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Joint ICTP-IAEA School on Nuclear Energy Management

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Workforce Planning for New Nuclear Power Programmes

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Joint IAEA/ICTP

School of Nuclear Energy Management

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Workforce Planning for New Nuclear Power Programmes

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IAEA

International Atomic Energy Agency

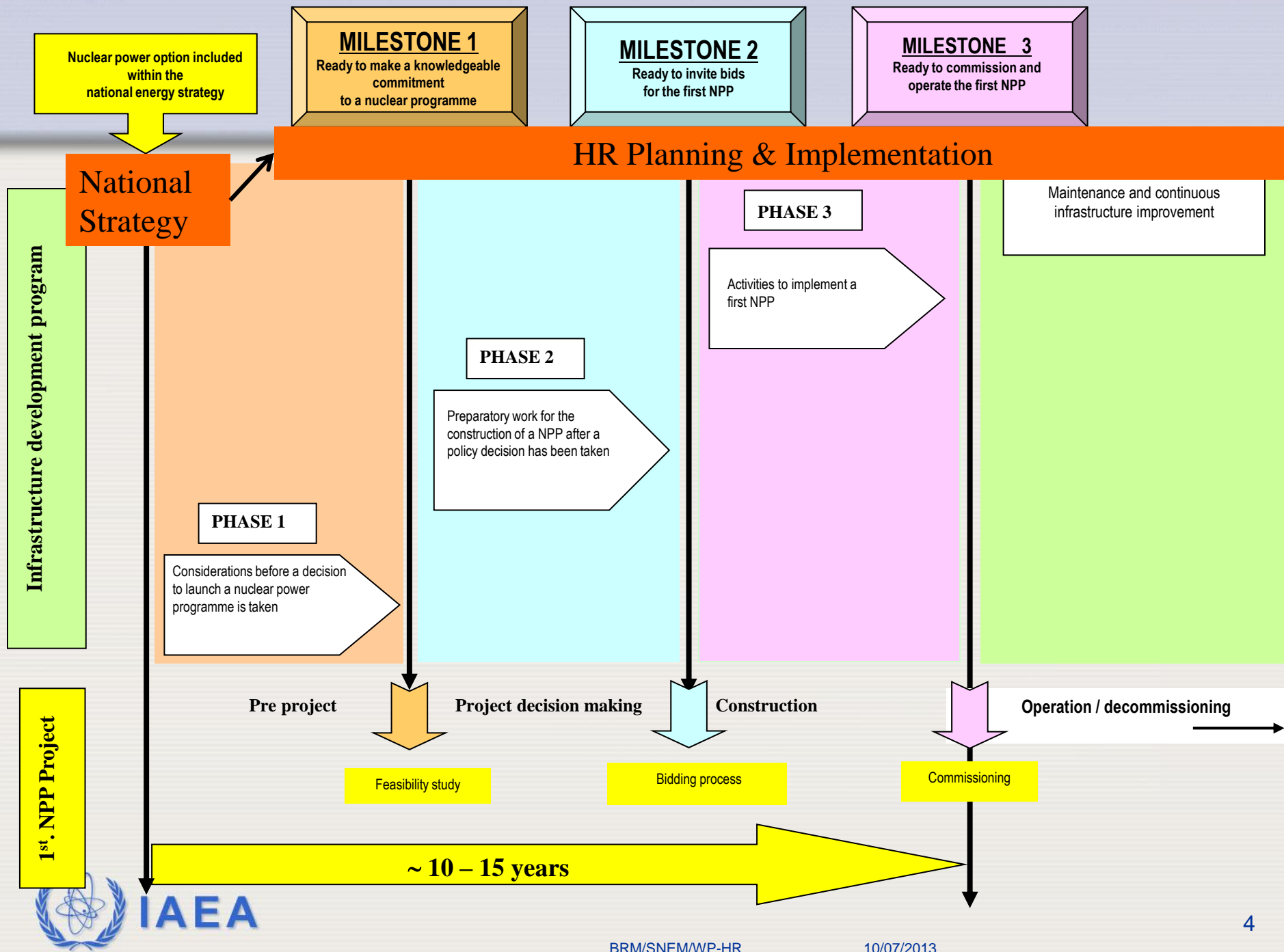


SESSION OVERVIEW

- The Human Resources 'Roadmap' – developing a national Human Resources Strategy
- Human Resources requirements – Workforce Planning
- Breakdown of Workforce types
- IAEA guidance and support

KEY CHALLENGE FOR HUMAN RESOURCES

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



KEY INFRASTRUCTURE ISSUES

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

Note: All 19 issues have a Human Resource component

HUMAN RESOURCES 'ROADMAP'

There are three main steps to achieving sustainable **competence** in Human Resources for any programme:

1. Developing the necessary Human Resources Infrastructure
2. Building Capacity
3. Developing and sustaining **competence**

