Japan's Nuclear Emergency
- Update -

April 6, 2011

Ministry of Economy, Trade and Industry
Government of Japan

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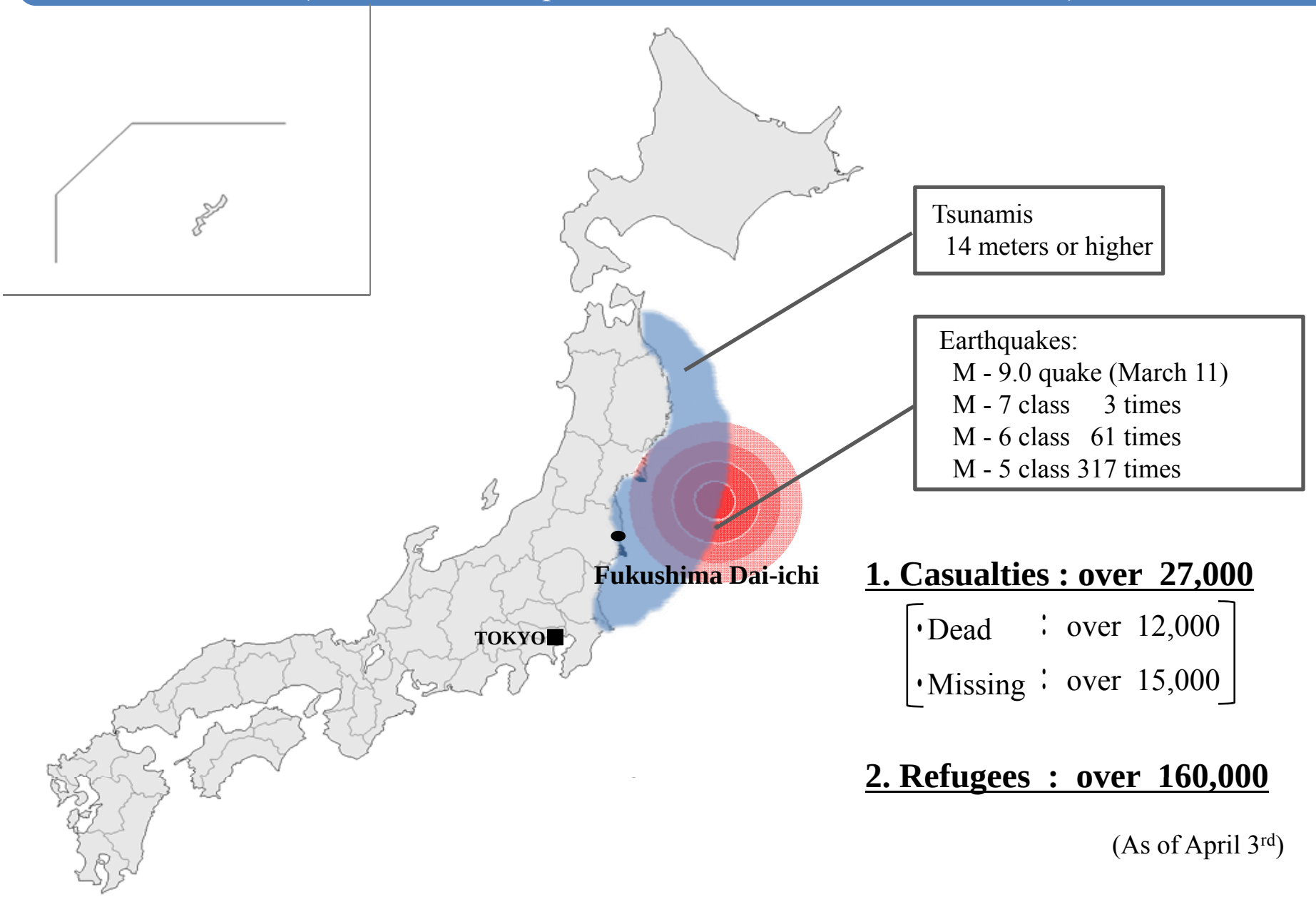
A. Japan Faces an Unprecedented Challenge

(Enormous Earthquake, Tsunamis and Nuclear Accident)



1. Casualties : over 27,000

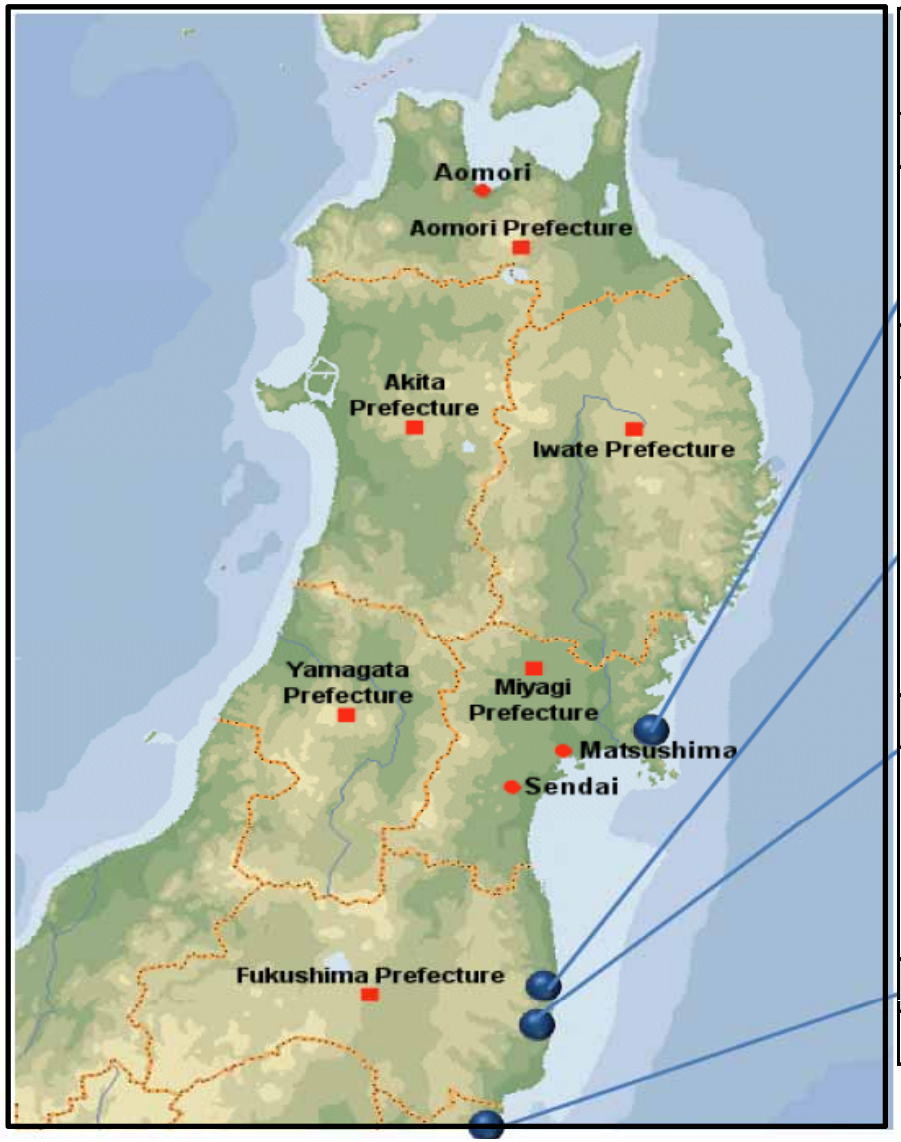
- Dead : over 12,000
- Missing : over 15,000

2. Refugees : over 160,000

(As of April 3rd)

Nuclear Reactors Near Epicenter of the Earthquake

4 Nuclear Power Stations with 14 Units

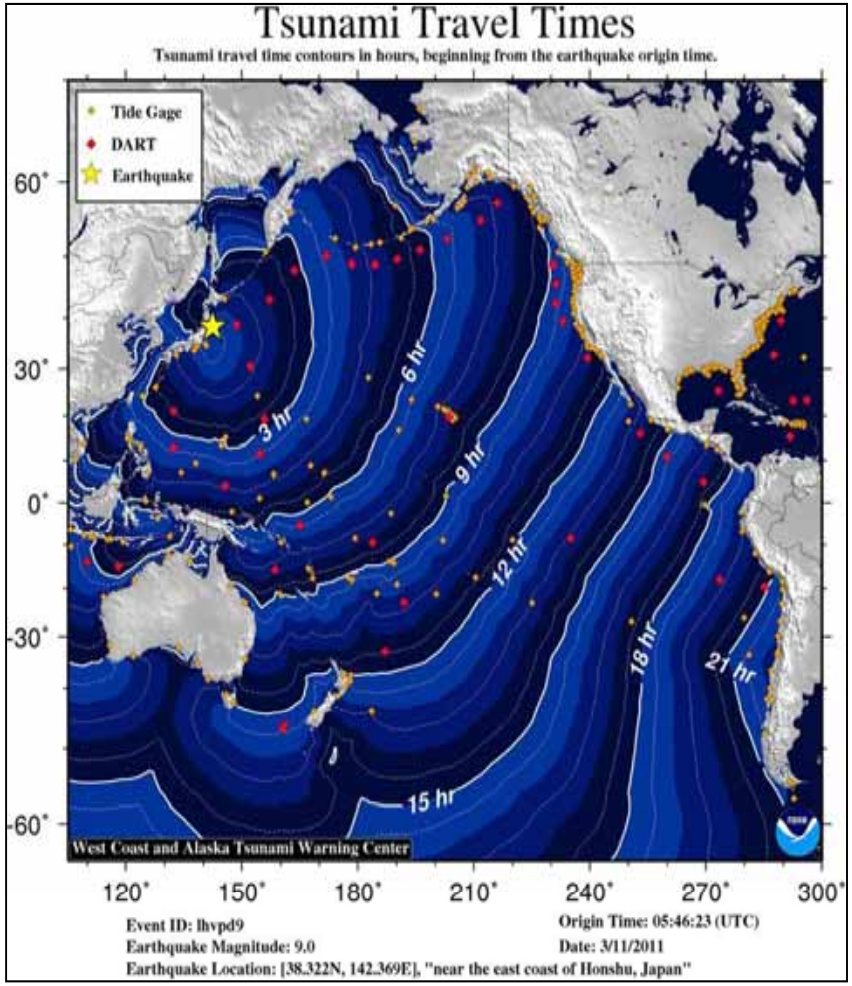


		automatic shut down	cold shut down
Onagawa			
Unit 1	524 MW, 1984-	✓	✓
Unit 2	825 MW, 1995-	✓	✓
Unit 3	825 MW, 2002-	✓	✓
Fukushima Dai-ichi			
Unit 1	460 MW, 1971-	✓	
Unit 2	784 MW, 1974-	✓	
Unit 3	784 MW, 1976-	✓	
Unit 4	784 MW, 1978-	Periodical inspection	
Unit 5	784 MW, 1978-		✓
Unit 6	1,100 MW, 1979-		✓
Fukushima Dai-ni			
Unit 1	1,100 MW, 1982-	✓	✓
Unit 2	1,100 MW, 1984-	✓	✓
Unit 3	1,100 MW, 1985-	✓	✓
Unit 4	1,100 MW, 1987-	✓	✓
Tokai Dai-ni			
Unit 1	1,100 MW, 1978-	✓	✓

