Rosatom Global Expertise in NPP Construction

Nuclear Industry Localization Conference

Cape Town, June 1-3, 2011
Fully Integrated Nuclear Technology Company

Anniversary of Russian Nuclear Industry 2010

Uranium production
Uranium enrichment
Fuel fabrication
Power equipment manufacturing
NPP Design, Engineering and Construction
Electricity generation
Services and modernization

Nuclear Power Complex
Applied and Basic Science
Nuclear and Radiation Safety
Nuclear Icebreakers

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Rosatom offers complete solution from uranium supplies to NPP construction operation and decommissioning

**Guaranteed supply**
of complete life-cycle products and services

**Flexible capabilities**
of NPP supply from components and services to turn-key and BOO projects

Being a state corporation, Rosatom is taking advantage of unique industry access to privilege resources
### Key Figures - 2009

<table>
<thead>
<tr>
<th><strong>17 nuclear units</strong></th>
<th><strong>79,3%</strong></th>
<th><strong>$18 bln</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Simultaneous construction</td>
<td>High-tech products share in revenue</td>
<td>Revenue</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>275 000 people</strong></th>
<th><strong>$200 mln</strong></th>
<th><strong>$2 bln</strong></th>
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</thead>
<tbody>
<tr>
<td>Number of employees</td>
<td>R&amp;D investment</td>
<td>Net income</td>
</tr>
</tbody>
</table>
Rosatom Global Operations

#1 in key segments

#1 in uranium deposits

#1 in uranium enrichment

#1 in new NPPs construction

#1 Russian electricity generation company, 24,2 GWe installed capacity

5 continents. More than 40 countries.

Europe
Finland, Sweden, the Netherlands, Belgium, Germany, France, Spain, GB, Switzerland, Czech Republic, Slovakia, Hungary, Lithuania, Bulgaria, Slovenia

CIS
Russia, Ukraine, Kazakhstan, Belorussia, Armenia

Asia
China, Japan, South Korea, Vietnam, India, Bangladesh, Mongolia

MENA
Turkey, Libya, Morocco, Algeria, Egypt, Iran, Jordan

Africa
Namibia, South Africa, Tanzania

Latin America
Venezuela, Argentina, Brazil

North America
USA, Canada, Mexico

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Nuclear Innovation – Variety of Applications

**Nuclear Icebreaker Fleet**
- #1 nuclear fleet in the world
- Assures stable functioning of Northern Sea Route

**Fast Reactors (Gen IV)**
- #1 fast neutron reactor in the world
- #1 operating fast neutron reactor in the world
- Broad development programme

**Small and Medium Size Reactors**
- Variety of different designs with referent parameters
- #1 floating NPP in the world is being built
- #1 successful public-private partnership for developing SMR

**Nuclear Medicine**
- Isotope production (curable 2 kinds of cancer, earlier diagnostic)
  - Cyclotrons
  - RFP laboratory
Russian NPPs worldwide

Russian nuclear reactors worldwide

<table>
<thead>
<tr>
<th></th>
<th>Russia</th>
<th>Globally</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constructed</td>
<td>36</td>
<td>56</td>
<td>92</td>
</tr>
<tr>
<td>In Rosatom’s operation</td>
<td>32</td>
<td>-</td>
<td>32</td>
</tr>
<tr>
<td>In Progress</td>
<td>10</td>
<td>15</td>
<td>25</td>
</tr>
</tbody>
</table>

More than 30 units of installed fleet outside Russia

Up to 40 new units in potential pipeline till 2030
Rosatom offers one of the most mature and safe nuclear reactor technology – VVER, and...

