

**Regional Training Course on Management Systems  
ANL  
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**Workforce Planning for new  
Nuclear Power Programmes**

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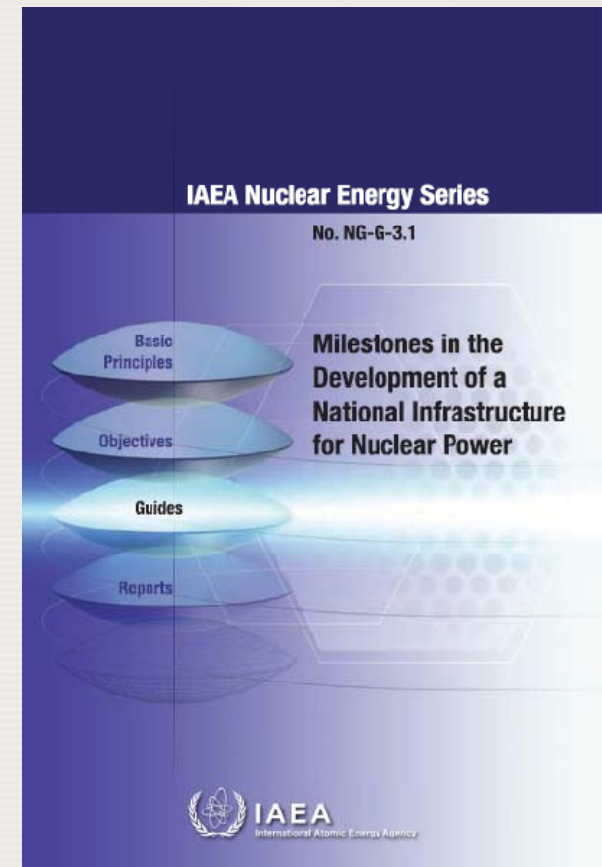


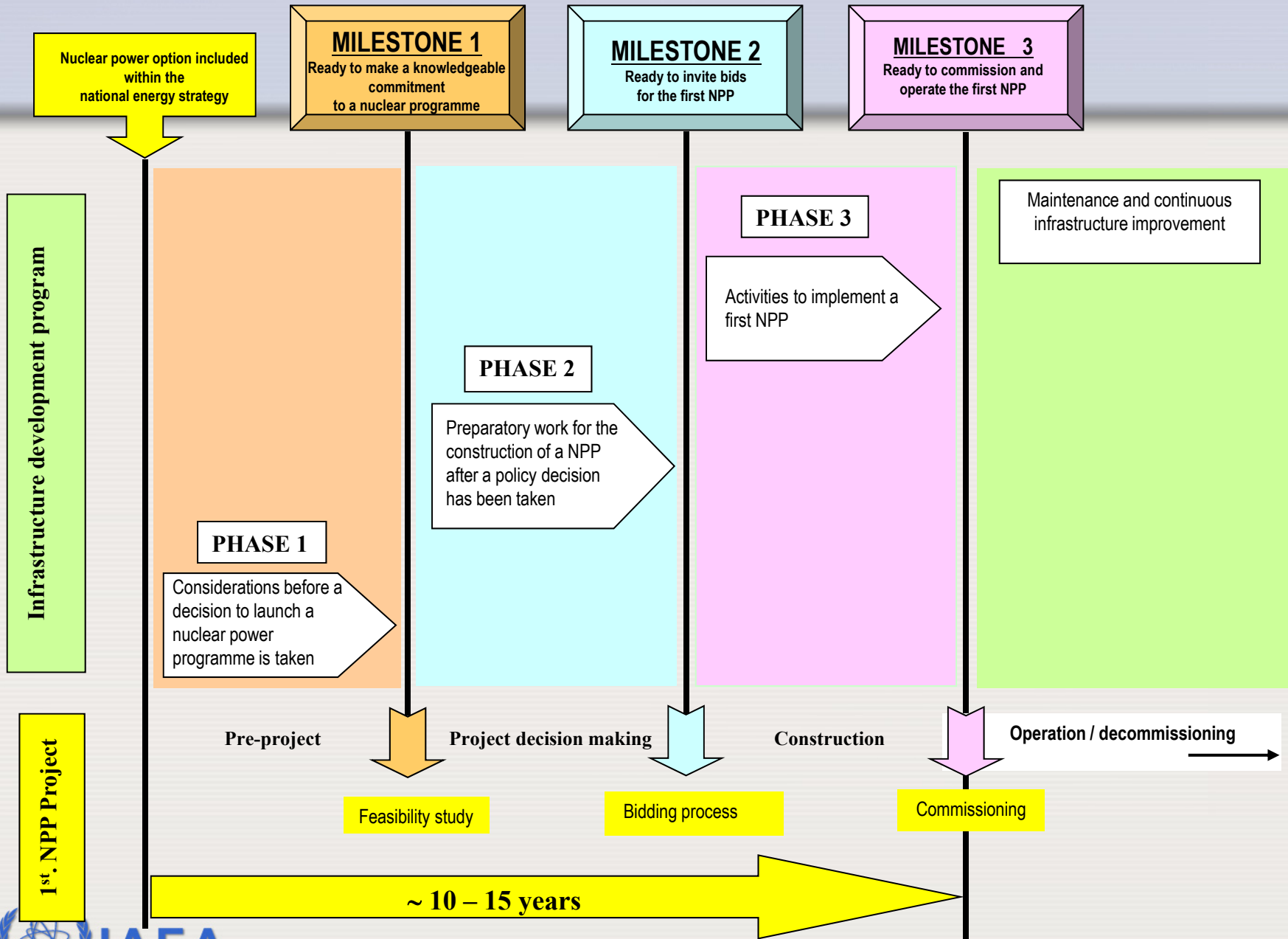
*Atoms for Peace: The First Half Century  
1957-2007*



# BACKGROUND TO WORKFORCE PLANNING DOCUMENT

- IAEA developed new “Milestones” document, published in September 2007
- Identifies 3 distinct phases, each with its own milestone, to be completed in preparation for a first nuclear power plant
- Provides detailed guidance on timely preparations for a nuclear power programme
- Intended to help Member States to assess progress and prioritise actions necessary to order, license, construct and then safely operate a nuclear power plant





