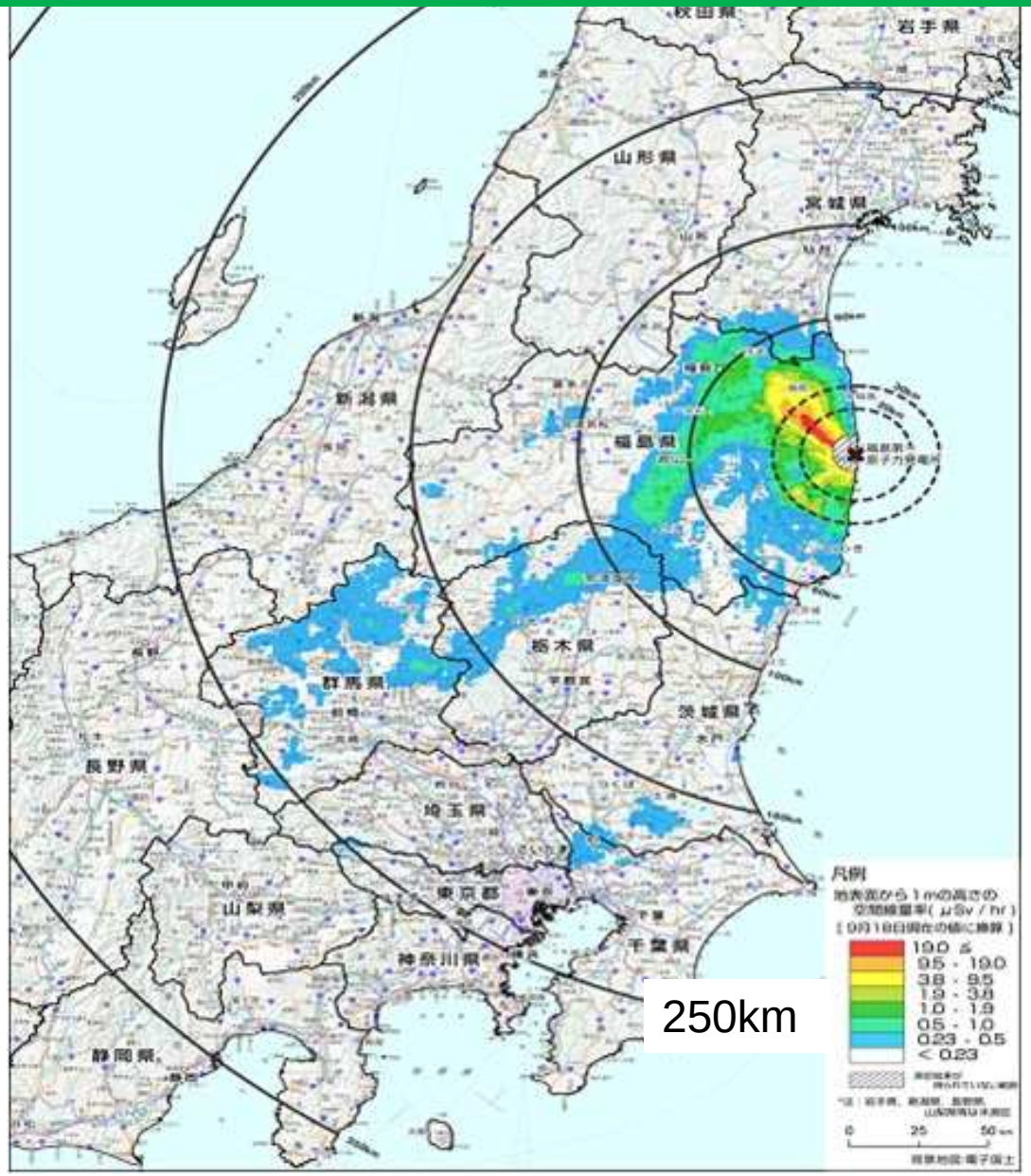
The Long-term Strategy for Remediation

Ministry of the Environment, Japan

Radioactive Pollution caused by the accident at Fukushima Dai-ichi NPP



Framework of Decontamination

New legislation for promoting decontamination

- The Act on Special Measures Concerning the Handling of Radioactive Pollution came into full force on January 1, 2012.
- Based on this Act the following actions are taken:
  - Planning and implementation of decontamination work
  - Collection, transfer, temporary storage, and final disposal

Special Decontamination Area

- 11 municipalities in (former) restricted zone or planned evacuation zone (<20km from the NPP, or annual cumulative dose is >20mSv)
- Decontamination is implemented by the national government

