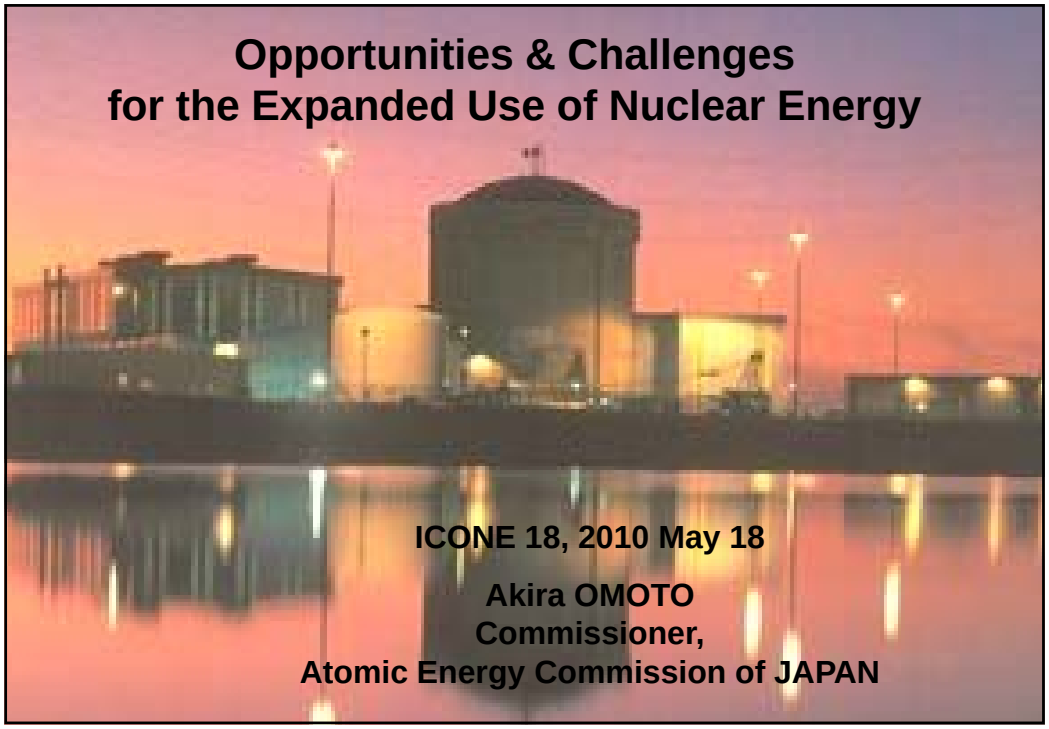


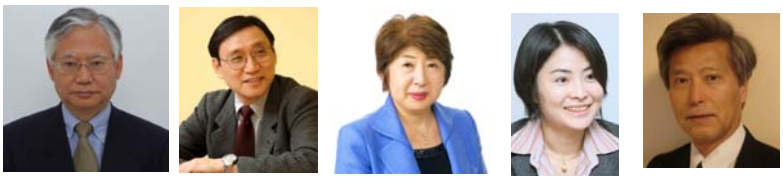
OUTLINE

1. Short introduction
2. Nuclear Energy in JAPAN's "Growth Strategy"
3. Global expanded use of Nuclear Energy
4. Conclusions

1

Atomic Energy Commission of JAPAN

- Five Commissioners
  - Led by the Chairman (Prof. Kondo)
  - Four out of five: newly assigned in January 2010
- Plan, Deliberate and Decide on basic policies
  - R&D
  - Use of NE (including nuclear applications)



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NE's contribution to JAPAN's Growth Strategy

- Growth strategy by "Green innovation" and "Life innovation"
  ……expected for release in June 2010
- 25% reduction from 1990 level of CO2 emission by 2020, on the condition that all other major emitters agree on ambitious reduction targets
- Contribution of nuclear power to "Green innovation"
  - Climate change policy "for" the economy, not necessarily "against"
  - 1% increase of availability displaces CO2 emission by 3M Tons/Y
  - One new unit displaces CO2 emission by 5M Tons/Y
- NPP projects in & out of Japan leading to job and economy
- Contribution of nuclear applications to "Life innovation"
  - Improved standard of living (medical use, food irradiation etc)

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AEC's draft policy paper (27April2010) discusses

1) Efficient use of existing NPPs
   - Restart criteria and short refuelling/maintenance outage
   - Reliability-centered maintenance
   - Power prating
   - Long operating cycle

