

**Fukui International Meeting on Human Resources Development for  
Nuclear Energy in Asia**

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Organized by Fukui Prefectural Government and Wakasa Wan Energy  
Research Center (WERC)

In cooperation with the International Atomic Energy Agency (IAEA)

**Human Resource Development for  
Nuclear Power Programmes:  
The IAEA Perspective**



**IAEA**

International Atomic Energy Agency

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# Presentation Contents

- DG note
- Human Resource Development (HRD) in the **context of the Milestones' Approach**
- IAEA Guidance and Support on HRD
- Additional material and information

# From the DG

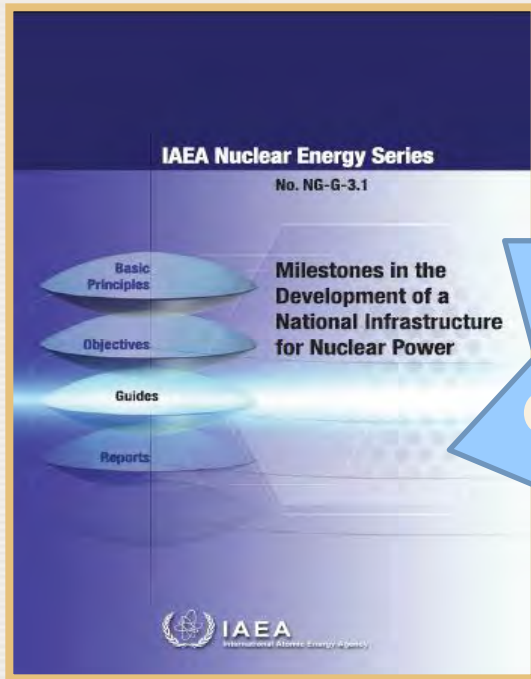


*"Nuclear power remains the best known application of nuclear technology. Our programme of assistance to both newcomers and established users of nuclear power will continue to grow."*

**Yukiya Amano**

**IAEA Director General**

# Milestones' Approach to Nuclear Power



Phased  
Comprehensive  
Integrated



# 19 Infrastructure Issues



New Start



- National position
- Nuclear safety
- Management
- Funding and financing
- Legislative framework
- Safeguards
- Regulatory framework
- Radiation protection
- Electrical grid
- **Human resources development**
- Stakeholder involvement
- Site and supporting facilities
- Environmental protection
- Emergency planning
- Security and physical protection
- Nuclear fuel cycle
- Radioactive waste
- Industrial involvement
- Procurement

# Management responsibilities for HR

- Senior management should ensure that the necessary individual competences are available for the effective and efficient operation of the organization.
- Senior management should evaluate both present and expected needs for competences against the competences already available in the organization.

## WORKFORCE PLANNING

*(IAEA Safety Guide GS-G-3.1 Application of the Management System for Facilities and Activities)*

# Key Challenges for HR

- Key challenge is to achieve the initial **competence**, and then **sustainability**, of sufficient Human Resources to support a nuclear power programme.
- Requires the coordination and cooperation of all national stakeholders (**government**, education sector, industry, vendor, suppliers, international bodies).

# HR Strategy

- If in the past HR was just an admin process, today it is considered a strategic tool to achieve business objectives
  - HR strategy and plan is needed to ensure the availability of the necessary human resources to enable the organisation to meet its business objectives.
  - To do this, the HR strategy must be a firmly integrated part of the business strategy and fully aligned to its goals.



# “Real World” Experience

- Many newcomer countries take a bottom-up approach and look at what resources they have and will recruit in the short/medium term, but many of the key programme linkages are not clear at this level.
  - However, it is necessary to begin with the Nuclear Power Programme goals, and the roles and responsibilities of the various stakeholders in delivering those goals, i.e. a top-down approach.
  - Otherwise the programme is driven by the availability of human resources and not the other way round.
- Senior decision makers have to recognise the need to invest in HR early to secure other programme goals.