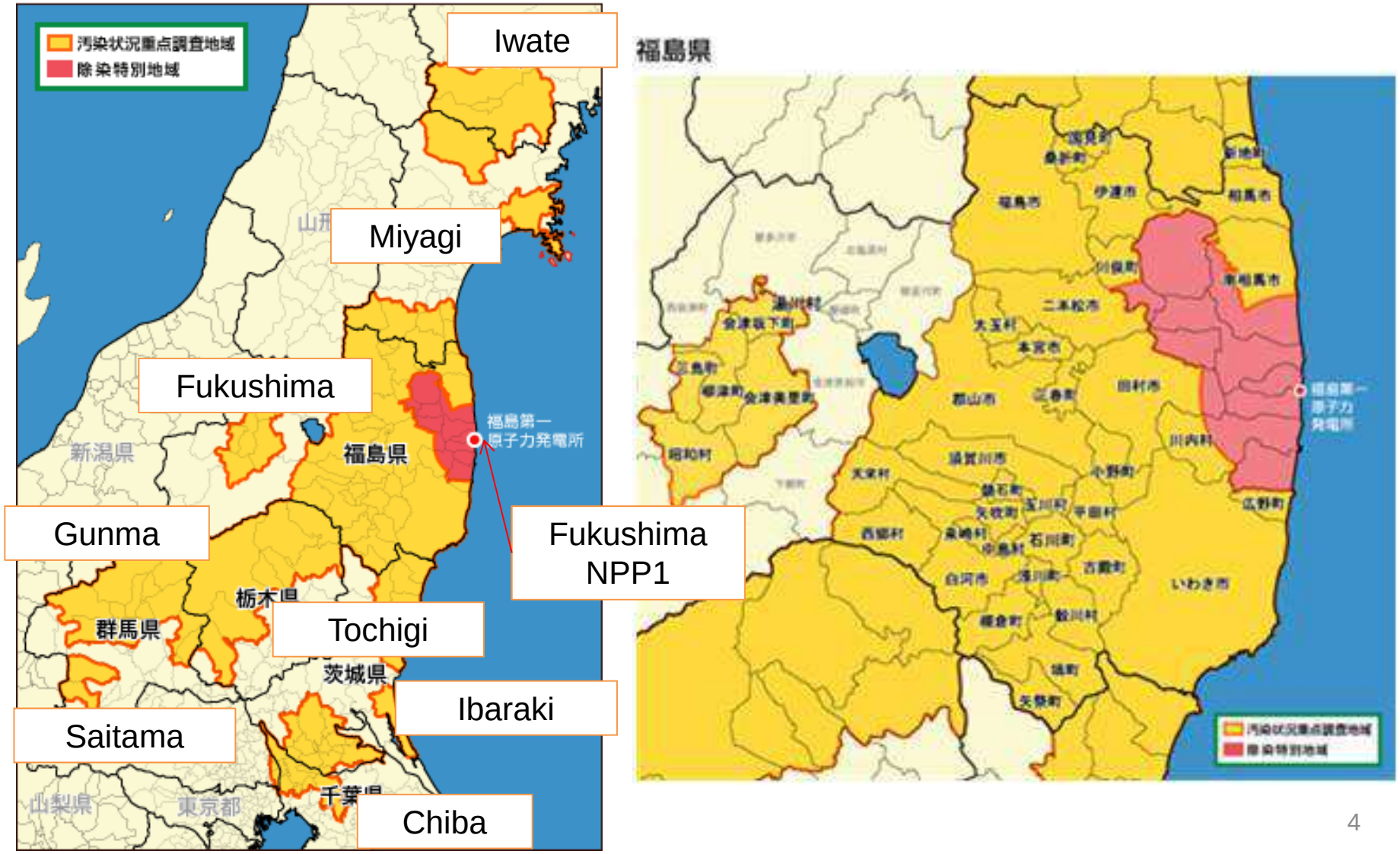
(*) Entire area of Naraha, Tomioka, Okuma, Futaba, Namie, Katsurao, and Iitate.
Some area of Tamura, Minami Soma, Kawamata, and Kawauchi.

Intensive Contamination Survey Area

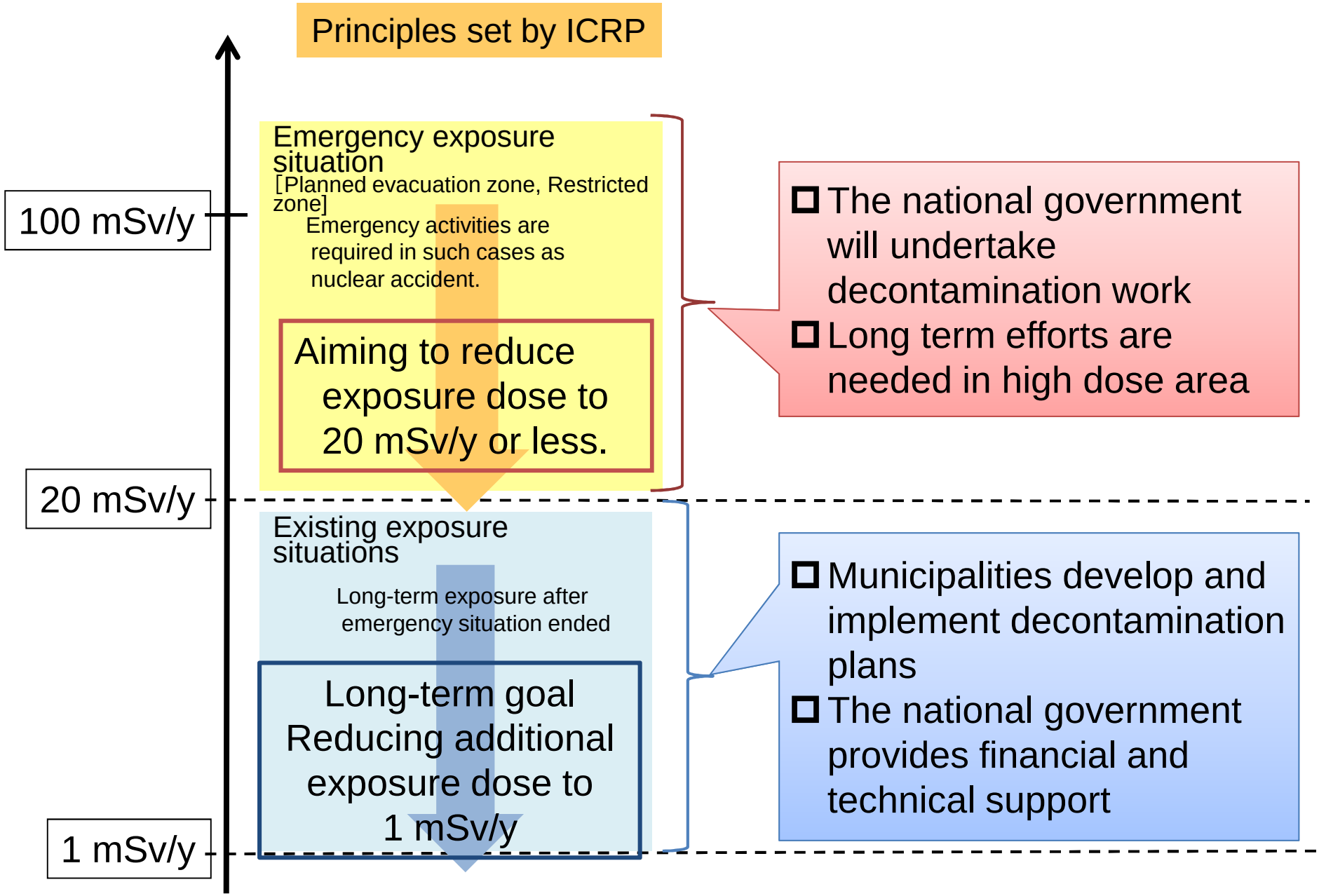
- 101 municipalities in 8 prefectures (*), in which over 0.23 μSv/hour of air dose rate (equivalent to over 1 mSv/Year) is observed, were designated.
- Decontamination is implemented by each municipality. The national government will take financial and technical measures.