1. Damages

KYODO NEWS

KYODO NEWS



NOAA/US Dept of Commerce, http://wcatwc.arh.noaa.gov/

2. Rescuing Efforts and Foreign Assistance

KYODO NEWS

Japan deeply appreciates the assistance offered from

134 countries and regions and
39 international organizations

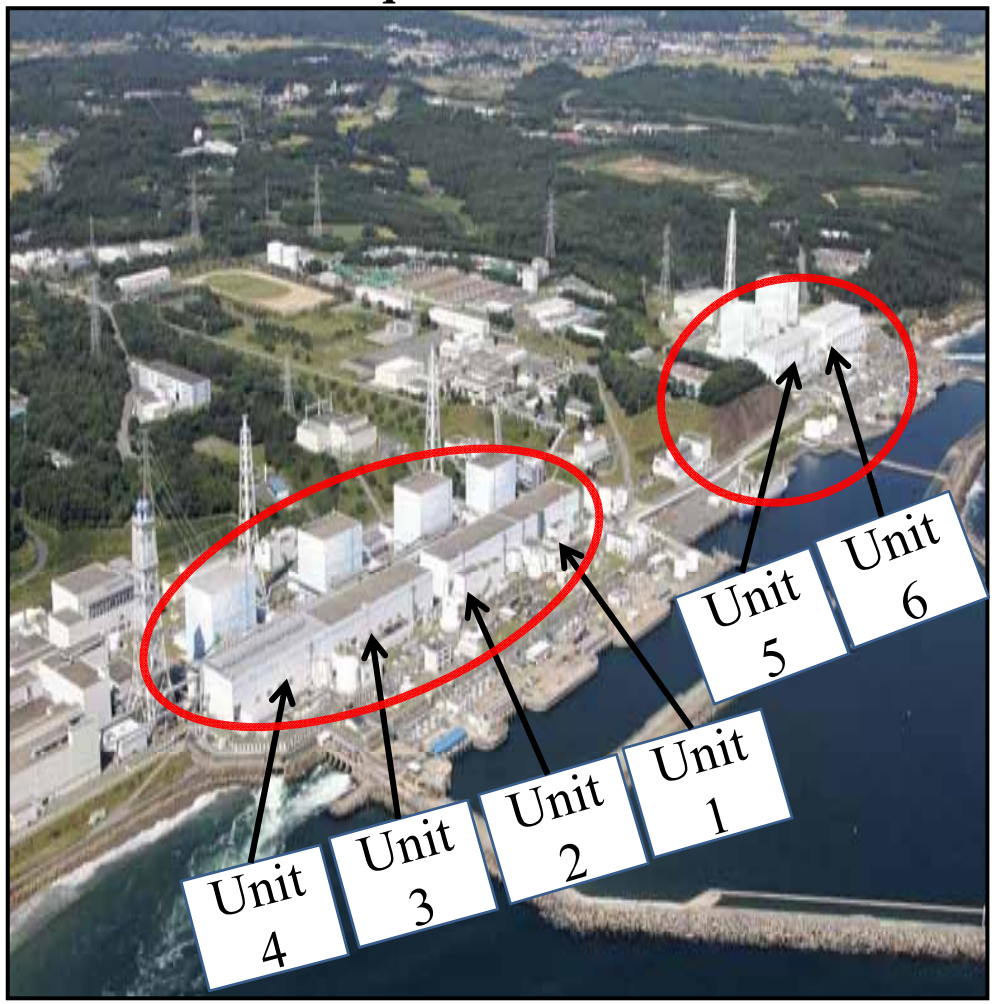
(Rescue teams were sent from 19 countries and region)

Ministry of Defense

US Navy/US Pacific Command
(Operation Tomodachi)

3. Fukushima Dai-ichi Nuclear Power Station

Before the Earthquake and Tsunamis



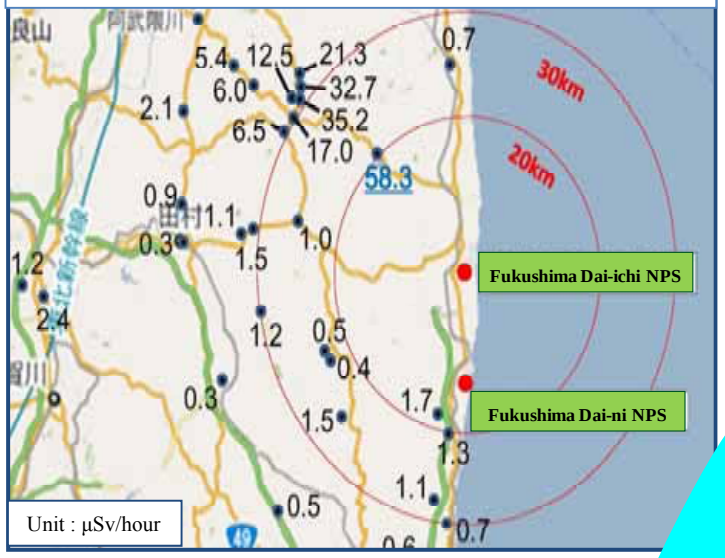
TEPCO

After the Earthquake and Tsunamis

Air Photo Service Inc (Myoko, Niigata Japan)

3. Fukushima Dai-ichi Nuclear Power Station

Evacuation



Cause of the Damage

Grid Line

① Loss of Offsite Power due to the Earthquake

Reactor Building

Turbine Building

About 20M

About 40M

Tsunami (estimated 14m)

Diesel Generator

Elevation: about 10m

② Diesel Generator Inoperable due to the Tsunami

All Motion Operated Pumps including ECCS became Inoperable

Seawater level

Seawater Pump

B. Key Challenges

1. Cool Down the Reactors
2. Contain Spreads of Radioactive Substances (sea, soil and atmosphere)
3. Rigorous and Intensive Monitoring
4. Ensure the Safety of Food, Drinking Water and On-site Workers

1. Cool Down the Reactors

(As of April 5)

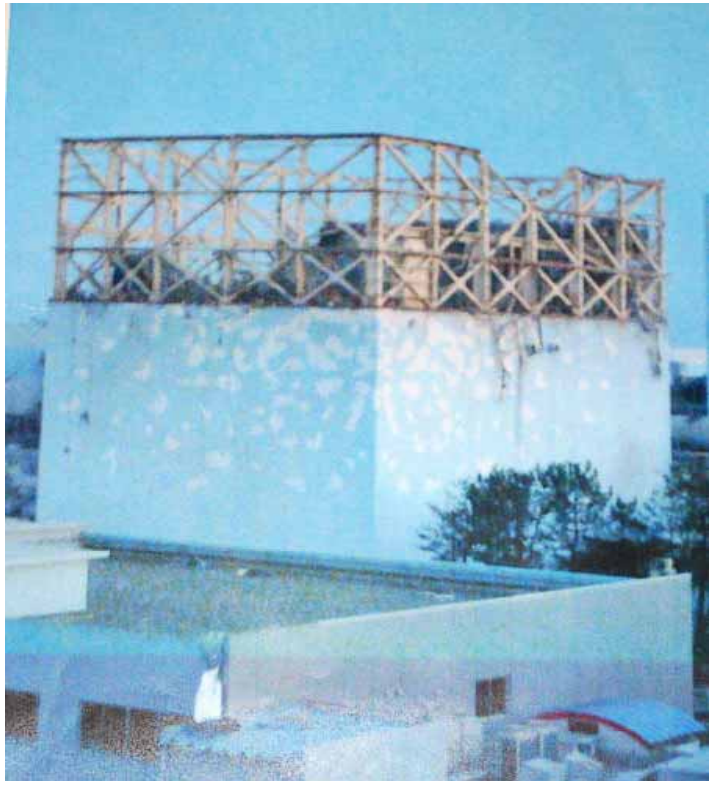
		Unit 1	Unit 2	Unit 3	Unit 4
					
Type / MW / Commercial Operation		BWR / 460 / Mar 71-	BWR / 784 / Jul 74-	BWR / 784 / Mar 76-	BWR / 784 / Oct 78-
Status at time of Earthquake		In Service	In Service	In Service	Periodical Inspection Outage
	Automatic Shutdown	✓	✓	✓	–
RPV	Fresh Water Injection	✓	✓	✓	–
	Water Level [mm] (distance from the top of fuel)	-1,650 (A)	-1,500 (A)	-1,850 (A)	–
		-1,650 (B)	N/A (B)	-2,250 (B)	
	Reactor Pressure [Mpa g]	0.304 (A)	-0.018 (A)	0.009 (A)	–
		0.632 (B)	-0.023 (B)	-0.081 (C)	
	Temperature – Feedwater Nozzle	221.6℃	140.9℃	N/A	–
	– Bottom Head of RPV	114.8℃	N/A	114.1℃	
SFP	Fresh Water Injection	✓	✓	✓	✓
	Temperature	18℃*	68℃	56℃*	50℃*
Building		Damage	Slight Damage	Damage	Damage
AC Power (Lighting of Central Operation Room**)		✓	✓	✓	✓

*Temperature based on reading of the thermograph from air by Ministry of Defense. (the indicators attached to the SFPs are broken)

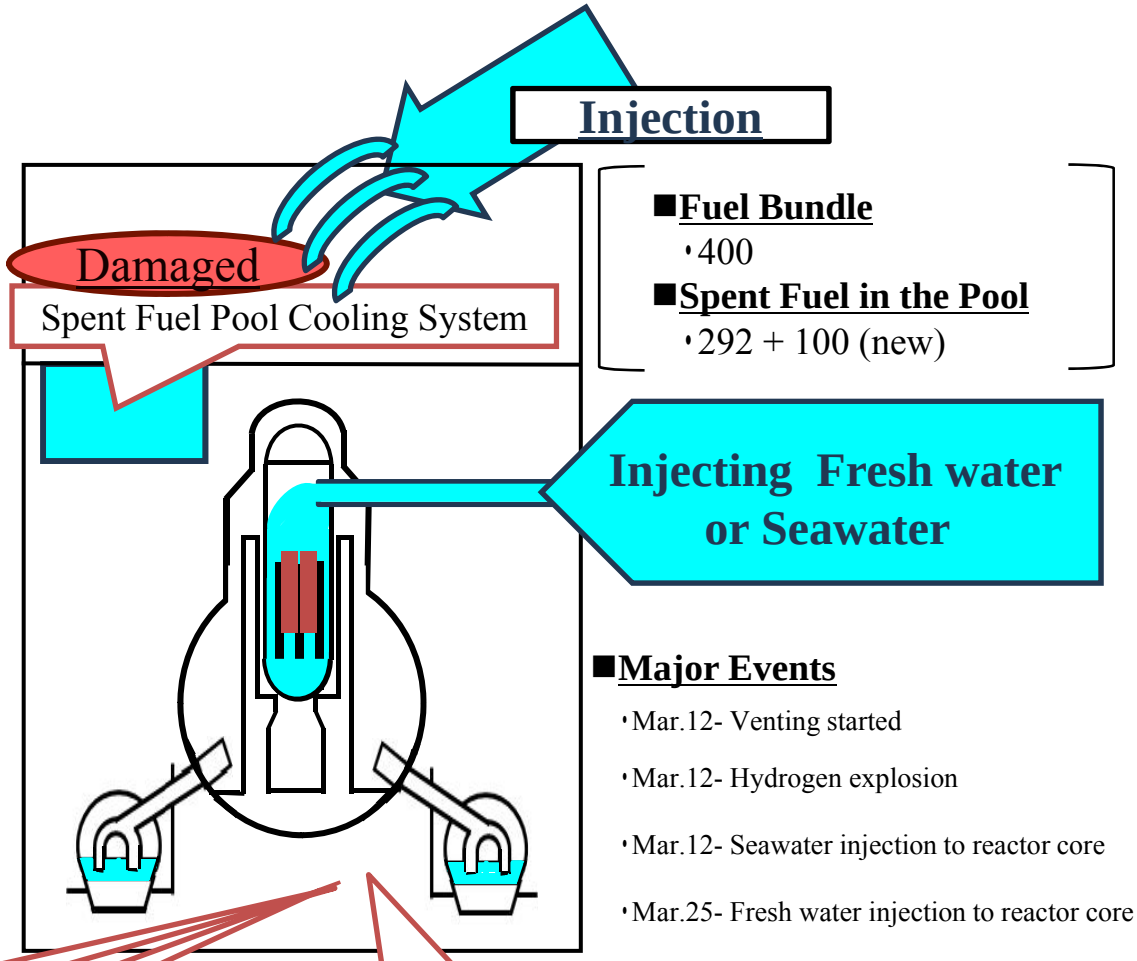
**Facilities are under-checking.

