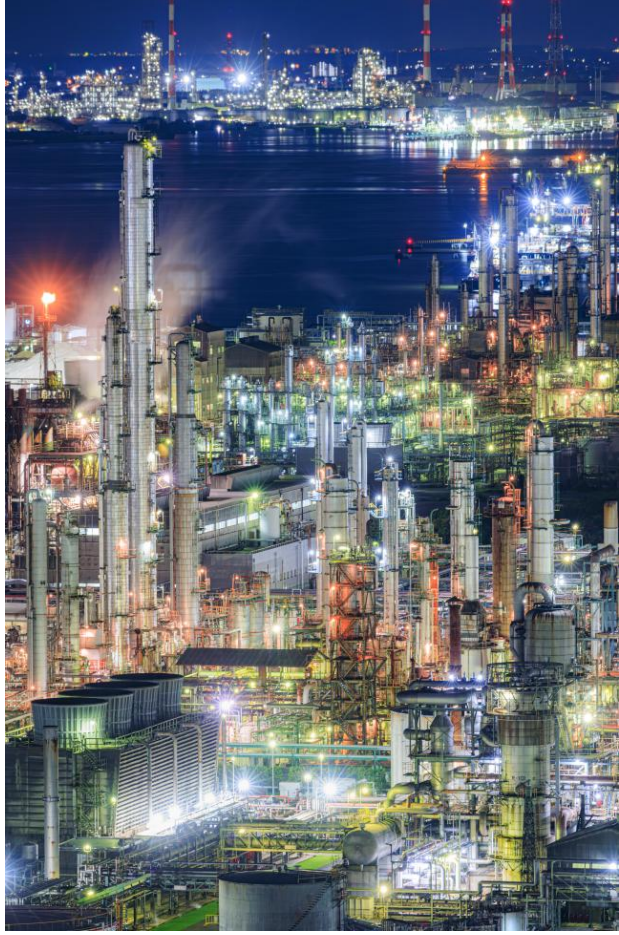
Environmental protection, economic activity, and community stability



～Air pollution in Yokkaichi City and implementation of countermeasures～

Hideki MINAMIKAWA

President, Japan Environmental Sanitation Center (JESC)

Former Administrative Vice Minister,

Ministry of the Environment

CONTENTS

CONTENTS

Yokkaichi City: Severe air pollution and health hazards in 1960s

- My Hometown
- Led me to pursue a career in environmental administration.
- In order to learn how environmental administration should be, I conducted a thorough survey of the history of pollution in Yokkaichi:
  - through interviews with the administrative officials and scientists of the time
  - covering from the occurrence of pollution to the relief of health hazards and the introduction of strong preventive measures.

Books for Reference

Pollution in Japan

By Hikaru Shoji and Kenichi Miyamoto — a foundational account of industrial pollution across postwar Japan.

Yokkaichi Pollution: Lessons Learned and Challenges for the 21st Century

By Katsumi Yoshida — a detailed case study of the Yokkaichi crisis and its enduring policy implications.

Personal History of Environmental Administration: Between Scientists and Administrators

By Michio Hashimoto — an insider account of how science and policy intersected during Japan's environmental awakening.

Yokkaichi from 1960 to 1970: Symbol of Japan's Economic Growth

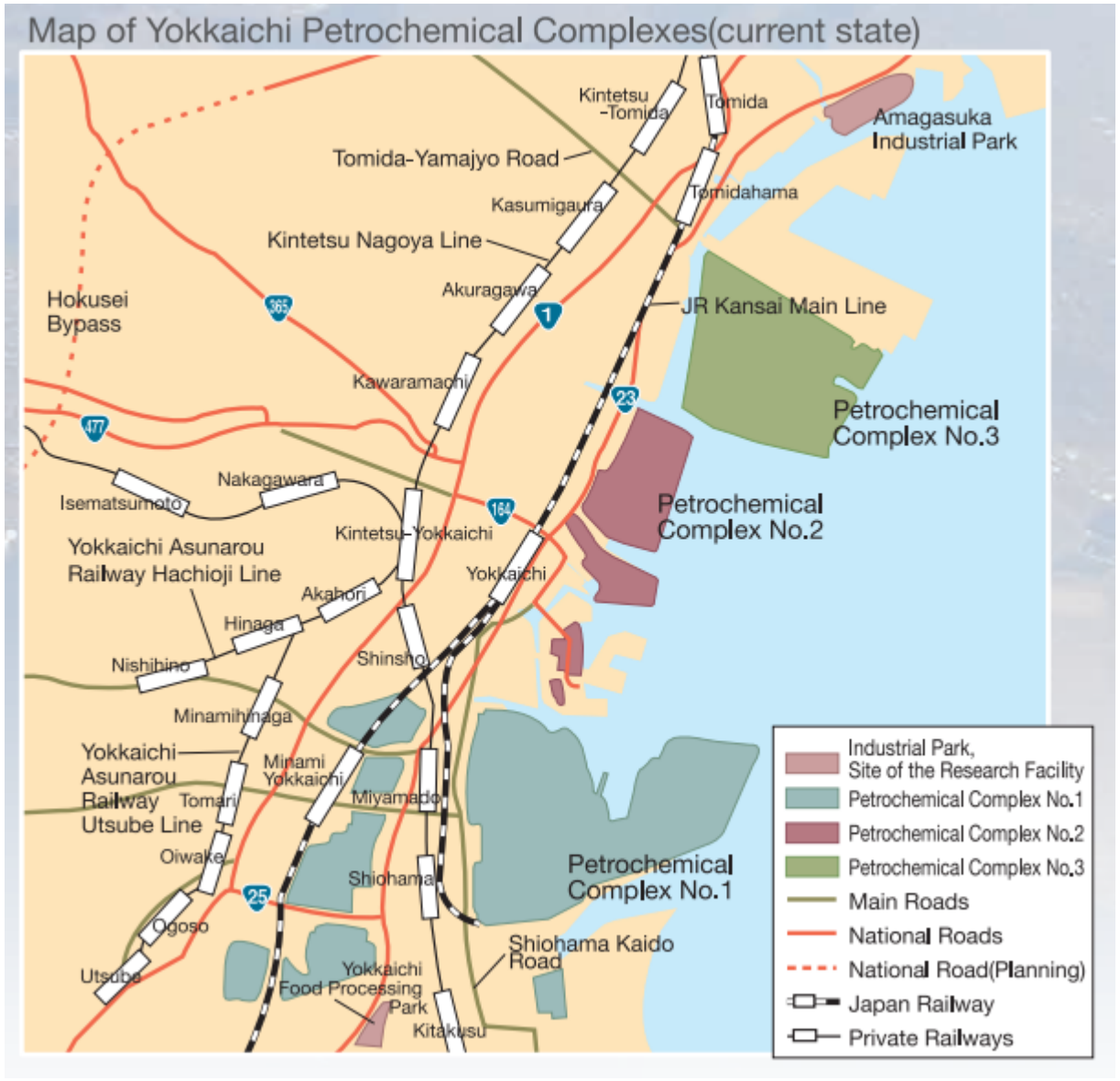
In this era, high economic growth remained the greatest thesis of national policies.