(*) Iwate, Miyagi, Fukushima, Ibaraki, Tochigi, Gunma, Saitama, and Chiba

Special Decontamination Area (Red) and Intensive Contamination Survey Area (Yellow)



Basic Approach of Decontamination Work



Basic Principles under the Act
Targets of the Decontamination

Additional * exposures over 20mSv/y

- Aim at stepwise and rapid reduction of those areas based on the ICRP Recommendation (2007).

  * 'additional' means beyond natural background and medical exposure

Additional exposures < 20mSv/y

- As a long term goal, aim at reducing to 1 mSv/y or less

General Public

- Reduce estimated annual exposure of the general public by 50 % in 2 years (by Aug 2013)

by radioactive decay, decay by natural factors and by decontamination

Children

- Reduce estimated annual exposure of children by 60 % in 2 years (by Aug 2013) by thorough decontamination of their living environment.

by radioactive decay, decay by natural factors and by decontamination

- The goals will be reviewed periodically

Guidelines
-Helping understanding regulations under the Act-

- **Waste-related guidelines:** storage, maintenance and management standards and disposal standards
- **Decontamination-related guidelines:** methods for the investigation and measurement of the status of pollution, decontamination and other measures, collection, transfer and storage of the removed soil
- **Guidelines for decontamination workers:** exposure dose management methods, preventive measures against internal exposure, safety and health management systems

Financial Resources

- The national government takes fiscal actions to finance the costs required to implement the Act.

- Decontamination work and other measures taken under this Act are implemented at the expense of the relevant nuclear power producer.

- National government budget: allocated 464 billion yen for FY2011, 462 billion yen for FY2012 and 636 billion yen in budget request for the initial FY2013 budget.

Institutional Arrangements at MOE

Opening of the Fukushima Office for Environmental Restoration

- Aiming at smooth and effective implementation of decontamination work, the Office was opened in the City of Fukushima in January, 2012.
- 5 branches were additionally opened in April 2012 in Fukushima prefecture.

Increase in the number of staff

- The number of staff from April 2012: about 400 (Fukushima office and its branches, Kanto regional office and Tokyo HQ)*

  * including experts from relevant entities (JAEA, TEPCO and others)

Decontamination Policy for Special Decontamination Area

Policy in FY 2012 and 2013

Decontamination should be implemented taking into account the level of air dose rate.

- ◆**Area less than 20mSv/year**: Aiming for reducing additional exposure dose less than 1mSv/year as long-term goal.
- ◆**Area from 20～50mSv/year**: Aiming for reducing exposure dose in residential and farmland area less than 20mSv/year by the end of FY 2013.
- ◆**Area more than 50mSv/year**: Demonstration projects will be implemented. Lessons learnt will be reflected into future decontamination policy.

Policy After FY 2014

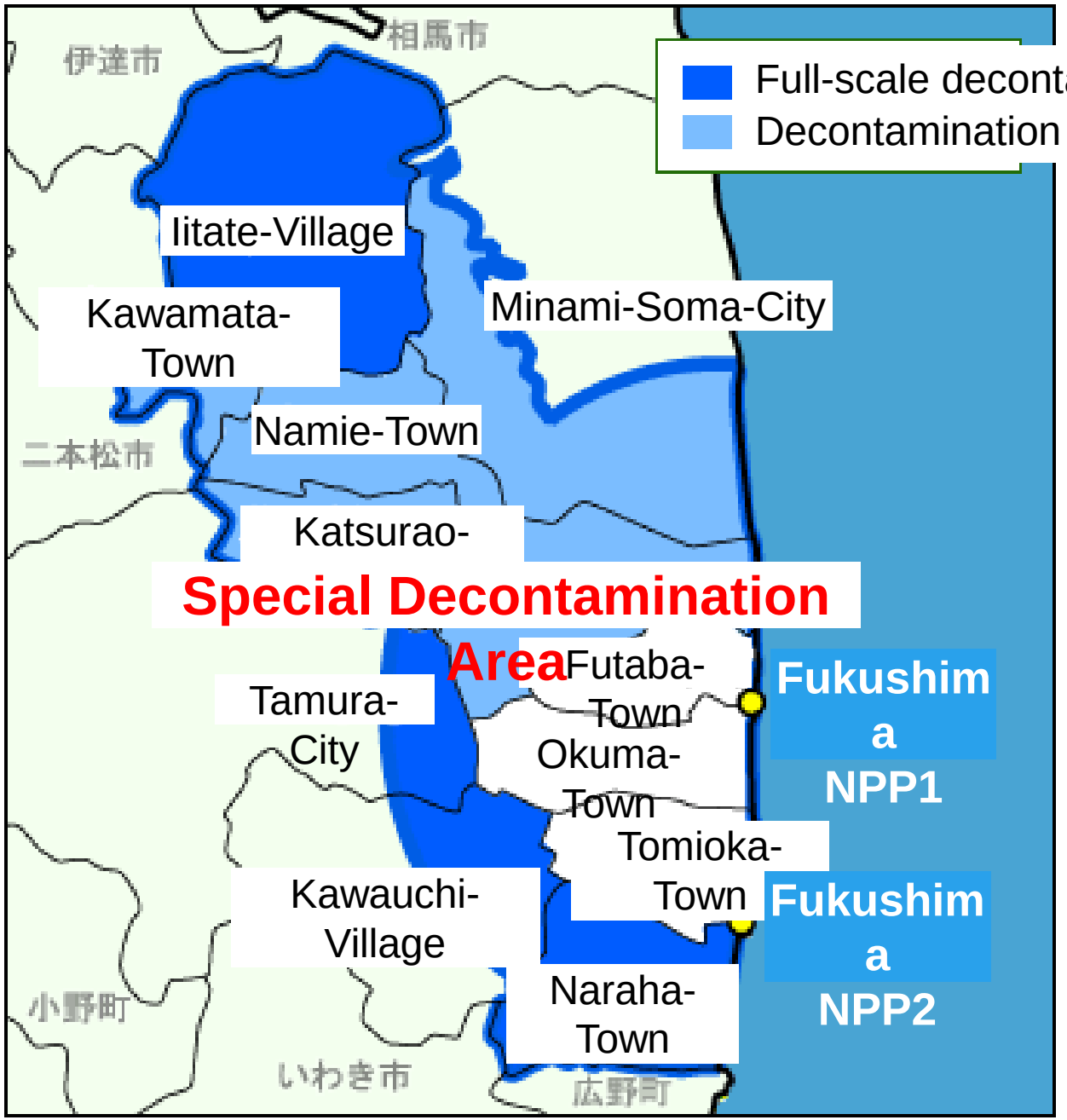
- ◆ Aiming for reducing additional exposure dose less than 1mSv/Y as long-term goal
- ◆ Check and evaluate two-year decontamination results, consider proper actions, and revise implementation plans as needed.

