Collaboration of Countries Embarking on Their First NPP and/or RR Project, on Sustainable Nuclear Infrastructure Development

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Intergovernmental agreement on cooperation in the field of peaceful uses of atomic energy with nuclear infrastructure section and mutual obligations to advance NI

- Intergovernmental agreement on cooperation in the field of construction and operation of a NPP
- Agreement on Cooperation between regulatory bodies

“the competence of both the owner / operator and the regulatory body may well be ensured through expertise and support from experienced foreign organizations, including the nuclear power plant supplier”
Specific considerations for IGA with NI section

The Parties shall cooperate in nuclear infrastructure development for the benefit of NPP/SMR/RR/CNST construction, global nuclear safety regime and proliferation resistance. The cooperation shall include assistance in:

1. Nuclear policy, strategy
2. Legislation and regulatory framework development
3. Enhancement of the institutional framework (NEPIO, Owner/Operator, regulatory body)
4. Human resources development
5. Ensuring safety, security and safeguards: nuclear and radiation safety, EPR, IAEA safeguards, SSAC, nuclear fuel cycle, electrical grids development, safety culture
6. Stakeholder involvement and public acceptance

For safe and efficient project implementation and licensing, cooperation on NI development shall be:
- aligned with the NPP/SMR/RR/CNST construction contract schedule;
- based on the norms and rules of the technology recipient country, IAEA and international recommendations and guidance and vendor regulations.
National and organizational Nuclear Safety Policy and Strategies backed by interstate collaboration

Organizational (corporate) level
- Safety policy and safety culture policy
- Integrated management policy
- Stakeholder involvement and local engagement policy
- Supply chain policy

Corporate strategies

Energy planning and Feasibility study

- International nuclear conventions & and IAEA requirements
- National nuclear policy and strategies
- Comprehensive nuclear law, other legislation and regulations

Safety strategy, HRD strategy, Nuclear fuel cycle strategy, RWM strategy, Industrial involvement and localization strategy, Non-energy application strategy, R&D strategy

International nuclear conventions & IAEA requirements
National nuclear policy and strategies
Comprehensive nuclear law, other legislation and regulations

R&D strategy
R&D strategy
R&D strategy
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R&D strategy
Regulatory body and regulatory base maturity for licensing: interstate partnership approach

**TARGET:** Availability of the clear legal and regulatory base for NPP project licensing.

**SOLUTION:**
- Analysis of the national comprehensive nuclear law.
- Adoption of the regulatory base with the provisions of the Vendor country and IAEA safety standards, in the absence of the regulatory framework at the beginning of the NPP construction and licensing.
- Using the experience of the regulatory body of the Vendor country.
- Regulatory body personnel training.
- Soft coordination between the operating organization and the regulatory body.
- Requirements harmonization.

"An option is to start development of national regulations by adopting or adapting regulations from a country that has licensed the same type of NPP".

1. Legal and regulatory framework of the customer country

1.2. IAEA safety standards (Safety fundamentals (SF-1), General Safety Requirements (GSR)), Specific Safety Requirements (SSR)).

1.3. Legal and regulatory framework of the contractor

2. Safety guidelines (safety guidelines of the customer country, IAEA safety guidelines (GSG and SSG), safety guidelines of the contractor (design development country)).

* References: Belarus, Turkey, China, Bangladesh; Uzbekistan (under development).
Gap analysis for institutional development through interstate partnership

**case of Operating organization (OO) readiness for licensing and safety ensuring**

**TARGET:**
- Meeting operational safety management requirements;
- Timely licensing;
- Readiness of qualified specialists to perform the functions of OO during construction, testing and commissioning of NPP.

**SOLUTION:**
- OO development, including the IMS, documentation and personnel skills.
- Development of a procedure for managing organizational and design, construction, operation modifications with the aim of ensuring safety.
- Development of procedures and rules for the acceptance of equipment and documentation review.

<table>
<thead>
<tr>
<th>№</th>
<th>Activities for safety assurance</th>
<th>Functions National &amp; IAEA requirements</th>
<th>Current status</th>
<th>Gaps</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Management and organization structure</td>
<td>*Assessment of OO’s readiness to perform the required functions based on IAEA requirements:</td>
<td></td>
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<tr>
<td>2</td>
<td>Operational safety management</td>
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<td>3</td>
<td>Operational safety programmes</td>
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<tr>
<td>4</td>
<td>NPP commissioning</td>
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<td>5</td>
<td>NPP operation</td>
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<tr>
<td>6</td>
<td>Maintenance, testing, surveillance and Inspection</td>
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<tr>
<td>7</td>
<td>Preparation for decommissioning</td>
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</tbody>
</table>

*Assessment of OO’s readiness to perform the required functions based on IAEA requirements:
- № SSR-2/2 (Rev. 1)
- № NS-G-2.4 and national requirements

“It is important to develop a functional unit that can take the project forward to the point where the experience of the vendor country (or another experienced country) can be included.”
**Advance planning is a key to successful Project implementation (train-the-trainers approach).**

### NI competency management and HR enhancement through interstate partnership

**TARGET:** Availability of the required NI personnel of the necessary quantity to perform the functions in the sphere of radiation protection, radioactive waste management, nuclear material transportation, emergency preparedness and response, etc.

