Enhancement of Leadership – JANSI's approach –

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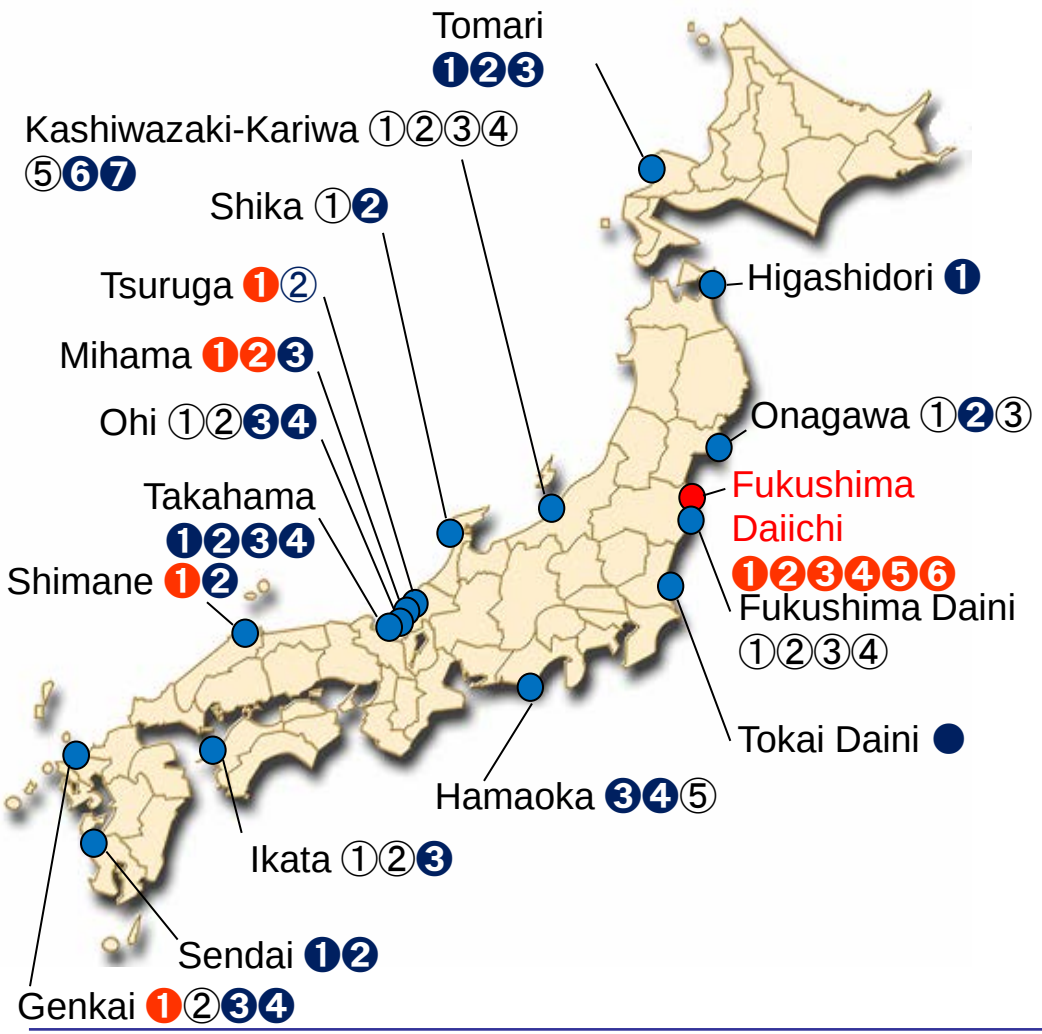
September, 2015

Current status of nuclear power in Japan

○ **Nuclear power reactors** in Japan decreased from 54 to **43 units** after the Fukushima Daiichi NPS accident.



Legend:
- ● Plant applying for approval of restart of operation
- ● Plant under decommissioning
- ○ Plant whose future policy has not been decided

Breakdown of 54 units:

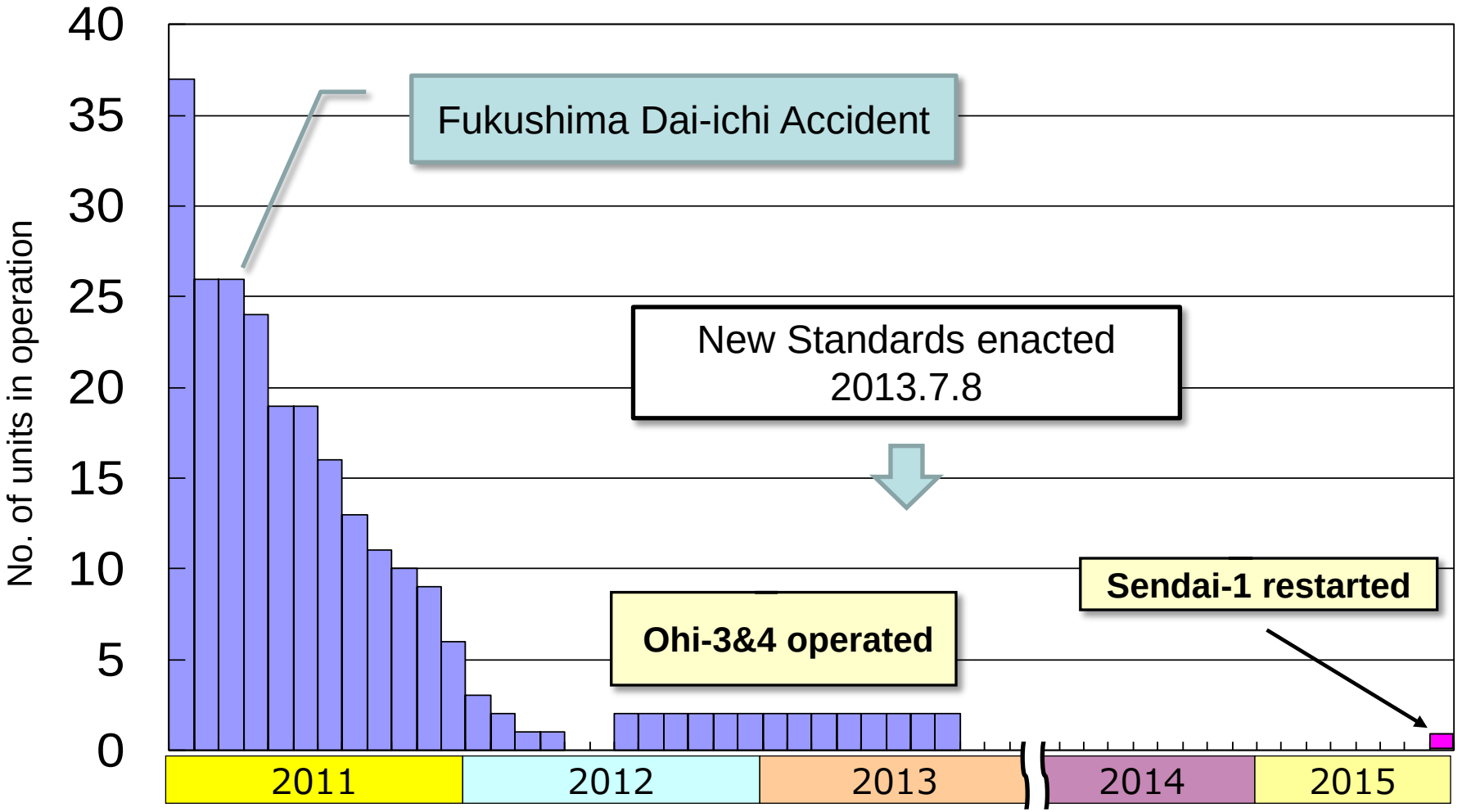
Plant applying for approval of restart of operation: 24 units

