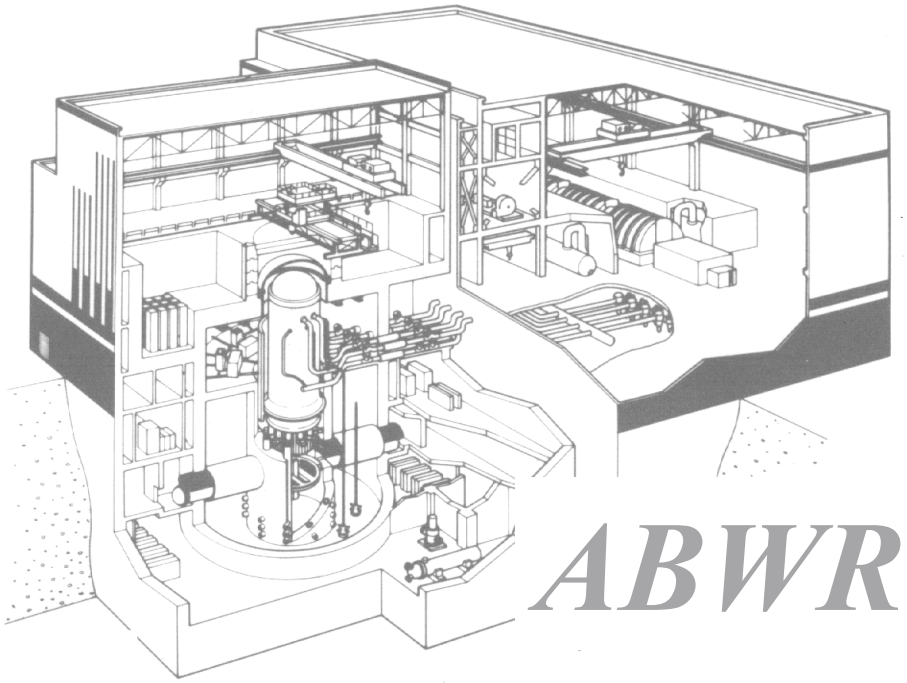
Near Term Challenges for Stable Operation of Nuclear Power

