



Nuclear Technology: Supporting Sustainable Socio-economic Development

2013 WiN-Global Annual Conference Country Report

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2013 WiN-Global Annual Congress

Country Report

WiN Taiwan

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1. WiN-Chapter – Background

- Number of WiN Taiwan members: 158
- WiN Taiwan founded: February 1994

WiN Taiwan operates as a special division under the Chung-Hwa Nuclear Society. Since its founding in 1994, members of WiN Taiwan have grown from 20 to 158 (among them, 48 are global members). WiN Taiwan has nine steering committee members by election, including chair and vice chair (i.e. president and vice president). The current (2012–2014) president and vice president are Lora Yu-Chuan Chung and Shung-Hwei Fan, respectively.

2. Nuclear Facilities in the country

- Number of NPP`s – 2 units under construction
 - 6 units in operational phase
 - None in decommissioning phase
- Number of Research Reactors / Reactors for medical isotope production:
 - 1 – Tsing Hua University Open-pool Reactor (THOR)

Over 99% of Taiwan's energy sources relied on imports. In 2012, electricity generation totaled 250.4 terawatt-hours (TWh), 0.7% lower than that of 2011, which was contributed by: coal 36.4%, co-gen 14.9%, LNG 26.2%, oil 2.3%, nuclear 16.1%, hydro 3.4% and wind & solar PV 0.6%. The three nuclear power plants at Chinshan, Kuosheng and Maanshan, operated by state-owned utility TPC, with two operating units at each site, generated 40.42 terawatt-hours (TWh) of electricity (gross) in 2012 – a drop of 4% from 2011, mainly due to an extended shutdown during refueling outage to obtain restart approval after replacement of seven damaged anchor bolts at Kuosheng Unit 1. This is reflected in the nuclear share of electricity generation which dropped from 16.7% in 2011 to 16.1% in 2012, and in the average capacity factor for all six units which dropped from 93.1% in 2011 to 89.9% in 2012. Meanwhile, LNG share, which accounted for 59.3 TWh (24%) electricity generation in 2010, further increased from 63.4 TWh (25.1%) in 2011 to 65.5 TWh (26.2%) in 2012.

3. Waste Management

- Repository for low & intermediate level waste – in site selection phase

As required by law, a candidate site for a low-level waste final disposal facility will be determined through local referendum on each of the multiple recommended candidate sites. In July 2012, the Ministry of Economic Affairs (MOEA) announced two recommended candidate sites located in Nantien of Taitung County and Wuchiou of Kingmen County, which were determined by its site selection committee in 2011. The MOEA has since been collaborating with the local governments to conduct referendum, however, without significant progress. Meanwhile, to streamline the siting process, the AEC drafted amendments to the siting law in 2012, which has been reviewed and commented by the MOEA, the ministry solely responsible for the siting process after the Government reform completed in 2014.

- Repository for high level waste – in host-rock investigation phase

According to TPC's Spent Nuclear Fuel (SNF) Disposal Plan (Edition 2010, approved 2011), the operation of a repository is projected to start in 2055, with the 50-year (2005~2055) project life divided into five stages, the first stage being the investigation and evaluation of potential host rocks. In 2012, the drilling of a deep hole into granite bedrock for host rock investigation in Hualien country was halted due to protests of local residents. Recently, host rock investigation in a set of 6 holes drilled into granite bedrock in Kingmen was also interrupted due to protests of local residents for fear that the county would become the site for the final spent fuel repository facility. TPC has reached an agreement with the county government to transfer the ownership of these wells to the academia for research in groundwater resource development.

4. Win-Chapter activities during 2012/13

- Activities for training and networking (member benefits and development)

WiN Global Annual Meeting – 26~30 May 2012. A delegation of four members attended the 20th WIN Global Annual Meeting held in Kalmar, Sweden, as well as a post-conference tour to nuclear facilities in Olkiluoto, Finland. The delegation was represented by members from the utility (TPC), government authority (AEC), research (INER), and information service (NIC). Jessie Chiu of AEC and Evelyn Chen of TPC also attended the Executive and the Board meetings prior to the conference.

WiN Taiwan Annual Meeting – 9 August 2012. WiN Taiwan and ANS-Taiwan Section held a Joint Annual Meeting at the Institute of Nuclear Energy Research in Long-Tan. At the ANS-TS meeting, Jyi-lan Wu of INER, former president of WiN Taiwan, was elected as supervisor of the steering committee of ANS Taiwan Section. On the WiN Taiwan side, Lora Yu-Chuan Chung, CEO of the Nuclear Information Center (NIC), and Shung-Hwei Fan, AEC's Senior Radiation Protection Specialist, were elected president and vice president (for the second time), respectively, for a two-year term 2012-2014.