Plant under decommissioning: 11 units

Plant whose future policy has not been decided: 19 units

(As of the end of August 2015)

Number of units in operation

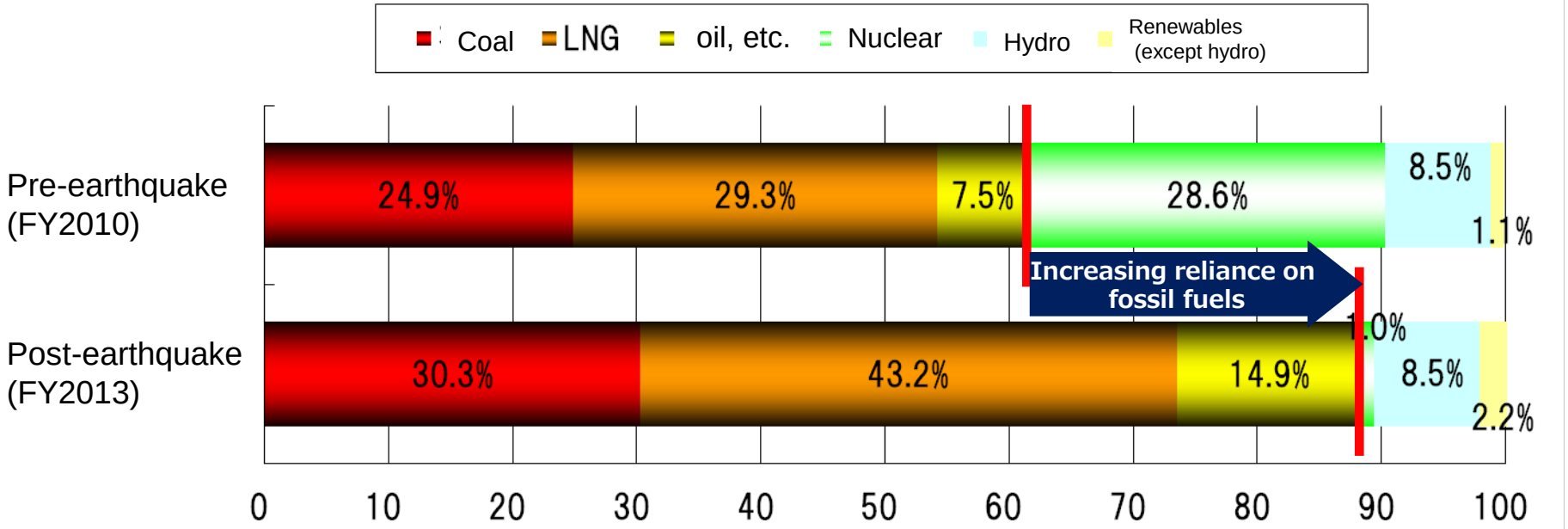


Change in Composition of Power Sources

○Currently, all nuclear power plants are shut down except Sendai-1.

About 90% of the generated energy relies on thermal power generation.

Composition of electric power generation



Increase in costs for fossil fuel

¥3.6trillion/year
↓
¥7.7trillion/year

Rate rise

(Electric light)