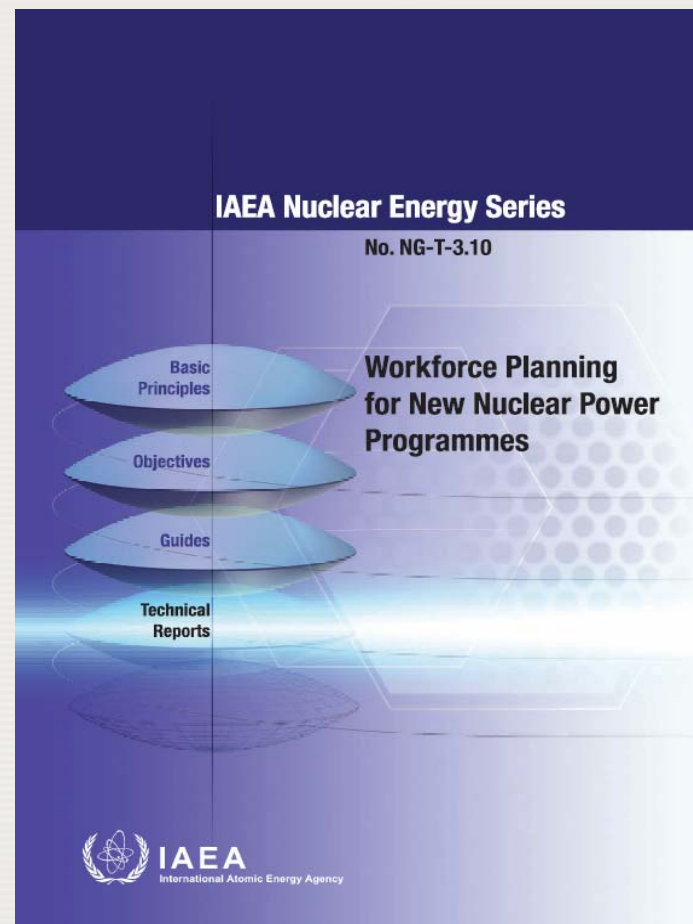
# KEY INFRASTRUCTURE ISSUES

- 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*

# IAEA Nuclear Energy Series – NG-T-3.10

- Developed to provide guidance to Member States (MS) in the identification of, and to develop Workforce Plans for, the Human Resources needed to implement a New Nuclear Power Programme
- Includes actual Case Studies to illustrate how other Member States implemented their first Nuclear Energy Programme



# SCOPE OF THE DOCUMENT

- Focuses on ‘*nuclear related*’ competencies, while recognising significant non-nuclear resources also required, but assumed to be within Member State’s capability
- Addresses the Workforce requirements for each of the three phases focusing on 3 main organisational entities indentified as having specific responsibilities within the “Milestones” document:
  - NEPIO (Nuclear Energy Programme Implementing Organization)
  - Regulatory Body
  - Operating Organisation



# SCOPE OF THE DOCUMENT (cont'd)

- Focuses on '*permanent*' resources (as above) and does not address construction, and other, resources, which are addressed in other IAEA documents.
- Assumes Turnkey project and therefore resource levels based on those needed to be an "*Intelligent Customer*".
- As with the "Milestones" document, this document assumes MS has an existing national infrastructure for radiation, waste and transport safety

# WORKFORCE PLANNING:

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

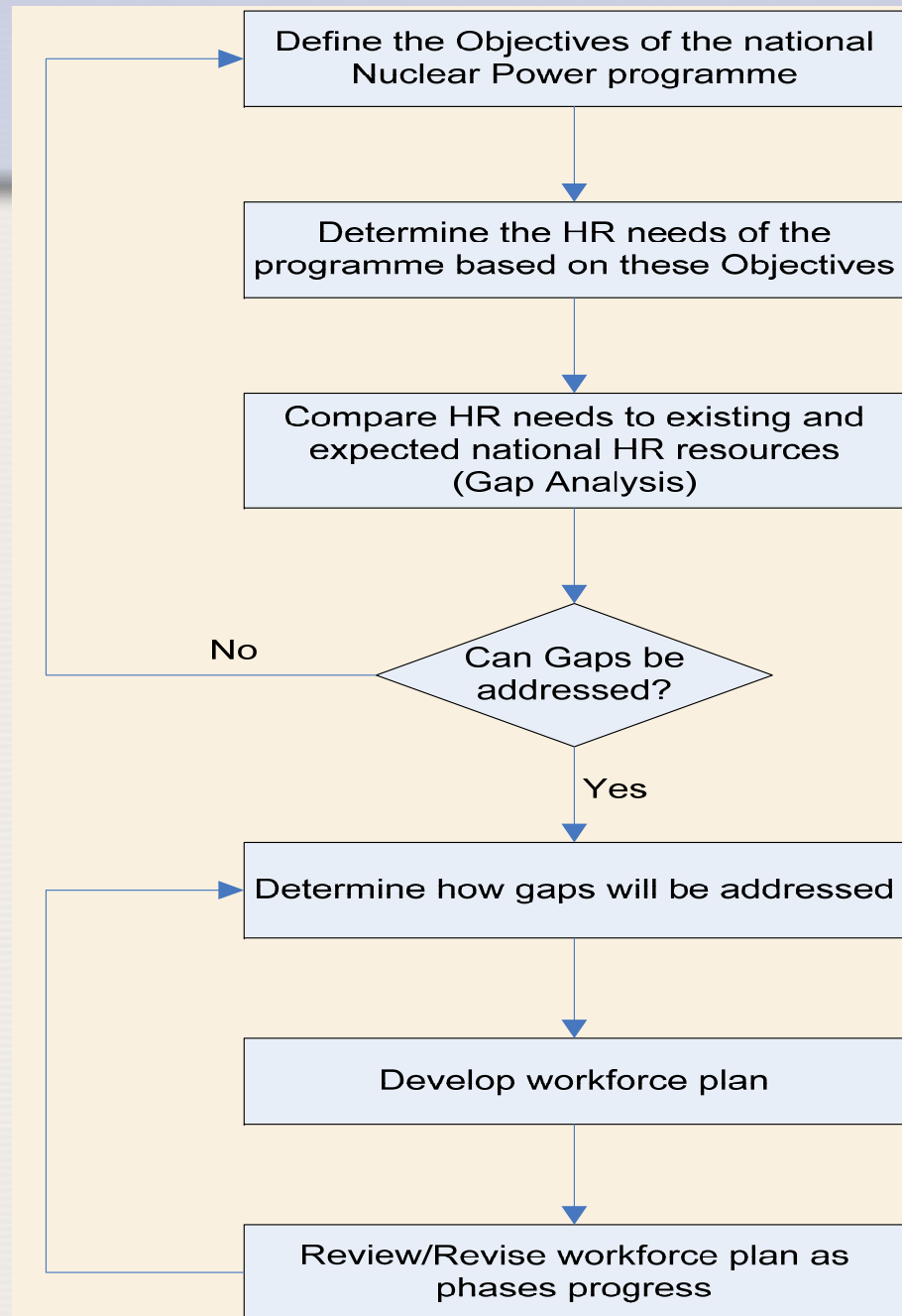
Identifies the steps that should be taken to get the right number of the right people in the right place at the right time.



