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International Atomic Energy Agency

Responsibilities and Capabilities of Owners and Operating Organizations in a New Nuclear Power Programme

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**AFCONE-IAEA Webinar on Responsibilities and Capabilities of
Owners and Operators for a New NP Programme**

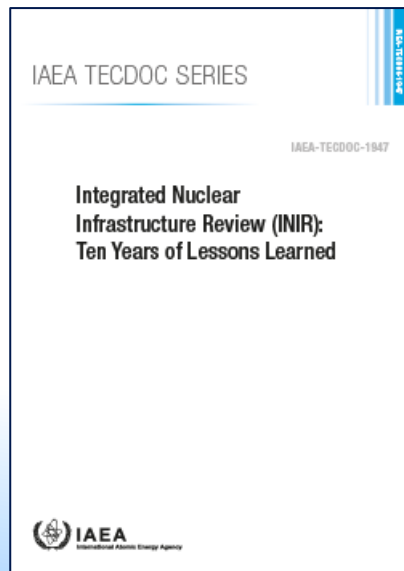
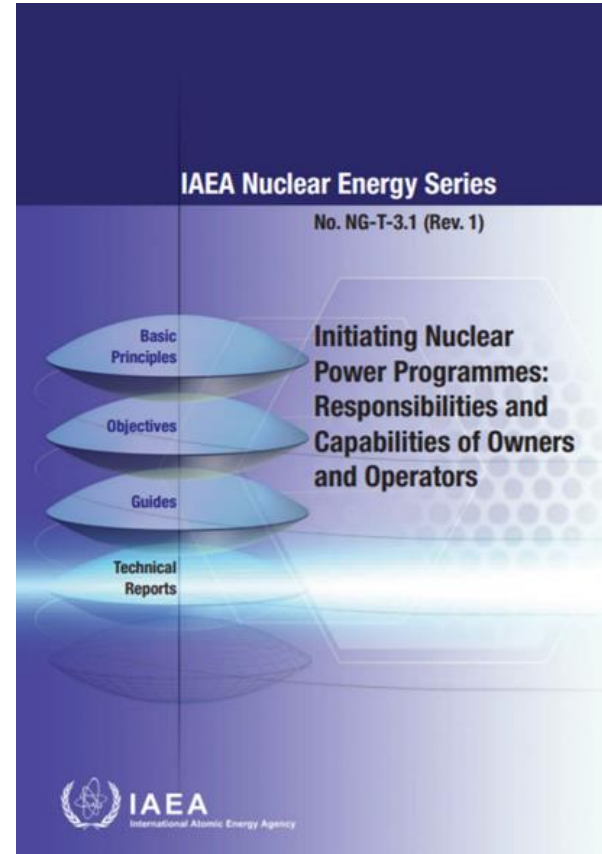
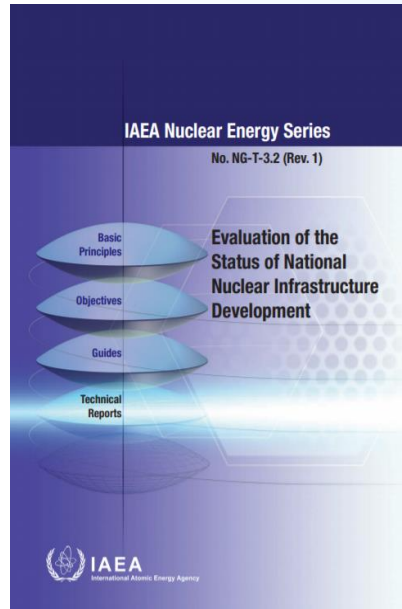
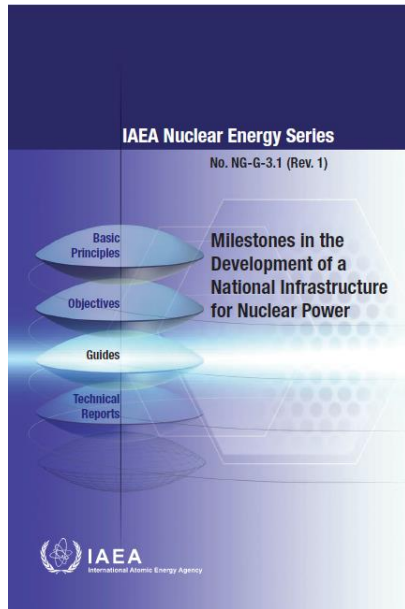
24 February 2022

Outline



- Milestones Approach
- Roles and responsibilities of Owner/Operators in different phases of the nuclear power programme
- Evolution of Owner/Operator throughout the programme

