Development, Implementation and Outcomes of the IAEA Lise Meitner Programme in Korea

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1. Introduction

The International Atomic Energy Agency (IAEA) actively promotes gender equality through its Gender Equality Policy, encouraging member states to enhance women's representation in nuclear science and technology. Responding to this initiative, Korea hosted the 2024 IAEA Lise Meitner Programme (LMP), named after Lise Meitner, a pioneering physicist in nuclear fission. During the 67th IAEA General Conference, Korea's Minister of Science and ICT officially announced the country's intention to host the LMP in the first half of 2024, demonstrating Korea's commitment to supporting the career development of women scientists and engineers.

The 2024 IAEA Lise Meitner Programme in Korea, held from March 25 to April 5, 2024, was a two-week intensive programme aimed at enhancing the technical and leadership skills of young women nuclear professionals while fostering a strong global network. The programme was organized by the IAEA and hosted by the Korea Nuclear International Cooperation Foundation, with technical training primarily led by the Korea Atomic Energy Research Institute (KAERI).

The LMP had previously been held twice in 2023 under the leadership of the U.S. Department of Energy (DOE), with sessions conducted at the University of North Carolina (June 5–16) and Oak Ridge and Idaho National Laboratories (October 16–27). Korea's proactive role in hosting the 2024 LMP underscores its dedication to addressing gender disparities, strengthening international collaboration, and promoting gender equality within the nuclear sector.

2. Program Development and Implementation

2.1 Program Objectives

The primary objective of Korea's LMP was to support the career development of early to mid-career women nuclear professionals from diverse IAEA member states through a structured training and exchange programme. It focused on enhancing participants' technical expertise (hard skills) in nuclear science and operations, while also strengthening their communication and leadership abilities (soft skills). By nurturing young women professionals and expanding female representation at operational and leadership levels, the programme aimed to contribute to addressing gender imbalance in the nuclear sector and reinforce Korea's collaborative efforts with the IAEA.

2.2 Curriculum

The two-week curriculum (March 25 - April 5, 2024), titled "2024 IAEA Lise Meitner Programme in Korea: Nuclear Power and Operation," was comprehensively designed to reflect Korea's nuclear power competencies and technical expertise. The curriculum was structured into three integrated modules, each designed to build technical competence, deepen institutional understanding, and foster international leadership among participants.

Module 1: Lectures & Hands-on Training

This module provided foundational and advanced knowledge in nuclear science and engineering, combining theoretical instruction with simulator-based practical training.

- Theoretical Education:

Participants attended lectures on key topics such as pressurized water reactor (PWR) systems, nuclear power start-up procedures, safety culture, and Korea's nuclear development history and R&D policies. Lectures were delivered by experts in nuclear power operations, safety analysis, and research reactor applications, including HANARO and small modular reactors.

- Practical Exercises:

Hands-on training was conducted using the KAERI PWR simulator, with scenarios covering normal operation, transient phenomena, non-LOCA events, and small/large break LOCA in DBAs. Additional sessions included code analysis using RELAP5, simulator operations for APR-1400 and SNU NuScale, and a VR-based APR-100 reactor review.

- Project-Based Learning:

Participants collaborated on group presentations summarizing key takeaways and submitted individual reports to consolidate their learning outcomes.

Module 2: Site Visits

To complement the theoretical and practical training in Module 1, participants conducted field visits to major research institutes and industry facilities central to Korea's nuclear infrastructure.

• Nuclear Facility Visits:
The itinerary included visits to the Saeul Nuclear Power Plant, KAERI facilities (HANARO, radioisotope production facility, ATLAS, SMART-ITL), Doosan Enerbility's Changwon factory, and national institutions such as KURT, KEPCO, KORAD, and KHNP. These visits offered participants direct exposure to Korea's operational and developmental capabilities in nuclear technology.

Module 3: Soft Skills & Networking

This module focused on building leadership capacity and fostering global professional networks, particularly through engagement with Korean women leaders in the nuclear field.

• Professional Development Session(Soft Skills):
Targeted sessions on communication and leadership skills were provided to support participants' professional growth and advancement in international nuclear careers.

• Networking Activities:
Participants engaged in "Lunch-n-Mentoring" with female Korean nuclear professionals, joined a Women Empowerment Workshop with top Korean women leaders in nuclear field, and connected with previous LMP cohorts through online networking sessions.

• Cultural Experience:
The programme also featured visits to cultural heritage sites in Gyeongju and K-beauty experiences, allowing participants to engage with Korean culture and promote mutual understanding.

