

Strategy for the Taiwan Spent Nuclear Fuel Management: a personal view

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Nuclear Renaissance

- **Global Climate Changes**
- **Concerns of national energy security**
- **Sustainable energy future – reduce CO² emission**
 - Solar, wind, bio-fuels, geothermal, ..
 - Nuclear energy
- **Asia has the most number of NPP under construction in the world**
- **The US has about two dozen NPP license applications submitted**
- **New emerging countries are also seriously considering nuclear energy**
- **dubbed as, “the Nuclear Renaissance”**

Options for Spent Nuclear Fuel Management

- **Interim pool storage and interim dry storage**
- **‘open fuel cycle’ or ‘once-through cycle’**
 - USA, Finland, Sweden, others
- **‘closed fuel cycle’- reprocessing or recycling**
 - France, Russia, Japan, China, and others
- **‘wait and see’**
 - Many countries take this position
- **Geologic repository programs continue to delay**

Spent Nuclear Fuel Management in the US

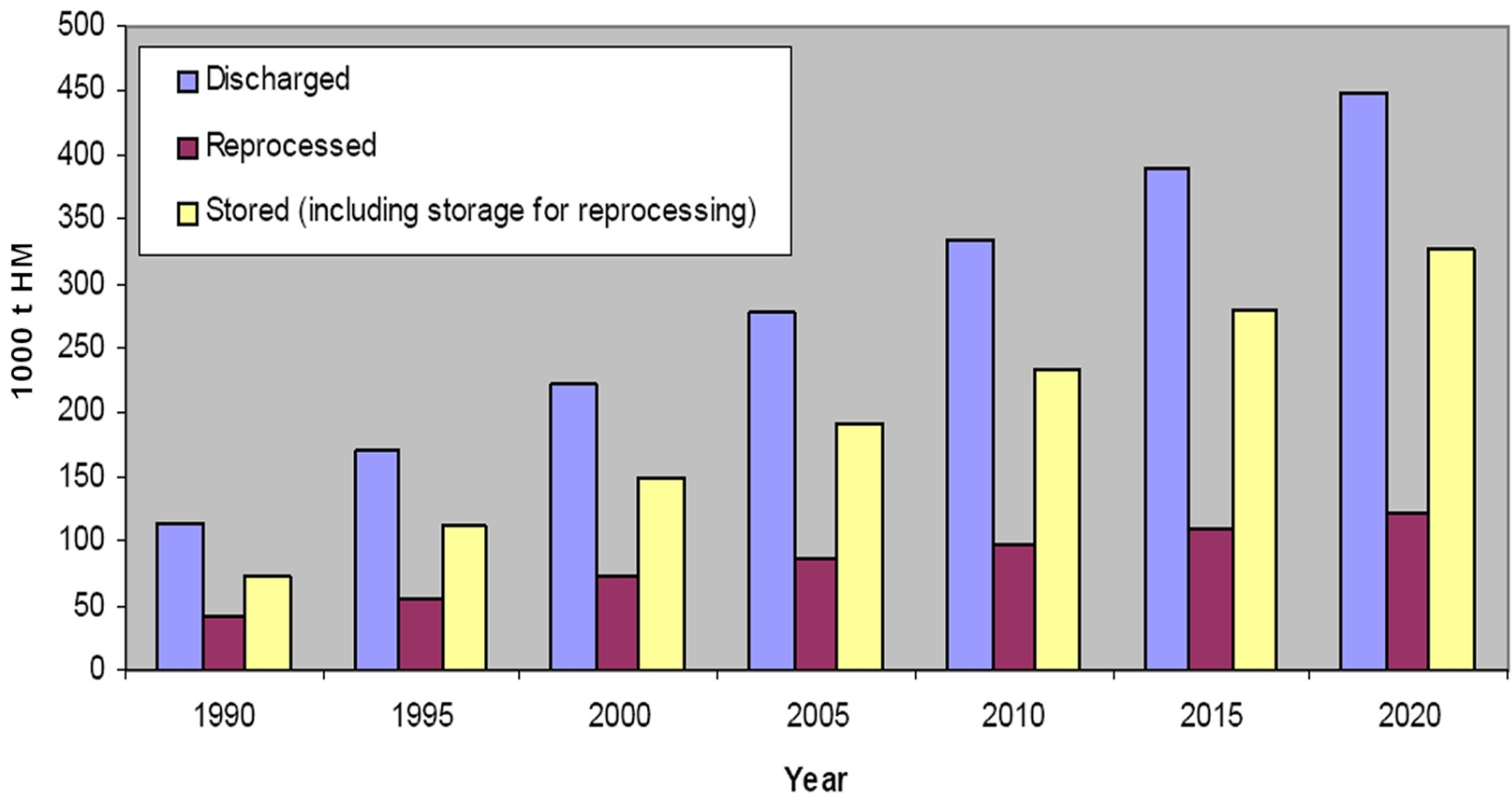
- **'open fuel cycle' policy**
 - Non-proliferation concerns and high costs
 - Continuing debates
- **Interim pool and dry storage at reactor sites**
- **Formal President Bush announced Global Nuclear Energy Partnership (GNEP) in February, 2004**
 - Recycle spent nuclear fuels using new proliferation resistant technologies to recover more energy and reduce waste
- **Yucca Mountain: future is uncertain**