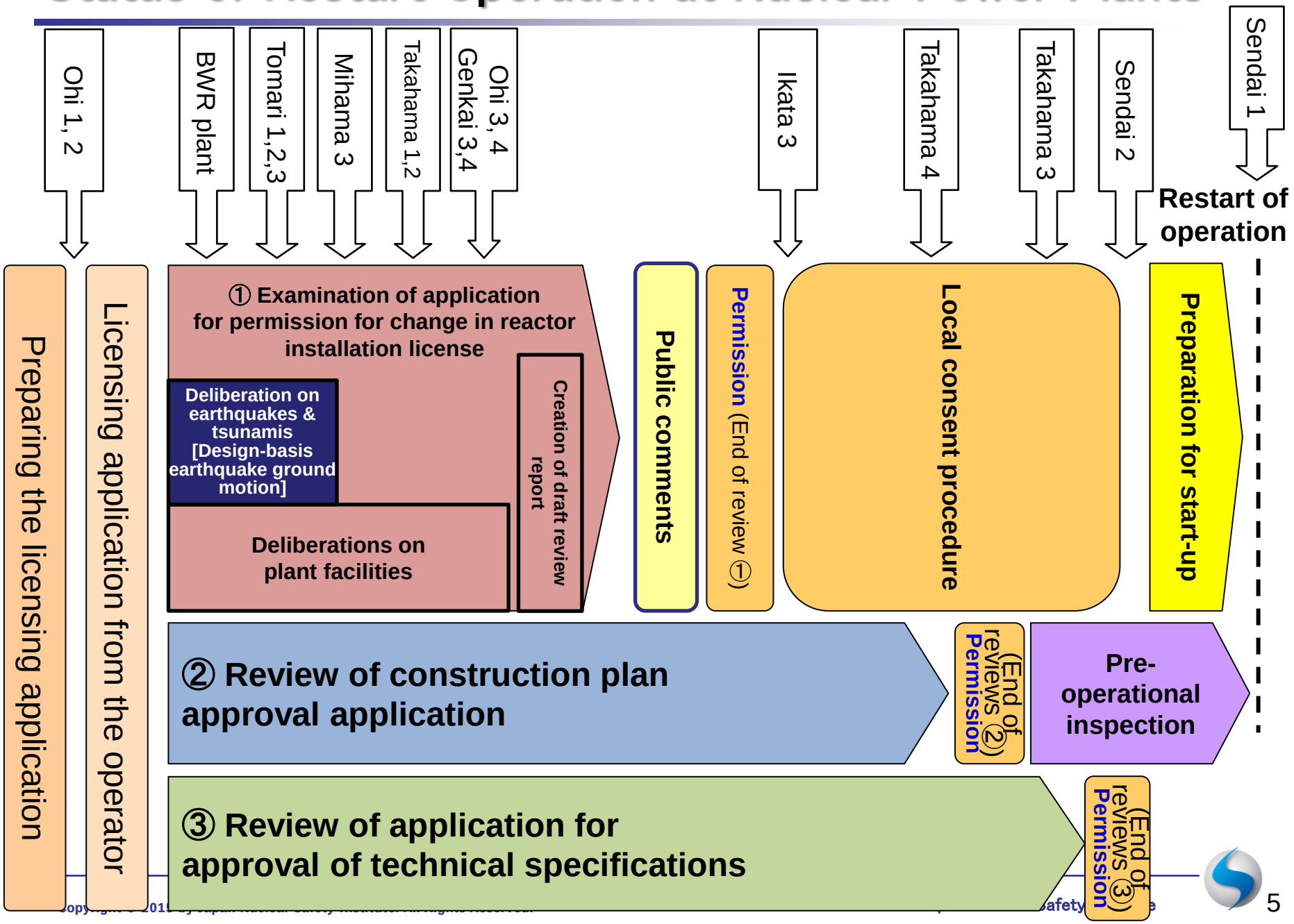
¥20.4/kWh
↓
¥24.3/kWh

increase in CO2 emissions

374million t-CO_2/year
↓
484million t-CO_2/year

NB: Red figures in brackets show a comparison between FY2010 and FY2013

Status of Restart Operation at Nuclear Power Plants



Energy Policy after the Great East Japan Earthquake

Outline of the Strategic Energy Plan (related to nuclear power)【April 2014】

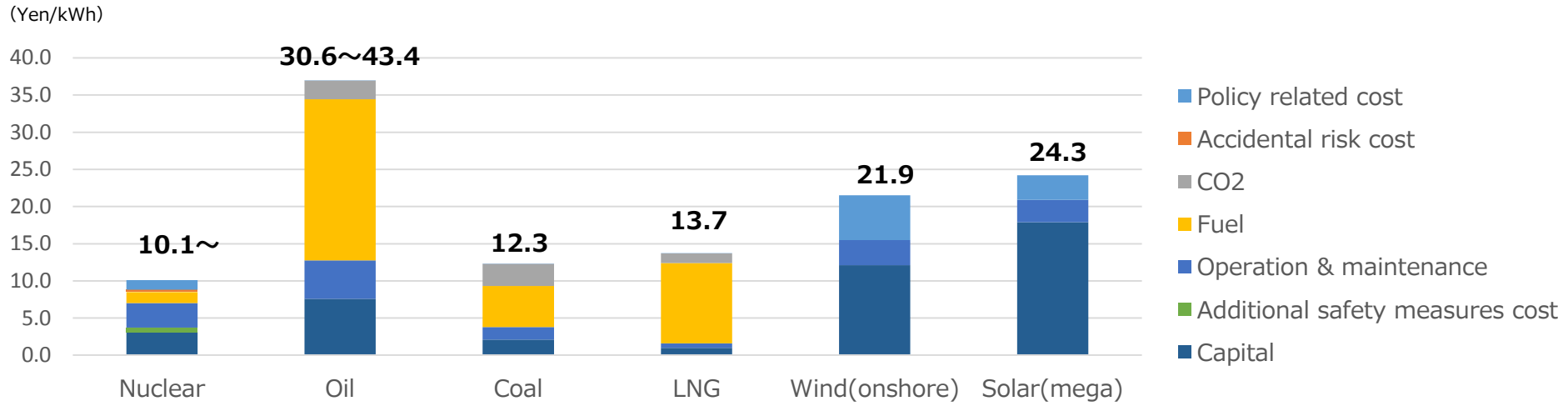
○Nuclear power is important base load power source

-Minimize dependency on nuclear power generation-

○Promote the restart of operation of the nuclear power plants which satisfy the new regulatory standards

○Continue to promote the nuclear fuel cycle including reprocessing and use of MOX fuel

Cost estimation (2014 model plant)【April 2015】



Decision on Energy Best Mix【July 2015】

○Power supply composition in 2030 (approximate)

Nuclear	Oil	Coal	LNG	Renewable
20～22%	3%	26%	27%	22～24%

What is Japan Nuclear Safety Institute

Birth of JANSI

Japan Nuclear Safety Institute (JANSI) was created by the initiative of Nuclear Industry, after the Fukushima Daiichi accident, as a self-regulated entity to reinforce nuclear safety of Japanese nuclear power plants.