2) New nuclear build as planned

3) Contribution by NPP Projects outside of Japan to meet the demand

4) Supporting environment, institutional arrangement and fuel cycle

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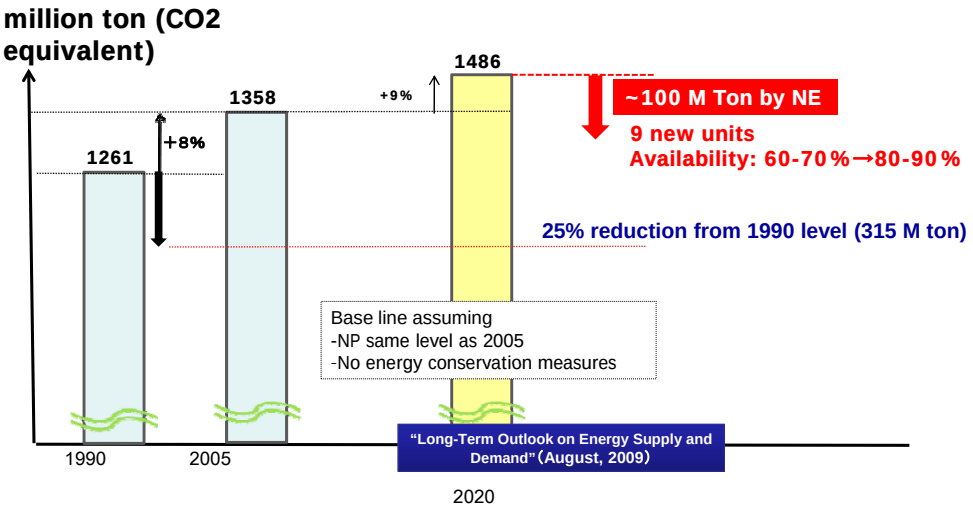
25% reduction target from 1990 level of CO2 emission by 2020



Difficult to achieve the emission goal without NE

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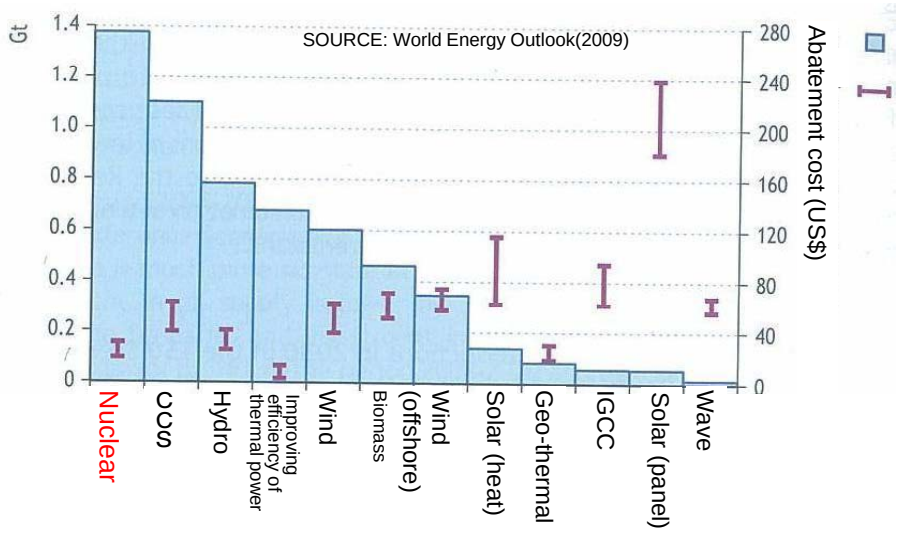
Abatement cost and potential of emission reduction

- Issue of economic burden to the nation's economy
- Availability increase of existing NPPs: Low hanging fruit but with a fence around it (Japan)



