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Nuclear  
Infrastructure  
Catalogue

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# Contents

|  |    |
|--|----|
| Our approach to nuclear infrastructure development | 2  |
| Our facilitation                                   | 3  |
| Pre-assessment and audit                           | 4  |
| Risk management                                    | 5  |
| Codes and rules                                    | 6  |
| Trainings and technical tours                      | 7  |
| Thematic centres                                   | 8  |
| Knowledge management system                        | 10 |
| Metrology  | 11 |
| Who we are   | 12 |
| Contacts   | 13 |

# Our approach to nuclear infrastructure (NI) development

- Based on our wide experience in executing construction projects both in Russia and abroad that has begun since 1950th we understand the significance of on-time and comprehensive development of nuclear infrastructure amid successful nuclear power programme implementation, risk management and safety.
- According to IAEA methodology, nuclear infrastructure consists of 19 complex areas that should be all developed. All areas are interrelated and comprised together they contribute to better social, economic, ecological, scientific and many other spheres and uplift the country to the new level of development.

## Including metrology and knowledge management system



### Russian references since 1970s (including transfer of technology and knowledge):

**NPP:** Bulgaria, Hungary, Germany, Slovakia, Ukraine, Finland, Czech Republic

**Research reactor:** Hungary, Vietnam, Kazakhstan, Libya, Uzbekistan, Ukraine, Czech Republic

### Since 1990s:

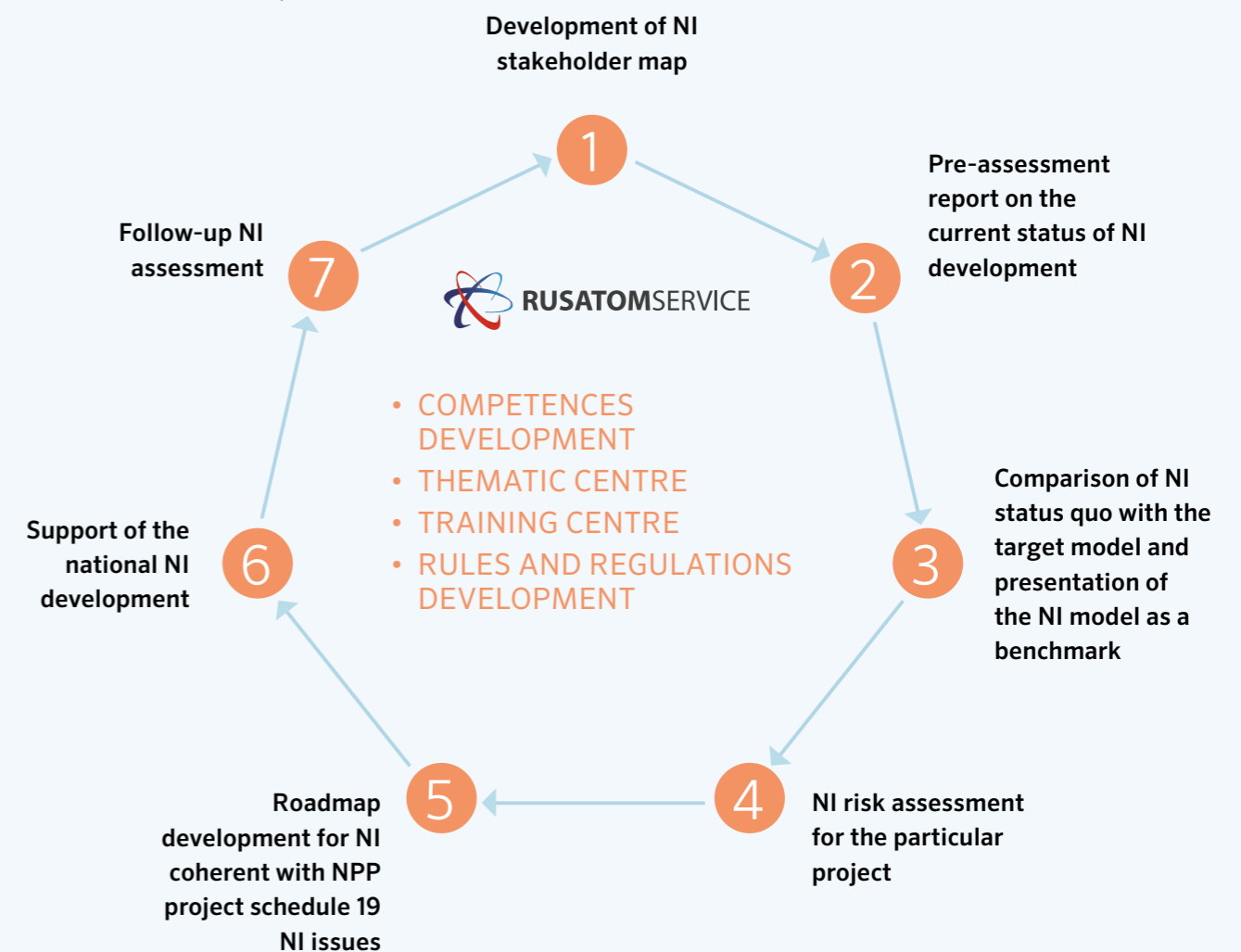