Progress of work in the Special Decontamination Area

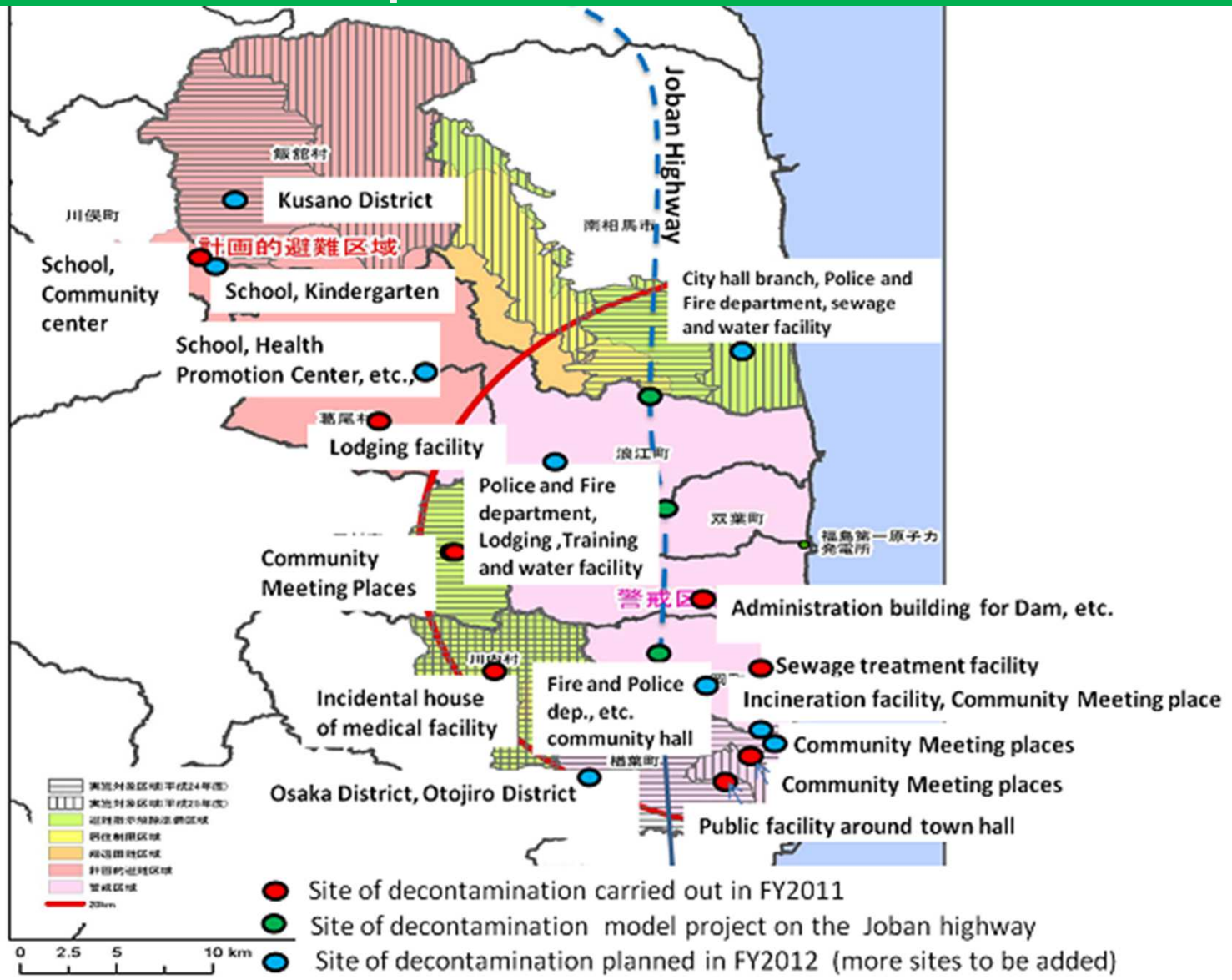
	Advance Decontamination (base facilities, etc.)	Identification of owners of houses, etc.	Decontamination plan	Full scale Decontamination Works	Securing temporary storage sites
Tamura city	✔	✔	✔（Apr 13）	in operation（July 25）	✔
Naraha town	✔	✔	✔（Apr 13）	in operation（Sept. 6）	✔
Kawauchi village	✔	✔	✔（Apr 13）	in operation（Sept. 4）	✔
Iitate village	✔	✔	✔（May 24）	in operation（Sept. 25）	✔ (partly secured)
Katsurao village	✔	✔	✔（Sep 28）	in preparation（Oct. 12）	✔ (partly secured)
Kawamata town	✔	✔	✔（Aug 10）	In preparation（Nov. 1）	✔ (partly secured)
Minami-Soma city	✔	✔	✔（Apr 18）		local coordination process
Namie town	✔	✔	✔（Nov 21）		local coordination process
Okuma town	✔	✔	✔（Dec 28）		local coordination process
Tomioka town	✔	✔	local coordination process		local coordination process
Futaba town					

*Decontamination works in a municipality are to be implemented on the premises of formulation of the decontamination implementation plan and securing of temporary storage sites.

