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THE VVER 1200 DELIVERED BY ROSATOM

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New nuclear power in the Netherlands beyond 2030

Universiteit Twente

October/29/2021

ROSATOM AT A GLANCE

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138.3 Bn USD
10-YEAR PORTFOLIO OF OVERSEAS ORDERS

RUSSIAN DESIGNED NPPs AVOIDED
213 M tonnes of CO_2eq

R&D INVESTMENT
4.5% of revenue

>250 000
EMPLOYEES

16.7 Bn USD
REVENUE*

35 UNITS
OVERSEAS NPP PORTFOLIO

0 INES
LEVEL–2 INCIDENTS
36 UNITS (31 GW)

GLOBAL FOOTPRINT -
> 50 countries

** Source: Rosatom IFRS, annual report*

ROSATOM: ALL THAT IS NUCLEAR

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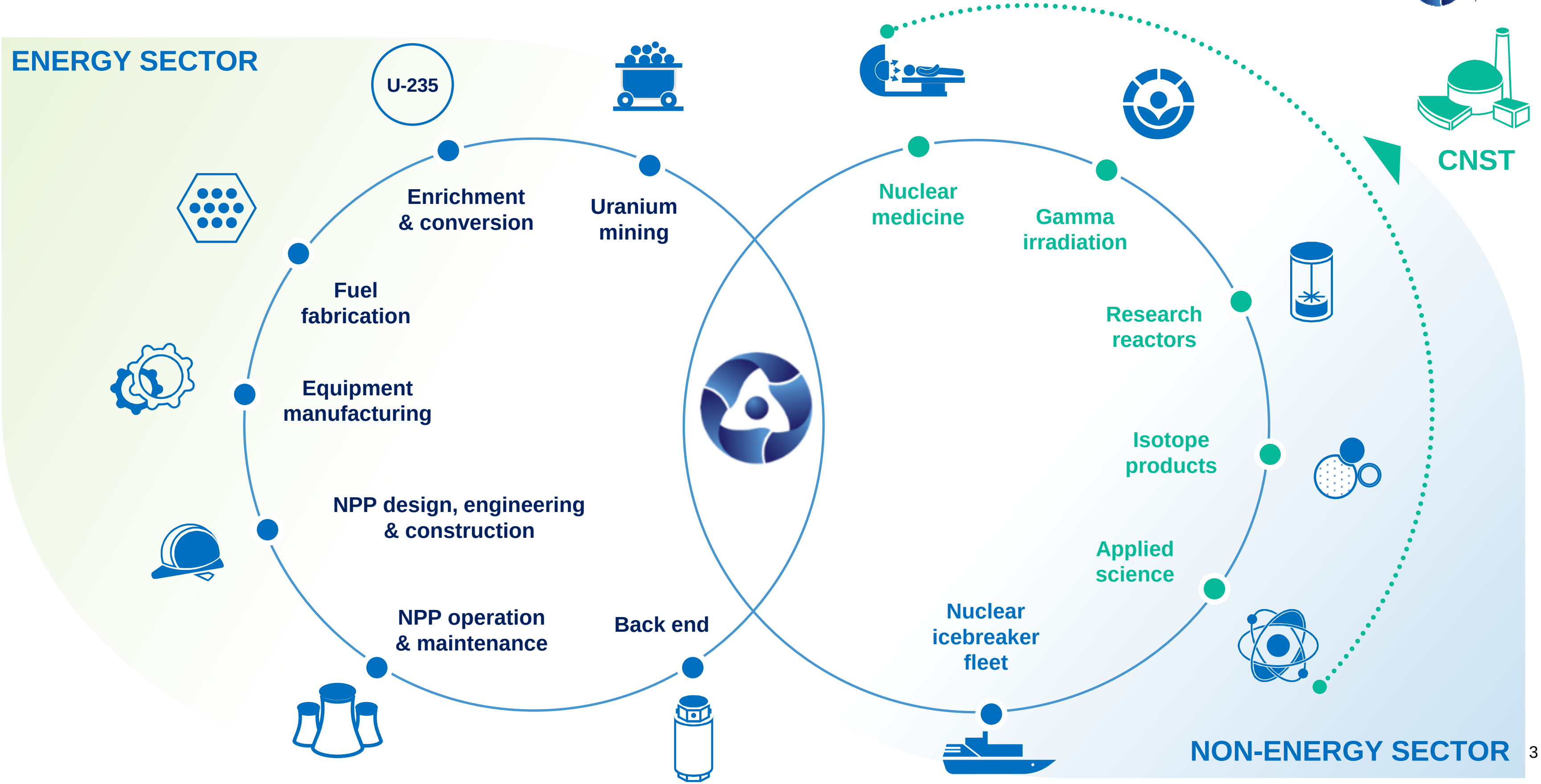