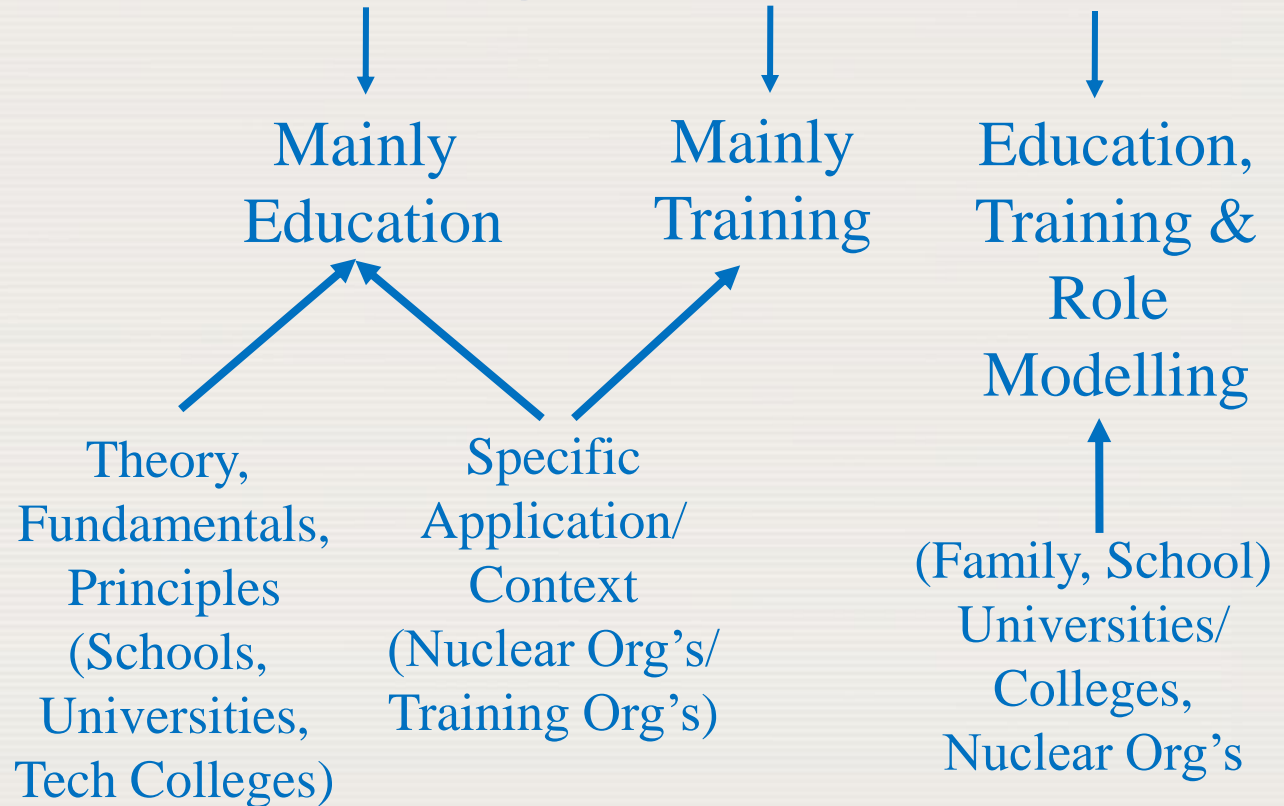
COMPETENCE

*A combination of **knowledge, skills and attitudes** in a particular field, which, when acquired, allows a person to perform a job or task to identified standards.*

Competence (Competency) may be developed through a combination of education, experience and training.

COMPETENCE

Competence = Knowledge + Skill + Attitudes



1. HUMAN RESOURCES INFRASTRUCTURE

- Secondary (and primary) education system with strong maths and sciences components, to prepare for, and stimulate interest in, Engineering careers
- Technical/Vocational schools to create good skilled artisans/technicians in different engineering and technical disciplines
- University programmes for (nuclear) Science and Engineering professional staff (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. CAPACITY BUILDING