- Yokkaichi petroleum complex produced the largest amount of petroleum products in Japan
- The energy source was mostly Middle Eastern crude oil with high sulfur content, which emitted large amount of sulfurous acid gas.

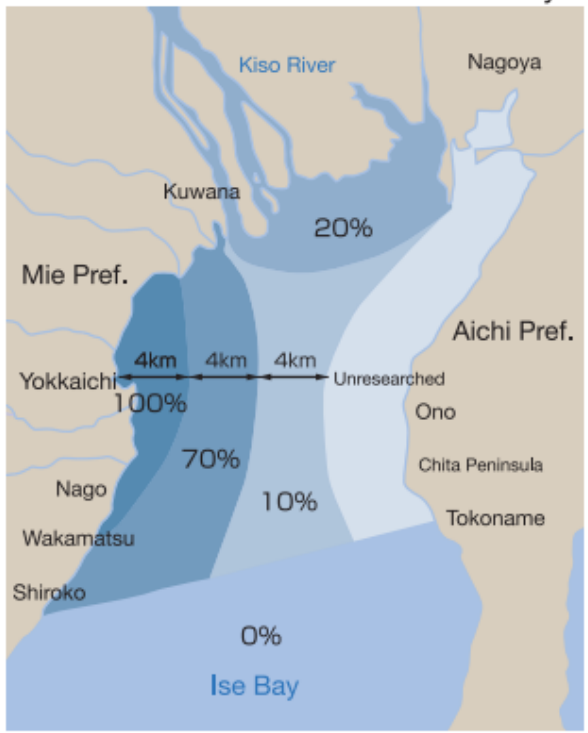
Serious health problems among residents emerged.

- Many asthmatics developed among the residents, and more than 1,100 people died.

The Outline of Yokkaichi Pollution



Distribution of Odorous Fish in Ise Bay



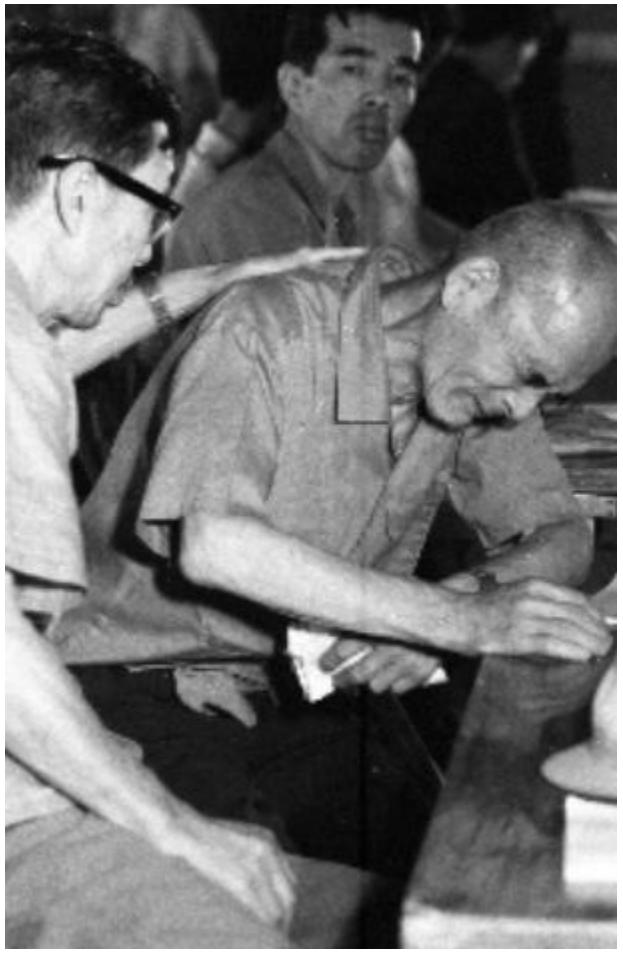
Percentage of Odorous Fish Living in the Water Area Concerned
(This is the material that the Prefectural Fisheries Division received from fishermen in March1960.)
Source: "Yokkaichi Pollution-Lessons Learned and Challenges for the 21st Century" (written by Katsumi Yoshida

Petrochemical Complex No.1(Shiohama) in 1960
(Photo provided by Yomiuri Newspaper Company)

Ref. The Yokkaichi Pollution and Environmental Miraikan

The Outline of Yokkaichi Pollution

Industrial complex adjacent to a residence



(Ref.) The Yokkaichi Pollution and Environmental Miraikan

School children leaving a school with pollution prevention masks
(Photo provided by Shiohama Elementary School)

Air purifiers installed at the nurse's office (Yokkaichi City Collection)

Yokkaichi from 1960 to 1970: Symbol of Japan's Economic Growth

First steps towards countermeasures to the health problems caused by air pollution

- The mayor of Yokkaichi City at the time, who came from a business management background, understood the seriousness of the situation and embarked on a number of new measures.
- The mayor's partner was Professor Katsumi Yoshida, who had been appointed to the nearby the Mie university.
  - The mayor's enthusiasm and support spurred Yoshida to take an active role.
- Professor Yoshida conducted, as the first step, an epidemiological study that showed relationship between contamination and health hazards in detail.

Air Pollution Levels and Incidence Rate by Area in Yokkaichi city

Area	Sulfur dioxide concentration (mg/day/100 cm²)	Bronchial Asthma, Chronic Bronchitis (%)
A	1.95～2.00	9.87
B	1.75～1.90	6.94
C	1.20～1.50	6.84
D	0.80～0.90	5.01
E	0.75	4.74
F	0.65	3.63
G	0.55	4.41
H	0.50	3.71
I	0.40	3.49
J	0.25～0.30	2.12
K	0.10～0.20	3.13

Yokkaichi Pollution Lawsuit

- In 1967, patients living in Isozu District filed a civil suit against 6 companies affiliated to Complex No.1. This was escalated into the “Yokkaichi Pollution Lawsuit”, the first pollution-related trial in Japan.
- After 5 years, in 1972, the case was decided in favor of the plaintiff, thereby revealing ignorance of the companies and the inadequateness of administrative control measures.
- Impelled by the Yokkaichi Pollution Lawsuit, local governments and private enterprises had recognized the importance of air pollution control efforts as their principal responsibility and started the development of various countermeasures to overcome Pollution-related problems.
- The above chain of events later became a benchmark for the national government and other local governments in guiding their administrative action for environmental protection.