CONTRIBUTION TO CLIMATE SAVING

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33,3

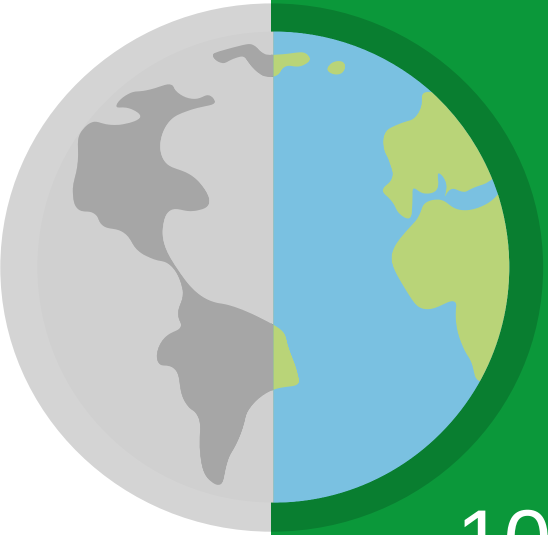
M hectares of forest

WILL ABSORB THE SAME AMOUNT OF CO_2 IN A YEAR

11% **OF FOREST AREA IN THE USA**

&

3 **TIMES MORE THAN TOTAL FOREST AREA IN GERMANY**



ALL RUSSIAN–DESIGNED NPPs SAVE:

213

M TONNES

CO_2eq on average per year

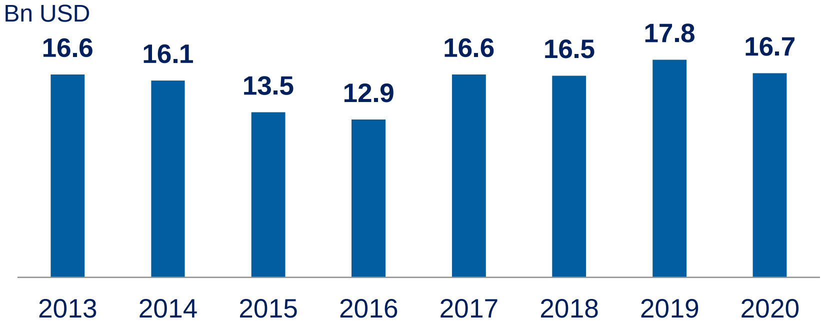
108 M TONNES CO_2eq DOMESTIC

\+

105 M TONNES CO_2eq ABROAD

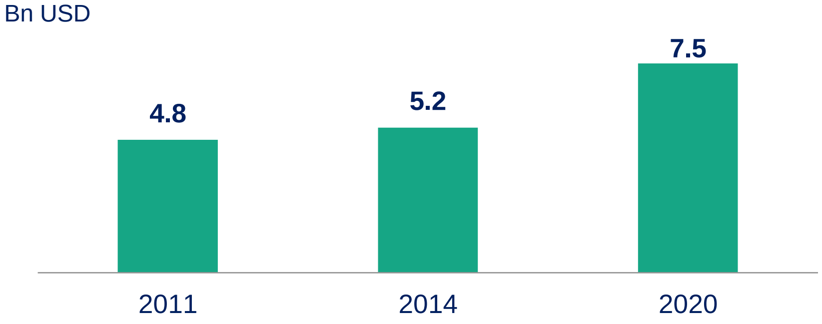
FINANCIAL SUSTAINABILITY

Revenue

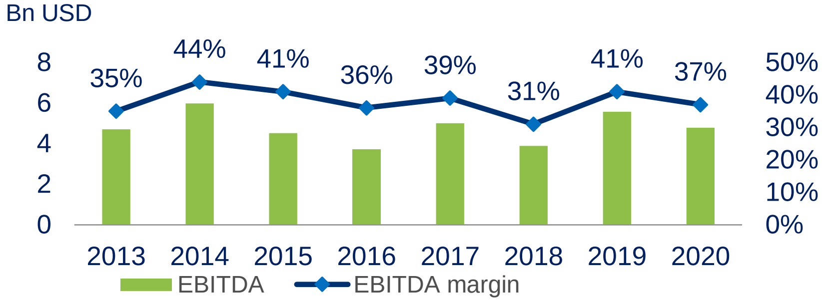


Source: Rosatom IFRS, annual report

Overseas revenue



Consistent Profitability Margins



Source: AEP IFRS, annual report

Credit Ratings

	S&P	Fitch Ratings	Moody's Investors Service
Rating	BBB-/A-3	BBB	Baa3
Forecast	Stable	Stable	Stable

