Webinar #**3**

Responsibilities and Capabilities of Owners and Operators

IAEA
Nuclear
Infrastructure
Development

Responsibilities and Capabilities of Owners and Operators

Marta Kaczmarek

Nuclear Infrastructure Development Section
IAEA Department of Nuclear Energy

Learning Objectives

- Gain a general understanding of the responsibilities and capabilities of the owner/operator organisations for the implementation of a new nuclear power project;
- Learn about experiences by embarking countries in setting up a nuclear power project management organization; and;
- Increase awareness of the complementarity of IAEA support in developing the infrastructure for a nuclear power programme, and NUA Working Group services towards operational readiness of the future operator organization.

3 Responsibilities and Capabilities of Owners and Operators

Benoît Lepouzé
EDF, France

Renata Kozakowska-Stankiewicz
PGE EJ 1, Poland

Md Shawkat Akbar
NPP Company Bangladesh Ltd., Bangladesh

Robert Fisher
WANO

Poll Time

At the moment your country is…

- considering a new nuclear power programme;
- ready to take a decision or already decided and preparing infrastructure;
- negotiating the first NPP contract or building the first NPP;
- relaunching or expanding an existing nuclear power programme;
- operating NPPs and is also a nuclear technology/reactor provider;
- None of the above.

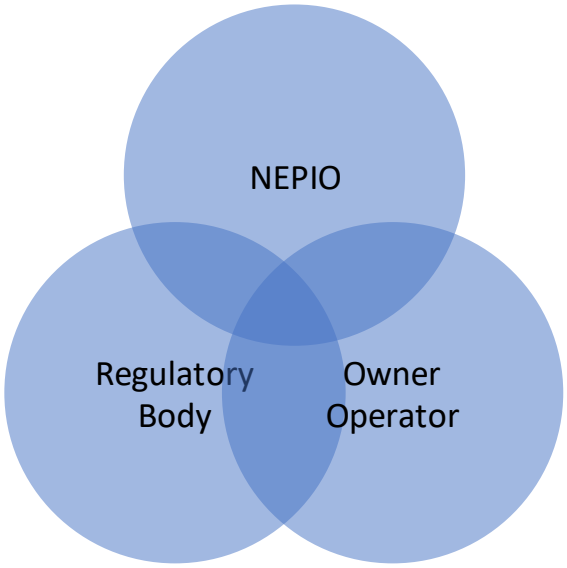
Responsibilities and Capabilities of Owners and Operators

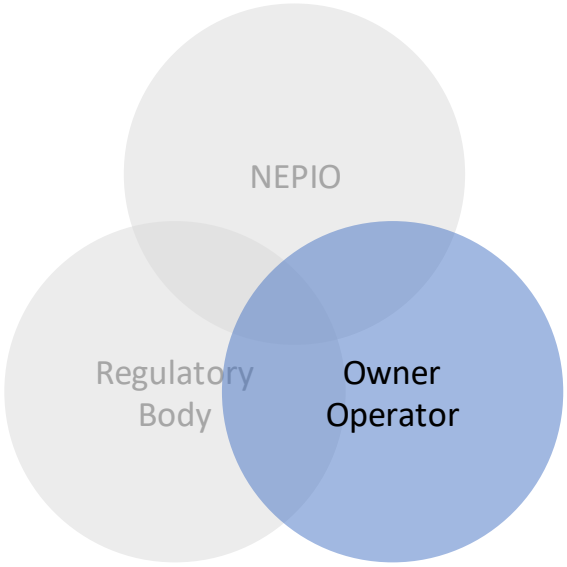
Benoît Lepouzé

- Former IAEA Scientific Secretary for the development of the IAEA publication *Initiating Nuclear Power Programmes: Responsibilities and Capabilities of Owners and Operators*, Nuclear Energy Series No. NG-T-3.1 (Rev. 1, 2020)
- Almost 30 years of nuclear experience:
  - 23 Years in EDF (French Nuclear utility)
  - 5 years experience working for the IAEA (NIDS section)
- Currently in charge of the relations with international organizations for the new nuclear and pre-development of nuclear projects for EDF
- Member of the IAEA Technical Working Group for Nuclear Power infrastructure (2020-2022)

Responsibilities and capabilities of owner/operators in a new nuclear power programme

IAEA Webinar - 29 October 2020


NEPIO
Regulatory Body
Owner Operator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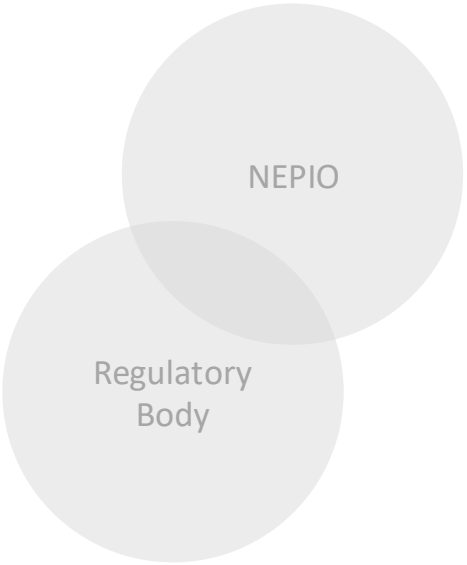
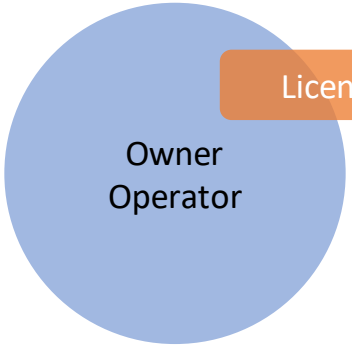
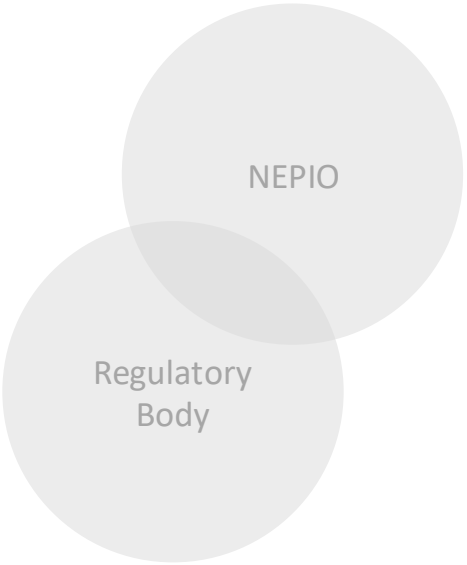
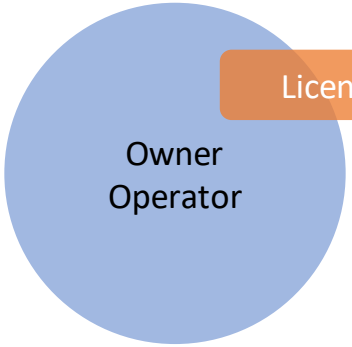




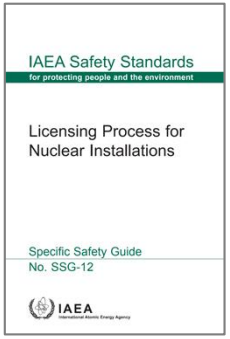
Bears the prime responsibility for safety

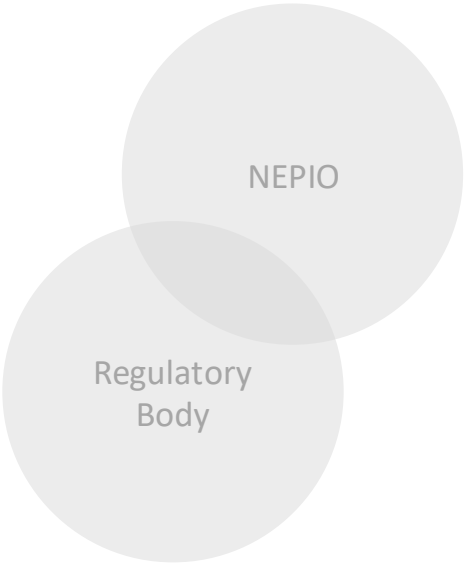


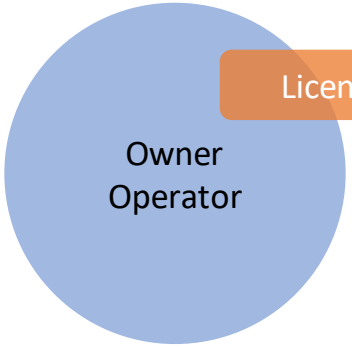


Bears the prime responsibility for safety

See SSG 12



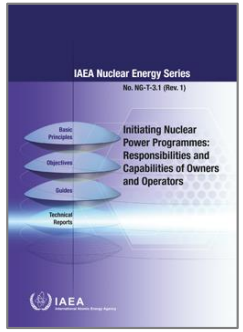


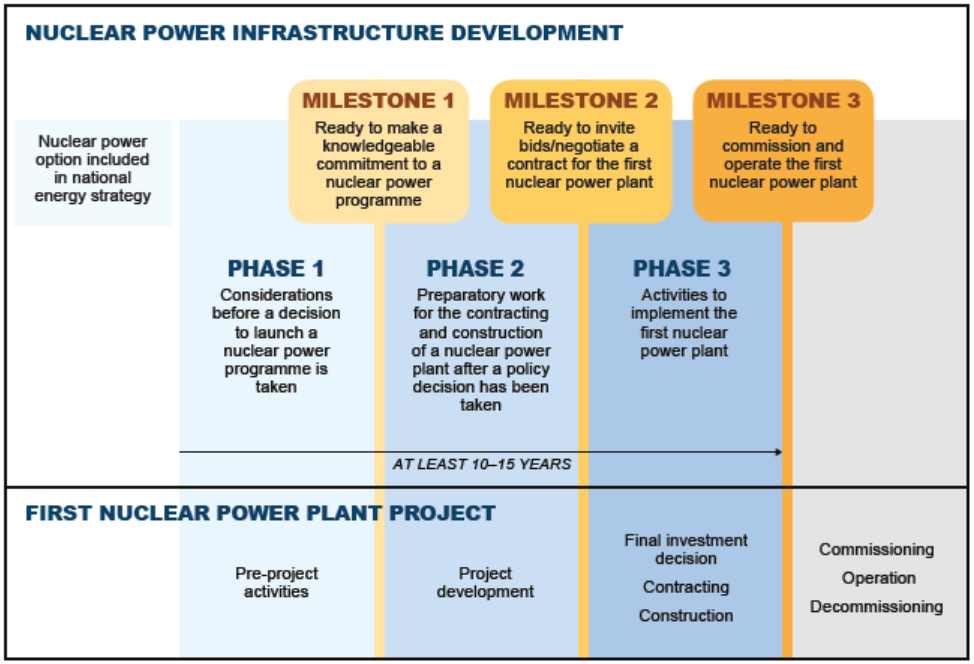


Bears the prime responsibility for safety

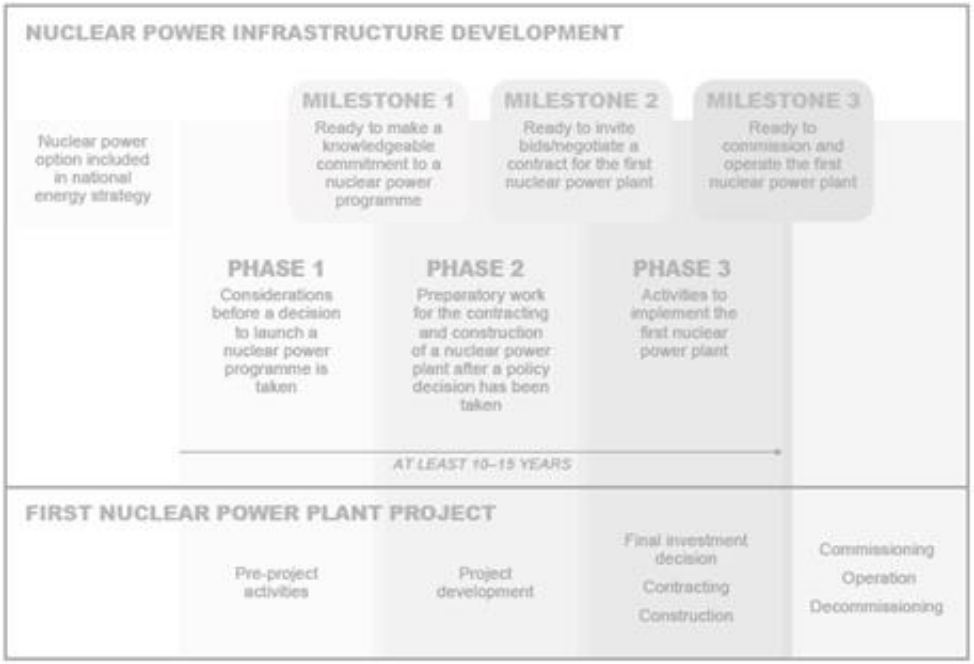
See SSG 12

NG-T 3.1 (Rev. 1) describes the roles of the Owner/operator within a new nuclear power programme