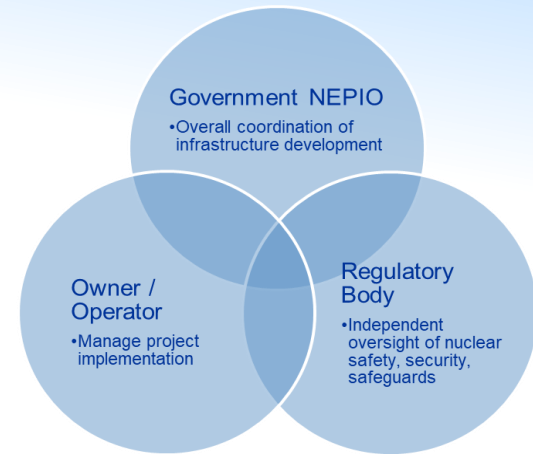
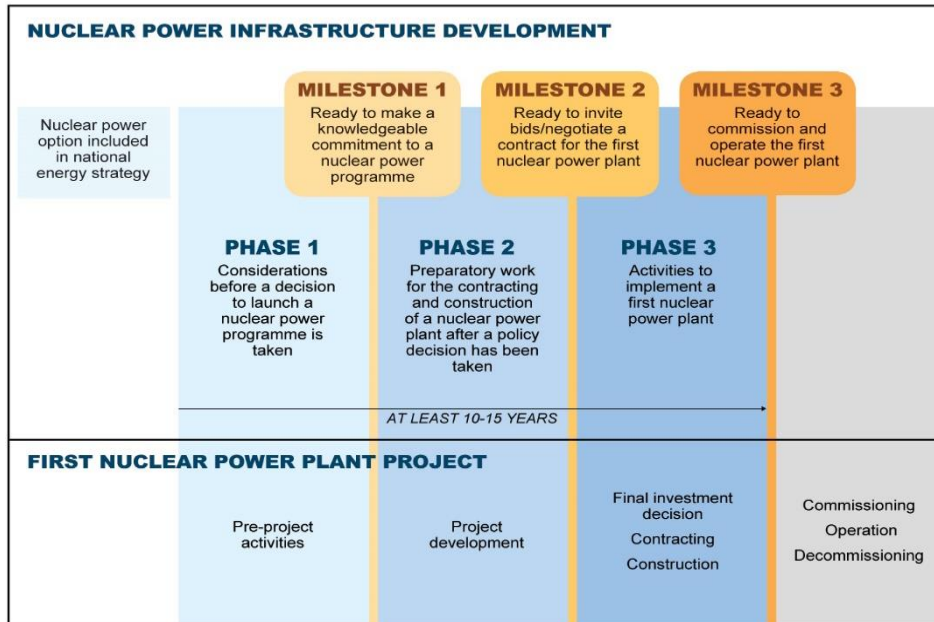
Supporting IAEA publications



