

# Capacity Building and Nuclear Knowledge Maintenance for Sustainable Energy Development

## Objective

*To strengthen Member State capacities to use 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

The Agency continued to support Member States in building capacity for energy system planning and for assessing the potential contribution of nuclear power to meeting energy needs. During the year, through a mix of e-learning courses and face to face training, the Agency trained approximately 390 energy analysts and planners from 95 Member States in using its analytical tools for conducting national and regional studies of future energy strategies and the potential role of nuclear power. Modelling focused in particular on sustainable electricity options in the power pools of western and southern Africa. Efforts to enhance the tools continued during the year, with the development of improved versions of MAED (Model for Analysis of Energy Demand) and ESST (Energy Scenario Simulation Tool). The Agency also developed a French version of the e-learning materials for SIMPACTS (Simplified Approach for Estimating Impacts of Electricity Generation). These tools are now being used in research and planning institutions in 130 countries and have been acquired by 20 international and regional organizations for use in their energy projects in developing countries.

## Energy–Economy–Environment (3E) Analysis

In advance of the 21st session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21), the Agency published *Climate Change and Nuclear Power 2015*. Significantly updating its predecessor, the 2015 report emphasizes the importance of nuclear energy in reducing greenhouse gas emissions from the electricity sector and identifies nuclear power as a low carbon technology, along with wind and hydropower. The report concludes that nuclear energy is necessary to help meet global energy needs while reducing greenhouse gas emissions to a level consistent with keeping the global average temperature within 2°C above pre-industrial levels. A French version of *Climate Change and Nuclear Power* was also published during the year.

The Agency continued its involvement with the Working Group on Climate Change of the United Nations High-Level Committee on Programmes. At high level side events and within the United Nations exhibit booth at COP21, the Agency presented the sustainability benefits of nuclear power, including its potential contributions to sustainable development (Fig. 1). It also showcased nuclear energy as a clean, reliable, affordable energy source and a key technology for climate change mitigation.

In November, the Agency published *Indicators for Nuclear Power Development* (IAEA Nuclear Energy Series No. NG-T-4.5). The book provides stakeholders with a set of indicators to help them assess the broader context of establishing or expanding a nuclear power programme with regard to the macro-, techno- and socioeconomic aspects of nuclear power, as well as the energy and environmental dimensions.

During the year, the Agency conducted coordinated research projects in the areas of financial modelling for new nuclear power plants, energy infrastructure vulnerability to climate change, assessment of national and regional economic and social effects of nuclear programmes, and the CLEW (climate, land, energy and water) framework for integrated assessment of resource systems. A total of 29 Member States, including operating countries, nuclear newcomers and non-nuclear countries, took part in the projects, performing country case studies.

---

*“the Agency published *Indicators for Nuclear Power Development...* [helping stakeholders to] assess the broader context of establishing or expanding a nuclear power programme.”*

---



FIG. 1. At side events (left) and within the United Nations exhibit booth (right), the Agency provided COP21 delegates with information on nuclear applications and on nuclear power as a low carbon energy source.

## Nuclear Knowledge Management

With strong support from the General Conference, and with extrabudgetary funding from Japan, over the past three years the Agency has been working to improve the availability and accessibility of master's level courses for nuclear sector managers through the establishment of the International Nuclear Management Academy (INMA). Within the collaborative framework for the INMA, four assist missions were undertaken in 2015 to the participating universities: North-West University and the University of the Witwatersrand in South Africa; Tsinghua University in China; and the University of Manchester in the United Kingdom.

The Agency provides an important service to its Member States through its Knowledge Management Assist Visits. In 2015, it carried out visits to the Smolenskaya nuclear power plant in the Russian Federation in February, and to the Nuclear Power Production and Development Company of the Islamic Republic of Iran and the KSU training centre at the Ringhals nuclear power plant in Sweden in November. The visits focused on improving

understanding of the strategic importance, shared responsibilities and specific challenges of sustaining the nuclear knowledge base needed for high levels of safety, as well as on sharing experience.