India, Iran, China

# Our facilitation

All of our facilitations are custom-designed to meet the needs of newcomer countries and countries expanding their nuclear power programmes and their range of nuclear technologies applied.

We support our partners throughout all the stages of nuclear power programme development using complex of tools.

## ISO's process approach to NI development



- ✓ Nuclear power plant (NPP) and Centre for nuclear science and technologies (CNST) (Research reactor (RR) and Radiation technologies - RT)

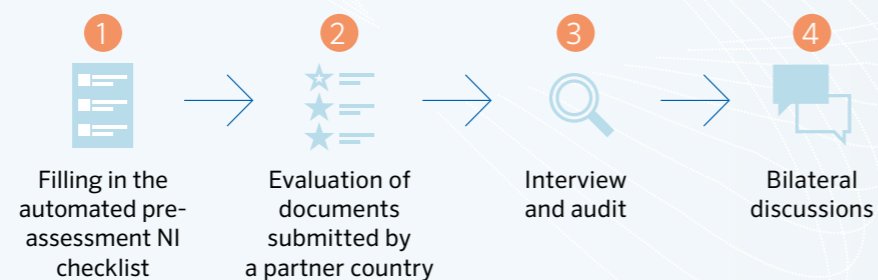
# Pre-assessment and audit

Nuclear infrastructure pre-assessment and audit are one of the critical components of national infrastructure development process.

Having decided to embark on a nuclear power programme the country should realize that for safe and efficient development the country should not only define a schedule of

NPP/ CNST construction but also develop a schedule of nuclear infrastructure establishment in its context. For that, one need to have an understanding of the current development level.

Process:



Planning NPP/CNST project implementation, a country needs to perform due diligence in order to assess all NI areas.

In order to accomplish it, a recipient-country requires professional support and expertise.

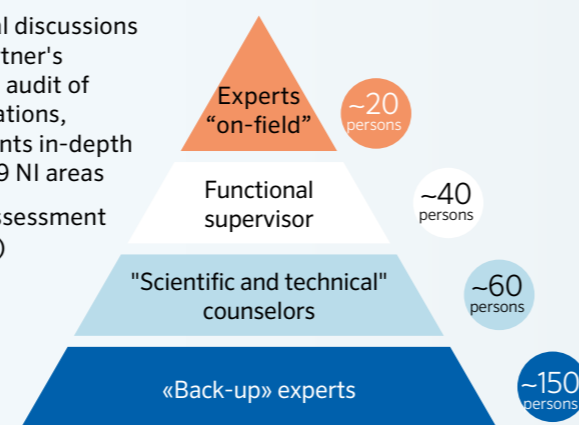
We developed an online self-assessment NI checklist, which is based on the IAEA recommendations and our best practices of projects' implementation all over the world. On request of our partners, our highly qualified experts assess the NI current state by interviewing stakeholders and visiting organizations involved in the nuclear power programme development and implementation.

