Rusatom Overseas

The future of nuclear energy in Central and Eastern Europe from ROSATOM perspective

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Introduction

Initial conditions

Current situation in Europe
Nuclear after the Fukushima
ROSATOM and Rusatom Overseas introduction

Nuclear development in the countries of Central and Eastern Europe

Kaliningrad, Ukraine, Turkey, Belarus, Czech Republic, Hungary, Poland, Slovenia, Slovakia, Romania, Bulgaria

Localization of the equipment production

Conclusions
“Public confidence in nuclear power worldwide was understandably shaken by Fukushima. But, on reflection, **people can draw confidence from the absence of any health harm even from this extreme, highly unusual event and also from the industry’s concerted worldwide effort to strengthen nuclear safety even further.**

Countries like Germany will soon demonstrate the economic and environmental irresponsibility of allowing politicians to set important national policies in the middle of a panic attack. In contrast, many national leaders who soberly reviewed their energy strategies have reaffirmed the conclusion they reached before Fukushima: that **nuclear power is a uniquely reliable and expandable source of low-carbon energy that can be safely used to meet clean-energy need.**”

WNA Director General John Ritch
Despite the tragic Fukushima accident nuclear energy is expected to grow further

Fukushima accident did not engender the cancelation of national programs for nuclear energy development in the majority of countries, but became a reason for temporarily halt in clearance of some new construction sites. The review of safety requirements and prolongation of licensing terms are the main reasons of that.
CURRENT SITUATION IN EUROPE

- No common European energy concept
- Growing divide between pro-nuclear and anti-nuclear countries
- Extremely long and complicated licensing processes
- Strong position of anti-nuclear NGO’s
- Uncertain economical development in Europe
- Growing difficulties to finance long-term energy projects
- Strong support for renewable sources of energy

Highly challenging environment for both investors and vendors
Rosatom is a fully integrated nuclear technology company

- Uranium production
- Uranium enrichment
- Fuel fabrication
- Power equipment manufacturing
- NPP Design, Engineering and Construction
- Electricity generation
- Services and modernization
- Applied and basic science
- Nuclear and radiation safety
- Nuclear icebreakers

ROSATOM INTRODUCTION
## ROSATOM KEY FIGURES - 2010

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of employees</td>
<td>275,000 people</td>
<td>Rent check</td>
</tr>
<tr>
<td>R&amp;D investment</td>
<td>$200 mln</td>
<td>Rent check</td>
</tr>
<tr>
<td>Net income</td>
<td>$2 bln</td>
<td>Rent check</td>
</tr>
<tr>
<td>Revenue</td>
<td>$17 bln</td>
<td>Rent check</td>
</tr>
<tr>
<td>Number of nuclear units</td>
<td>30 units</td>
<td>Rent check</td>
</tr>
<tr>
<td>Simultaneous implementation</td>
<td>79.3%</td>
<td>Rent check</td>
</tr>
</tbody>
</table>
NPPs construction program in Russia is among the most dynamically developing in the world

Rosatom NPPs in Russia

11 new NPPs (24 units) will be constructed till 2030

Under construction

<table>
<thead>
<tr>
<th>NPP</th>
<th>Unit</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baltiyskaya №1</td>
<td>№2</td>
<td>VVER-1200</td>
</tr>
<tr>
<td>№2</td>
<td>VVER-1200</td>
<td></td>
</tr>
<tr>
<td>Beloyarskaya №4</td>
<td>№4</td>
<td>BN-800</td>
</tr>
<tr>
<td>№1</td>
<td>VVER-1200</td>
<td></td>
</tr>
<tr>
<td>№2</td>
<td>VVER-1200</td>
<td></td>
</tr>
<tr>
<td>№3</td>
<td>VVER-1000</td>
<td></td>
</tr>
<tr>
<td>№4</td>
<td>VVER-1000</td>
<td></td>
</tr>
<tr>
<td>Novovoronezhskaya №2</td>
<td>№2</td>
<td>VVER-1200</td>
</tr>
<tr>
<td>№1</td>
<td>VVER-1200</td>
<td></td>
</tr>
<tr>
<td>№3</td>
<td>VVER-1000</td>
<td></td>
</tr>
<tr>
<td>№4</td>
<td>VVER-1000</td>
<td></td>
</tr>
<tr>
<td>Rostovskaya №2</td>
<td>№2</td>
<td>VVER-1200</td>
</tr>
<tr>
<td>№1</td>
<td>VVER-1200</td>
<td></td>
</tr>
<tr>
<td>№3</td>
<td>VVER-1000</td>
<td></td>
</tr>
<tr>
<td>№4</td>
<td>VVER-1000</td>
<td></td>
</tr>
</tbody>
</table>

In operation: 33
Under construction: 9
To be constructed till 2030: 24

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Rosatom safe and mature VVER technology is highly welcomed worldwide...

Rosatom NPP construction perspective backlog – more than 80 units

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... being a part of Rosatom unique integrated NPP construction solution

**Energy solution**
- Modern NPP design (Gen III+)
- NPP construction and life cycle management support (fuel, services, modernization)
- Operation & maintenance

**Regulation / infrastructure**
- Creation and development of regulatory base
- NFC facilities construction,
- SNF & RW management,
- Social-political programmes support

**Industrial solution**
- NPP equipment manufacturing, service & works localization,
- Technology transfer,
- Certification of local suppliers, participation in Rosatom third countries projects

**Knowledge, skills, human capital**
- Personnel education & training (incl. traineeship on NPP sites),
- R&D base development,
- NPP operation experience exchange

**Financial solution**
BOO projects implementation;
State credits,
Partnership projects

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Promotion of Russian nuclear technologies on global markets is accomplished by Rusatom Overseas

Key Activities of Rusatom Overseas

1. Promotion of Rosatom’s integrated solution
2. Rosatom’s worldwide marketing offices network development and operation
3. Management of BOO projects shares and fund-raising
4. Development of new-comer’s national nuclear infrastructure
5. Management of Rosatom’s Globalization program
Rosatom NPP construction integrated solution

Customer

Rusatom Overseas

Energy solution

Industrial solution

Financial solution

Local regulation

Knowledge

NIAEP-Atomstroyexport
Rusatom Service
Concern Rosenergoatom
TVEL, Tenex, ARMZ.