Takuya Hattori
Tokyo Electric Power Company, Inc

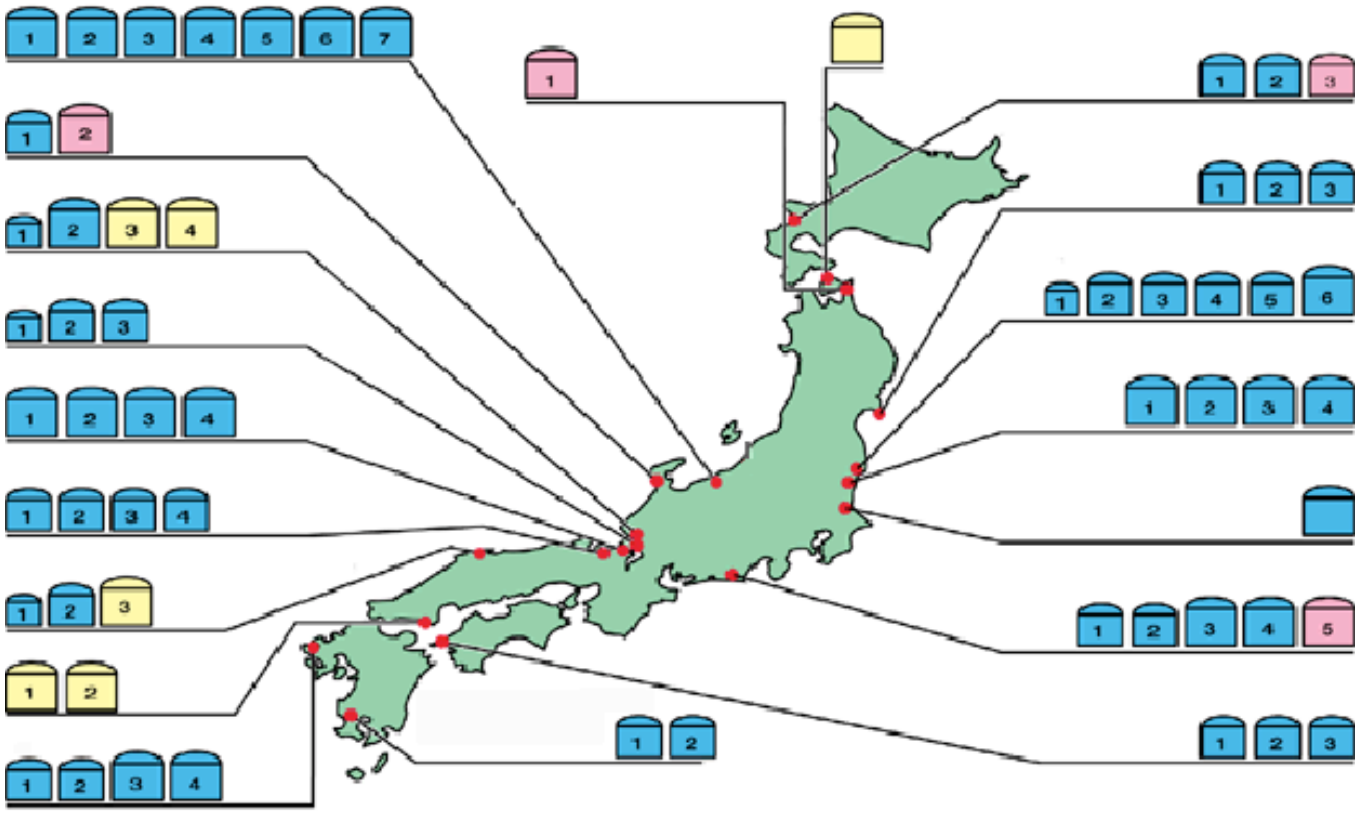
Today's Topics

1. **Overview of Japanese Nuclear Power**
2. **Near Term Challenges**
   - **(1) Effective Operation**
   - **(2) Corporate Revitalization**
   - **(3) New Reactor Development**
3. **Conclusion**

(1) Overview of Japanese Nuclear Power



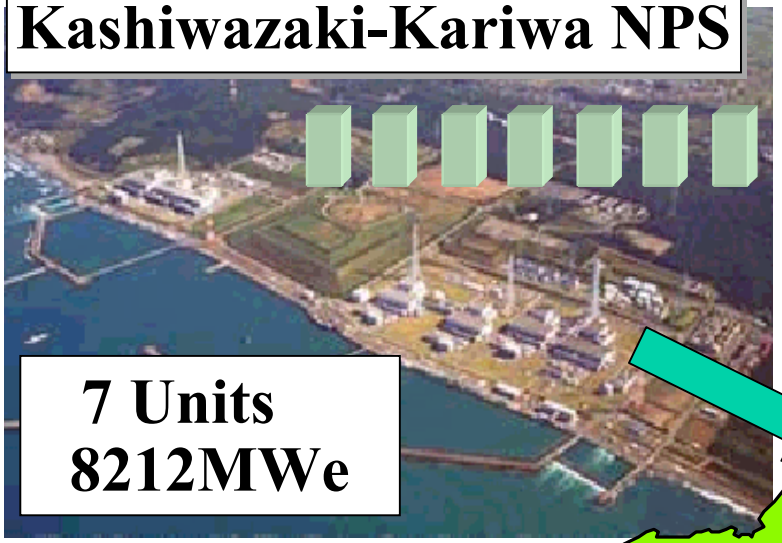
Nuclear Power Plants in Japan



52 operating plants (total capacity 45,742 MWe)
- **20 % of generation capacity**
- **31 % of generated electricity (FY 2002)**