From NG-G-3.1 (Rev. 1) (p.5)



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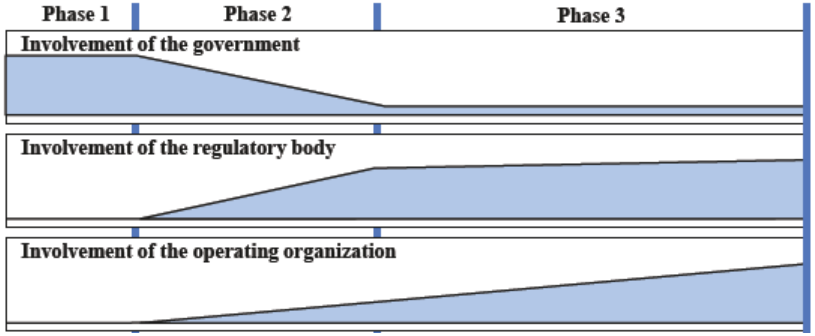
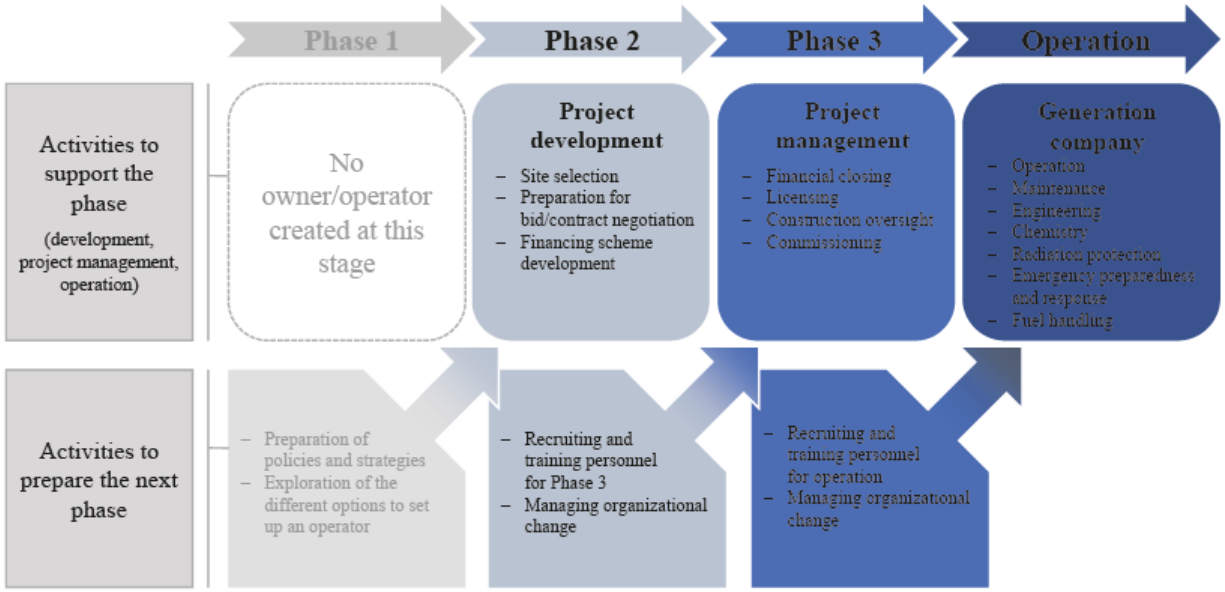


From SSG16 (Rev. 1) (p.5)


Safety culture
Open communication
Knowledgeable customer
Ability to manage growth and change



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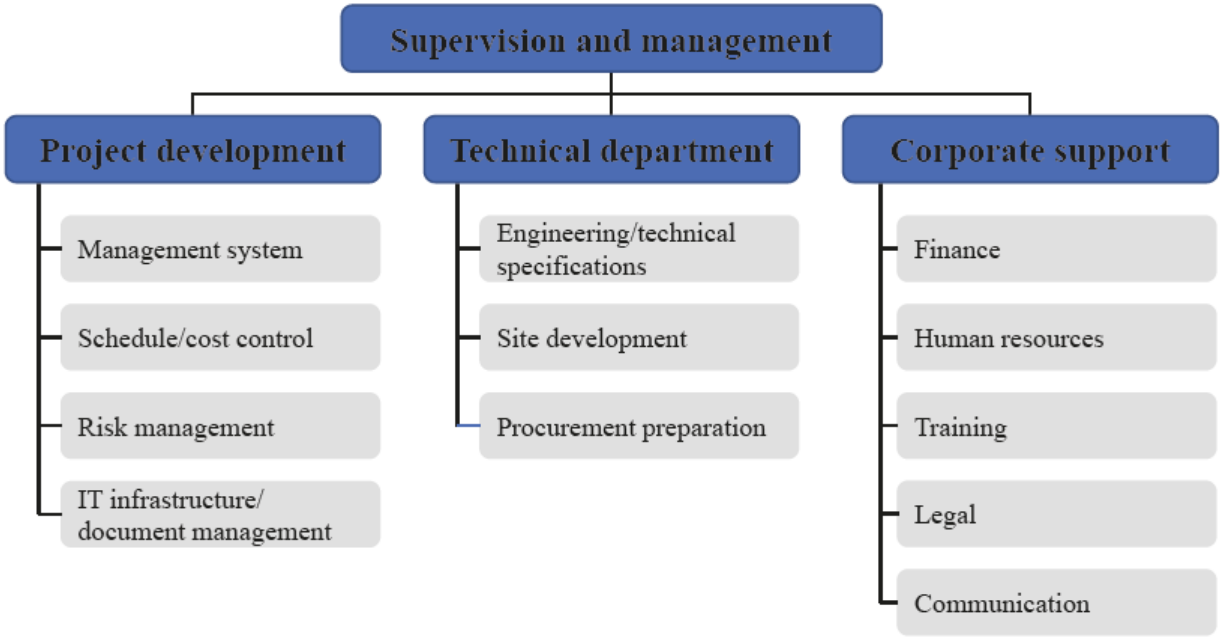
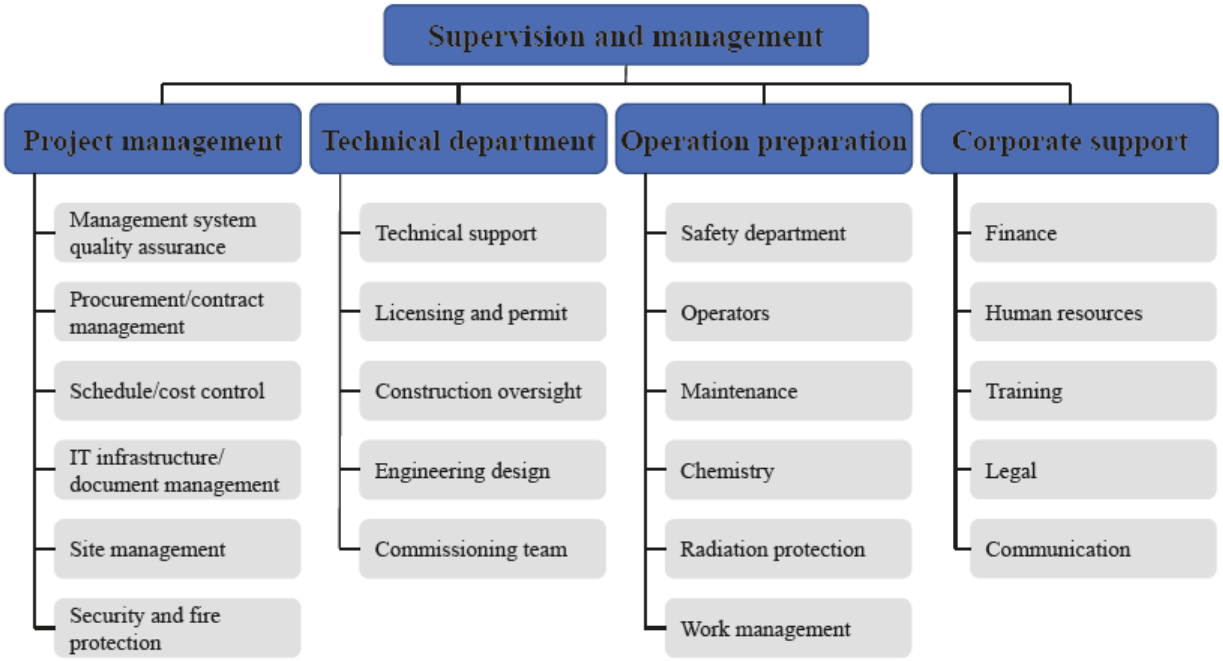

Supervision and management
Project development
Management system
Schedule/cost control
Risk management
IT infrastructure/ document management
Technical department
Engineering/technical specifications
Site development
Procurement preparation
Corporate support
Finance
Human resources
Training
Legal
Communication


Supervision and management
Project management
Technical department
Operation preparation
Corporate support
Management system quality assurance
Procurement/contract management
Schedule/cost control
IT infrastructure/ document management
Site management
Security and fire protection
Technical support
Licensing and permit
Construction oversight
Engineering design
Commissioning team
Safety department
Operators
Maintenance
Chemistry
Radiation protection
Work management
Finance
Human resources
Training
Legal
Communication