Progress of Special Decontamination Area

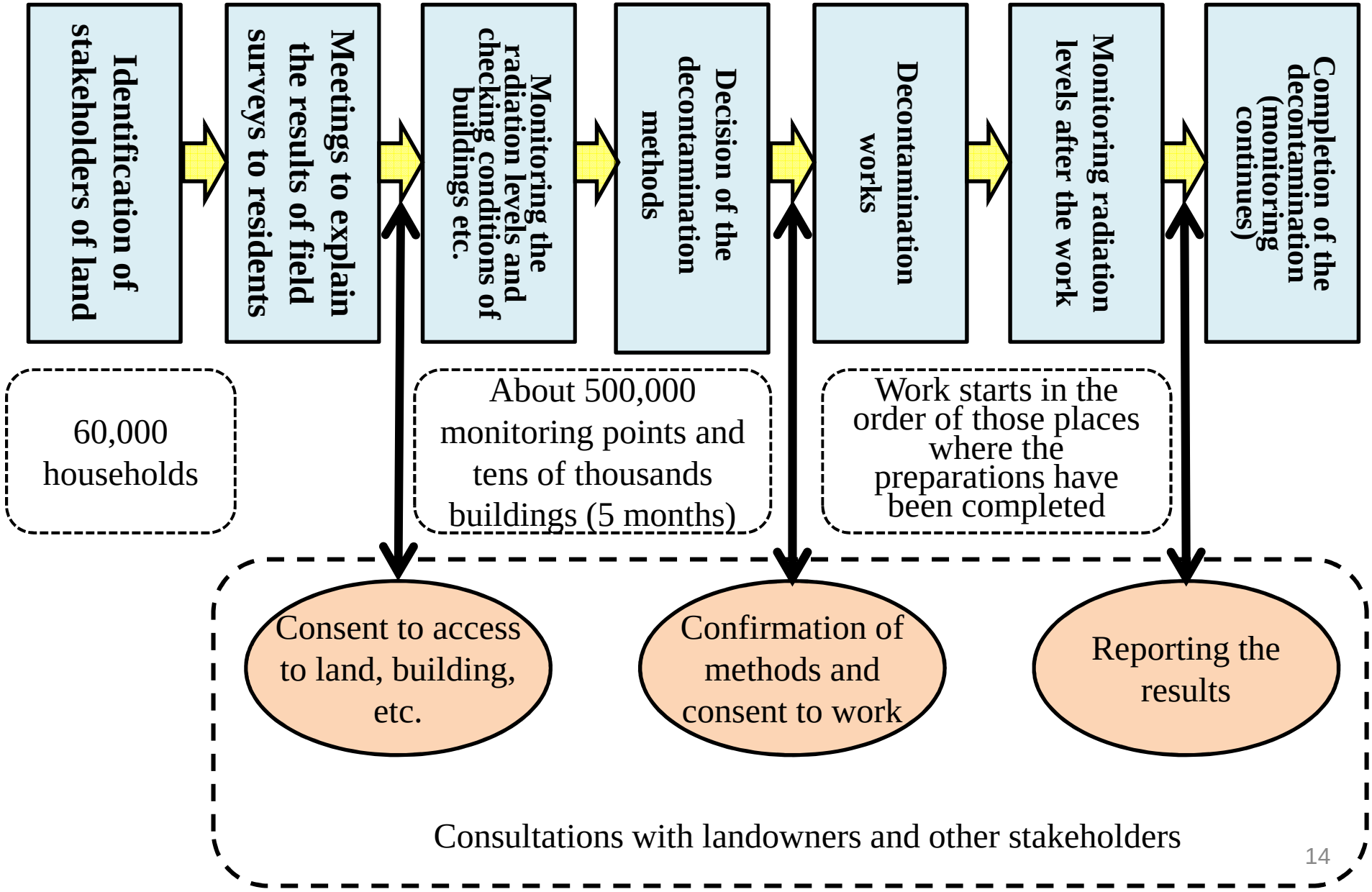


Decontamination of selected sites in the Special Decontamination area



- In addition the Government commissioned Decontamination Model Projects to JAEA in FY 2011.

Flowchart of actions under the Decontamination Roadmap



Order Placement of Decontamination Works

Full scale decontamination works in the Special Decontamination Area shall be carried out by the Ministry of the Environment based on the decontamination plans, which are established for each municipality. Order placement of decontamination works will be executed for municipalities sequentially when preparations are completed.

（Reference）

1. Evaluation Method of the bidding

Comprehensive evaluation method will be placed.

- Winning bidder will be decided by evaluating the bidding prices and technical abilities in total while checking the working system of bidders.
- Evaluating items of technical aspect includes suggestion of new technology, prevention of removed soil generation, etc. and consideration to the areas.

2. Bidding participation

Specific qualification criteria for participation is required; however, no specific requirement is ruled in terms of the nationality of participants.

3. Order Placement

Information regarding order placement for each municipality will be announced publicly on the web-site of “Procurement Information”, Fukushima Office for Environmental Restoration, Ministry of the Environment.

