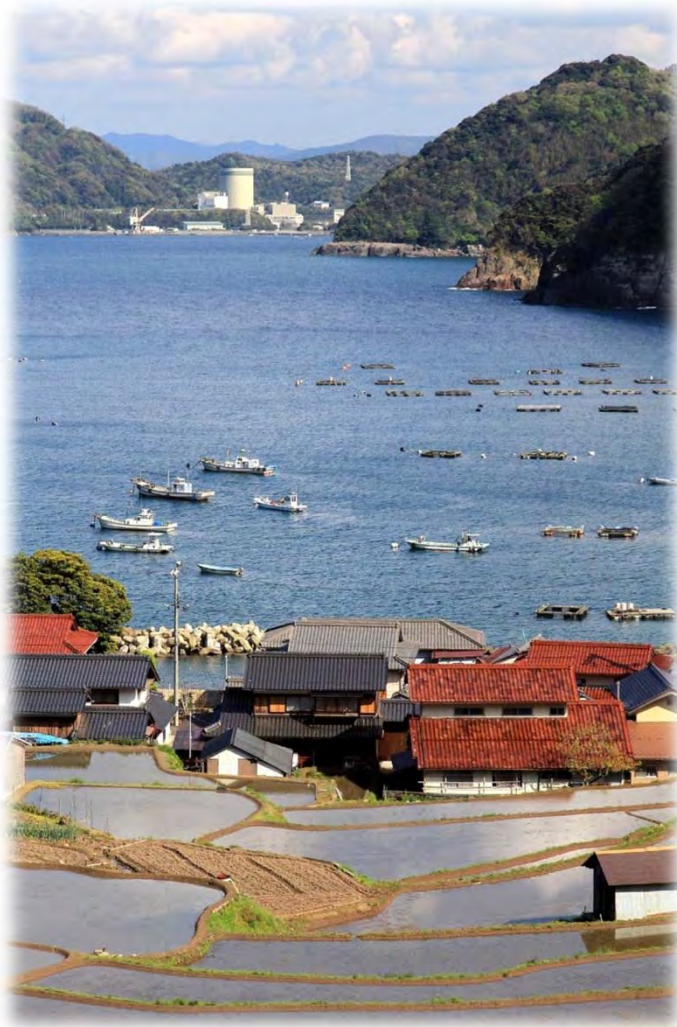




Nuclear Power Generation and Regional Development

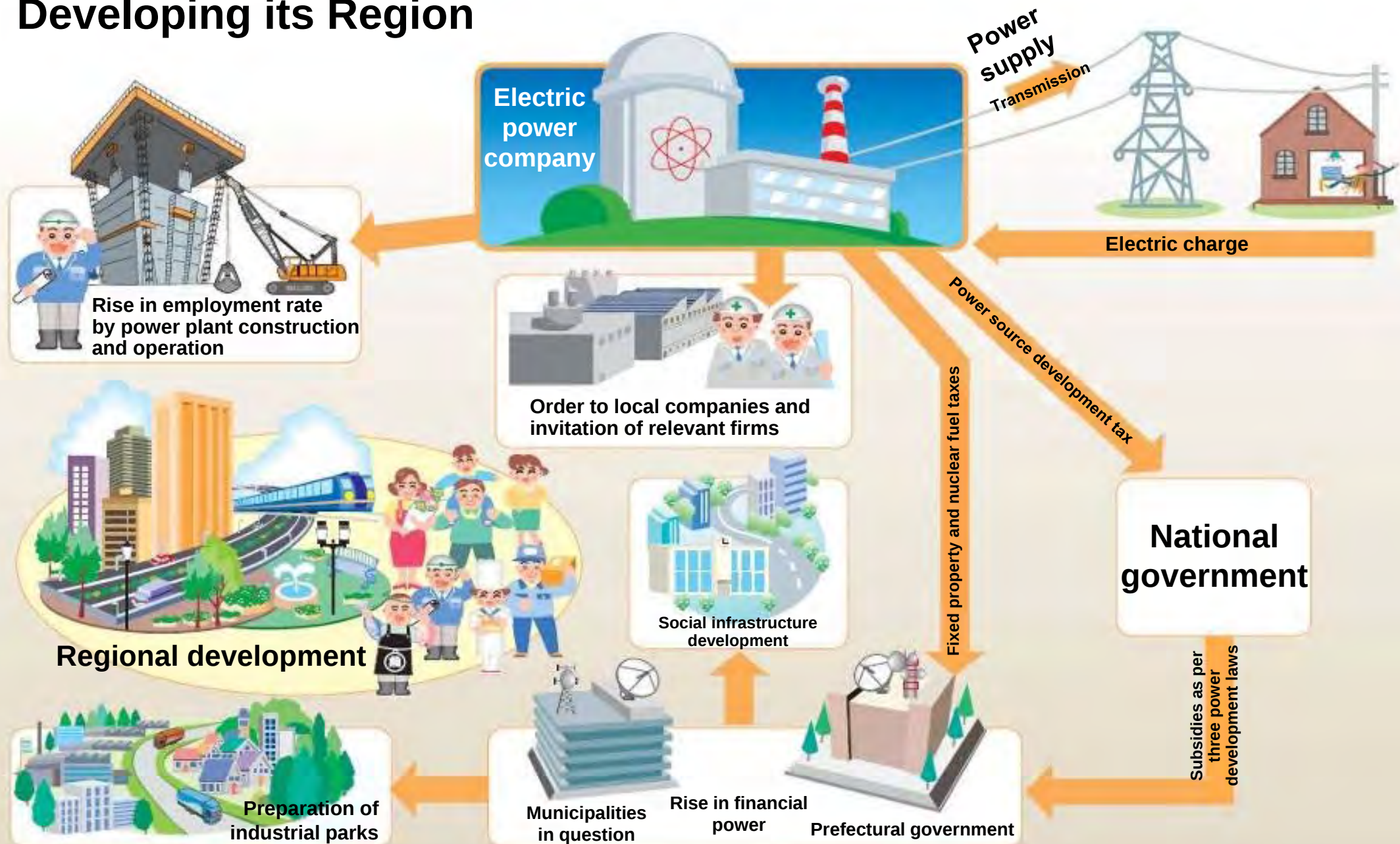


March 27, 2013

Masato Hasegawa,

**Director, Energy Producing Region Development Division,
Department of General Policy, Fukui Prefectural Government**