The Agency held three Nuclear Energy Management Schools during the year: the second Joint United Arab Emirates–IAEA Nuclear Energy Management School was held at Khalifa University in Abu Dhabi in May; the third annual IAEA–Japan Nuclear Energy Management School was held at the University of Tokyo in June; and the sixth annual Joint ICTP–IAEA Nuclear Energy Management School was held at the Abdus Salam International Centre for Theoretical Physics (ICTP) in Trieste, Italy, in November. In addition, the 11th annual ICTP–IAEA Nuclear Knowledge Management School was conducted in Trieste in September. A total of 167 participants from over 30 Member States graduated from these schools during the year.

The Agency continued to support the activities of, and collaboration among, the regional nuclear education networks that it helped to establish, namely 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). The Agency facilitated the establishment of a fifth regional network, the Regional Network for Education and Training in Nuclear Technology (STAR-NET), with 12 universities from six countries in eastern Europe and central Asia signing an agreement at a consultancy meeting in September in Vienna. Close collaboration with the European Nuclear Education Network (ENEN) continued during the year.

The Cyber Learning Platform for Nuclear Education and Training (CLP4NET) continued to be recognized by the regional nuclear education networks as an effective learning management system platform to support capacity building and knowledge transfer in the nuclear sector. CLP4NET was used throughout the Agency to support the delivery of on-line e-learning materials to Member States. More than 50 separate courses and training modules have already been deployed on the platform, and over 7000 users from more than 70 countries used CLP4NET in 2015.

---

*“over 7000 users from more than 70 countries used CLP4NET in 2015.”*

---

## Collection and Dissemination of Nuclear Information

In 2015, Burundi joined the International Nuclear Information System (INIS), the Agency’s largest document repository, operated in collaboration with 130 Member States and 24 international organizations. Of the almost 3.9 million records within INIS, over half a million full texts are not readily available through commercial channels. The Agency added over 136 000 metadata records and 8000 full texts to the INIS Repository during the year, making it the highest annual input in the history of INIS. The INIS Repository had over 2.3 million page views and 1.9 million document downloads in 2015.

In cooperation with the National INIS Centre of Japan within the Japan Atomic Energy Agency, the INIS Secretariat began incorporating the Fukushima Nuclear Accident Archive records into its collection in 2015. During the year, INIS developed an application for harvesting bibliographic metadata from open access archives, publishers and other information providers. The Agency also used the Open Nuclear Information eXchange System (ONIXS) to harvest thousands of records from PubMed Central and the Food and Agriculture Organization of the United Nations.

Participants from 22 countries attended an INIS training seminar, held in October in Vienna, aimed at building capacity and improving many aspects of national INIS operational capabilities. The INIS Thesaurus, available in eight languages with almost 31 000 well defined descriptors, continued to serve the international community; the Thesaurus was maintained through intensive collaboration with Member States. To mark the forty-fifth anniversary of INIS, the Agency published a special edition of the *Nuclear Information Newsletter*.

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 28 000 in 2014 to over 50 000 in 2015. More than 14 000 people visited the Library in 2015, and 20 000 documents were loaned out. The number of electronic resources entered in the collection rose by 38% compared with 2014.

Responding to customer requests for tailored packaging of nuclear information products and services, the number of personalized user profiles grew to 2202. The Agency offered over 50 training sessions covering general aspects of the Library for newcomers as well as personalized sessions answering the specific needs of Agency staff members.

The Agency's mandate includes fostering information exchange. In this regard, membership in the International Nuclear Library Network, coordinated by the IAEA Library, grew to 55 partners in 2015. The three new members are the Research Centre for Energy, Environment and Technology (CIEMAT) in Spain, the Belgian Nuclear Research Centre (SCK•CEN) and the library and information centre of the Nuclear Research Center NEGEV-NRCN in Israel.

---

*“The number of electronic journals available through the Library increased from 28 000 in 2014 to over 50 000 in 2015.”*

---