# Key Programme Drivers

- Programme size
- Contractual arrangement (BOO, BOOT, Turnkey, etc.)
- Scope of HR support in vendor contract
- Regulatory approach
- Training lead times
- Quality of existing HR infrastructure (secondary education, vocational training, university programmes)
- Scope of existing industrial infrastructure
- Project language

# Steps to build Sustainable Human Resources

Consistent with the programmatic objectives (and schedule) just described, there are three main steps to achieving sustainable ***competence*** in Human Resources for any programme:

1. Develop the necessary Infrastructure
2. **Build Capacity (create a 'pool' of resources)**
3. Develop and sustain competence

# 1. Develop Infrastructure

- Secondary (and primary) education system with strong maths and sciences components, to prepare for, and stimulate interest in, Science and Engineering careers.
- Technical/Vocational schools to create good skilled artisans/technicians in different engineering and technical disciplines.
- University programmes for (nuclear) Engineering and Science professional staff and allied professions (and allied professions e.g. Chemistry, Business, Finance, Human Resources, etc.).
- **Creating 'Outreach' programmes to engage students in nuclear programmes and stimulate career interest.**

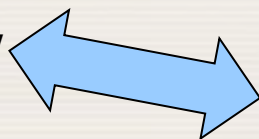
# 2. Build Capacity



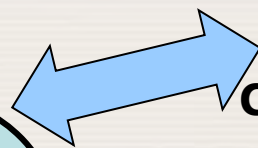
# 3. Develop and Sustain Competence

## Capacity Building – National Environment

National  
Capability/  
Needs



Workforce  
Planning



National/International  
Education & Training  
Capability/Requirements

Retirement

Organisational Internal

Recruitment

Succession  
Planning

Career  
Management

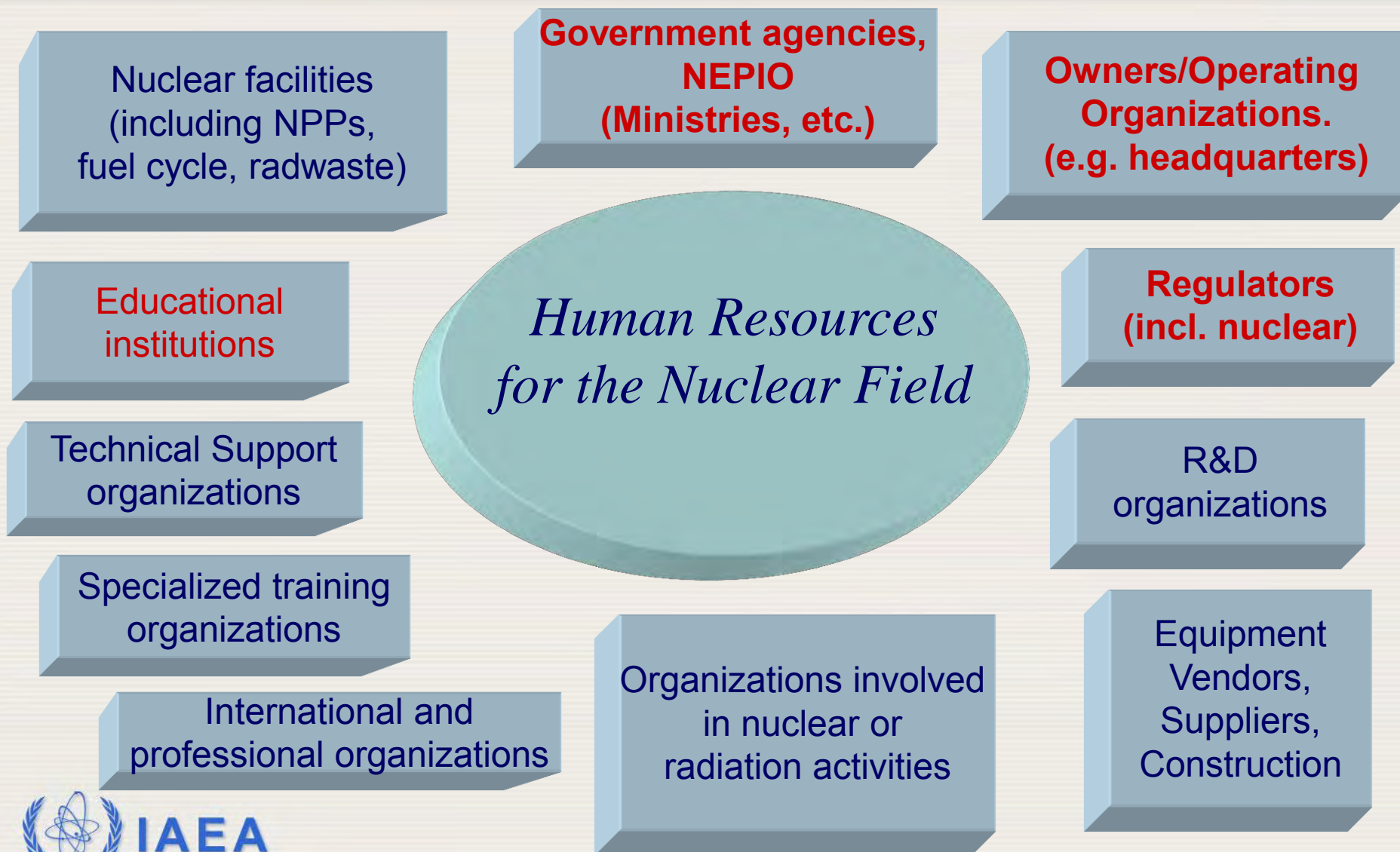
Training &  
Development

Remuneration

Performance  
Management

Human Resource and Knowledge Management

# Organizations with HR Requirements



# Workforce Planning

*"The systematic identification and analysis of what an organization/nation is going to need in terms of the numbers, type, and quality of workforce to achieve its objectives"*

*(IAEA NE Series Report NG-T-3.10 on Workforce Planning for New Nuclear Power Programmes)*

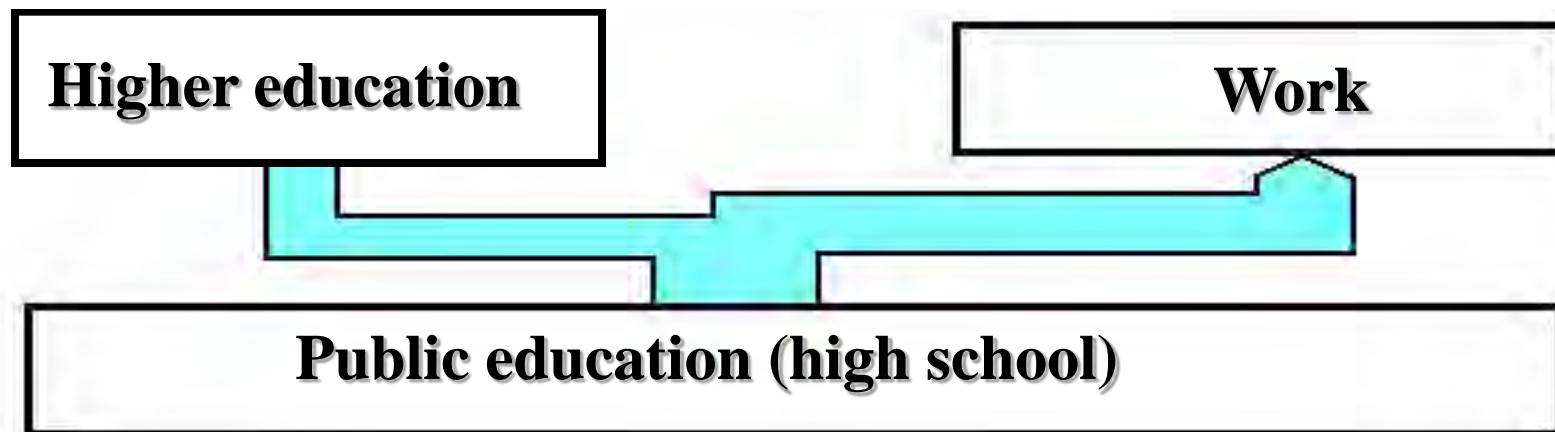
Identifies the steps that should be taken to get the **right number** of the **right people** in the **right place** at the **right time**.