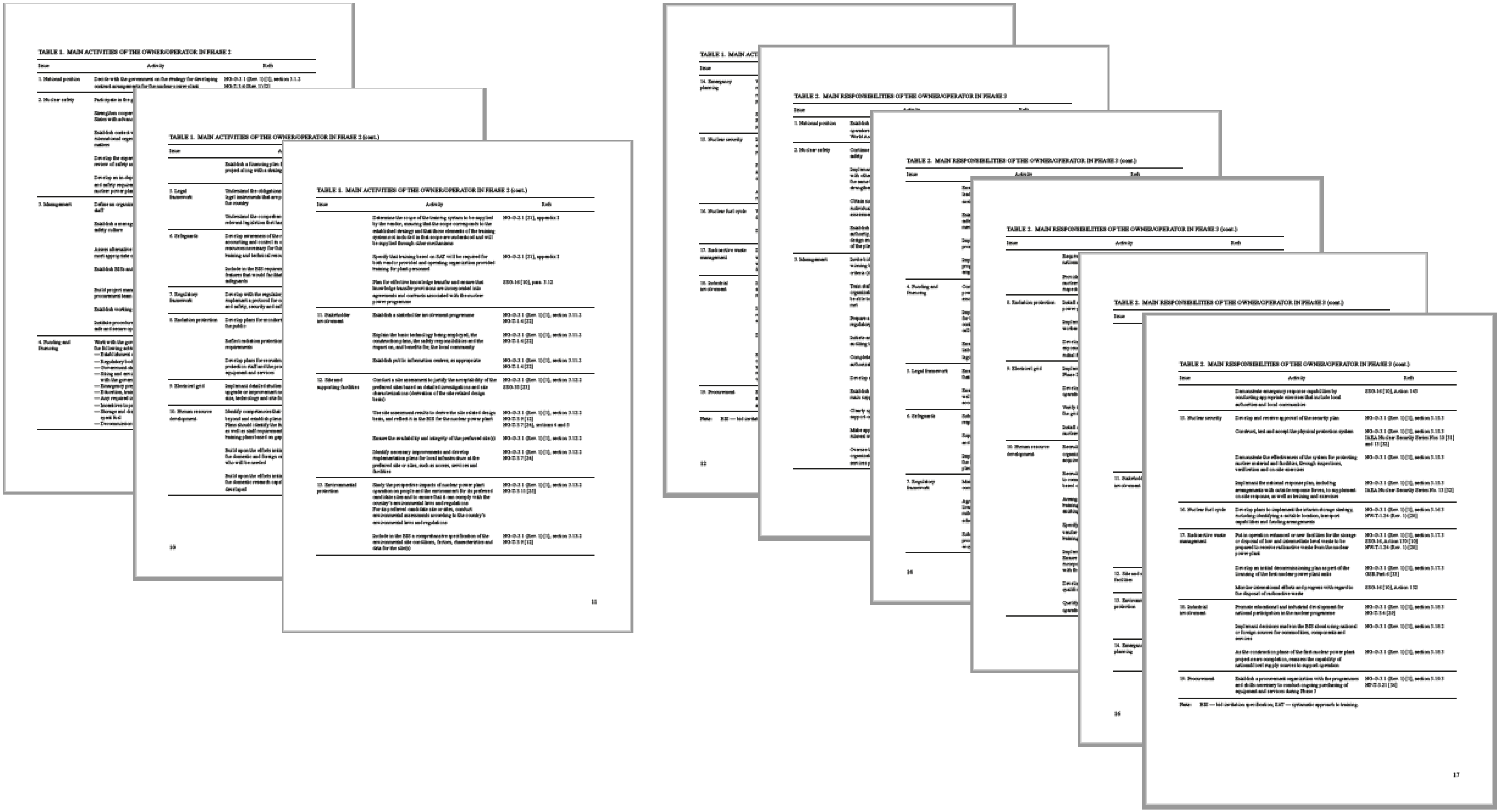


TABLE 1. MAIN ACTIVITIES OF THE OWNER/OPERATOR IN PHASE 2
TABLE 1. MAIN ACTIVITIES OF THE OWNER/OPERATOR IN PHASE 2 (cont.)
TABLE 2. MAIN RESPONSIBILITIES OF THE OWNER/OPERATOR IN PHASE 3
TABLE 2. MAIN RESPONSIBILITIES OF THE OWNER/OPERATOR IN PHASE 3 (cont.)

Key Activities in Phase 2

Future O/O needs to implement the following activities:


Develop an IMS


Review legal and regulatory activities


Manage site activities e.g. EIA and site characterization


Agree on a financing strategy


Prepare the bid inquiry/contract specifications


Implement a stakeholder involvement plan


Plan and develop capabilities for construction

Key Activities in phase 3

Before FID, and thus before construction commencing, the O/O is expected to:

- Negotiate and finalize NPP procurement contracts;
- Close financing agreement;
- Review and approve design documentation;
- Obtain construction and other required licenses;
- Make site services and infrastructure available.

Key Activities in Phase 3 (Cont'd)

Once construction starts, the O/O is expected to:

Manage construction contract and oversee construction;

Ensure grid upgrade and apply for an electricity license if needed;

Implement all requirements necessary to bring fuel on site;

Implement stakeholder involvement plan;

Prepare for the operation phase (procedures, recruitment and training, license application).

Take away messages

1. The owner/operator is an evolving organization that should be established at the beginning of Phase 2

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2. It is the licensee of the plant and hence bears the prime responsability fo safety (even during construction, even with an EPC contract)
3. The owner/operator should be technically and commercially competent to discharge its obligations during construction
4. The owner/operator manages interfaces with external stakeholders and should have clear lines of communication both internally and externally

Take away messages

1. The owner/operator is an evolving organization that should be established at the beginning of Phase 2
2. It is the licensee of the plant and hence bears the prime responsability fo safety (even during construction, even with an EPC contract)
3. The owner/operator should be technically and commercially competent to discharge its obligations during construction
4. The owner/operator manages interfaces with external stakeholders and should have clear lines of communication both internally and externally
5. Eventually, the owner/operator will have to turn into a generating company and should prepare for operation during construction.

Renata Kozakowska-Stankiewicz

- Program Coordination Office, PGE EJ 1
- Experience in
  - Integrated management systems
  - process management
  - HR process owner support
- Advocate of strong leadership, continuous improvement and digital transformation

EJ 1 sp. z o.o.

PGE EJ 1 - First Polish NPP build Program

IAEA Webinar on Roles and Capabilities of Owner and Operator

Warsaw, 2020

Contents

- ❑ Owner / Operator of the NPP
- ❑ PGE EJ 1 role / upcoming changes
- ❑ Program execution schedule - current scope
- ❑ Organisation chart / allocation of HR
- ❑ HR development
- ❑ Culture of Safety

Owner / Operator of the NPP

Polish Nuclear Power Program (PNPP)

Document defining the roles, objectives, schedule, strategic and economic aspects of NPP

adopted in 2014, to be amended

PGE Polska Grupa Energetyczna S.A.

The largest power group in Poland, project organiser for construction of the NPP

PGE EJ 1 sp z o.o.

Special purpose company acting as the operator established in 2010

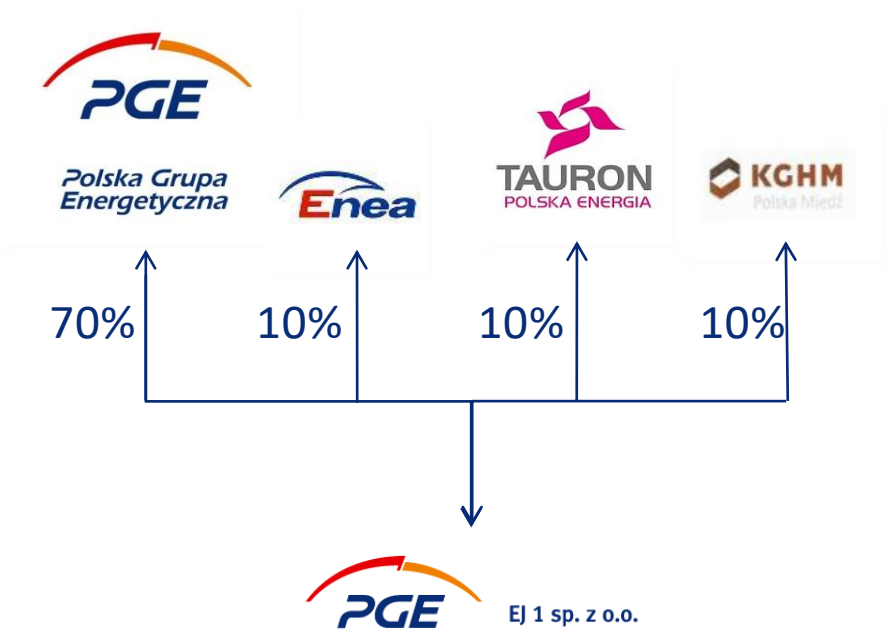
PGE EJ 1 role / upcoming changes

Current focus:

Completing **the site investigations and environmental surveys** in the potential locations for constructing the NPP.

Development of the **EIA and site evaluation reports** on the basis of the conducted studies.

Current ownership structure:

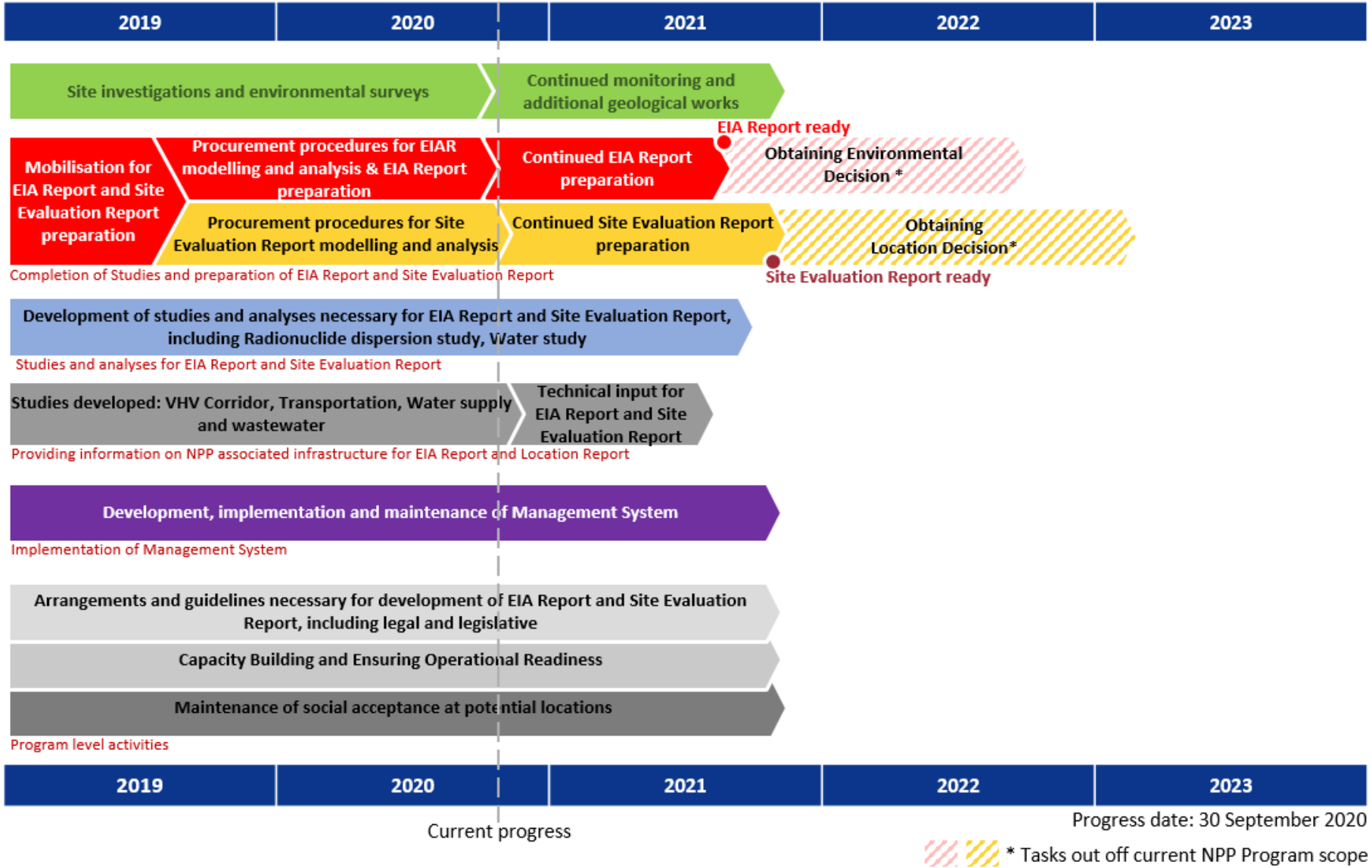


The Polish Nuclear Power Program is under amendment. Planned changes include new ownership structure of PGE EJ 1:

- will be acquired by the State Treasury in 100%
- will be owned by the State Treasury in at least 51% after the choice of strategic investor.

