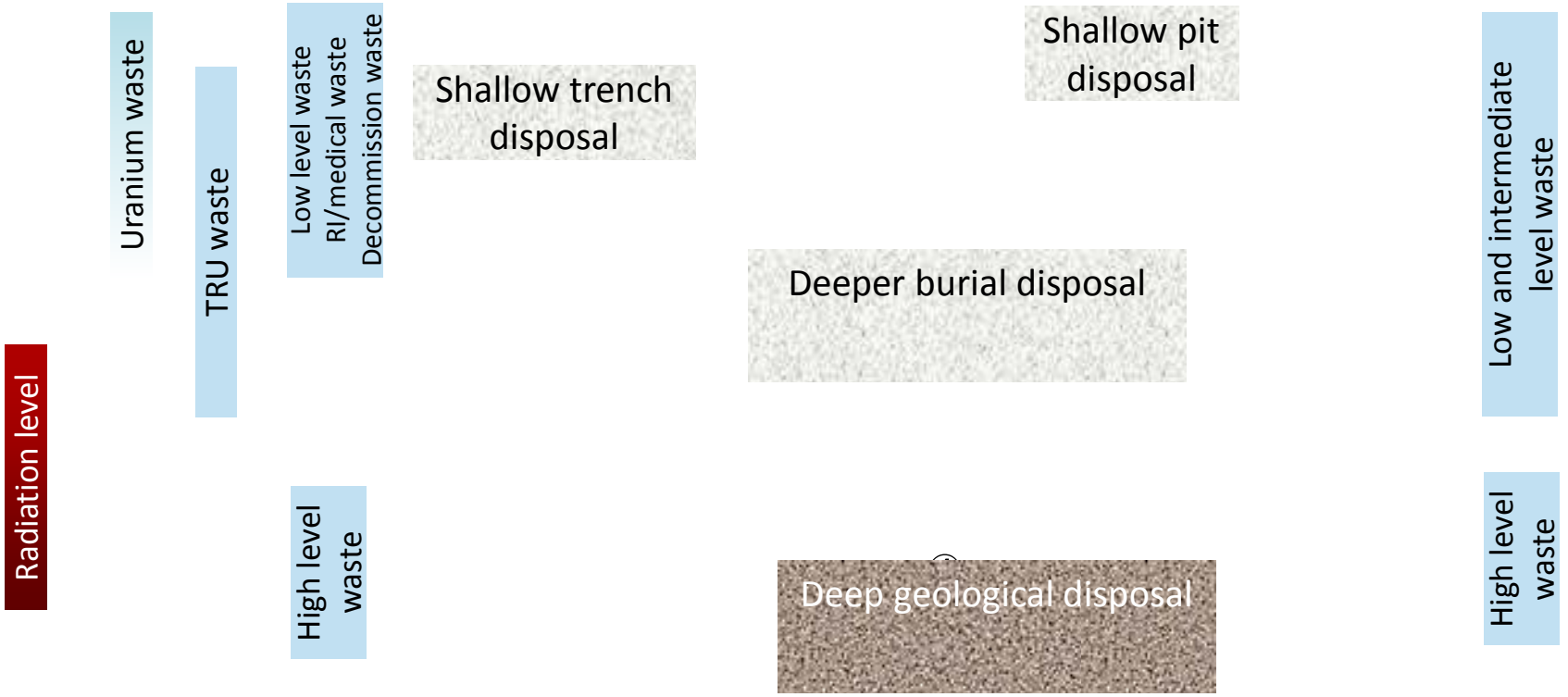
Governance of Nuclear Waste Management in Japan - From irrationality to chaos, and to where ?

1st Sept. 2014
Tetsu IIDA
Institute for Sustainable Energy Policies
(ISEP)