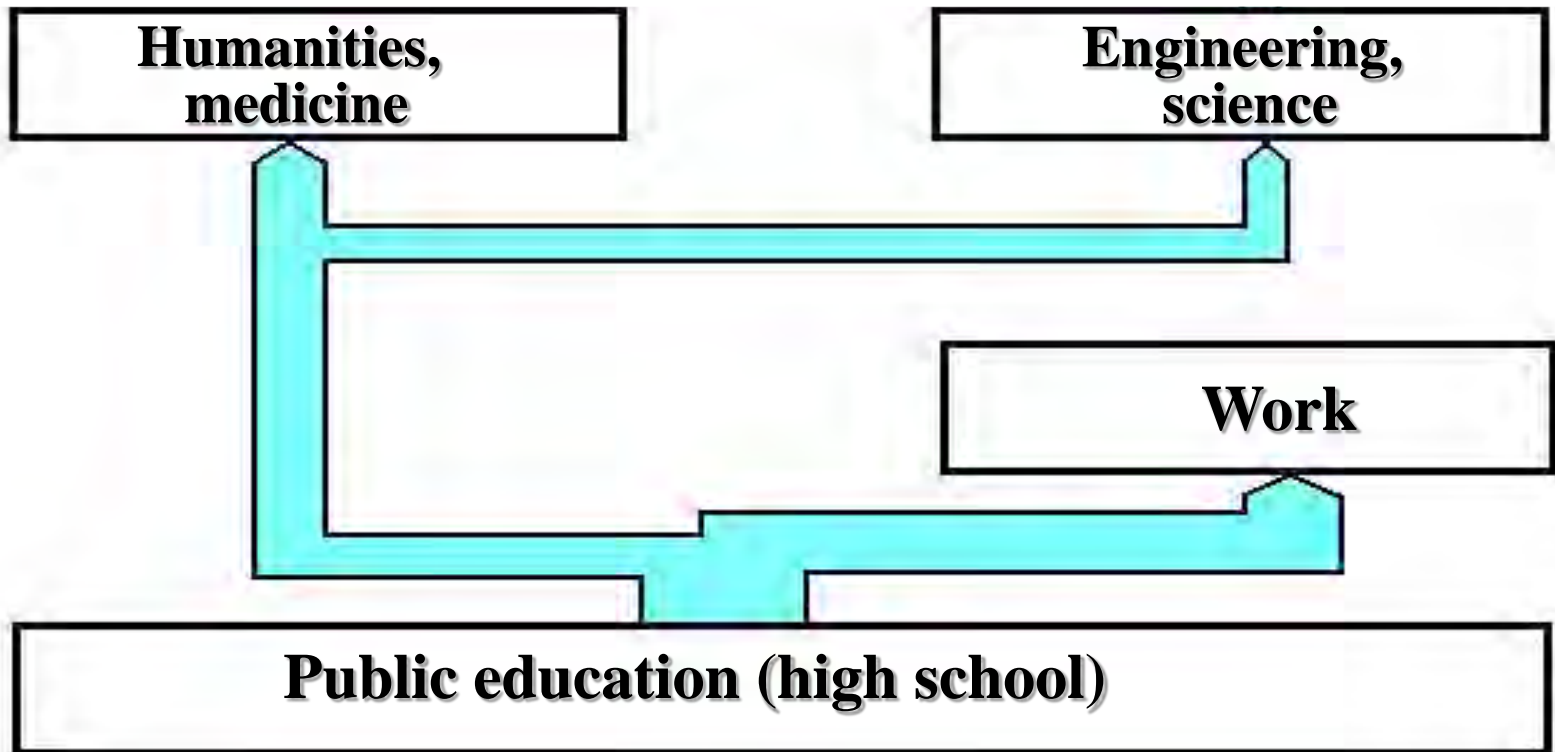
# Workforce Planning – Key Issues

- To define the objectives of the Nuclear Power Programme as they will influence the competencies to be acquired by the Member State
  - How many units
  - What type of contract (Turnkey, BOO, BOOT)
  - Level of industrial involvement
- Member States must be realistic about the gaps in national capability and the potential to close them.
- For effective Workforce Planning define the roles, responsibilities and functions of all the stakeholder organizations (even if not yet established) in Phase 1.