Efforts to secure Interim Storage Facility

Oct., 2011 Ministry of the Environment officially announced and explained the **Basic Principles for Interim Storage Facility (the roadmap)** to the heads of relevant municipalities

Main Contents

- The National Government shall secure, maintain and manage the facility
- The National Government shall make utmost efforts **to start operation of the facility by January 2015.** Location sites would be selected within FY 2012
- Target materials for storage is limited to soil and waste generated in Fukushima pref.
- **Final disposal will be carried out outside Fukushima Pref. within about 30 years** from the start of the interim storage.

Dec., 2011 The Ministry requested 8 towns in Futaba County and Fukushima Pref. to examine location sites in Futaba county

Mar., 2012 The Ministry explained the 8 towns and Fukushima Pref. that the facilities may be located separately in 3 towns (Futaba, Okuma and Naraha)

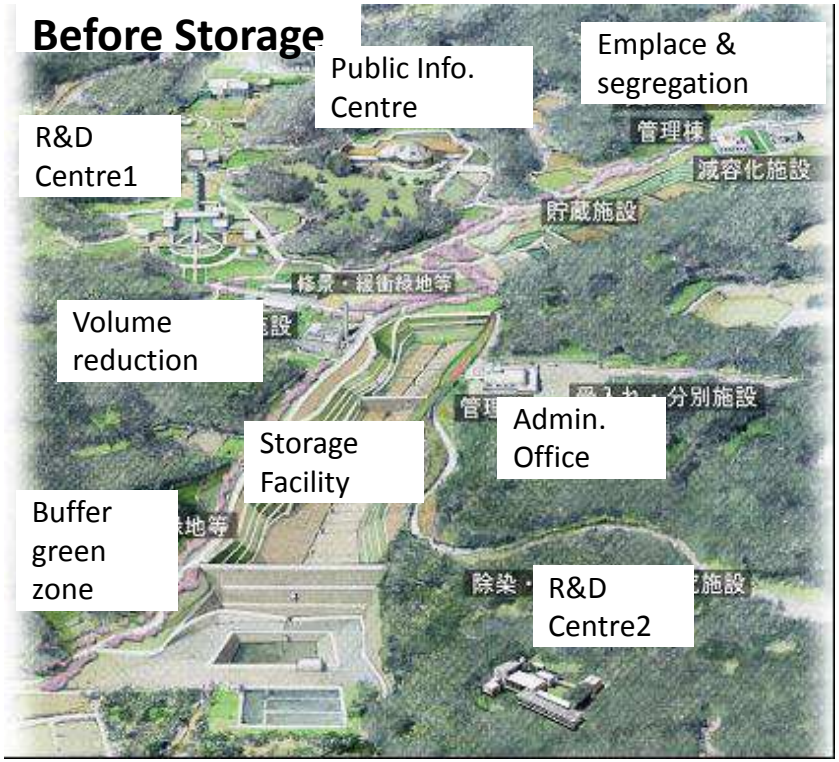
Aug., 2012 The Ministry proposed the sites for investigation to 8 towns and Fukushima Pref.

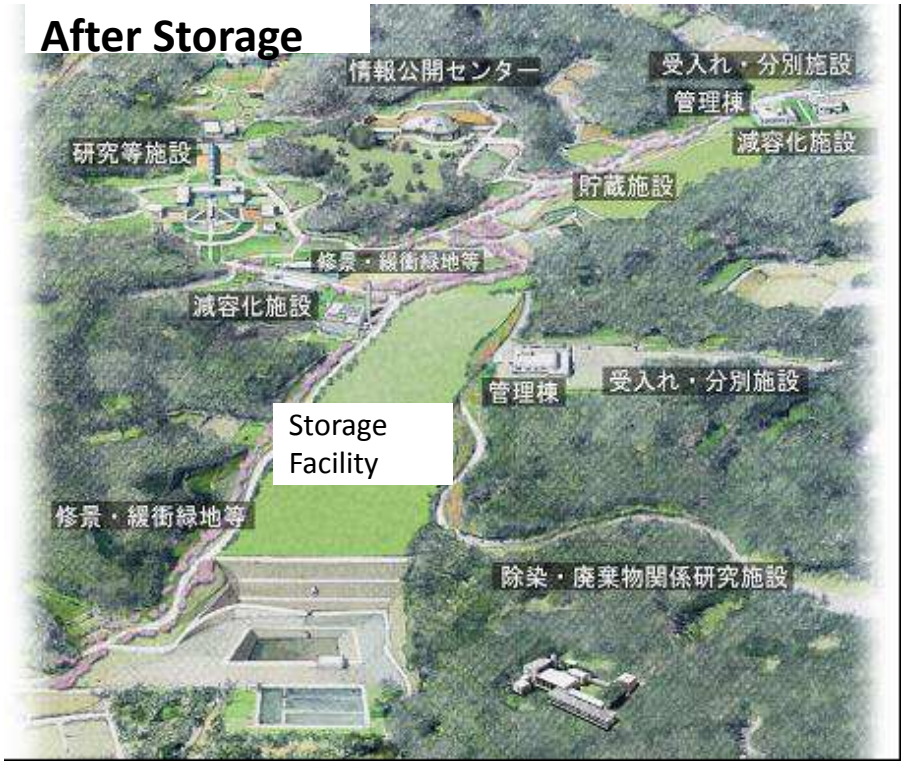
Aug. to Nov., 2012 The Ministry visited and explained to each of the 8 towns and Fukushima Pref. about the facility

Nov., 2012 The Governor of the Fukushima Pref. announced the acceptance of the investigation proposed by the Ministry at the consultation meeting with the mayors of Futaba County's towns and villages

ISF: Bird-view Image

- Total storage volume ranges 15-28 million_m^3 according to the decontamination scope and methods
- Should contribute to municipal economy during construction and monitoring phases.