Nuclear Waste Issues



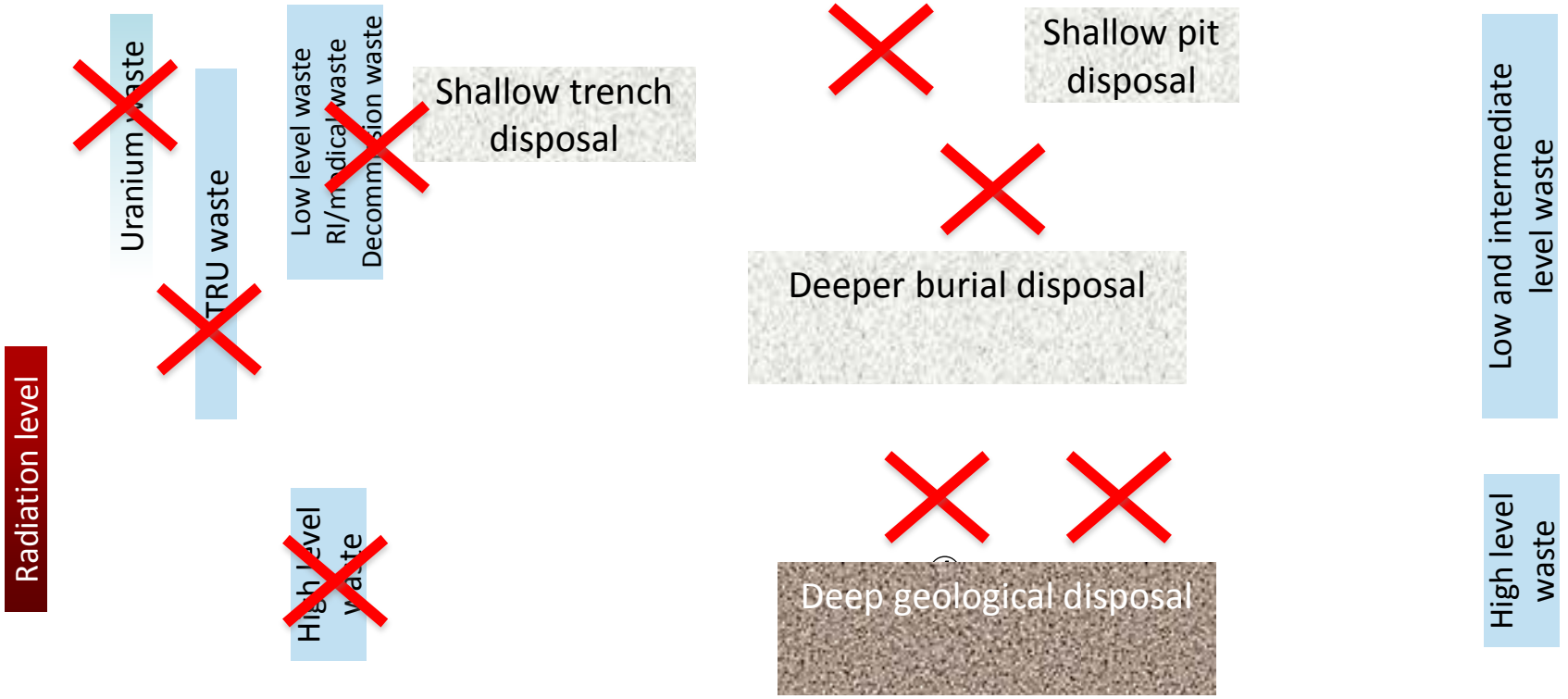
Nuclear Waste Concept before 3.11



Nuclear Waste Concept before 3.11

Waste source	Waste	Storage concept	Siting
Front side	Uranium waste	Burial disposal, laws not yet prepared	(Net yet)
Power plant	Low level waste Intermediate level waste Decommission waste * spent fuel is not “waste” in Japan	Burial trench disposal, operating Deeper burial pit disposal, not yet operating Deeper pit disposal, not yet operating	Rokkasho Rokkasho (Net yet)
Reprocessing	Low level waste TRU waste High level waste	Deeper burial pit disposal Deep geological disposal Deep geological disposal	(Net yet) (Net yet) (Net yet)
Medical Research Univ.	Low level waste RI waste	Burial trench disposal, operating Burial trench disposal, operating	Iwate Iwate

Nuclear Waste Concept before 3.11



Existing Waste Issues – already irrational

1. Reprocessing and Nuclear Fuel Cycle as “KOKUSAKU”
   - “KOKUSAKU”, historically established “national policy” supported by inner-circle anonymously and confirmed by bureaucratic manner
   - History
     - ✓ 1977: Reprocessing contract with France/UK (5600+1500MTU)
     - ✓ 1990: Low level waste at Rokasho
     - ✓ 1993: Rokkasho Reprocessing plant start to construct (not finished)