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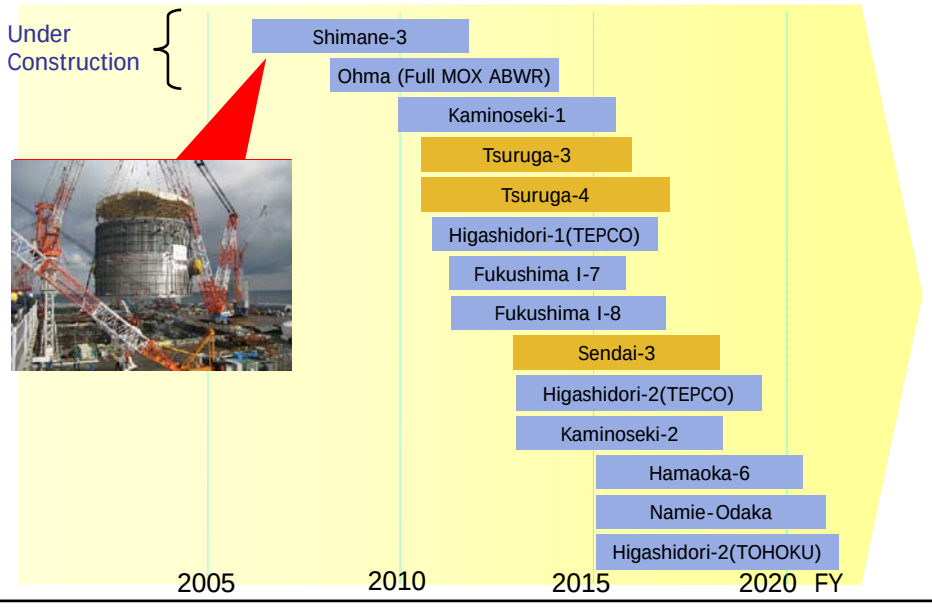
Japan's New Nuclear Builds

Based on 2009 Power Supply Plan

PWR
BWR



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To achieve the proposed role in the Growth Strategy

■ Need to restart of remaining units at Kashiwazaki-Kariwa

- Unit 6 & 7 : resumed operation
- Other units : inspection/assessment/modification work is underway

■ Need to revisit gaps from global standard practices

[Examples]

- Use best practices in the world etc.
  Operational cycle, Power uprating, outage duration, licensing procedures (pre-approval of standard design in plant and fuel) etc.
- A number of organizations with similar functions
- Low mobility of experts among nuclear organizations

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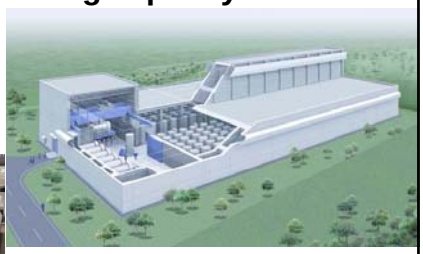
Also, Japan needs to implement fuel cycle & FR policy as planned

a) Start of commercial operation of Reprocessing Plant and interim storage of SF

99% of commissioning completed, but delay in establishing operational procedure of the joule-heating ceramic glass-melter for HLW vitrification line

b) SF storage for surplus beyond reprocessing capacity

JNFL Reprocessing plant



5,000 Tons Dry Storage at Mutsu
By TEPCO/JAPC
Scheduled for 2012
Under licensing review

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c) Restart of Monju FR

Sodium leakage: December 8, 1995
Restart: May 6, 2010

d) Use of MOX fuel in LWRs

- MOX in LWRs
  - Plan for use of MOX in 16-18 LWRs by 2015
  - 2 LWRs (Genkai 3 and Ikata 3) are in operation using MOX
  - 7 LWRs (including full-MOX Ohma ABWR) : licensed

- Recovered Pu from foreign reprocessors → foreign fabricators
- Domestic MOX fabrication plant (130 MT/YR)
  start construction 2010
  start production 2015

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IAEA member states considering introduction or expanded use of nuclear power

✓**2009 IAEA Projection (RDS-1) by 2030**
- 807 GWe in operation in Hi-projection (2.18 x current 370 GWe)
- 511 GWe in operation in Lo-projection (1.38 x current 370 GWe)
- Continuous trend of increase in the number in recent several years
- Most of the growth in existing 30 NP countries
- Newcomers: 2(Lo)-6(Hi) by 2020 6(Lo)-21(Hi) by 2030

✓**More than 60 Member States have expressed through different channels to the IAEA their interest in the introduction of nuclear power**

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Challenges of expansion/introduction of Nuclear Power

(IAEA status and prospect report on nuclear power, 2008)

1. **Safety and reliability**
2. **Economic competitiveness and financing**
3. **Public acceptance**
4. **Uranium resources**
5. **Fuel and waste management**
6. **Human and industrial resources**
7. **Proliferation risk and security**
8. **Infrastructures, especially in new entrants countries**

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Cooperation with newcomers: Issues for consideration

1) Responsible supply and responsible use

For international confidence building (safety, security, non-proliferation, sound infrastructure)

- Review of Supplier's safety design
- Newcomer's progressive capacity building, including culture for safety, ownership and transparency
- Code of conduct (Suppliers & Newcomers)
- Excessive government-to-government deal has a potential to jeopardize technology development based on market principle

2) Assistance in specific enabling conditions

Financing/HRD/ Technology Transfer etc.

