



WiN Taiwan

Chapter president	Shung-Hwei FAN (2014-16)
Chapter board members	<p>WiN Taiwan operates as a special division under the Chung-Hwa Nuclear Society. It has nine steering committee members (i.e. board members) by election, including chair and vice chair (i.e. president and vice president), serving two-year terms. Past presidents are invited to serve as advisors. Chapter members are mostly from the nuclear regulatory agency, utility, and research, academic and medical institutes. Among the remaining, there are entrepreneurs, home makers and retired educators and scientists.</p>
Number of members	Local/Global: 149/53
Chapter accepted by WiN Global	February 1994
Nuclear power infrastructure	<p>There are three NPPs at Chinshan, Kuosheng and Maanshan, operated by state-owned utility Taipower, with two units at each site. They contributed to 16.3% of total electricity generated in 2014, with an average capacity factor of these units about 92.8%. Construction of two ABWRs at the fourth plant, Lungmen, was nearly completed. However, effective July 1, 2015, Unit 1 has been mothballed, and construction of Unit 2 suspended.</p> <p>There is only one research reactor in operation, Tsing-Hua University Open-pool Reactor (THOR) for research and medical isotope production; the rest have been decommissioned.</p> <p>About half of the low-level waste is being stored at storage facilities at the NPP sites. The other half has been stored at an interim storage facility on an offshore island Lanyu.</p> <p>A spent fuel dry storage facility has been constructed onsite at the Chinshan NPP for three years, pending approval of Taipower's Water and Soil Conservation Plan by the local government.</p>
Nuclear medical applications	<p>We have one Proton and Radiation Therapy Center at a university hospital in operation since 2014, and two others under construction. In addition, there are 11 cyclotrons at a research center and 9 hospitals for pharmaceuticals manufacturing, as well as large numbers of various medical equipment and facilities, such as Gamma Knife and Cyber.</p> <p>The Institute of Nuclear Energy Research (INER) has engaged in the new radiopharmaceutical research for more than 20 years.</p> <p>Tc-99m Trodat-1 was the first Tc-99m-labeling radiopharma-</p>

	<p>ceutical for dopamine-transporter imaging in the world which could be used for the diagnosis of Parkinson’s and related diseases. The drug license-out for Tc-99m Trodat-1 to local industry was established in 2015. Re-188 Liposome is the brand-newly therapeutic radiopharmaceutical developed by INER. In 2014, the first-in-human phase 1 clinical trial of Re-188 Liposome for the metastatic cancer treatment was performed to evaluate the safety in Taiwan. Radiopharmaceutical Manufacturing Centre (RMC) in the INER has obtained 17 radiopharmaceutical drug licenses from Department of Health at Taiwan. In 2014, RMC got the approval of PIC/s-GMP certification which is the newest manufacturing standard in Taiwan. RMC regularly supplies the radiopharmaceuticals for the domestic hospital need, but also support the clinical application for international cooperation.</p>
<p>Waste management philosophy</p>	<p>The strategies for Low-level waste (LLW) management are “volume reduction, storage safely and final disposal.” Since a volume reduction strategy program was launched in 1990, Taipwoer has successfully reduced its annual output of solidified LLRW to about 176 (55-gal) drums in 2014, which is only 1.4 % of over 12 thousand drums in 1983. Currently, the accumulated amount of LLW is about 220 thousand drums; roughly half stored at NPPs, half at Lanyu and about 7% at INER. In order to lay down a legal process for site selection of LLW final disposal facility, the “Act on Sites for Establishment of Low Level Radioactive Waste Final Disposal Facility” was promulgated in 2006. The Ministry of Economic Affairs (MOEA) selected two locations as Recommended Candidate Sites in July, 2012. Local referendum is required by law, however, local governments has not been cooperating with the central government in conducting such referendum due to significant pressure from antinuclear groups. Communications among all stake holders are much needed in order to move forward.</p> <p>The strategies for spent fuel management in Taiwan are “storage in spent fuel pools for the near term, onsite dry storage for the medium term, and final disposal for the long term”. Currently, all spent nuclear fuels are stored in NPP storage pools. As for onsite dry storage, Taipower completed the construction and cold test for the dry storage facility at Chinshan NPP in 2012; and has since been awaiting approval of its Water and Soil Conservation Plan by New Taipei City Government to carry out hot test, then if passed, begin operation. Delays of the project have also been largely caused by mass anti-nuclear activities. A similar project on dry storage of spent fuel at Kuosheng NPP is also in progress. As to the final disposal, geological assessments (2005-2017) are being conducted to determine suitable siting regions for spent nuclear fuel.</p>

<p>Research</p>	<p>The National Synchrotron Radiation Research Center (NSRRC) houses the “Taiwan Light Source” and “Taiwan Photon Source”, the latter, inaugurated in January 2015, will soon become one of the world’s brightest sources of X-rays.</p> <p>Major research activities conducted by INER include, among others: structural integrity of nuclear components and fuel cladding, development and applications of plasma technologies for nuclear power system lifecycle, clearing legacy nuclear facilities, construction of nuclear industry platform, development of solar photovoltaic technology, and development and applications of plasma technologies in the green energy-saving environment.</p>
<p>Post-Fukushima</p>	<p>While nuclear power plants continued to operate without interruption since the Fukushima accident, all of the facilities have undergone a safety evaluation for its capability to cope with extreme natural disasters, including earthquakes, tsunamis, extreme rainfalls and mudslides resulted from the related hazards, and take possible countermeasures. The reassessment program comprises two parts: (1) nuclear safety, and (2) radiation protection and emergency response preparedness. The outcome provides a comprehensive background on radioactive hazards, and how to protect against them, as well as an overview of the enhancement measures to nuclear safety and security for the accidents in light of the Fukushima accident. Lessons learned from the Fukushima accident as well as relevant international information available were used as references in the safety reassessment.</p> <p>The key safety reassessment results including the enhancement of capability to mitigate a prolonged station blackout, protection against tsunami hazards, spent fuel pool cooling, hydrogen detection and explosion prevention, severe accident management, protection against seismic hazards, critical infrastructure, and safety culture.</p> <p>In the area of radiation protection, capabilities have been strengthened to support an established Radiation Detection Information System. The platform will be able to integrate various environmental radiation information for the government to provide immediate alarms and for the people to take shelter or evacuation actions.</p> <p>For the Emergency Preparedness, enhancements are being implemented for emergency communication, alert and notification system, iodine tablet arrangements and evacuation and reception. In addition, the evaluation system, geographical information systems (GIS) for nuclear emergency planning and nuclear emergency management platform system were also reinforced.</p> <p>Peer reviews by international experts have also been conducted</p>

	<p>through arrangements with EU and OECD/NEA on two of the operation plants as well as the Lungmen NPP, including document review and plant walk-through.</p> <p>Despite all of the above efforts, public support for nuclear power remains low since a major drop right after the accident. Only during the past year, some surveys suggest a slight recovery of support for nuclear power, i.e. pro-nuclear catching up or equal to anti-nuclear. No policy has been set on whether to extend life or decommission Chinshan NPP upon expiration of its operating license (2018/2019).</p>
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