2. Two (2) center structure, power shift, dissolving
   - STA (MEXT) : power center for gov’s nuclear
   - ✓ STA was secretariat for Atomic Energy Council, Nuclear Safety Commission
   - ✓ STA had lead gov’s nuclear development
     - ➢ JAERI: research, PNC: RD&D, now merged into JAEA
     - ➢ Tokai Reprocessing Plant (1977~) and Pu-fuel development
     - ➢ Joyo & Monju for Fast Breeder Reactor
     - ➢ R&D for final geological disposal
   - MITI(METI) : power center for commercial nuclear
   - ✓ “Regulation for electricity monopoly” is the power source
   - ✓ Competition and independence against STA (and MoE)
     - ➢ Double structure for nuclear policy, safety regulation
     - ➢ Nuclear waste has been excluded from “Environmental Laws”

Existing Waste Issues – already irrational

3. Turning points
   - 1997: Monju accident: from FBR to LWR MOX use
     - ✓ MITI took over “Pu-hegemony” from STA
   - 2000: Restructuring Ministries: METI won, STA lost the power
   - 2004: Political argument about Rokkasho
     - ✓ Both METI and TEPCO break-up internally

4. High level radioactive wastes (HLW)
   - 2000: Special law and special national company (NUMO) for HLW final dispocal
   - There had been no progress, and political dead-end
   - Spent fuel storage, yet not to be “HLW”
     - ✓ 17,000 MTU at site and Rokkasho, 6 years room left
     - ✓ Pilot interim dry storage at Fukushima Dai-ichi and Tokai
     - ✓ Interim dry storage at Mutsu (5000 MTU) only for TEPCO under construction

5. Just after 3.11
   - 2012.9 DPJ nuclear phase-out by 2030s, keep Rokkasho reprocessing plan
     - ✓ However, very much strangely, because of Aomori local strong requirement
   - 2012.9 Japan Academy Science recommendation
     - ✓ Long term interim storage with controlling total amount of HLW

Nuclear Waste Concept after 3.11

Radiation level

Uranium waste

TRU waste

Low level waste

RI/medical waste

Decommission waste

Shallow trench disposal

Shallow pit disposal

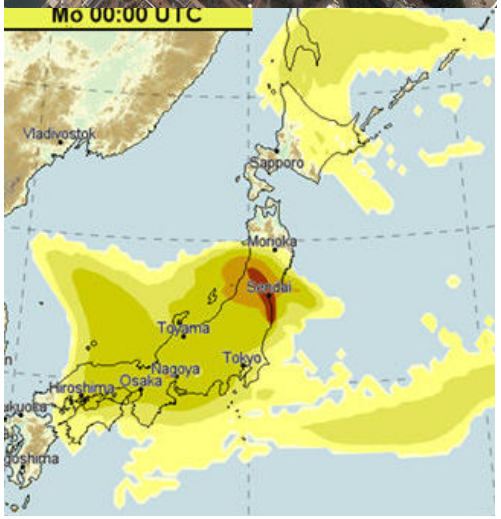
Deeper burial disposal

High level waste

Deep geological disposal

Low and intermediate level waste

High level waste



Emerging Waste Farm

Emerging Waste Farm and “interim storage”

1. Estimation of “waste from decontamination work”

(in million m3)	Fukushima	Other area	total
Lower case	15	1.4	16.4
Higher case	28 *	13	41

