



**ROSATOM**

STATE ATOMIC ENERGY CORPORATION "ROSATOM"

## **Rusatom Overseas**

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

**Ivo Kouklik**  
**Vice-president**  
**Rusatom Overseas**

**Prague**  
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# 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**

# NUCLEAR AFTER FUKUSHIMA

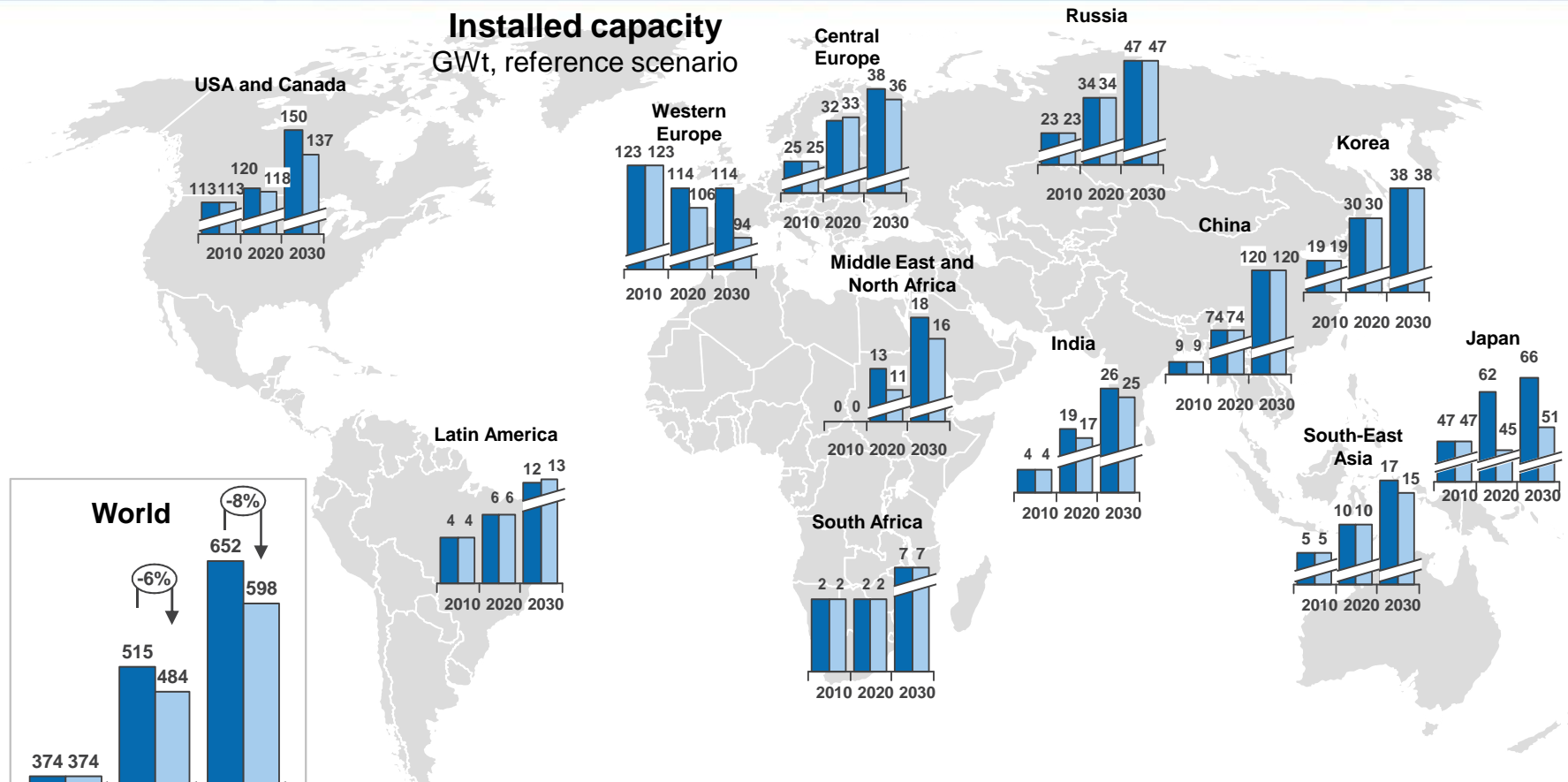
***“Public confidence in nuclear power worldwide was understandably shaken by Fukushima. But, on reflection, people can draw confidence from the absence of any health harm even from this extreme, highly unusual event and also from the industry’s concerted worldwide effort to strengthen nuclear safety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