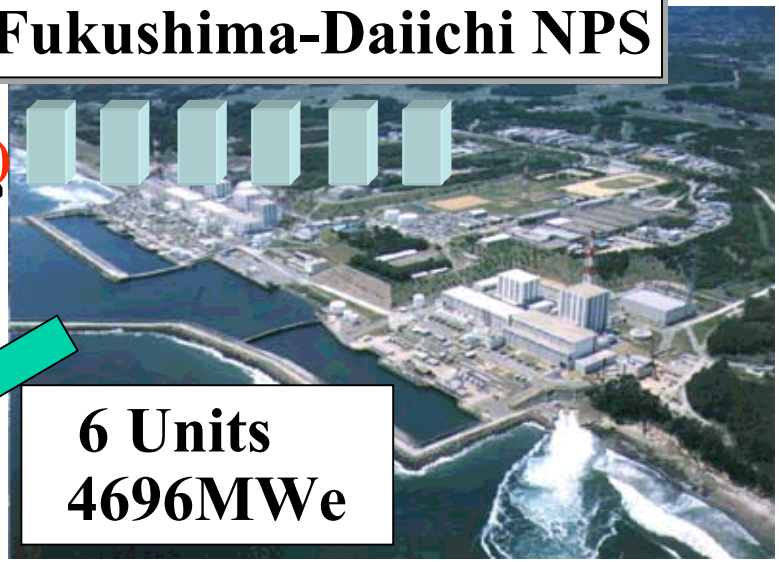
TEPCO's Nuclear Power Plants

Kashiwazaki-Kariwa NPS



7 Units
8212MWe

Fukushima-Daiichi NPS



6 Units
4696MWe

Fukushima-Daini NPS

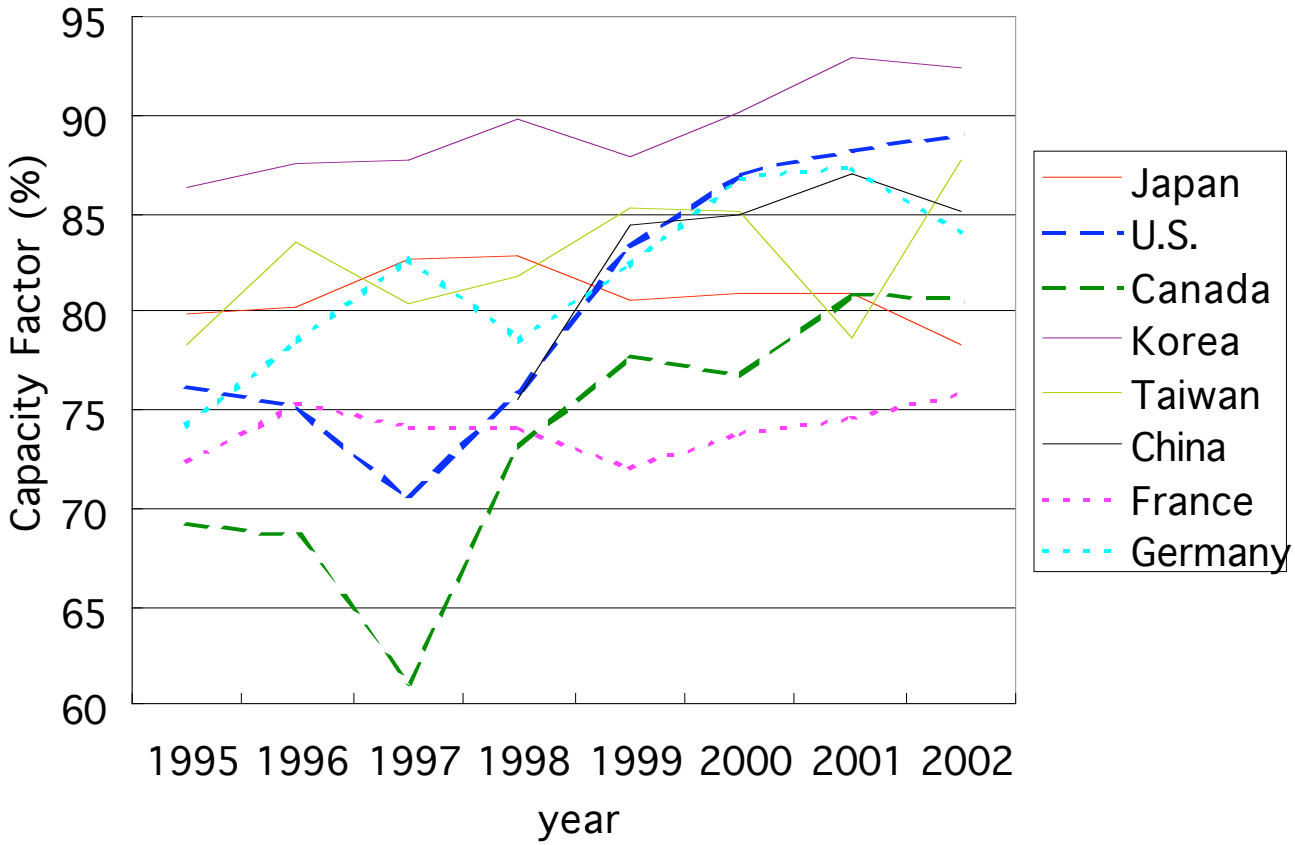
4 Units
4400MWe

17 BWRs including 2 ABWRs
(total capacity 17,308MWe)
- 29% of generation capacity
- 44% of generated electricity
(FY 2001)

2. Near Term Challenges

(1) Effective Operation

Comparison of Capacity Factors



Capacity factor must be improved

Outage Duration

✧ Reasonable maintenance method

- RCM is experimentally introduced