JANSI's Mission

Pursue the highest-level of safety for the nuclear power industry in Japan

JANSI

JANSI

JANSI's Seven Principles of Safety Culture

1. Recognized safety as first priority
2. Leadership with strong commitment
3. Framework to ensure safety
4. Effective communication
5. Continuous learning (organizational learning)
6. Recognition of potential risks (questioning attitude)
7. Vital and blame tolerant work environment

Concept of Responsibility Sharing for Human Resource Development

■ **Nuclear Operators**

for Nuclear Power Plant Management and Operational Technical skills and Management capabilities

- Normal management
  - Plant staff: Operation, maintenance, radiation control
  - Specialized skills: inspection of welding, fuel fabrication, construction
  - Official Qualifications: Chief reactor engineers, radiation control engineers, fuel handling engineers
- Emergency responses
  - Emergency Drill and exercises on site

■ **JANSI**

for Non-Technical/Mental Capabilities such as stress control, team building and Coaching as well as Technical Guidelines/Qualifications

- Leadership Training (from CEOs to Frontline Managers)
  - Crisis Management Training in collaboration with outside
  - Shift supervisor certification
  - Maintenance ability qualification
  - Plant Staff Education Guidelines

Initiatives of HRD Placing the Highest Priority on Nuclear Safety

< Capability >

	Non-technical	Technical
Emergency	- Leadership - Assessment/Comprehension of the situation - Management of organizations - Risk management - Sense of mission, etc.	- Accident management procedures - Knowledge/reactor operation - Knowledge about Facilities - Repairing/restoring of facilities (Connecting of cables, etc.) - Sampling/analysis, etc.
Normal condition	- JANSI's 7 principles of safety culture, etc.	- Operation management - Maintenance management - Radiation/Chemical Management - Fuel management, etc.

Leadership training program

Education Guideline

Basic Concept of Leadership Training Courses

Identified problems and lessons of Fukushima Daiichi Accident from the reports on the accident.

For example JANSI reviewed the Yoshida Interview reports, detailed narratives of the director of the Fukushima Daiichi Power Station.

Crisis management to organize information and establish strategic response in extremely chaotic conditions

Strong leadership

- To make other individuals and organization **to think proactively** and **to take action** in accordance with safety culture
- Strongly willed and encourage people to raise organization to a higher level of safety culture

Objective of Leadership Training at Each Level

Leadership training is to make participants:

- **Clearly aware significance of nuclear risks**
- **Encourage organizations to work to reduce risks**
- **Develop human resources to change organizational culture**

Management Levels	Objectives
CEOs	Share the value of nuclear safety
Plant Directors	Confirm determination as a chief commander at front line
Chief Reactor Engineers	Enhance capability to make technical advice at accidents
Crisis Management (Managers)	Enhance capability of strategic command and communication as a team leader at Emergency Response Center
Managers	Enhance leadership under high stress
Assistant Managers	Enhance capability of team building and followership

Top Management Training *CEOs*

To share the value **“ We are in the same boat”**

■2013/6/5 1st time: Panel Discussion

“Direct causes of the Fukushima Daiichi accident”

■2013/7/18 2nd time: Panel Discussion

“The organizational culture at TEPCO”

■2013/9/12 3rd time: Breakdown Session

“Response of each individual nuclear operators”

■2014/6/12 Value Sharing Meeting

“How to Voluntarily and Continuously Improve Nuclear Safety”

■2015/3/19 Value Sharing Meeting

“Lessons from Fukushima accident such as Emergency Response, Leadership, Risk Communication, New Regulations”

Top Management Training *Plant Directors*

2015/2/19-20

Objective: **Uplift Determination of Plant Director as Top Frontline Commander**

Program:

- Lecture by the shift supervisor at Fukushima Daiichi unit 1&2
- Discussion of 3 key challenges in groups
  - Decision making and delegation
  - Assessment of the situation and share information
  - Requirements of Plant Director
- Lectures by experts in crisis management
  - Experts from Airlines, Fire Department, and the USA

Group discussion

Lecture by outside experts

Crisis Management Training *Staff of ERC* (1/2)

Training at Institute of Fire Safety & Disaster preparedness

Program

- Emergency response
- Organizational management for emergency
  - Leadership
  - Psychological affect (PTSD)

Explanation about crisis management and team-building, on the basis of differences and similarities between firefighting and nuclear power. The possibility of people dealing with crisis management suffering from PTSD.

- Situation Awareness Training
  - Difficulty of communication and information sharing
- Emergency command training
  - Fire at department store
  - Terrorism at Nuclear Power Plant

Training targeting acquisition of key points and execution capability of integrated command and accomplishing the mission under high stress and harsh conditions.

Communication skills and Strategy

Crisis Management Training *Staff of ERC* (2/2)

■ Integrated Training

➢ Training for dealing with harsh conditions simulating Terrorism and Radiation contamination.

Field training for experiencing the problems by carrying out the role play for each job function (From plant director to subcontract workers) by simulating the high stress and harsh conditions of nuclear plant lifesaving mission.

■ Summary of training

➢ From the view point of crisis management

Pursue the Reality (Extreme Stress)

Manager Training *Shift Supervisors* (1/2)

Training for shift supervisors to enhance leadership under the extreme stress in the event of severe accident

Program:

- Review of Fukushima Daiichi Accident
  Lecture by the shift supervisor of Fukushima Daiichi unit 1&2 at the time of the accident
  - Lessons learned from the accident
  - Difficulties of decision making and activities under the situation of no electricity, very limited resources and little information

Bring back Memories

- Soft skills necessary for operators
  - Leadership
  - Thinking
  - Communication
  - Solution of conflict
  - Confidence
  - Decision, etc.