Programme execution schedule - current scope

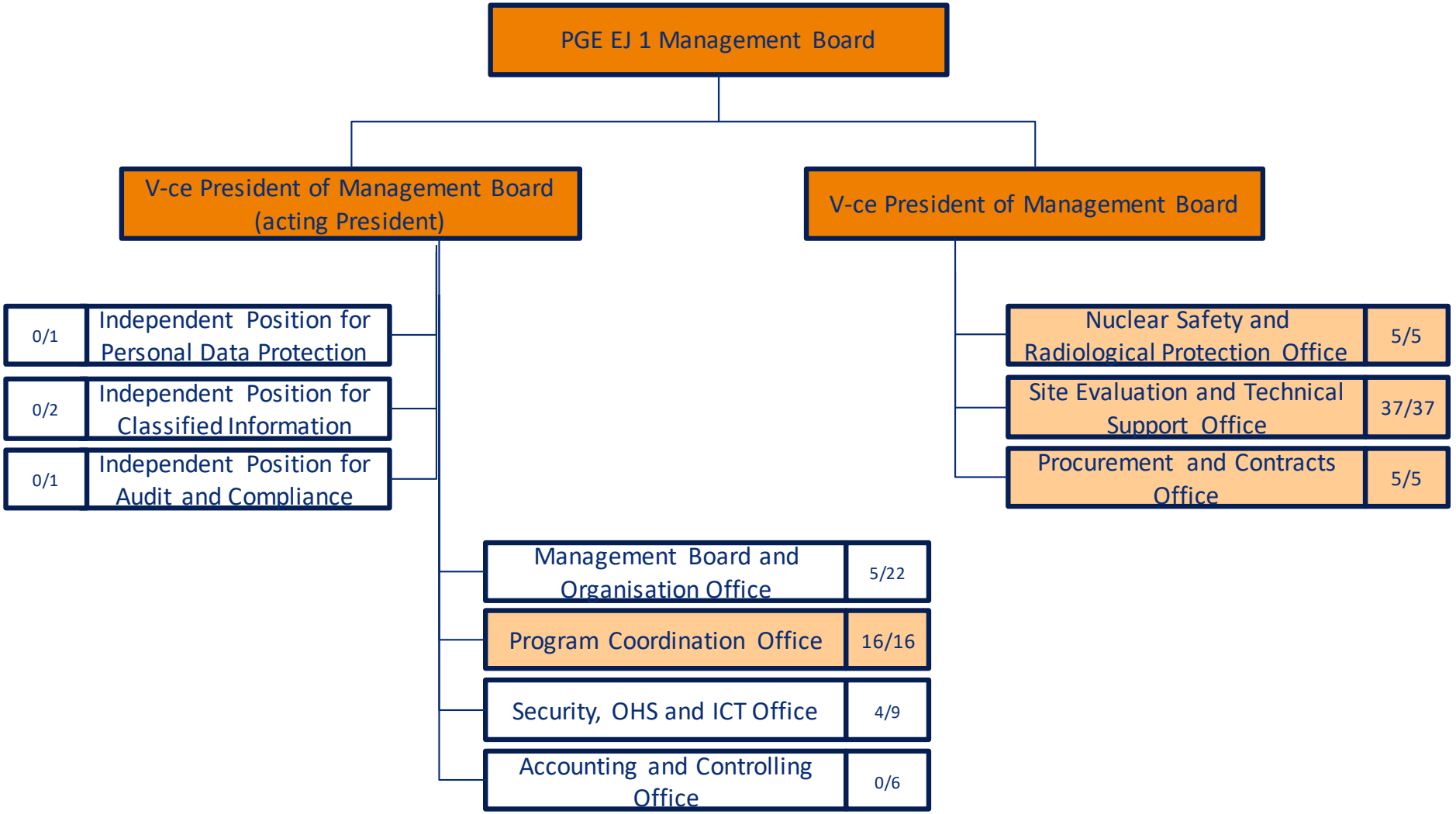
The First Polish NPP Build Program focuses on the completion of site investigations and environmental surveys up to the development of EIA Report and Site Evaluation Report



Engaged in preparation or supporting preparation of the reports / All employees	70/104

Organisational Structure

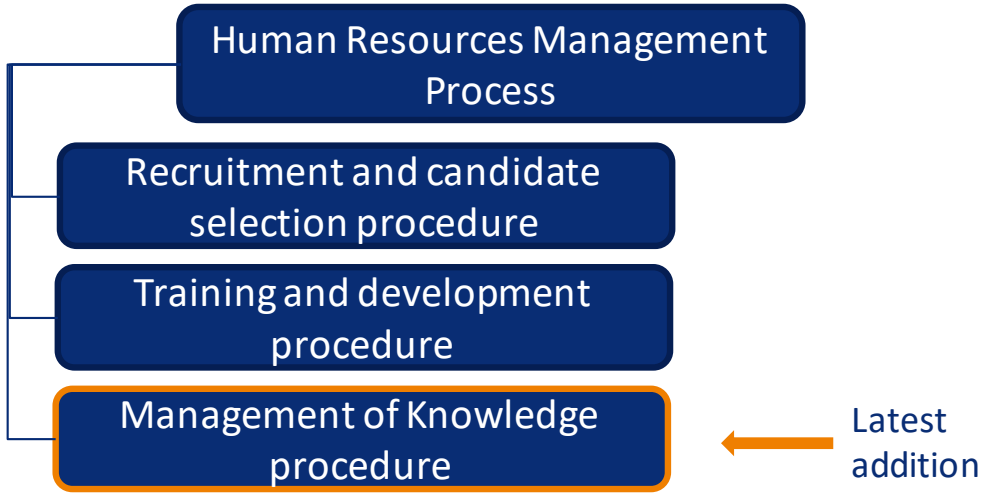
Organisational structure / allocation of HR



Human Resources development

Evolution towards nuclearisation of human resources

Set of IMS documentation



Selected guidelines

IAEA standards

Polish Nuclear Power Programme (PNPP) (former Ministry of Energy)

Outline plan for the development of human resources for the needs of nuclear power" (former Ministry of Energy)

Analyses and plans delivered by the Technical Advisor

Analyses and plans developed internally

Current focus

Strong internal competencies to realise the activities in the current phase
Trainings with strong focus on Polish Nuclear Power Programme related issues
Implementation of HR mechanisms according to the current phase
Continuous improvement based on the quality&process management mechanisms
Evolution towards full compliance with the IAEA standards (including SAT)

Human Resources Development

Nuclearisation of human resources - examples

External Partners

IAEA International Atomic Energy Agency

Warsaw University of Technology

PTN

Narodowe Centrum Badań Jądrowych
National Centre for Nuclear Research
ŚWIERK
instytut kategorii A+, JRC collaboration partner

Internal communication

Newsletters, dedicated press reviews concerning the nuclear subjects and energy market

Latest HR development projects:

- Job descriptions / Competence matrix project (2019)
- Succession planning (in progress)

104

99 employees - higher education
4 employees – PHDs in the nuclear field
33 employees completed postgraduate studies, incl.9 who completed more than one
4 people to complete postgraduate studies in 2021

PGE EJ 1 induction training

2-days of training including: **nuclear technology and safety, electricity, energy market**, security, information security and personal data protection, project and org.structure, site investigations and environmental surveys, etc.

PGE Group induction training

(optional, available new employees of PGE Group) including: Energy market, ethics and compliance, including a visit to the lignite mine and the largest power plant in Poland (Bełchatów)

Internal experts trainings

Trainings prepared and let by internal experts (knowledge sharing, organisational culture building)

External trainings

About 2000h (2019+2020) of trainings directly related to Program

Culture of Safety

Selected elements of the **Culture of Safety Plan** are implemented and described in the IMS documentation:

1. Policies

- Leadership and Management for Safety Policy,
- Security Policy,
- Quality Policy.

2. **Processes,** e.g.

- OHS Management and Fire Protection,
- Security Management,
- Environmental Management.

3. **Mechanisms** embedded in other processes, e.g.:

- Safety Team,
- Safety Meetings,
- management of knowledge,
- trainings.

Safety Team

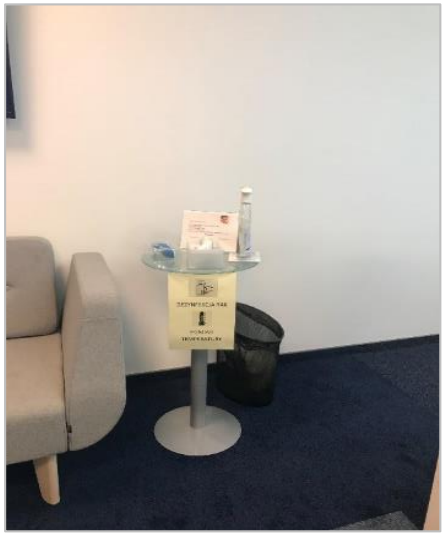
advisory team facilitating introduction of elements of Culture of Safety, comprised of employees from every org. unit

Safety Meetings

regular meetings for all employees promoting Culture of Safety

SAFETY TEAM - COVID CASE

- „Safe return to the office" manual
- Visual preparation of the office (e.g. limits in the number of people in rooms)
- Equipment preparation and distribution (gloves, disinfectants, temperature measuring stand, screens)
- Coordination of tests / isolation procedures



Temperature measuring stand

Face masks available in the reception area

EJ 1 sp. z o.o.

Thank you

Mohammad Shawkat Akbar

- Chief Scientific Officer of Bangladesh Atomic Energy Commission
- Over 28 years of experience
  - Project Director for Construction of Rooppur NPP Project
  - Managing Director of Nuclear Power Plant Company Bangladesh Limited
- Contributor to the development of national nuclear infrastructure as a Member of
  - National committee headed by Hon. Prime Minister
  - Technical Committee headed by Hon. Minister of Science & Technology
  - Working Group and 8 Sub-groups headed by MOST Secretary