IAEA Report on Worldwide Trend: Interim Dry Storage of Spent Nuclear Fuel

- Continued expansion of nuclear energy use worldwide and operating life extensions of NPPs become the norm
- Most countries continue to postpone the decision on final spent nuclear fuel disposition
- Challenges in selecting geologic repository sites: social, political, and technical
- NPP on-site storage pools for spent nuclear fuels are nearing capacity
- In 2004, there were 18,000 tons of spent fuels in dry storage and it continues to increase

Trend of Worldwide Spent Nuclear Fuel Management

IAEA report



Taiwan Energy Policy: Since Ma's Admin May 2008

- **Sustainable Energy Policy, June 2008**
 - Energy security
 - Economic development
 - Environmental Protection
- **3rd National Energy Conference, April 2009**
 - Low carbon society
 - Development of Renewable energy technologies
 - ensure safe constructions, operations of nuclear power plants and radioactive waste management
- **Formal Premier Liu sees nuclear energy as an important “transition source of power” to the low carbon society, and committed to:**
 - Nuclear power safety
 - Nuclear waste treatment technology
 - Freedom of information and public oversight

Spent Nuclear Fuel Management: A Long Term Program

- An integral part of nuclear energy policy
- Taiwan should develop a long term policy for spent nuclear fuel management
- SNF or HLW geologic repository would take longer time to be realized
- “Regional repository” concept: a good idea, but faces difficult challenges to implement

Considerations for Taiwan

Spent Nuclear Fuel Management Strategy

Near Term: Next 20 Years

1. SNF Interim Dry Storage

- interim dry storage is a mature technology
- Keep dry storage operations safe and secure
- Implement “freedom of Information and public oversight” for SNF interim dry storage
- initiate R&D in SNF interim dry storage
 - long term (20 years or longer) safety of SNF in dry storage under Taiwan environmental conditions
- Explore regional interim dry storage concept

Considerations for Taiwan

Spent Nuclear Fuel Management Strategy

Near Term: Next 20 Years (continued)

2. Public Participations and Legislations

- Engage dialogues with academics and general public on Taiwan spent nuclear fuel management and the feasibility of a geologic repository in Taiwan
- Engage legislative bodies to begin addressing national legislations on spent nuclear fuel. *Need legislations to formally recognize the importance of spent nuclear fuel management (e.g., Nuclear Waste Policy Act in the US)*
- Consider creating a government agency with the sole responsibility for spent nuclear fuel management programs

Considerations for Taiwan

Spent Nuclear Fuel Management Strategy

Near Term: Next 20 Years (continued)

3. International Cooperation

- Actively participate in international (e.g., IAEA, NEA) and regional (e.g., EAFORM) cooperation in spent nuclear fuel management
- Explore cross strait technical collaborations in spent nuclear fuel management

Considerations for Taiwan

Spent Nuclear Fuel Management Strategy

Long term: next 50 years

- Continue safe and secure operations of SNF interim dry storage facilities
- Review and update technology development in SNF management on a 10 year interval
- Review and update national legislations and policy on spent nuclear fuel management on a 10 year interval based on new information
- Keep other options open: e.g., recycling; regional interim storage; regional repository