Yokkaichi Pollution Lawsuit (Environmental Change Leading to the Yokkaichi Case)

Around 1965: Increasing demand for healthy living environment

- Society as a whole began to emphasize that economic wealth was not the only way to improve quality of life, but to ensure a healthy living environment.
- This spilled over into politics and led to the retreat of old style governors and mayors, in many prefectures and cities.

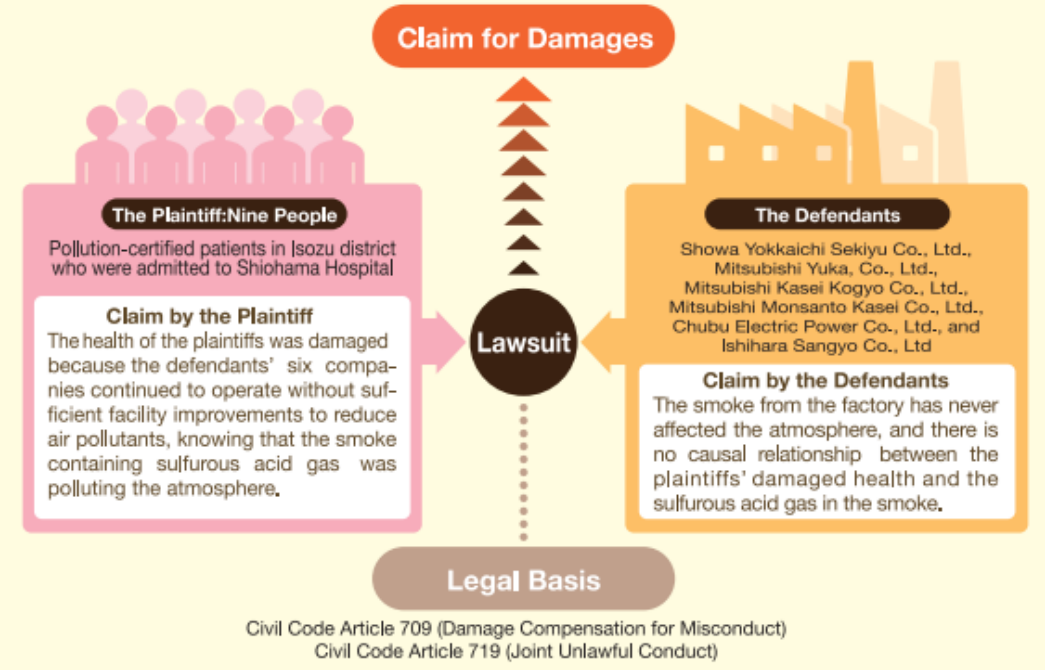
  ⇒Environmental pollution drove politics through elections.

Despite these changes, Yokkaichi citizens continued to support Mayor Hirata

- Mayor Hirata, along with Professor Yoshida, continued to engage in dialogue with businesses and residents.
- Professor Yoshida continued scientific investigations:
  - Clarifying the actual damage
  - Determining the cause and causal relationship

Yokkaichi Pollution Lawsuit

July 24, 1972
the date of the judgment in the Yokkaichi Pollution Lawsuit

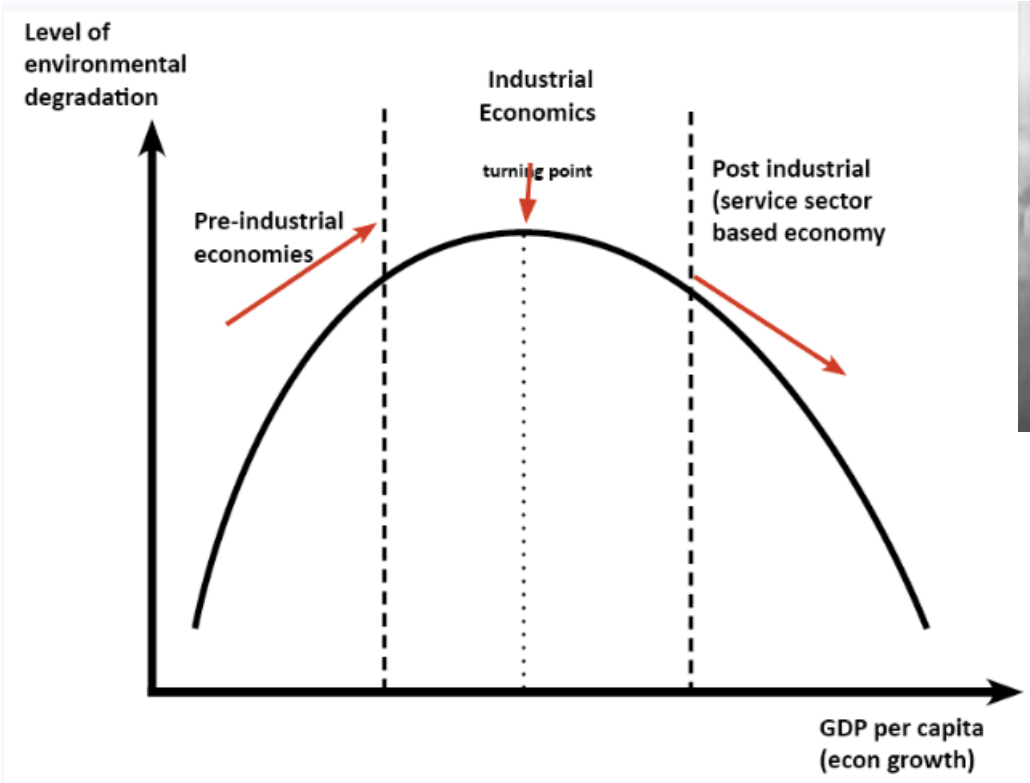



Plaintiffs reporting victory


Nine plaintiffs
(pollution-certified patients living in Isozu district)

EKC: Environmental Kuznets Curve

- Once the economy reaches a certain level, environmental conditions begin to improve.
- This hypothesis holds true for both air and water pollution.
- Waste generation tends to increase as income levels rise.