2012 Forum on Intelligent Power of Women – 15-16 September 2012. The Forum was organized by the Society of Taiwan Women in Science and Technology (TWiST). Jessie Chiu, WiN Taiwan advisor and TWiST first-term supervisor took part in the forum and delivered a presentation on “Why Women Scientists Found/Join Women Organizations?”. WiN Global and its Taiwan chapter were used as an example of what women scientists can contribute to and benefit from a women organization.

Fall Seminar – 12 November 2012. Prof. Hao-Chiang “Koong” Lin of the National University of Tainan was invited to give a talk on “Digital Arts and Interactive Design – Application of Affective Computing”. Prof. Lin is not only an expert in information sciences,

but a remarkable artist. His lively presentation aided with visual displays opened the eyes of the audience in the ever advancing area in interactive design and digital arts.

Spring Outing –9 March 2013. Following the success of last year’s spring outing, the annual spring-time Saturday networking event this year brought 37 WiNners with friends and family members to Yilan county for a full-day excursion. Attractions include visits of LongtanTan Lake, Luo-Tung Forestry Park, Yilan Distillery, and Siho Seafood Processing Factory, as well as an outdoor foot spa experience at Tangweigo hot spring park in Jiaosi.

WiN Taiwan Annual Meeting –8 August 2013. WiN Taiwan and ANS-Taiwan Section held a Joint Annual Meeting at the Nuclear Engineering Institute of the National Tsing Hua University (NTHU) in Hsin-Chu. At the ANS-TS meeting, Evelyn Yi-Ju Chen of TPC, former president of WiN Taiwan, was elected as supervisor of the steering committee of ANS Taiwan Section. The business meetings were followed by a joint seminar attended by both assemblies totalling about 90 people. Prof. Tung Shen of the National Taiwan University was invited as a special guest to deliver a speech on “Green Island Serenade - How Mandarin Pops Became Popular in Asia Pacific“. After lunch, two presentations followed: Dr. Yulong Wang of INER introduced a website he established “Energy PK” (Policy and Knowledge) <http://energypk.com>, and Ren Shin of TPC shared his experience in communicating with the public, and the visit of Lungmen Plant by President Ma he organized on June 3. Two additional activities were arranged for the balance of the day: a tour of the University’s newly completed library and a visit of the Taiwan Pavilion which was relocated back to Taiwan after being retired from the 2010 World Expo in Shanghai.

2013 APNN/IConWiST –14~16 September 2013. Five WiN members took an active part in organizing/advising the 2013 the International Conference on Women in Science and Technology (IConWiST). Jessie Chiu also served as a panelist on the session: “Strategies for Work-Life Balance”. The conference offered a good opportunity for training in gender issues and for networking among international women scientists and engineers.

- Activities for communication and public acceptance

High School Students Visiting Japan –19-24 August 2012. A group of 26 high school students and teachers, as organized and led by two professors from NTHU: Profs. Min Lee and Ming-Fong Tai (also a WiNner), with support from Dr. Mu-Chien Hsieh (retired from INER) and Lora Chung (NIC and WiN Taiwan President), completed a 6-day tour to Japan to learn and exchange knowledge on radiation and nuclear power. The program includes site visits of Rokkasho LLW disposal and spent fuel reprocessing facilities in Aomori Prefecture, and Onagawa NPP in Miyagi Prefecture, as well as an exchange with high school students in Fukushima Prefecture. As part of the student selection process, several science camps were held prior to the trip, with participants totalling nearly 300. Extensive trip reports written by the participants turned valuable information for sharing on the web. WiNners were key players throughout all phases of the project.

Dialogues with Concerned Mothers – 10 May 2013. Instead of hosting a regular spring seminar for WiN members, the event was held differently this year. Prof. Szuli Chang, one of WiN Taiwan’s core members, along with a group of WiNners, was invited by a newly founded NGO “Mom Loves Taiwan” to give a seminar on “Let’s talk about radiation”. A dozen of radiation monitoring/detection devices with radioactive specimens were demonstrated after the seminar. Over 30 people took part in the 3 and 1/2 hour long event. Extensive discussions were held among participants, many of which were antinuclear activists.

Science Camps — *July 20~21 and 27~28, 2013.* WiN Taiwan hosted two 2-day summer camps “Science is Fun – Hands-on Learning of Power and Energy” for school children in Grades 6-10 and their parents exploring science and technology related to various types of energy sources and power generation. The camps were organized by WiN Taiwan member Prof. Ming-Fong Tai, and conducted by the popular science education team she leads at the Physics Department of NTHU. The 2-day non-overnight program included introduction of various types of energy sources, basic principles of power generation, demonstration on how electricity is generated, DIY design projects, and visits of a nuclear power plant and a visitors center. A total of nearly 60 participated in the two camps. Among them, about 3/4 were school children and the rest were parents. Comments were collected at the end of the camps for consideration of further improvement when similar activities are conducted in the future.