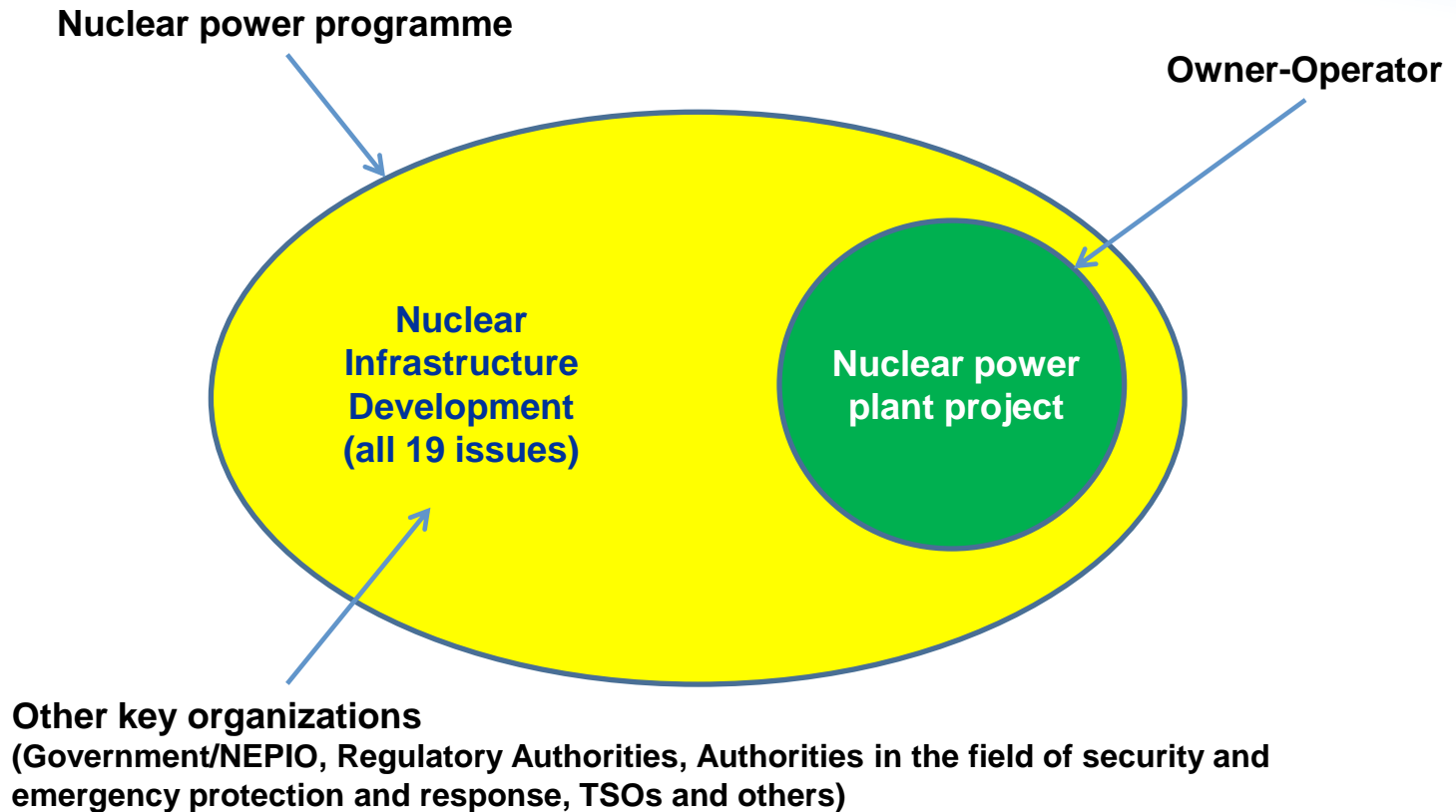
IAEA Milestones Approach

Nuclear programme governance guide

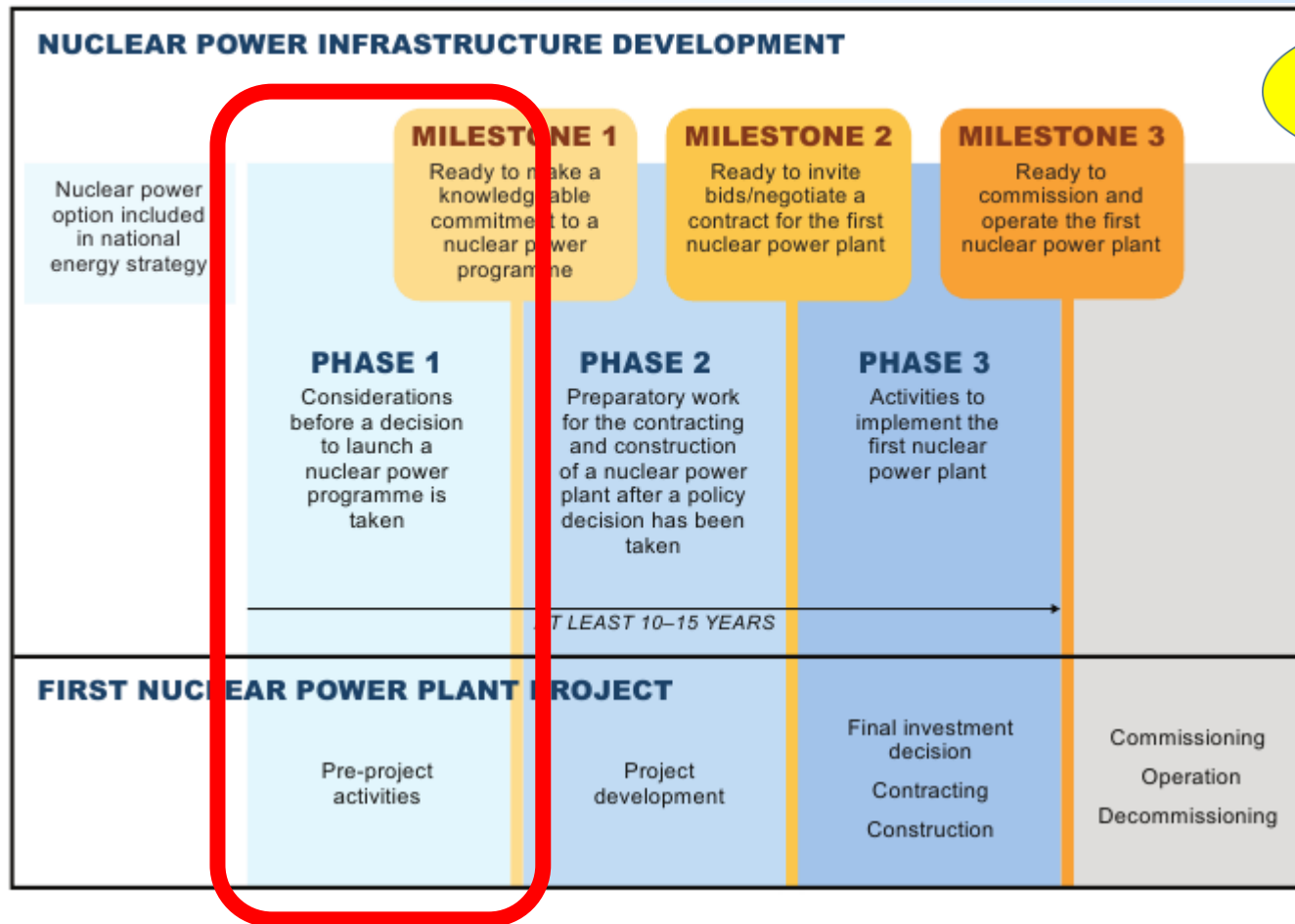
- 3 Phases (Consider – Prepare – Construct)
- 3 Milestones (Decide – Contract – Commission)
- 19 Infrastructure Issues



