Capacity Building and Nuclear Knowledge for Sustainable Energy Development

Objective

To strengthen Member State capacities in energy and nuclear power planning to elaborate sustainable energy strategies and conduct studies for energy system and electricity supply options, energy investment planning, and energy environment policy formulation. To build Member State capacities to manage nuclear knowledge and provide knowledge management services and assistance. To procure and provide printed and electronic information in the area of nuclear science and technology to the IAEA Secretariat and Member States.

Energy Modelling, Databanks and Capacity Building

During 2016, the Agency updated, enhanced and disseminated its energy planning tools and databanks; the number of Member States using its energy models grew to 138. The Agency and the International Renewable Energy Agency (IRENA) signed a cooperation agreement to coordinate joint capacity building and training in energy planning. Multi-criteria decision analysis capabilities were added to the Model for Energy Supply Strategy Alternatives and their General Environmental Impacts (MESSAGE) to enable assessment of energy options for sustainable development and climate change mitigation. Regional training events on energy planning tools were conducted with local experts in Africa, Eastern Europe and Latin America. Training of trainers was organized to extend the pool of experts in developing countries. In total, over 600 professionals from 86 countries were trained through distance training and face-to-face training events.

Energy–Economy–Environment (3E) Analysis

In advance of the 60th regular session of the Agency's General Conference, the Agency issued two publications on nuclear power as a sustainable energy option: *Climate Change and Nuclear Power 2016* and *Nuclear Power and Sustainable Development*. The publications present information on how nuclear energy, as one of the low carbon energy sources available today, can help meet the 'climate–energy challenge' and contribute to sustainable development. Linkages between nuclear technology and sustainable development were also highlighted in the Scientific Forum held during the 60th General Conference, covering 'Nuclear Technology for the Sustainable Development Goals', one of the sessions of which focused on 'Energy for the Future: The Role of Nuclear Power' (Fig. 1).

At the 22nd session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP22), held in November in Marrakesh, Morocco, the Agency participated in a side event on energy, in cooperation with several organizations in the United Nations system, and hosted an exhibit on nuclear power and nuclear

applications. The Agency also had greater scientific engagement in climate change science though participation in the drafting of the Intergovernmental Panel on Climate Change special report on the 1.5°C scenario.

Scoping missions for CLEW (climate, land, energy and water), a framework for integrated assessment of resource systems, were conducted in Ghana and Nicaragua to assist those countries in achieving the Sustainable Development Goals. Under CLEW, the Agency, in collaboration with the United Nations Department of Economic and Social Affairs, United Nations Development Programme and the World Bank, helps Member States assess the cross-sectoral impact of policy decisions and promote robust and cohesive policy formulation.

Work continued on several coordinated research projects focusing on national and regional macroeconomic effects of nuclear power programmes, financing nuclear investments, and the potential role of nuclear energy in national climate change mitigation strategies. The Agency published seven technical reports from these projects in 2016, on topics such as sustainable development, addressing the impacts of climate change, financing and electricity market reforms.

FIG. 1. Fiona Reilly of Atlantic Superconnection speaks on financing nuclear power projects at the Scientific Forum held during the 60th General Conference.

Nuclear Knowledge Management

The Agency continued to assist Member States in maintaining and preserving nuclear knowledge by developing methodology and guidance documents and facilitating sustainable education, training and information exchange in nuclear science and technology. In 2016, the Moscow Engineering Physics Institute (MEPhI) became the second institution — after the University of Manchester — to implement the International Nuclear Management Academy (INMA) programme, with 15 enrolled students. At the end of the year, some ten

universities across the world were in the process of implementing programmes that would meet the competency requirements of the Agency's INMA initiative, aimed at improving the availability and accessibility of master's level courses for nuclear sector managers.

In 2016, the Agency carried out three Knowledge Management Assist Visits: to the Nuclear Power Production and Development Company of the Islamic Republic of Iran in April; to the Leningrad nuclear power plant in the Russian Federation in June; and to the Shanghai Nuclear Engineering Research and Design Institute in China in October. The visits focused on the importance, shared responsibilities and challenges of maintaining nuclear knowledge for high levels of safety, and on sharing best practices and experience.