**SOLUTION:**

- Organize training and competences development based on the assessment of the national educational system abilities, NI and Project requirements and NPP Project schedule.
- Application of train-the-trainers methodology.

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### Quantity of NI personnel required for NPP Project

<table>
<thead>
<tr>
<th>№</th>
<th>Personnel category</th>
<th>Quantity (pers.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regulatory body</td>
<td>~100</td>
</tr>
<tr>
<td>2</td>
<td>Organizations and ministries providing radiation protection</td>
<td>~350</td>
</tr>
<tr>
<td>3</td>
<td>Organizations of the country's electric power system</td>
<td>~100</td>
</tr>
<tr>
<td>4</td>
<td>Organizations and ministries providing EPR, municipals</td>
<td>~650</td>
</tr>
<tr>
<td>5</td>
<td>Organizations and ministries providing physical protection</td>
<td>~250</td>
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<tr>
<td></td>
<td>of nuclear installations and nuclear material, RW and SNF</td>
<td></td>
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<tr>
<td></td>
<td>storage facilities and transportation</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Organizations and ministries providing nuclear material</td>
<td>~60</td>
</tr>
<tr>
<td></td>
<td>accounting and control, IAEA safeguards application, export</td>
<td></td>
</tr>
<tr>
<td></td>
<td>control</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Organizations and ministries providing RW management</td>
<td>~100</td>
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</tbody>
</table>

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"All organizations involved in the nuclear power programme should have a systematic way of categorizing, disseminating and retaining knowledge, including training material, obtained through international cooperation and contracted commercial service”.

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Ensuring safety, security and safeguards and Licensing risk management through comprehensive partnership and soft coordination

1. National emergency preparedness and response framework and capabilities
2. National RW and SF strategy and operator
3. Radiation monitoring system on national and regional level
4. SSAC, physical protection, national fire protection framework
5. Decommissioning plan and strategy

1. Requirements for the EPR plan, classification of emergency situations
2. Requirements for RW categorization and management
3. Dose limits, radiation protection of workers, public and environment requirements
4. Overall safety, accounting and control, PP, decommissioning requirements
5. Licensing and supervision

1. Qualification and training, commissioning, plant operation programmes
2. Physical protection, Radiation protection programmes
3. Fuel management programme, waste management and environmental monitoring
4. Plan operation and maintenance, quality assurance, fire safety programmes
5. Decommissioning programme

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**NPP project schedule**

1. **Construction license**
2. **Construction**
   - Permission for commissioning works
3. **Operation license**
   - Permission for fuel loading
4. **Operation**
   - Decommissioning license
Interstate partnership for stakeholders involvement and public acceptance based on multi-criteria cost & benefits analysis

MACRO LEVEL: UN methodology on countries’ VNR on SDG

MESO LEVEL: INPRO methodology on nuclear energy sustainability

MICRO LEVEL: ESG indicators according to GRI standards, UNCTAD GCR

Stakeholders impact on NPP project

Statutory and non-statutory stakeholders map with communication practices

NPP project impact on stakeholders anticipations, decisions and judgements

1. International organizations
2. State entities and regulators
3. Local government
4. Shareholders
5. Ecological societies and public organizations
6. Universities
7. Analysts and rating companies
8. Business partners and investors
9. Suppliers and electric companies
10. Employers and workers
11. Students
12. Banks
13. Media
14. Local community

UN methodology on countries’ VNR on SDG
INPRO methodology on nuclear energy sustainability
ESG indicators according to GRI standards, UNCTAD GCR
Partnership model of efficient NI development

IWP between IAEA – Partner-country – Rosatom

IAEA missions (INIR, IRRS, IPPAS, EPREV, ISSAS, etc.)
Technical cooperation programmes

IAEA

Customer Country

Vendor country

4-S approach: safety, security, safeguards, sustainability

Technical cooperation programmes

Cooperation in NPP construction and operation, NI development

ROSATOM – IAEA
tactical cooperation programmes
(Nuclear infrastructure & Nuclear security funds)

“The IWP’s main objectives are:
[...]
To enable the Member State to plan the utilization of complementary assistance from other bilateral and national sources within the scope of its National Action Plan”.

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Thank you for your attention

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Rusatom Service JSC, Nuclear Infrastructure and Sustainable development brochure

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