## Installed capacity Gwt, reference scenario

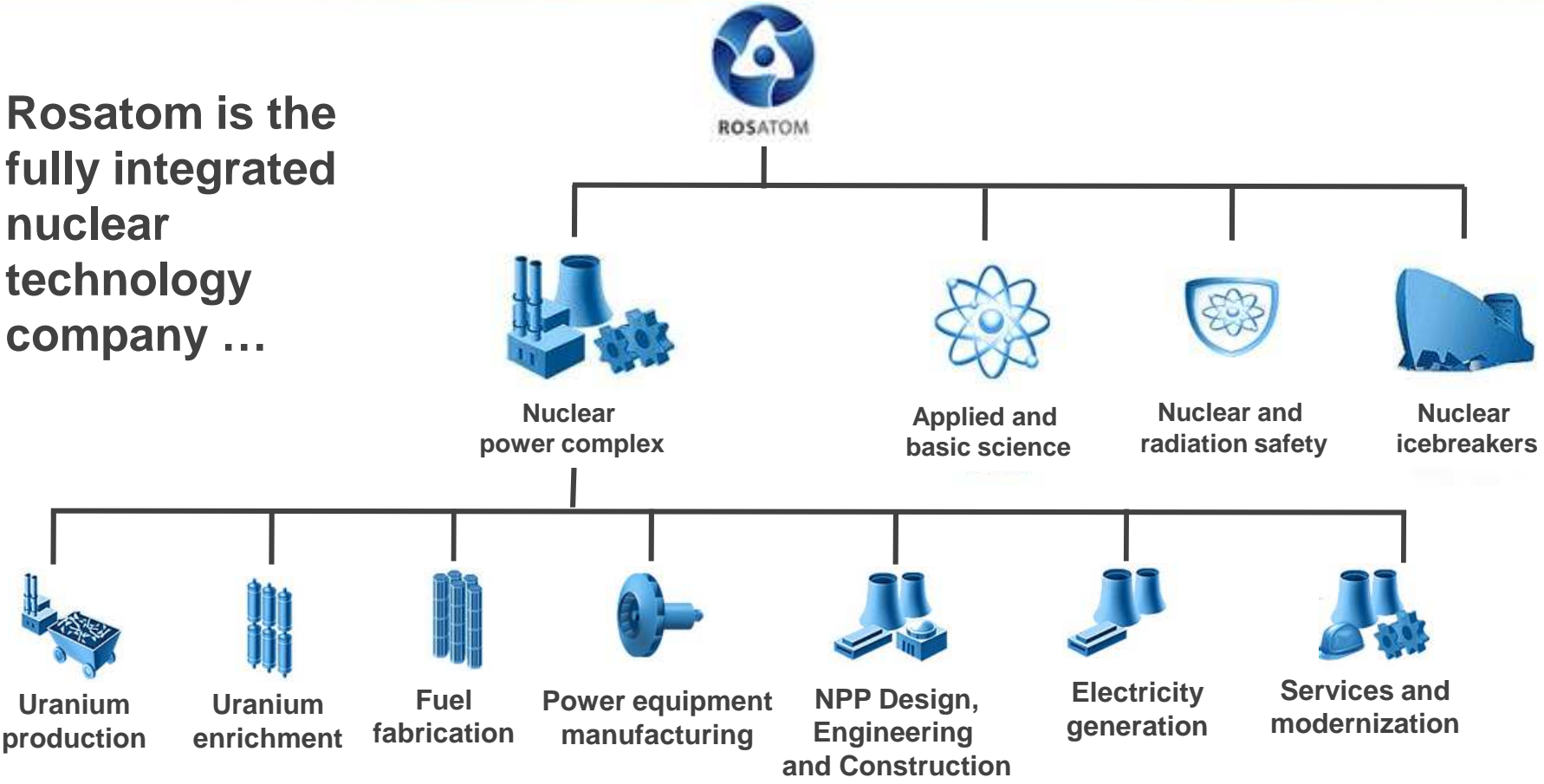


Fukushima accident did not engender the cancellation of national programs for nuclear energy development in the majority of countries, but became a reason for temporarily halt in clearance of some new construction sites. The review of safety requirements and prolongation of licensing terms are the main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

■ Rosatom's scenario before Fukushima  
■ Rosatom's scenario after Fukushima

# ROSATOM INTRODUCTION

Rosatom is the fully integrated nuclear technology company ...