3. BUILDING & SUSTAINING COMPETENCE

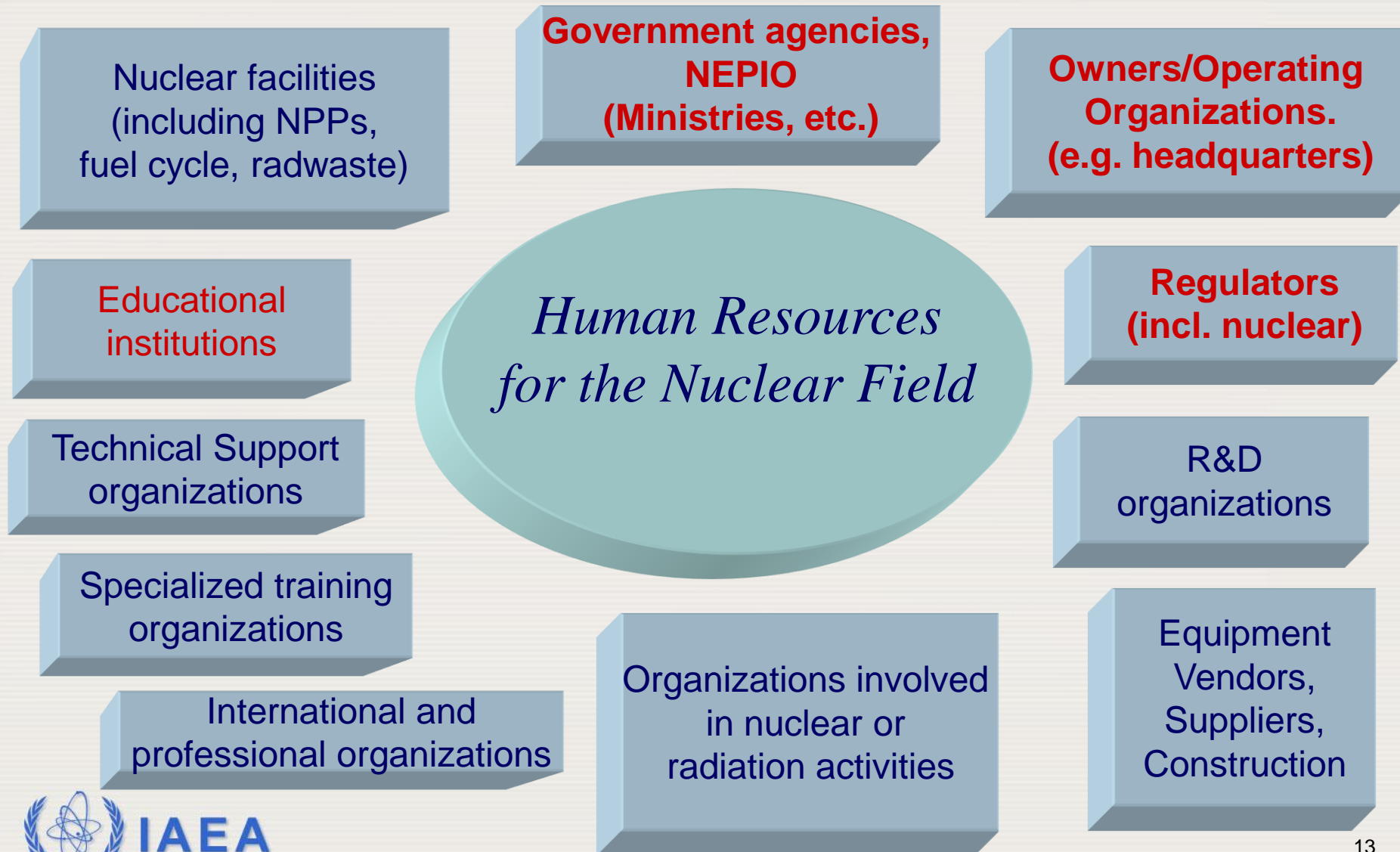


WORKFORCE PLANNING:

“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.”