# INTELLIGENT CUSTOMER:

- *An organisation (or individual) that has the competence to specify the scope and standard of a required product or service and subsequently assess whether the supplied product or service meets the specified requirements.*

# Workforce Planning Process



# DOCUMENT STRUCTURE

1. Introduction
2. Nuclear Energy Strategy – an indication of how the chosen strategy may affect workforce planning requirements
3. Analysis of Infrastructure activities – supported by matrix of 3 phases and 19 Infrastructure Issues to identify competence requirements and resources
4. Developing a Workforce Plan - some general considerations regarding when and how to recruit

# CURRENT DOCUMENT STRUCTURE

5. Staffing considerations – a phase by phase review of the resources needed by the 3 key groups leading into the operations phase
6. The role of Support Organisations – an indication of the role of Educational, Research & Development and other Support Organisations
7. Knowledge Management for New Nuclear Power
8. Summary: How to get started
9. Overview of Case Studies

# CASE STUDIES

- A range of actual case studies to give practical examples of how Member States implemented their Nuclear Energy programmes
- Case Studies may cover individual phases or whole programme
- Case Study Contributions: China, Republic of Korea, India, UAE, Armenia

# WORKFORCE PLANNING MATRIX

- The main activities to be undertaken to address each Infrastructure issue, together with an indication of the responsibilities of key organisations in completing these activities;
- An indication of the competencies required to complete these activities successfully
- Probable educational/professional requirements necessary to support achievement of these competencies, and
- Suggestions for the Workforce Planning needed to deliver these competencies within the project.

# Sample of Competencies Matrix

## Infrastructure Issue 10. Electrical Grid Phase 1

Activity	Responsibilities of key organizations	NP specific competencies	Probable education sources/ professions	Inputs regarding Workforce Planning, education and training	Comments
Study of grid capability/ capacity re nuclear power	<p><b>NEPIO:</b></p> <ul style="list-style-type: none"> <li>➤ Take a lead role in the study</li> </ul> <p><b>Grid Operator:</b></p> <ul style="list-style-type: none"> <li>➤ Provide information regarding the stability and reliability of the grid, and anticipated grid growth/changes and suitability for NPPs</li> </ul>	<p>Knowledge of grid characteristics that are important re an NPP</p> <p>Thorough understanding of electrical O/P characteristics of an NPP and their impact on existing grid/necessary upgrades</p>	<p>Nuclear power engineer</p> <p>Electrical Power Engineer with Nuclear Power training module</p>	<p>At least one nuclear power engineer with expert level competency</p> <p>At least one power engineer with expert level competency and Nuclear Power training</p>	<p>Core competence is Electrical Power Engineering, but training in specifics of NPP output characteristics would be necessary to address grid capability/upgrade requirements</p>
Study of grid interconnection possibilities	<p><b>Grid Operator:</b></p> <ul style="list-style-type: none"> <li>➤ Provide information re grid characteristics and the issues related to their interconnection</li> </ul>	<p>In-depth knowledge of principles for, and lessons learned, regarding grid interconnections</p>	<p>Power engineer</p>	<p>One Power Engineer with expert level competency</p> <p>One or more with working level competence</p>	