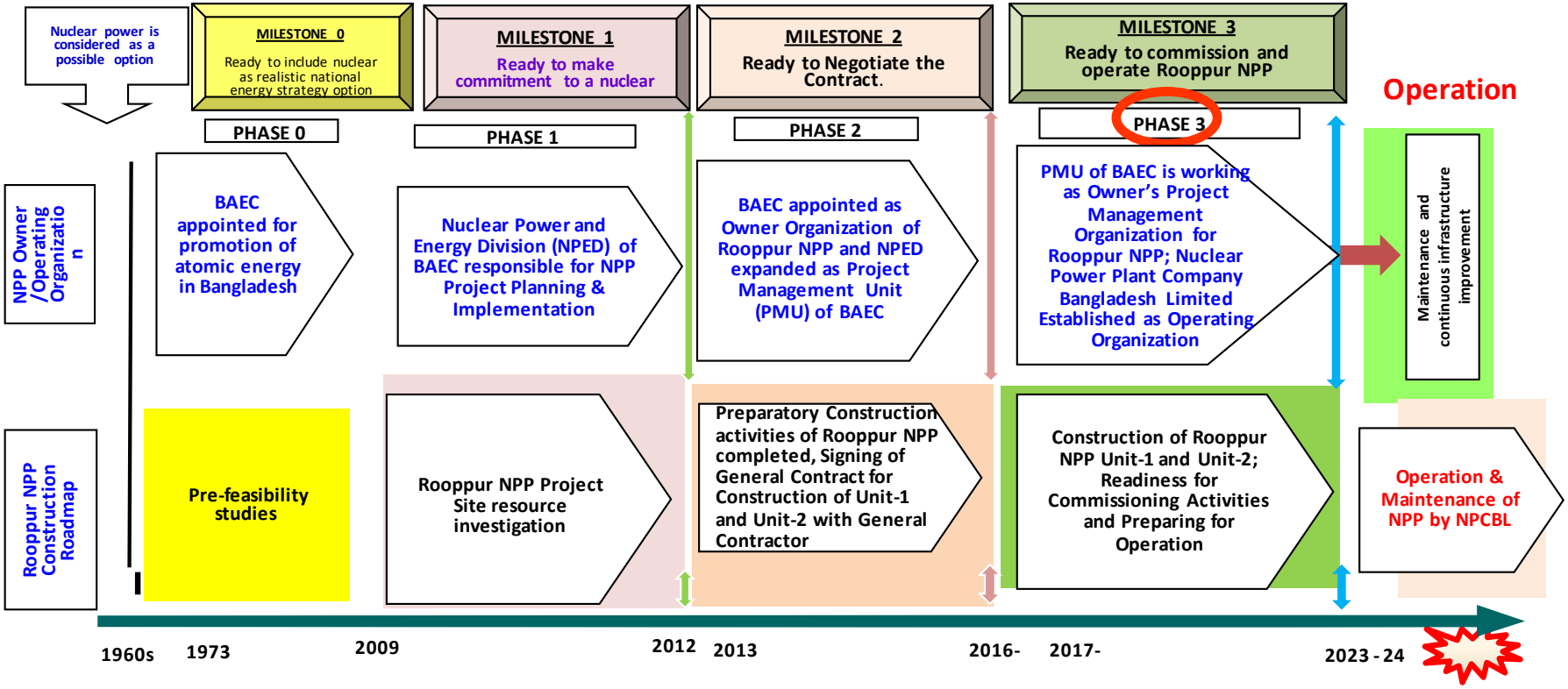
Construction of Rooppur NPP - Phase 3 Activities

Mohammad Shawkat Akbar
Project Director, Rooppur NPP Project, &
Managing Director, NPCBL

Content

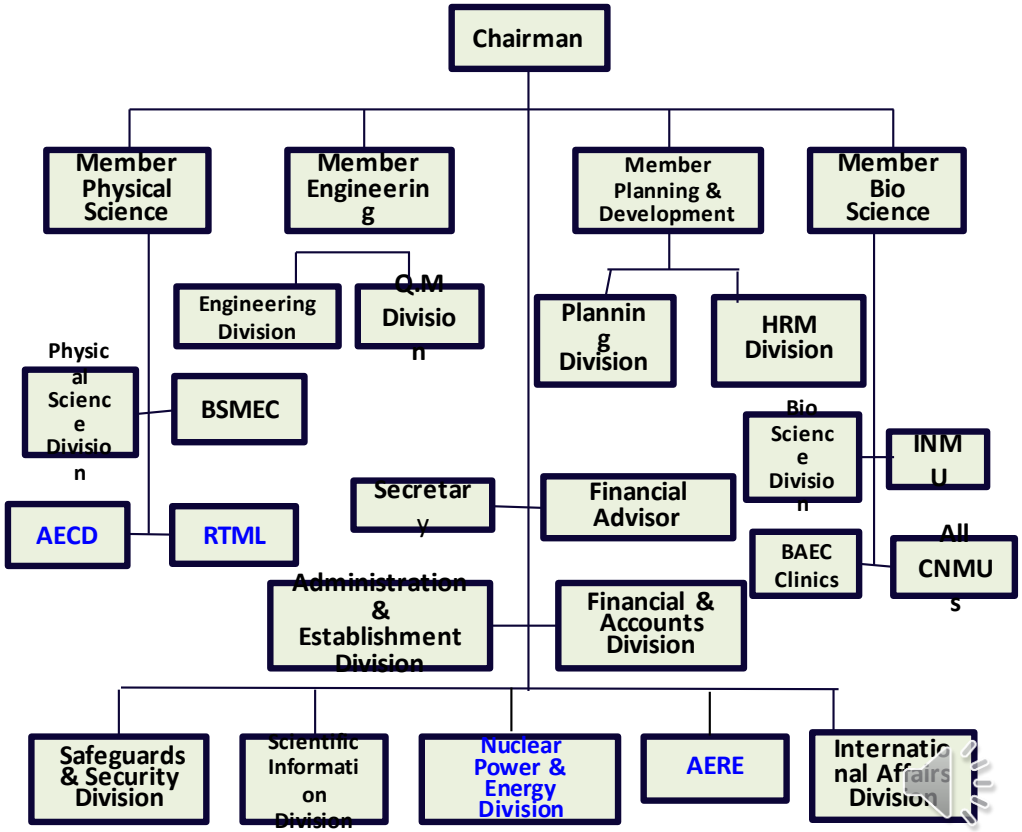
- Infrastructure, Organization & Rooppur NPP Project Phases
- Owner Organization, Infrastructure and Project Management
- Phase 3 Activities- Rooppur NPP Construction Activities
- Transition from Project Management to NPP Operation at Phase 3
- Challenges: Transition from Project Management to NPP Operation

Infrastructure, Organization & Rooppur NPP Project Phases

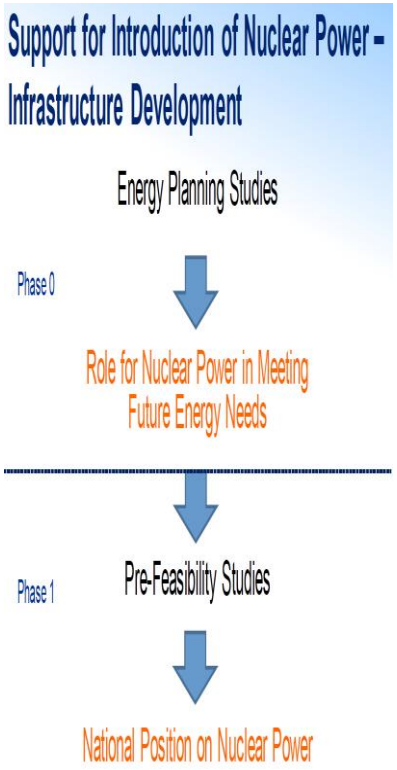


NPP Owner Organization, Infrastructure Development and Project Management

- Bangladesh Atomic Energy Commission (BAEC) was established in 1973 for promotion of application of atomic energy for peaceful purposes in the country;
- BAEC has the ultimate right to use the NPP by the Atomic Energy Commission Order 1973;
- Nuclear Power and Energy Division (NPED) of BAEC assigned responsibilities for planning and implementation of nuclear power project in the country;



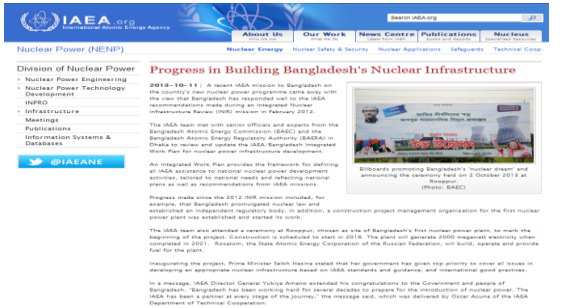
- A fundamental basis in the area of nuclear science and technology through establishment of a 3 MV Van de Graff accelerator, a TRIGA Mark II Nuclear Research Reactor, a 3 MeV Tandem Accelerator and various nuclear R&D facilities within BAEC;
- Introduction of research reactor was important step towards building NPP;
- NPED involved nuclear power programme through IAEA assistance; participated in IAEA-RCA programmes in economic assessment of nuclear power considering all components of costs and technical parameters of NPP during 2000 – 2008; outcomes of such helped in determining national position to include nuclear energy in energy mix;
- Experiences in construction, regulatory approval, operation, maintenance of research reactor and other nuclear facilities and the knowledge gained through TRIGA Mark II enables in making knowledgeable decision about NPP;
- Many key infrastructure issues of the IAEA Milestones Approach related to Milestone 1: national position, nuclear safety, regulatory framework, safeguards, radiation protection, security and physical protection, etc. are already developed within the scope of a research reactor and other nuclear R&D programme;



- Experiences of operation, regulation, training personnel, nuclear research and educational programme and safety assurance activities of the research reactor are the domestic resources to begin to form a NEPIO and making it functional in the development of nuclear infrastructure for Rooppur NPP build;

- Past experiences of Bangladesh in running research reactor and other nuclear facilities and recommendations of the INIR Mission in 2011 for Phase 1 and Phase 2, follow-up mission in 2016, IWP for Bangladesh developed and implementing with assistance of IAEA and other stakeholders helped in developing infrastructure related to Milestone 2 and approaches toward the Phase 3 activities;

- BAEC signed General Contract for construction of Rooppur NPP with two power units VVER-1200 with JSC Atomstroyexport, Russian Federation and started construction of Rooppur NPP by concrete pouring to the foundation of Unit-1 in November 2017;



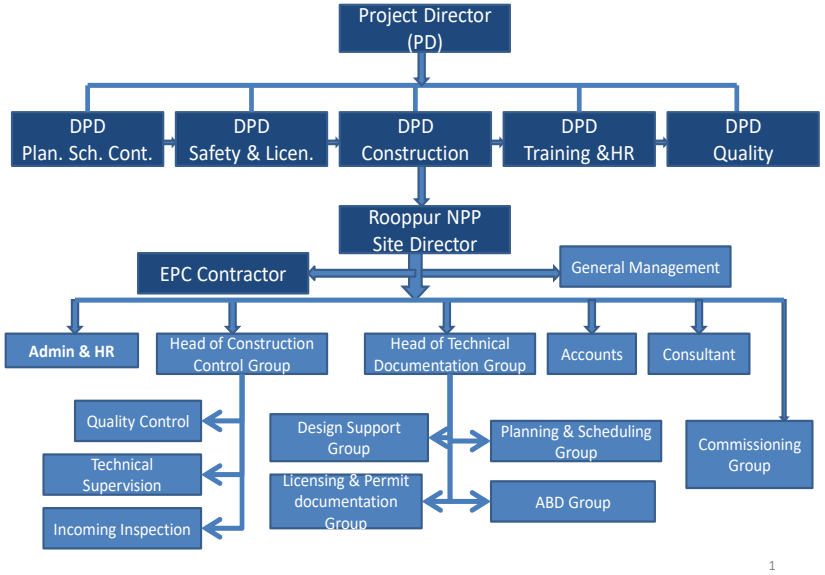
Phase 3 Activities: Rooppur NPP Construction

- Bangladesh is now in Phase 3- an active phase of Rooppur NPP construction. Completion of concreting of ICW, concreting of rector cavity and containment slab at elev. +26.300, and supply of reactor vessel and four steam generators of Unit-1 to the site are the targeted activities of 2020;

- A project management Organization (PMO) for Rooppur NPP Project is established within BAEC based on Project Document and IAEA guidelines to fulfill obligation of BAEC under General Contract for construction of Rooppur NPP;

- Presently, PMO performing technical supervision of the construction activities that is carried out by General Contractor based on Work Execution Plan, Working Documentation, normative requirements and regulations;

