



Nuclear HRD Program of Fukui Prefecture

March 27, 2013

**The Wakasa Wan Energy Research
Center (WERC)**



Establishment of Fukui IHRDC

The potential of Fukui prefecture related to human resources development for atomic energy

① Various kind of nuclear power generating facilities

② Concentrated HRD Organizations

③ Experience for 50 years and Accumulation of Human Resources



Domestic HRD (2005 -)

Fukui International Human Resources Development Center for Atomic Energy (Fukui IHRDC) was established in April 2011.



Potential of Fukui Prefecture for Atomic Energy

① Various kind of nuclear power generating facilities

The greatest power supply area in Japan

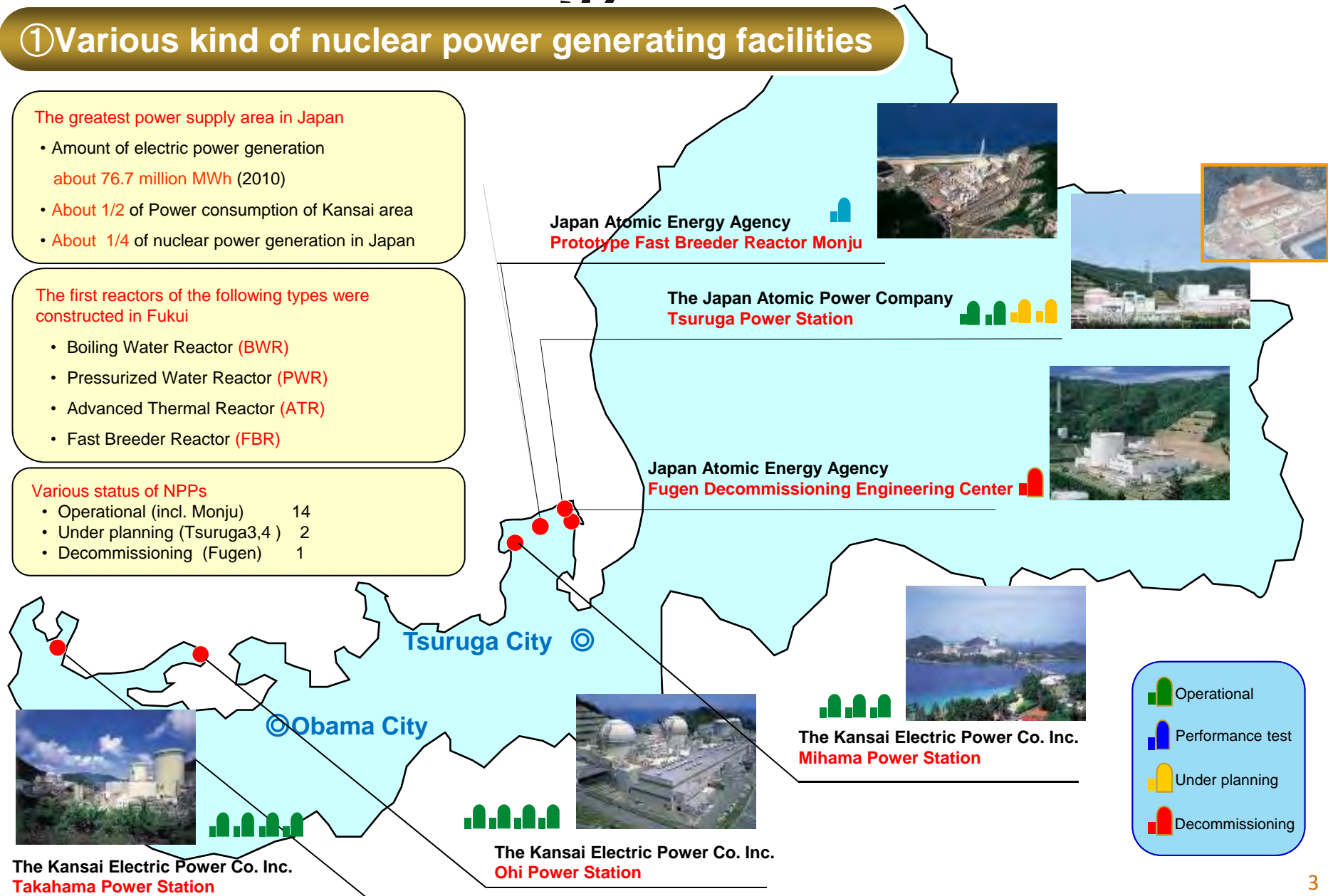
- Amount of electric power generation
about 76.7 million MWh (2010)
- About 1/2 of Power consumption of Kansai area
- About 1/4 of nuclear power generation in Japan