Constructing a Nuclear Power Plant and Developing its Region



Grant-in-Aid System for the Location of Power Sources

- Balance between consuming area's benefits and producing site's burdens -**

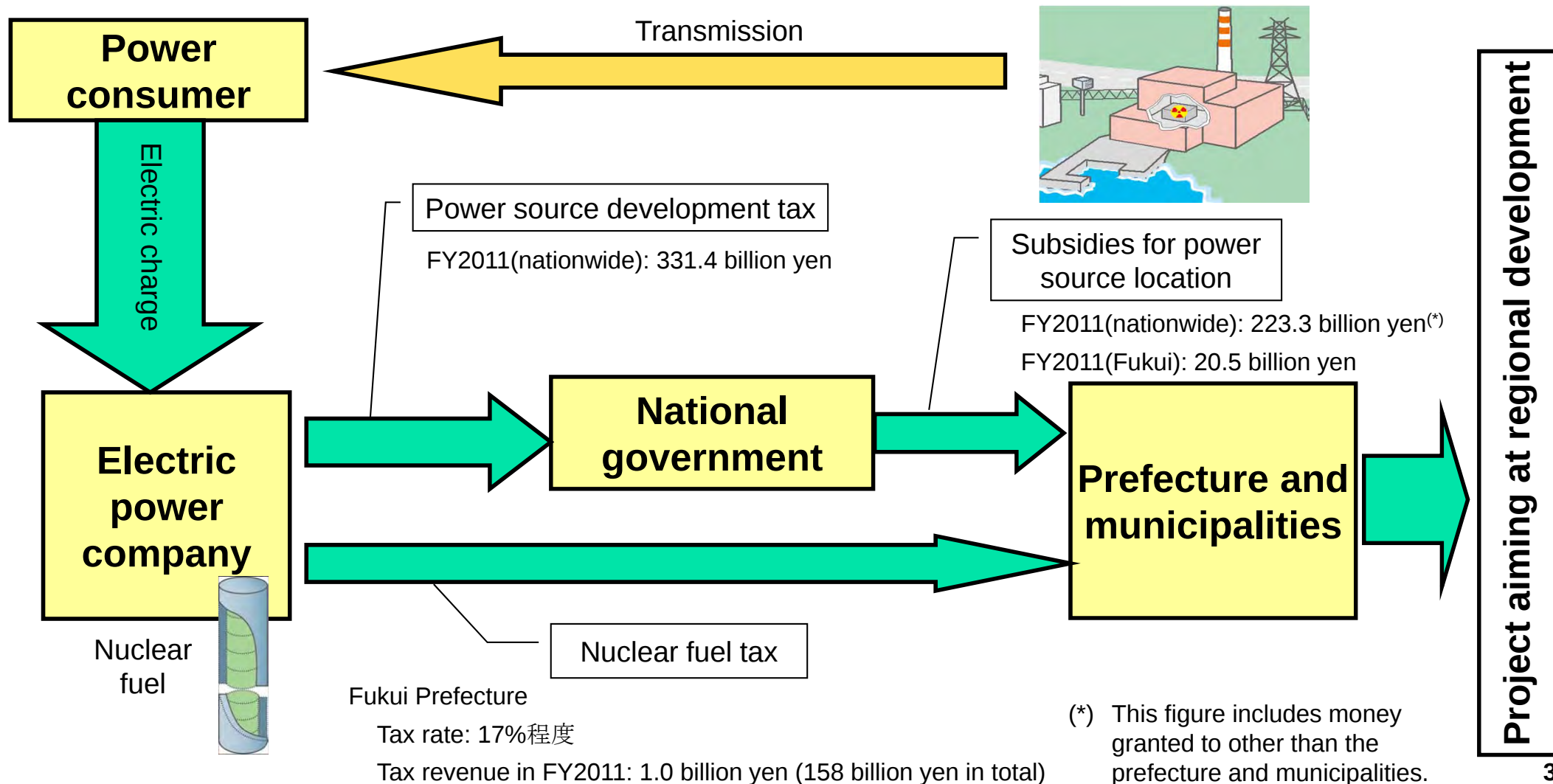
Outline of the Grant-in-Aid System for the Location of Power Sources and the Nuclear Fuel Tax