**What is VVER?**
(Water-Water Power Reactor)

- **Forefront** of nuclear technology – Generation 3+ reactor
- **Proven and mature** solutions – ≈1400 reactor years of total operating time
- A high level of internal safety gained through evolution of design
- Most **demanded capacity** suitable for various grid conditions – 1000-1200 MWe
- Long – run facility – design lifetime of the main equipment: 60 years +
- **High performing** source of supply – availability factor ≈ 92 %

**Protection from outer impacts**

- Hurricanes, tornadoes
- Airplane crash
- Snow load
- Outside explosions
- Tsunamis, floods
- Earthquakes
- Meets all current Russian and international safety standards and the IAEA requirements
- Widely referenced by utilities
- EUR certified

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...unique complex solution leveraged by integrated nature of the business

1. Extensive capabilities in both local and global sourcing;
2. Overall Operation & Maintenance service;
3. Comprehensive Nuclear Fuel Cycle solution
4. Flexible approach to technology transfer;
5. Opportunity to participate in other projects globally;
6. Strong project financing capabilities;
7. Personnel education and training;
8. Assistance with development of local regulations, norms and standards.
Key NPP Construction Projects Overview
Belene NPP project profile

Belene NPP is the first purely European project of Rosatom in NPP construction

Key parameters

- **CAPEX (EPC part)** – €6,3 bn.
- **Construction period** – 2011-2017
- **Legal basis** – Resolution №260 of the Council of Ministers of the Republic of Bulgaria (08.04.2005)
- **Reactor design** – NPP-92 (VVER-1000)
- **Total capacity** – 2 100 MW (2 units x1050 MW)

Project highlights

- Tender for NPP construction won by Rosatom in international vendors competition (Skoda and Westinghouse consortium)
- The reactor design is EUR certified
- Belene NPP meets Bulgarian&EU electricity needs
- Strong involvement of European contractors (CARSIB, etc.)
- European investors participation is envisaged (Fortum, Altran)
- Rosatom is minority stake holder and financing partner in the project

Proposal Structure

1  2  3  4  5  6  7  8
Baltic is the first Rosatom homeland NPP construction project oriented to EU market with involvement of foreign investors.

**Key parameters**

- **CAPEX** – € 5 bn.
- **Construction period** – 2010-2018
- **Reactor design** – NPP-2006 (VVER-1200)
- **Total capacity** – 2 400 MW (2 units x 1200 MW)

**Project highlights**

- Unique exclave territorial location
- Fully complies with EC energy policy and EC supported
- Meets EUR requirements (certificate to be issued)
- Significant export potential due to expected deficit of generation in the region
- Involvement of foreign investors is envisaged
- Strong political support from the Russian government

**Proposal Structure**

1. Baltic NPP project profile
2. Baltic is the first Rosatom homeland NPP construction project oriented to EU market with involvement of foreign investors
3. Key parameters
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   - Meets EUR requirements (certificate to be issued)
   - Significant export potential due to expected deficit of generation in the region
   - Involvement of foreign investors is envisaged
   - Strong political support from the Russian government
5. Site – Kaliningrad region, Russian Federation

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Belorussian NPP project profile

Belorussian NPP is the first Eastern European nuclear debut supported by Rosatom

Key parameters

- CAPEX – known after contract conclusion
- Construction period - 2011-2018
- Legal basis – Intergovernmental Agreement of March 15, 2011
- Reactor design – NPP-2006 (VVER-1200)
- Total capacity – 2 400 MW (2 units)

Project highlights

- First NPP in Belorussia
- Strong support to Belorussia with regulatory system establishment and personnel training
- Involvement in infrastructure development
- Significant local content sourcing, especially in civil construction
- Russian state credit comprehensive financing solution
- NPP capacity meets both Belorussian & EU needs

Proposal Structure

Site – Ostrovec, Belorussia

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Temelin NPP project profile

Temelin NPP is the first Rosatom project of reuniting Eastern Europe capabilities in NPP construction

Key parameters

- CAPEX – known after contract conclusion
- Implementation period – 2013-2025
- Reactor design – NPP-2006 (VVER-1200)
- Total capacity – 2 400 MW

Project highlights

- Temelin NPP units #3,4 construction decision taken
- High local content rate required by the Customer
- Czech-Russian consortium created to meet the Customer requirements
- Skoda JS – leader of Consortium
- Russian export financing solution
- Local supply chain envisages to cover ≈70% of the project needs
- High potential for local suppliers to be involved in Rosatom overseas projects
- Consortium is qualified for tender
- Winner to be announced in 2013
Akkuyu NPP project profile