Programme versus Project



Phase 1 – Pre-Project Activities



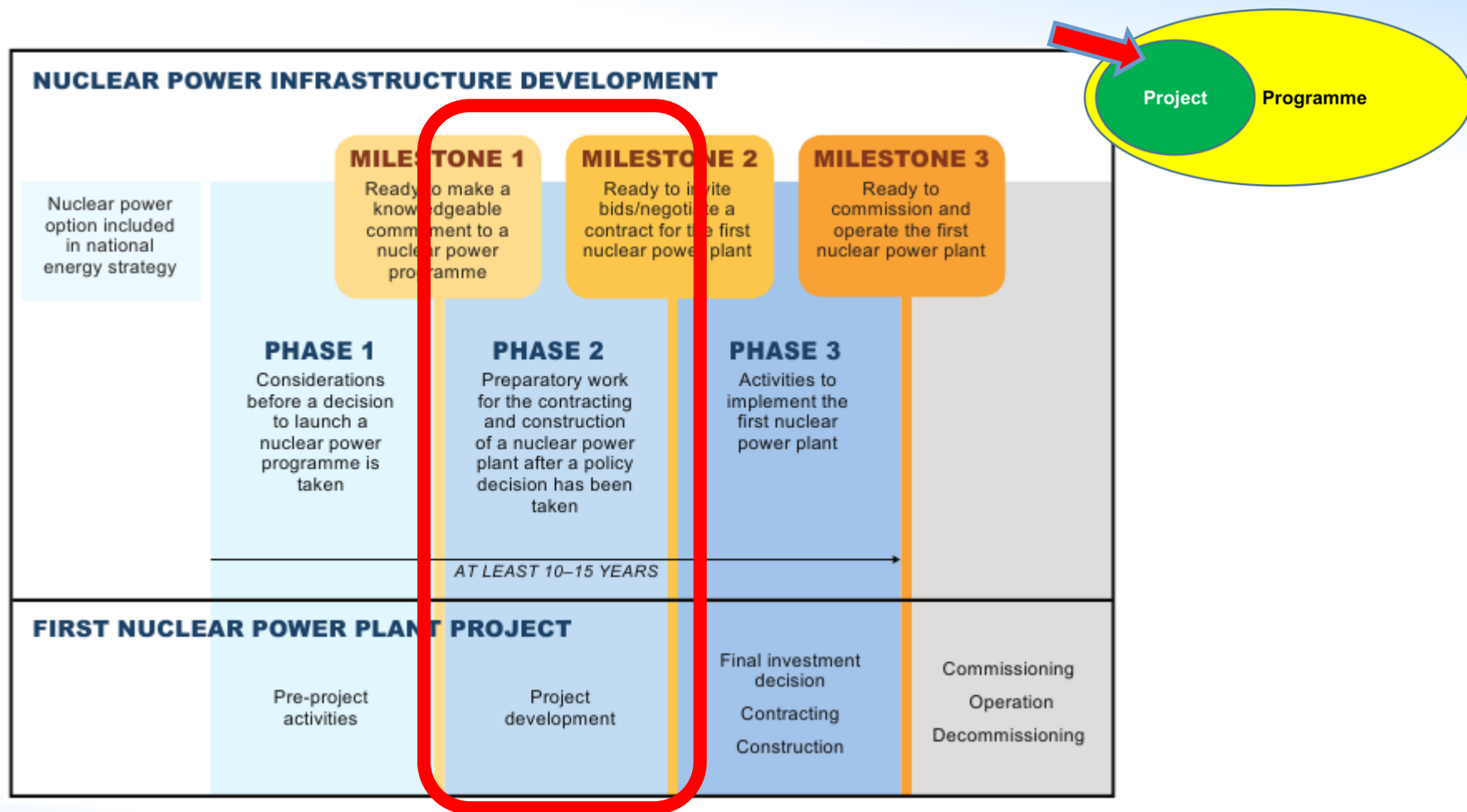
- Defining the nuclear power programme roadmap
- Performing pre-feasibility studies

Phase 1 - Pre-Project Activities



- The future owner/operator is not expected to be established in Phase 1 as there is no project yet
- However, some thoughts should be given to it as pre-project activities take place:
 - The Milestones approach suggests including staff from existing utilities in the NEPIO;
 - HR needs and external support for the future owner/operator considered;
 - Considerations on partnership with potential technology suppliers
- The owner/operator does not exist but there are plans to have one. In some countries, the future operator is already identified in Phase 1
- If exists, it takes part in pre-feasibility studies:
 - Site survey, preliminary grid studies and HRD planning

Phase 2 - Project Development Activities



- Establishing/developing the owner/operator
- Developing a feasibility study

Phase 2 - Project Development Activities

- Future owner/operator needs to be established/designated in early Phase 2
- Owner/operator develops and implements the feasibility study.
- Owner/operator develops a business case. And this will be a major input to the financing plan.