- Grant-in-aid system for the location of power sources

Its purpose is to build and operate a power generation plant smoothly by convincing the local resident of the necessity of it. The national government built up this legal system in 1974.

- Nuclear fuel tax

The local government taxes nuclear fuel used in the nuclear reactor of an atomic power plant. In 1976, Fukui was the first prefecture to start this tax in the country.



Examples of the Recent Use of Subsidies Granted to Fukui Prefecture



Project for developing a public center for children and families

The purpose is to support the sound growth of children by developing a facility in which parents and their children or family members communicate with each other.



Project for supporting the Obama Municipal Hospital's function of emergency medical treatment and health examination

The purpose is to improve health examination facilities and local medical services by introducing medical equipment including an MRI unit to Obama Municipal Hospital.



Project for developing an industrial park in Tsuruga City

The purpose is to invite companies to Tsuruga City by developing a 13.8 ha of land as an industrial park.



Project for running "Fukui Science School"

The purpose is to raise children's interests in science and mathematics by asking "Local Doctors of Philosophy" who have expertise to conduct scientific experiments.



Project for promoting local activities through child rearing meisters

The purpose is to support parents who are rearing their children by asking "Meisters" who have plenty of knowledge about and qualifications for child rearing to deliver lectures.



Project for promoting return to Fukui for finding a job

The purpose is to encourage students out of the prefecture to find a job within the prefecture by holding a meeting in which they have talks with companies within Fukui. 4

Energy Research and Development Centralization Plan

- The national and regional governments, electric power companies, and universities taking local development measures as one -**