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

ORGANIZATIONS WITH HR REQUIREMENTS



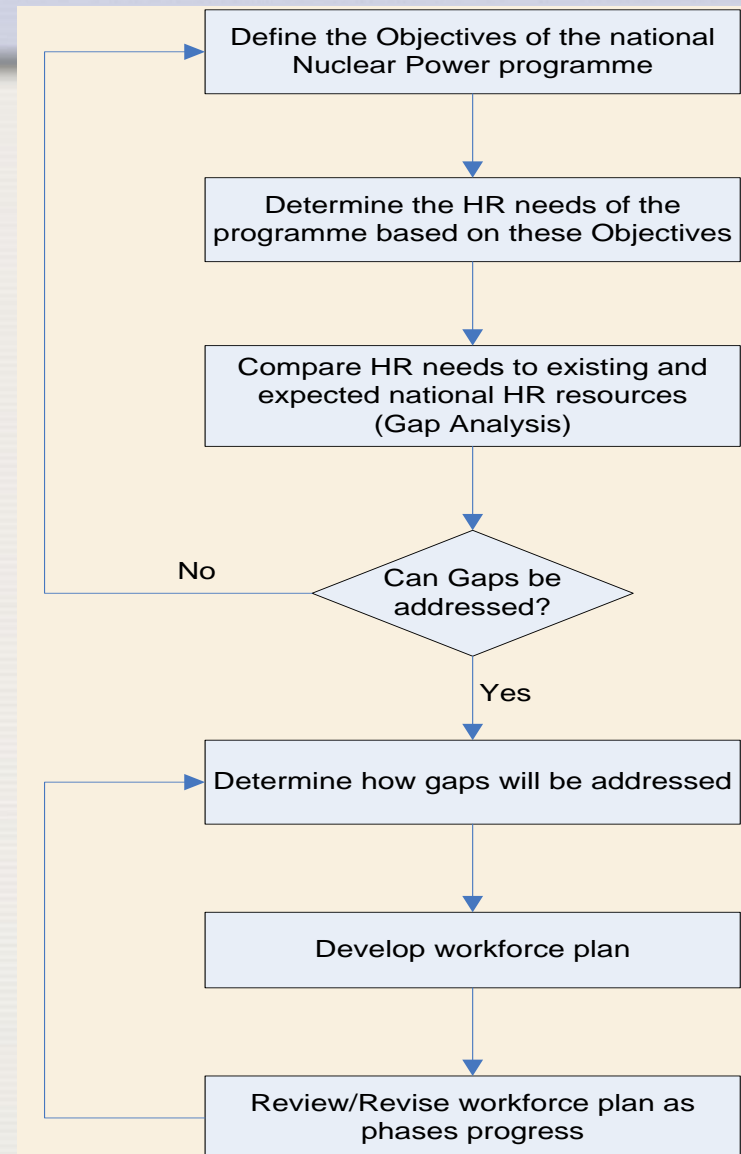
IAEA FOCUS ON WORKFORCE PLANNING

- Addressing the Workforce requirements for each of the three phases focusing on 3 main organisational entities identified within the “Milestones” document:
 - NEPIO
 - Regulatory Body
 - Operating Organisation
- IAEA focus especially on Phases I & II, recognising that Vendor(s) may provide significant assistance for Operating Organisation during Phase III.
- IAEA is not an appropriate source of nuclear ‘technology’ training
 - This should be provided nationally/by the Vendor
 - focus is on Programme and Infrastructure Management

(IAEA NE Series Report (NG-T-3.10) Workforce Planning for New Nuclear Power Programmes Feb 2011)

WORKFORCE PLANNING – KEY ISSUES

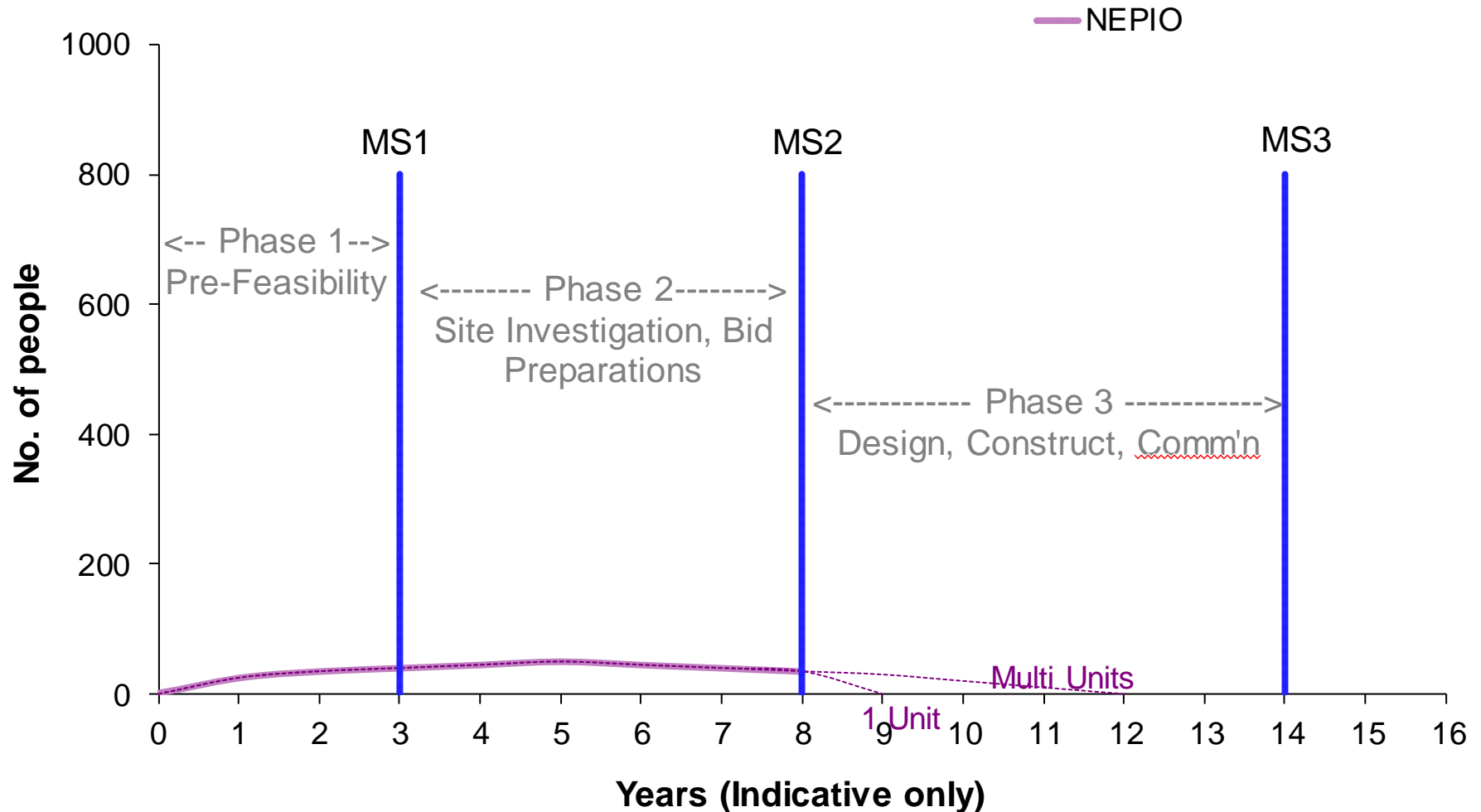
- Define the objectives of the Nuclear Energy programme as this will influence the competencies to be acquired by the Member State
 - How many units
 - What type of contract (Turnkey, BOO, BOOT)
 - Level of industrial involvement
- Member States must be realistic about the gaps in national capability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