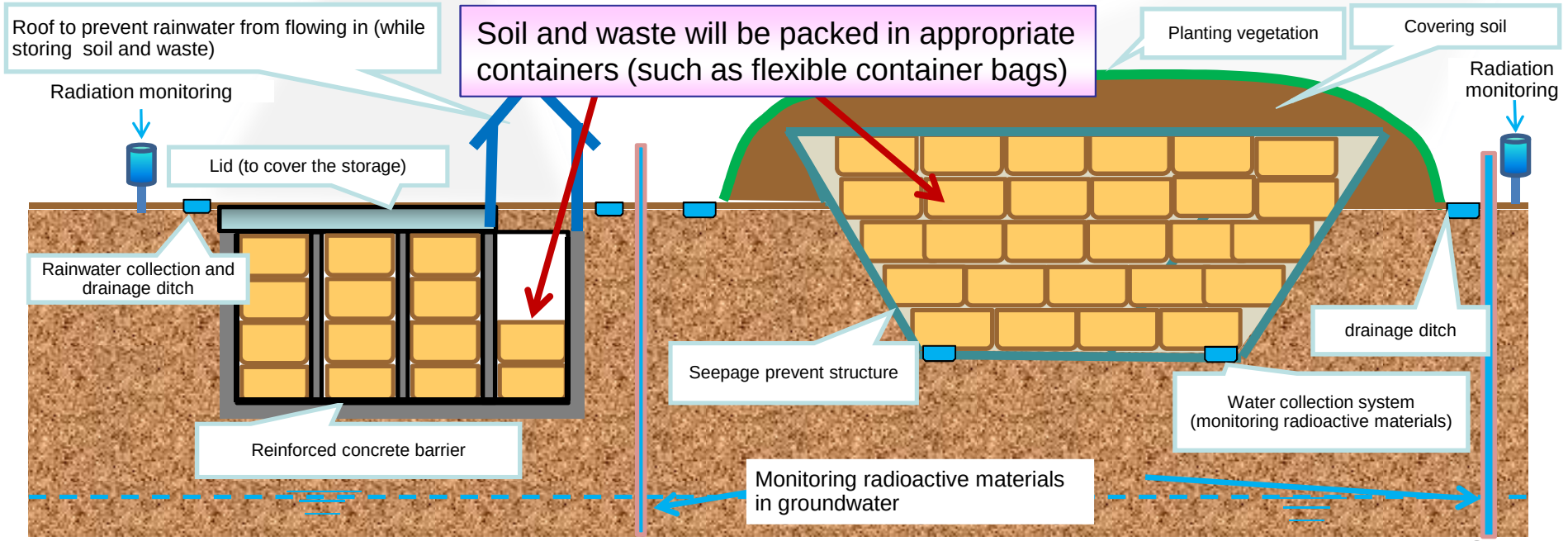
※ The image is conceptual. Actual facilities and their layouts will be modified to the sites selected.

ISF: Storage Facility Image

- Several types of Storage Facilities may be installed according to the characteristics of stored soil and waste.
  - ✓Level of contamination
  - ✓Leachate traits under various environmental scenario.

Example of facilities for radioactive waste which can generate leachate

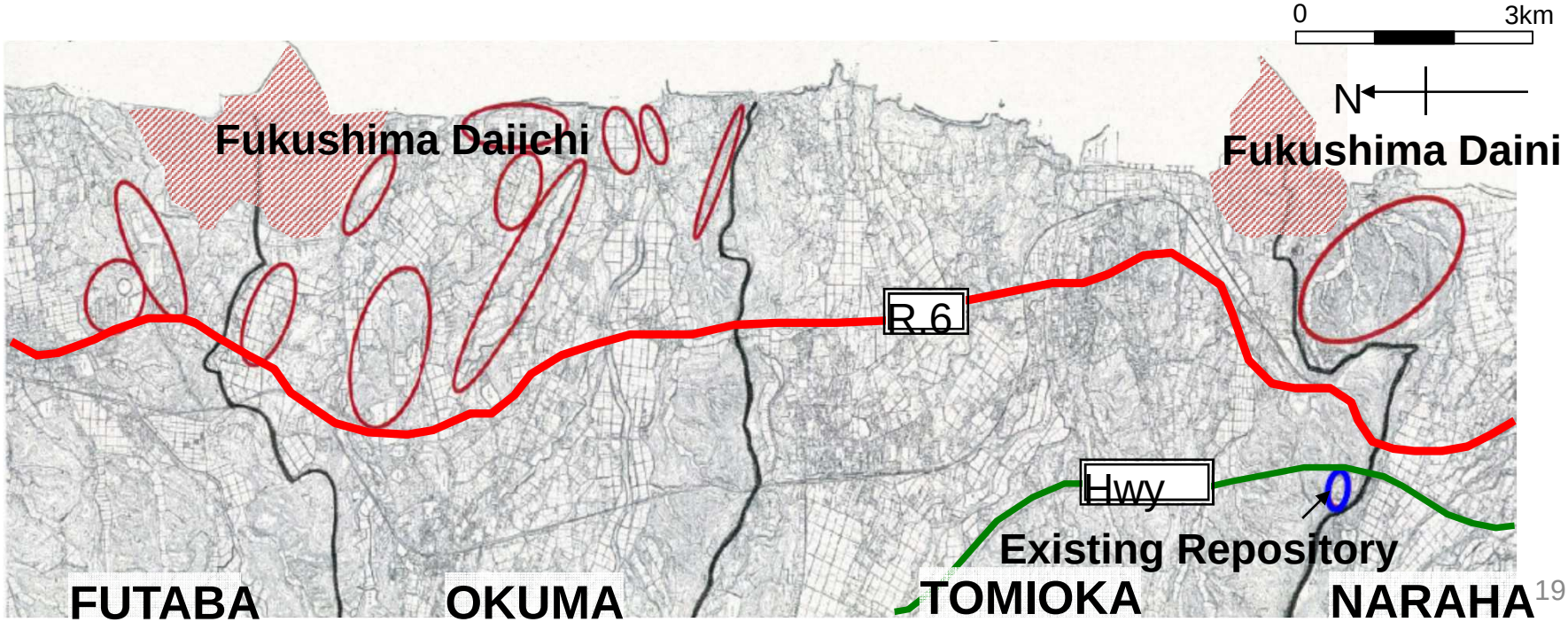
Example of facilities for radioactive waste which does not generate leachate