Manager Training *Shift Supervisor* (2/2)

Program (continued)

- Leadership under stress during emergency response
  - Lecture by former Officer of Maritime Self Defense Force
  - Learn to prepare for life-or-death situations from the survival training expert

- Soft skills necessary for operators
  - Coaching skill

- Role-playing exercises on communication skill & stress control, simulating plant trouble response, participants acquire the following soft skills in the exercise through role play

Simulated experience

  - Coaching
  - Leadership (independent performance)
  - Communication
  - Emphasis on safety (inquiry, proposal, assertion)
  - Confidence (Maintenance of team structure, stress management)
  - Solution for disagreements
  - Review of decision and action, comments

Follow-up Cycle of Leadership Training

JANSI will continue to provide an “opportunity" for operators to keep improving their leadership skills.

Report results (examples of good practices, etc.) at the international workshop (July 15, 16, 2014 @ JANSI)

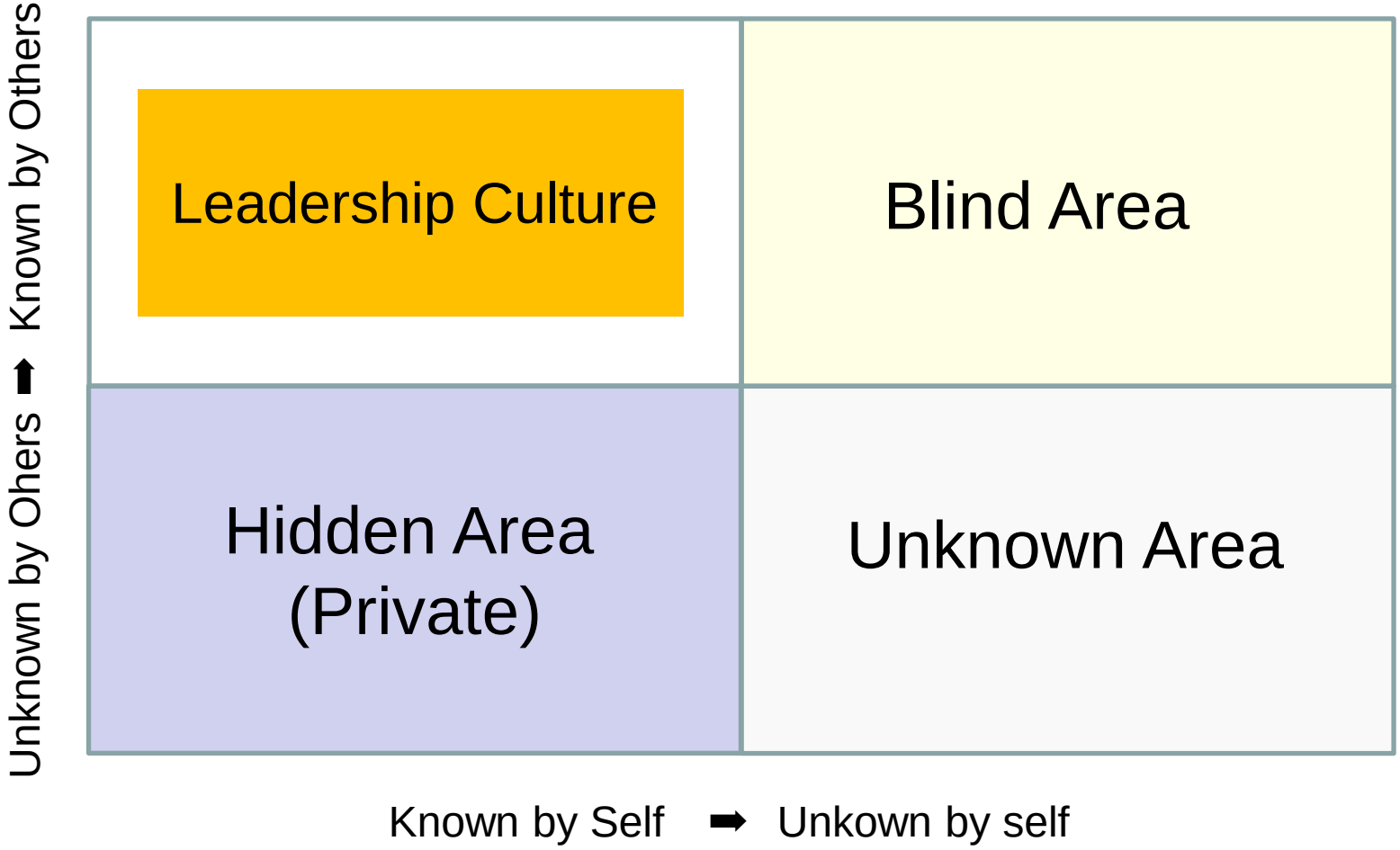
Follow-up of Leadership Training Program

International Workshop on Leadership for Emergency Response

[Participants] Overseas : 8 countries & region, 11 members
Japan : 17 members

Provide the opportunities for benchmarking.