As a result, based on the self-assessment report and expert audit findings, together with the country-recipient we draft the roadmap of NI development including stakeholders' management with an eye toward successful and sustainable project execution (time, quality, and budget).

Lack of a roadmap results in foundation of potential risks of inefficiently developed nuclear infrastructure that could torpedo successful implementation of the whole project, such as lack of competent personnel, low level of public acceptance, financial deficiency, lack of competent regulatory body, etc.



Bilateral discussions with partner's experts, audit of organizations, documents in-depth study (19 NI areas) ≈ 550 assessment spheres)



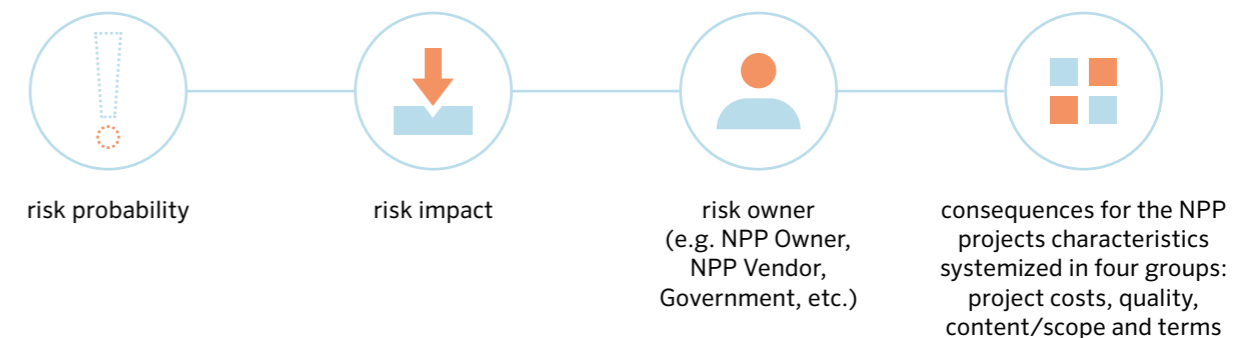
Consolidate experts' experience in nuclear sphere - 3000 years

# Risk management

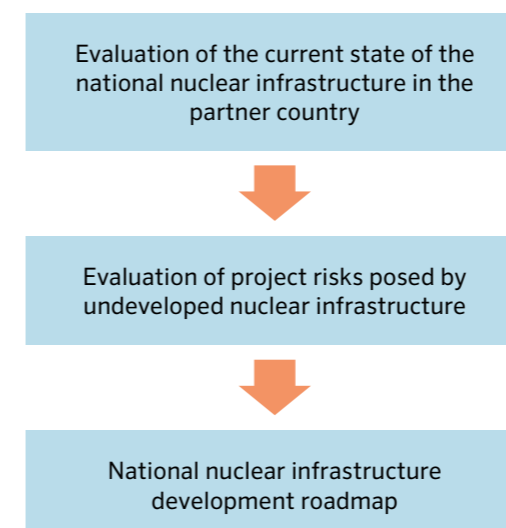
At the earliest stages of the nuclear project implementation, it is of utmost importance to take into consideration risks of immature nuclear infrastructure.

NPP/ RR project is exposed to multiple risks, which could be systemized through risk assessment process.

Prior to the construction of a nuclear facility, we provide our partners with our methodology of risk assessment within all NI areas classifying them by the following criteria:

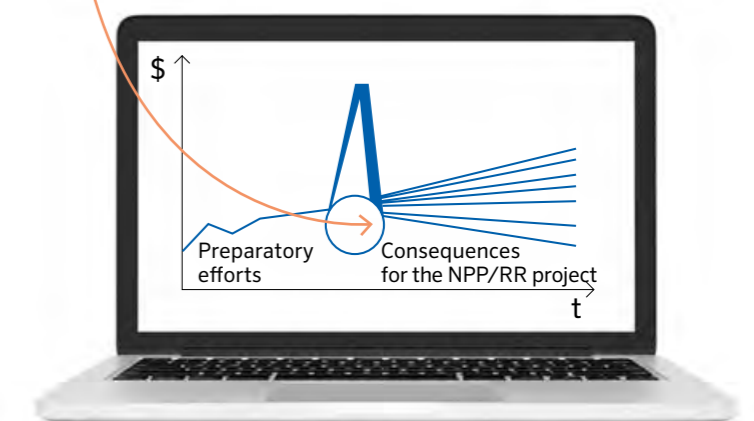


The results of the risk assessment process are included in the nuclear infrastructure development roadmap, which is a visualized map of activities to be made within certain timeframes in order to efficiently and timely implement the nuclear facility project:



Uncertainties and non-transparency of the NI status is a challenge for a nuclear facility project financing

A slight divergence of NI pre-conditions leads to a significant gap of consequences for project implementation