Potential Construction Sites

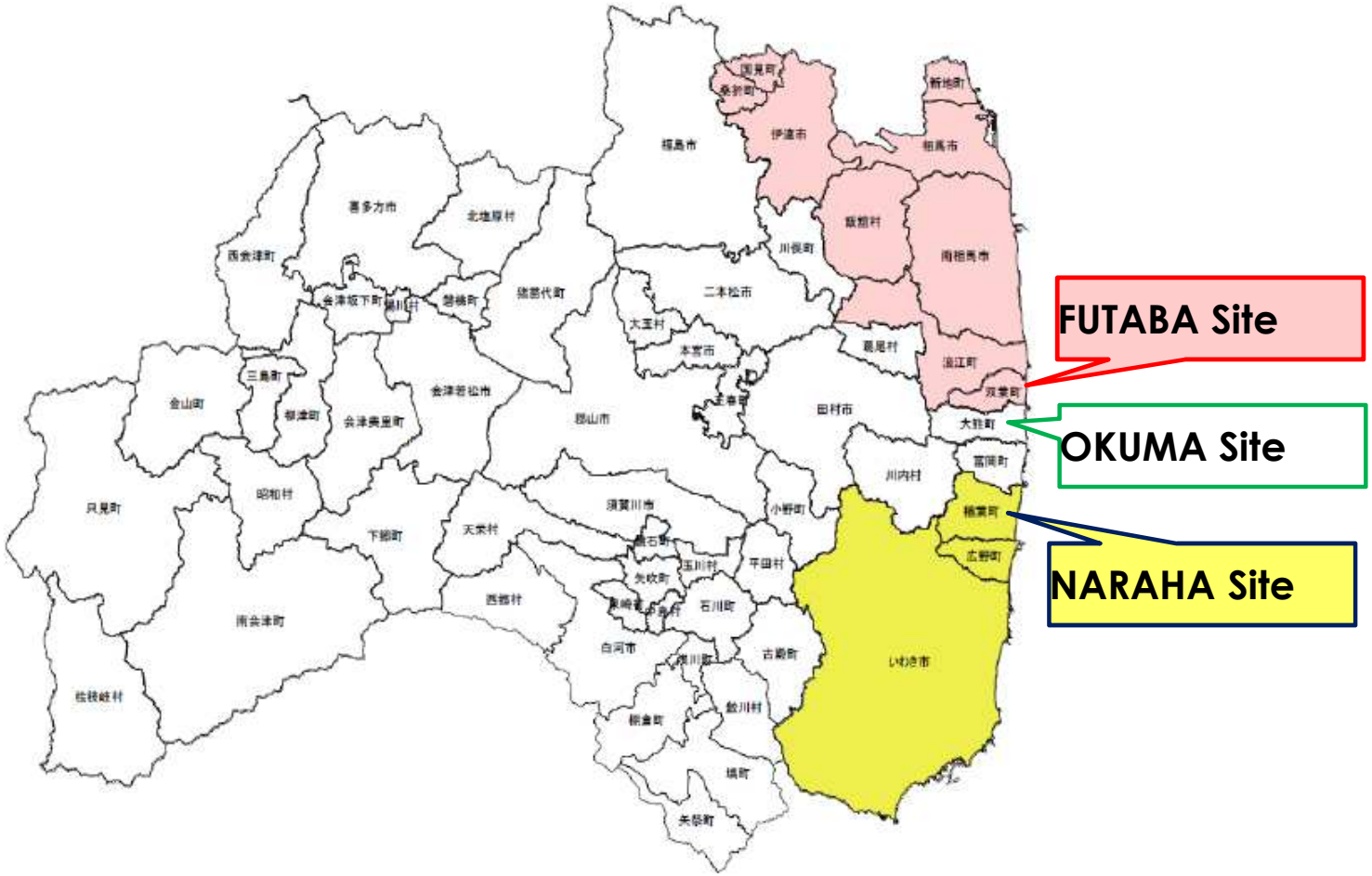
- 12 potential sites (for preliminary survey) around the TEPCO's Fukushima-Daiichi and –Daini Nuclear Power Stations
  - ✓ Vicinity to the highly contaminated (=high volume) area
  - ✓ Sufficient area for storage and related facilities
  - ✓ Transportation conditions (mitigation of congestion etc.)
  - ✓ Avoiding active fault and soft ground
  - ✓ Minimization of surface water diversion

12 potential sites for preliminary survey（based on the document published on 19 Aug,2012）



Transportation Plan

- Divide into 3 areas corresponding to ISF locations (FUTABA, OKUMA and NARAHA).
- Challenge: Mgmt. of huge volume transportation, avoiding local congestion.



Decontamination Progress
In Intensive Contamination Survey Area

- 101 municipalities in 8 Prefectures
  (40 in Fukushima Pref.)

- 92 municipalities have already developed statutory Decontamination Plans as of January 7th

Demonstration Project for Decontamination technologies

1. Overview

National government is soliciting decontamination technologies potentially usable in decontamination works, aiming to contribute to diffusion of similar technologies and progress of decontamination consequently, by supporting new technologies' development and evaluating effectiveness, economical aspects, and efficiency, etc. of the technologies.

2. Targeted Technologies

-1. Technologies to raise efficiency of decontamination works
-2. Technologies to reduce volume of contaminated waste and soil
-3. Technologies to treat contaminated waste by radioactive material
-4. Technologies to collect and treat contaminated water
-5. Technologies to transport and store removed object

3. Budget: JPY 2.1million(including tax) max. per case

4. Status:

Cabinet office – 25 new technologies (Nov. 2011 – Feb. 2012)
Ministry of the Environment – 22 new technologies (May 2012 – Sep. 2012)
and 15 new technologies (Nov. 2012 – Mar. 2013)