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

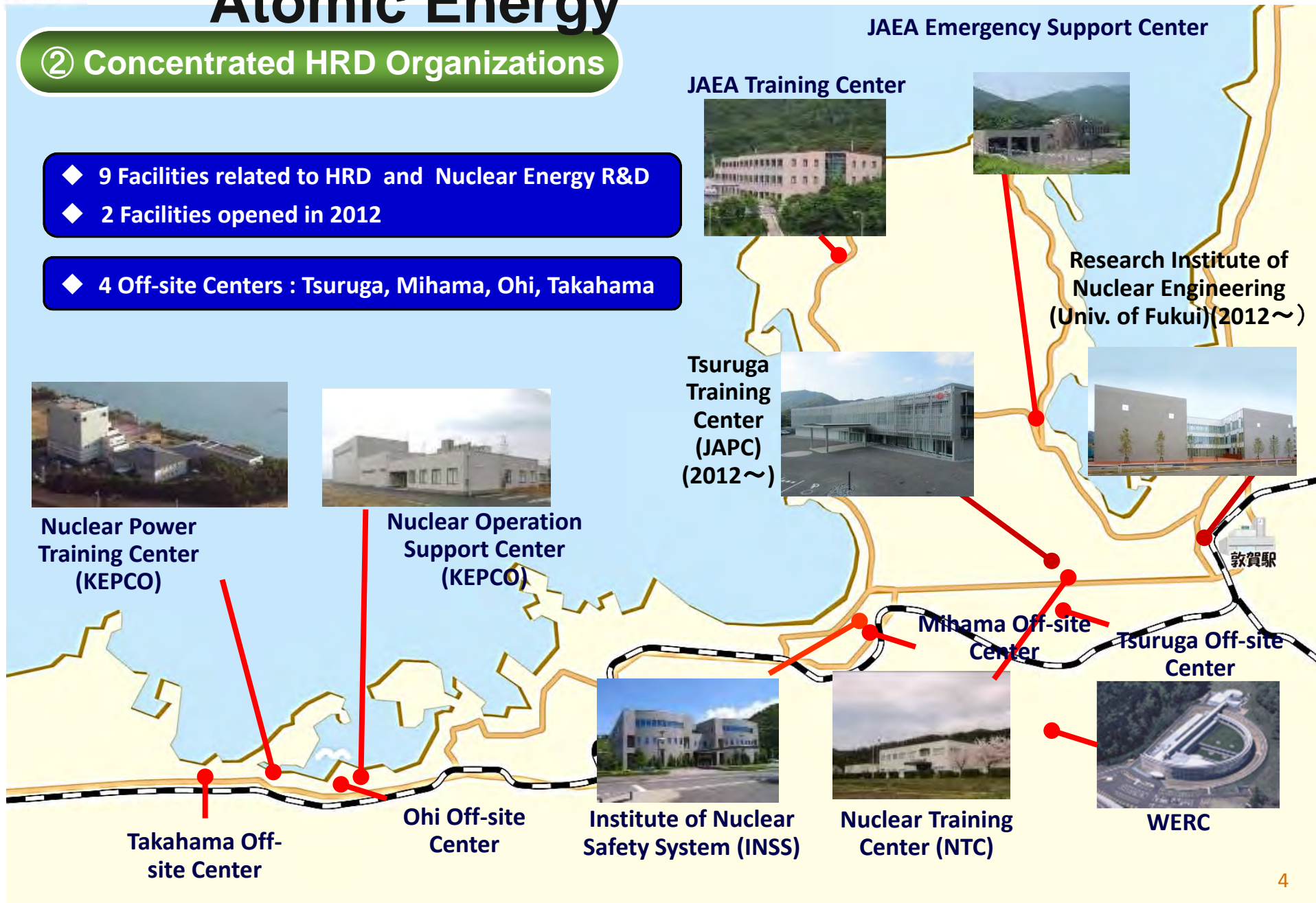




Potential of Fukui Prefecture for Atomic Energy

② Concentrated HRD Organizations

- ◆ 9 Facilities related to HRD and Nuclear Energy R&D
- ◆ 2 Facilities opened in 2012
- ◆ 4 Off-site Centers : Tsuruga, Mihama, Ohi, Takahama