WiN Taiwan e-Newsletters — *Since January 2010.* WiN Taiwan continues to publish the bimonthly e-newsletter. Evelyn Chen has been serving as editor-in-chief. Twenty-seven issues have been published as of August 2013.

5. Challenges and future plans

- Country

On-site Dry Storage of Spent Nuclear Fuel. For Chinshan NPP, the concrete pad was laid in 2012, a hot test with two loaded casks is anticipated by end of 2013, and a license for operation in 2014. For the Kuosheng plant, the Preliminary Safety Analysis Report (PSAR) was submitted to the FCMA by the TPC in March 2012. A pre-hearing conference and a public hearing were both held in July 2012. The FCMA has completed review of the PSAR, and will soon issue its conclusions. Meanwhile, the TPC must also receive approval of its environmental impact report from the central government Environmental Protection Administration as well as approval of its Water and Soil Conservation Plan by the county government before the FCMA can issue a construction permit for this project.

The Lungmen Nuclear Power Plant. Construction of the Lungmen Plant started in 1999. As the fourth nuclear power station located on northeastern coast of Taiwan, it houses two ABWR units, each of 1,350 MWe. The project has encountered numerous difficulties as led by suspension in 2000, and followed by subsequent restart in 2001 and associated problems with rising price of construction materials, rehiring and interface of subcontractors, resulting in repeated delays and requests for additional budget allocation. As of end of January 2013, Lungmen was 93.6% complete on construction, a reset from 97% six months before.

Premier Jiang Yi-huah, soon after he took office in February 2013, proposed to launch a national referendum to decide the fate of the Lungmen plant. The proposal was debated at the Legislative Yuan during last legislative session without conclusion. If passed, a referendum will be held within six months.

According to a recent opinion poll conducted by the Research, Development and Evaluation Commission of the Executive Yuan during April 12-13 to test public opinion on the proposal, 68 % of those surveyed support the idea of deciding the fate of the Lungmen plant by means of a national referendum, while 19 % do not. In the survey, it was found that 91 % of people in the country are aware of the planned referendum. On the issue of safety, 54 % of the respondents said the controversial power plant should not be put into operation unless its safety can be assured, while 39 % expressed opposition to the project regardless of the level of safety. It also indicated that 26 % of people in Taiwan think the country's three operational nuclear power plants should be decommissioned earlier than scheduled and Taiwan should abandon nuclear power entirely. However, 57 % will prefer a gradual move toward the goal

of a nuclear-free homeland, which means sticking to the decommission schedule for the three existing plants, allowing the Lungmen plant to come on stream as planned and taking steps to reduce the country's dependence on nuclear power.

Since the onset of the Fukushima Daiichi nuclear accident caused by a massive earthquake and tsunami in Japan in 2011, public concerns over safety of the Lungmen plant escalated and eventually led to a national rally on 9 March 2013 calling for halting of the project. An estimate of 200,000 protestors turned out for the event nationwide. Meanwhile, to alleviate public concern, the Ministry of Economic Affairs (MOEA) has organized a safety evaluation group to begin a re-inspection of the plant's reliability in May. It is anticipated that the evaluation won't be completed with a report issued until 2014.

Government Reform. In January 2010 the Legislative Yuan passed a set of four laws paving the way for a reform of the Executive Yuan that will reduce the number of cabinet-level agencies from 37 to 29. The AEC and its affiliated organizations are among those affected by this reform. According to an earlier plan, the AEC was to be transformed into a nuclear safety regulatory entity of a lower tier under the Ministry of Science and Technology (MOST). The Ministry of Economic Affairs (MOEA) will become the Ministry of Economy and Energy (MOEE), under which AEC's research arm the Institute of Nuclear Energy Research (INER) would become the Institute of Energy Research (IER). Only a small fraction of INER would stay under the new nuclear regulatory authority. However, the Fukushima accident has prompted reconsideration of the importance and therefore independency and capability of the nuclear safety regulatory authority. Consequently the Executive Yuan revised its plan to pull the nuclear safety authority out of the MOST, and make it a more independent entity. The reform regarding the AEC is still in final debate at the Legislative Yuan.

- WiN Taiwan

Activities associated with development, networking, school children education, and communication that have been conducted for years will be continued in the coming year. In addition, a membership database overhaul is being proposed, and hoped to be implemented in 2014.