Various kind of nuclear power generating facilities in Fukui Prefecture

The greatest power supply area in Japan

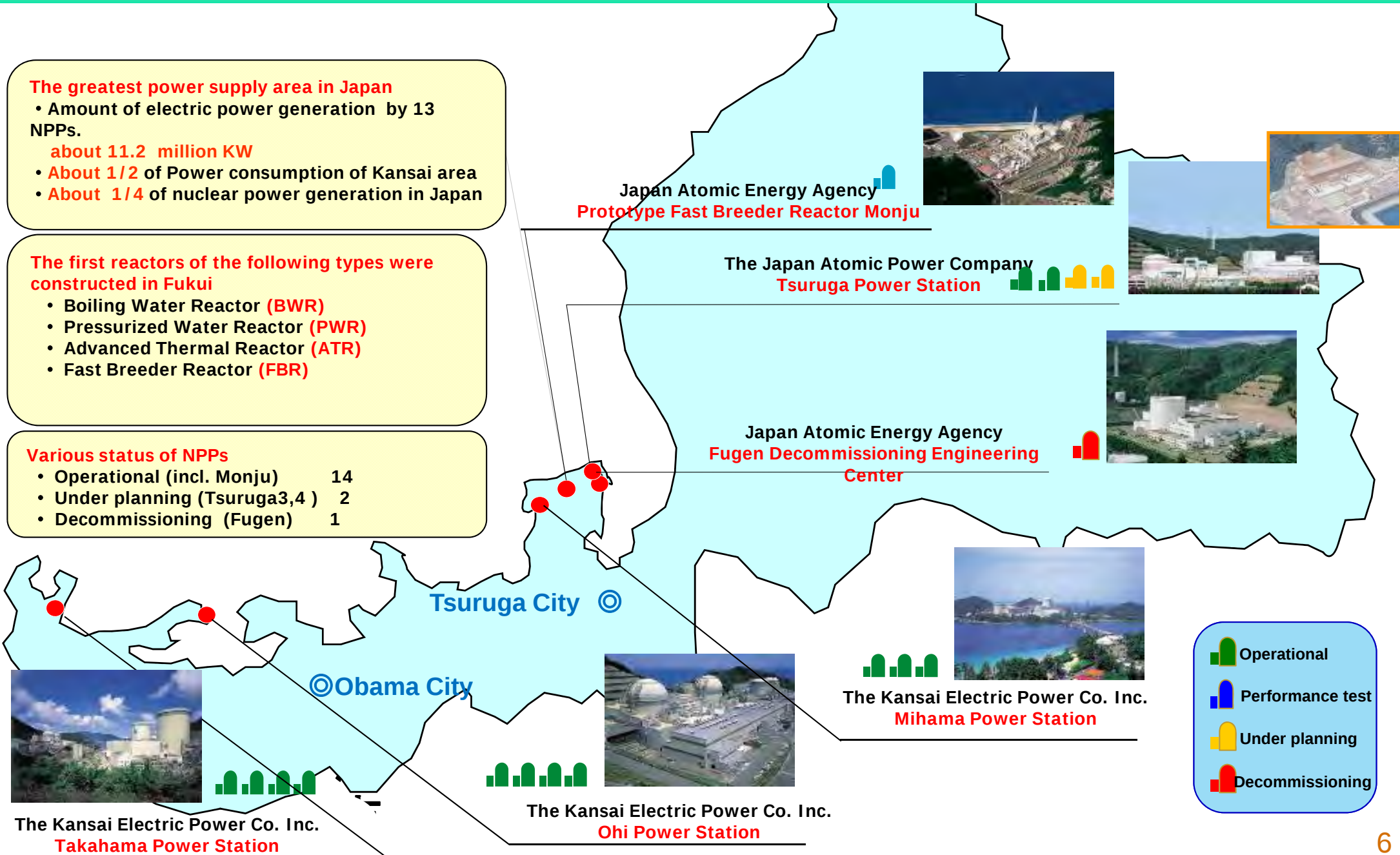
- Amount of electric power generation by 13 NPPs.
about 11.2 million KW
- About 1/2 of Power consumption of Kansai area
- About 1/4 of nuclear power generation in Japan

The first reactors of the following types were constructed in Fukui

- Boiling Water Reactor (BWR)
- Pressurized Water Reactor (PWR)
- Advanced Thermal Reactor (ATR)
- Fast Breeder Reactor (FBR)

Various status of NPPs

- Operational (incl. Monju) 14
- Under planning (Tsuruga3,4) 2
- Decommissioning (Fugen) 1

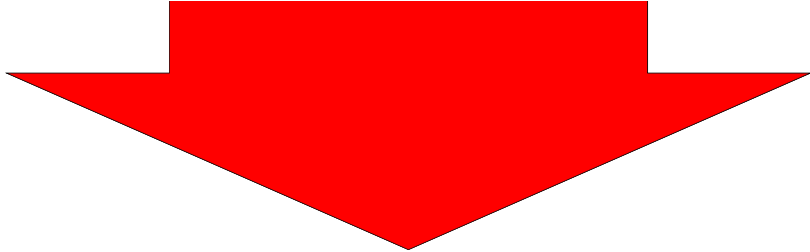


What is the Energy R&D Centralization Plan?