- To be fully applied in the future in systematic integration with CBM and online maintenance

✧ Inspection by regulatory agency

- New inspection framework has increased flexibility in inspection schedule

✧ Targets

- Achieve short outage (ex. less than 30 days)
- Constantly achieve short duration and reduce total outage duration over the long term

Cycle Length

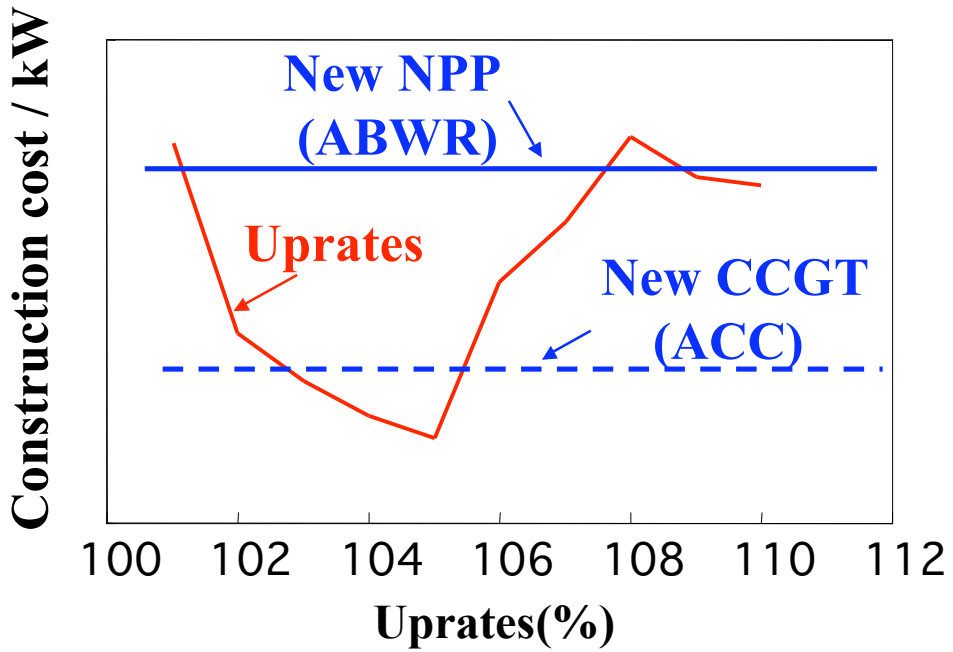
✧ **Operation cycle length has been restricted to 13 months at the longest**

- Restriction will be eliminated if safety of long operation cycle is confirmed
- Long cycle operation ex. 18months, 24 months