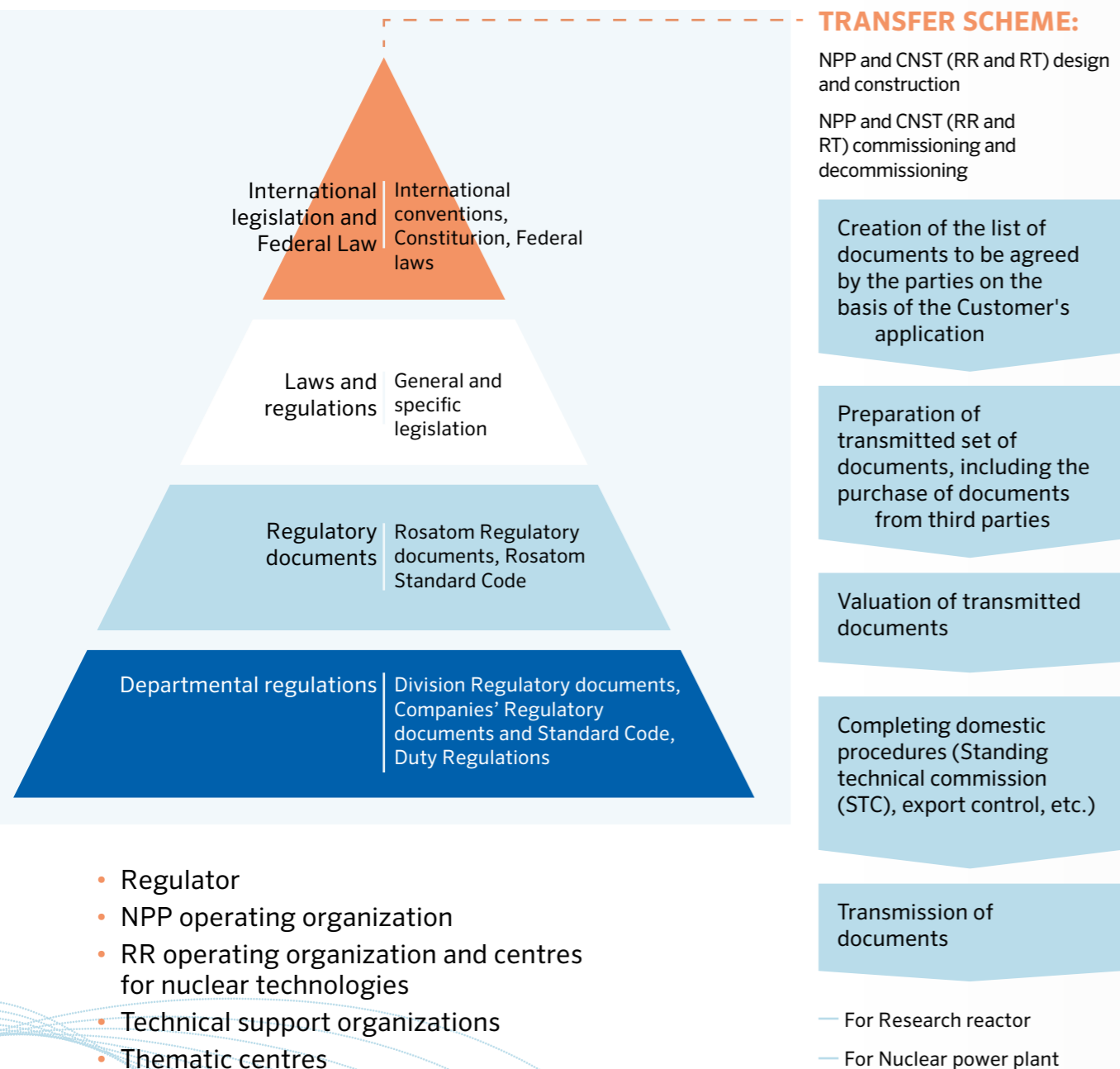


## Codes and rules

- Nuclear power programme should be based on an adequate legal basis that establishes conditions for efficient development of all the nuclear infrastructure areas in line with safety requirements.
- For development of sophisticated regulatory base, we engage experts from operating organization, regulatory body, and different agencies.

### We will assist you in:

- Preparation of rules and regulations relating to the nuclear power industry
- Preparation of specialized documents at the level of organizations specifying their functions and including instructions and manuals
- We provide with an adequate regulatory basis for the structures of organizations involved in the nuclear power programme and the functional interrelationships.



## Trainings and technical tours

Human capital assets is the key to successful nuclear power programme implementation, research & development.

We offer a comprehensive proposal of training programmes for nuclear infrastructure personnel.

It includes basic and specialised courses relating to both NPPs and CNSTs (RR and RT), e-learning, webinars, technical tours, workshops with experts, team building, business simulation, emergency drills & exercises.

### Types of trainings on 19 NI areas for NPP and CNST:

- basic courses for managers
- specialized courses for experts and technical specialists

### The courses could be combined with technical tours and internships for improvement of practical and technical skills, for instance:

#### 1 North-west nuclear cluster:

- St. Petersburg branch of Rosatom Technical Academy (RosatomTech)
- Leningrad NPP
- St. Petersburg Emergency Centre of Minatom

#### 2 South cluster:

- Novovoronezh NPP
- Novovoronezh training centre of Atomtechenergo
- MEPhI Volgodonsk Engineering and Technical Institute
- Atom mash

The programme of courses and clusters organization could be customized upon our partners' request.

# Thematic centres

Our integrated proposal on nuclear infrastructure development includes the adaptation of our thematic centres that ensure safety of a national nuclear

power programme. For instance, such centres carry out activities on keeping population informed, assurance of public acceptance, emergency planning.

## Steps of thematic centres establishment



### Example of a service package for development of emergency planning system:

- 1 Assessment and audit of national Emergency and Crisis Management System;
- 2 Elaboration of a concept and technical design of the centre (terms of reference)
- 3 Organizational manual
- 4 Personnel training
- 5 Consulting

# Knowledge management system

Knowledge management is a crucial factor for assuring the sustainability of safe nuclear facilities use, effective development of new designs and technology to meet the growing energy demand.

In our knowledge management services performance we pursue comprehensive approach which entails adoption of knowledge management system in the

company. Knowledge management system allows to preserve national and corporate knowledge and knowledge management principles.

The comprehensive knowledge management system creates conditions for management of scientific and technical competences, increasing the quality of research and development activities and for management of IP rights.



## 1 Accumulation and consolidation of knowledge

Implementation of the knowledge management system (KMS) is an effective way to satisfy the newcomer's need to accumulate and consolidate the knowledge created in various organizations of the nuclear industry, established within the nuclear infrastructure development process, in order to produce innovative products and to modernize existing technologies.



## 2 Intellectual property rights protection

Intellectual property rights protection is also one of the KMS responsibilities with numerous technical and conceptual products being created during the nuclear infrastructure development process.