- Fukui is one of the leading energy supply bases in Japan.
- Many diverse nuclear reactors are located here.
- Research institutes and institutions for human resource development also exist.



Not to be mere electricity “production plants”
but to make the best use of Fukui Prefecture’s
features



**The Energy R&D Centralization Plan is designed to effect
Fukui Prefecture’s transformation into a region with
comprehensive R&D facilities that focus on nuclear power.**

System to Fulfill the Energy R&D Centralization Plan

Council on the Promotion of Energy R&D Centralization

- The “Council on the Promotion of Energy R&D Centralization” consists of top-level representatives of industry, business, academia and research institutes, the national government, Fukui Prefectural Government, and municipal governments. The council meets every year to fulfill the Centralization Plan steadily and smoothly.
- At the council, the contents of measures are coordinated and promotion policies for the next year are determined.



Project Office of Energy R&D Centralization

- The “Project Office of Energy R&D Centralization” was established at the Wakasa Wan Energy Research Center as the promotion engine for the fulfillment of the Energy R&D Centralization Plan.
- The project office is responsible for collaboration among academia, industry and government, technological support/consultations, and human resource development/exchange.



Purposes of the Centralization Plan

Integration of international R&D functions

- We aim to promote international R&D by integrating laboratories.
- We aim to provide a place where domestic and overseas talented researches communicate with each other.



Contribution to the development of safety technologies and human resources in Asia

- We aim to build up a human resource development environment with relevant organizations including universities.
- We aim at international contribution by receiving trainees from overseas including Asia.



Contribution to the local industries

- We aim to develop the local industries through nuclear-related technology transfer and decommissioning measures.
- We aim to invite companies relating to nuclear or energy.



System of Measures for the Energy R&D Centralization Plan

[FY2013 promotion policies]

Basic Measures

The US, European & Asian nations, IAEA, etc

3 Education and Exchange of HR

- (1) Building Center of International Human Resources Development for Atomic Energy
- (2) Build an academic hub for the wide area collaboration with universities
- (3) Conduct technical training aimed at the skills of engineers at companies in Fukui
- (4) Promote education of nuclear power & energy at elementary, junior high and high schools

Accumulation of human resources (knowledge)

Local companies

1 Ensuring Safety and Security

- (1) Research systems for long-term use
- (2) Organize local primary medical system
- (3) Build research and treatment facilities centered on proton beam cancer treatment

Universities and research institutes in Fukui and the Kansai & Chukyo areas

Enrichment and Enhancement Fields

- ◎ Firm Nuclear Safety Measures
 - ① Building Nuclear Emergency Response System
 - ② Promoting R&D against Nuclear Accident and Decommissioning
 - ③ Development of Human Resources supporting Nuclear Safety by International Collaboration
- ◎ Industrial Enhancement and Employment Countermeasures in "Reinan area" of Fukui Prefecture
 - ① Attraction of enterprises leading to creation of new industries.
 - ② Pluralistic Energy Source
 - ③ Spread of Renewable Energy

4 Creating and fostering of new industries

- (1) Fukui Cool-Earth Next Generation Energy Industrialization Project
- (2) Build a technology transfer system together with government industry and academia
- (3) Create new industries that utilize resources from NPPs

2 Enhancement of R&D function

- (1) FBR R&D center
- (2) Applied Laser Research Center
- (3) Reinan New Energy Research Center
- (4) Fugen Decommissioning Engineering Center
- (5) New roles for the Wakasa Wan Energy Research Center
- (6) Promote collaboration with universities and research institutes inside and outside Fukui, including the Kansai & Chukyo areas

Accumulation of technologies

NPPs Operators and Manufacturers

Ensuring Safety and Security

○ Improvement of the local medical system for ensuring safety

[Electric power businesses]

- High-standard ambulances equipped with the latest medical instruments were deployed at each power plant. (2006)
- The scholarship system for medical students was established by Reinan Medical Promotion Foundation (2007-)
- Facilities for treating thermal injuries were established at Obama Municipal Hospital. (2010)