1. Cool Down the Reactors (Unit 1)

(As of 6:00 April 3rd, 2011)



TEPCO



■**Major Events**

- Mar.12- Venting started
- Mar.12- Hydrogen explosion
- Mar.12- Seawater injection to reactor core
- Mar.25- Fresh water injection to reactor core
- Mar.31- Fresh water spray by concrete pump trucks

Damaged

Recovered

Emergency Diesel Generator

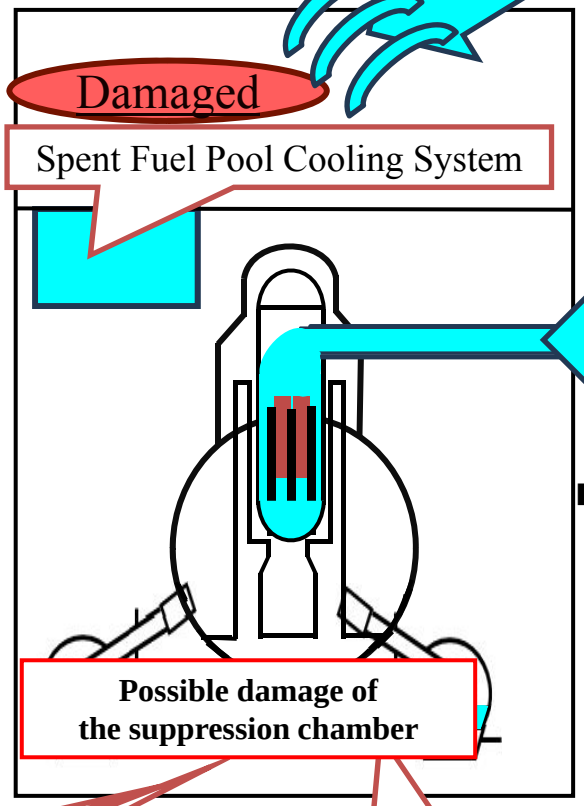
Residual Heat Removal System

External Power
(Mar.24- connected to the central control room)

1. Cool Down the Reactors (Unit 2)

(As of 6:00 April 3rd, 2011)

Ministry of Defense



Injection

Damaged

Spent Fuel Pool Cooling System

■**Fuel Bundle**
- 548

■**Spent Fuel in the Pool**
- 587 + 28 (new)

Injecting Fresh water or Seawater

■**Major Events**

- Mar.13- Venting started
- Mar.14- Seawater injection to reactor core
- Mar.15- Sound of explosion
- Mar.20- Seawater injection to spent fuel pool (SFP)
- Mar.26- Fresh water injection to reactor core
- Apr. 1- Fresh water injection to SFP

Damaged

Emergency Diesel Generator

Residual Heat Removal System

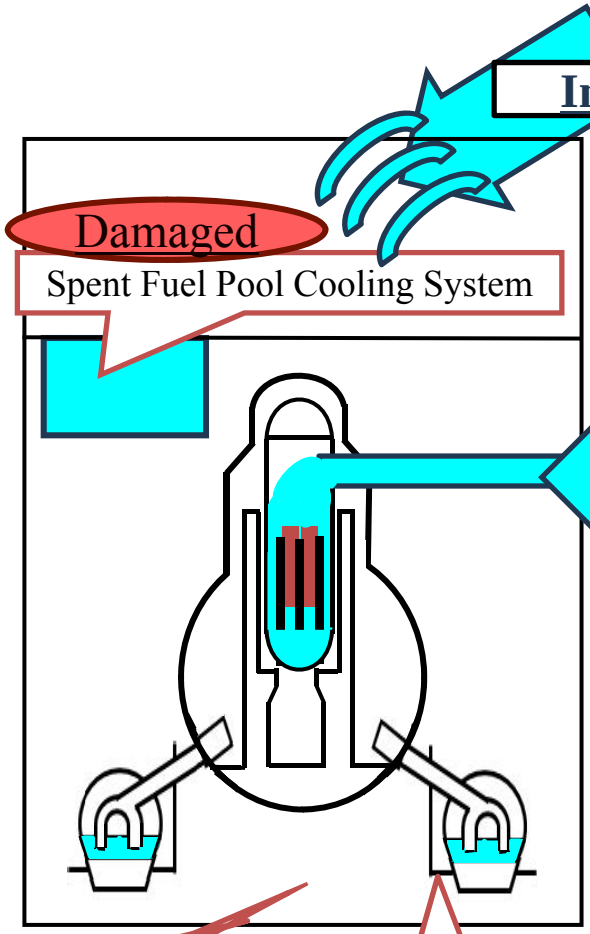
Recovered

External Power
(Mar.26- connected to the central control room)

1. Cool Down the Reactors (Unit 3)

(As of 6:00 April 3rd, 2011)

Air Photo Service Inc (Myoko, Niigata Japan)



■**Fuel Bundle**
- 548

■**Spent Fuel in the Pool**
- 514 + 52 (new)

Injecting Fresh water or Seawater

■**Major Events**

- Mar.13- Venting started
- Mar.13- Seawater injection to reactor core
- Mar.14- Hydrogen explosion
- Mar.17- Seawater discharge by helicopters and sprayed to spent fuel pool (SFP)
- Mar.25- Fresh water injection to reactor core
- Mar.29- Fresh water spray by concrete pump trucks to SFP

Damaged

Emergency Diesel Generator

Residual Heat Removal System

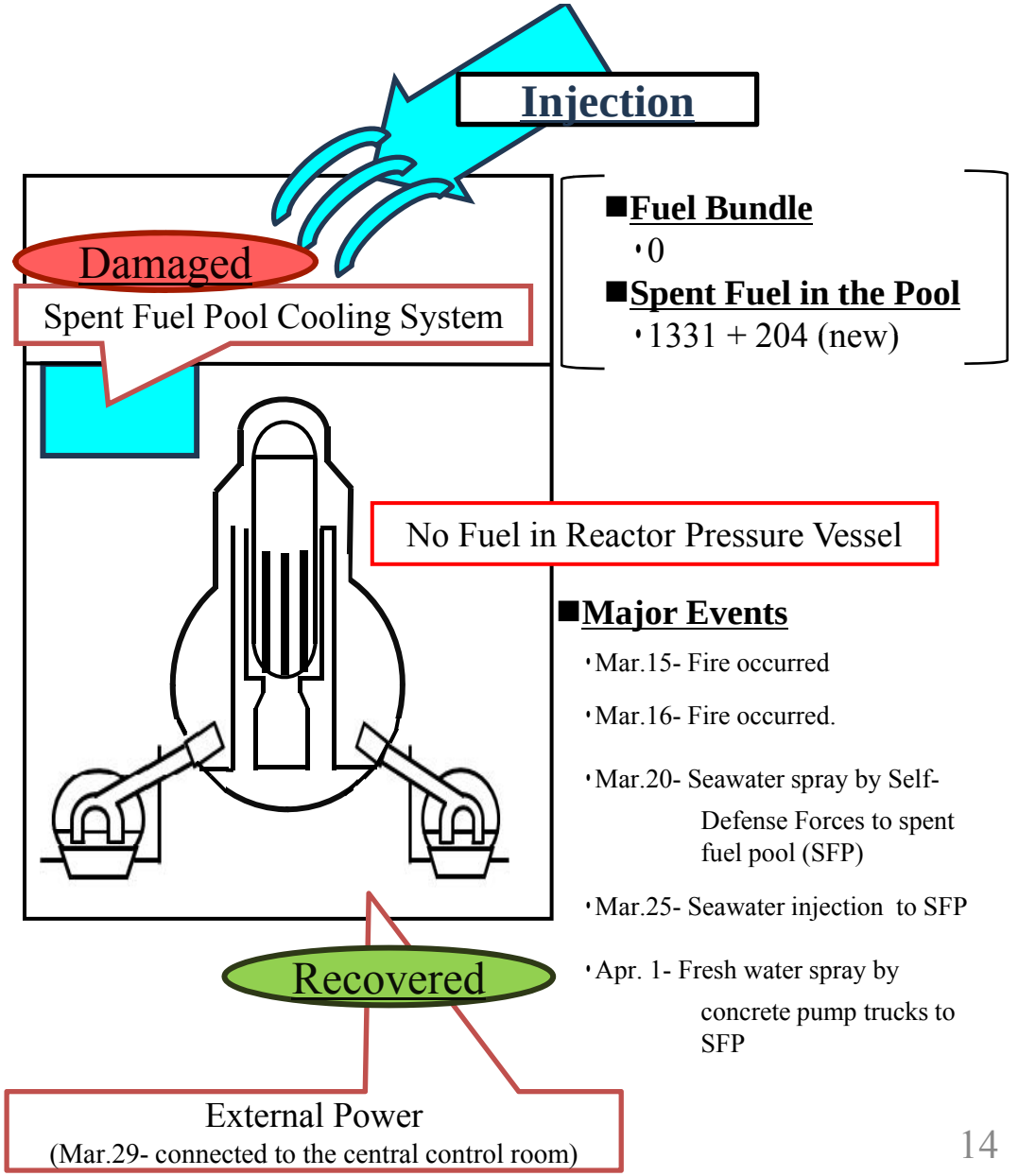
Recovered

External Power
(Mar.22- connected to the central control room)

1. Cool Down the Reactors (Unit 4)

(As of 6:00 April 3rd, 2011)

