IAEA

INTERNATIONAL CONFERENCE ON HUMAN RESOURCE DEVELOPMENT FOR NUCLEAR POWER PROGRAMMES
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Summary & Conclusions by the Conference President M. Ziakova

Conference Rapporteur: Peter Gowin

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Distinguished participants,

Thank you for participating in this conference and remaining until the end. I would like to begin my closing remarks by looking back four years. The 2010 conference on *Human Resource Development for Introducing and Expanding Nuclear Power Programmes* highlighted the importance of human resources, the need to broaden nuclear curricula, emphasized governmental and societal support, requested more cooperation in building human resources and proposed a follow-up conference to be held to monitor progress.

In response, the IAEA organized this conference we are about to conclude. It has focussed on capacity building, human resource development, attracting the next generation, education and training, nuclear knowledge management and knowledge networks. I am pleased to say that the conference was very successful. It was attended by more than 300 participants from 65 Member States and 5 international organizations, a very good turnout, and an increase from the 2010 conference. Participation was also very *broad* and covered all *types* of countries: newcomers, countries with expanding nuclear power programmes and 'mature' countries. It also covered all types of *institutions*: from industry to regulators to academia. This is clear evidence that capacity building and human resource development continues to be of high interest to many Member States.

Let us now review the work we have done in the course of the last five days.

One first insight is that the *drivers* for capacity building are manifold: countries with new programmes need to build up new capacity, countries with expanding programmes need to recruit additional workforce and countries with mature programmes need to ensure stable capacity and turnover. In addition, nuclear safety and security requirements provide strong drivers, and the importance of capacity building was rightly underlined in the IAEA Action Plan on Nuclear Safety.

A second insight is that in terms of nuclear activities, *the world has changed* since the 2010 conference. New nuclear power programmes have started in several countries, we see a continuing globalization in nuclear power, we expect the decommissioning of additional plants in countries with phase-out policies, and the Fukushima accident has led to additional lessons learned.

I am pleased that an *impressive number of activities in Member States* that address these challenges were presented, and that *the IAEA has responded* to these developments as well. In all areas we heard about this week – nuclear energy, nuclear safety and nuclear security – the IAEA has active programmes that support capacity building in Member States. New IAEA services and guidance have been developed, for example, the *Capacity Building Self-Assessment Methodology*. New *networks* have been established for nuclear education and training and nuclear safety and security. Other IAEA services continue to play an important role, for example, the expanding catalogue of

training and e-learning courses. The IAEA's Technical Cooperation programme will remain essential in this area.

Against this background, and while we will continue to need to learn from each other, we are now in a phase of *implementing* capacity building programmes based on *proven* mechanisms.

A third important insight is that capacity building programmes need to *cover the full scope of the nuclear programme*. They should encompass fuel, power and waste facilities; consider government, regulators, industry, academia and research; include all academic subjects needed; and cover nuclear programme management and outreach into society at large.

As a fourth insight, we heard this week that capacity building is a real need and is being addressed on many levels, which all need to be considered:

- **On the *individual* level**, development of staff and life-long learning are important. New multi-disciplinary curricula complement the traditional engineering curricula, and training schemes supplement university education.
- **On the *corporate* level**, we see a growing culture of corporate knowledge management and recruitment programmes. The nuclear sector at present offers a very supportive environment for young generation and new employees.
- **On the *national* level**, we heard about the importance of an integrated and comprehensive *national* approach for capacity building. The role of governments crucial for such an approach.
- **On the *global* level**, the globalization of the nuclear industry is mirrored by an increased *internationalization* of university programmes, recruitment and professional careers. A growing number of international cooperative programmes, for example in the area of networks in nuclear education, safety and security, were presented.

As a fifth insight, I would like to comment on progress made in *reducing boundaries between nuclear and non-nuclear professions*. Professionals *outside* the nuclear sector increasingly benefit from having basic knowledge of nuclear technology, safety and security, for example in governmental organizations, trade unions, commerce and local authorities, achieved and supported by training offers, proactive outreach and communication. *Nuclear professionals* in turn often have additional qualifications in non-nuclear subjects, such as law, economics, management, social sciences, communication and public administration, and we heard good examples of new or multi-

disciplinary curricula that support this trend. In addition to these challenges on the level of professionals, a greater general understanding by the public of of nuclear technologies was deemed desirable.

From the five sessions we followed in course of the past five days, we made the following important findings:

- *Human resource needs analyses* are now conducted more systematically both by mature and new nuclear programmes and sometime even at a regional level, e.g. Europe. These analyses are extremely useful to dimension education and training efforts in the short and medium term. Human resources are the backbone of every nuclear energy programme, and a significant variety of personnel in terms of skills and training are required.

- *Progress in human resource development* has been made by considering both vocational training and academic education; by considering interfaces between technical, safety and security issues; by recognizing the importance of non-nuclear knowledge and by reaching out to society.

- We heard several *good examples of managing and improving the education and training pipelines.* We looked at training needs analysis, the Systematic Approach to Training process, national programmes, and international support to newcomer countries. Key conclusions were that education and training is strengthening across all levels of the skills pyramid with good blending of theory, practical and hands-on experience.

- *Strategic outreach plans* are crucial for workforce development, commitment of the next generation and for building acceptance of nuclear energy. Organizations should maintain and further develop pathways "from education to employment" and be ready to inspire, develop and encourage the next generation. There is also a need to engage better with the public, so that dialogue with prospective future nuclear professionals becomes more attractive.

- Education and training programmes should *be integrated into an overall strategy* for building and maintaining capacity, supported by governments. For regulators, management of competencies is of particular importance, and the *Systematic Assessment of Regulatory Competence Needs* was presented as useful tool in that regard.

- *Networks* have become a proven and key mechanism to support knowledge sharing and capacity building and to foster harmonization and cooperation. A large number of successful existing and new networks working at corporate, national and international levels were presented this week.

- Nuclear programmes are large scale and long term. The *knowledge* required for the safe, reliable and efficient operation of nuclear facilities is an asset that should be properly managed. Knowledge management should address each area of a nuclear programme – from design through construction, commissioning, operation and decommissioning or closure of nuclear facilities. Proper knowledge management contributes to the meeting a company's strategic and business objectives. It is vital not only for operating, design and construction companies, but also for regulatory bodies and technical support organizations, and for countries with mature nuclear programmes as well as for newcomer countries.

Dear participants,

The IAEA is to be commended for this timely and fruitful conference, organized jointly by the Departments of Nuclear Energy and Nuclear Safety and Security. The conference concluded that capacity building is a major and important step in the process of ensuring a sustainable supply of qualified human resources for safe, secure and sustainable nuclear power programmes.

The IAEA is invited to further develop its support for capacity building, to document good practices, to continue to develop tools and guidance, to provide services and assistance and to continue to facilitate international coordination and cooperation.

Member States, in turn, are invited to join existing networks and *make use of available IAEA services,* including the new *Capacity Building Self-Assessment Methodology*.

There have been significant, practical developments since the 2010 conference and we all look forward to the next occasion to continue our discussions, possibly at another follow-up conference in about four or five years from now.

My thanks go in particular to all speakers, session chairs and co-chairs and to the conference rapporteur. I also thank all participants for their valuable time, attendance and contributions.

It was your participation that made this conference a success.

Thank you.