1955～1964

Current

ICETT
(INTERNATIONAL CENTER FOR ENVIRONMENTAL TECHNOLOGY TRANSFER)

ICETT

INTERNATIONAL CENTER FOR
ENVIRONMENTAL TECHNOLOGY TRANSFER

Background and Objective

Rapid growth in our social and economic activities has dramatically changed the global environment, giving rise to serious problems that need to be addressed urgently.
Against this background, ICETT was established through the cooperation of industry, government and academia to serve as an organization that drives forward transfer of Japan's leading systems for environmental conservation with aims to contribute to the mitigation of environmental issues and the sustainable development of the world economy.
In order to achieve this objective, ICETT facilitates smooth transfer of clean technologies which address the particular conditions of each targeted country by carrying out a wide range of programs and projects.

Training Programs

Aiming to develop human resources in the field of environmental protection, ICETT provides training programs for government officials, engineers and researchers from various countries focusing on Japan's environmental policy and framework, and leading technologies.
ICETT organizes training programs in Japan as well as overseas.

Study-tour of a gas detecting operation

Training for soil contamination countermeasures

Technical Guidance

ICETT provides training and guidance on environmental conservation by sending experts to developing countries.
Capacity building is also provided with aims to establish framework and contribute to the diffusion of energy efficiency measures throughout the region.

Technical guidance in a chemical fertilizer plant in China

Research

To enhance the effectiveness of technology transfer, ICETT carries out comprehensive research and analysis to determine the state of environment in overseas countries in order to provide guidance on the identified problems and its counter measures. Further information and consulting service are provided upon request.

Research of water contamination at a silk factory

CONTENTS

Waste treatment measures and the progress of recycling

A number of major milestones in Japan's economic and social transition

- Edo Period

Examples of recycling in the Edo period

second- hand clothes shop

old umbrella

old tableware

出典:「江戸職人歌合」、喜多川守貞「守貞漫稿」

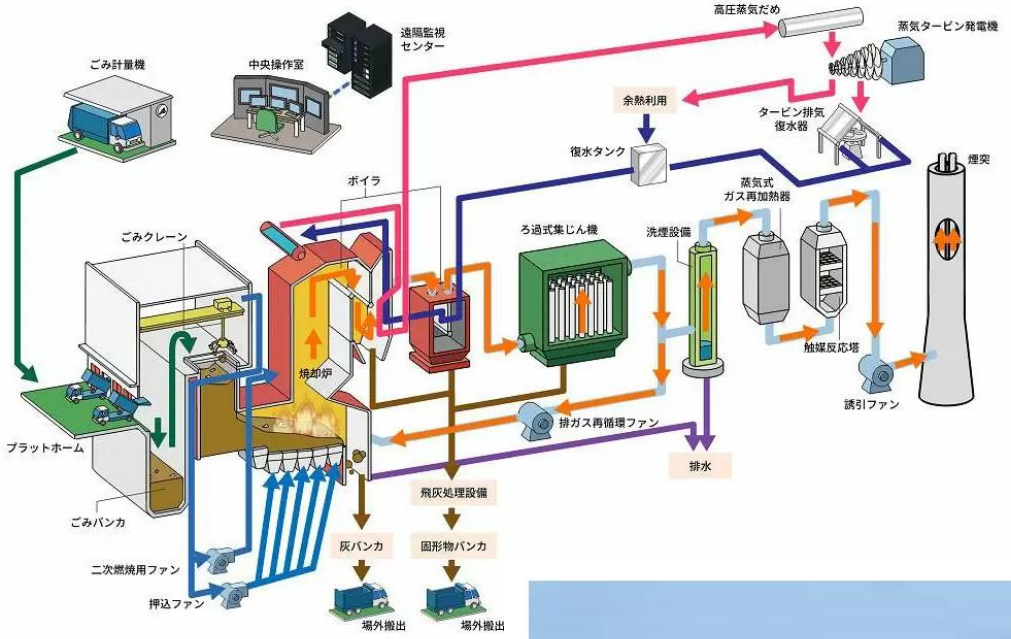
The Tokyo Olympics in 1964

- Prior to that time, economic activities were emphasized above all else in Japan
- Environmental pollution and the contamination of towns by garbage were not recognized as major issues.
- The streets, vacant lots, and rivers were often littered with domestic garbage with impunity, which emitted foul odors and caused infestations of rodents and sanitary pests.

Wastes thrown into a river

Progress of Incineration Technology

Large Scale facility



Small Scale facility

DE480型

Introduction of 3Rs systems

1. Exercise 3R ～ Every person can do it ～

3R is the keyword to a life of reducing waste and cherishing resources.

The first R Reduce

Reducing what becomes waste

Find ways in everyday life to avoid producing waste. This is the most important thing. Waste can become a resource, but that alone does not establish a recycling-oriented society.

The second R Reuse

Reusing things before disposing of them

Do not throw anything away after using it once! So many things can be reused with a few ideas or effort. It consumes less resources and energy than producing something new.

If there remains some waste...