Module	Description	Category	Courses
Module 1 Lectures & Hands-on Training	Lectures and practical training covering various aspects of nuclear power development	Theoretical lectures	• Overview of Pressurized Water Reactor (PWR) • Research Reactor HANARO and its Application • NPP Start-up Procedures and Practices with Barakah NPP example • NPP Safety Culture • Reactor Operations and Safety Analysis • Korea's nuclear power development history • Nuclear R&D policies and direction • BANDI SMR development
		Hands-on Training	• Hands-on Exercises with KAERI PWR simulator: NPP Normal operation, NPP Transient phenomena during operation, Non-LOCA in primary system in DBA, Small/Large break LOCA RELAP5 analysis code modeling • APR-1400 full-scope simulator operation • APR-100 VR experience and 3D review • SNU Nuscale E2 simulator operation
		Project	• Key Takeaway Summary Group Project Preparation and Presentation • Individual Report Writing
Module 2 Site Visits	Visits to nuclear research and industry facilities related to Module 1	Nuclear Facility Visits	• Saeul NPP • HANARO, KAERI RI Production Facility • Doosan Enerbility Changwon Factory • ATLAS, SMART-ITL, KURT • KEPCO NF Factory • KORAD Radioactive Waste Disposal Facility • KHNP Headquarters • KEPCO E&C Headquarters
Module 3 Soft Skills	Mentoring and casual meetings with diverse female nuclear professionals	Soft Skills	• Communication Skills Enhancement • Leadership Development
		Networking	• Mentoring Lunch with Korean female experts • Women Empowerment Workshop with women nuclear leaders in Korea • Online Networking with previous LMP cohorts
		Cultural Experience	• Visiting historical sites and museums • K-beauty image-making sessions

Table. Program Overview

2.3 Participants

The programme involved twelve female nuclear experts with 3 to 5 years of experience, selected directly by the IAEA from eleven countries. The participants represented Nigeria, South Africa, Ghana, Mongolia, Türkiye, the Philippines, Singapore, Spain, Slovakia, the United States, and Korea, with one participant from each country except Korea, which had two participants.

3. Program Outcomes

To measure program outcomes, qualitative data were gathered from all 12 programme participants via open-ended responses. Participants were asked to reflect on their overall satisfaction and identify the most beneficial components of the programme. As per the IAEA's request, no quantitative surveys were conducted. Thematic analysis was employed to extract recurring elements, supported by a preliminary keyword frequency check.

Thematic analysis revealed three components as the most impactful. The percentages below indicate the proportion of participants (out of 12) who mentioned each component in their open-ended responses:
• Hands-on Training (83%): Simulator sessions effectively connected theoretical learning with real-world application.
• Mentorship (67%): Provided career insight and fostered international networks.
• Facility Visits (58%): Delivered practical exposure to nuclear technology and operations.

In terms of skill development, soft skills (67%)—notably communication and leadership—were more frequently highlighted than technical skills (42%), suggesting the programme's effectiveness in cultivating both professional competencies and broader career capabilities.

In a nutshell, the 2024 IAEA Lise Meitner Programme effectively fulfilled its objectives, as evidenced by consistently positive qualitative feedback from participants. The curriculum's integration of theoretical lectures, simulator-based exercises, mentorship, and site visits was widely appreciated for bridging the gap between theory and practice. Mentorship sessions were valued for their career guidance and networking opportunities, while enhanced understanding of Korea's nuclear governance system was frequently cited as a key takeaway. Thus, the programme's unique combination of technical, practical, and leadership-focused elements was particularly effective. Despite these positive outcomes, the absence of quantitative data limited the precision of this evaluation. To strengthen future assessments,

incorporating both qualitative and quantitative methods is recommended.

4. Discussion and Conclusion

4.1 Key Achievements

Hosting the LMP strengthened Korea's international standing by actively promoting gender equality within the global nuclear sector. This initiative demonstrated Korea's commitment to emerging international priorities and reinforced its leadership in the nuclear industry.

The programme also facilitated valuable diplomatic and professional relations with countries preparing to introduce or expand their nuclear technologies. Notably, Türkiye is planning nuclear power plant development, Nigeria is considering the establishment of a second research reactor, and Mongolia is developing nuclear medicine facilities. By engaging with these nations, Korea effectively promoted its nuclear expertise and cultivated positive relations with key international stakeholders.

Additionally, the LMP provided an excellent platform for showcasing Korea's advanced nuclear technologies and operational expertise to international participants, establishing a foundation for future technological exchanges and collaborations. Through its collaboration with the IAEA, Korea successfully expanded the scope and impact of its national nuclear training programs on an international scale.

4.2 Implications

The programme's success highlights the importance of continuous engagement and communication with participants to ensure sustained, long-term impacts. Upon returning to their home countries, participants actively shared the knowledge and insights acquired from the programme, particularly on Korea's nuclear governance system, through institutional seminars and presentations, such as those conducted at the Philippine Nuclear Research Institute. Furthermore, ongoing communication and networking through social media platforms like LinkedIn, Instagram, and WhatsApp facilitated continuous professional exchanges and broader dissemination of knowledge.

Korea's experience demonstrates the strategic value of maintaining robust international collaboration beyond the programme itself. Continued knowledge exchange with future host countries and active participation in the IAEA's gender equality initiatives will be essential for maximizing the programme's long-term effectiveness and fostering global efforts toward gender equality in the nuclear sector.

REFERENCES

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