Potential of Fukui Prefecture for Atomic Energy

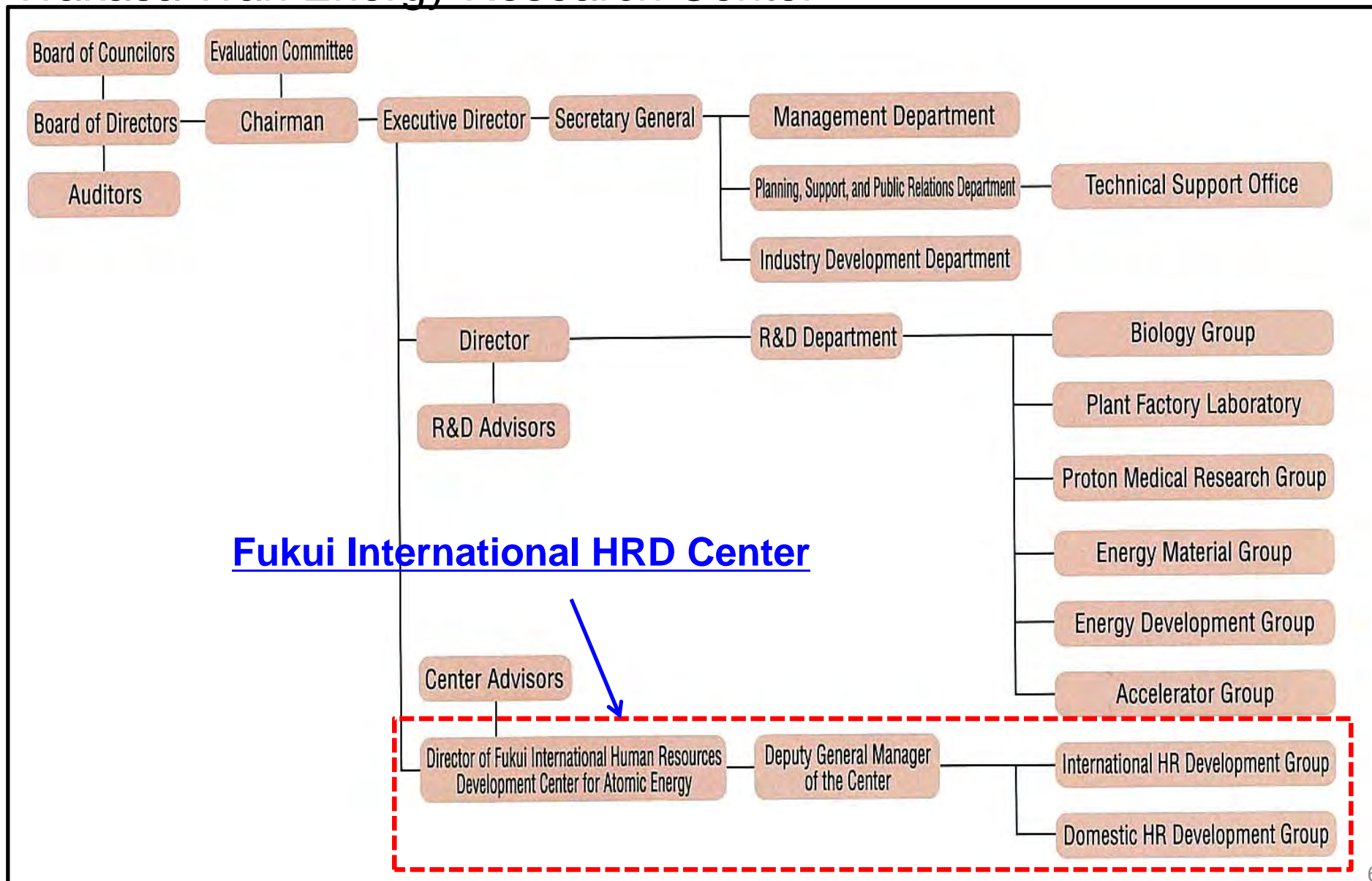
③ Experience for 50 years and Accumulation of Human Resources