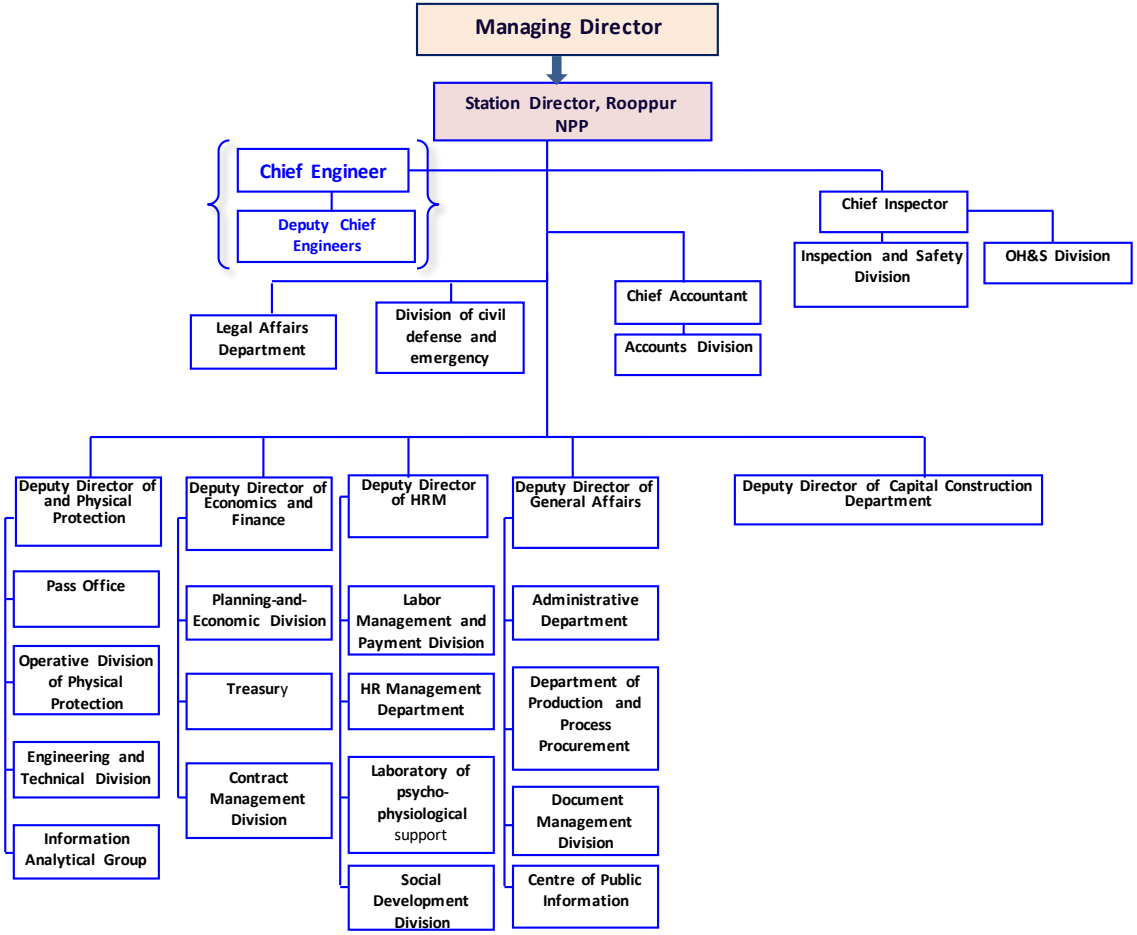
- The PMO is controlling over quality of design and structures, products, materials, equipment, construction and assembly works and the testing and installation of equipment



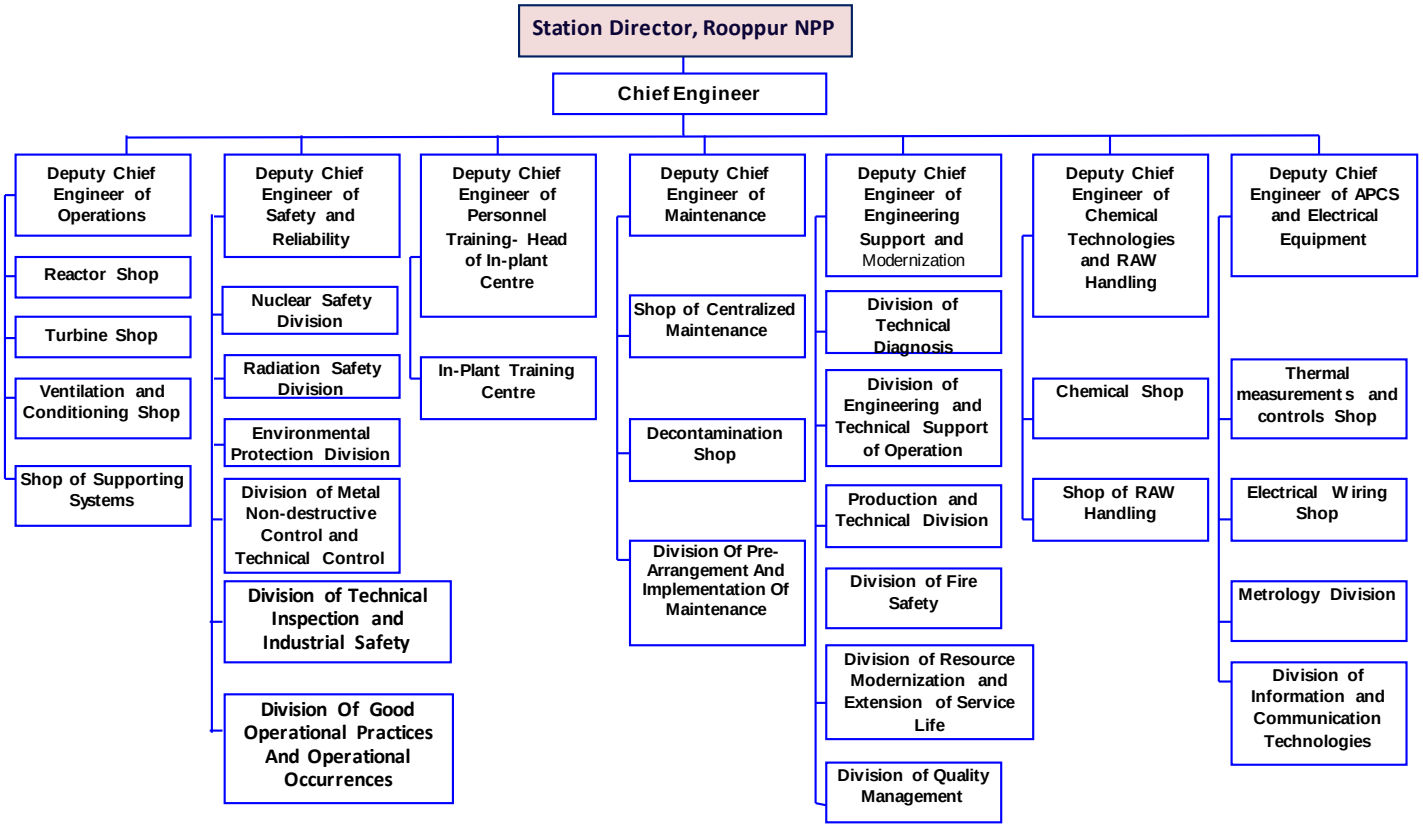
Establishment NPCBL, Rooppur NPP Operating Organization, Phase 3

Nuclear Power Plant Company Bangladesh Limited (NPCBL) established based on Nuclear Power Plant Act 2015 as an operating organization of NPP for timely creation of necessary infrastructure for safety operating Rooppur NPP at the end of Phase;

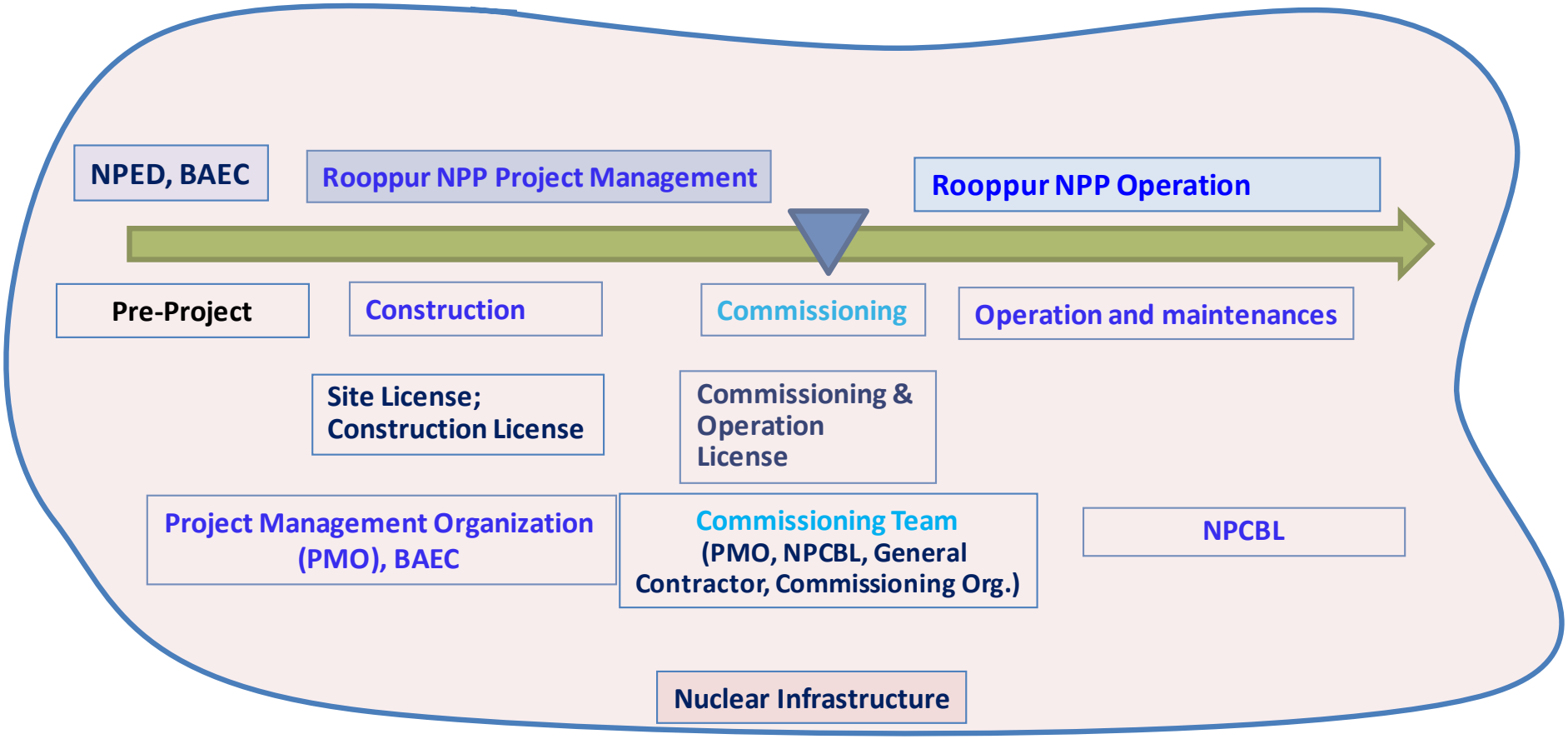
As a part of Phase 3 activities, the Project Management organization of Rooppur NPP is developing the competency of the Operating Organization, NPCBL for commission and operation of the plant