Joseph. Luft & Harry. Ingham: Johari Window

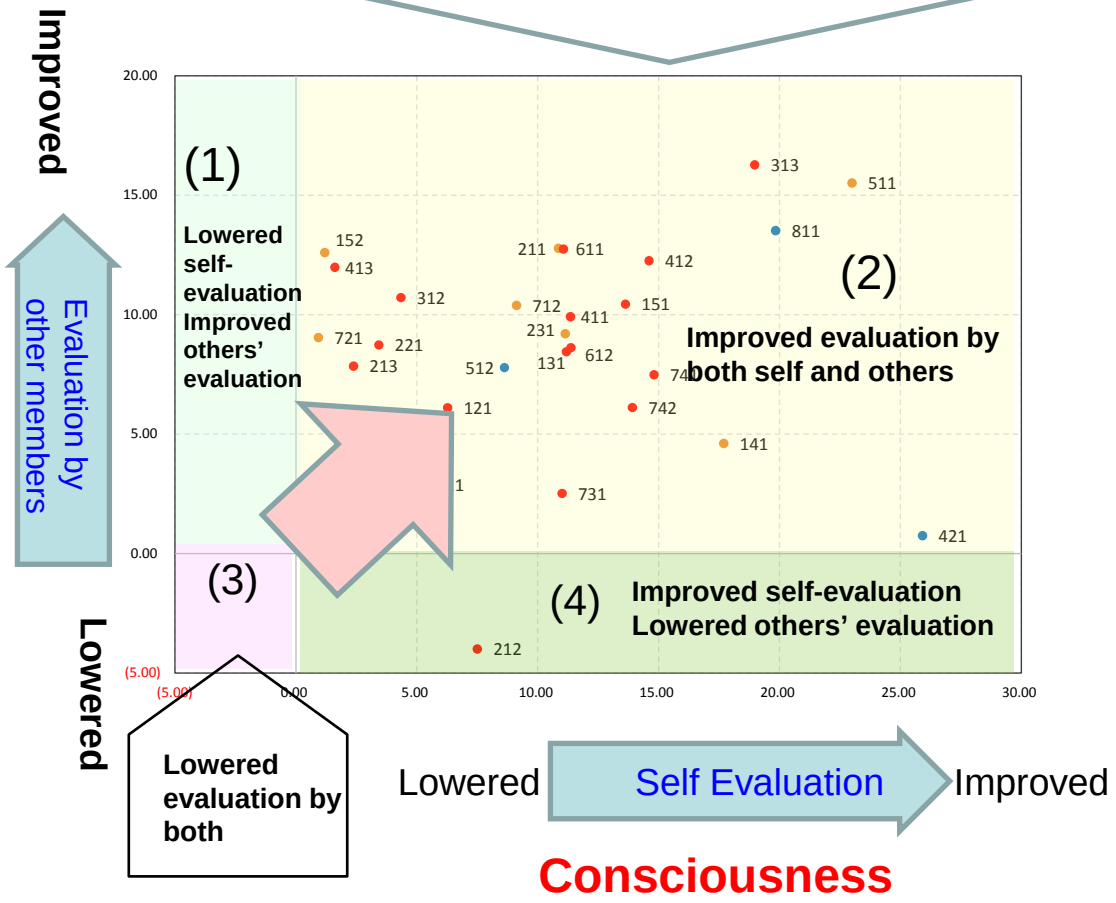


Analyses and Assessment of leadership profiling

Example of the Shift Supervisor Course

Self-evaluation and evaluation by other members **before and after the training courses**

Ask questions to participants and their subordinates about these skills one month before and three months after the course and makes mapping on the chart.

