

IAEA

Ministerial Conference: Nuclear power's future

Exploring the potential role of nuclear power in the world's future energy mix was the focus of the International Atomic Energy Agency's International Ministerial Conference on Nuclear Power in the 21st Century, held October 30–November 1 in Abu Dhabi, United Arab Emirates. Ministers and senior officials from IAEA member states discussed critical issues regarding nuclear power, including challenges to its introduction, continued operation of existing plants, and the expansion of nuclear's use.

"All countries—both developed and developing—need to secure sufficient energy to drive economic growth and counter climate change," said IAEA Director General Yukiya Amano in his opening remarks. "However, more use of nuclear power will be needed to provide the steady supply of baseload electricity to power modern economies if countries are to meet the goals for greenhouse gas emissions which they set for themselves in the Paris Agreement."

This fourth such ministerial-level event follows previous gatherings in Paris, France (2005); Beijing, China (2009); and St. Petersburg, Russia (2013). Significant developments since the last meeting in 2013 include the adoption of the United Nations Sustainable Development Goals, the entry into force of the Paris Agreement on climate change, and new historical highs in net installed nuclear power capacity in 2014, 2015, and 2016, all critical for the future of nuclear power.

Organized in cooperation with the OECD Nuclear Energy Agency, the conference was hosted by the UAE government through its Ministry of Energy and Federal Authority for Nuclear Regulation. Ambassador Hamad Alkaabi, the UAE's permanent representative to the IAEA and conference president, said at the opening session, "The UAE has a strong commitment to clean energy, where nuclear, solar, and other clean sources will play an important role in our nation's future energy mix. This makes Abu Dhabi a perfect place for this conference."

The challenge for nuclear

Setting the stage for the conference, Amano stressed in his opening presentation the difficulty in seeing "how the world will meet the challenge of securing sufficient energy and mitigating the impact of climate change without making more use of nuclear power. The challenge is immense. Today, 70 percent of the world's electricity comes from burning fossil fuels, according to the International Energy Agency. By 2050, if climate change goals are to be met, around 80 percent of electricity will need to be low-carbon."

Amano made numerous other observations during his speech, including the following (these are taken directly from his presentation):

■ Nuclear power produces 11 percent of the world's electricity. But when it comes to low-carbon electricity, nuclear generates almost one-third of the global total. Hydro power, by comparison, generates nearly half of the world's low-carbon electricity, but its potential for growth is limited.

■ Global installed nuclear capacity is now the highest that it has ever been, at 392 GWe. Twenty new reactors were connected to the grid in the last two years, the highest number since the 1980s. However, around 14 power reactors have been shut down since 2015, and global nuclear electricity production remains below 2010 levels. Some countries have taken the decision to phase out nuclear power altogether.

■ It will be important to keep current nuclear power plants running at full power for as long as possible. . . . Clearly, the pace of construction of new nuclear power plants will need to be stepped up if the world's future energy needs, as well as climate change goals, are to be met. It is difficult to see other low-carbon energy sources growing sufficiently to take up the slack if nuclear power use fails to grow.

■ I am hopeful that continuous, evolutionary improvement in reactor designs in the coming years will improve the economic attractiveness and cost-effectiveness of nuclear power, and help to alleviate public concerns about issues such as safety and waste disposal. . . . Several small modular reactors are also ready for near-term deployment. These could make nuclear power feasible for the first time on smaller grids and in remote settings, as

well as for nonelectrical applications.

■ As far as the long-term management of high-level radioactive waste and spent fuel is concerned, good progress has been made in recent years, especially in Finland, Sweden, and France.

■ Nuclear power undoubtedly has an important contribution to make in reducing greenhouse gas emissions. But the damage that climate change has already caused to the environment—and the threat it can pose to the livelihoods of some communities—also need to be addressed.

Championing diversity

On the final day of the conference, attendees heard a special presentation on the role of women in the nuclear industry in the UAE by Sheikhha Lubna bint Khalid Al Qasimi, vice chair of the Emirates Nuclear Energy Corporation's (ENEC) board of directors and president of Zayed University. "Here in the UAE," she said, "we strongly believe in the equality of men and women, both in society and in professional development. From the very beginning, we emphasized strongly the need to bring more women into the nuclear industry and into what is generally considered a male-dominated sector."