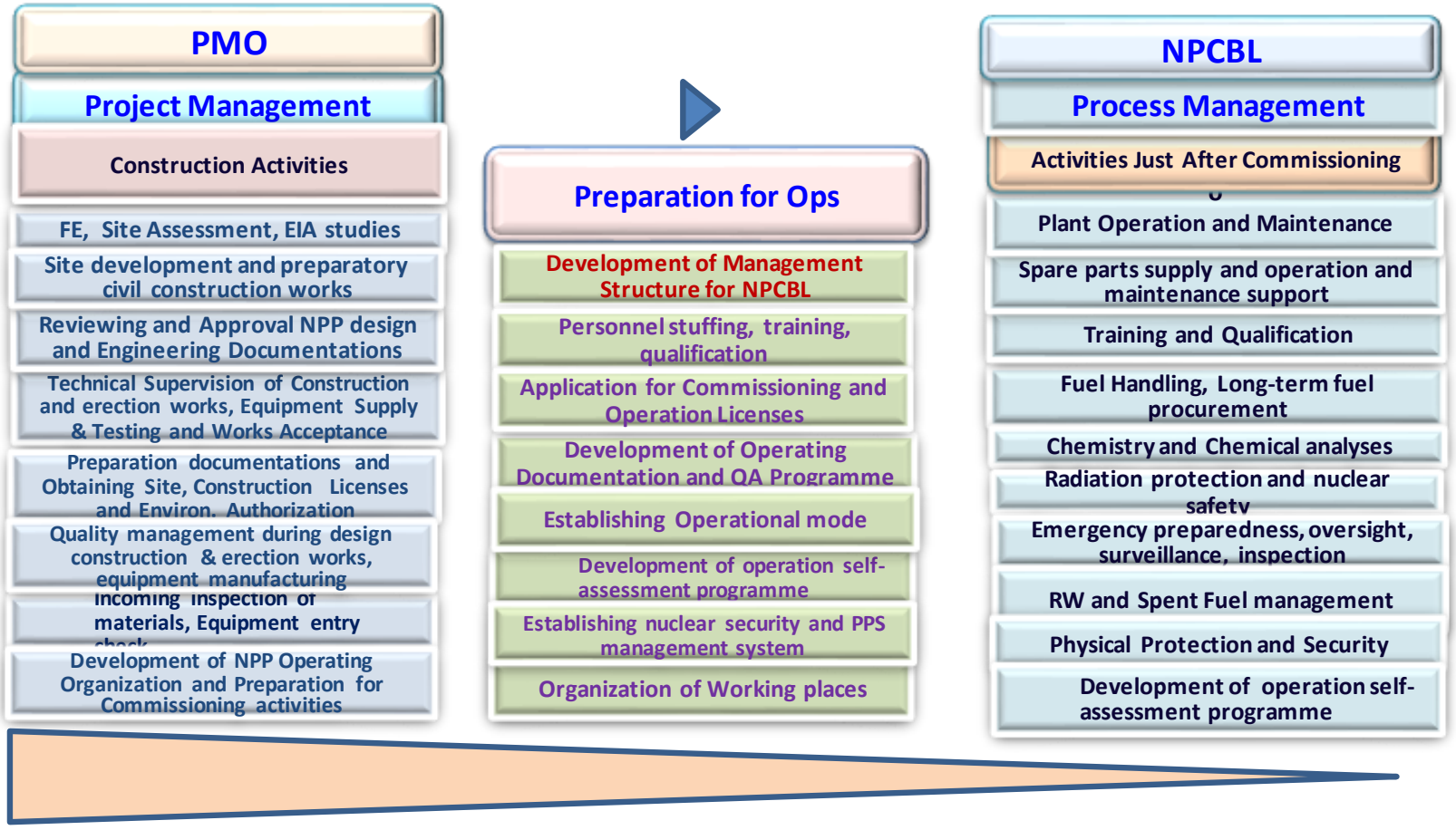
Proposed Organizational Structure of Rooppur NPP Operational Management



Transition of Functions from Project Management to NPP Operation at Phase 3



Functions of PMO and the function during Transition from and Operating Organization



Challenges: Transition from Project Management to NPP Operation (Phase 3)

- **Management of the General Contracts is a critical task and synchronization and maintaining the Schedules of the General Contract is big challenge;**
- **Synchronization of Construction Schedule and Licensing Schedule;**
- **Rooppur NPP project is the largest project of the country both in terms of financial involvement and complex tasks – a BIG national concern for timely construction with quality and guarantying nuclear safety,**
- **Communicating and coordinating activities with other organizations participating in the Nuclear Power Programme;**
- **Timely Recruitments, Training and Posting of the personnel**

- Complexity of the change during organizational phase transition (technical, organizational, cultural, etc.);
- Mix of different activities in a transition from Project phase to operating phase
- New competences needed to be obtained in advance
- Cultural change is to be implemented to introduce safety culture
- Nuclear infrastructure is vital environment to be in place at all phases

Thank you very much

Poll Time

Amongst other responsibilities and capabilities, the owner-operator should:

- Understand the safety implications of the works being undertaken under its supervision
- Foster a safety culture across its organization and throughout the supply chain
- Implement a management system for all its activities
- Manage all site and environmental impact assessments required for the site license
- Manage the financial package of the construction project
- Oversee the Nuclear Power Plant construction
- Apply for Licenses at different stages of the construction project
- Define a communication strategy to communicate with all relevant stakeholders
- Prepare for operation and maintenance far before the end of construction
- All the above

Robert J Fisher

- Chairman of the New Unit Assistance Working Group
- 40 Years of nuclear experience
  - PWR, BWR, and CANDU Fleet Operational Experience
  - Transformational Leadership Experience at Exelon, Bruce Power, and TVA
  - 7 Years of New Unit Operational Readiness Experience as CNO, Nawah Energy Company, UAE
- Lead Author of the Roadmap to Operational Readiness (R2OR)

New Unit Assistance Working Group *and the* Roadmap to Operational Readiness

Webinar on Responsibilities and Capabilities of Owners and Operators

Robert Fisher

Chairman, New Unit Assistance Working Group

Contact: rjf112158@yahoo.com

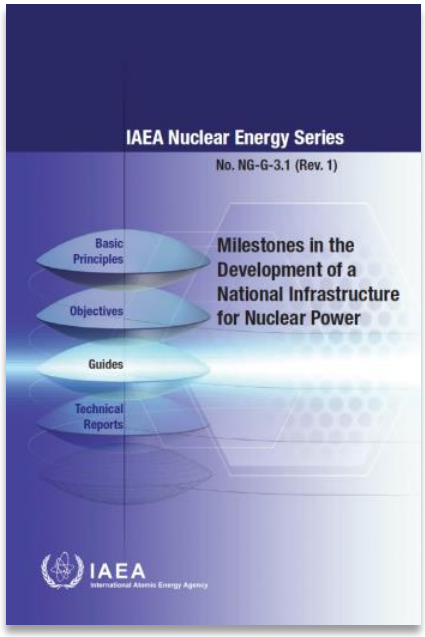
Milestones in the Development of a National Infrastructure for Nuclear Power (NG-G-3.1)

The IAEA has developed the Milestones Approach to assist Member States introducing a nuclear power programme or expanding an existing one

The national nuclear infrastructure required to support the programme ranges from

'**softer**' areas, such as laws, institutions, regulations, international legal instruments, human resources, and stakeholder involvement

to the '**hard**' (or physical) aspects of infrastructure, such as the capacity and quality of the electricity grid, available sites, transport system and the local industrial base



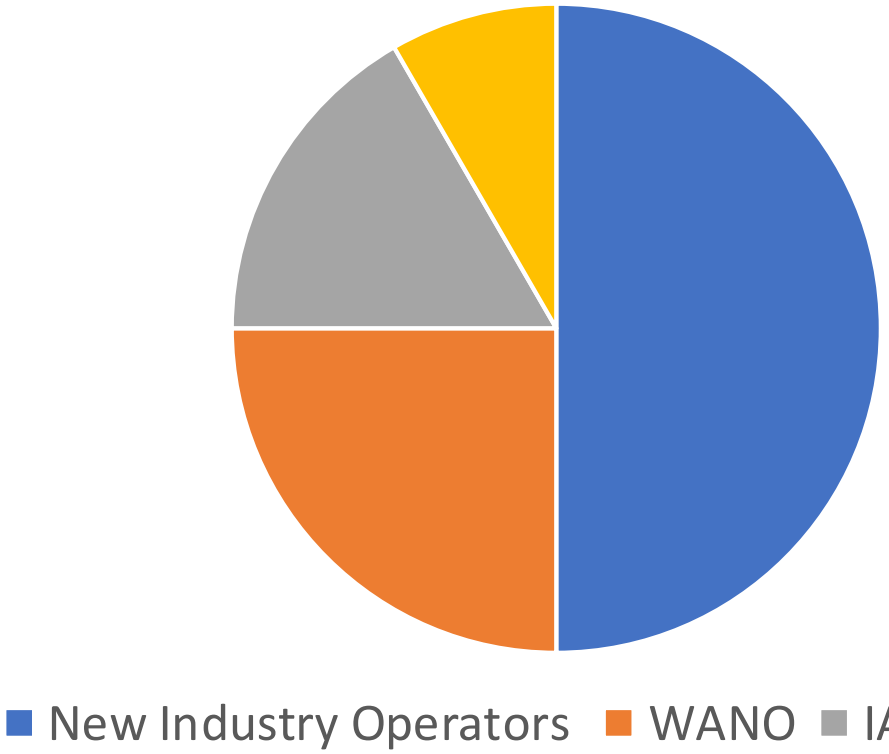
NG-G-3.1 issued in 2007
Updated in 2015

"What I struggled to know and understand early in my 7 year journey to operational readiness"

- What do I (as the operator) need to be ready for? What are the important milestones?
- When is the earliest I need to be ready for each milestone?
- How will I know we are "ready" at each important milestone?
- What metrics should I have to help track my progress? What pace of change is required for each to be successful?
- What help is available to me from the IAEA and WANO? How are they organized to help me?
- What is the basis for my readiness needs that I might effectively justify my annual planned actions and associated costs?
- How do I best compensate for my organization's lack of large project skills? How do I best manage significant, ongoing change?
- How do I build an effective team and healthy safety culture with a broad mix of international employees of varying experience levels?

Robert Fisher
previous CNO Nawah Energy Company, Barakah NPP

The New Unit Assistance Working Group (NUAWG)

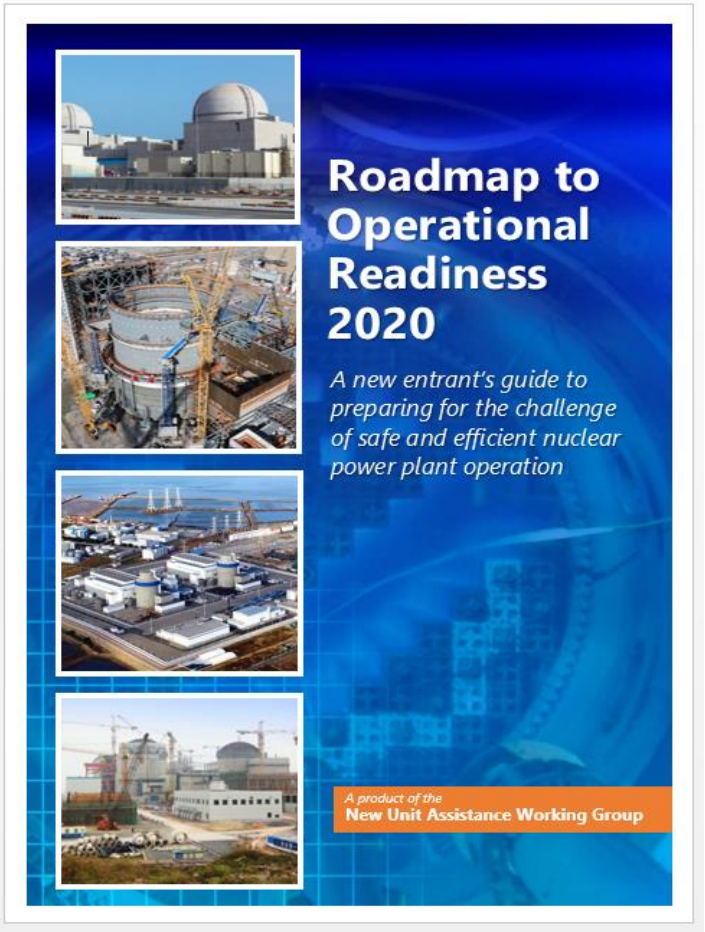


The NUAWG is an industry working group facilitated by WANO.

Members are predominantly operators. Expertise from the IAEA, WANO, and EPRI provide essential support.