The third R Recycle

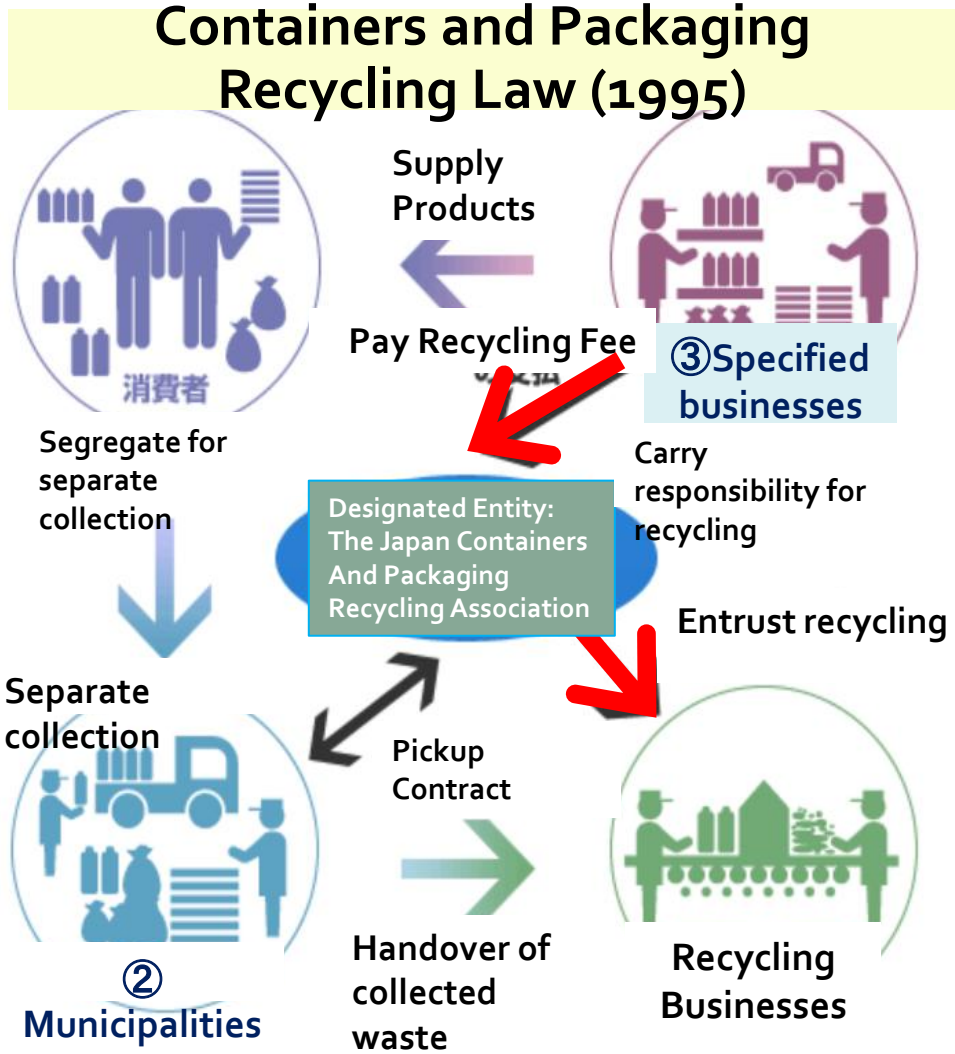
Recycle things as resources

What becomes a resource when separated correctly would become waste if simply thrown away. Are you aware of what can be transformed into resources?

Containers and Packaging Recycling

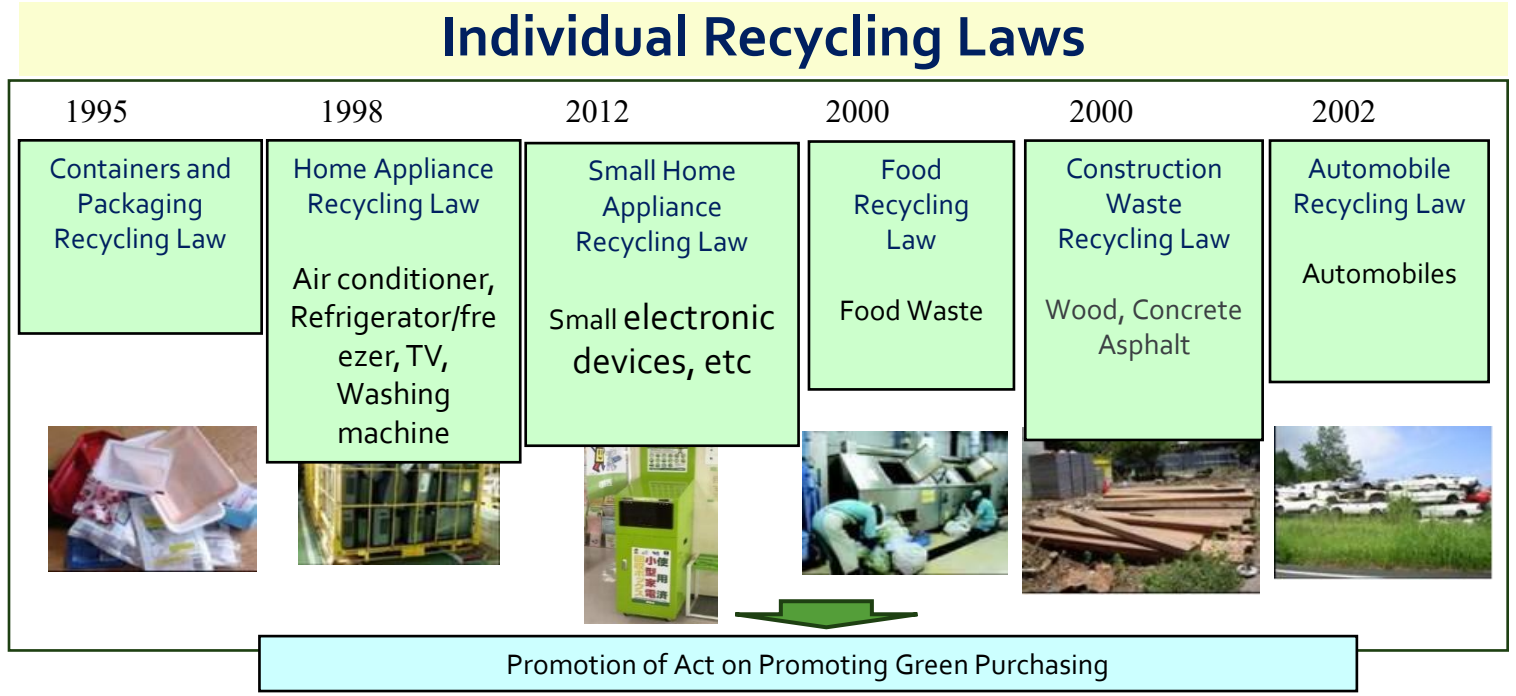
The recycling system is determined for each individual product type :

- Collects fees from companies that benefit from their production and sales.
- Collected fees are paid to:
  - Municipalities responsible for collection and sorting, and,
  - Companies that conduct recycling operations
- The full amount is not covered.