Sheikhha Lubna noted that efforts to inspire women to join the industry have been successful. "Today, 23 percent of professionals working at ENEC are women," she said. "At the Barakah nuclear energy plant, approximately 10 percent of employees are female. This is a significant achievement."

Sheikhha Lubna also noted that the UAE nuclear program is "one of the most diverse and perhaps the most multinational and multicultural nuclear program in the world, with over 40 nationalities involved. We celebrate this diversity and continue to promote understanding, diversity, and acceptance."

Sheikhha Lubna did not ignore another important future source of talent: the UAE's youth. Following the formal presentation, she participated in a "Youth Circle," organized in parallel to the conference, during which participants discussed youth inspiration and motivation, knowledge management and sustainability, research and development opportunities, and innovation in the nuclear field. Sheikhha Lubna stressed the crucial role of

young people in ensuring the sustainability of growth and development in various sectors, especially the peaceful nuclear energy sector, and also highlighted her own experiences as a young woman and noted how important it is for young people to be engaged in the workplace and to fully pursue their career ambitions.

Summing up the conference

At the closing session, the concluding statement by conference president Hamad Alkaabi noted a wide convergence of views among the nearly 700 participants. “The conference recognized that nuclear power remains an important option for many countries to improve energy security, reduce the impact of volatile fossil fuel prices, and mitigate the effects of climate change and air pollution, including by backing up intermittent energy sources,” he said.

According to Alkaabi, “The conference noted that each year, an estimated 6.5 million deaths a year are linked to air pollution, with that number set to increase significantly in the coming decades in the absence of greater action to curb emissions and expand access to modern forms of energy.” Alkaabi said that to address these concerns and meet the targets and requirements set out in the Paris Agreement on climate change, the International Energy Agency has indicated that substantial growth in nuclear electricity generation by 2050 will be needed, but that “nuclear power is not currently attracting the nec-

essary global investment” to limit the average global temperature increase to 2 °C. “In addition,” he said, “a number of plants are being shut down in some countries before the end of their safe operational lifetimes for both political and economic reasons.”

To address investment concerns, Alkaabi said, nuclear investors need clarity and certainty from policymakers. It was agreed, he said, that governments should “provide clear and consistent policy support for existing and new nuclear power capacity, including, for example, by incorporating nuclear power into clean energy incentive schemes and encouraging its development in addition to other clean forms of energy.” Participants also stressed the importance of development assistance for nuclear power projects, as well as affordable financing, to ensure project viability.

Other key issues included nuclear-power infrastructure development, capacity building, and innovations and advanced nuclear technologies. A conference panel gave considerable attention to the establishment of an appropriate national infrastructure for nuclear power, particularly for countries developing nuclear power programs. Also, Alkaabi noted, “Government commitment to the development and maintenance of such infrastructure sends an important signal to stakeholders and potential project investors and reduces construction and operational risk.”

Regarding human resource development and management, these need to be of “a high standard in terms of both compe-

tence and performance,” Alkaabi said. “As the current work force ages, the next generation must be rigorously recruited and trained so that tacit nuclear knowledge is retained and transmitted.” Increasing the participation of women and youth in the workforce was also emphasized, he added, “to attract the best and brightest professionals.”

Technology development is resulting in new reactor designs, Alkaabi said, including small modular reactors. It is hoped that they will allow for expanded use of nuclear power, he added, including on smaller grids and in remote settings, and for nonelectrical applications. He also stressed “the role of governments in fostering nuclear energy innovation through research and development and in adapting licensing and regulatory approaches for new deployments.”

Participants also repeatedly highlighted the importance of public confidence for the future of nuclear power. “Open and transparent decision making involving all stakeholders can improve the public perception of nuclear power and lead to broader public acceptance,” Alkaabi said. “For many countries,” he concluded, “nuclear power will have an important role to play in achieving the Sustainable Development Goals and meeting the targets in the Paris Agreement. Governments should ensure that their national energy policies support their development and climate goals.”