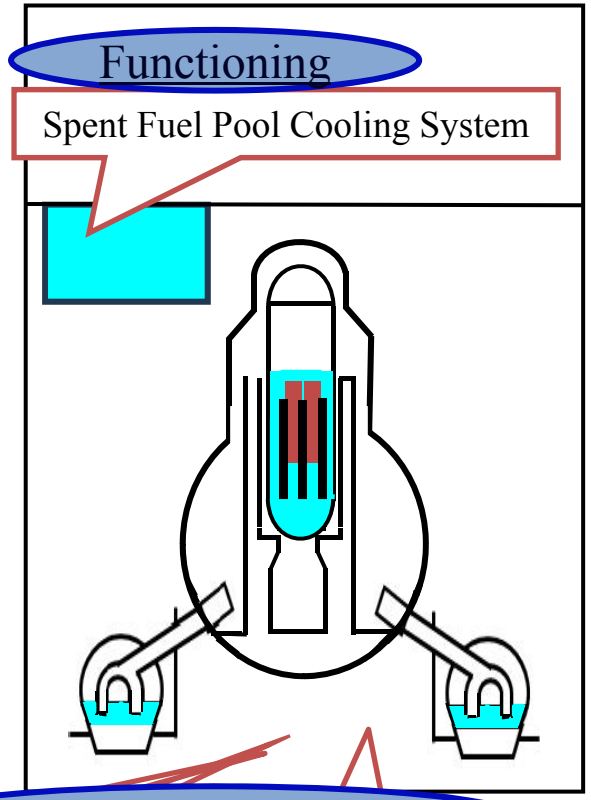
Air Photo Service Inc (Myoko, Niigata Japan)



1. Cool Down the Reactors (Unit 5&6)

(As of 6:00 April 3rd, 2011)

KYODO NEWS



■**Fuel Bundle**
- Unit5 : 548
- Unit6 : 764

■**Spent Fuel in the Pool**
- Unit 5 : 946 + 48 (new)
- Unit 6: 876 + 64 (new)

Other Nuclear Power Stations in the Tohoku Area

Onagawa (3 Units)

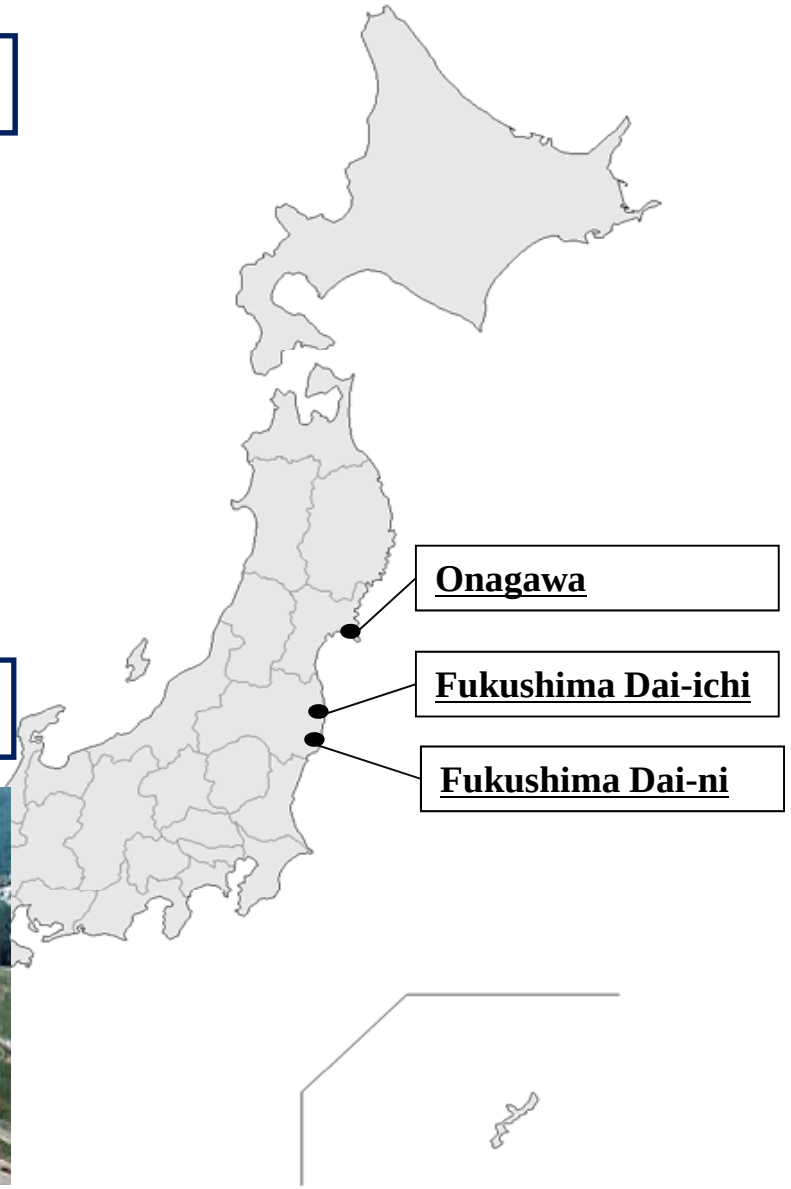
Tohoku Electric Power Co., Inc

All units (Units 1-3) were immediately shut down automatically, then safely cold shut down.

Fukushima Dai-ni (4 Units)

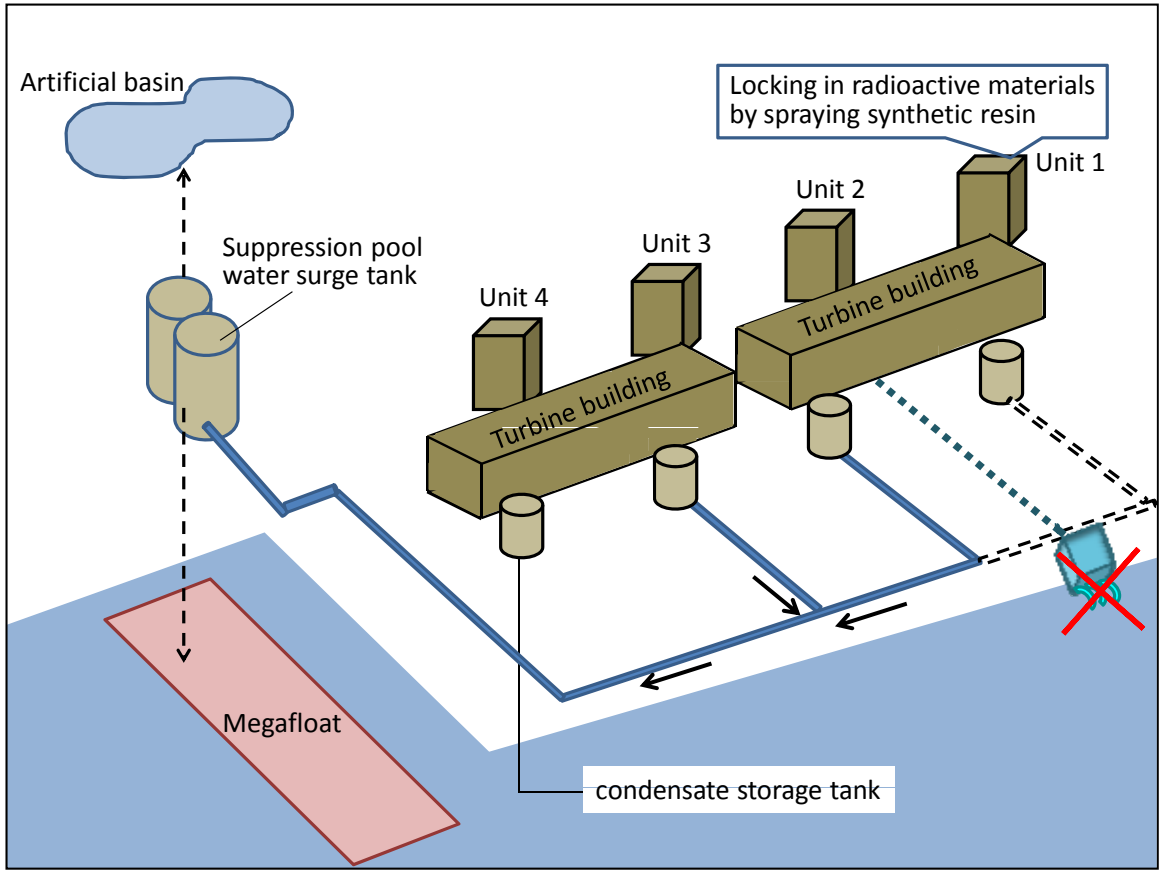
All units (Units 1-4) were immediately shut down automatically, then safely cold shut down.

TEPCO



2. Contain Spreads of Radioactive Substances
(sea, soil and atmosphere)

The Japanese Government and TEPCO are making the utmost effort to prevent the dispersion of flow-out radioactive contaminated water.



■Major Events

- Mar. 27
  Stagnant water on the basement floor of the turbine of Unit2 and in the trenches found to be highly contaminated.
- Mar. 29
  Stagnant water in the trenches and the turbine building transferred to the storage tank, then to the surge tank.
- Apr. 1
  Highly contaminated water discovered leaking into the sea.
- Apr. 6
  Leak of contaminated water into the sea was stopped.

2. Contain Spreads of Radioactive Substances
(sea, soil and atmosphere)

Experts are making the utmost effort to prevent dispersing radioactive substances contained in dust, debris and vapor.

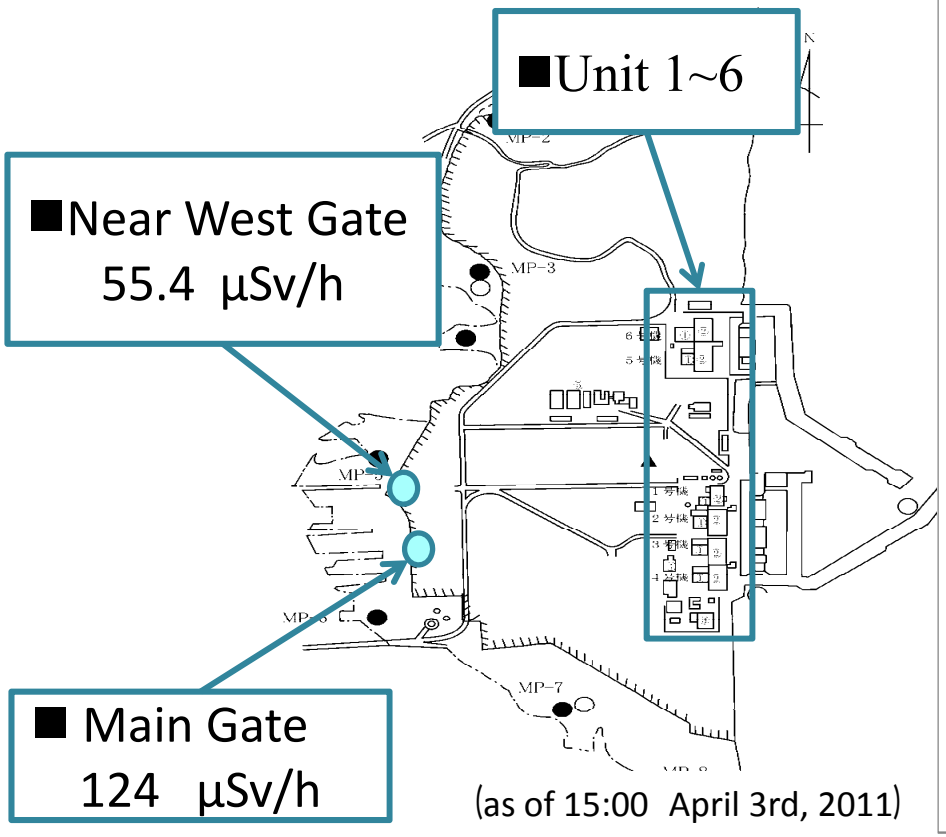
Spraying synthetic materials on the surface of the ground and debris to prevent radioactive substances dispersion