# ROSATOM IN RUSSIA



Operating NPP



Construction of NPP



# ROSATOM KEY FIGURES - 2010



**30 nuclear units**

Simultaneous implementation



**79,3%**

High-tech products share in revenue

**\$17bln**

Revenue



**275 000 people**

Number of employees



**\$200 mln**

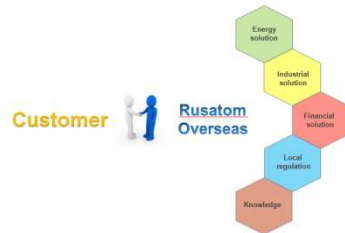
R&D investment

**\$2bln**

Net income

# Promotion of Russian nuclear technologies on global markets is led by Rosatom Overseas

Rosatom offer integrator



Operator and owner of global offices network



## Rosatom Overseas

BOO projects owner, investor and customer



Rosatom globalization program operator





# Rusatom Overseas integrates, customizes and promotes Rosatom global offering

Current and perspective  
Rosatom backlog

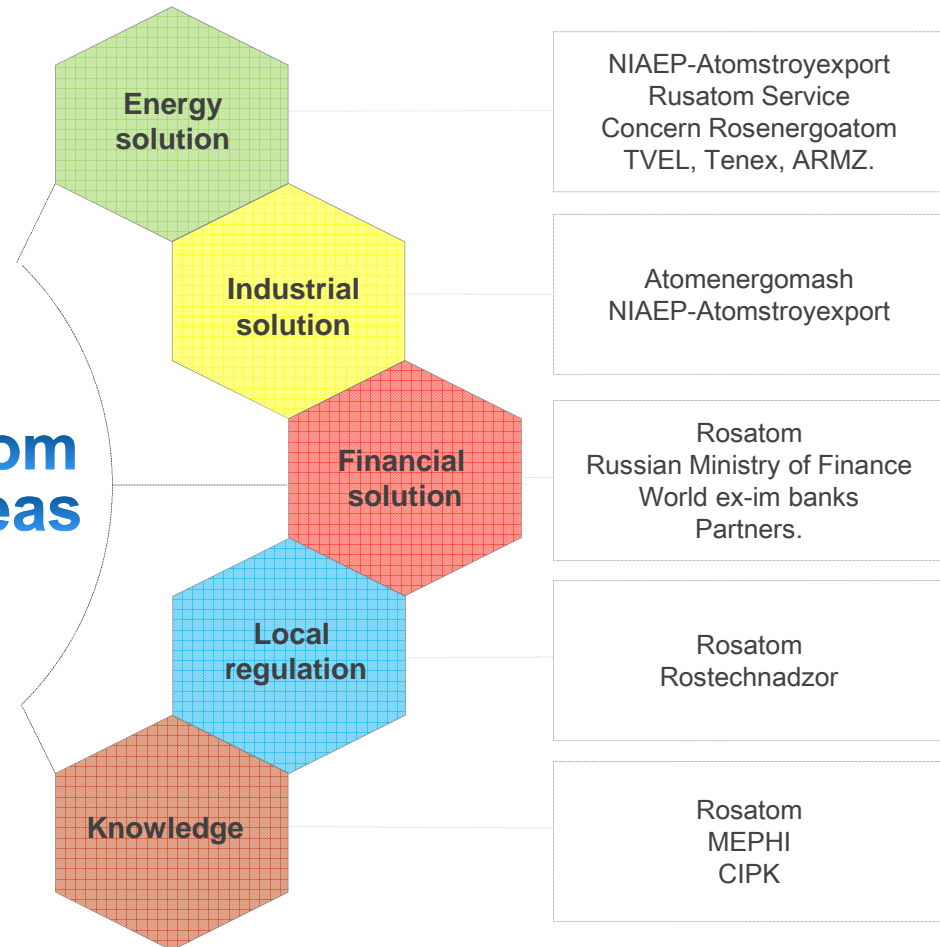


## Customer

- |            |              |
|------------|--------------|
| Argentina  | Indonesia    |
| Armenia    | Hungary      |
| Bangladesh | Jordan       |
| Belorussia | Kazakhstan   |
| Brazil     | Malaysia     |
| Bulgaria   | Saudi Arabia |
| China      | Slovakia     |
| Czech Rep. | South Africa |
| Egypt      | Turkey       |
| Finland    | Ukraine      |
| India      | Vietnam      |