- Experience of introducing NPP[Senior Human resources of Electric Company]
 - Human Resources Development Method needed in NPP siting
 - Troubles and Know-how experienced at Nuclear power plants
- Public Acceptance(PA) and Communication related to Nuclear Power
 - Popularization of knowledge concerning nuclear peaceful utilization
 - Nuclear education to children
- Safety measures and responses for troubles and local resident
 - Safety agreement
 - Environmental radiation monitoring
 - Information disclosure
- Know-how regarding symbiosis with local society



Organizational Chart

Wakasa Wan Energy Research Center





WERC Facility Overview

Radiation Research Building

Accelerator room
Irradiation rooms: 4
Solar furnace(outdoor)

Lecture Building

Training rooms: 4
Practical training rooms: 3
Conference rooms: 3

General Research Building

Research offices:18
Laboratories:12
Scientific instruments:55

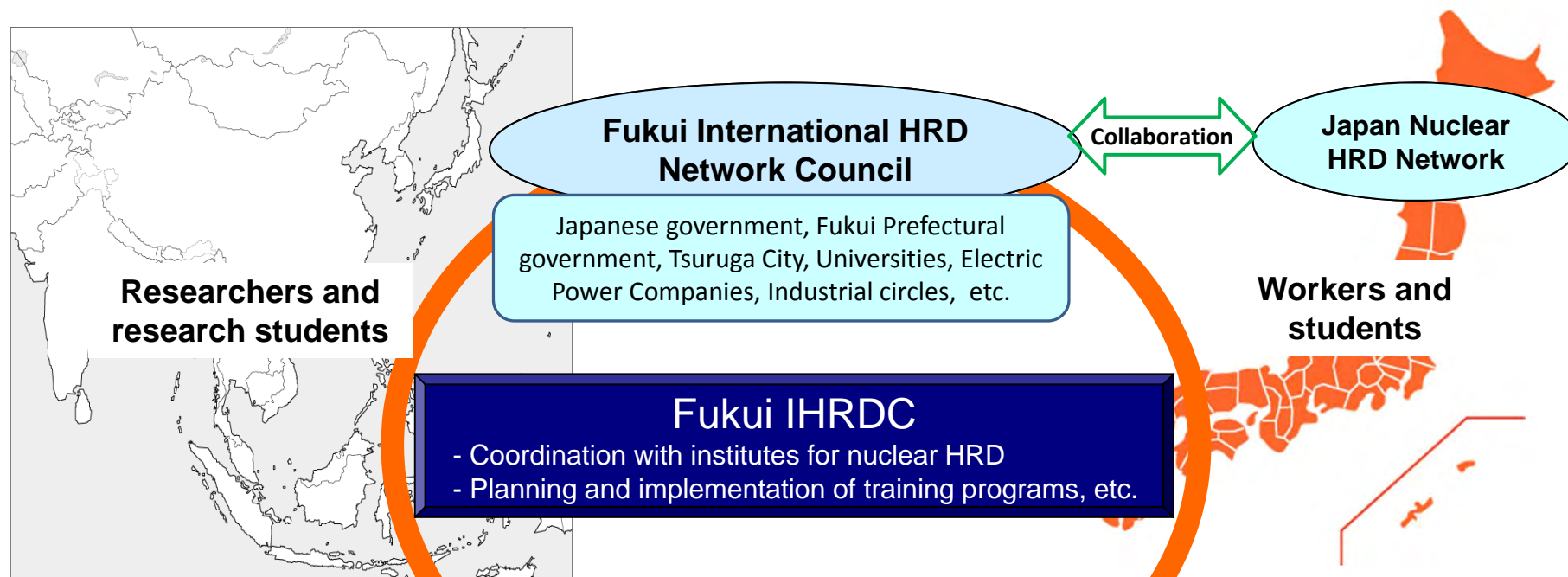
Exchange Building

Exchange rooms: 2
Science information area
Science experience area
Hall (350 seats)

Site area: 81,819 m²
Total Floor area:13,854 m²
Total number of staffs: 61
(Researchers: 22)



Activity Development utilizing Network



Research Institute

WERC

Monju Fast-Breeder Reactor

Institute of Nuclear Safety System, etc.