* after incineration

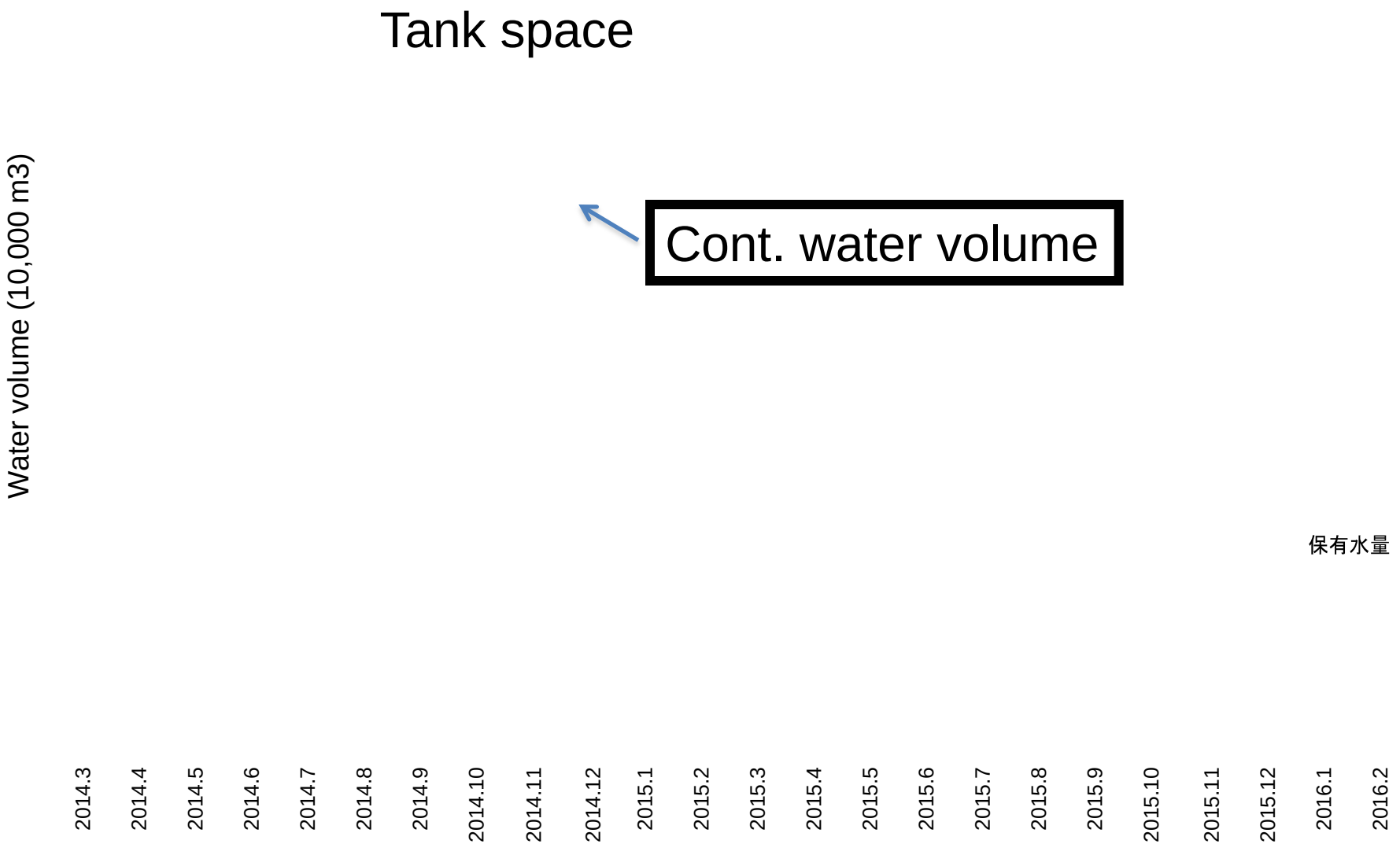
2. “Interim storage” as political word
   - Political commitment to Fukushima people without any reality;

   “The waste from decontamination work will store for 30 years, then it must be taken out from Fukushima for final disposal”