Phase 2 - Project Development Activities

Owner/operator also needs to:

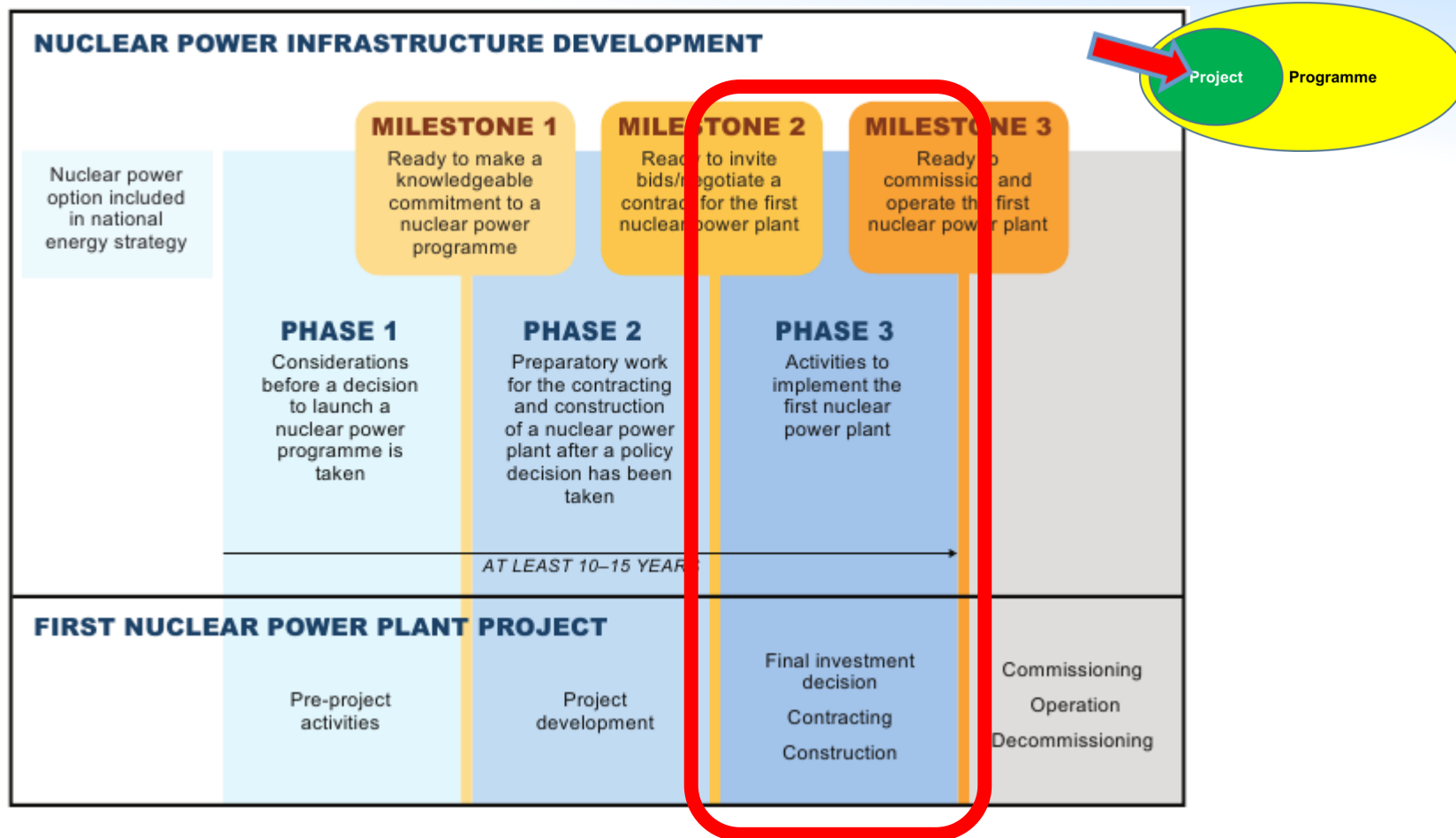
- Develop an IMS covering structure, roles, responsibilities, key processes and interface description and management
- Start developing HR and needed competencies
- Review legal and regulatory activities
- Implement stakeholder involvement plan
- Manage siting activities
- Agree financing strategy
- Prepare the bid inquiry/contract specifications, including project control

Phase 2 - Project Development Activities

And...

- Owner/operator plans and develops capabilities required for the next phases construction and commissioning.

Phase 3 - Project Implementation Activities



- Contracting for NPP procurement
- Applying for/receiving licenses, oversee construction
- Preparing for operation

Phase 3 - Project Implementation Activities

Construction starts only after the FID which occurs at the beginning of phase 3. During this first step, the owner/operator has to:

- Negotiate and finalize the NPP procurement contracts
- Close the financing agreement, including insurance for construction
- Review and approve design documentation
- Obtain the construction and other required licenses
- Make available site services and infrastructure for the construction

Phase 3 - Project Implementation Activities

Once that the construction starts, the owner/operator is expected to:

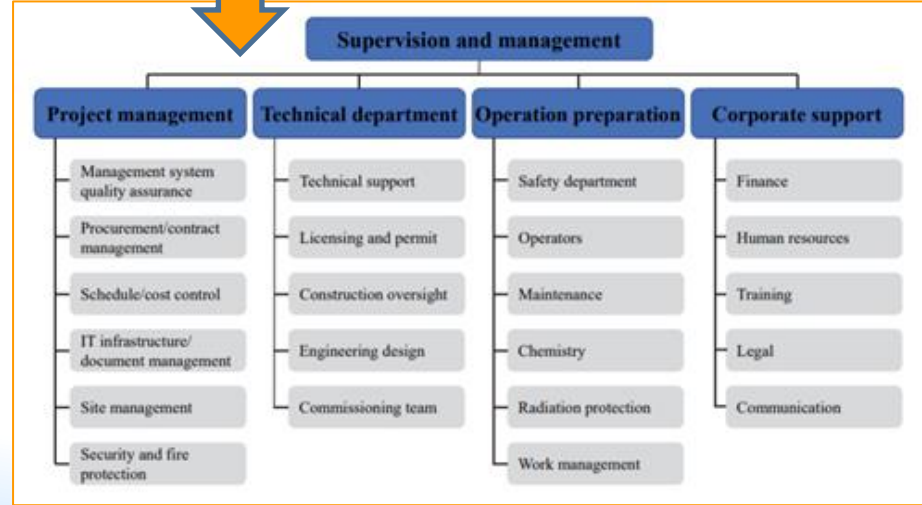
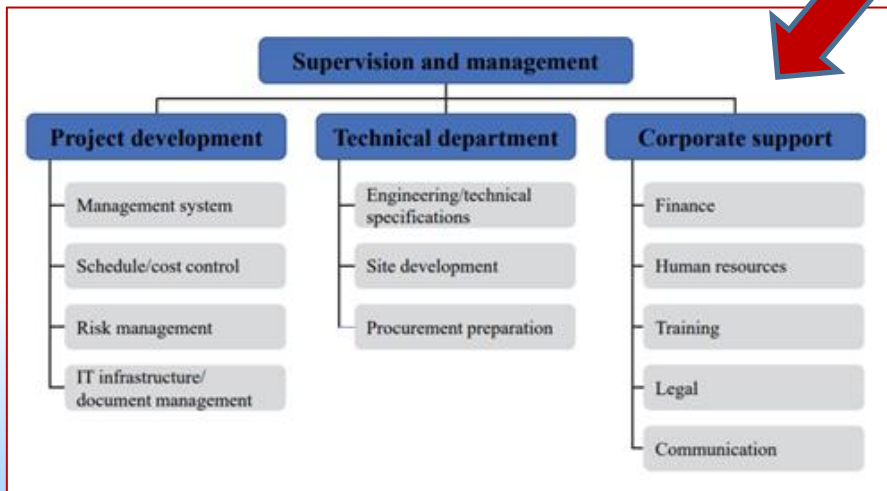
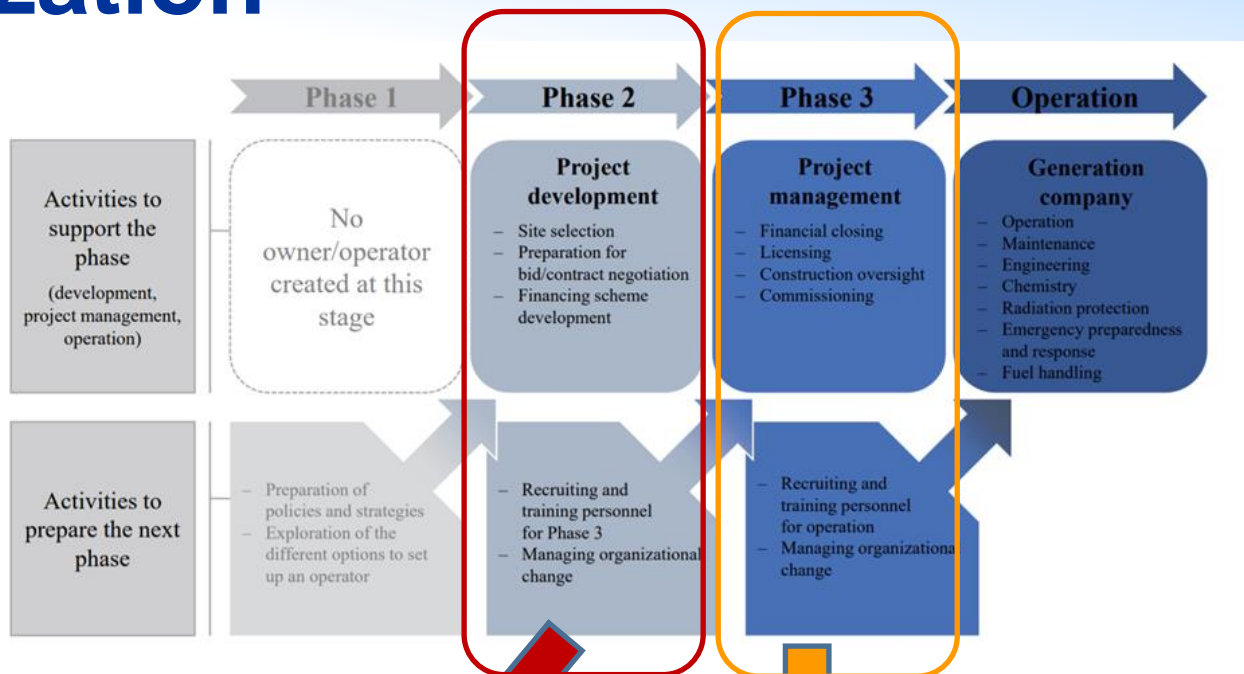
- Manage the construction contract and oversee the construction
- Endorse project decisions related to safety, schedule and budget
- Ensure grid upgrade and apply for an electricity generation license, if needed
- Implement all requirements (security and safeguards) necessary to bring fuel on site
- Implement stakeholder engagement plan

Phase 3 - Project Implementation Activities

And...prepare for the next phase!