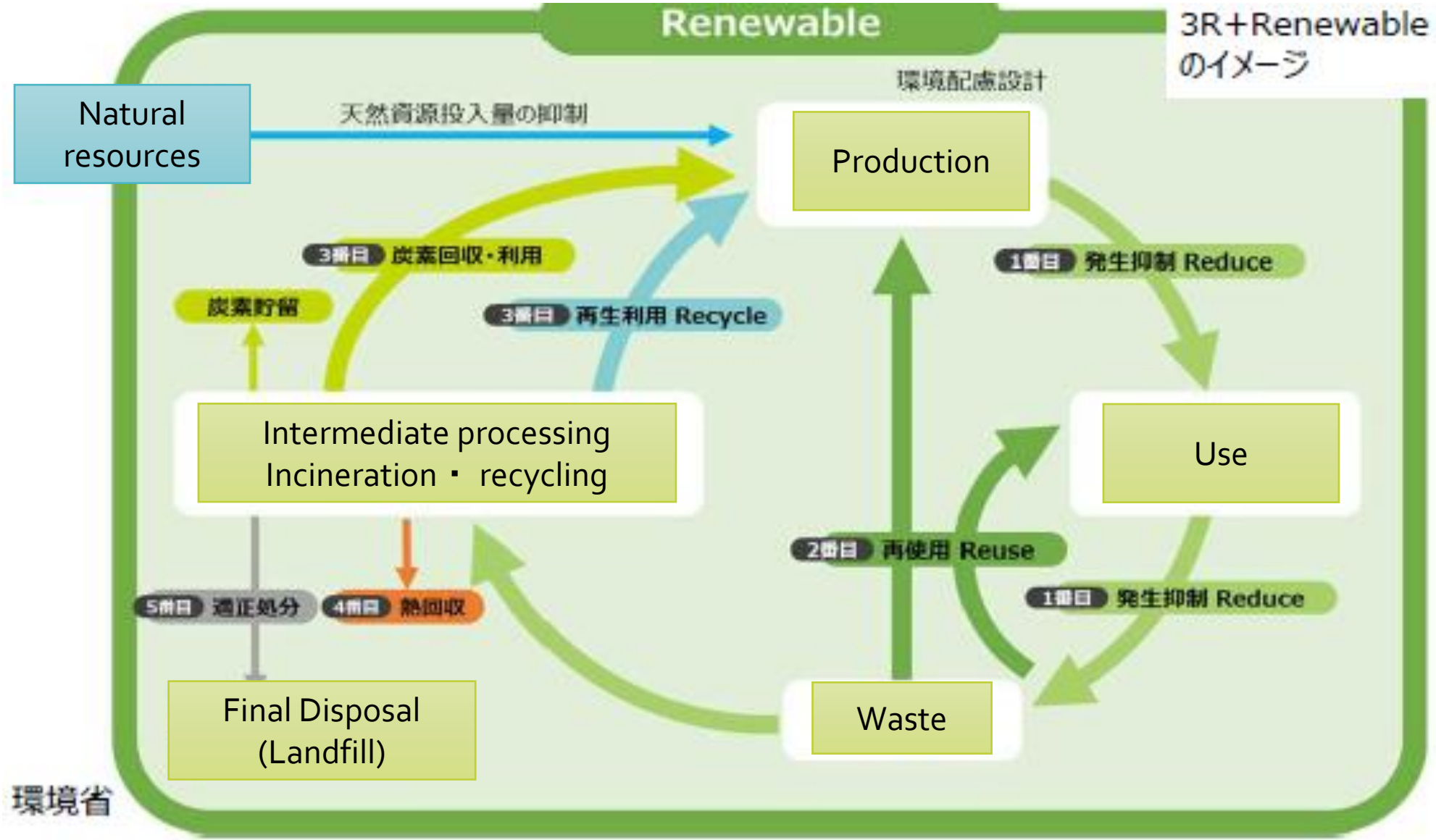


Individual Recycling Law

- Target: Household appliances including televisions, refrigerators, air conditioners, and washing machines.
- New purchasers pay a set amount for each used product they dispose of, and companies that receive the money pay for recycling.
- Recycling laws are also in place for food, construction waste, automobiles, and electronics.



Concept of Circular Economy



Plastic wastes

Treatment of Plastics: a common perception in many countries

- The impact on the marine environment, including ecosystems, obstacles to shipping, and negative effects on tourism and fisheries make it a global issue.
- China, which had been importing the largest amount of plastic waste, has stopped importing it.
- Global and regional administrative measures are being prepared to prevent further spread of pollution of the oceans by plastic waste.

Recycling and Climate Change

Recycling of rare metals and rare earths

- The batteries in electric vehicles, the spread of renewable energy, and the manufacture of the latest electronic devices are considered to be climate change measures.
- But they require a wide variety of rare metals and rare earths.
- Due to limited extraction areas for these raw materials, many countries are actively promoting the recycling of materials in existing products to stabilize their economic activities.
- This is essential for the advancement of environmental measures and the stable implementation of economic activities
- It is expected that these efforts will be strengthened in the future.

CONTENTS

Massive amount of waste disposal by earthquake and tsunami

March 11, 2011

- The magnitude 9 earthquake , high tsunami, caused extensive damage:
  - The death approximately: 20,000
  - The damage to houses and buildings : 400,000
  - Many homes, social and industrial infrastructures and lifelines were destroyed.

- More than 10 years volume of waste was generated in the affected area.

- The nuclear power plant accident released large amounts of radioactive materials into the environment.
  - many local residents concern to environmental standpoint
  - need quickly dispose of the huge amount of disaster waste

Establishment of disposal system

Disaster waste treatment

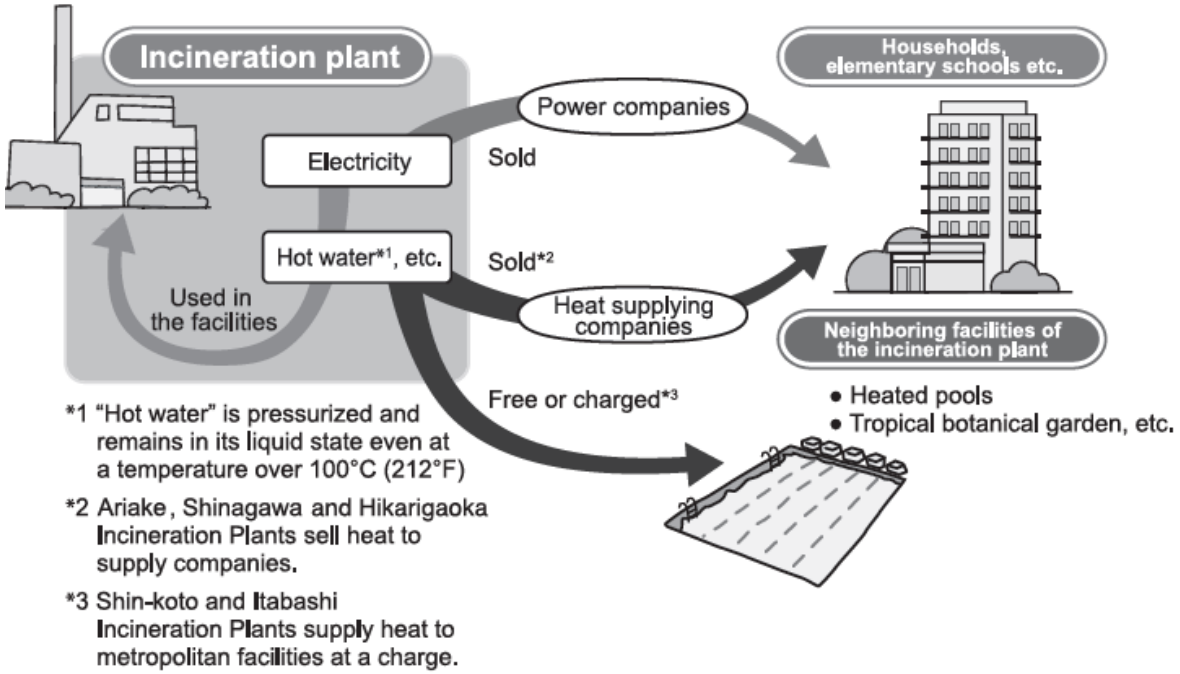
- more than 10 times of disposal waste led by prefectures and cities with local knowledge of the situation
- difficult for the prefectures and cities to identify the relevant national ministry for subsidized systems
- the involvement of national government agencies with knowledge and assistance systems for individual waste disposal was also indispensable
- the Ministry of the Environment assign a person for “The one-stop service “