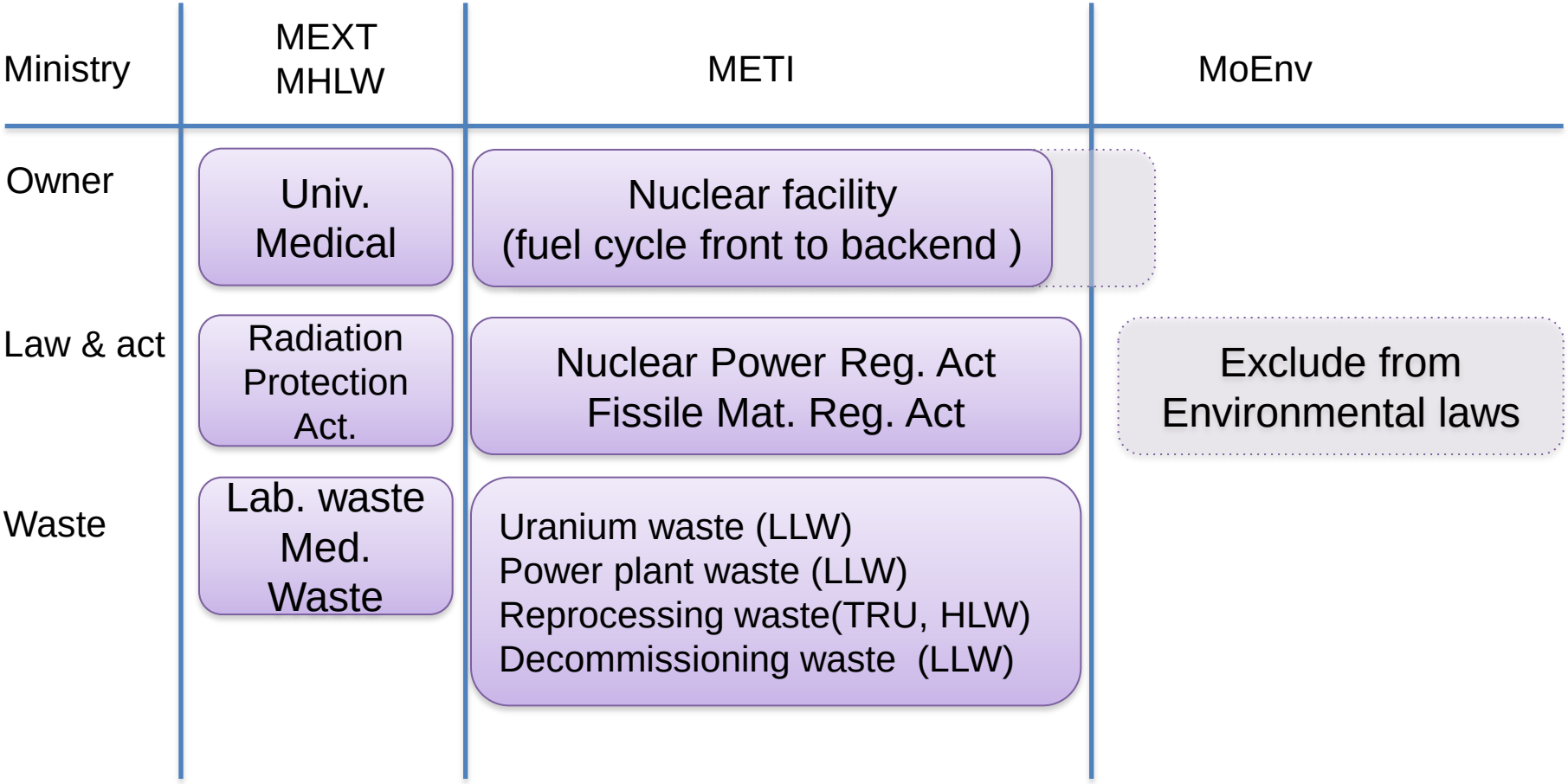
3. The other local conflict over “contaminated general waste”
   - Each regional government has responsibility to treat it by themselves
   - Dealt as general waste by Ministry of Environment
   - Waste less than 8000 Bq/kg (Cs) treat as general waste