**Key parameters**

- **Project value** – $20 bn.
- **Implementation period** – 2011-2021
- **Legal basis** – Intergovernmental Agreement of May 12, 2010
- **Reactor design** – NPP-2006 (VVER-1200)
- **Total capacity** – 4 800 MW (4 units)
- **PPA period** – 15 years, fixed price terms

**Project highlights**

- First NPP project in Turkey
- Sound Russian and Turkish State encouragement
- Strong support to Turkey with regulatory system establishment and personnel training
- The project is implemented in close cooperation with Turkish partners, involvement of Turkish suppliers mainly in civil construction
- International investors are welcome to join the project with up to 49% Akkuyu SPV stake

**Site – Akkuyu, province Mersin, Turkey**

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Kudankulam NPP project profile

Kudankulam 1,2 are the first of series of Rosatom units in India

Key parameters

- Construction period – 2002-2011
- Reactor design – NPP-92 (VVER-1000)
- Total capacity – 2 000 MW (2 units)

Project highlights

- Project is in its final stage of implementation
- Kudankulam 1,2 are the first of 16 VVER units to be constructed in India (Russia-India IGA on new NPP construction signed in 2008)
- Kudankulam 3,4 are already in progress
- Significant part of Russia - India Strategic Partnership
- Russian state financing support
- Significant local content sourcing, especially in civil construction
- Broad localization programme envisaged

Site – Kudankulam, India

Proposal Structure

1 2 3 4 5 6 7 8
Localization – is the generally accepted trend in the nuclear and power engineering for the last 20 years.

Drivers of localization:
- National regulation (demand of local content)
- Search for efficient supply chains

Scale of localization:
- Local sourcing
- JVs for local market needs
- Strategic Partnership

Product range of equipment:
- 4th class of safety
- 3rd and 4th classes of safety
- 2nd, 3rd, and 4th classes of safety; possibly, certain items of the 1st class

Potential volume of a regional market:
- Local content
- Imported components

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Construction of a nuclear power plant brings numerous opportunities to the local suppliers

Subject for Sourcing

- Reactor Pressure Vessel;
- Steam generators;
- Main circulation pumps, etc.

Exclusive Russian supply

- Valves, pumps and piping (6%)
- Other equipment (5%)
- Air cooling systems (3%)
- Turbine and generator equipment (6%)
- Electrical equipment (9%)
- I&C (6%)

Potential for external sourcing

- Civil construction & engineering* ~50%
- Nuclear steam supply system** ~10-15%
- Other Equipment ~35-40%

Examples of projects

<table>
<thead>
<tr>
<th>Project</th>
<th>Country</th>
<th>Capacity</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akkuyu 1-4</td>
<td>Turkey</td>
<td>4 x 1200</td>
<td>20 bil. USD</td>
</tr>
<tr>
<td>Belene 1-2</td>
<td>Bulgaria</td>
<td>2 x 1050</td>
<td>6.3 bil. Euro</td>
</tr>
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</table>

Rosatom is ready for and has extensive experience of both local and global sourcing as well as technology transfer and localization

* incl. design, project management, erection and commissioning works, training etc.
** Nuclear steam supply system

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Structure of NPP equipment (24 000 MT)

Equipment of Reactor island 5 500 MT
- RPV
- Steam generator
- Heat exchangers

Equipment of Turbine island 5 700 MT
- Turbine
- Generator

Auxiliary equipment 13 000 MT
- Electric equipment (2 500 MT)
- Pumps, pipings (5 000 MT)
- Transporting and processing equipment (3 900 MT)

Auxiliary equipment amounts to more than 50% of equipment supply to NPP, being technologically adjacent to other types of power plants

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Localization benefits

- Valves
- Piping systems
- Pumps
- Structural steel
- Cylindrical and spherical tanks
- Vessel equipment

Percentage of adjacency of equipment production for NPPs, coal-fired and gas-fired power plants:

20-30%

Cooperation in nuclear contributes to general industry development

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