3) Regional and multi-lateral/international cooperation

- Coordination among players (IAEA, EC, WANO, bilateral...) to effectively address the gaps in the newcomers capacity building
- AOS

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Challenges for operating reactors

- Continued vigilance in safety and safeguards
- Aging workforce and facility
- Uncertainties in spent fuel management
- Preparation for waste disposal, decommissioning
- Technology updating
- Stable supply of fuel/Uranium at reasonable price
- Security issues

etc.

Network is the key

1.Share information so that best practice may prevail and LL may understood

2.Network by Universities/Research institutes & Utility

- To address real practical issues
- (Example) MIT Utility programme

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How Japan will be able to contribute to the global expanded use?

Contribution to newcomers' NE programme

- Support of IAEA's activities
- Workshops/Seminars on earthquake engineering/Safeguard etc
- Recent (2010April) NNSA-MEXT MOC (Memorandum of Cooperation) includes "collaboration to establish nuclear safeguards and security infrastructure in third countries"
- Experiences/LL of localization
  - 12 years from conception to start of commercial operation
  - 20 years to complete localization
- Experiences/LL from 44 years of operation
- Financing, One-stop shopping by SPC etc
- Human Resources Development (universities, JAEA)
- To "Life innovation" as well: use of radiation in medical use & agriculture to improve the living standards of newcomers

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Concerted efforts to increase competitiveness in the global market

- Government (METI) , Industry, Utility, Research Institute etc
- Proposal by JAIF to the PM (2010 April 20)
  1) Establish national focal point for competitive NPP Projects
  2) Timely action for bilateral cooperation agreement
  3) Reduce financial risk both for Suppliers and Recipients

  etc.
- JBIC (Japan Bank for International Cooperation: Financing to projects involving Japanese companies) & NEXI (Nippon Export and Investment Insurance) to NPP projects
- Enabling one-stop shopping by a Special Purpose Company

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Examples of unique added value by JAPAN

(Engineering)

- Continuously deployed new units in JAPAN
  → Short construction and construction management
- Pioneering the use digital control for NPPs since 1980's
- Earthquake engineering
- Key components supply such as large forging

(Institutional)

- Setting an model case for Integrated Safeguard by the IAEA
- Framework of local area vitalization to sponsoring community

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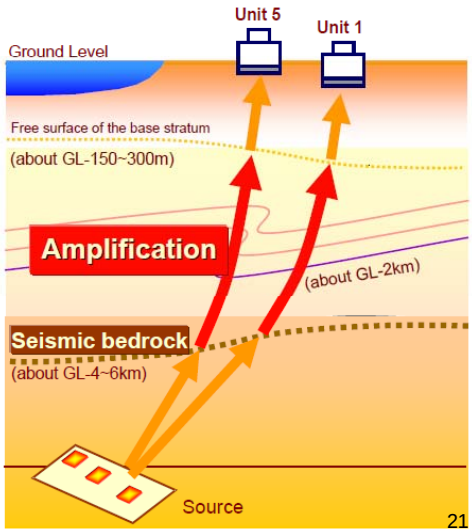
Lessons Learned from 2007 earthquake to be utilized for new builds

- To pay attention to relative displacement between non-safety grade & safety grade structures (Business continuity issue)
- To consider the inclination of a nearby fault to the NPP (Anisotropical release of energy)
- To consider amplification effect underground Structural irregularity in evaluating the propagation of seismic wave (Local amplification)
- Others;
  - Emergency preparedness
  - Indicator of energy applied to equipments



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Long-term sustainable NE programme needs technological and institutional innovation

EXAMPLES

(a) SMR development to expand potential of the use
(b) Non-electric applications of NP
- **heat and transportation**
- help **chemical energy production and production of energy carrier**
  - ◆Recovery of oil from tar sand (Canada)
  - ◆Coal Liquefaction (S. Africa, Australia)
  - ◆Hydrogen (JAEA's HTR300)

(c) Closed FC using FR for long-term assurance of supply
(d) Addressing institutional aspect
- **Lifting nuclear exclusion from CDM/JI**
- **Achieving level playing field**
- **Multi-lateral arrangement for AOS etc.**

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Concluding remark

1. High potential to contribute green growth
   Recognition of marginal abatement cost

2. Challenges include;
   Responsible supply and use
   Institutional innovation
   Networking so that best practices may prevail

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