TEPCO

3. Rigorous and Intensive Monitoring

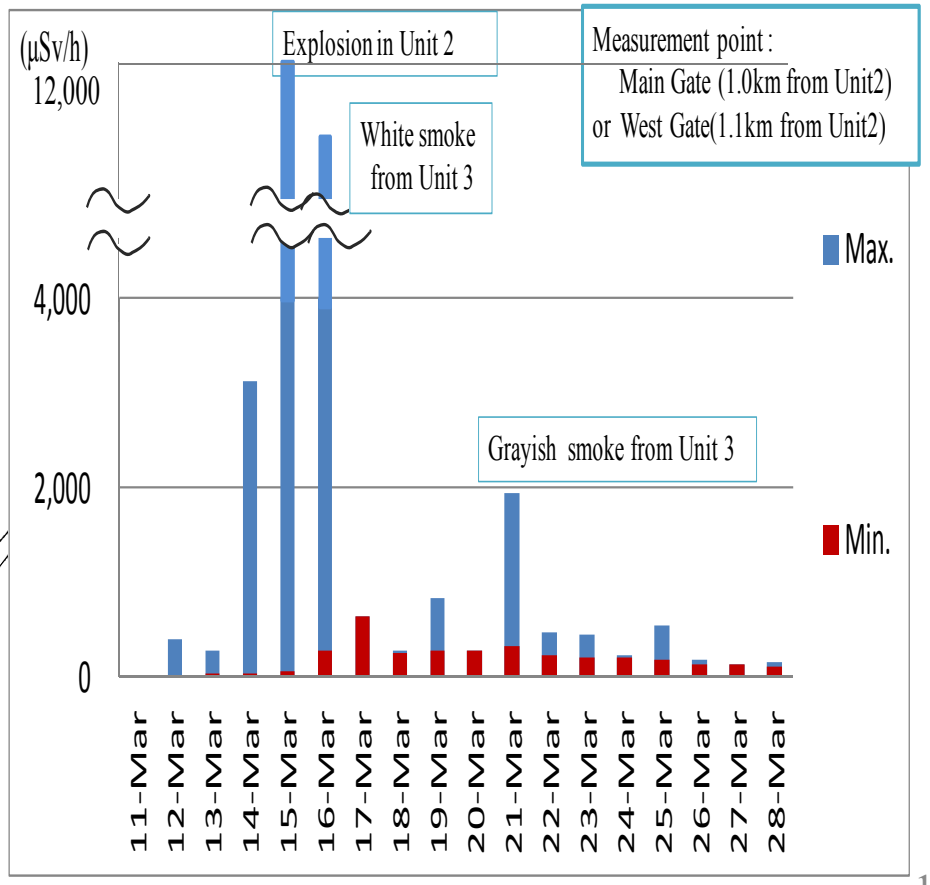
TEPCO monitors radioactivity levels every ten minutes and releases the results immediately. Radioactivity levels rose on March 15th, but has since fallen and remain low.

Monitoring posts and the readings at the Fukushima Dai-ichi NPS

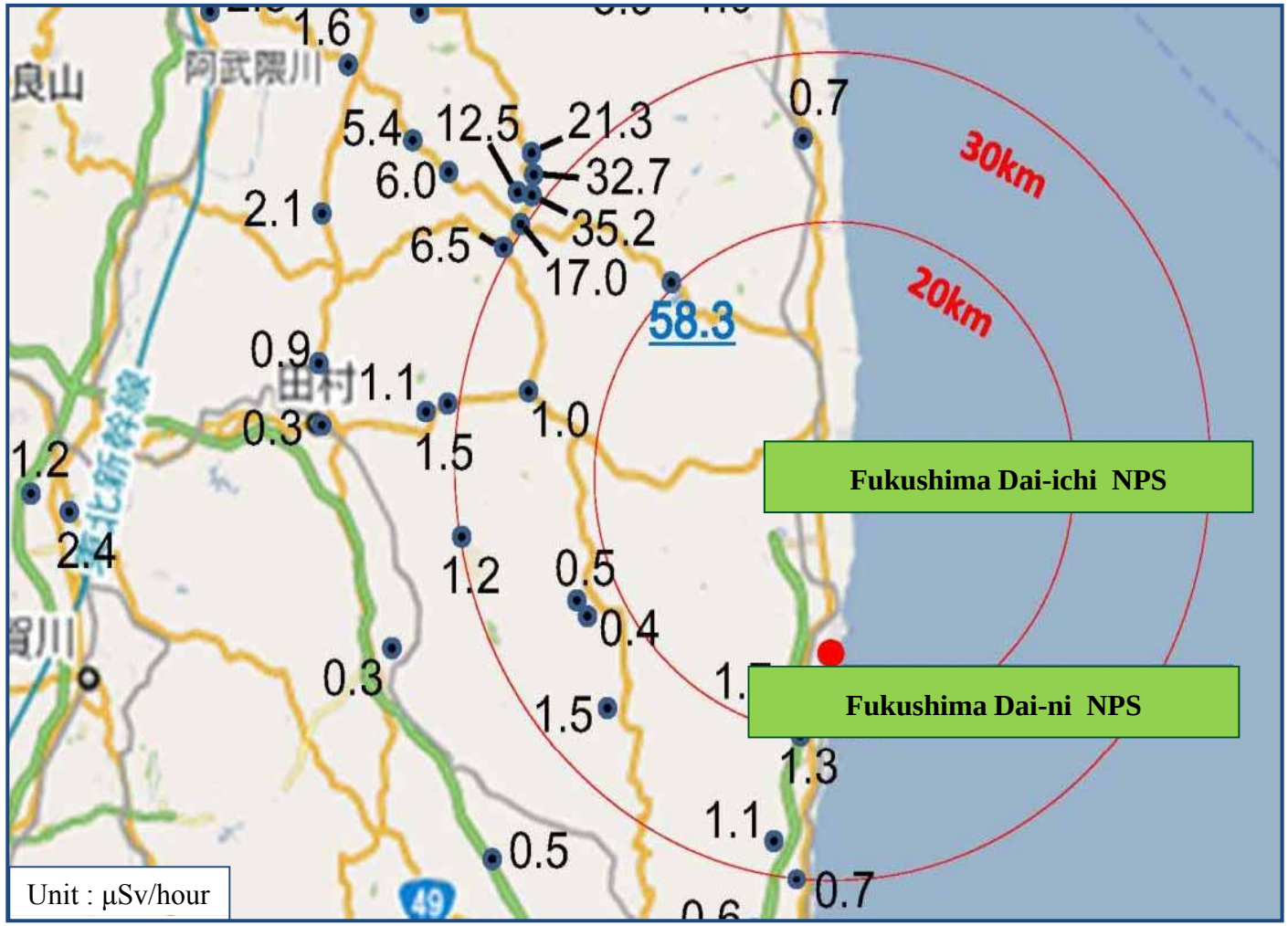


(as of 15:00 April 3rd, 2011)

Environmental Radioactivity Level at the Fukushima Dai-ichi NPS

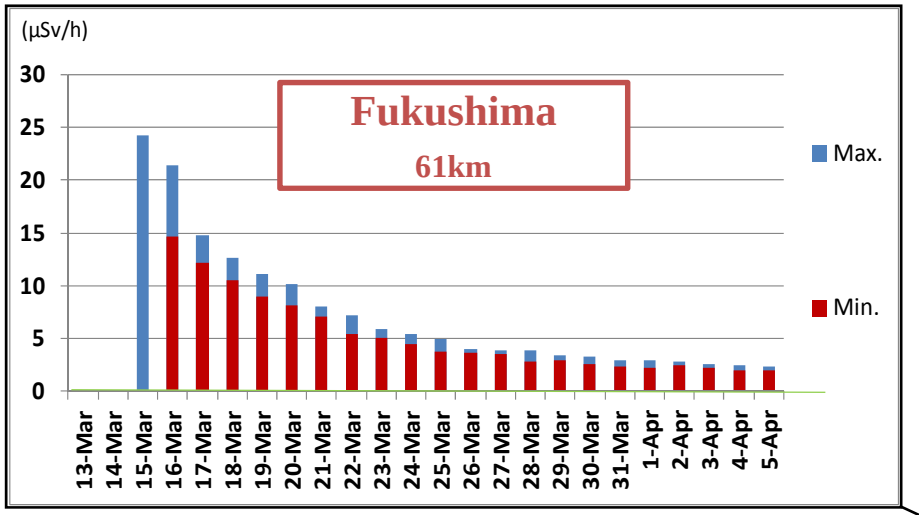


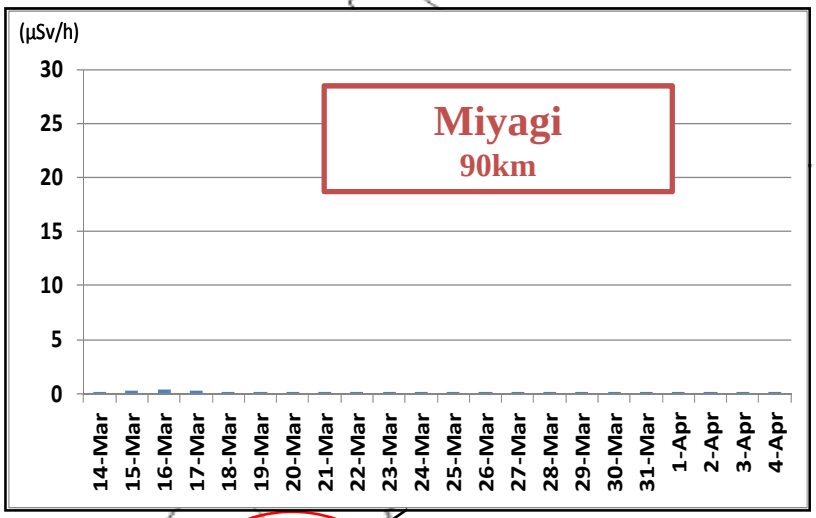
Readings at Monitoring Posts out of Fukushima Dai-ichi NPS