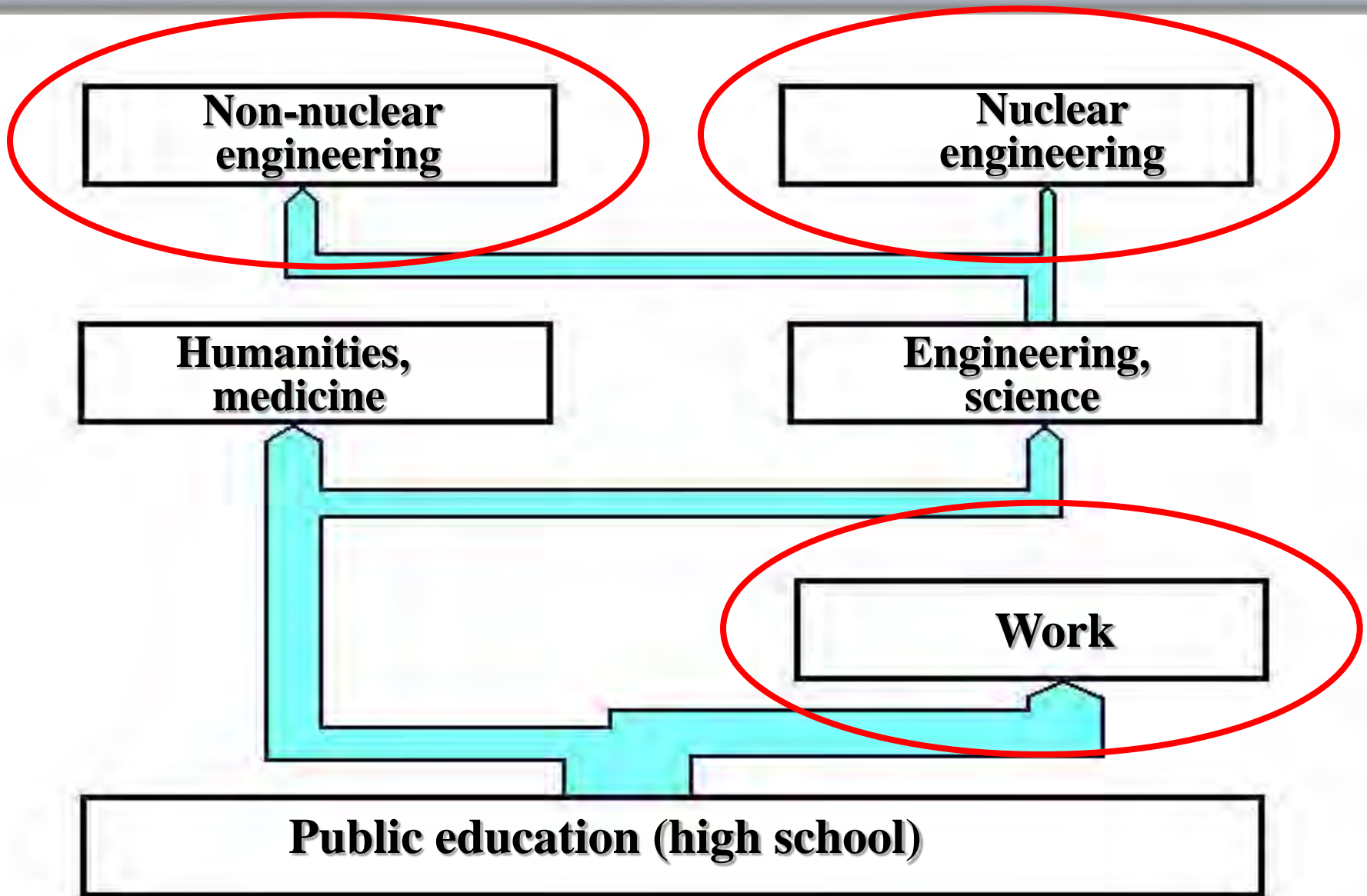
# Nuclear Workforce “Pipeline”