The NUAWG serves as the advocate for new nuclear operators, especially those in newcomer countries

Our objective is to improve the safety, quality, schedule, and cost of the new entrant operational readiness experience.



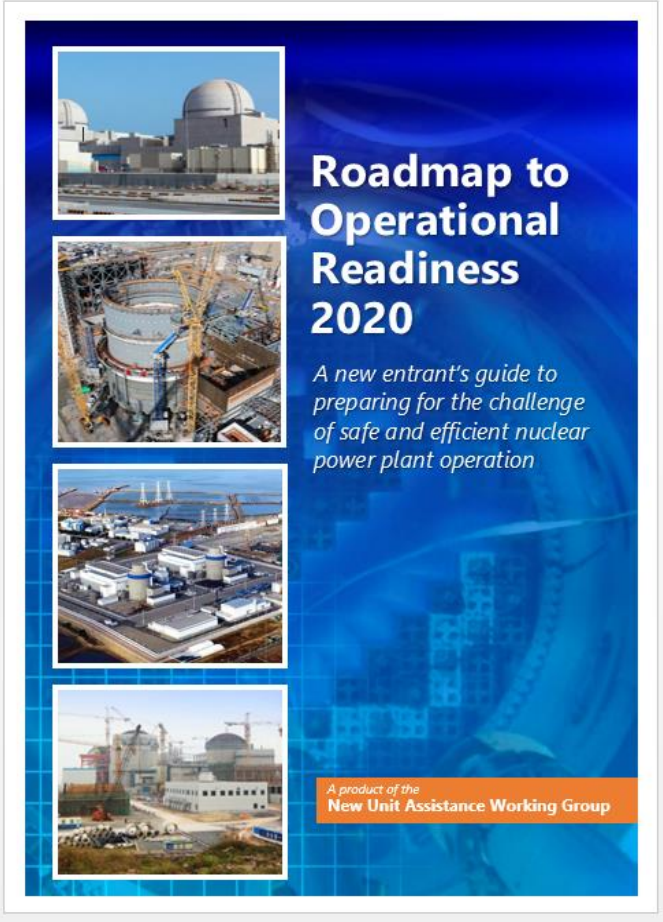
The intent of the Roadmap is to guide the methodical creation of a robust operational capability … and do so ahead of plant availability

The Roadmap is a document written by operators for operators

While based on a foundation of recent operator experience, it leverages the guidance and lessons learned available from the IAEA, WANO and other agencies.

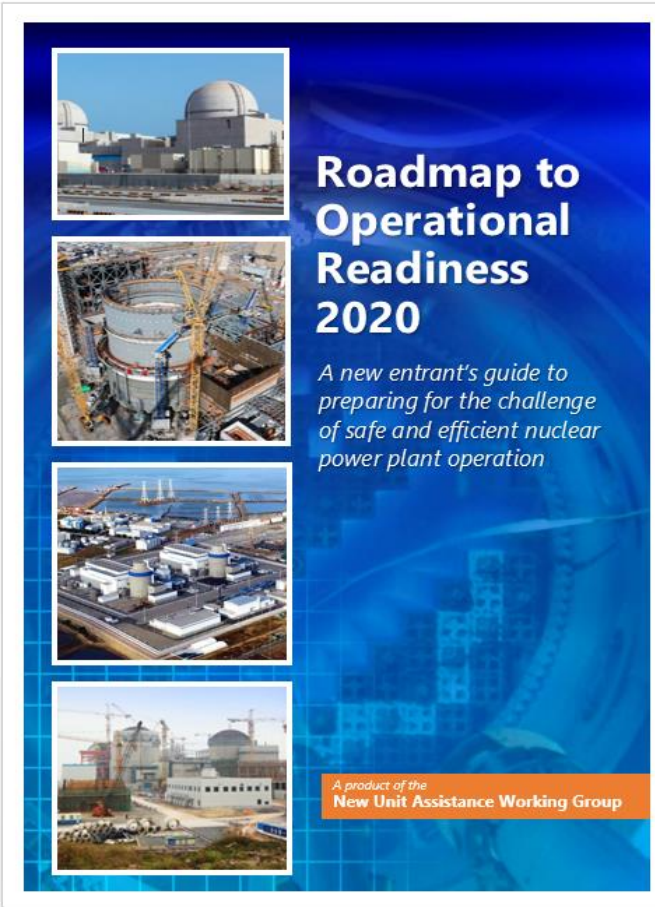
The NUAWG is working to “close the gaps” in new unit operational guidance and support, to include:

- Greater consideration for operationally friendly decision making in the early project phases of evaluation, commercial contracting, construction, and commissioning
- The identification of needed operational elements and content within an integrated management system (IMS)
- A definition of the large scope and associated timings of Operational Readiness activities
- A connection, integration, and resolution to conflicts within existing industry guidance



To close these gaps, the NUAWG has created 300+ pages of guidance contained within the Roadmap to Operational Readiness. It includes the following:

- Important nuclear safety concepts and standards
- Common terminology
- A listing of relevant and helpful industry references
- The citing of benefits tied to early relationship building with IAEA, WANO, EPRI, etc.
- An explanation of the process and a description of the applicable standards linked to critical pre-startup assessments
- The identification of recent industry new unit success stories



The Roadmap expands upon the multi-agency model of New Unit support for building operational understanding and capability ...

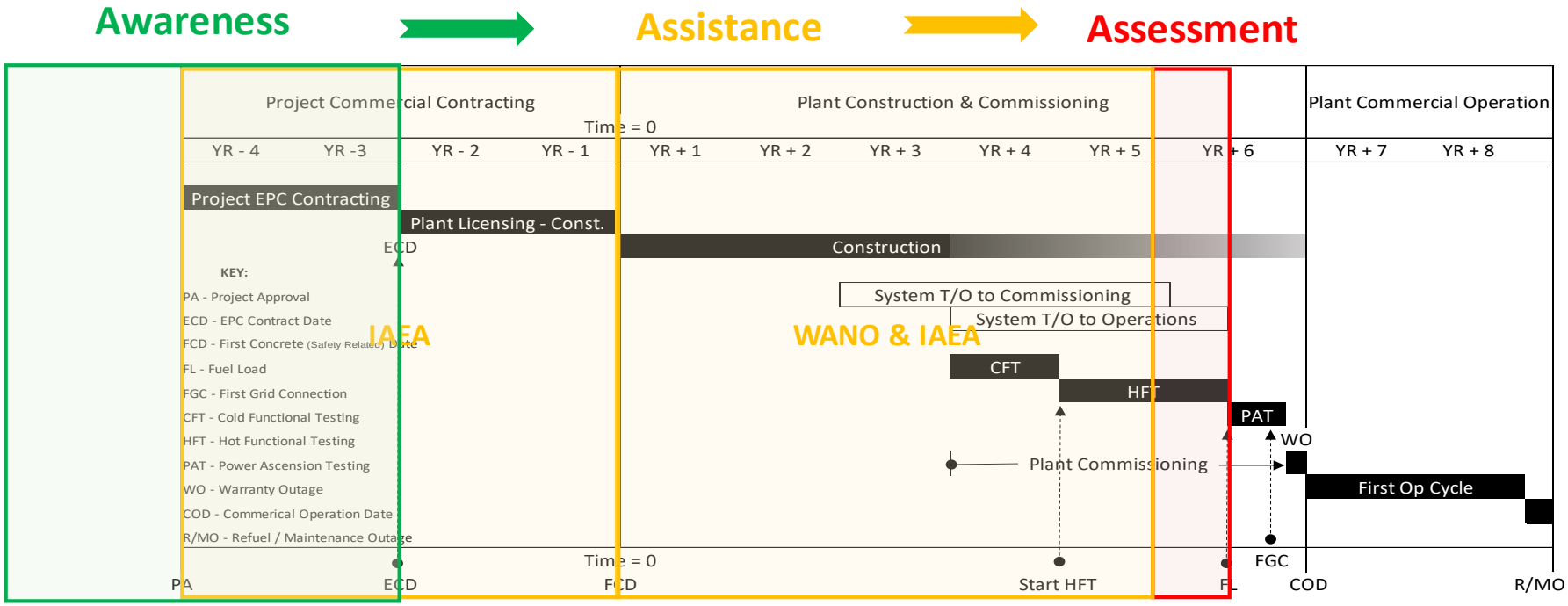


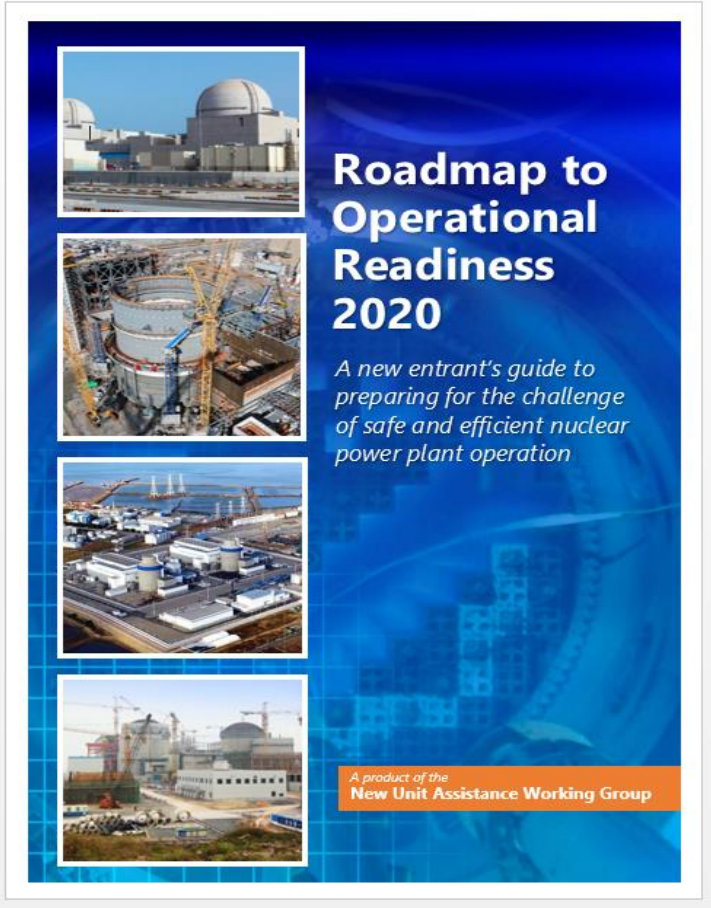
Figure D.1: Standardized Sequence of Project Activities to Plant Operation

Publication of the Roadmap to Operational Readiness (R2OR) is the NUAWG's first effort to close the gaps in new unit operational readiness performance.

Next steps:

- This month, we conducted a pilot workshop for R2OR implementation with PAKS II.
- The creation and execution of a robust and integrated suite of operational readiness projects complementary to the R2OR

We have begun a virtuous cycle of continuous improvement in the development and implementation of operator policy, process, program, procedure, infrastructure, and organizational structure in preparation for new unit operation



The Roadmap is a publically available document accessible via the IAEA and WANO websites

The New Unit Assistance Working Group (NUAWG) invites and encourages you to access the Roadmap to Operational Readiness 2020

AND

We extend an invitation to new nuclear industry operators to join the NUAWG and benefit from the group's work and interactions with its membership.

Responsibilities and Capabilities of Owners and Operators

Q & A Time

Benoît Lepouzé
EDF, France

Renata Kozakowska-Stankiewicz
PGE EJ 1, Poland

Md Shawkat Akbar
NPP Company Bangladesh Ltd., Bangladesh

Robert Fisher
WANO

Webinar Series on
Role of Government and Key Organizations involved in the development of a nuclear power programme

Upcoming Webinar

Experience of Member States in Building a Regulatory Framework for the Oversight of NPPs

The materials from previous webinars under this series are available under https://www.iaea.org/nid-webinars

IAEA Nuclear Infrastructure Development