WORKFORCE PLANNING – RESPONSIBILITIES AND RESOURCE REQUIREMENTS BY ORGANISATION

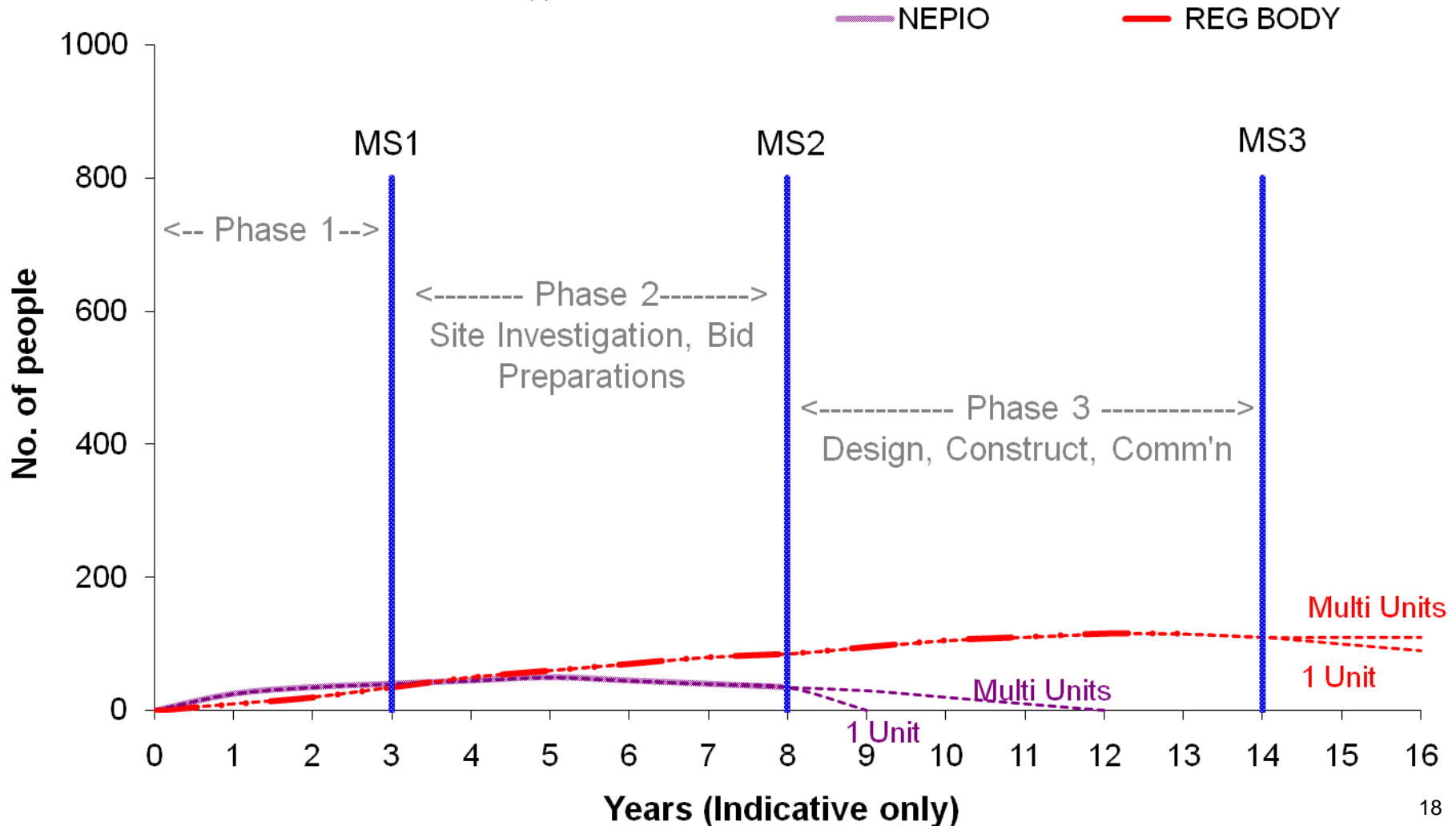
RESOURCE REQUIREMENTS FOR NEPIO

1. NEPIO = 10 --> 50 (Depending on Expert Group Support) --> 0 (close to)



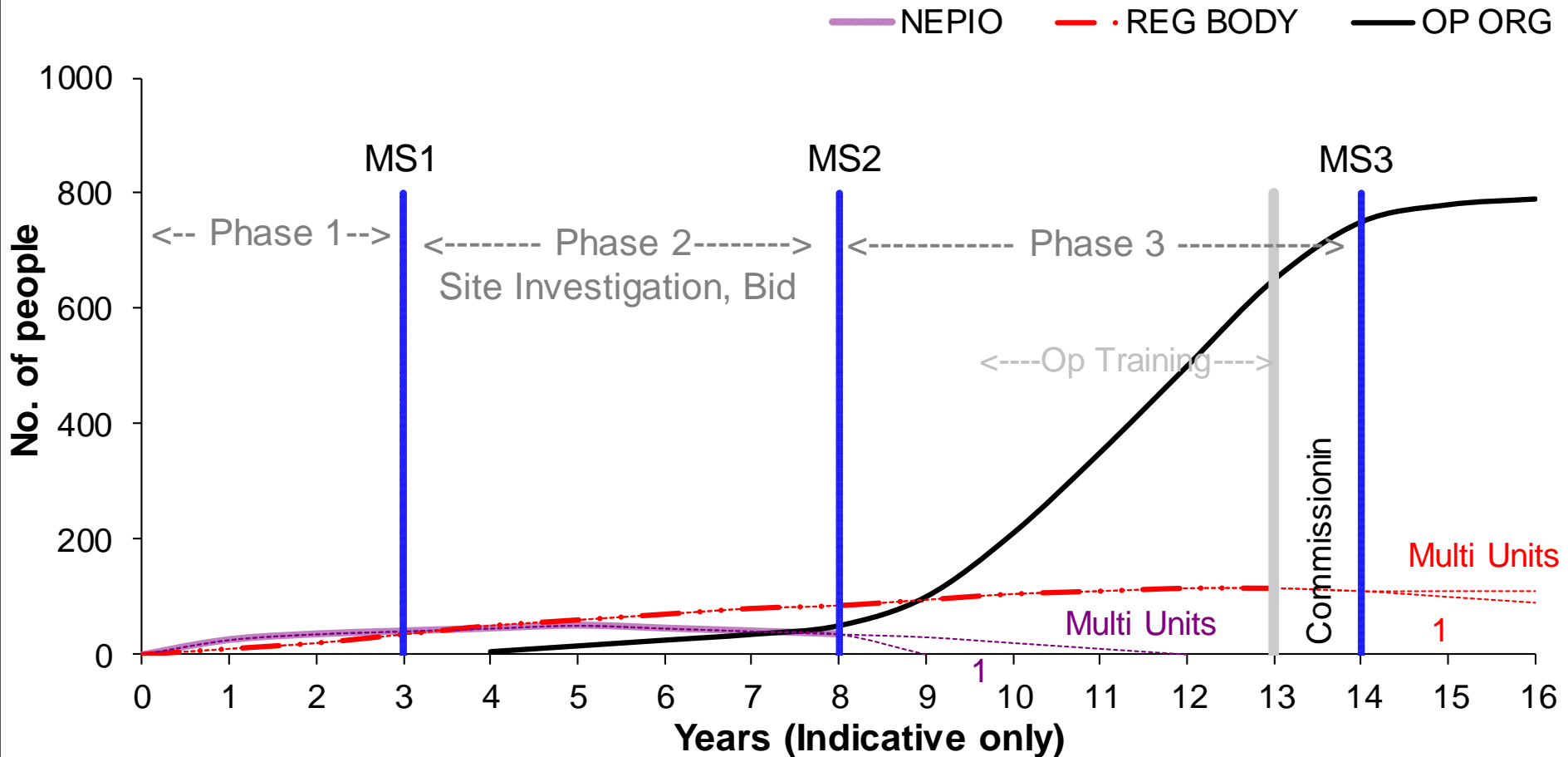
RESOURCE REQUIREMENTS FOR REG BODY