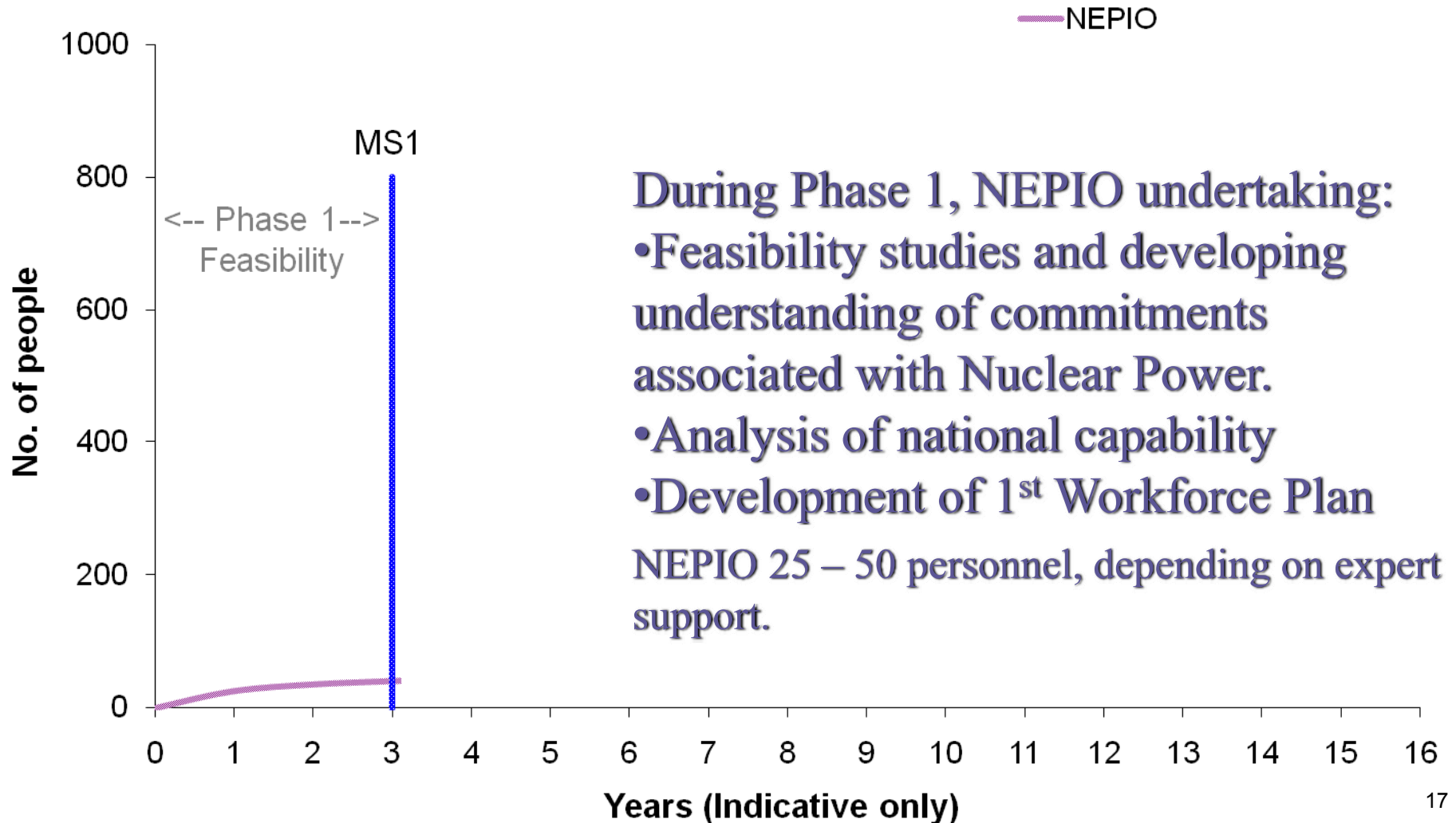


# Human Resource Development-Phase 1

- Knowledge and skills needed to support a nuclear programme identified by NEPIO
- Two fundamental aspects of Human Resource development to be considered:
  - What level of National involvement is desired?
  - What level of National capability exists or could be developed?
- Workforce/Staffing Plans prepared
- Workforce Plans needed for all organisations and should be integrated upwards



# Resource Requirements for Phase 1

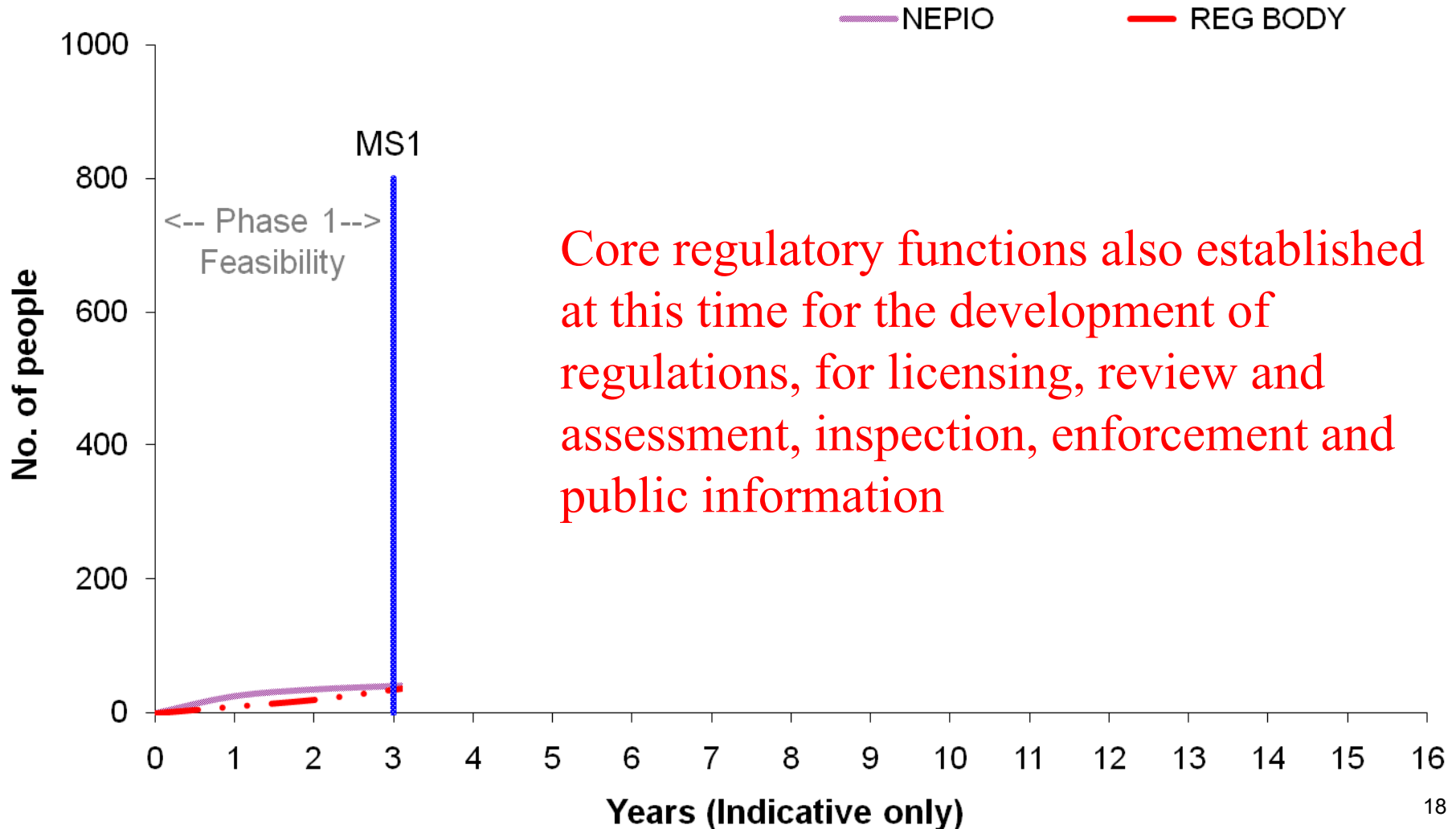


During Phase 1, NEPIO undertaking:

- Feasibility studies and developing understanding of commitments associated with Nuclear Power.
- Analysis of national capability
- Development of 1<sup>st</sup> Workforce Plan

NEPIO 25 – 50 personnel, depending on expert support.

# Resource Requirements for Phase 1 (cont'd)



# RECRUITMENT CHALLENGES IN PHASE 1

Lack of experience in phase 1 may be alleviated by:

- Contracting out whole work packages to experienced consultants, including requirements to utilise/train national staff in delivering the work package.
- Contracting with consultants to become ‘temporary’ staff working with nationals to deliver work packages, while developing national staff.
- Engaging senior consultants to ‘coach’ national staff in specific areas of competence.
- Organising national conferences/workshops where vendors and specialist support organisations can present their capabilities and services

# RECRUITMENT CHALLENGES IN PHASE 1

Opportunities to gain experience outside MS include:

- Establishing Bi- and Multi-lateral relationships with governments, regulatory agencies, vendors, utilities, educational institutions, etc.
- IAEA Training courses, Fellowships and Internships.
- Formal courses of overseas study (e.g. vocational, under- and post-graduate programmes).
- Building staff training and development assignments into potential contracts with vendors, service providers, etc.
- Developing 'strategic alliances' with vendors/equipment suppliers whereby national organisations obtain licenses to manufacture components in-country, which can include training and qualification in the country of origin.