## Rusatom Overseas



# Rusatom Overseas is responsible for BOO projects marketing and implementation

## Rusatom Overseas role in BOO projects

### Investor

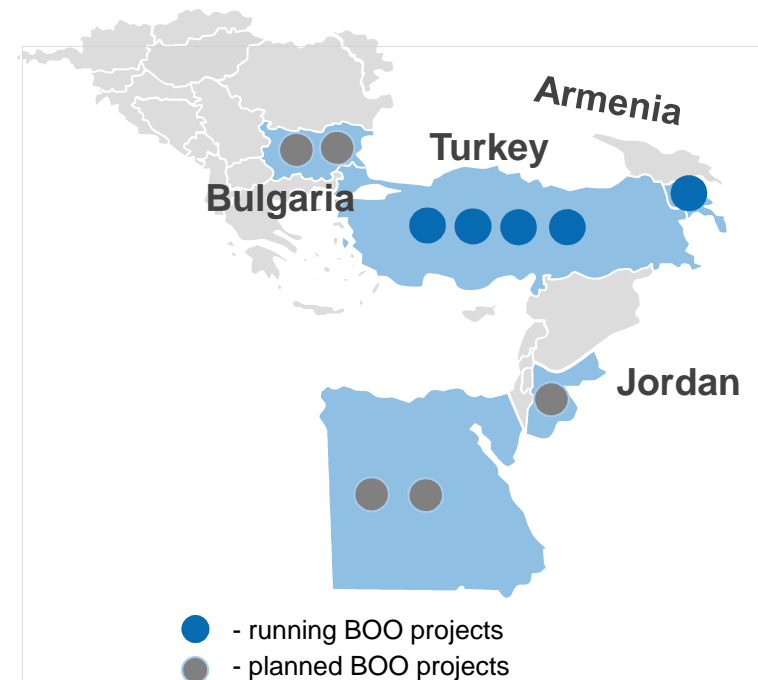
- Provides project financing
- Responsible for profit return
- Supports government financing attraction activities