Waste treatment using the latest technology

Japan's best function in the world

- Debris is temporarily collected in a temporary storage area,
  - ➢ What can be used as resources is recycled
  - ➢ Concrete becomes material for landfill
  - ➢ Burnable debris was incinerated
  - ➢ Unburnable debris was broken into small pieces and buried with the ashes

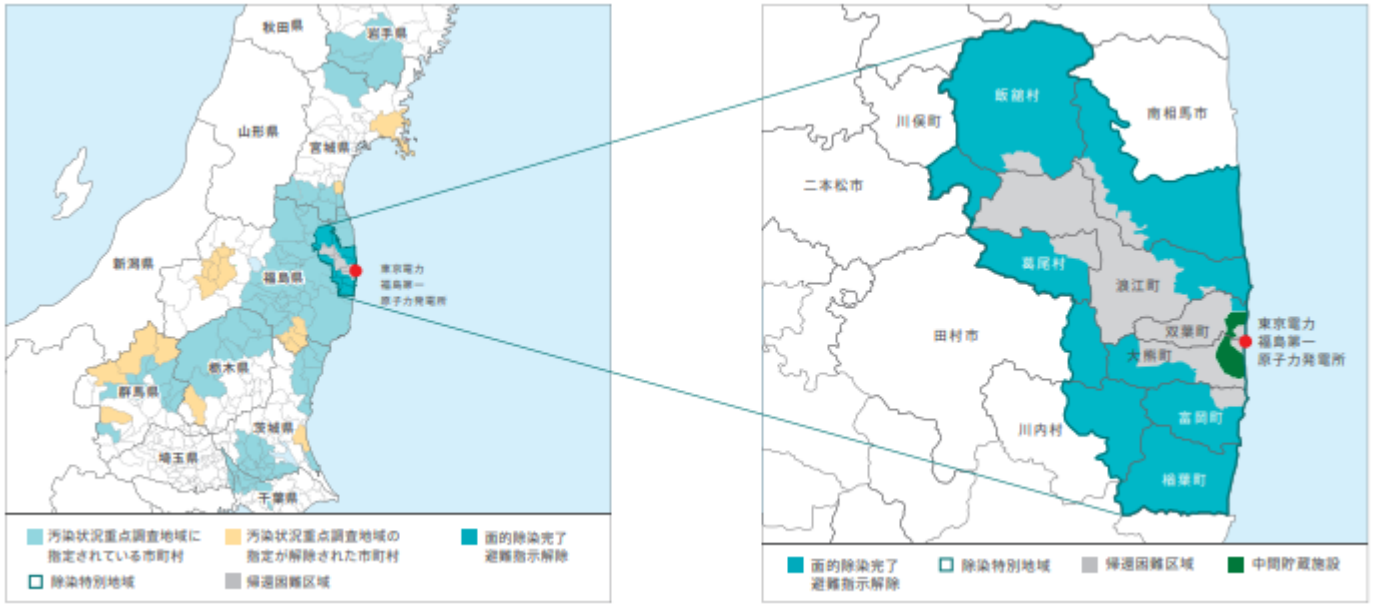
- Japan's incineration facilities boast the highest combustion efficiency

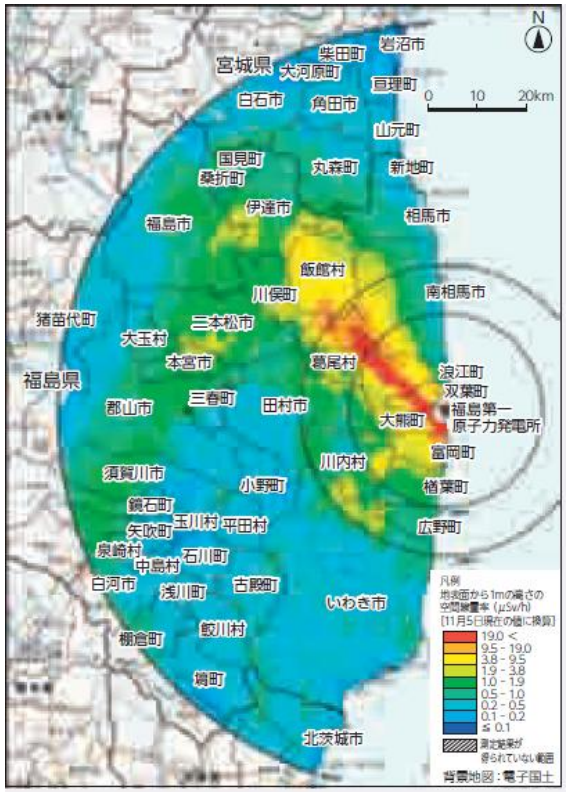


The accident at TEPCO's Fukushima Daiichi Power Station

Ministry of the Environment conducted a survey of pollution

- identified radioactive materials
- Depending on the contamination level, the areas were classified into two categories:
  - ➢areas where the government will take direct measures
  - ➢areas where the prefecture or city will take measures





