

Capacity Building for Operating and Expanding Nuclear Power Programmes

Supporting safe, reliable
and sustainable nuclear
power plant operations



Assisting with plant life
management for long term
operation

Providing support to
expanding nuclear power
programmes



Helping strengthen
management systems,
human resource
development, stakeholder
involvement



Nuclear
Energy

The sustainability of nuclear power plant operations depends on strong performance, technical infrastructure, management systems, human resources and stakeholder involvement. Currently, 30 countries generate nuclear power, with approximately 450¹ nuclear power reactors in operation and over 50 under construction globally.

There is ongoing demand from Member States for support in strengthening engineering for nuclear power programmes, including the long term and sustainable operation of the current fleet of reactors.



The IAEA assists Member States operating and expanding nuclear power programmes through a wide range of technical support services such as expert and review missions, training courses, conferences, technical meetings, workshops and guidance documents, among other activities, and the provision of tools and databases. A number of robust partnerships with national and international institutions contributes to and complements these services.

By disseminating good practices and helping to share experiences across Member States, the IAEA supports organizations operating nuclear power reactors to achieve excellence in long term plant life management. These practices and innovative techniques are consistent with global objectives to help ensure nuclear power remains an available and sustainable option to support the transition to clean energy systems of the future.

Engineering and Operational Support

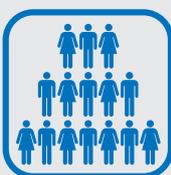
To enhance operational efficiency and effectiveness, the IAEA offers capacity building support to countries on quality control, quality surveillance for construction, supply chain management, component manufacturing and commissioning. This includes dedicating efforts to address material ageing and degradation, plant life management beyond 60 years and reducing operational costs, among other topics.

The engineering aspects of plant operations cover topics such as instrumentation and control technologies, and performance and maintenance, which are key for the long term operation or pursuit of lifetime extensions of nuclear power plants.

The IAEA supports Member States to achieve excellence in nuclear power plant operation:



- Power uprate and plant upgrade
- Design change
- Configuration management
- Asset management
- Corrective action programme
- Operation
- Outage and maintenance management
- Ageing/Plant Life Management
- Supply chain
- Risk informed decision making



- Human resource management
- Training and qualification
- Leadership
- Stakeholder involvement
- Organizational culture and management of safety and performance

¹ Latest data available at: <https://www.iaea.org/pris/>

To achieve the goal of long term, safe, economic and reliable operation of a nuclear power plant, a Plant Life Management (PLiM) programme is essential. The IAEA develops guidelines to strengthen PLiM programmes for long term operation and offers expert missions and other capacity building support in this area. International Conferences on Nuclear Power Plant Life Management, held periodically since 2002, have attracted hundreds of nuclear energy experts from Member States.

Review Missions

National utilities, regulators, technical support organizations, research laboratories and universities can benefit from Independent Engineering Review of Instrumentation and Control System (IERICS) missions. IERICS is a peer review of instrumentation and control (I&C) design documents, prototype I&C systems and those already deployed in operating nuclear power plants. The reviews highlight good practices and facilitate the exchange of experiences and international expert discussions on an organization's practices.

The IAEA Construction Readiness Review (CORR) mission assesses a nuclear power plant project's readiness to proceed to its initial or next construction phase. The mission can be deployed before the start of a major construction, at a major project milestone, or at any other time requested by a Member State.

Management Systems, Human Resource Development and Stakeholder Involvement

Nuclear power plants need effective management based on robust decision making processes, involving all stakeholders and executed by skilled and well trained professionals. The IAEA also supports Member States in these areas through a variety of capacity building activities.

An effective and sustainable management system at a nuclear facility integrates such issues as safety,



Webinars on Stakeholder Involvement related to Nuclear Power

In this new webinar series participants join online seminars to learn about and interact on specific stakeholder involvement topics, such as public information centres, social media, and public surveys. The webinars are run four times a year and are open to all interested participants.

<https://www.iaea.org/si-webinars>

security, safeguards, health and quality, to ensure that strategic decision making does not take place in isolation. Planning and maintaining a sustainable human resource development system is integral to the earliest, ongoing and projected phases of a nuclear power programme.

The nuclear industry relies heavily on a specialized and highly trained workforce. Effective human resource management ranges from education and training to the continuous monitoring and improvement of staff performance. The IAEA offers training courses, workshops, guidance, and arranges technical meetings, to support Member States that seek to train national experts.

Involving a wide range of interested parties in the decision making on nuclear power programmes can enhance public awareness, understanding and confidence. This is also important for those stakeholders who do not have a direct role in making those decisions. The IAEA supports Member States in their efforts to effectively engage with stakeholders of a nuclear power programme through technical meetings, national workshops and expert missions, training courses, scientific visits and publications.

Nuclear Energy Capacity Building Hub

This digital platform allows registered users to join proactive communities of practice for information sharing, capacity building and networking across Member States on workforce planning, leadership, training, stakeholder involvement and human performance.

<https://nucleus.iaea.org/sites/connect-members/cbh/>



Technical Working Groups

Several IAEA Technical Working Groups (TWGs) provide advice and support to programme implementation in the field of nuclear power, supporting capacity building for operating and expanding nuclear power programmes:

- TWG on Life Management of Nuclear Power Plants (TWG-LMNPP)
- TWG on Managing Human Resources in the Field of Nuclear Energy (TWG-MHR)
- TWG on Nuclear Power Plant Instrumentation and Control (TWG-NPPIC)
- TWG on Nuclear Power Plant Operations (TWG-NPPOPS); recently inaugurated, this TWG also advises on managing and strategizing sustainable nuclear power plant operations.

Representing a global network of excellence and expertise in their subject areas, the TWG members are nominated by their Governments and designated by the Secretariat.



Operational and Performance Databases

The IAEA hosts qualitative and quantitative platforms, promoting transparency of carbon neutral electricity production data from nuclear power programmes around the world. These databases serve both the expert communities and the public.

Power Reactor Information System (PRIS)

PRIS is the world's most comprehensive, authoritative and up-to-date database on nuclear power reactors worldwide. Developed and maintained by the IAEA for five decades, it is a reference tool used routinely by international organizations and the industry. PRIS contains quantitative information on power reactors in operation, under construction, or those being decommissioned. All information and data are collected by the IAEA through formal channels via data providers nominated by Member States. The PRIS database is publicly available and continuously updated.

<https://www.iaea.org/pris>

Country Nuclear Power Profiles (CNPP)

The IAEA also releases an annual publication, Country Nuclear Power Profiles, documenting the qualitative status and development of nuclear power programmes worldwide. The publication summarizes organizational and industrial aspects of nuclear power programmes, including information about relevant legislative, regulatory and international framework, across Member States that currently operate nuclear power plants or formerly operated nuclear power programmes and those constructing their first nuclear power reactors.

<https://cnpp.iaea.org/pages/index.htm>

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