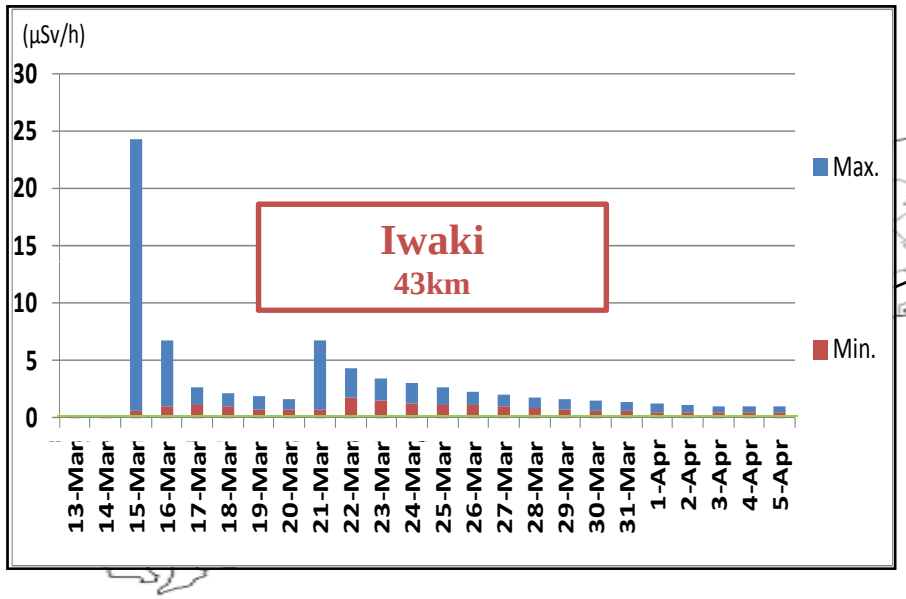


Ministry of Education, Culture, Sports, Science and Technology (MEXT)

Atmospheric Readings within 100km

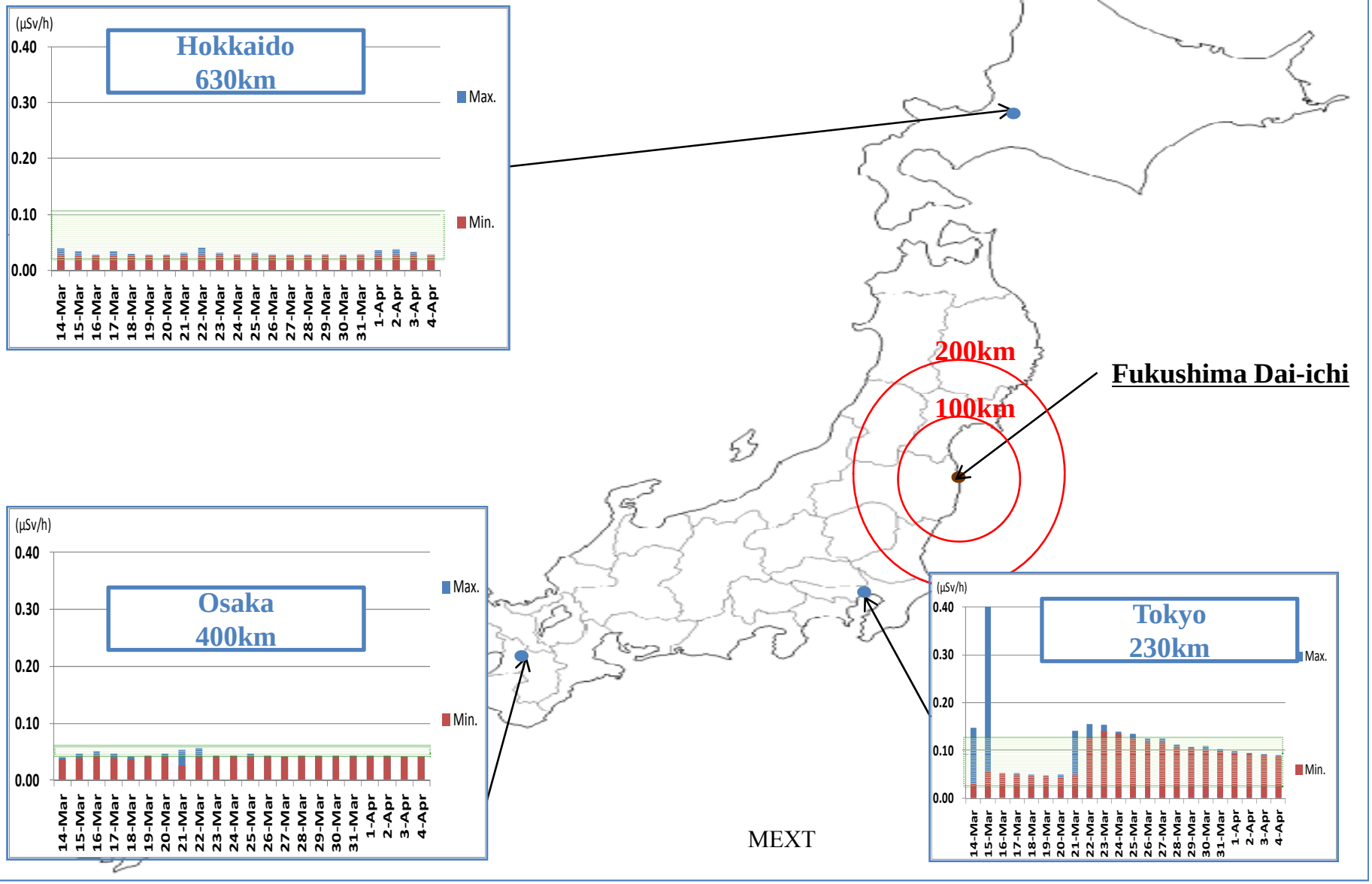






MEXT, Fukushima Prefectural Government

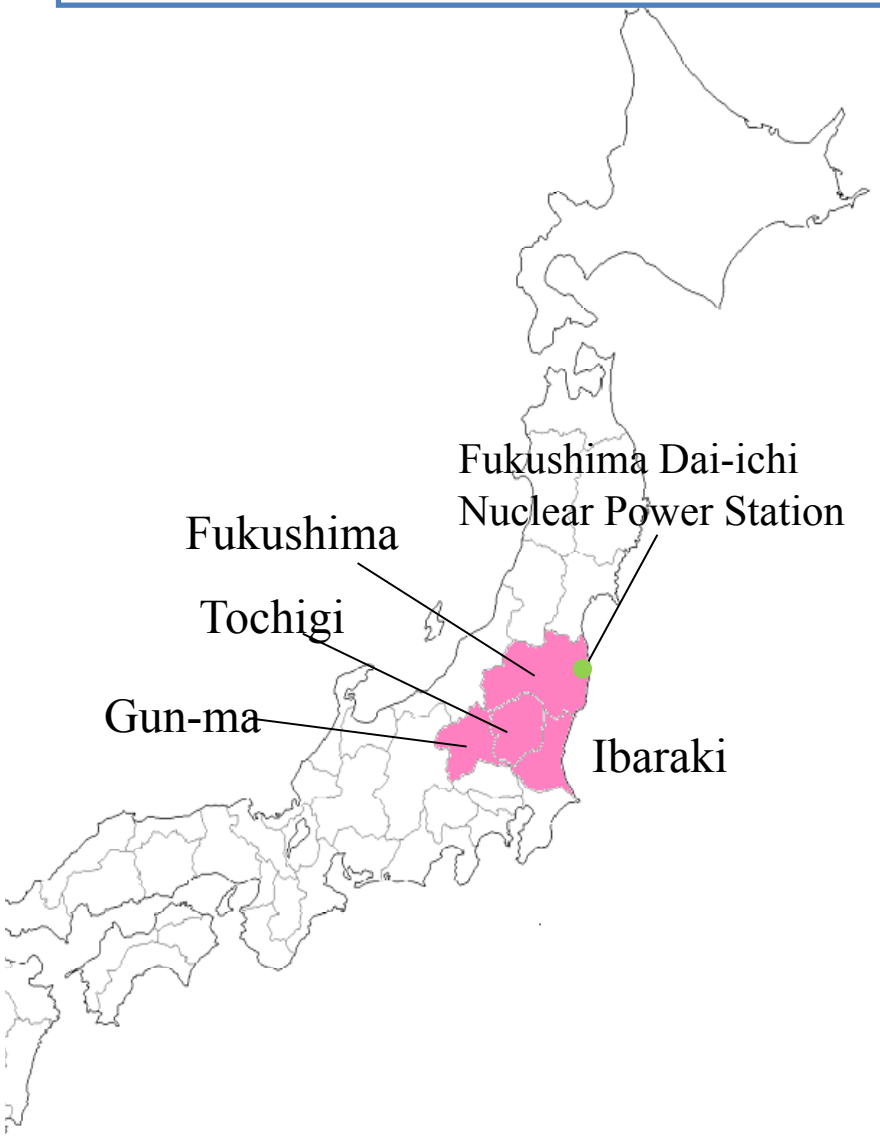
Atmospheric Readings in Tokyo, Osaka and Sapporo



MEXT

4. Ensure the Safety of Food and Water

The Japanese government inspects radiation dosages every day, and prohibits distribution and consumption of food that fails to meet stringent criteria.



Instructions
(issued by Prime Minister on 21, 23 March 2011)

… Not to Distribute

∗Fukushima Prefecture
- Fresh raw milk
- Non-head type leafy vegetables and head type leafy vegetables (e.g. spinach)
- Flowerhead brassicas including turnip (e.g. broccoli, cauliflower)

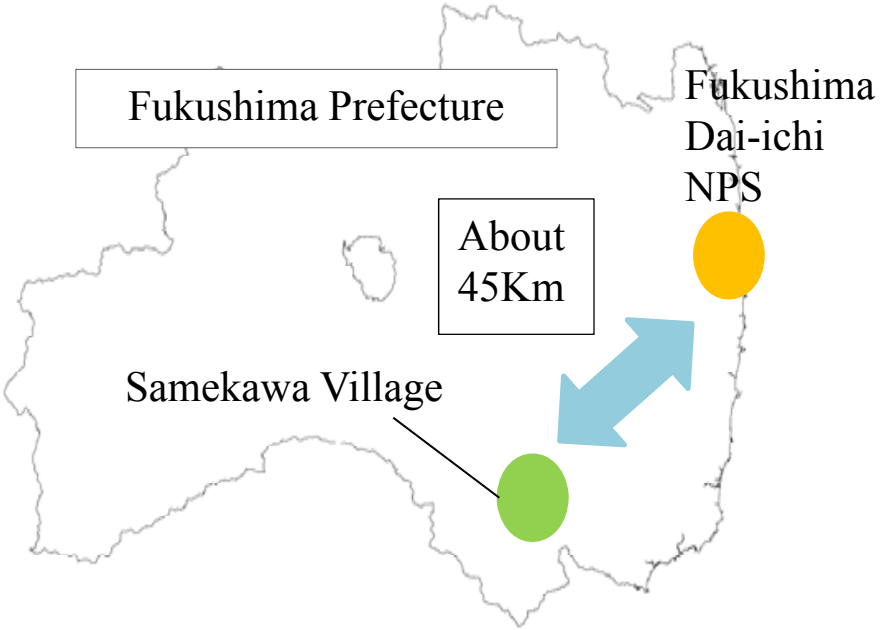
∗Ibaraki Prefecture
- Fresh raw milk
- Spinach
- Parsley

∗Tochigi and Gun-ma Prefectures
- Spinach

… Not to Consume

∗Fukushima Prefecture
- Non-head type leafy vegetables and head type leafy vegetables
- Flowerhead, brassicas

Safety of Farm Produce



Radioactive Contamination in Leafy Vegetables in Samekawa-village (Fukushima Prefecture)

(bq/kg)	Samekawa-village		
	21-Mar		24-Mar
radioactive iodine	5,900	→	1,200
radioactive cesium	1,700		68

Guidance Levels for Radionuclides in Vegetables

Japan	EU	IAEA *	
2,000	2,000	3,000	
500	1,250	1,000	(Cs134)

Source: Ministry of Health, Labour and Welfare, EURATOM, IAEA

*OIL(Operational Intervention Levels)6 : Locally produced food, milk and water have been screened, and all members of the public, including infants, children and pregnant women can safely drink the milk and water and eat the food during the emergency phase.