1. NEPIO = 10 --> 50 (Depending on Expert Group Support) --> 0 (close to)
2. REG BODY = ' 50 - 150 Tech Support



OVERALL RESOURCE REQUIREMENTS

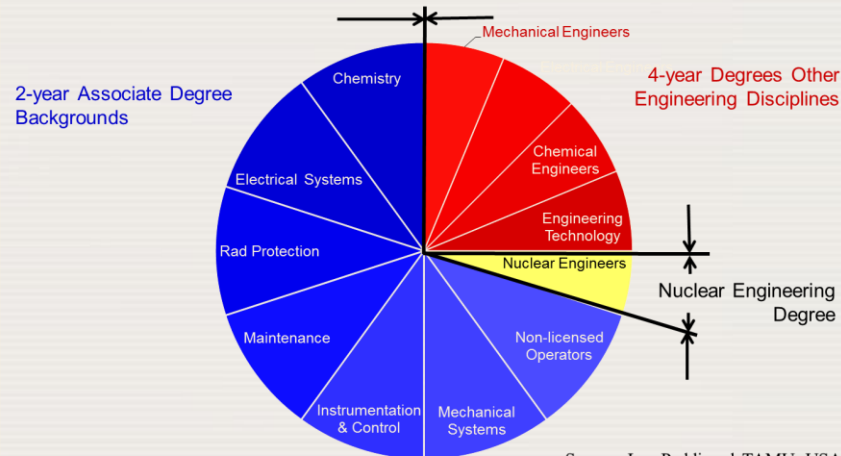
1. NEPIO = 10 --> 50 (Depending on Expert Group Support) --> 0 (close to)
2. REG BODY = 50 --> 150+Tech Support
3. OP ORG = 0 --> 20 to 30 --> 600 to 1200 (2-Unit site)