⇨ **3~6% increase in capacity factor (assuming 60 days outage duration)**

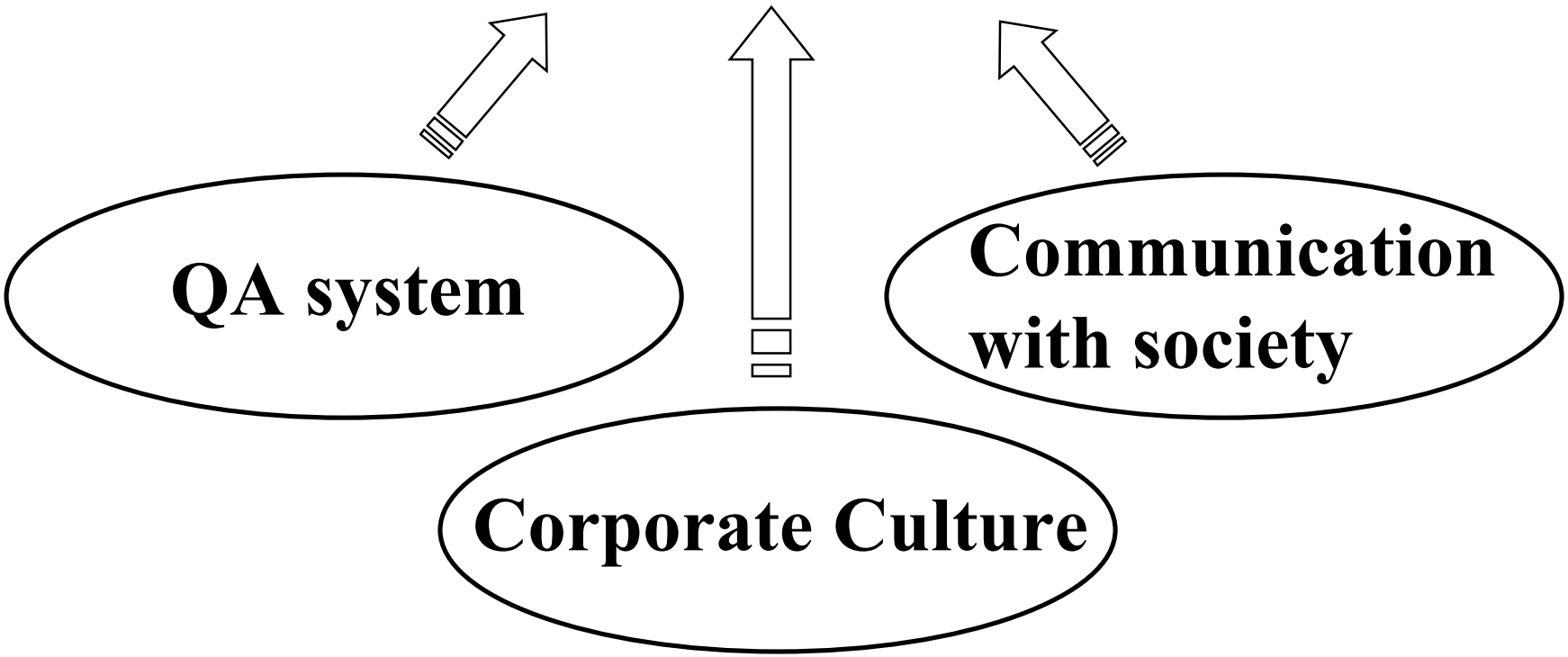
Power Uprates

✧ Cost analysis on plant uprates



- Start with ~5% uprates
- >5% uprates will be considered at the timing of major equipment replacement.

(2) Corporate Revitalization



QA System

- **Systematically define and qualify job elements**
  - Documentation structure
  - Work manuals
- **Organizational reform in QA system**
  - Audit organization directly responsible to the president
  - Quality and Safety department at power stations
- **The Nuclear Power Safety and Quality Assurance Meeting, composed of external personnel**

Corporate Culture

✧ **Eliminate the room for exclusive circle of nuclear engineers**

- Open communication among all departments and job positions.
- Staff exchange between nuclear and other divisions
- Strict observance of code of ethics
- Corporate Ethics Committee consists of TEPCO executives and external personnel

Communication with Society

✧ **Expanded spectrum of information disclosure**

- Even minor troubles are released to the public
- About 1,300 nonconformance events a month on the web-site

✧ **Regional Information Meeting at local communities**

- All information necessary to confirm safety operation is provided to the members