Interest in the Agency's Nuclear Energy Management (NEM) and Nuclear Knowledge Management (NKM) Schools continued to increase. The Agency held four NEM Schools and one NKM School during the year: the fourth annual IAEA–Japan NEM School, in July, at the University of Tokyo; the first IAEA–Rosatom Regional NEM School, in September, in St. Petersburg; the seventh annual Joint ICTP–IAEA NEM School, in October, at the Abdus Salam International Centre for Theoretical Physics (ICTP) in Trieste, Italy; the first Joint South Africa–IAEA NEM School, in October, in Cape Town; and the 12th annual ICTP–IAEA NKM School in September, at the ICTP in Trieste.

The Agency continued to support the activities of and collaboration among the four regional nuclear education networks it has helped establish — the Regional Network for Nuclear Education and Training in Nuclear Technology (STAR-NET), the AFRA Network for Education in Science and Technology (AFRA-NEST), the Asian Network for Education in Nuclear Technology (ANENT) and the Latin American Network for Education in Nuclear Technology (LANENT). In 2016, the Agency supported the development of educational materials and e-learning courses. It also organized an annual 'Networking Networks' workshop, where the regional networks exchanged information on their activities and on existing resources in the field of nuclear knowledge management. Close collaboration with the European Nuclear Education Network (ENEN) continued during the year.

In 2016, the Cyber Learning Platform for Network Education and Training (CLP4NET) was established as the Agency's official learning management system (LMS) platform for e-learning resources. The number of CLP4NET users surpassed 13 500, and more than 300 courses are now hosted in the self-directed (open) LMS and the instructor-led (protected) LMS. The platform has improved accessibility to the Agency's education and training resources and made delivery of training to Member States more efficient.

The IAEA CONNECT platform serves as the gateway to the networks run by the Agency. Such networks are important, as they promote capacity building, as well as facilitate collaboration and sharing of information and experience among their members. Improvements to IAEA CONNECT in 2016 included the development of public areas to provide access to basic information on web sites on the platform.

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Collection and Dissemination of Nuclear Information

The membership of the International Nuclear Information System (INIS) comprises 130 Member States and 24 international organizations. INIS reached a milestone of 4 million records, with over half a million full texts that are not readily available through commercial channels. The Agency added over 127 000 bibliographic records and 8620 full texts to the INIS Repository, which had over 2.7 million page views during the year. In addition, a major upgrade was introduced to the INIS Repository Search. The INIS Thesaurus continued to serve the international community and was maintained through intensive collaboration with Member States. The Thesaurus is available in eight languages, with almost 31 000 well defined descriptors.

In cooperation with the Japan Atomic Energy Agency (JAEA), which serves as the National INIS Centre of Japan, over 1600 Fukushima Nuclear Accident Archive records

were made publicly available through the INIS Repository. During the year, new automated technology was developed and digital harvesting of more than 15 000 records containing nuclear information was completed.

The 38th Consultative Meeting of INIS Liaison Officers was held in October, attended by 69 participants from 60 Member States and 5 international organizations. The meeting provided Member States with information on INIS activities. Participants shared experience and provided recommendations on the further development and future operation of INIS.

The IAEA Library continued to ensure that information resources and services remained current, cost effective and easily accessible. The number of electronic journals available through the Library increased from 50 000 in 2015 to over 53 000 in 2016. More than 13 400 people visited the Library in 2016, and over 16 000 items were loaned out. The Library fulfilled over 1530 interlibrary loan and document delivery requests.

In response to customer requests for tailored packaging of nuclear information products and services, the Agency created 1810 personalized Library user profiles. It also offered over 30 training sessions covering general aspects of the Library for newcomers as well as personalized sessions responding to the specific needs of Agency staff members.

During the year, the Agency, through the IAEA Library, coordinated the International Nuclear Library Network (INLN) —comprising 55 libraries and research institutes — by sharing knowledge, resources and best practices.

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