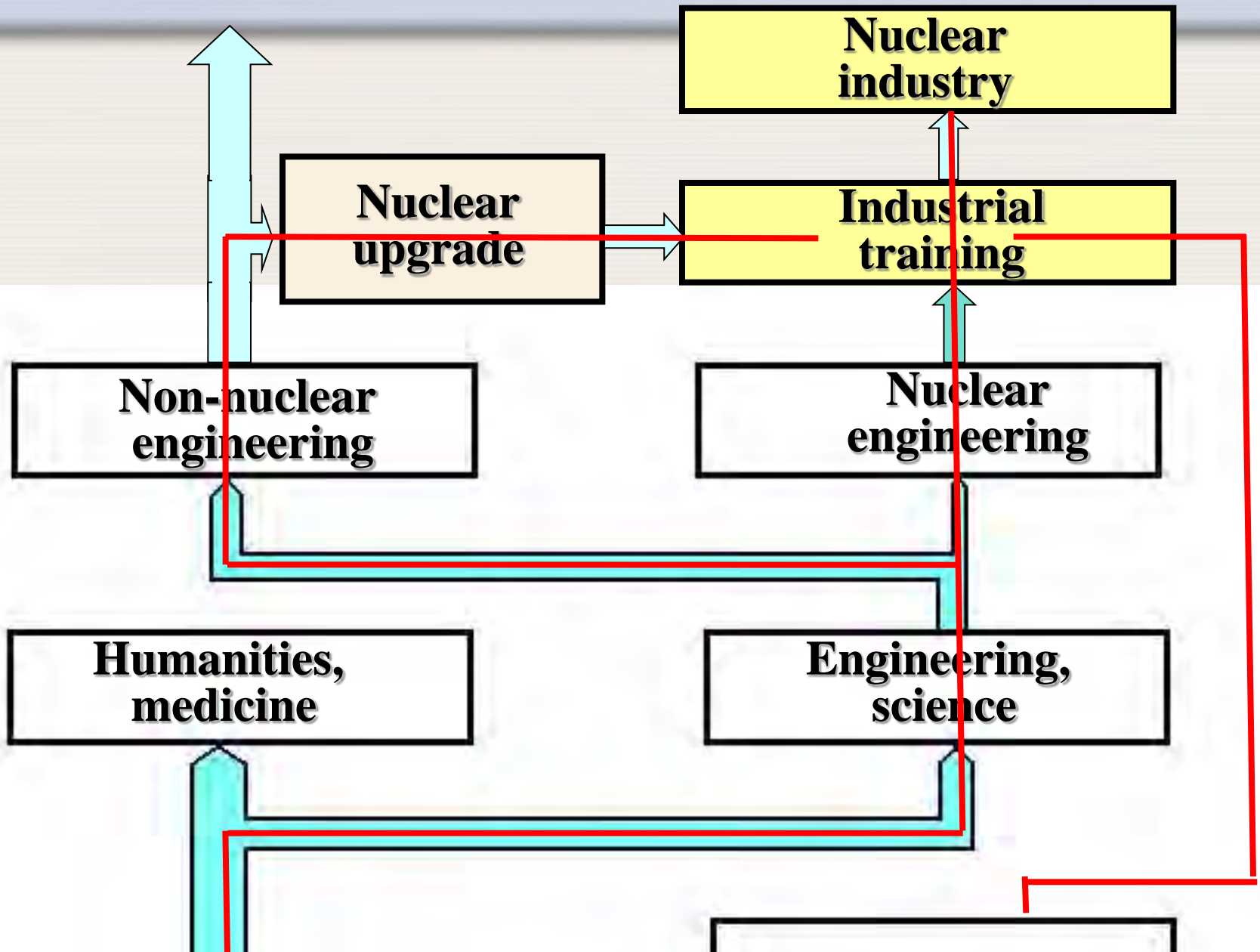
# Nuclear Workforce “Pipeline”