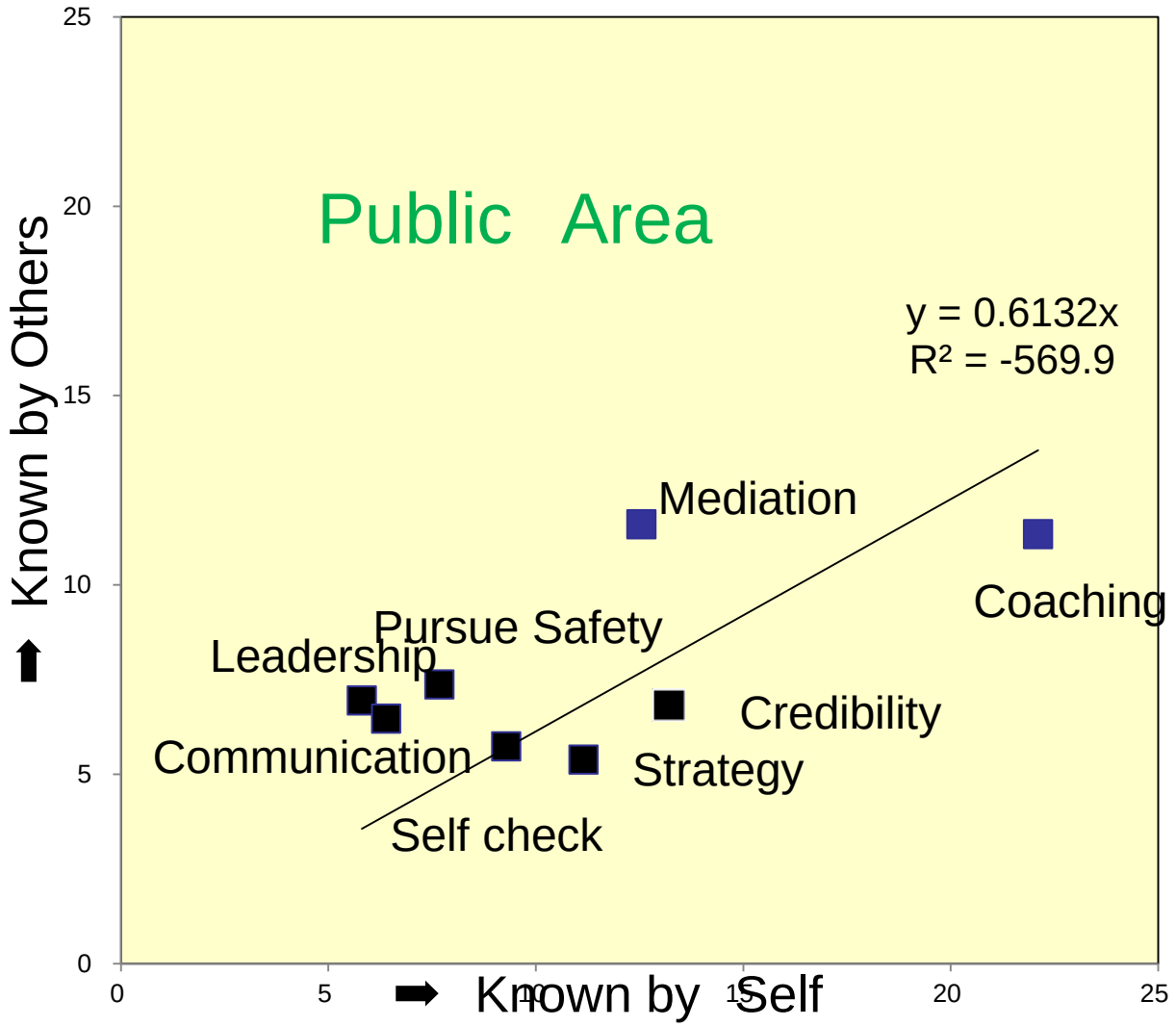


Each dot shows required skill

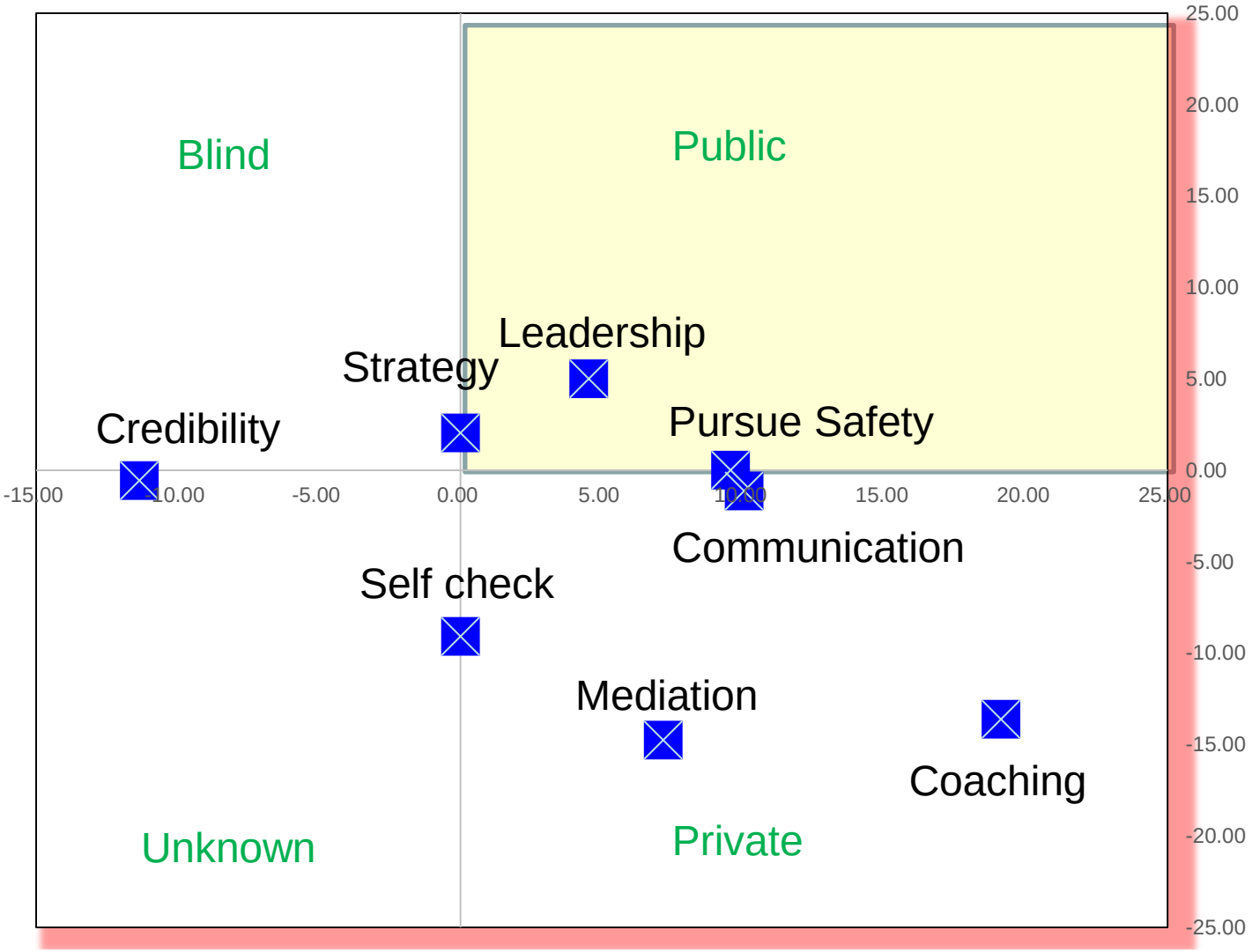
(Examples)

313: Handling of different opinions
411: Reliable relationship
511: Recognition of necessity
721: Decision making
811: Coaching skill

Total Shift Supervisor's deviation value (After - Before)



Some Shift Supervisor's deviation value (After - Before)



Summary of Present Status

- JANSI was established after the Fukushima accident to enhance nuclear power safety and pursue highest level of excellency in Japan's nuclear industry.

- Based on the lessons from Fukushima accident, JANSI's leadership training program is designed to enhance leadership of each level from CEOs to frontline managers especially in the event of emergency.

- **The training courses are mainly focusing on leadership and non-technical skills.** (Improvement of technical skills are responsibility of each nuclear operator)

- One training course itself is not sufficient to improve leadership. Follow-up of the courses are essential. We hold international seminars as the follow-up as well as benchmarking.

- Assessment of effectiveness of leadership courses is challenging issue. We are continuously trying to improve leadership courses based on constant reviews, analyses and assessment. Assessment method also needs improvement.