Safety of Drinking Water

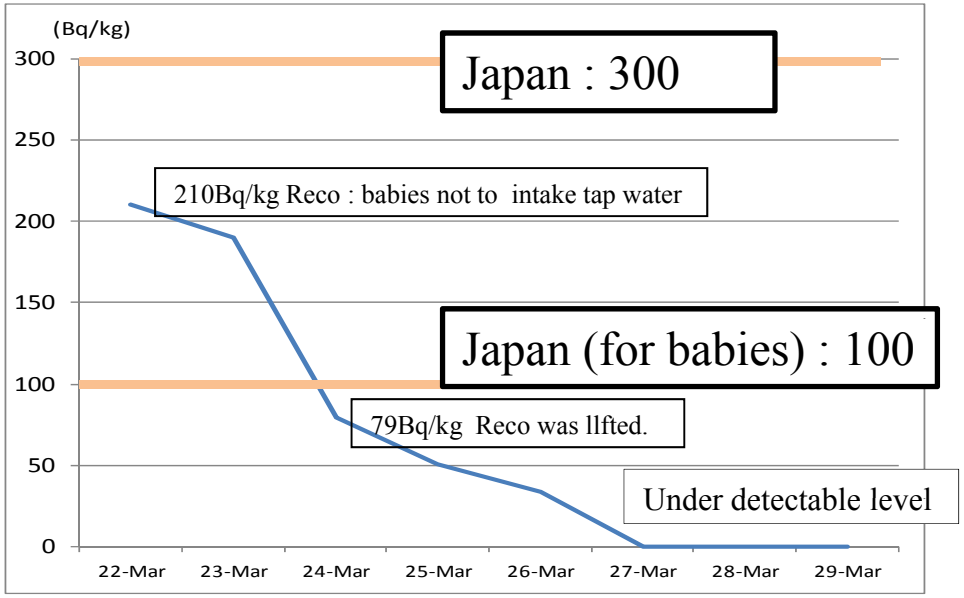
The Japanese Government has been implementing necessary measures based on its stringent criteria for radionuclides in drinking water, and monitoring radionuclide levels every day.

Guidance Levels for Radionuclides in Drinking Water

(Bq/kg)	Japan	EU
radioactive iodine(I131)	300 (for babies) 100	500
radioactive cesium	200	1,000

Ministry of Health, Labour and Welfare, EURATOM

Radioactive Iodine(I131) in Drinking-Water in Tokyo
(Kanamachi filter plant)



Bureau of waterworks Metropolitan Tokyo Government

*On March 23, the Japanese Government recommended that the residents in Tokyo area refrain from having their babies intake tap water, but it lifted the recommendation in two days.

Safety of On-site Workers

The Japanese Government closely supervises on-site workers' health conditions, limiting the level of their maximum exposure to radiation to 250mSv.

No workers in Fukushima NPS have been exposed to 250mSv or more.

On March 24, three workers exposed to more than 170mSv. were hospitalized, but were released four days later after no health problems were found.

Emergency Dose Limit

mSv	JAPAN
emergency dose limit	100 ↓ 250 (limit raised for Fukushima emergency workers)

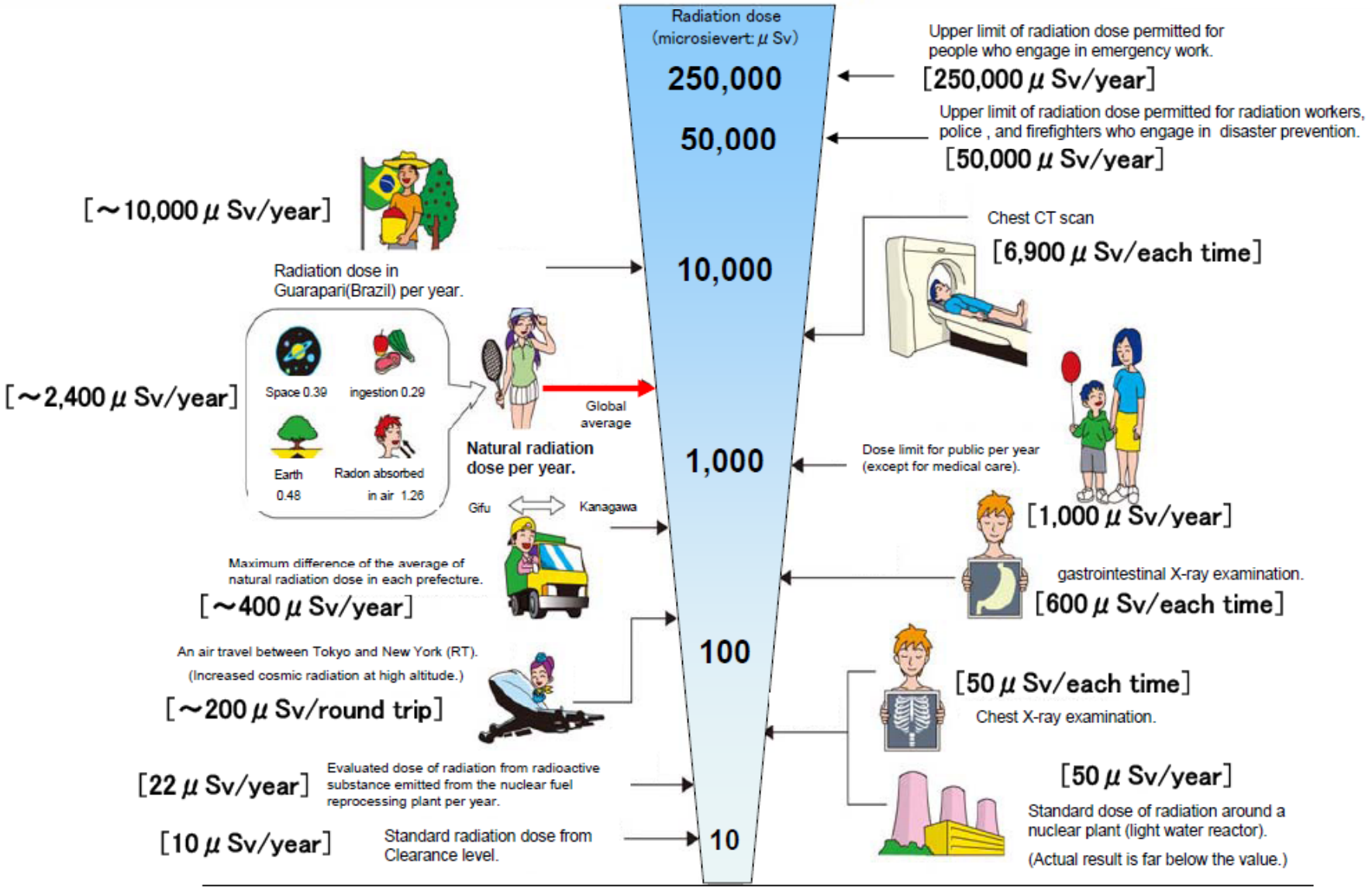
Ministry of Health, Labour and Welfare, Nuclear and Industrial Safety Agency, ICRP,

Workers Exposed to Radiation in Fukushima Dai-ichi NPS, as of April 5

level of exposure	number of workers
more than 100mSv	21
more than 250mSv	0

Nuclear and Industrial Safety Agency

Radiation in Daily-life



Ministry of Education, Culture, Sports, Science and Technology (MEXT)

C. Impact on Japanese Economy

1. Estimated Economic Damages and Plan for Reconstruction

2. Impact on Energy Supply/Demand in Japan

1. Estimated Economic Damages and Plan for Reconstruction

Damaged Stocks in Disaster Areas

* estimated by the Cabinet Office of Japan

16～25 trillion Yen
(US$195～305 billion)

(Reference) Japan's GDP : 500 trillion Yen (US$5.9 trillion)

Recovery and Plan for Reconstruction

*from the speech of Prime Minister Kan on April 1

Short-term: Clearing Debris, Erecting Temporary Housing, Rehabilitating Industrial Facilities

Mid and Long-term: Disaster-Resilient, Eco-Friendly, and Welfare-Oriented City Planning

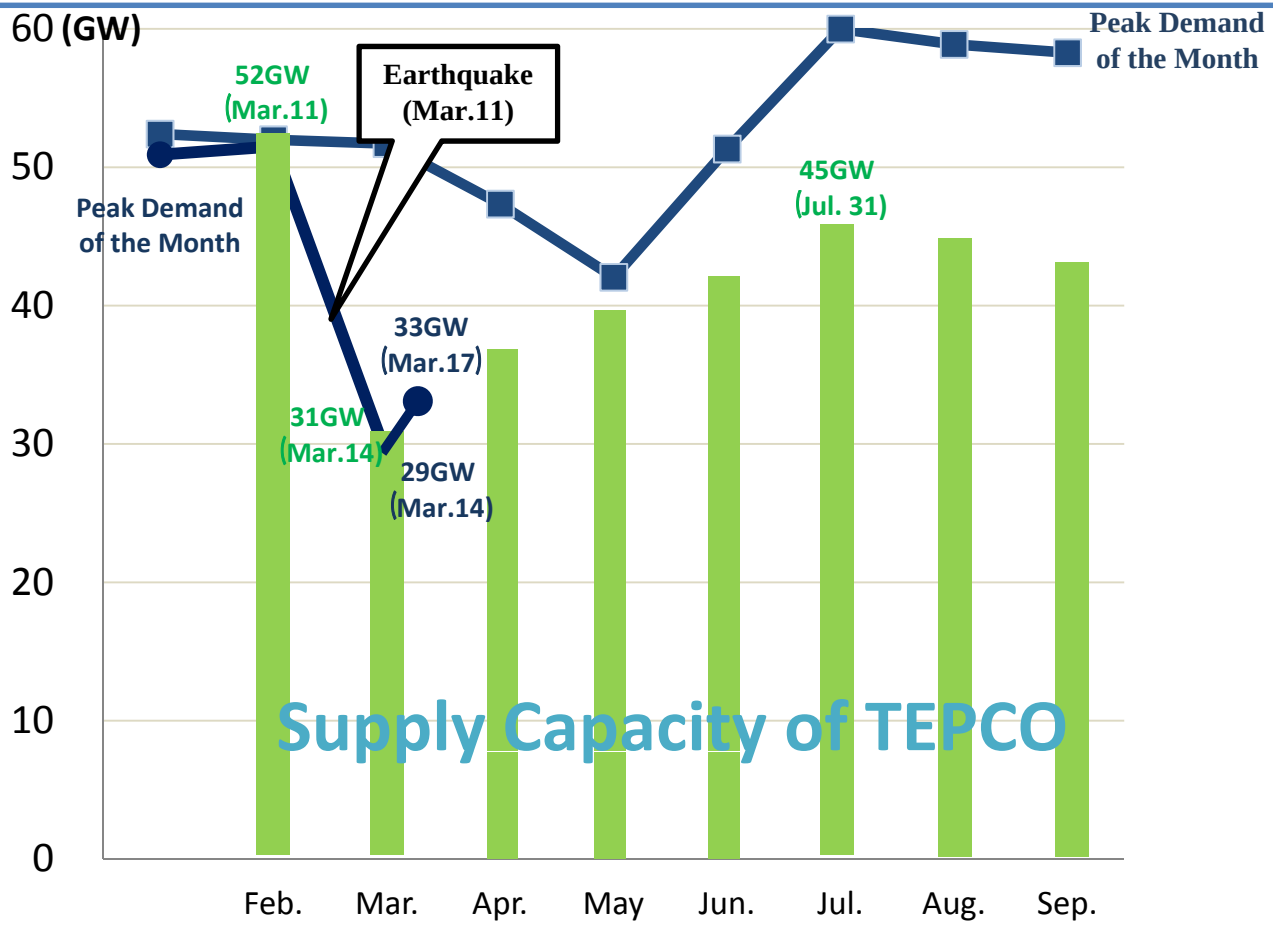
Establishing "Reconstruction Planning Council"