- Agree commissioning procedures and an approval process
- Recruit and prepare staff and procedures for the operational phase (including engineering, maintenance, chemistry etc.)
- Apply for the operating license

Evolution of the Owner/Operator Organization



Desired Attributes of an Owner/Operator – NG-T-3.1



- **Strong leadership** that leads to an appropriate organizational culture that promotes the appropriate attitudes, values, standards, morals and norms of acceptable behaviour
- **Ability to manage growth and change** (e.g. progressive staffing, management systems arrangements, readiness reviews)
- **Effective internal and external communication**
- **Technical and commercial competence** to manage the NPP project

In conclusion

- Owner/Operator normally is established in Phase 2. However, if it has already been identified in Phase 1 it needs to be involved certain activities in Phase 1
- The structure and staffing of the owner/operator is not static but evolves in response to the needs in different phases
- In Phase 2, Owner/Operator develops the NPP project through feasibility study, arranging financing and preparing for bidding/negotiation
- In Phase 3, Owner/Operator implements the NPP project through contracting, receiving necessary licenses, overseeing the construction and preparing for the operation



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Thank you!



Phase 2 - Project Development Activities

- Details from IAEA publication

National position

- Decide on the contracting strategy

Legal framework

Safeguards

- Include in the bid invitation specifications requirements on safeguards design features

Regulatory framework

- The regulatory body and the owner/operator develop and, as needed, implement a protocol for communications about licensing and safety, security and safeguards.

Electrical grid

- Implement detailed studies to determine any expansion, upgrade or improvement necessary to accommodate the size, technology and site that are anticipated for the new plant..

Safety

- Participate in the global nuclear safety framework.
- Strengthen cooperation on safety related matters.
- Establish organizations to provide expertise and engineering support or other external support
- Establish contact with organizations in other States and international organizations
- Develop the expertise to prepare for the conduct or the review of safety assessments.
- Develop an in-depth understanding of the safety principles and safety requirements applicable in the design of a nuclear power plant.

Radiation protection

- Develop plans for for monitoring and protecting workers and the public
- Develop plans to reflect radiation protection provisions in the plant's design requirements
- Develop plans for recruitment and training of RP staff and the procurement of RP equipment and services

Management

- Define an organizational structure and recruit appropriate staff.
- Establish an integrated management system that promotes a strong safety culture.
- Assess alternative technologies to determine which are most appropriate or preferred.
- Establish bid invitation specifications and evaluation criteria.
- Build project management capabilities and a competent procurement team.
- Establish working relationships with the regulatory body.
- Institute procedures to ensure that knowledge critical to safe and secure operation will always be preserved.

Stakeholder involv.

- Establish a stakeholder involvement programme as part of the creation of the organization
- Explain the basic technology being employed, its construction plans, its safety responsibilities and the impact on, and benefits for, the local community.
- Establish public information centres as appropriate

Funding and financing

- Contribute to the development of funding plans
- Develop financing plans

HRD

- Update HRD plan
- Identify competences needed in phase 3
- Assess availability in the country
- Assess domestic and training capacity
- Identify specialized recruiting and training
- Assess domestic research capabilities to develop
- Develop/import needed HR
- Determine the scope of training provided by the vendor and what will not
- Structure training programme using SAT
- Plan for effective knowledge transfer
- Establish authorization/licensing/qualification policies for plant personnel

Phase 2 - Project Development Activities

- Details from IAEA publication



Siting

- Justify the acceptability of the preferred sites
- Conduct site assessment based on detailed investigations and site characterizations
- Use site assessment results to derive the site related design basis, and reflect it in the bid invitation specifications for the nuclear power plant.
- Ensure the availability and integrity of the preferred site(s).
- Identify necessary improvements and develop implementation plans for local infrastructure at the preferred site or sites

Environmental prot.

- Study the prospective impacts of NPP operation on people and the environment for its preferred candidate NPP sites and to ensure that it can comply with the country's environmental laws and regulations.
- Conduct environmental assessments according to the country's environmental laws and regulations.
- Include in the bid a comprehensive specification of the environmental site conditions, factors, characteristics and data for the site(s)

Emergency planning

- Specify the national institutions with responsibilities for emergency preparedness and response related to NPPs.
- Start implementing new arrangements as identified in Phase 1 for strengthening the infrastructure for emergency preparedness and response

Security

- Plan programmes for the management of sensitive information, and for promotion of a nuclear security culture and trustworthiness of personnel.
- Assign roles and responsibilities for preparing for, detecting and responding to nuclear security events

Nuclear fuel cycle

- Participate in the development of the national nuclear fuel cycle policy and strategy.
- Develop bid invitation specification related to the nuclear fuel cycle

Radioactive waste

- Develop, for inclusion in the bid invitation specifications, provisions for RWM, including minimizing radioactive waste volumes and toxicity, requirements for associated facilities and requirements for a decommissioning plan.