Administrative Agency

Fukui Prefectural Environmental
Radiation Research and Monitoring
Center

Training Institutes

International Nuclear Information & Training
Center(JAEA)

Nuclear Safety Training Center (JAPC)

Nuclear Technology and Education Center
(KEPCO)

Nuclear Power Training Center, etc.



Universities in Fukui and Kansai/Chukyo areas

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





Activities of Fukui IHRDC

Fiscal 2011

Implementation of training programs utilizing existing facilities

Activities

<International HRD>

○Overseas training

- Reactor plant safety course
- Public acceptance course
- The training in foreign countries

○International conference

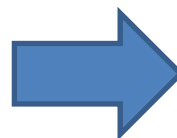
<Domestic HRD>

○Improvement of skills of engineers

- Training for workers involved in nuclear power plants maintenance, etc.

○Improvement of internationality

- Internationalism cultivation training on nuclear power



Fiscal 2012

Expand project in conjunction with opening of Tsuruga Training Center and Research Institute of Nuclear Engineering, University of Fukui

Activities

<International HRD>

○Overseas training

- Reactor plant safety course
- Public acceptance course
- [Nuclear power generation safety bases course](#)
- [Nuclear energy administration course](#)
- The training in foreign countries

○International conference

- [Acceptance of researchers and research students](#)

<Domestic HRD>

○Improvement of skills of engineers

- Training for workers involved in nuclear power plants maintenance, etc.

○Improvement of internationality

- Internationalism cultivation training on nuclear power

- [Improvement of safety, disaster prevention and crisis management skills](#)
- [Specialization improvement training on safety and crisis management, etc.](#)



Activities of Fukui IHRC

International Human Resources Development Activities [FY2012 result]

Training Course, etc.	Country	Participant	Duration	Number of participants	Contents, etc.
Reactor Plant Safety Course	10 Asian countries [Bangladesh, China, Indonesia, Kazakhstan, Malaysia, Mongolia, Philippines, Sri Lanka, Thailand and Vietnam]	Atomic energy-related engineers, etc.	[4 weeks] Oct. 22 – Nov. 16, 2012	10 [except Kazakhstan]	Lecture on Nuclear Power Plant Safety Technology [design, evaluation, operation & maintenance, etc.], Lessons from Fukushima Daiichi NPS Accident, etc., Facility visit, Practical training, Discussion
Nuclear Energy Administration Course	10 Asian countries [Bangladesh, China, Indonesia, Kazakhstan, Malaysia, Mongolia, Philippines, Sri Lanka, Thailand and Vietnam]	Administrative officer on nuclear power, etc.	[3 weeks] Nov. 26 – Dec. 14, 2012	9 [except China, Vietnam]	Lecture on Japanese government and regulations on nuclear power, Lessons from Fukushima Daiichi NPS Accident, etc., Facility visit, Practical training, Discussion
Public Acceptance (PA) Course	Vietnam	Press officers of electric power company, etc.	[1 week] Sep. 10 – Sep. 14, 2012 Feb. 18 – Feb. 22, 2013	17	Lecture on Fukui Prefectural Administration, Lessons from Fukushima Daiichi NPS Accident, Public Acceptance Activities, etc., Facility visit, Discussion
Nuclear Power Generation Safety Bases Course	Vietnam	Atomic energy-related engineers, etc.	[2 weeks] Sep. 24 – Oct. 5, 2012	12	Lecture on Nuclear Power Plant Safety Technology, Lessons from Fukushima Daiichi NPS Accident, etc., Facility visit, Practical training, Discussion
The training in foreign countries	Vietnam	Atomic energy-related administrative officers and engineers, etc.	[1 week] Jan. 21 – Jan. 25, 2013	60	Lecture on Lessons from Fukushima Daiichi NPS Accident, Nuclear Power Safety Measure, Fukui Prefectural Administration, Public Acceptance Activities, etc., Discussion
Atomic Energy Researchers and Research Students Acceptance Program	Asia, USA and France, et.	Researchers in institute or university, etc.	[About 3 months]	3	Acceptance of researchers concerning nuclear Safety Technology and application technology improvement, etc. within universities in Fukui



International HRD Activities -1- [FY2012 result]

Reactor Plant Safety Course

Purpose : Upbringing of engineers related to nuclear safety

Invited countries : Bangladesh, China, Indonesia, Malaysia, Mongolia,
Philippine, SriLanka, Thailand, Vietnam

Participant : Atomic energy-related engineers, etc.