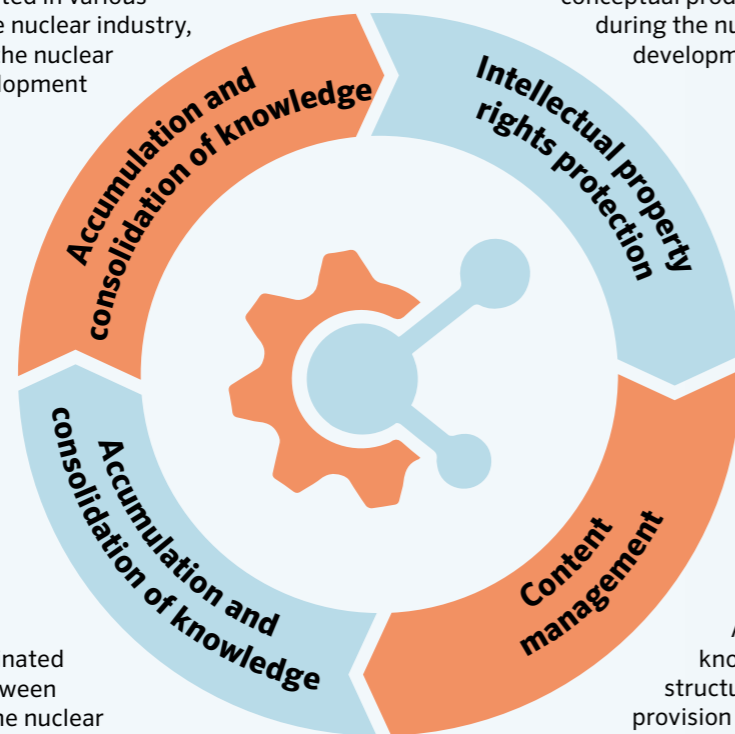
## 4 Content management

The KMS assures effective and coordinated communication between all participants of the nuclear infrastructure development process.



## 3 Knowledge sharing

A well-organized knowledge sharing structure assures the provision of up-to-date scientific and technical information to industry specialists engaged in research and development activities.



# Metrology

Nuclear safety and efficient research & development demands setting forth the requirements for metrology support at the stages of NPP/RR siting, designing, development and manufacturing of equipment, construction, operation, decommissioning.

We provide comprehensive training modules on establishment of the authorities and centres required for well-developed metrological infrastructure within nuclear power programme.

## NATIONAL AUTHORITY

National Metrology Authority

National Accreditation Authority

National R&D institutes



## DEPARTMENTAL AND REGIONAL METROLOGY CENTRES

Departmental metrological bodies

Regional metrology centres

Personnel training centres

Centres for testing measuring instruments reference materials

Centres for certification of products

We have depth of experience in the development of

- the national legislative and regulatory framework for assuring uniformity of measurements and metrological support at the stages of siting, construction, design, operation, decommissioning of NPPs/RRs;
- measuring instruments, information and measurement systems for nuclear power industry;
- measuring, testing and control procedures;
- training centres and testing centres of measuring instruments and certified reference materials.

Based on our experience and using our network of experts we propose our partners facilitation in analysis of partner's current national framework for metrology and formulation of fields for the modernization and improvement of the measuring instruments operation, information and measurement systems.

## Who we are



JSC «Rusatom Service» is a subsidiary of the Rosatom State Corporation and is a member of the electric power division.



It was established in 2011 to provide full range of services for foreign NPPs including **nuclear infrastructure development** in Rosatom partner countries.



The JSC Rusatom Service is capable to offer an **unique comprehensive solution** for nuclear infrastructure and competences development with support of the whole Russian nuclear industry. Nowadays, Rosatom encompasses **more than 300 enterprises** and organisations **with the workforce above 250.000**. Its leading edge stems from a number of competitive strengths, one of which is assets and competences at hand in all nuclear segments.



Rosatom State Corporation incorporates companies from all stages of the technological chain, such as uranium mining and enrichment, nuclear fuel fabrication, equipment manufacture and engineering, operation of nuclear power plants, and management of spent nuclear fuel and nuclear waste.



**To provide our facilitation we engage experts and scientific and technical support organizations.**



Taking into account the importance of global sustainable development, the necessity to meet global electricity demand we are ready to support our partners by sharing our best practices, experience and competences.

## Contacts



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