### 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



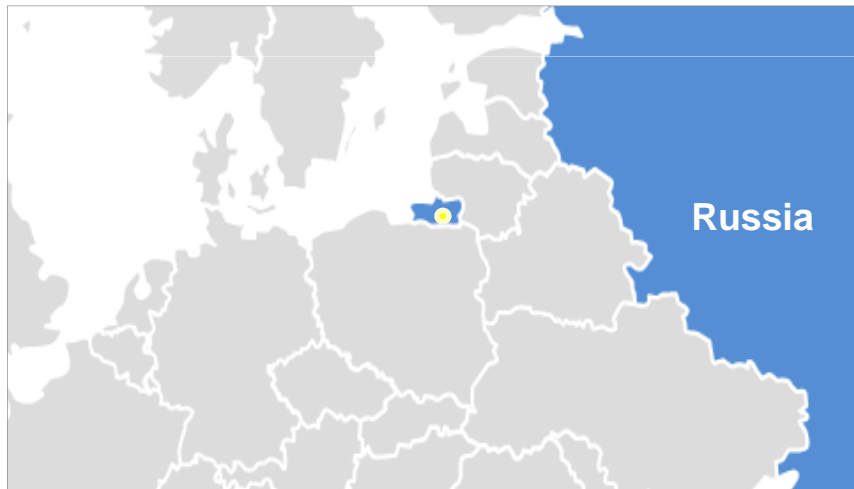
# CURRENT STATUS OF ROSATOM PROJECTS

Country	NPP	Number of blocks	Block performance	Project
Russian Federation	Baltiiskaya	2	1200 MB <sub>T</sub>	AES-2006
	Belojarskaya	1	800 MB <sub>T</sub>	BN-800
	Lenningradskaya-2	2	1200 MB <sub>T</sub>	AES-2006
	Novovoronezhskaya-2	2	1200 MB <sub>T</sub>	AES-2006
	Rostovskaya	2	1000 MB <sub>T</sub>	AES-92
Armenia	Armjanskaja	1	1000 MB <sub>T</sub>	AES-92
Bangladesh	Roopur	2		
Belarus	Belorusskaya	2	1200 MB <sub>T</sub>	AES-2006
Bulgaria	Belene	2	1000 MB <sub>T</sub>	AES-92
Vietnam	Ninthuan	2	1000 MB <sub>T</sub>	AES-92
India	Kudankulam	4	1000 MB <sub>T</sub>	AES-92
China	Tianwan	2	1000 MB <sub>T</sub>	AES-92
Turkey	Akkuyu	4	1200 MB <sub>T</sub>	AES-2006
Ukraine	Chmelnickyi	2	1000 MB <sub>T</sub>	AES-92
		<b>30</b>		

# Baltic NPP project profile



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



**Site – Kaliningrad region, Russian Federation**

## Key parameters

- CAPEX– € 5 bn.
- Construction period – 2010-2018
- Legal basis – Resolution of the Government of Russian Federation, № 1353-p, 25.09.2009.
- Reactor design – NPP-2006 (VVER-1200)
- Total capacity –2 units x 1184 MW

## Project highlights

- Unique exclave territorial location
- Fully complies with EC energy policy and EC supported
- Meets EUR requirements
- 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

# Akkuyu NPP project profile



**Akkuyu is the first Rosatom' foreign NPP project configured on BOO principles**



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

## 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

# Temelin NPP project profile



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



Site – Temelin, Czech Republic

## 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

# OTHER COUNTRIES IN THE CEE REGION

- **Belorussia – 2 units contract signed**
- **Ukraine - signed preliminary contract for 2 units of Chmelnicka NPP**
- **Hungary – the opening of the tender is expected this year**
- **Poland - the opening of the tender is expected this year**
- **Lithuania – project with boiling water reactor GE - Hitachi**
- **Slovakia – construction of two units Mochovce 3,4, plan to build additional unit on Jaslovske Bohunice site**
- **Bulgaria – Government must decide how to process further**
- **Romania – Cerna Voda – financing + next site**
- **Slovenia – preparation team for Krsko**
- **Austria – no changes in anti-nuclear policy**

# LOCALIZATION OF THE PRODUCTION

- ✓ **Construction of NPP has huge impact on entire country**
- ✓ **Optimal localization gives reasons for huge investment**
- ✓ **Construction of NPP generates up to 15 000 new jobs**
- ✓ **Transfer of „know how“ and „know why“ provides inestimable „value added“ for the economy**
- ✓ **Localization is an inevitable part of ROSATOM policy**



# CZECH COMPANIES DRIVE IT LOCALLY AND GO GLOBALLY

- ✓ Czech Republic has an unique position among „nuclear“ countries
- ✓ Decades-long-cooperation on VVER projects allows Czech companies to play a **key** role in a ROSATOM supply chain both locally (MIR.1200) and globally
- ✓ We want to integrate Czech companies into ROSATOM global supply chain regardless the result of the Temelin tender
- ✓ 30 ROSATOM reactors in 10 countries will need reliable partners
- **we cannot do it all alone!**
- ✓ As of today ROSATOM signed 25 MoA with Czech companies – let us do it together!
- **let us do it together!**

# Rosatom unique integrated NPP construction solution

## SAFETY

- basic principle

### 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

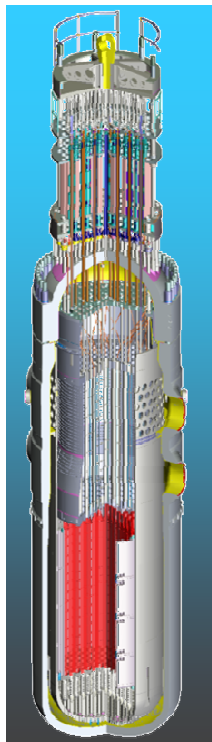
### Knowledge, skills, human capital

- 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

# Rosatom Gen III+ NPP design

## 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



Airplane crash



Outside explosions



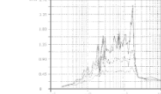
Hurricanes, tornadoes



Snow load



Tsunamis, floods



Earthquakes

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

# Belene NPP project profile



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



**Site – Belene, Bulgaria**

## Key parameters

- CAPEX (EPC part) – € 6,3 bn.
- Construction period – 2012 -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