# Human Resource Development-Phase 2

In preparation for inviting Bids to construct a first NPP:

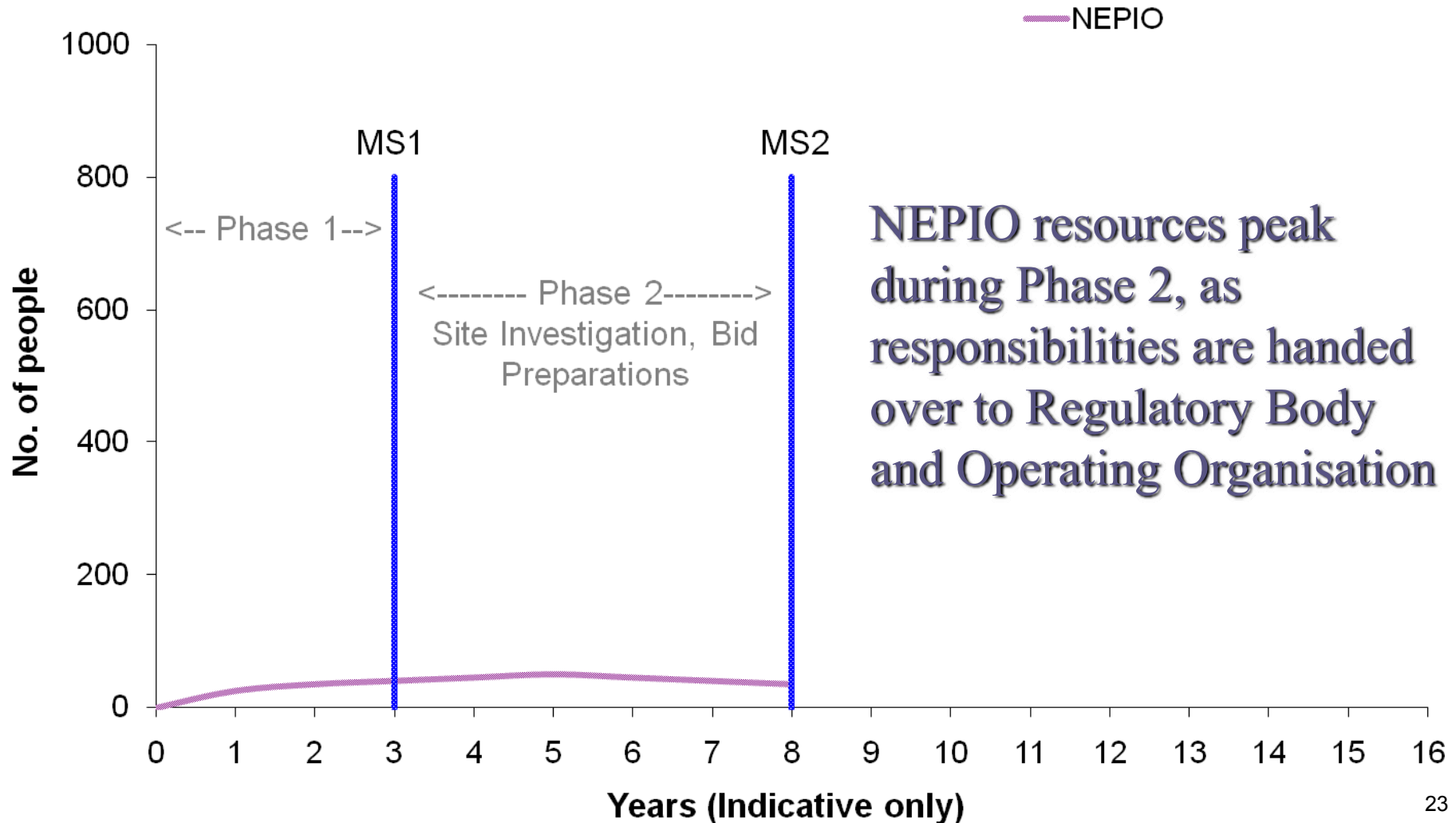
- Sufficient human resources are in place to be an “Intelligent Customer”
- A Systematic Approach to Training (SAT) of human resources needed for plant operation is initiated
- HR issues, including SAT requirements, are addressed in requirements for suppliers (turnkey assumed)
- Workforce/Staffing Plan(s) updated

