

# Capacity Building and Nuclear Knowledge Maintenance for Sustainable Energy Development

## Objective

To enhance the capacity of Member States to perform their own analyses of electricity and energy system development, energy investment planning and energy–environment policy formulation and their economic implications. To sustain and effectively manage nuclear knowledge and expertise. To enhance information and knowledge resources on the peaceful uses of nuclear science and technology serving the needs of Member States and the Secretariat.

## Energy Modelling, Data Banks and Capacity Building

In 2006, the IAEA published updated projections on global nuclear power development that show a significant potential increase in global nuclear power capacity up to the year 2030 (see <http://www.iaea.org/OurWork/ST/NE/Pess/RDS1.shtml>). Figure 1 shows updated low and high projections for worldwide nuclear power capacity. The low projection includes only firm plans announced by governments and power utilities for the construction of new nuclear power reactors, for lifetime extensions of existing reactors and for retirements of reactors. Even in this low projection, global nuclear power capacity will increase to 414 GW(e) by 2030. In the high projection, which incorporates additional power reactors

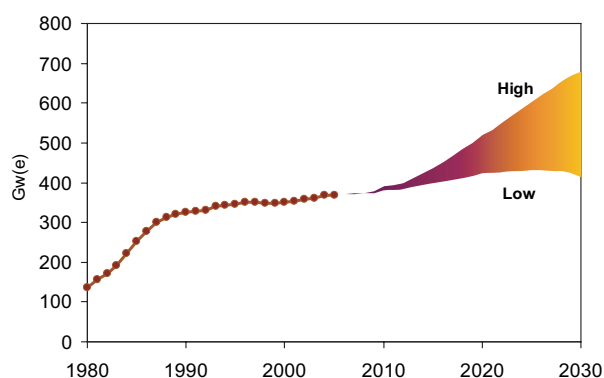


FIG. 1. Projections for worldwide nuclear power capacity up to 2030.

suggested by long term government and utility plans, global nuclear power capacity is estimated to reach 679 GW(e) in 2030.

The Agency offers analytical tools for energy–environment analyses and provides training and assistance in their application. Use of these tools reached a record level in 2006, with 112 Member States and six international or regional organizations applying them in their analyses. Also in 2006, a major modification was made to the SIMPACTS (Simplified Approach for Estimating Impacts of Electricity Generation) model, which assesses and compares the environmental impacts of different electricity generation technologies, by the addition of a new module for estimating the impacts of liquid effluents.

Special emphasis is given by the Agency to building capacity in interested Member States, both for energy system analysis for sustainable development in general, and for assessing the potential role of nuclear power in meeting a country's future energy needs. A total of 274 professionals from 49 Member States were trained in regional and national courses held in 2006. A large number of new requests were received from Member States for the Agency's assistance in conducting energy studies to evaluate future energy options. To cater to these requests, the Agency in 2006 designed 19 new technical cooperation projects involving 63 countries.

## Energy, Economic and Environment Analysis

Partly because of rising oil prices, energy security occupied the attention of many governments in 2006. In this regard, the Agency completed two new studies on energy supply security. The first study quantified the costs incurred in implementing specific supply security enhancement measures beyond the least cost market solution, incorporating nuclear power into the general energy supply security context. The study's conclusions show that no one approach to energy supply security carries the same costs and benefits for different countries.

The second study, *Analyses of Energy Supply Options and Security of Energy Supply in the Baltic States* (IAEA-TECDOC-1541), provided a detailed quantification of the costs of specific national and regional energy supply security measures aimed at reducing dependence on imports of oil and gas, and at replacing electricity generation lost through the scheduled closing by 2009 of Lithuania's Ignalina nuclear power plant. The study showed that, among the alternatives analysed, integrated regional approaches to energy supply security are more cost effective than individual national efforts.

Three other studies carried out in 2006 contributed to the understanding of sustainable energy development. Under the aegis of the Agency and UNDESA, partner institutions in Brazil and South Africa completed in-depth country profiles that included assessments of potential energy system pathways and supporting policies that would be consistent with the overall achievement of national sustainable development goals. Both studies were carried out under the World Summit for Sustainable Development's Partnerships for Sustainable Development, through a project led by the Agency on 'Designing Country Profiles on Sustainable Energy Development'. The profile of Brazil, which was published in 2006, highlighted the importance of 'technology leapfrogging' (e.g. ethanol production and deep water drilling) to reduce oil imports. The report on South Africa (available at [http://www.iaea.org/Our-Work/ST/NE/Pess/assets/South\\_Africa\\_Report\\_May06.pdf](http://www.iaea.org/Our-Work/ST/NE/Pess/assets/South_Africa_Report_May06.pdf)) highlighted the policies and measures being considered to meet growing energy needs in the context of national development priorities, including bringing power to remote and rural areas.

The Agency is also an active participant in 'UN-Energy', which was created in 2004 as the UN's principal interagency mechanism in the field of energy. As part of this effort, the Agency led a study that combined its models for analysing national energy systems with data provided by the Energy Commission of Ghana, FAO, UNEP and UNIDO. The resulting pilot study for Ghana provided insights on policy options identified by UNDESA in line with the Johannesburg Plan of Implementation's call for countries to increase their use of renewable energy resources.

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As part of its information dissemination activities, a new brochure, *Nuclear Power and Sustainable Development*, was distributed at the 14th session of the Commission on Sustainable Development, held in New York in April 2006. The brochure was also made available at the combined second meeting of the Parties to the Kyoto Protocol and 12th session of the Conference of the Parties in Nairobi in November.

## Nuclear Information and Knowledge Management

The Agency's International Nuclear Information System (INIS) remains a very important information resource and nuclear knowledge preservation tool for Member States. In 2006, its membership grew to 140; the INIS bibliographic database was increased by 122 412 records and reached a total of 2 778 427 references. Over 200 000 electronic full text documents were also made available to INIS members on the Internet.

In 2006, the Agency published *Knowledge Management for Nuclear Industry Operating Organizations* (IAEA-TECDOC-1510) and a special publication on *Risk Management of Knowledge Loss in Nuclear Industry Organizations*. Training activities included a 'School of Nuclear Knowledge Management' at the Abdus Salam ICTP, as well as nuclear knowledge management workshops in Japan, Kazakhstan, the Republic of Korea and Ukraine. The Agency also continued to assist the World Nuclear University Summer Institute, providing support, in particular, to participants from developing countries.

In response to an increasing number of requests by Member States for Agency assistance, new national and regional technical cooperation projects were developed for Europe and Asia, including a regional Asian project in support of the Asian Network for Education in Nuclear Technology. In addition, a new CRP on the comparative analysis of methods and tools for nuclear knowledge preservation began in 2006. Special emphasis was given to improved communication with Member States with the introduction in 2006 of a newsletter and a web site (<http://www.iaea.org/inisnkm>) for INIS and nuclear knowledge management.

The International Nuclear Library Network (INLN) (<http://inln.iaea.org/>) is coordinated by the Agency to assist nuclear libraries worldwide in the provision of information and services to users

without additional cost to their parent organizations. In 2006, Australia joined the INLN as its sixth member. ■