

Future of nuclear energy*

Yukiya Amano (Director General, International Atomic Energy Agency (IAEA), Vienna), delivered the Indian Nuclear Society (INS) Silver Jubilee Lecture on 'Perspectives on future of nuclear energy' in Mumbai recently. V. Venugopal (Vice President, INS) welcomed the guests. R. K. Sinha (Chairman, Atomic Energy Commission and Secretary, Department of Atomic Energy), K. C. Purohit (Chairman and Managing Director, Nuclear Power Corporation of India Limited) and Ramachandran Swaminathan (Ambassador and Resident Representative of India to the IAEA, Vienna) graced the occasion.

Amano focused upon the cooperation with India in the field of peaceful nuclear technology and about strengthening this cooperation in future. A year ago the nuclear world looked a bit different from today. People talked about global nuclear renaissance. Several countries thought about introducing nuclear power and 30 or so existing users proposed to build additional plants.

The Fukushima Daiichi accident two years ago, however, gave rise to public anxiety and damaged confidence in nuclear power. In fact, some European countries even announced to stay away from nuclear power. Yet, there seems to be a continuous growth in nuclear power, although slower than expected prior to the Fukushima Daiichi accident.

At present, there are 437 operating nuclear power reactors in the world. Amano suggested that the number of nuclear power plants could increase by 80–90 or even double in the next 20 years. Amongst the present 66 reactors under construction, 7 of them are in India. China and Russia too have proposed significant expansion plans. Today, Bangladesh, Egypt, Jordan, Nigeria, Poland, Turkey and Vietnam have resolved to introduce nuclear power. Amano was particularly impressed with the progress being made in the United Arab Emirates.

Regarding the benefits of nuclear power use, Amano stressed upon the use of nuclear power for improvement of energy security, reducing the impact of

volatile fossil-fuel prices and mitigating the effects of climate change. And this can specifically benefit the rapidly developing Indian economy contributing to growth.

Amano believes that although renewable energy sources have an important contribution to make, they may be unable to provide the reliable base-load electricity for 24 hours a day, 365 days a year, which a modern economy requires. This is where nuclear power comes in. But the main obstacle to build new reactors in many countries is the financial crux; the cost of construction being one of them. However, these may be offset by lower and more stable fuel costs during operation.

At present, in India there have been demonstrations against construction of new nuclear plants. According to Amano, an unwavering commitment to safety as well as openness and transparency by operators, regulators and governments is required. Safe management and disposal of radioactive waste and spent fuel are major challenges for the future of nuclear power; and for this IAEA works closely with Member States in this area.

Good progress has been made in many countries regarding the long-term disposal facility for nuclear spent fuel. For instance, the ONKALO facility in Finland is building a repository deep underground. In fact, the world's first deep geological repositories for nuclear spent fuel are expected to become operational after 2020.

Regarding the future of nuclear power, Amano said that India is at the forefront of technological development in the nuclear sector. The innovative technology, including fast reactors and related fuel cycles are important for the long-term sustainability of nuclear power making energy resources last for several thousand years and reducing the volume of toxicity of the final waste.

In India, construction of 500 MW (e) Prototype Fast Breeder Reactor has reached an advanced stage. And the country is a key partner to IAEA. After the Fukushima Daiichi accident, Member States have adopted an IAEA Action Plan on nuclear safety, which is now being implemented. Stress tests are being conducted to assess how well facilities are likely to withstand extreme events

such as earthquakes and tsunamis. Practical steps, including equipping plants with portable diesel generators and building higher protective walls are being taken.

In June 2013, IAEA will hold an International Ministerial Conference on Nuclear Power in the 21st Century in St Petersburg, Russia. It will provide a valuable opportunity to consider the long-term contribution of nuclear power to sustainable development.

Amano emphasized on the statutory objective of IAEA: 'To accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world'. IAEA is active across the full spectrum of peaceful uses of nuclear energy. Taking this into consideration, since 11 May 2009, India has placed 19 of its civilian facilities under that agreement and has undertaken not to use any of those nuclear facilities, or relevant nuclear material, for military purposes.

Elaborating on the nuclear applications, Amano mentioned about how IAEA aids countries to increase food production using nuclear techniques to develop robust new varieties of crops and also improve access to clean drinking water and to combat deadly animal diseases such as foot-and-mouth disease.

A special interest programme for which India has been a generous supporter is the Programme of Action for Cancer. Bhabhatron II radiotherapy machines were donated by India to Vietnam and Sri Lanka, through IAEA. A third machine is being provided to Namibia. India is one of the largest contributors to the IAEA Coordinated Research Projects, a major vehicle for international cooperation in nuclear research and development.

According to Amano, India's remarkable success in the field of peaceful nuclear technology is the result of careful, long-term planning and a focus on building home-grown expertise through high-quality education and training. The focus of the upcoming IAEA Ministerial Conference at Vienna in July 2013 year will be on nuclear security.

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