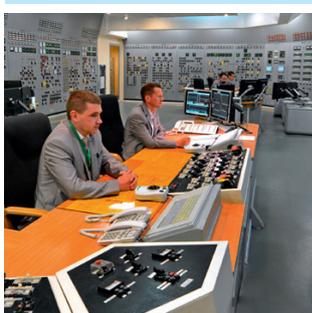
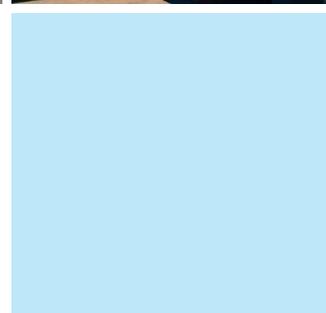
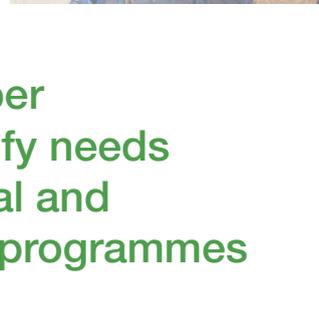
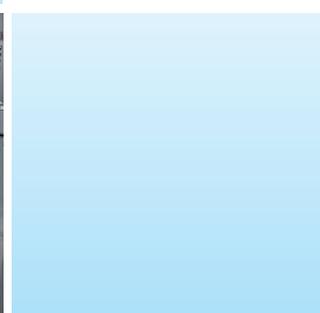
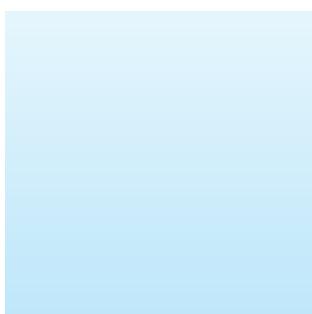
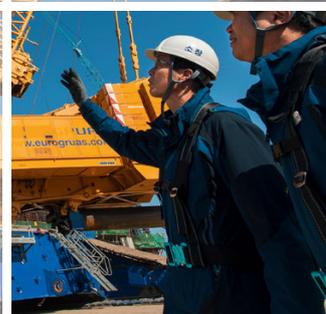


Nuclear Power Human Resource Model

Assists Member States
in human resource
development plans for new
nuclear power programmes

Supports assessment of
workforce needs for key
organizations in a nuclear
power programme

Helps Member
States identify needs
for vocational and
educational programmes



IAEA

International Atomic Energy Agency

The nuclear industry relies heavily on a specialized and highly trained workforce. Due to the high standards of competence and performance required to ensure safety and sustainability, and the considerable time needed to train such specialists, planning and managing human resources require particular attention.

The IAEA provides a modelling tool to help Member States understand their human resource requirements for a new nuclear power programme.



Planning for human resource development is an important component in the overall strategy for developing the infrastructure for a new nuclear power programme. When countries consider adding nuclear power to their energy mix, they need to know the number and types of qualified personnel that will be required to support the planning, procurement, construction, licensing, regulation, commissioning and operation of a nuclear power plant. The IAEA ‘Milestones’ approach indicates that planning for human resource development must be started at the earliest phases of a nuclear power programme.

The Nuclear Power Human Resource (NPHR) Model is a tool to assist Member States in examining their human resource development plans and requirements for new nuclear power programmes. Covering the complete programme life cycle, it can also be adapted to expanding nuclear power programmes and to those examining restarts or life extensions of nuclear power plants.

The model includes a simulation of a nuclear power programme as it progresses through the early phases of its development, through construction and commissioning, to nuclear power plant operation, and ultimately to shut down and decommissioning. It projects human resource needs at each stage.

It can be used in investigating staffing models for organizations contributing to the nuclear power programme, including the nuclear energy programme

implementing organization (NEPIO), regulatory body, owner/operator, and construction contractor. In addition, the model can be applied to examine nationwide education and training strategies, and take into account related industries that may provide or compete for workforce.

Data requirements

The NPHR model runs on a set of generic data, reflecting all aspects of a nuclear power programme and enabling the users to understand the workforce dynamics. It incorporates open source data on power plant staffing and construction workforce, which can vary greatly in the number and type of workforce needed. The model allows the user to select different staffing approaches to investigate their implications on the ability of the national workforce to support the nuclear power programme.

As countries develop their nuclear power programmes, they can tailor the datasheets to more accurately reflect their national situation. The skill sets required will differ from country to country and depend on the kind of reactor design used, as well as the existing national power and regulatory infrastructure. Planning is thus essential to ensure that the necessary education and training programmes are in place to provide qualified personnel.