Atomenergomash
NIAEP-Atomstroyexport

Rosatom
Russian State Credit System
World ex-im banks
Partners.

Rosatom
Rostechnadzor

Rosatom
MEPHI
CIPK

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Rusatom Overseas is responsible for BOO projects marketing and implementation

Rusatom Overseas role in BOO projects

**Investor**
- Provides project financing
- Responsible for profit return
- Supports government financing attraction activities

**Owner**
- Creates project companies
- Owns and operates Rosatom’s shares in project companies
- Elaborates assets acquisition proposals

**Customer**
- Defines NPP-design requirements
- Defines project configuration

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Project highlights

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

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

Rusatom Overseas

- Project company shares management
- Project fund-raising
- Control of investment return within specified terms and volumes
- Project configuration
- Definition of NPP-design requirement

Akkuyu is Rosatom’s first foreign NPP project being realized on BOO principles

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Baltic NPP project profile

Key parameters

- **CAPEX** – € 5 bn.
- **Construction period** – 2010-2018
- **Reactor design** – NPP-2006 (VVER-1200)
- **Total capacity** – 2 units x 1184 MW

Project highlights

- Unique exclave location
  Fully complies with EC energy policy and EC supported
- Meets EUR requirements
- Significant export potential due to expected power deficit in the region
- Anticipated foreign investment involvement
  Strong political support from the Russian government

Baltic is the first Rosatom homeland NPP construction project open for involvement of foreign investors

*Site – Kaliningrad region, Russian Federation*
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

Site – Temelin, Czech Republic

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<table>
<thead>
<tr>
<th>Country</th>
<th>Current situation/Plans</th>
<th>Rosatom activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belorussia</td>
<td>Intention for 2 units construction</td>
<td>The intergovernmental and contract agreements were signed</td>
</tr>
<tr>
<td>Ukraine</td>
<td>Intention for 2 units construction</td>
<td>The intergovernmental agreements were signed</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>Intention for 2 units construction. BID process is under way</td>
<td>Participation in BID process</td>
</tr>
<tr>
<td>Hungary</td>
<td>Intention for 2 units construction. Tender opening is expected this year</td>
<td>Intention to participate</td>
</tr>
<tr>
<td>Poland</td>
<td>Intention to construct 4 units at 2 sites. Tender opening is expected this year</td>
<td>Rosatom participation in tender under consideration</td>
</tr>
<tr>
<td>Lithuania</td>
<td>Project with boiling water reactor GE – Hitachi</td>
<td></td>
</tr>
<tr>
<td>Slovakia</td>
<td>Construction of Mochovce Units 3&amp;4. Intention to build new unit at Jaslovské Bohunice site</td>
<td>Participation in Mochovce VVER project. Intention to participate in BID process</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>Government to decide how to proceed</td>
<td>Construction of two units at Belene NPP site</td>
</tr>
<tr>
<td>Romania</td>
<td>Financing problems with further construction at Cernavoda NPP site. New site</td>
<td></td>
</tr>
<tr>
<td>Slovenia</td>
<td>Preparation team for Krsko</td>
<td>Intention to participate</td>
</tr>
</tbody>
</table>
Construction of a nuclear power plant brings numerous opportunities to the local industry.

Direct Effects

7 000
Construction and equipment production jobs in peak

Localization

- **Cost**: local products and services procurement
- **Technology transfer**: transfer of „know how“ and „know why“ provides inestimable „value added“ for the economy
- **Engineering**: render of engineering services by local companies
- **NPP equipment production**
- **Maintenance and modernization** of NPPs by local companies

Optimal localization gives reasons for huge investment.
Benefits of Localization Program

- Savings from local deliveries
- Improved chances to win NPP construction contract
- Development of base for safe operation of new NPP
- Diversification of supplies

Rosatom

Local Suppliers

Government of Hungary

- Revenue generation
- Technology transfer
- Profits
- Higher taxes from salaries & company profits
- Higher employment
- Improved GDP per capita
- Multiplication effects

Rosatom Localization Program Is a Win-Win Strategy to Support Local Economy Through Involvement of Local Suppliers into Nuclear Program
Central and Eastern Europe has reached historically positive experience with production of electricity in nuclear power plants, countries are moving towards launching new nuclear projects, uncertain economical development in Europe and positive public opinion.

Hungary can utilize nuclear industrial base, which is oriented on the VVER technologies.

ROSATOM is considered as attractive solution for many countries in the region because of its financing abilities, offers for the maximum localization together with modern proven Generation III+ technology, which combines the active and passive safety features.
Rosatom Gen III+ NPP design

What is VVER?
(Water-Water Power Reactor)

- Forefront of nuclear technology – Generation III+ 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

- Meets all current Russian and international safety standards and the IAEA requirements
- Widely referenced by utilities
- EUR certified

Hurricanes, tornadoes
Airplane crash
Snow load
Outside explosions
Tsunamis, floods
Earthquakes

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