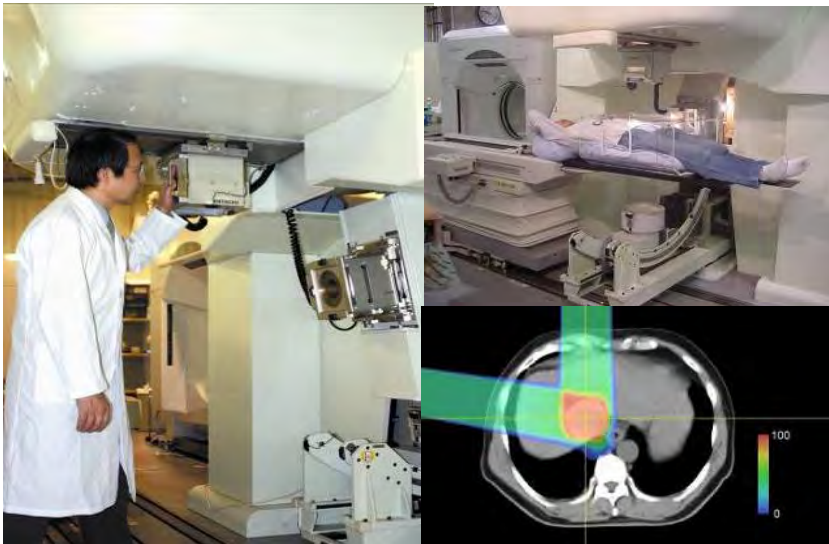


High-standard ambulance

○ Establishment of cancer research and treatment facilities centering on proton beam therapy

[Fukui Prefectural Government]

- Sixty-two cases of therapy research were conducted at the Wakasa Wan Energy Research Center, including research on therapy for prostate cancer and liver cancer.
- Based on the results of the therapy research, the Fukui Prefectural Proton Beam Cancer Therapy Center was established and therapy started. (March 2011-)



Practical
use of
research
results



Fukui Prefectural Proton Beam Cancer Therapy Center

○ Fast Breeder Reactor R&D Center

[Japan Atomic Energy Agency]

- Demonstrate the reliability of Monju as a power production plant and research the diversified use of Monju

○ Fugen Decommissioning Engineering Center

[Japan Atomic Energy Agency]

- Research the decommissioning of nuclear power plants by using Fugen.

○ Wakasa Wan Energy Research Center

- Promote the use of radiation in medical treatment, agriculture and the environment, and the practical use and applied research of environment/energy

(Examples of research)

- Development of more sophisticated therapy technology in response to the establishment of the Fukui Prefectural Proton Beam Cancer Therapy Center
- Development of new varieties of vegetables grown in plant factories and research on the improvement of the functions of beneficial fungi
- Development of laser decontamination/cutting technologies usable for the Fukushima nuclear accident and the decommissioning of nuclear power plants.
- Support for R&D carried out by local companies using the latest analysis and evaluation technology



Monju, a fast breeder reactor



Fugen, an advanced converter reactor



Multipurpose synchrotron tandem accelerator

Education and Exchange of HR (1/2)

- Training for improving the skills of engineers belonging to companies in the prefecture

[Wakasa Wan Energy Research Center]

- Training for technological improvement so that companies in the prefecture can contribute to the maintenance work of nuclear power plants. (2005-)

Total number of engineers who received training: About 8,300

- Education on nuclear energy at universities, senior/junior high schools, and elementary schools in the prefecture

[Universities in the prefecture]

- Improvement of the educational curriculums for nuclear energy of the University of Fukui and the Fukui University of Technology
 - Opening of Tsuruga Summer Institute on Nuclear Energy

[Electric power businesses, etc.]

- Give lessons on nuclear energy at elementary schools and junior/senior high schools, and receive student study tours at their nuclear facilities

- Inviting and holding international conferences

- Meeting on Human Resources Development for Nuclear Energy in Asia (June 2010, March 2012 , March 2013)
- The 9th APEC Energy Ministers' Meeting Fukui (June 2010)
 - The 13th FNCA Coordinators Meeting (March 2012)