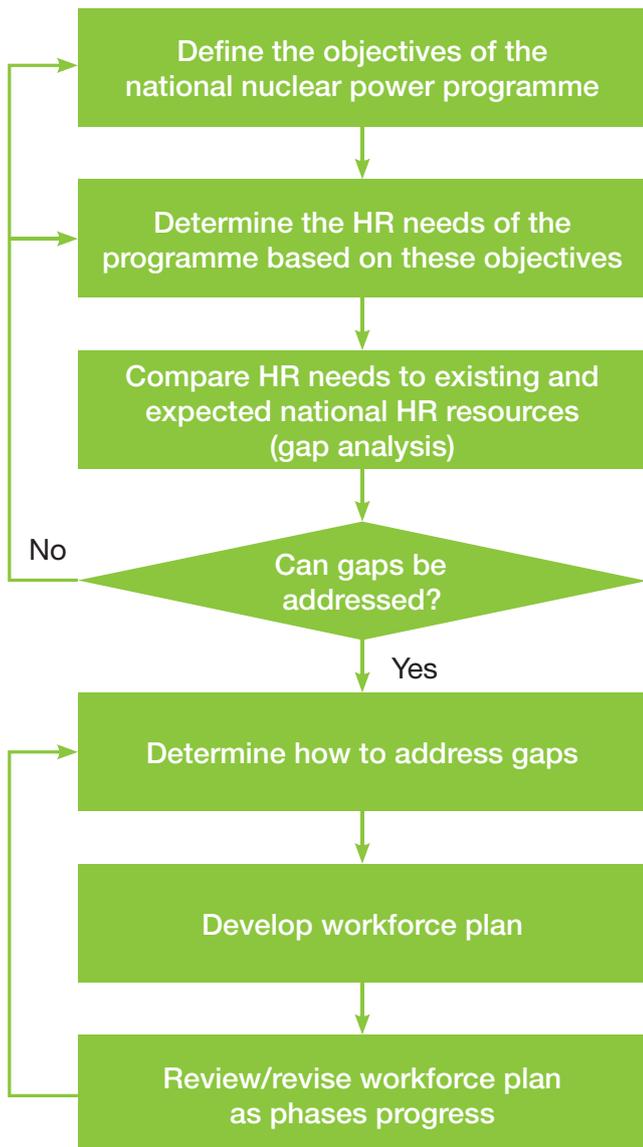


Technical details

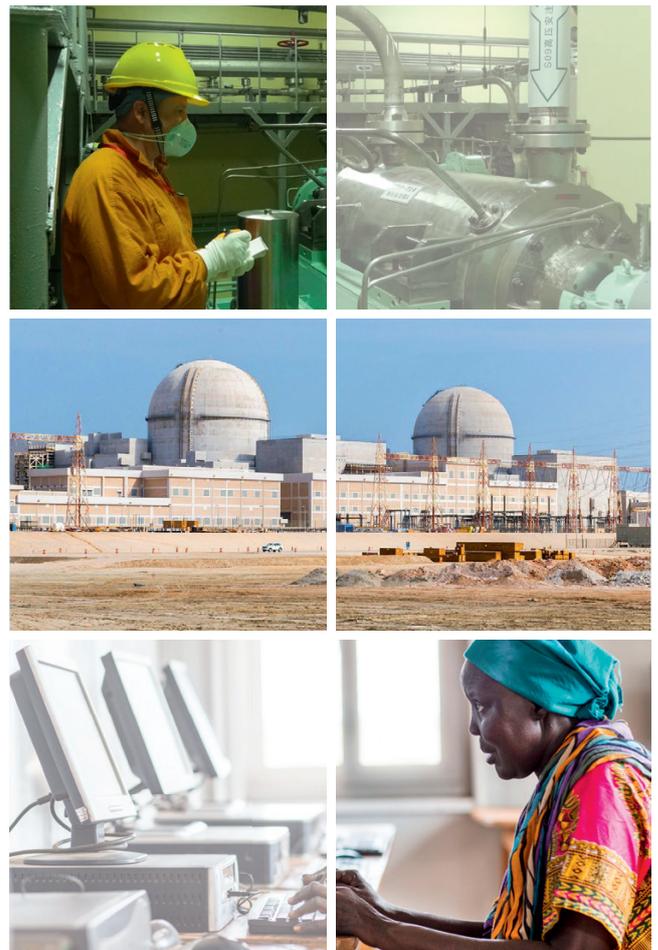
The NPHR Model is constructed in a commercial systems modelling package called Stella, marketed by *isee systems inc.* (iseesystems.com). A licence for Stella is required to work with the model, and data files are provided in Excel format. The stock and flow software allows building a model that visually depicts the movement of staff through the education and training system and into the nuclear workforce. The parameters that describe staff movement can be easily entered into the data file to customize the model for any IAEA Member State.

The flexibility of the NPHR model allows for users to add modifications, which can be used to include other associated parameters, such as cost.

The model can also communicate with external models and programmes (such as Microsoft Excel) for variable input and alternative visualization of results.



Simplified flow chart for a planning process for human resource development.



Training workshops

The IAEA offers training workshops on the use and modification of the NPHR model. They enable participants to tailor the model to reflect national circumstances and plans with the help of IAEA and international experts. The workshops also provide a unique opportunity to establish a dialogue between decision makers and analysts about developing the human resources required for a safe, secure and sustainable nuclear power programme.

The IAEA has provided the tool to numerous Member States and trained many national experts in its application.

Following the completion of a workshop, participants will be invited to join the NPHR Model Users Group on *LinkedIn*, where IAEA experts will be available to provide assistance. The user group will enable participants to improve their knowledge, share lessons learned, discuss common challenges and thus contribute to improving the model.



Related Publications

Milestones in the Development of a National Infrastructure for Nuclear Power

IAEA Nuclear Energy Series No. NG-G-3.1 (Rev. 1)

Workforce Planning for New Nuclear Power Programmes

IAEA Nuclear Energy Series No. NG-T-3.10

More relevant IAEA publications are available in the IAEA Nuclear Infrastructure Bibliography at:

<https://www.iaea.org/topics/infrastructure-development/bibliography>

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<https://www.iaea.org/about/organizational-structure/department-of-nuclear-energy/division-of-nuclear-power/nuclear-infrastructure-development-section>