Emerging Tank Farm

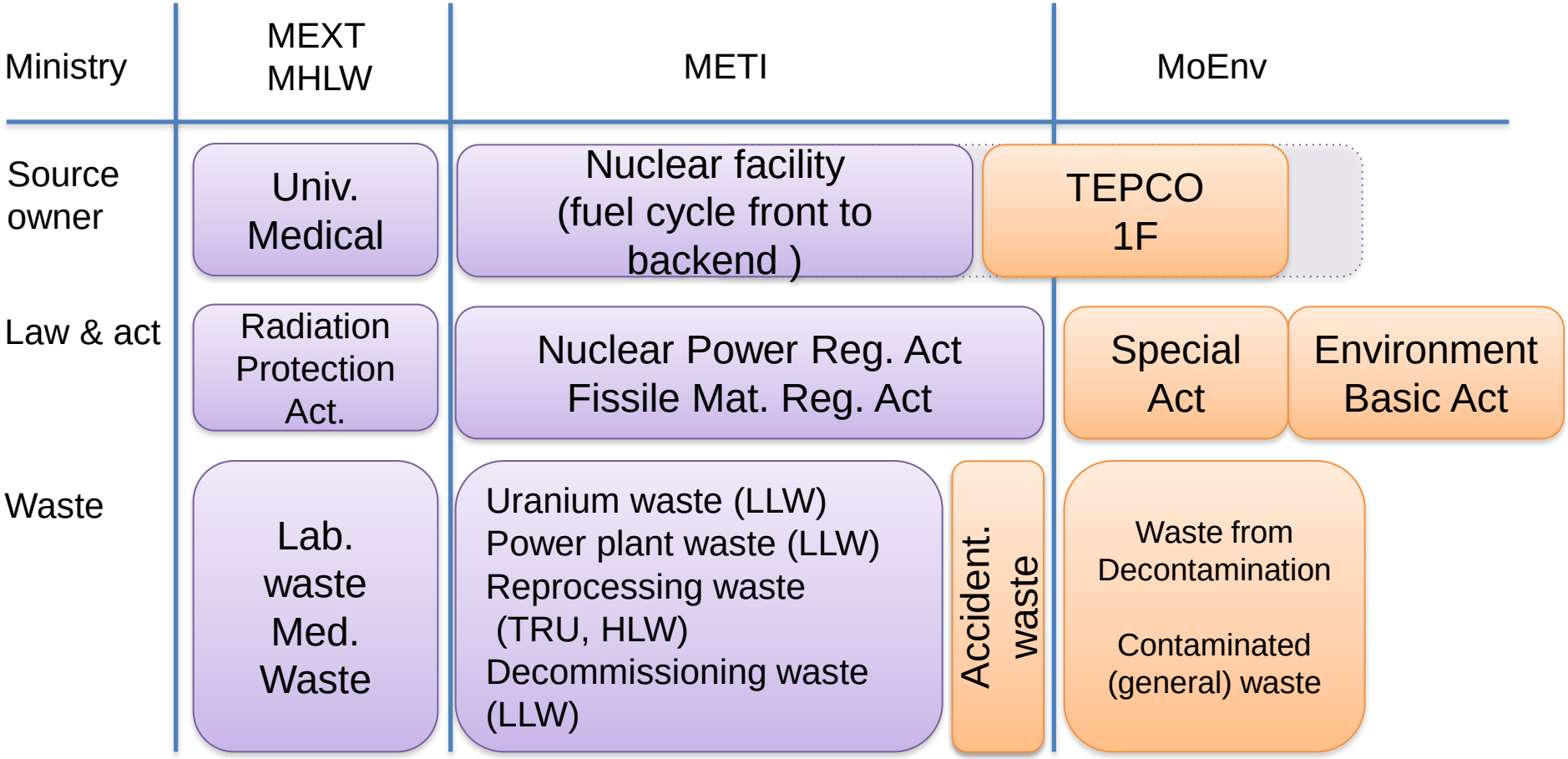
Emerging Tank Farm – one of simulation



Jurisdiction of Nuclear Waste before 3.11

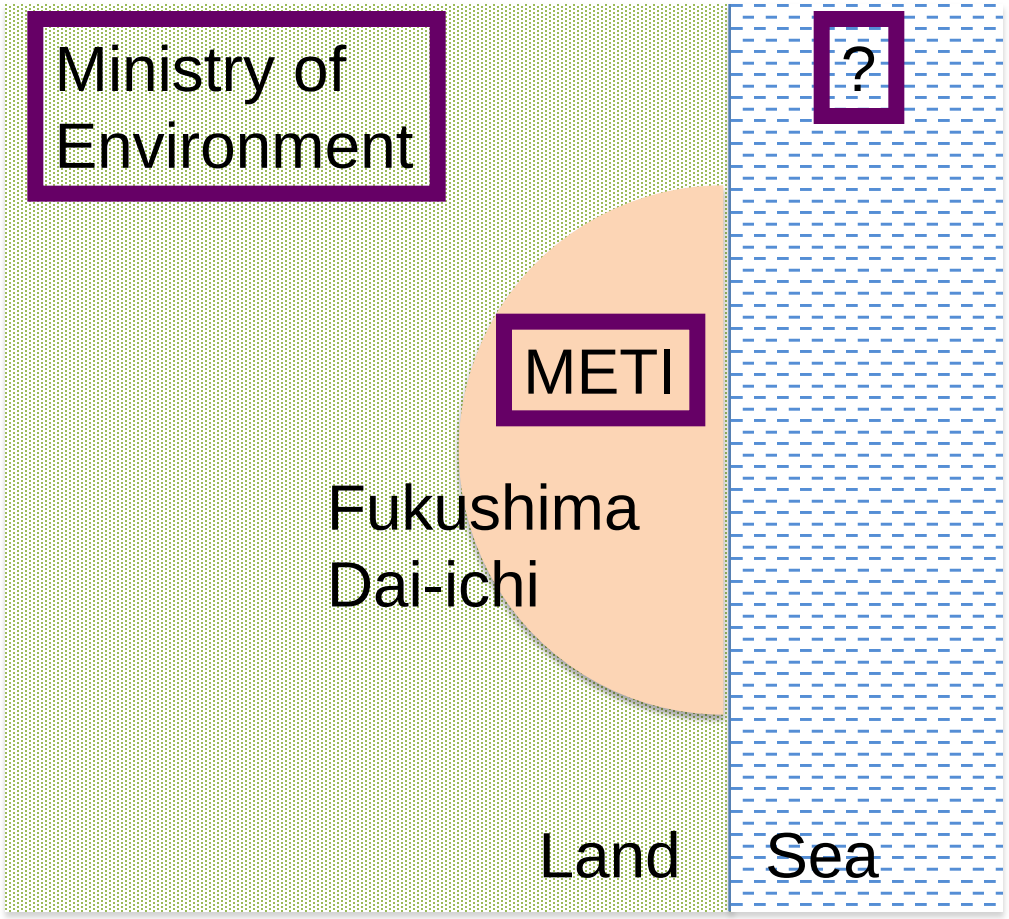


Jurisdiction of Nuclear Waste after 3.11



Territorial Jurisdiction after 3.11

- METI: inside of Fukushima Dai-ichi
  - ✓ Contaminated recovery water
  - ✓ Debris of decommissioning
- Ministry of Environment
  Outside of Fukushima Dai-ichi
  - ✓ Wastes from decontamination
  - ✓ Contaminated general wastes
- No clear jurisdiction found for sea contamination



Concluding remarks ~ Nuclear Waste Governance chaos after Fukushima ~

1. Nuclear waste program in Japan has been long facing difficulty, except for low level waste disposal from power plant, mainly because of lack of governance and irrationally strong stick to nuclear fuel cycle and SF reprocessing.
2. Under strong but ritual “KOKUSAKU”, the government had behaved in ritual and divided bureaucratic manner even though it was away from the reality. On the other hand, the industry had behaved pragmatically helped by METI such as SF reprocessing agreement between the UK and France.
3. Under the “amalgam” “KOKUSAKU” and industries’ pragmatism, there have been a series of failures, such as MONJU accident (1995), never-ending Rokkasho reprocessing, no progress in NUMO (HLW final disposal).
4. Although such historically apparent incapability of nuclear waste program and its governance, nuclear community in Japan strongly control any criticism, arguments and reviews neither inside nor outside, except for revolt against Rokkasho reprocessing from METI insiders in 2004/2005.