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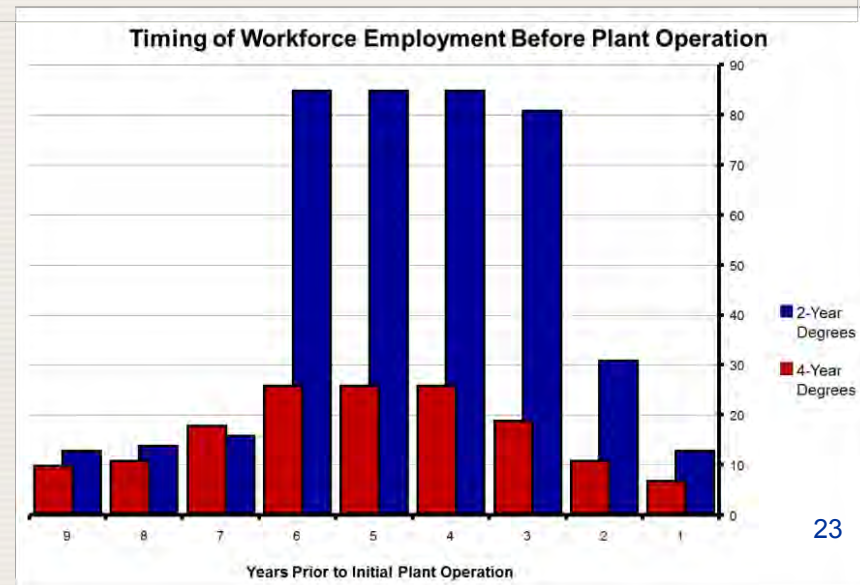
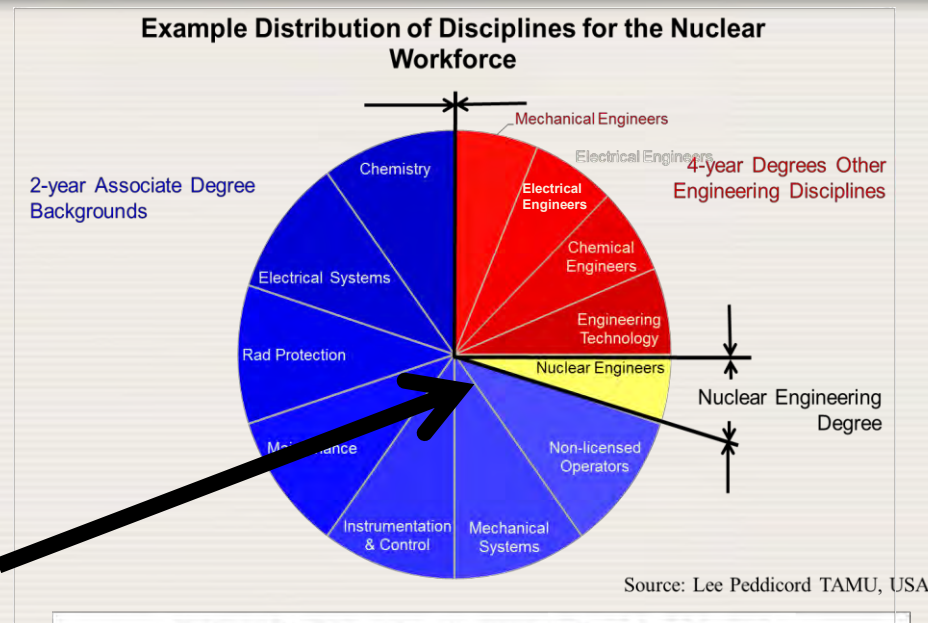