ROSATOM – BEING LOCAL GLOBALLY

14 REGIONAL & COUNTRY CENTERS

18 FOREIGN REPRESENTATIVES

***Acting Rosatom foreign representatives at Russian Embassies, Trade Missions and Permanent Missions of the Russian Federation to the IO in Vienna and to the EU and EAEC in Brussels:** *Austria, Argentina, Armenia, Bangladesh, Belarus, Belgium, Vietnam, Egypt, India, Iran, Kazakhstan, China, Turkey, Uzbekistan and Japan*

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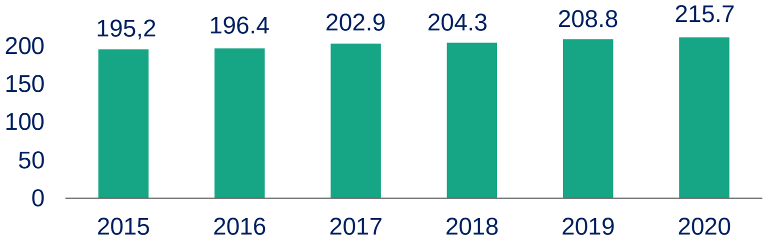
SECOND NUCLEAR UTILITY GLOBALLY

36 UNITS	in operation at 10 NPPs
1 FPU AKADEMIK LOMONOSOV	FNPP
30,58 GWe	total installed capacity (as of July 01, 2021)
20,3 %	nuclear in Russian power generation mix in 2020

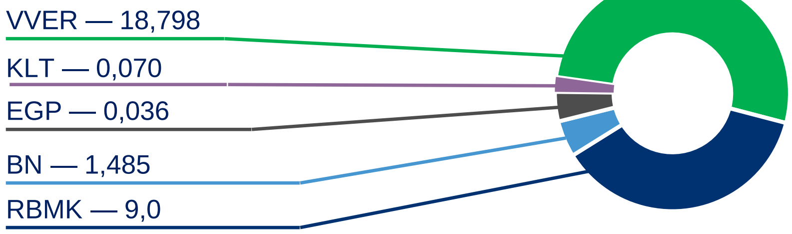
NPP power generation in Russia

Generation dynamics, TW–h



Technologies in operations portfolio

Installed capacity, GWe



INNOVATIONS AT WORK

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!

TOP-10 NUCLEAR POWER INNOVATION LEADER
(according to Thomson Reuters)

WORLD’S ONLY FLOATING NPP

SMR technology is widely referenced by the icebreaker fleet

More than
400
REACTOR YEARS!

Supply of electricity, thermal power and desalinated water to isolated territories

FAST NEUTRON REACTORS

The BN type reactor is a breakthrough generation IV nuclear energy system

More than
40 **YEARS**
of safe operation!

Increased fuel base, allows closed fuel cycle

MODERN SMR SOLUTIONS

Floating NPP	
Electrical capacity	100 MW
Refueling cycle	up to 10 years
Design life	60 years
Displacement	16 680 tons
Length	112 m
Beam	30 m
Draught	5 m

Land-based solution	
Electric capacity	>110 MW
Refueling cycle	up to 6 years
Design life	60 years
Plant area	0,06 km^2
Construction period	3-4 years