Number of acceptance : 10

Duration : 4 weeks



Lecture



Visit to Mihama NPP



Visit to Training Center

International HRD Activities -1- [FY2012 result]

Reactor Plant Safety Course ~ contents of the curriculum

①Basis of nuclear power plant safety

This course shows the fundamental agenda of NPS in each phase from location to design, construction, and operation.

②Safety measures and evaluation

The safety measures and evaluation is learned using actual cases.

③Operational techniques of nuclear power plant

The method of operation control (PWR, BWR) is learned.

④Maintenance management of the reactor plant

The system and timing of the plant equipment inspection, etc. are learned

⑤Fukushima Daiichi NPS event

This course includes the content about “Outline of Fukushima Daiichi NPS event”, “Lessons learned from the accident”, “Action of IAEA” and “The debate of NPS construction plan of each country after the accident”

⑥Facility visit

The knowledge related to the nuclear facility is attained by visiting “NPS”, “Training center”, “Nuclear Emergency Response Operations Facility”, “Fukui prefectural environmental research and monitoring center”, etc. in Fukui.



International HRD Activities -2- [FY2012 result]

Nuclear Energy Administration Course

Purpose : Upbringing of administrative officer on nuclear power

Invited countries : Bangladesh, Indonesia, Kazakhstan, Malaysia, Mongolia, Philippine, SriLanka, Thailand

Participant : Administrative officer on nuclear power, etc.

Number of acceptance : 9

Duration : 3 weeks



Lecture



Visit to Tsuruga NPP unit
3, 4 construction site



Visit to Decomissioning
Engineering Center "Fugen"

International HRD Activities -2- [FY2012 result]

Nuclear Energy Administration Course

~ contents of the curriculum

①Japanese government and regulations on nuclear power

The government and regulation of nuclear power in Japan is learned after experiencing the Fukushima Daiichi power plant accident.

②Basis of nuclear power plant safety

This course shows the fundamental agenda of NPS in each phase from location to design, construction, and operation.

③Ensure the safety of nuclear power

Safety culture and safety measures relating to nuclear power is learned.

④Fukushima Daiichi NPS event

This course includes the content about “Outline of Fukushima Daiichi NPS event”, “Lessons learned from the accident”, “Action of IAEA” and “The debate of NPS construction plan of each country after the accident”

⑤Facility visit

The knowledge related to the nuclear facility is attained by visiting “NPS”, “Training center”, “Nuclear Emergency Response Operations Facility”, “Fukui prefectural environmental research and monitoring center”, etc. in Fukui.



International HRD Activities -3- [FY2012 result]

Public Acceptance Course

Purpose: Improving public relations in countries aiming at introducing nuclear power plants

Invited country: Vietnam

Participant: Press officers of electric company , etc.

Number of acceptance: 17 (Autumn Course ; 8 , Winter Course ; 9)

Duration : 1 week



Lecture by Mayor of Ohi City



Visit to Fukui prefectural
Environmental Research and
Monitoring Center



Debate with local residents



International HRD Activities -3- [FY2012 result]

Public Acceptance Course ~ contents of the curriculum

① Basis of Atomic Energy

This course gives trainees the knowledge of “Role of Nuclear Power”, “Nuclear Policy in Japanese government and Fukui prefectural government”, “Outline of Nuclear Power Plant” and “Lessons learned from Fukushima Daiichi NPS Accident”.

② Coexistence between Siting Municipality and Atomic Energy

The mayor of Ohi city and Takahama city gives trainees the knowledge of the experience concerning coexistence with the atomic energy which Ohi city and Takahama city have cultivated. And the debate with local residents on the theme of "the communities and atomic energy" is conducted

③ Risk Communication

The method and concept of “Risk Communication” which is the effective technique at the time of having a dialog with local residents are learned through international and domestic success / failure example.