Industrial involvem.

- Identify which national or local suppliers can reliably supply commodities, components or services to the nuclear related or non-nuclear portions of the nuclear power plant.
- Identify what upgrades in skills and capabilities are realistic in the time frame that would be required to support nuclear construction.
- Determine localization criteria to be included in the bid invitation specifications.
- Encourage industrial organizations in the State to develop their capabilities with the objective of participating in the construction of nuclear power plants

Procurement

- Establish a procurement capability for pre-project activities

Phase 3 - Project Implementation Activities

National position

Legal framework

Safeguards

- Verify design information provided to the IAEA.
- Support installation of IAEA equipment for containment and surveillance
- Implement all elements of the safeguards infrastructure at the facility prior to fuel arrival

Regulatory framework

Electrical grid

- Implement grid upgrade planned in phase 2
- Develop arrangements to ensure coordination of grid operations with power plant operations
- Verify the completion of all upgrades and enhancements
- Install and test the redundant off-site power supplies

Safety

- Continue to implement the national policy and strategy for safety.
- Implement a cooperation programme with the vendor and with other organizations operating nuclear power plants of the same type as that selected
- Establish organizations to provide expertise and engineering support or other external support
- Obtain support from external support organizations or individual experts in performing or reviewing safety assessments
- Establish an internal entity, sometimes called the 'design authority', that will maintain the knowledge of the safety design

Radiation protection

- Install radiation monitoring equipment on the NPP site
- Implement radiation dosimetry requirements for all workers
- Develop and implement programs to minimize radiation exposure during plant operation and maintenance

Management

- Invite and evaluate the bids
- Establish a project management organization
- Prepare a licence application
- Initiate and manage the construction contract, including appropriate auditing
- Complete construction and apply for a licence to operate
- Establish working relationships with international organizations
- Develop a contract for a continuing nuclear fuel supply
- Establish mechanisms for turnover responsibility
- Specify the roles and responsibilities of TSOs
- Make appropriate arrangements to avoid conflicts of interest when obtaining external support.
- Oversee the activities of TSOs and contractors, and assess the quality of the services provided
- Provide effective leadership and effective management for safety
- Establish appropriate arrangements for management of safety related knowledge
- Implement an IMS
- Implement leadership and succession development programmes to develop future leaders

Funding and financing

- Establish a financing plan for the NPP project incl. a strategy for managing associated financial risks
- Implement an agreement on the financing arrangements for the first NPP project based on the contract and financing negotiations

Stakeholder involv.

- Continue to implement and assess their SI plans
- Communicate about construction progress and preparations for operation

Siting

- Confirm the site's suitability and the completion of all licensing and approval processes

Phase 3 - Project Implementation Activities

HRD

13

- Recruit, hire and develop the project management organization
- Recruit, hire and develop the HR necessary to commission and operate the 1st NPP
- Arrange for training of the operations and maintenance team on existing similar plants
- Require SAT based training
- Implement plans for knowledge transfer
- Develop a SAT-based training and qualification program for Plant personnel
- Implement a SAT-based training and qualification program for Plant personnel
- Authorize/qualify plant personnel for fuel loading and initial critical operation
- Acquire or have access to a full-scope plant specific simulator for training control room operators
- Develop and implement a systematic way of categorizing, disseminating and retaining knowledge obtained through international cooperation
- Identify competences nuclear industry personnel will need in Phase 3 and beyond and establish plans to develop them
- develop the full range of scientific, technical, managerial and administrative disciplines
- Develop domestic research and technical support capabilities

Environmental prot.

2

- Complete all licensing and approval processes established by the nuclear regulatory body and the environmental regulatory body
- Implement an environmental monitoring programme including the establishment of baseline data.

Radioactive waste

3

- Put in operation enhanced or new facilities for the storage or disposal of LILW.
- Develop an initial decommissioning plan as part of the licensing of the first NPP units
- Monitor international efforts and progress with regard to the disposal of radioactive waste

Nuclear fuel cycle

1

- Develop plans to implement the interim storage strategy, including identifying a suitable location, transport capabilities and funding arrangements

Emergency planning

2

- Develop and implement an emergency preparedness programme, and emergency plans and procedures for nuclear power plants, and prepare the corresponding chapter of the safety analysis
- Demonstrate emergency response capabilities by conducting appropriate exercises include local authorities, and local communities.

Industrial involvem.

3

- Promote educational and industrial development for national participation in the nuclear programme.
- Implement decisions made in the bid invitation specifications about using national or foreign sources for commodities, components and services.
- Reassess the capability of national/local supply sources to support operation as construction nears completion

Security

4

- Develop and receive approval of the security plan
- Construct, test and accept the physical protection system.
- Demonstrate the effectiveness of the system, through inspections, verification and on-site exercises.
- Implement the national response plan including arrangements with outside response forces to supplement on-site response

Procurement

1

- Establish a procurement organization with the programmes and skills necessary to conduct ongoing purchasing of equipment and services during Phase 3