Nuclear Renaissance Activities

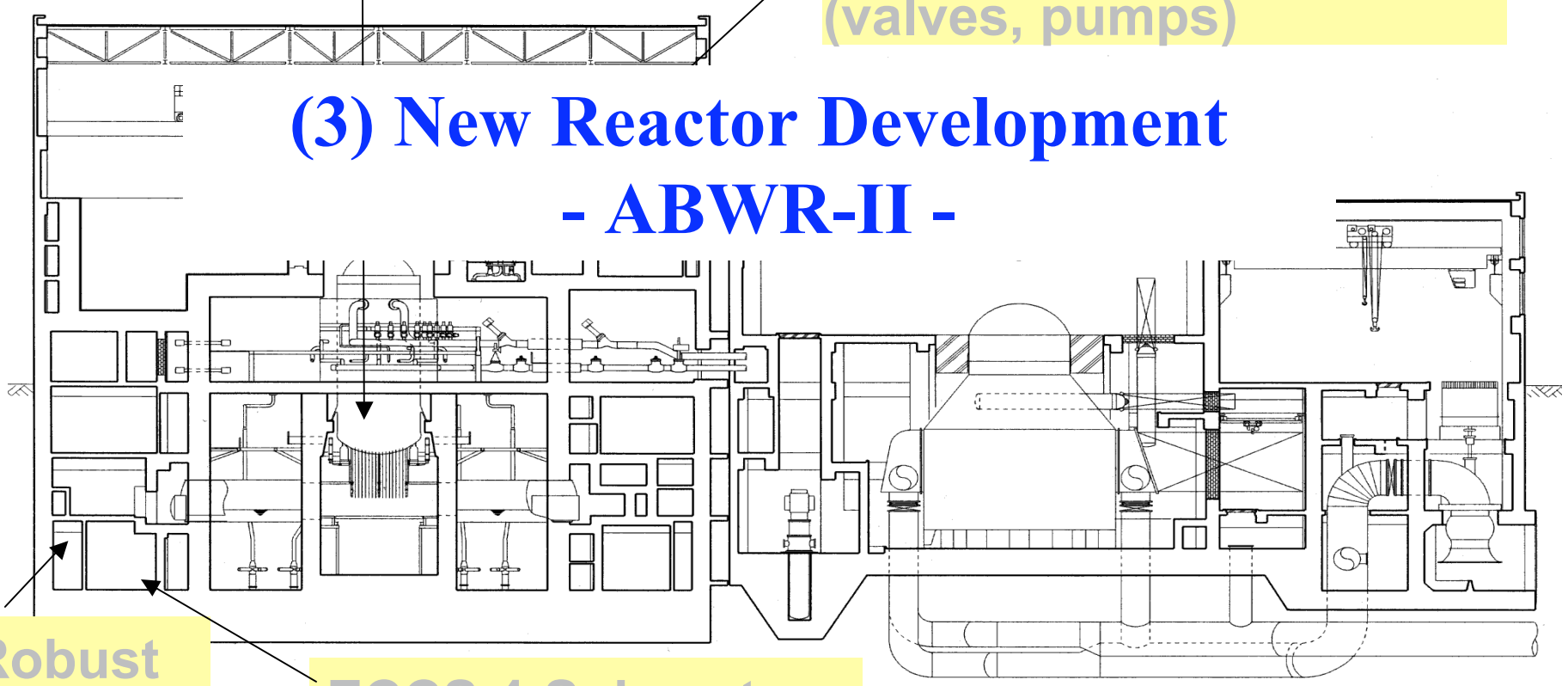
✧ Vision

"To be a reliable nuclear operator with the world highest level of safety and quality"

✧ Core Activities

- Leadership Development Training
  500 employees (20% of nuclear staff) within 2 years
- Work Process Improvement
  redesign functional area processes and drive change continuously

(3) New Reactor Development
- ABWR-II -



ABWR-II

✧Development strategy

- Developed by the same framework as ABWR team
- Focused on evolution of ABWR to minimize development risk

✧Improved features

- **Improved economy**

  Power generation cost is 15% less than ABWR

- **Improved safety**

  CDF $< 10^{-7}$

✧Deployment Strategy

- Major candidate for replacement of existing plants

Conclusion

- **Nuclear power plays major role in the electric power supply in Japan.**
- **1st challenge: Effective Operation**
  - Shortening Outage Duration, Long Cycle Operation, Uprates
- **2nd challenge: Corporate Revitalization**
  - QA system, Corporate Culture, Communication with Society
  - Nuclear Renaissance Activities
- **3rd challenge: New Reactor Development**
  - ABWR-II