Compiling Supplementary Budgets

2. Impact on Energy Supply/Demand in Japan

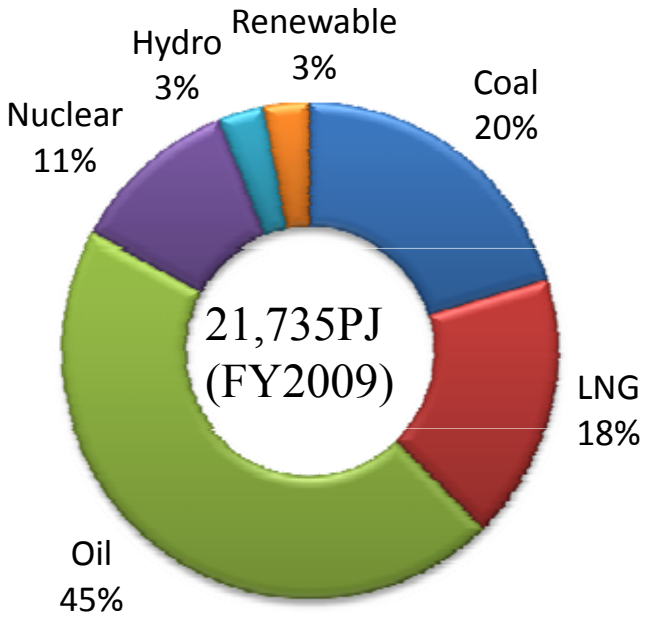
Tokyo Electric Power Company (TEPCO) normally supplies electricity to an area with a population of over 42 million producing almost 40% of Japan's GDP, but lost 40% of its generation capacity after the earthquake and tsunami.

We are making the utmost effort to match supply and demand during the peak-load summer on both demand side (intensive energy saving and scheduled rolling blackouts) and supply side (capacity expansion of thermal plants).



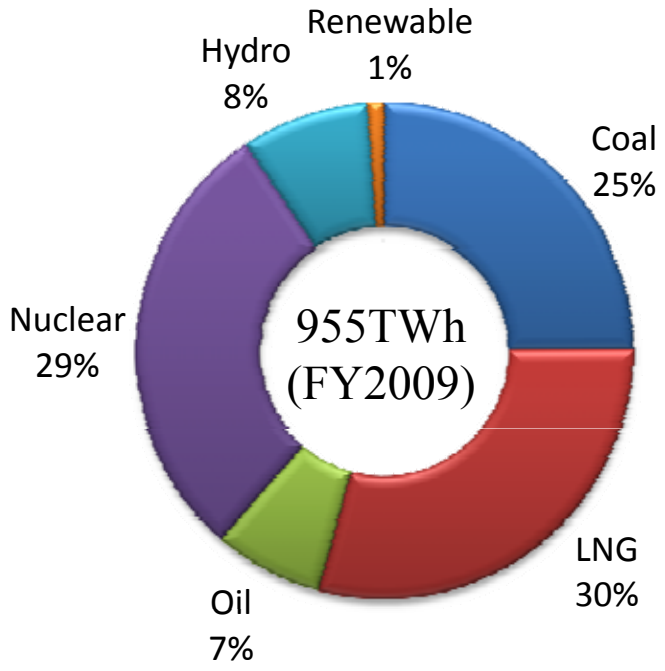
Energy Supply and Electricity Generation by Energy Source

Total Primary Energy Supply



Agency for Natural Resources and Energy
"Energy Balance of Japan"

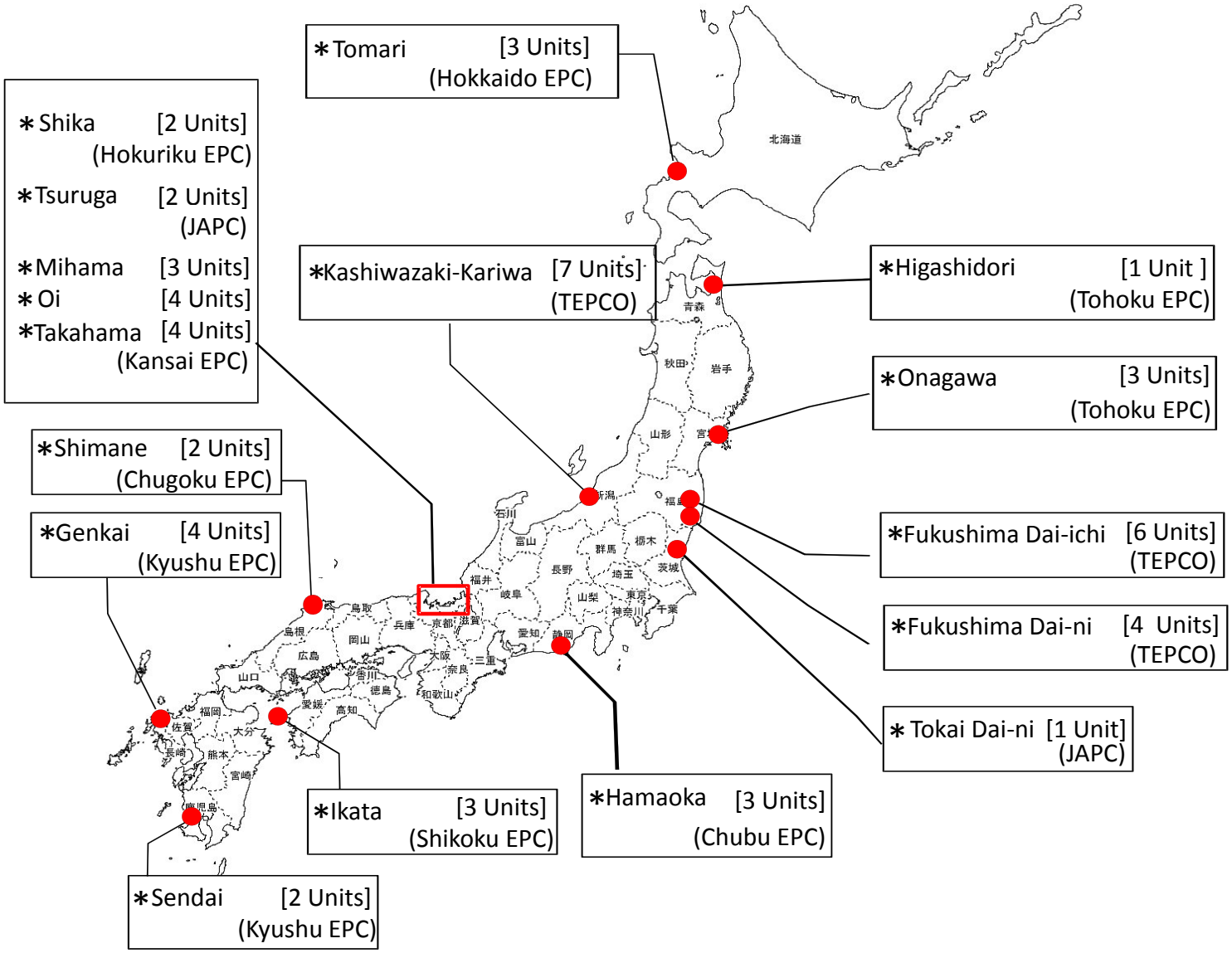
Total Electricity Generation



Agency for Natural Resources and Energy
"Current Situation of Electricity Development"

Location of Nuclear Power Stations in Japan

54 units (30 units of BWR and 24 units of PWR, total 49GW) in 17 sites



D. Responsiveness to the World

1. Cooperation with International Organizations
2. Speedy Dissemination of Accurate Information

Cooperation with International Organizations

- International Atomic Energy Agency (IAEA)
- International Civil Aviation Organization (ICAO)
- International Maritime Organization (IMO)
- World Meteorological Organization (WMO)
- World Health Organization (WHO)

March 19, Joint Statements confirmed
- No Restrictions on Air Travel to Japan -

- International flight and maritime operations can continue normally into and out of Japan's major airports and sea ports, excluding those damaged by the tsunami.
- Screening for radiation of international passengers from Japan is not considered necessary at this time.
- Currently available information indicates that increased levels have been detected at some airports, but these do not represent any health risk.

•Joint Statements from above Five Organizations
http://www2.icao.int/en/NewsRoom/Lists/News/Attachments/37/PIO.05.11.EN.pdf

Speedy Dissemination of Accurate Information

- Japan is committed to the speedy dissemination of accurate information.
- All necessary information are available below.

Japan's Countermeasures

- 1.http://www.kantei.go.jp/foreign/incident/index.html
- 2.http://www.meti.go.jp/english/index.html
- 3.http://www.nisa.meti.go.jp/english/

Measurement of Radioactivity Doses

- 1.http://www.mext.go.jp/english/radioactivity_level/detail/1303986.htm
- 2.http://www.nisa.meti.go.jp/english/
- 3.http://www.worldvillage.org/fia/kinkyu_english.php

Water Safety

- 1.http://www.mhlw.go.jp/english/topics/2011eq/index.html
- 2.http://www.waterworks.metro.tokyo.jp/press/shinsai22/press110324-02-1e.pdf

Food Safety

- 1.http://www.maff.go.jp/e/index.html
- 2.http://www.mhlw.go.jp/english/topics/2011eq/index.html

Ports and Airports Safety

- 1.http://www.mlit.go.jp/page/kanbo01_hy_001428.html
- 2.http://www.mlit.go.jp/koku/flyjapan_en/index.html