5. After 3.11, there had been a chance and risk;
   1) Chance was open argument over nuclear, which had almost never happen in Japan. However, we could not use this chance effectively.
   2) Risk was that “nuclear waste issues” become more complicated, and people become more sensitive and annoying against radiation.

Concluding remarks (cont.) ~ Nuclear Waste Governance chaos after Fukushima ~

6. METI become to have more hegemony in nuclear (waste) governance under Abe LDP Administration, in spite that they should take a part of serious responsibility of 3.11 accident, so-called “profit from a fire”.
7. While Atomic Energy Council (AEC) become relatively weak position because once AEC was supposed to dissolve, and newly established Nuclear Regulatory Authority (NRA), former NISA under METI and NSC under MEXT, behave to be “independent”
8. Even though METI’s hegemony in nuclear (waste) governance, it seems to be difficult to solve nuclear waste issues, or even to be getting worse if consider METI’s historical “track record” of failure and their lack of trust and confident from the public especially after 3.11.
9. Nuclear waste governance by Ministry of Environment also seems to difficult because they deal this issues same as general wastes.
10. Japan Academy Science recommendation (2012 Sept.) was one of the few reasonable and constructive proposal from insiders, that recommended for “long-term interim storage of HLW with total amount control”, but it was neglected by the Gov. in so far.