# RECRUITMENT CONSIDERATIONS

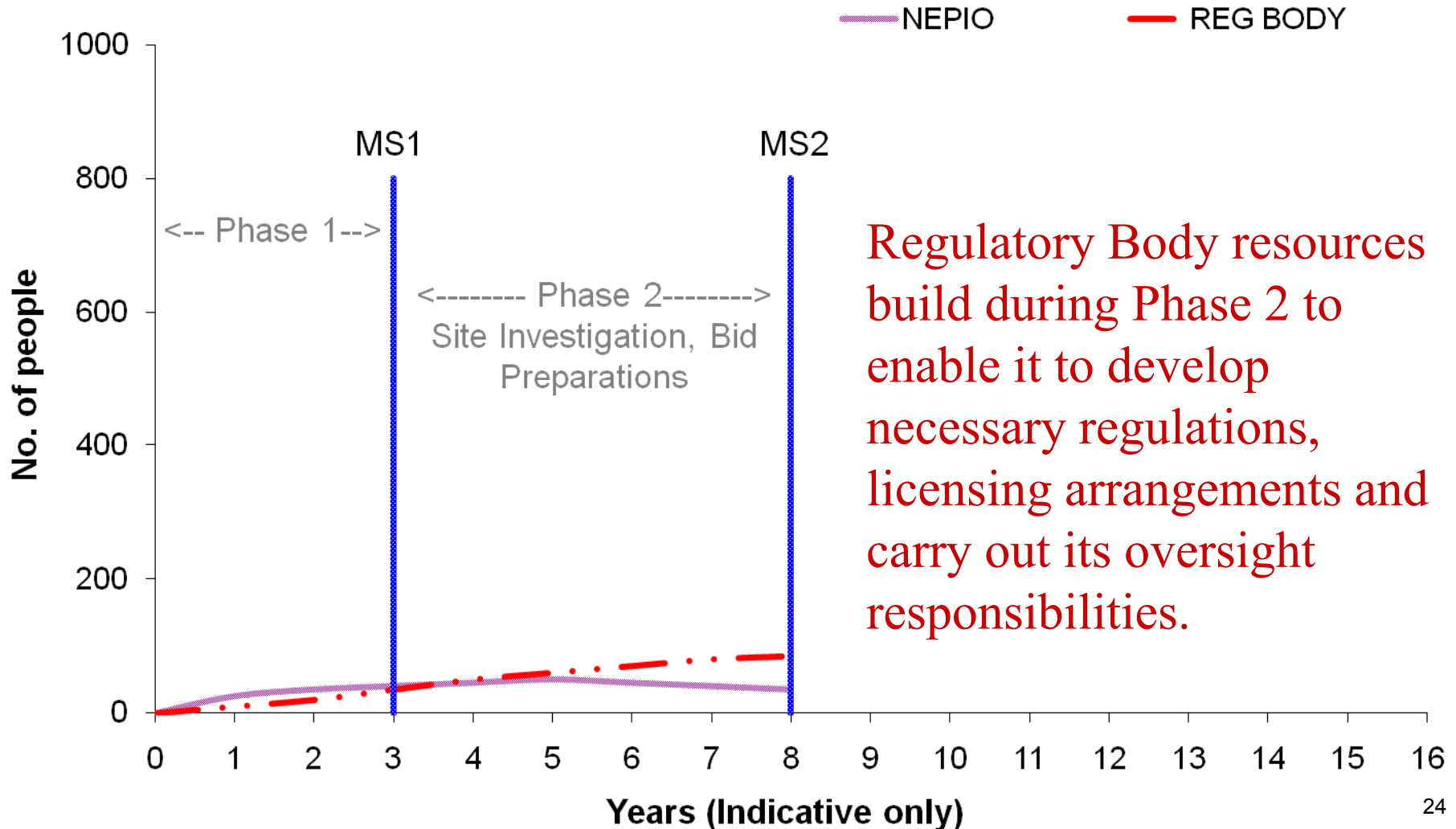
- Attracting expatriate personnel who have worked in the nuclear sector abroad.
- Attracting experienced foreign personnel, either as employees (if permitted by national labour laws/regulations) or as consultants.
- Recruiting experienced personnel from appropriate national industries such as fossil fired power generation, process/production, oil and gas industries, who will already have many of the required competencies to work in the nuclear industry.
- Remember recruitment is a two-way process – allow for loss of staff to other industries/countries