GLOBAL LEADER IN RESEARCH REACTORS

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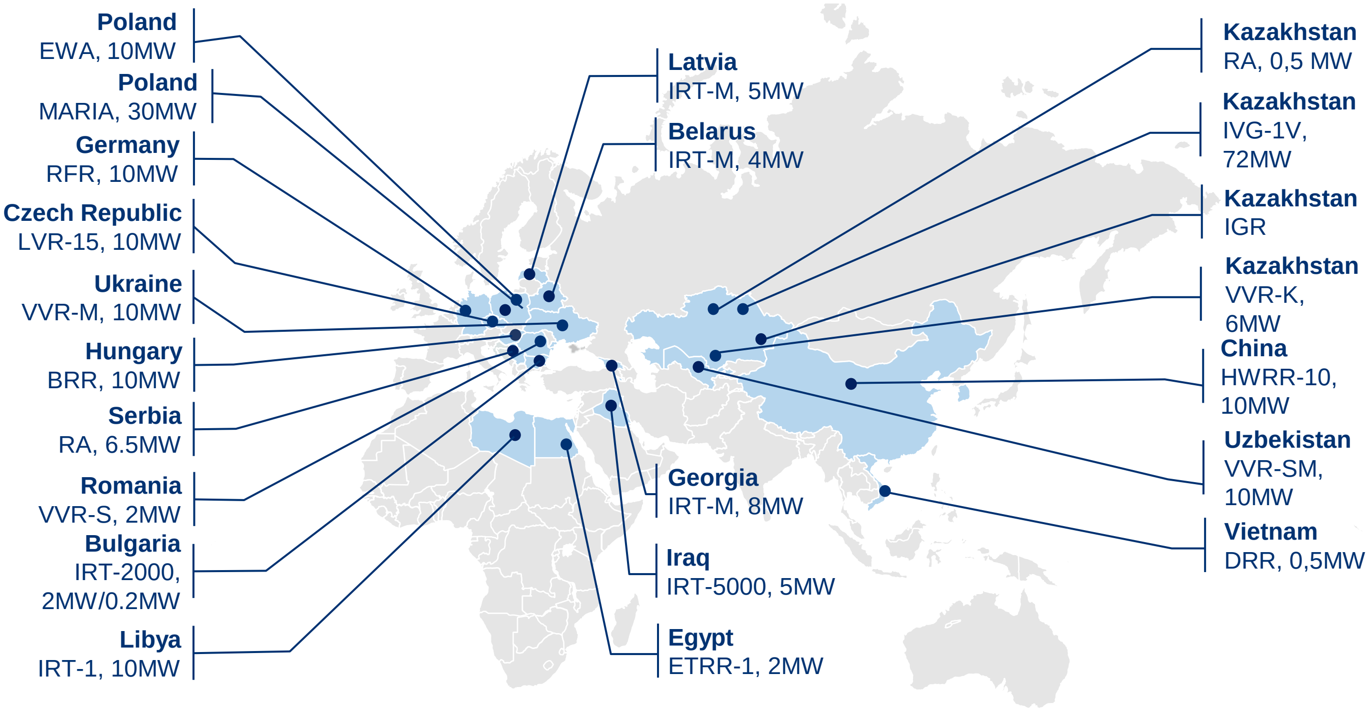
~75 years of technological experience



ROSATOM RR global references

So far ROSATOM has built

122 research reactors:

RUSSIA 100

ABROAD 22

Global fleet

Out of **226** RRs in operation

54 RRs are located in Russia

20%

DIVERSIFIED URANIUM RESERVES

№2 in Uranium reserves globally (696 th. tU)

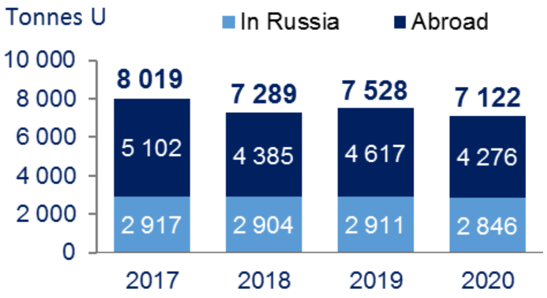
№2 in Uranium production globally

15% of all global production in 2020

100% of Uranium abroad was mined by ISL mining technology

PRODUCTION & DEVELOPING PROJECTS

Uranium production



SUPPLY GEOGRAPHY

- EUROPE
- NORTH & SOUTH AMERICA
- ASIA

URANIUM CONVERSION & ENRICHMENT LEADER

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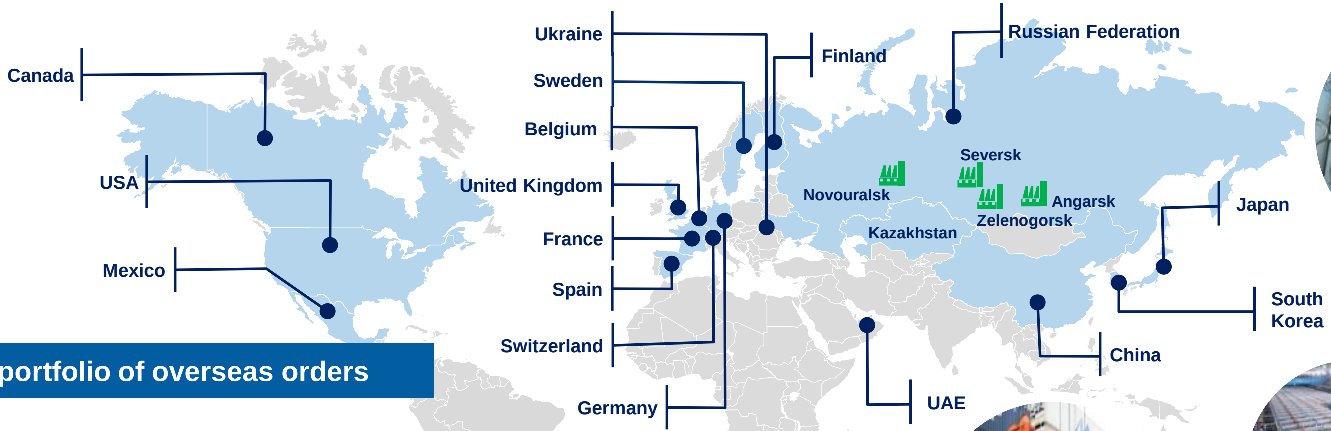
№1 in installed capacities