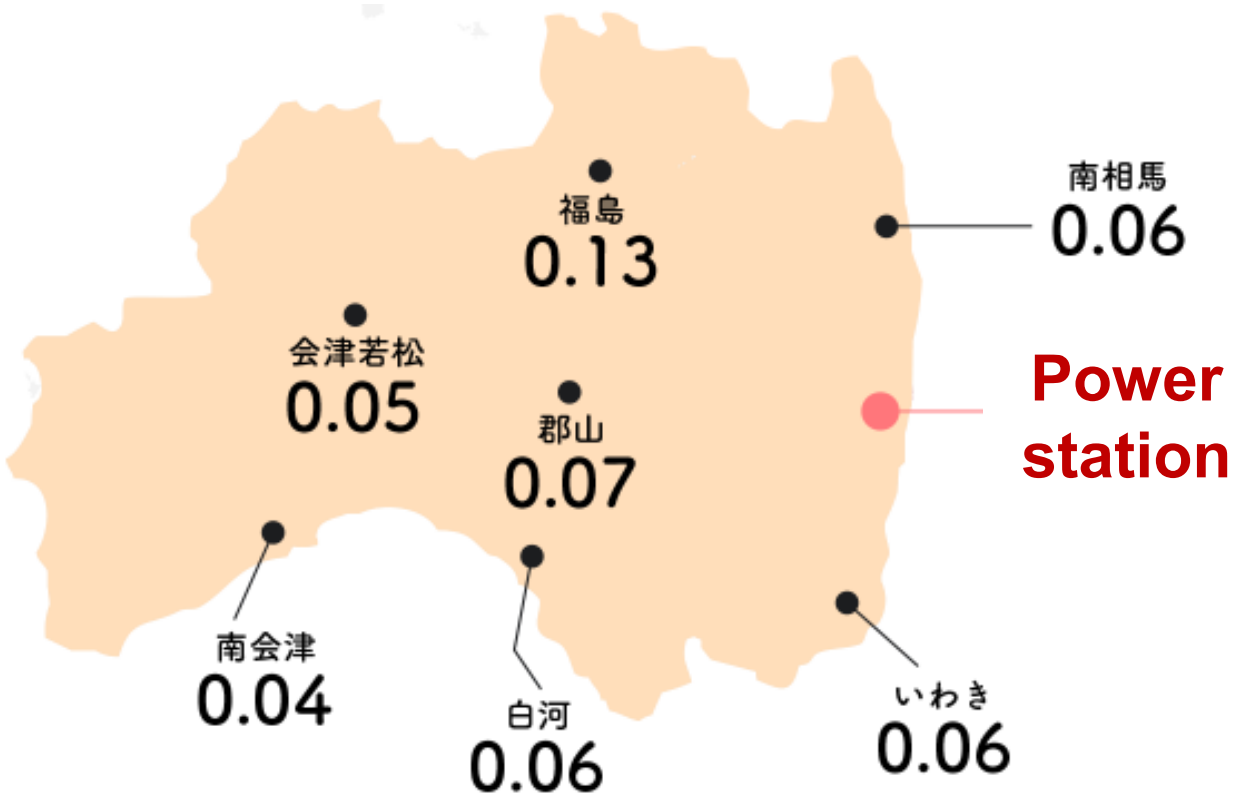
出典：文部科学省第4次航空機モニタリング結果（平成23年12月16日）

Execution of the decontamination project

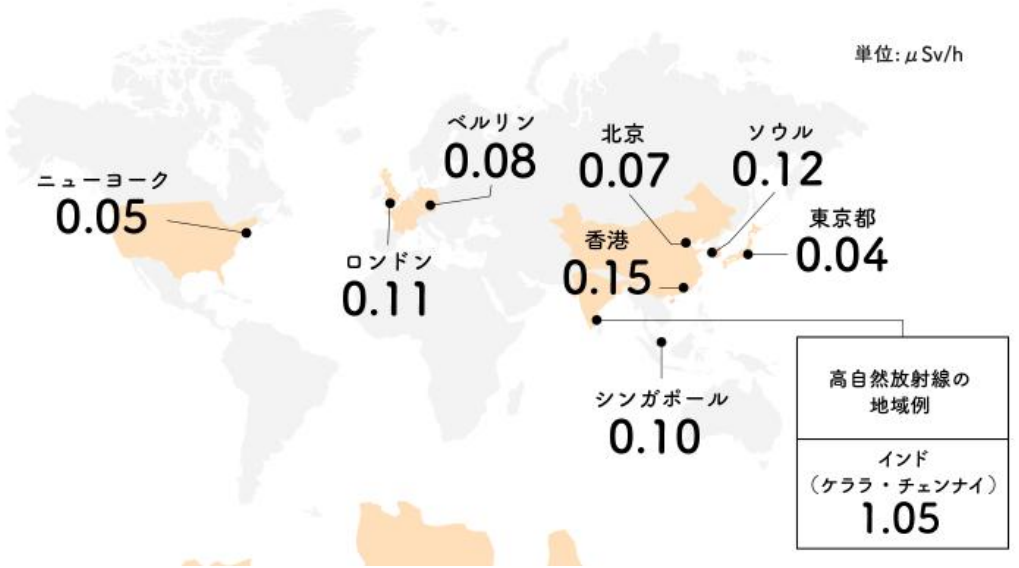
Radioactive materials treatment

- Fallen leaves, moss, and mud were removed were cleaned with brushes and high-pressure water
- Radiation levels in the environment were greatly reduced
- Effects continued even after the work

Current status of space radiation dose rate (2022)



出典：「風評の払拭に向けて」（令和2年4月　復興庁発行）

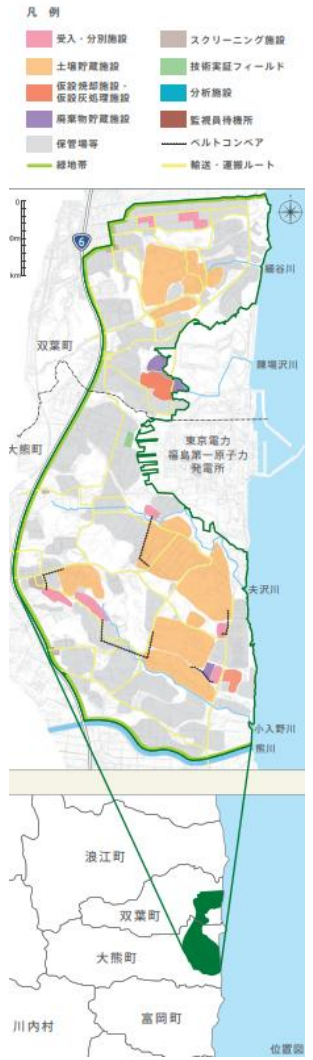


Unit: μSv/hr

Execution of the decontamination project

Established interim storage areas

- Two towns in Fukushima accept removed soil and other materials
- One is approximately 1,600 hectares in size
- No prospects for recycling or final disposal of the contaminated soil collected there.



Execution of the decontamination project

Decontamination

Intermediate Storage

Final Disposal out of Fukushima, Reuse

Proposal and expectation

- ✓ Establishment of a **web-based information platform** for future international collaboration
- ✓ Co-creation of **collaborative projects** targeting Southeast Asian region