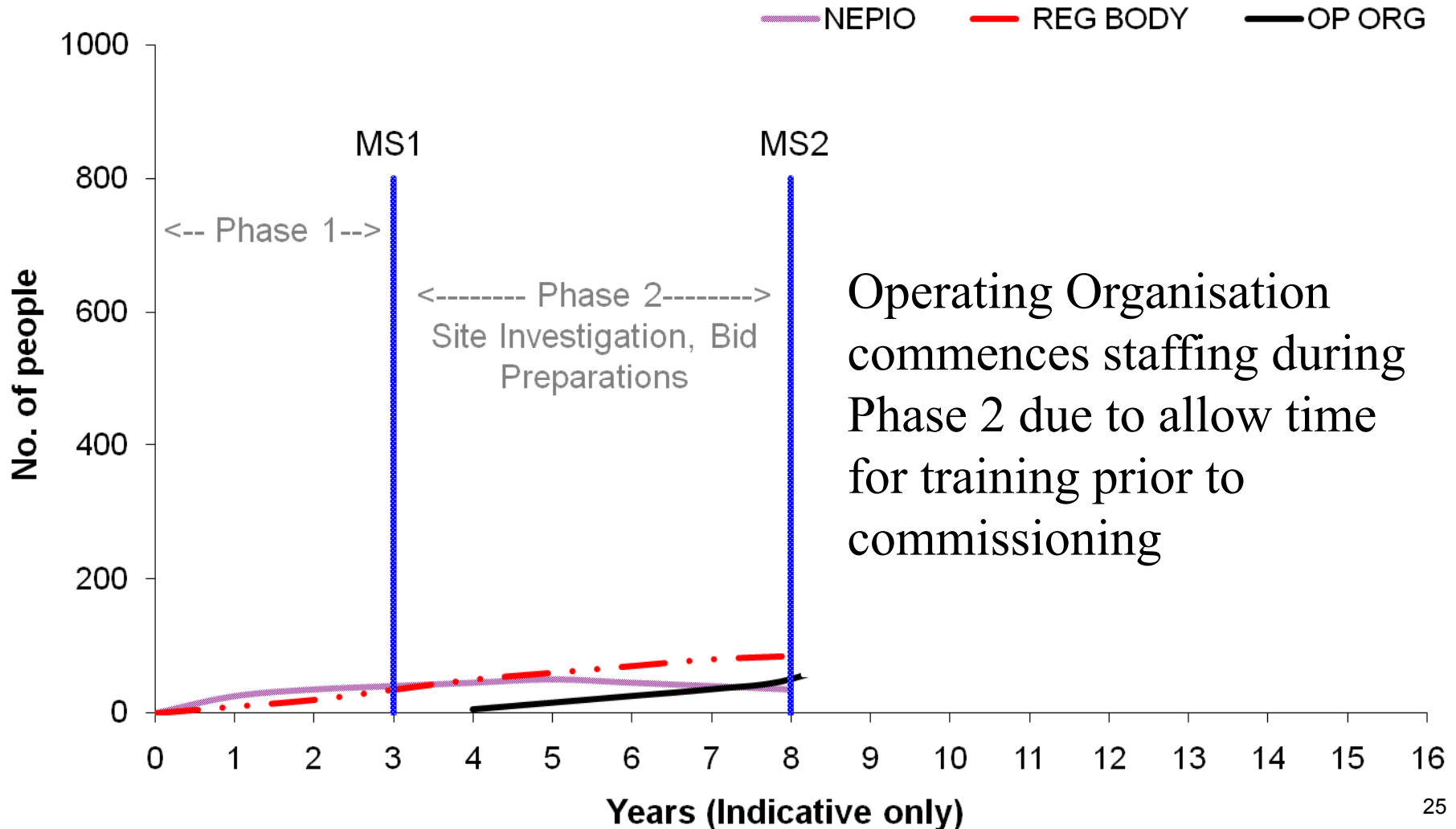
# Resource Requirements for Phase 2



# Resource Requirements for Phase 2 (cont'd)



# Resource Requirements for Phase 2 (cont'd)



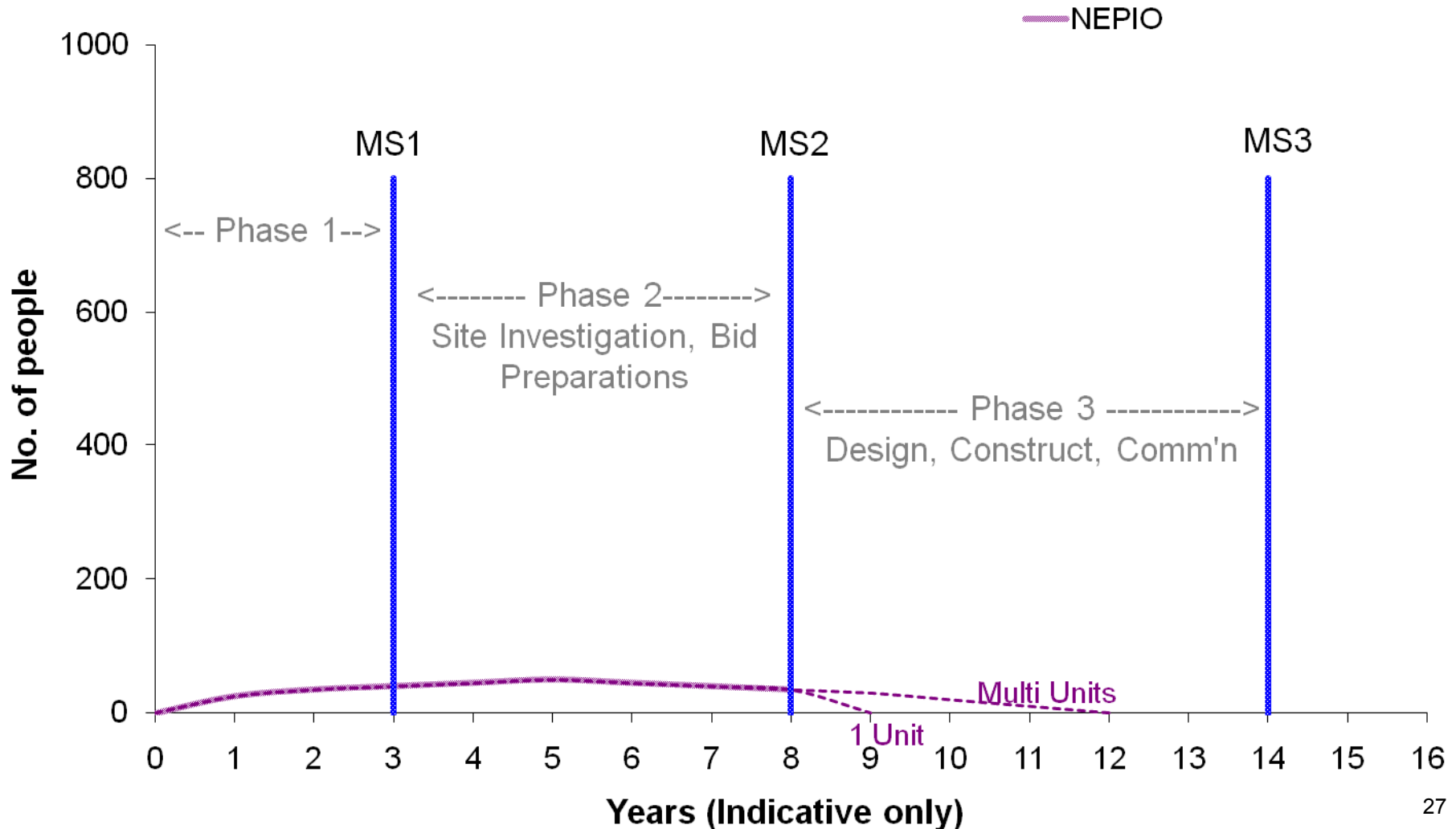
Operating Organisation commences staffing during Phase 2 due to allow time for training prior to commissioning

# Human Resource Development- Phase 3

- All human resources to commission and operate the first NPP are in place
- Education and training programmes for continuing flow of qualified people are in place
- Workforce/Staffing Plan(s) updated