Technological training in a company in the prefecture



Study tour of senior high school students at nuclear-related facilities

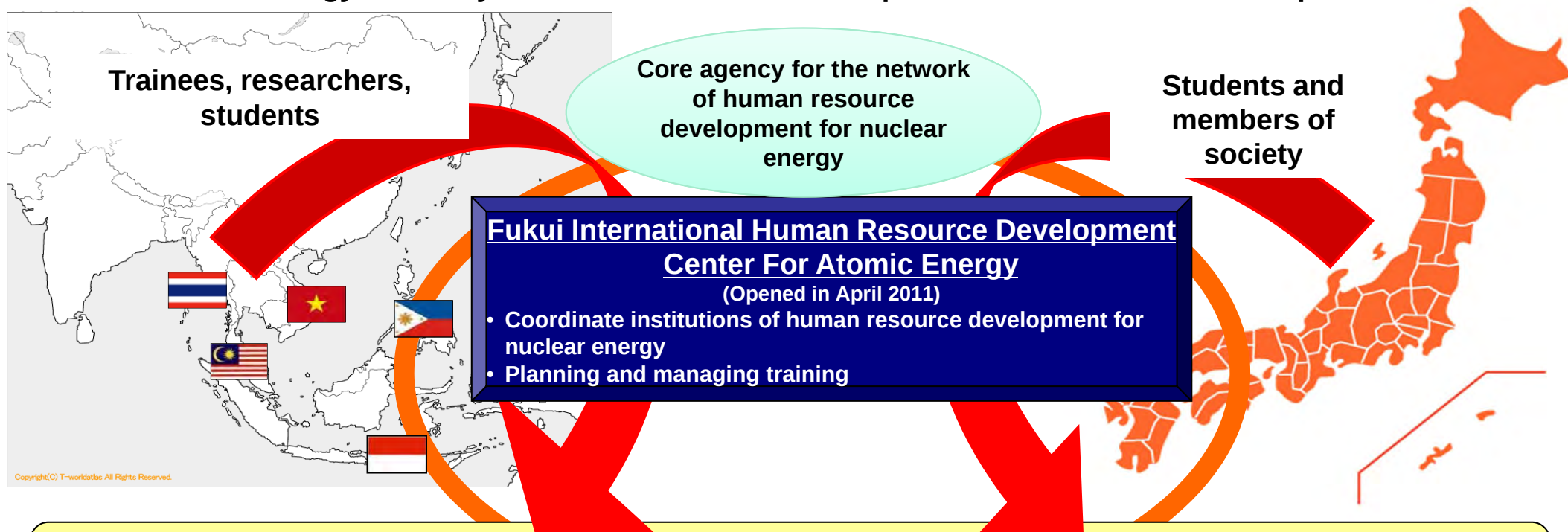


The 13th FNCA Coordinators Meeting (March 2012)

Education and Exchange of HR (2/2)

○ Establishing a hub for international human resource development for nuclear energy

- Fukui International Human Resource Development Center For Atomic Energy was established to accept trainees from Japan and abroad
- Accept researchers and trainees by utilizing nuclear energy-related research institutes, training institutions, and universities in the prefecture
- Contribute to technology for safety and human resource development in Asia as an advanced prefecture for nuclear



Research institutes

Wakasa Wan Energy Research Center
Fast breeder reactor, Monju
Institute of Nuclear Safety System,
Incorporated, etc.



Training institutions, etc.

Tsuruga Training Center
Nuclear Technology and Education Center
Nuclear Power Training Center Ltd.



Universities

University of Fukui, Fukui University of
Technology, Kyoto University, Osaka
University, Nagoya University, etc.



Creating and Fostering New Industries

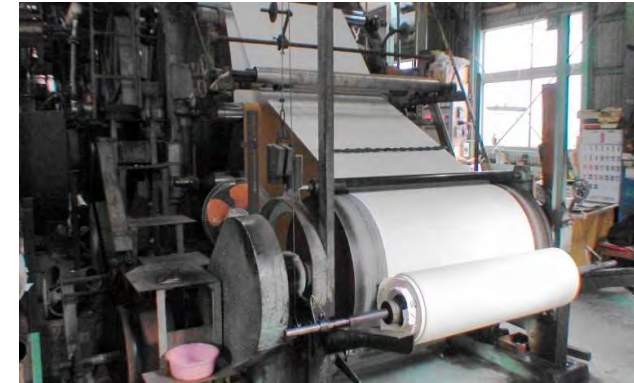
○ Establish a technology transfer system through collaboration among academia, industry and government

[Wakasa Wan Energy Research Center]

- Formed a network among academia, industry and government (2005-)
- R&D utilizing competitive funds of the national government
- Support companies in the prefecture in their attempt to enter the nuclear industry

Information exchange meeting with plant manufacturers (2008-2012)

Exhibition and business meeting with nuclear energy-related companies (2010)



Development of Echizen paper by utilizing radiation technology

[Kansai Electric Power Co., Inc.]