④ Facility Visit

The knowledge related to the nuclear facilities is attained by the facility visit in Fukui, such as NPP, “Fukui prefectural environmental research and monitoring center”, “Nuclear Emergency Response Operations Facility”.



International HRD Activities -4- [FY2012 result]

Nuclear Power Generation Safety Bases Course

Purpose: Upbringing of engineers related to nuclear Power Generation

Invited country: Vietnam

Participant: Atomic energy-related engineers, etc.

Number of acceptance: 12

Duration : 2 weeks



Lecture



Visit to Training Center



Debate with power company engineers



International HRD Activities -4- [FY2012 result]

Nuclear Power Generation Safety Bases Course ~ contents of the curriculum

①Basis of nuclear power plant safety

This course shows the fundamental agenda of NPS in each phase from location to design, construction, and operation.

②Ensure the safety of nuclear power

Safety measures relating to nuclear power is learned.

③Regional efforts and public relations

Local government and public relations activities are learned

④Fukushima Daiichi NPS event

This course includes the content about “Outline of Fukushima Daiichi NPS event”, “Lessons learned from the accident”, “Action of IAEA” and “The debate of NPS construction plan of each country after the accident”

⑤Facility visit

The knowledge related to the nuclear facility is attained by visiting “NPS”, “Training center”, “Nuclear Emergency Response Operations Facility”, “Fukui prefectural environmental research and monitoring center”, etc. in Fukui.



International HRD Activities -5- [FY2012 result]

Training in foreign countries

Purpose : Upbringing of administrative officers and engineers related to atomic energy

Country : countries in Southeast Asia

Participant : Atomic energy-related administrative officers and engineers, etc.

Number of participants : 60 (in Vietnam, FY 2012)

Duration : 1 week



Lecture



Lecture



Panel discussion



International HRD Activities -5- [FY2012 result]

Training in foreign countries ~ contents of the curriculum

①Basis of Atomic Energy

The outline of NPP construction as well as the development of sustainable energy and the composition and feature of LWR, etc. is learned.

②Safety measures of NPP

The safety measure of NPP and the accident management are learned.

③Technical issues of Atomic Energy

Fuel behavior during LOCA as well as radiation management and environmental monitoring is learned.

④Fukushima Daiichi NPS Accidents

Outline of Fukushima Daiichi NPS Accidents and Lessons from the accident are learned.

⑤Public Acceptance

PA activities as well as history of nuclear power introduction in Fukui and nuclear power contribution to Fukui is learned using actual examples.

⑥Panel discussion

The role of research institutions in introducing nuclear power, PA and the development of local community are discussed.



International HRD Activities -6- [FY2012]

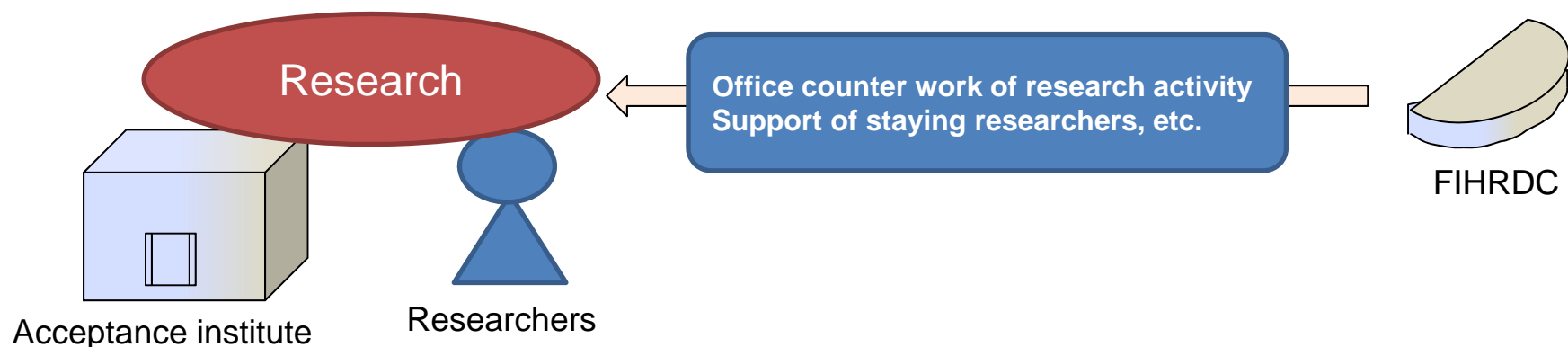
Atomic Energy Researchers Acceptance Program

Purpose : Contributing to nuclear safety and improving safety technologies of atomic energy and encouraging collaboration and exchange with overseas research institutes

Country : Asian countries, US and France, etc.