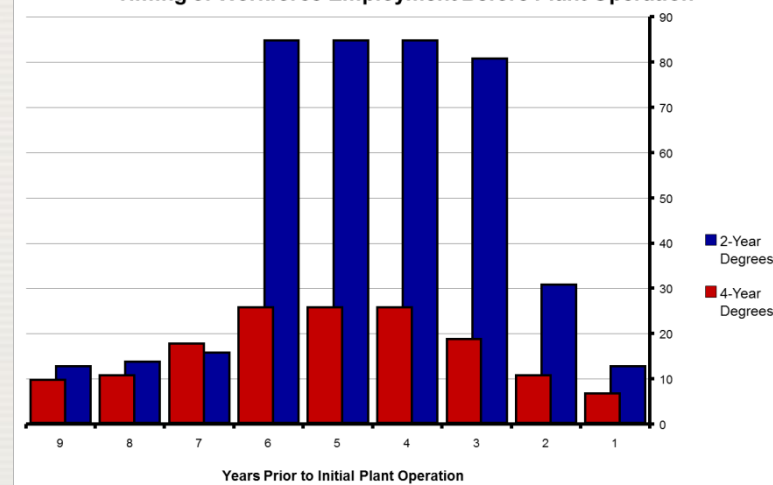
KEY EDUCATION AND TRAINING CONSIDERATIONS

- Majority of permanent workforce is needed for the Operating Organisation, 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

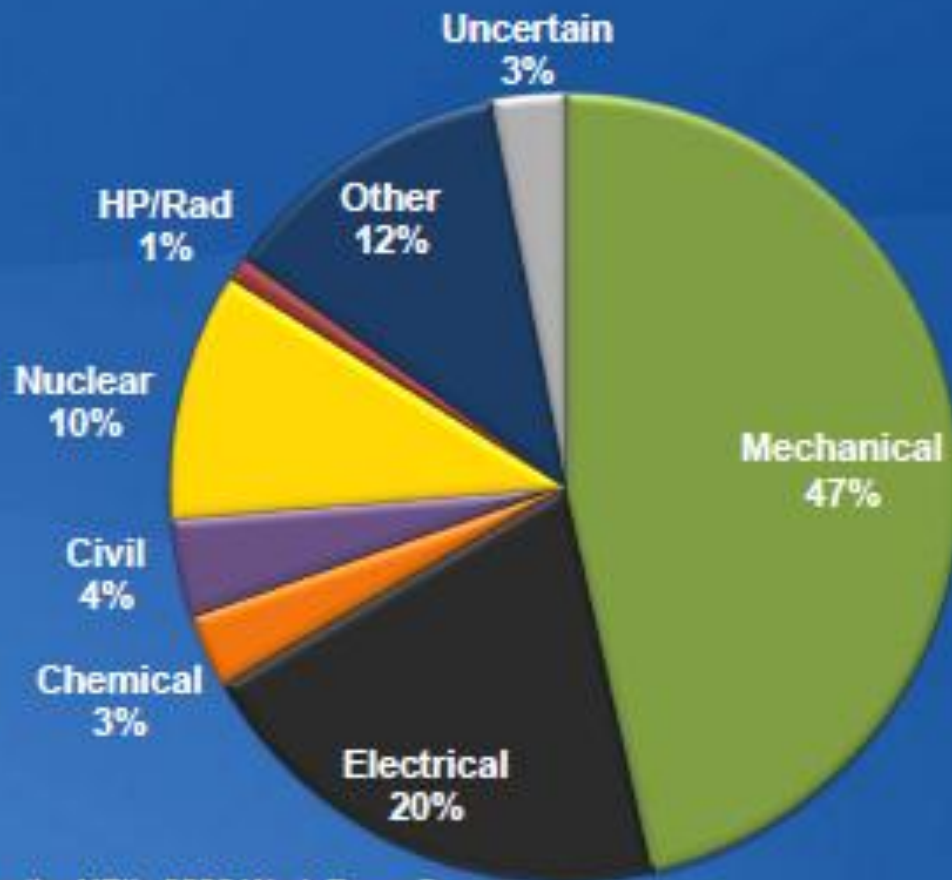
Example Distribution of Disciplines for the Nuclear Workforce