Reference

Comparison table of training systems at INPO and JANSI

INPO Conducted for around 250 days with around 1150 participants

No.	Seminar name	Target participants	Duration
1	For operation managers (OSPDS)	Staff who have the operator qualification and are appointed as first level manager	5 days 14 times
2	Leadership for first level managers (FLLS)	First level managers (with 3 to 24 months of experience)	5 days 9 times
3	Leadership for mid -level managers (NLLS)	Min-level managers with at least 3 months of experience	5 days 10 times
4	New leadership of atomic power generation (ENLS)	New or to-be head of division	3 days 8 times
5	Risk control with atomic power generation (NORM)	Top-level managers who take decisions with the help of PRA	3.5 days (at MIT) Once
6	Power station managers management course (SNPM)	(Current or to-be plant manager	5 weeks 4 times
7	New power station managers seminar (NPMS)	New plant manager	2.5 days Once
8	Top-level power station managers seminar (SNES)	Plant manager class (Site vice president)	2 days 2 times
9	Top-level administrators leadership (SELS)	In-charge of atomic power generation administration (New and to-be)	5 days Once/2 years
10	Nuclear reactor technical course (RTC)	CEO commanders (Other than those related to atomic power generation)	3 weeks (at MIT) Once
11	Goizueta Business School	Board of directors and executive officers	2 days Once

JANSI

JANSI schedule				Remark
No.	Seminar name	Target participants	Duration	
1	Training for Managers II (Operators)	Main operators (responsible classes, operators at the central control room)	3 days 2 times	
2	Training for Managers* II (Non-operators)	First level managers (chief clerks and executives)	3 days 4 times	* Crisis Management Training
3	Training for Managers I (Operators)	Shift supervisors, executives class	3 days 4 times	
4	Training for Managers* I (Non-operators)	Intermediate managers (manager, head of division)	3 days 4 times	* Crisis Management Training
5	Training for atomic reactor chief	Top-level managers such as main engineers of nuclear reactor	3 days Once	
6	Risk control training	Manager class that uses PRA	3 days Once	
7	Power station managers Management training	Plant directors To-be directors		
8	Emergency support facility Training for commanders	Plant directors	2 days Once	
9	Training for administrators III	Plant managers In-charge of power generation		
10	Training for administrators II	Main in-charge of power generation (CNO)	2 hours 5 times	Start course this year
11	Training for administrators II'	Board members other than those related to atomic power generation		
12	Training for administrators I	CEOs	2 hours 2 times	

Interactions between Nuclear Operators and JANSI

Global perspectives

JANSI

Leadership Training Courses
- Leadership
- Stress Management
- Team Building
- Coaching
- Followership

Accreditation
- Certification of Sift Supervisors
- Qualifications of Maintenance Skills

Guidelines/Standards

Nuclear Operators

Education of Leadership and Management Skills
- Each Management Level

Education & Training
- Operators
- Maintenance Staff
- Radiation Control Staff
- Specialized skills

Manager Training ***Shift Supervisors***

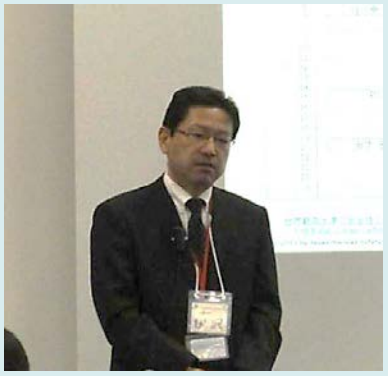
2014/2/12-14, 3/24-26
2014/6/9-11, 9/29-10/1, 12/2-4, 2015/1/27-29

Objective: **Enhancing leadership under the extreme stress in the event of severe accident**

Required Competence: **Leadership, Communication, Safety Insistence, Reliability, Reconcile deferent opinions, Review of Action, Thinking Skill and Coaching**

Program:

- Lecture by the shift supervisor at Fukushima Daiichi unit 1&2
- Learn to prepare for life-or-death situations from the survival training expert (Former plane captain of Japan Maritime Self-Defense Force, etc.)
- Role-playing exercises on communication skill & stress control



Lecture by the shift supervisor at Fukushima Daiichi unit1/2

Lecture by the former Maritime Self Defense Force captain

Role-playing exercise under extreme stress

Crisis Management Training ***Staff of ERC***

▪ 2015/1/13–15

Objective: **Enhance Non-Technical Skills of Team Leaders as Plant Director's Staff at Emergency Response Center**

Program:

- ■Lectures and exercise
  - ➢ PTSD
  - ➢ Team building in emergency
  - ➢ Communication exercise
- ■Command training
  - ➢ carry out missions under high-stress situation simulating a terror attack
- ■Integrated Exercise
  - ➢ under high-stress situation simulating large-scale radiation contamination by terror attack

Tabletop command training

Exercise

Review of Yoshida Interview Reports

We have carefully reviewed the Yoshida interview reports, the detailed recollection of the Fukushima Daiichi accident by Yoshida the plant director of the time of the accident and identified 5 major lessons.

(1) Difficulties of instructions which affect human safety
(2) Necessity of a field-first attitude
- ➢ Yoshida had heavy pressures from Headquarters and Government

(3) Importance of routinely analyzing information from overseas and past accident
- ➢ Fukushima Daiichi has not make operation test of isolation condenser essential cooling system in case of power loss since plant started operation.
- ➢ Fukushima Daiichi experienced a similar accident of emergency diesel generators in 1991.
  - ✓ Generators submerged in sea water but counter measures were inadequate.

(4) Setting priorities in cases of concurrent accidents
- ➢ Yoshida had to supervise 4 troubled reactors at the same time.

(5) Issues in establishing systems
- ➢ Fukushima Daiichi experienced difficulties to organize many organizations for support missions at the site such as Fire department, Self defense force, Local offices and etc.

For further Improvement

More needs-oriented and innovative program

- More appropriate programs meet the needs of participants and Nuclear Operators
- Inspire motivation of participants

More effective program

- More active discussion (not superficial discussion)
- Improvement of program through analysis and assessment of leadership capability
- Improve expertise to develop program (internal expertise and/or outsourcing)
- Secure superior instructors and facilitators