Participant : Researcher of the research institute, graduate student, etc.

Acceptance institute : Universities and Research institutes in Fukui





International HRD Activities -7- [FY2011 result]

International Meeting on HRD for Nuclear Energy in Asia

Purpose: Forming networks with governments and research institutes in foreign countries and understanding each country's needs for nuclear HRD

Participating Country: Australia, Bangladesh, China, Indonesia, Bangladesh, China, Indonesia, Kazakhstan, Korea, Malaysia, Mongolia, Philippine, Thailand, Vietnam and Japan (12 countries)

Number of participants: 26





Activities of Fukui IHRC

Domestic Human Resources Development Activities [FY2012 result]

Training course, etc.	Participant	Duration	Number of Participants	Contents, etc.
Training for workers involved in nuclear power plants maintenance	Engineers of companies in Fukui, etc.	June 2012 – March 2013	825	Improving skills and promoting new entry [4,527 engineers : FY2005 – FY2012] - General training [radiation treatment, basis of maintenance, etc.] - Specialized training [practical knowledge & skill of nondestructive inspection, equipment diagnosis, bodily sensation of safety, etc.]
Human resources development course for NPP maintenance	Engineers of companies in Fukui, etc.	August 2012 – March 2013	494	Improving skills and expanding business [3,804 engineers : FY2006 – FY2012] - Skill level certification training & examination - On-the-Job training
Training for inspector of NPP	Nuclear inspectors in Japan	December 17 – December 19, 2012	4	Lecture on radiation measurement technique, Practical training by using the monitoring car and radiation measurement devices, etc. [39 inspectors: FY2008 – FY2012]
Internationalism cultivation training on nuclear power	Staffs of makers, electric power companies and research institutes, etc.	March 21 – March 22, 2013	25	IAEA and Japan, Nuclear policy and plan of US and France, society and industry of countries introducing nuclear power generation, etc. [All lectures and discussions were conducted in English.] High school students and university students participated in some lectures.



Domestic HRD Activities [FY2012 result]

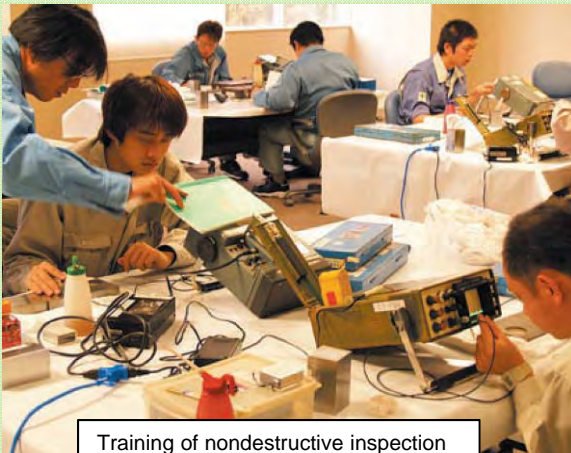
Training for workers involved in nuclear power plants maintenance
Human resources development course for NPP maintenance

Purpose: enhancement of domestic technicians in technical capacity, Tapping a new market

Target: Engineers of companies in Fukui, etc.

Contents:

- General training [radiation treatment, basis of maintenance, etc.]
- Specialized training [practical knowledge & skill of nondestructive inspection, equipment diagnosis, bodily sensation of safety, etc.]
- Training of radiation management, electric & pipe maintenance, etc.
- Skill level certification training & examination [post-installed anchors, joint fastened pipe, string electric wires and terminals]
- On-the-Job training



Training of nondestructive inspection



Skill level certification training
[Post-installed anchors]



On-the-Job training [mock-up training]