Timing of Workforce Employment Before Plant Operation



Commercial Nuclear Power's Demand for Engineers by Degree

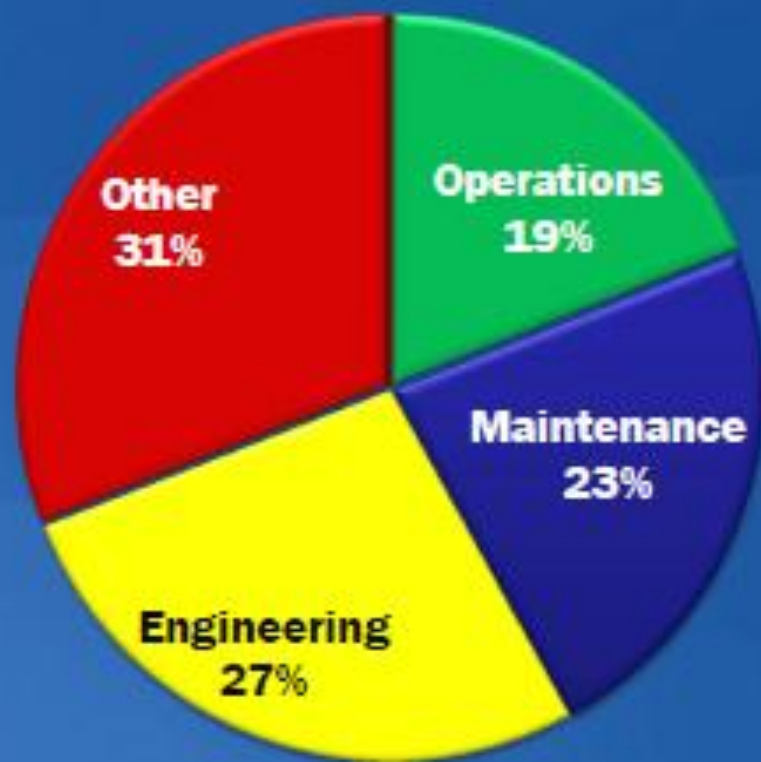


Data is from the NEI's 2008 Work Force Survey.

Additional Nuclear Engineers would be accepted if they were willing to work in systems engineering, design engineering and the operations department.

Commercial Nuclear Energy 2011 Hiring

The commercial nuclear energy industry hired over 5,000 individuals in 2010.



Source: 2011 NEI's Nuclear Workforce Pipeline Survey Results

KEY CHALLENGES

- Capacity Building and Sustainability
 - Developing, and maintaining, an appropriate secondary and tertiary education system
 - Established appropriate, complementary, tertiary education and training
 - Managing ‘brain drain’, esp for developing countries
- Cooperation of key stakeholders at the national level
- Establishing Regional Cooperation
 - Every Member State wants to host facilities
 - Need to look at developing complementary centres of excellence
- Developing ‘Intelligent Customer’ capability in terms of relationship with, and support from, vendors for Human Resource development needs

IAEA GUIDANCE & SUPPORT

- New e-learning programme on implementing a nuclear power programme, including a module on developing a HR strategy (available) and one on SAT (under development)
<http://www.iaea.org/NuclearPower/Infrastructure/elearning/index.html>
- IAEA NE Series Report (NG-T-3.10) “Workforce Planning for New Nuclear Power Programmes”, Feb 2011
- Capacity Building Concept and Self-Assessment Methodology – workshops available to assist Member States
- HR Roadmap - High level ‘brochure’ for senior decision makers under development
- New document with ‘working level’ guidance on staffing 1st NPP – outline prepared

IAEA GUIDANCE & SUPPORT (cont'd)

- Workforce Planning Workshops offered in cooperation with TC Department at National and Regional level, tailored to meet MS' specific needs
- Review service to assist in evaluating national HR strategies and Plans
- Nuclear Power Human Resources (NPHR) Modelling Tool developed:
 - Originally developed by LANL and donated to IAEA by US Government
 - Generic model for a nuclear workforce, including Education system, Regulatory Body, Construction workforce, and Operating staff
 - Training provided by IAEA to enable MS to tailor model to their own national situation
 - Priority given to 'advanced' newcomer countries.
- TM on Human Resources Roadmap 1 - 4 Oct, in Vienna.

THANK YOU..... ANY QUESTIONS?



...atoms for peace.

<http://www.iaea.org/NuclearPower/Infrastructure/elearning/index.html>