- Started operation of facilities for electron beam irradiation (2011-)
- Improve the quality of or sterilize materials, such as fiber and plastics, by electron beam irradiation

Electron accelerator 10 MeV

(The highest grade accelerator for commercial use in Japan)



Information exchange meeting with a plant manufacturer

○ Attract businesses

[Electric power businesses, Japan Atomic Energy Agency, Fukui

Prefectural Government, municipal governments]

- Act together to attract businesses to Fukui Prefecture

Number of newly established companies: 19 (2006-)



Facilities for electron beam irradiation

Fulfilling Measures based on the Fukushima Nuclear Accident

[Situation Surrounding Energy Issues after the accident]

- Based on the Fukushima Nuclear Accident, it is necessary to develop human resources to be engaged in enhancement of emergency response as well as further measures of nuclear safety.
- It is important to cope with long-term pluralistic energy source in order to ensure stable energy supply and support a people's life and industry.
- Serious impact on employment of people and regional economy in the area having NPPs.



Enrichment and Enhancement Fields

◎ Shaping Firm Safety Measures

◎ Industrial Enhancement and Employment Countermeasures in “Reinan area”

Shaping Firm Safety Measures

~Promoting to make firmer infrastructure for nuclear safety~

Establishment of Nuclear Emergency Response Structure

【 National and Prefectural Government, Town Office, Electric Power Companies, JAEA】

- Establishment and Management of the Nuclear Emergency Support Organization

【Wakasa Wan Energy Research Center (WERC), etc.】

- Holding Exhibition of Rescue Robot.



Practice operating Rescue Robot

Promoting R&D against Nuclear Accident and Decommissioning

【National and Prefectural Government, JAPC, Vendors in Fukui Prefecture, Universities】

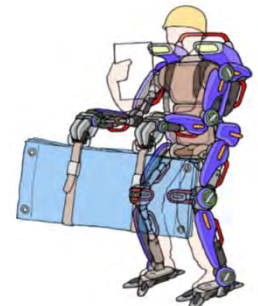
- Development of power assist suits for carrying heavy objects in radiation

【National and Prefectural Government, Electric Power Companies, Companies and Universities in Fukui Prefecture】

- Improvement of Protective Clothing, Development of Appliances for Emergency Response (Adsorbent for Radioactive Materials)

【 National and Prefectural Government, WERC, JAEA, Companies and Universities in Fukui Prefecture 】

- Development of High Intensity-Laser Technology for Radioactive Contamination and Dismantling of NPP.



(Power Assist Suits)

Development of Human Resources supporting Nuclear Safety by International Collaboration

【 National and Prefectural Government, WERC, Electric Power Companies, JAEA, Universities in Fukui Prefecture】

- Enrichment of HRD system in collaboration with IAEA.
- Development of Japanese Human Resources for Nuclear Safety, Succession of Technical skill.



Training Simulator

Industrial Enhancement and Employment Countermeasures

[Enrichment and
Enhancement Fields]

in “Reinan area” ~Creation of new industry ~

Attraction of enterprise, Creation of new industries

【Prefectural Government, Town Office, Electric Power Companies, JAEA】

- Attraction of the larger number of enterprises to “Reinan area” by making use of their competitiveness.
- Attraction of enterprises leading to creation of new industries.
- Preparation and development of business site and assistance in the site acquisition.

【 Prefectural Government, Town Office, Kansai Electric Power Company】

- “ Eco-gardening Promotion Centralization Project “



Year-round culture of Mid-tomato

Pluralistic Energy Source

【 Prefectural Government, Town Office, Electric Power Companies 】

- Preparation of infrastructure for LNG

【 Kansai Electric Power Company 】

- Development of a Mega Solar Power Plant



Power Station (LNG)

Promotion of Renewable Energy

【 National and Prefectural Government, Town Office, Electric Power Companies 】

- “One-Energy for One-Town” Project

【 National and Prefectural Government, Town Office, Kansai Electric Power Company】

- Feasibility Study of wave activated power generation technology

【Wakasa Wan Energy Research Center, Companies and Universities in Fukui】

- R&D on Production technology of biofuel



Hydro-electric power station
with Erosion Control Dam