# Nuclear Workforce Development

- Process starts with Secondary Education system, to ensure enough interest in science and engineering among the population (Outreach)
- Education and Training requires an integrated approach and must be industry focused (Connectivity)
- **Technical staff training should be 'work based', supported by flexible education opportunities (Part-time, 'E-learning'?)**
- Such an approach, if correctly implemented, provides an opportunity for increasing Public Support (Stakeholder Involvement)

# Education and Training Considerations

- Majority of permanent workforce is needed for the Operating Organization, once NPP is commissioned; typical workforce for a 2-Unit NPP is 600-1200 personnel
- Around 65 - 80% of workforce are required at non-graduate level i.e. **'Technicians'**
- Of the graduate workforce (20 – 35%) only around 20% (or ~ 5% of total workforce) need a Nuclear engineering background
- Training/experience requirements for very specialist roles can be 5-10 years
- In Regulatory Body, % of Graduates is much higher (> 50%) but specialist Technicians still needed



# IAEA HR Support

- Workforce Planning Workshops offered in cooperation with Technical Cooperation Programme at National and Regional level, tailored to meet **Member States'** specific needs
- Capacity Building Concept and Self-Assessment Methodology – workshops to assist Member States
- Review services to assist in developing and evaluating national HR strategies and plans
- Nuclear Power Human Resources (NPHR) Modelling Tool developed and currently being rolled out
- New e-Learning Programme based on **Milestones'** Approach



# E-learning for new builds!

New e-learning programme on implementing a nuclear power programme, including:

- *Milestones' Overview*
- *Developing a HR strategy*
- *Stakeholder Involvement*
- *Programme Management*
- *Construction Management*
- *SAT*
- *Feasibility Study*
- *Management Systems*
- *Emergency Preparedness Response*
- *Safeguards*
- *Nuclear Safety*

A screenshot of the IAEA website's "Nuclear Power (NENP)" section. The page has a blue header with the IAEA logo and navigation links. A search bar is visible. The main content area is titled "Nuclear Power (NENP)" and includes a sidebar with a navigation menu. The "E-learning" option is highlighted. The main content features a video player with the title "E-learning for Nuclear Newcomers" and the question "Is your country considering nuclear power?". Below the video, there is a section for "E-learning Modules" with two thumbnails for "Module 1" and "Module 2".

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## E-learning for Nuclear Newcomers

Is your country considering nuclear power?

The IAEA is here to help!

We have created an interactive e-learning series explaining the IAEA's Milestones Approach to introducing a nuclear power programme. This approach is based on three phases and covers the 19 infrastructure issues that need to be addressed, and brings decades of expertise to life. Both newcomers and those expanding their nuclear power programmes may benefit from the e-learning series.

## E-learning Modules

We have developed several interactive and engaging e-learning modules for nuclear power development:

Module 1: Implementing a Nuclear Power Programme - Introduction

Module 2: Welcome to the human resources development module

# IAEA HR Guidance

- IAEA NE Series Report ([NG-G-2.1](#)) “Managing Human Resources in the Field of Nuclear Energy”, 2009
- IAEA NE Series Report ([NG-T-3.10](#)) “Workforce Planning for New Nuclear Power Programmes”, 2011
- Capacity Building Concept and Self-Assessment [Methodology](#)
- HR Roadmap - High level ‘brochure’ for senior decision makers under development
- New document with ‘working level’ guidance on staffing 1st NPP – draft developed

# Summary

- HRD is a **'cross-cutting'** issue, impacting on all aspects of nuclear infrastructure.
- Key role of the Government.
- Synchronization between HR Strategy and Programme/Project requirements.
- HR Strategy and Infrastructure must be developed early including vendor support requirements.
- Education, training and experience lead times can be up to 5 – 10 years for key positions.

# Summary

- However, majority of workforce are not graduates and attention must be paid to vocational workforce development.
- Job specific training programmes must be developed based on the Systematic approach to Training (SAT).
- Training is a continuing process and some job positions require relicensing on a certain frequency.

# Thank you and...see you in May!

## International Conference on Human Resource Development for Nuclear Power Programmes: Building and Sustaining Capacity

Strategies for Education and Training,  
Networking and Knowledge Management

12–16 May 2014, Vienna, Austria



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