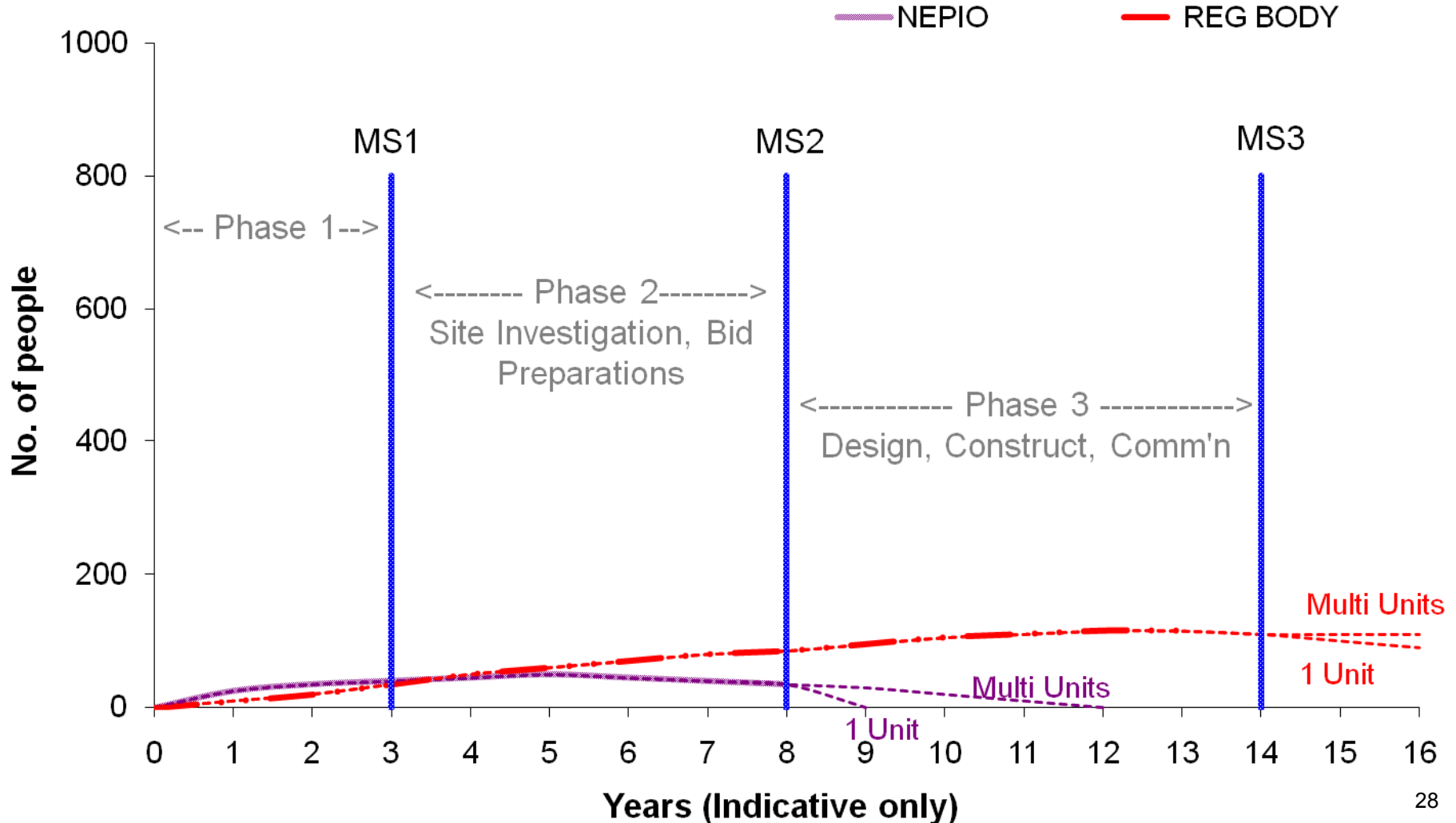
# Resource Requirements for Phase 3

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



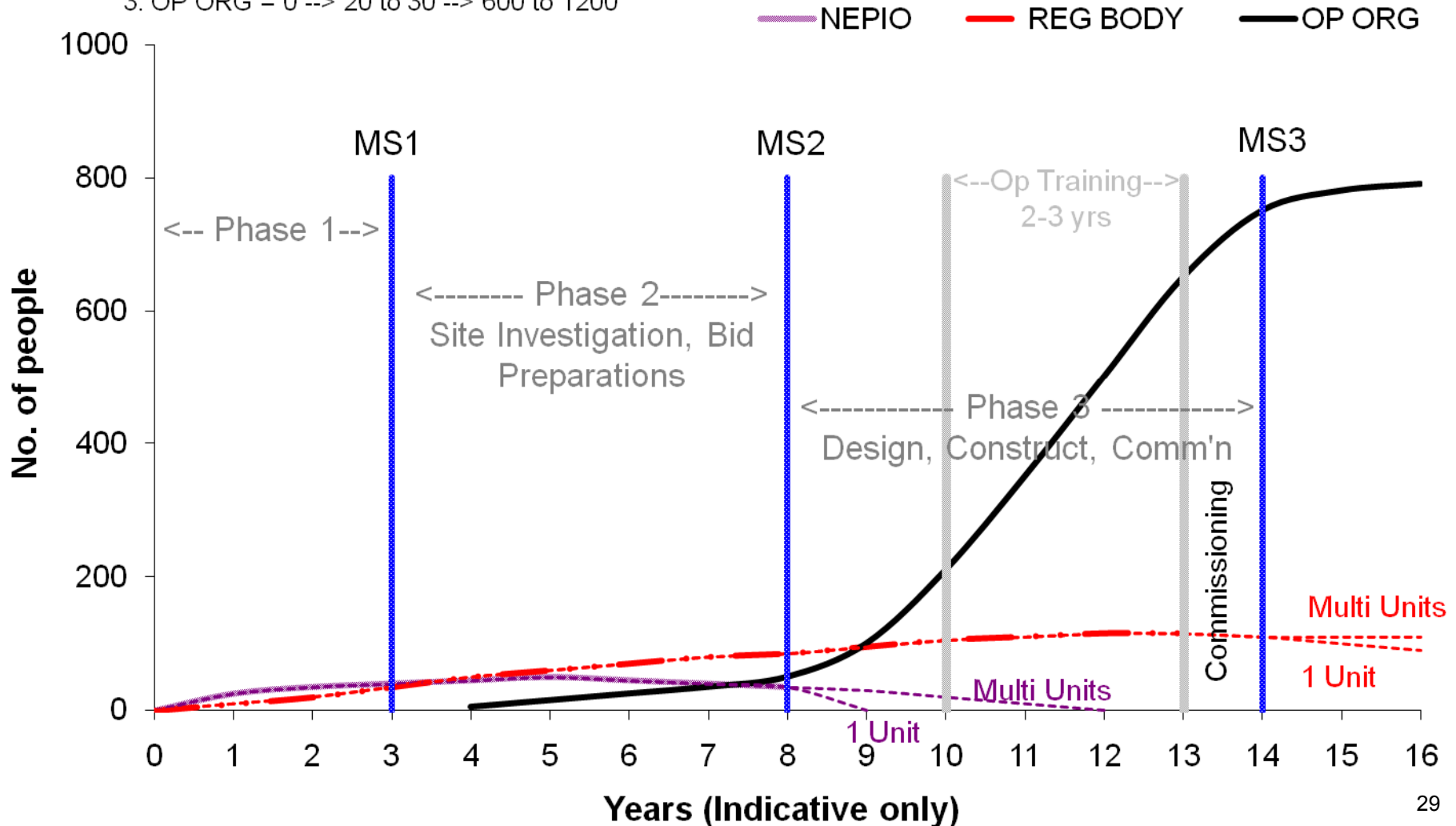
# Resource Requirements for Phase 3 (cont'd)

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



# Resource Requirements for Phase 3 (cont'd)

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





# ONGOING REQUIREMENTS

- Post-commissioning, SAT based training programmes should be in place in all organisations producing a 'pipeline' for new staff
- Succession Management arrangements in place for all positions
- Workforce Planning should allow for follow-on NPPs if appropriate
- Long-term Workforce Planning arrangements should allow for full Lifecycle requirements including Plant Life Maintenance and eventual decommissioning

# Summary: How to effectively consider HR from the beginning?

- Use an integrated, systematic approach toward considering and implementing a NP programme (The “Milestones” Approach)
- Develop workforce/staffing plans that are based upon the roles and responsibilities for the activities in each of the 3 Phases, particularly focusing on the three key organisational entities
- Require SAT for all training programmes
- Include SAT, and knowledge capture and transfer requirements in supplier(s) contracts
- Maintain this integrated workforce planning approach through the entire lifecycle of the facilities/programmes

# Thank you – Any Questions?