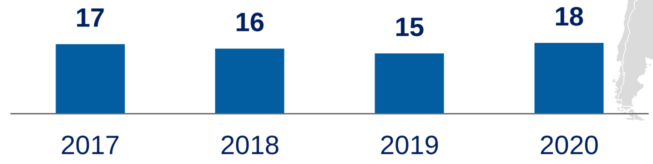
~1/3 of global uranium enrichment market

50 years of centrifuge technology development

GEOGRAPHY OF SUPPLY & PRODUCTION FACILITIES



10-Year portfolio of overseas orders



KEY PLAYER ON THE GLOBAL FUEL MARKET

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17% global NPP fuel market share

> 70 power units work on Rosatom fuel

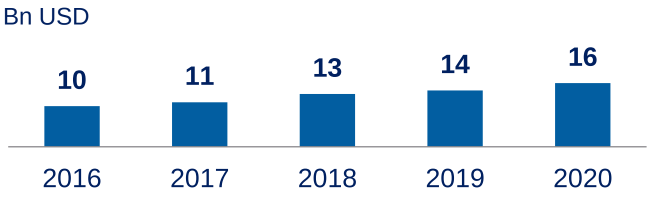
> 10 countries supplied with research reactor fuel

Fuel assemblies, U and Zr fuel components

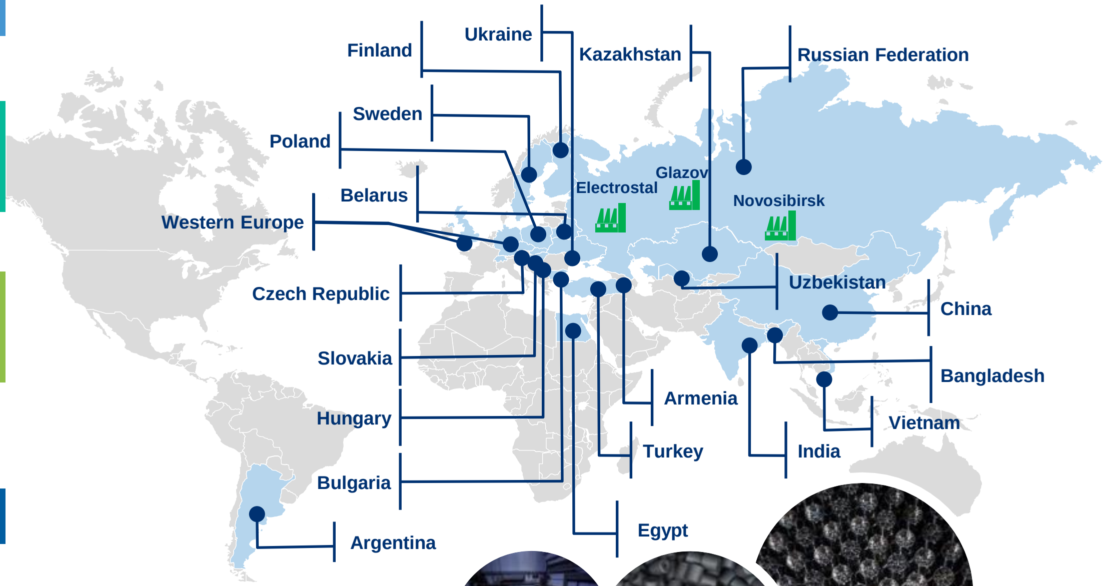
new fuel
- tolerant fuel testing
- MOX-fuel for fast reactor
- fuel from reprocessed uranium

Advanced technologies for increased safety & fuel performance in open and closed fuel cycle

10-Year portfolio of overseas orders



GEOGRAPHY OF SUPPLY & PRODUCTION FACILITIES



EXTENSIVE MANUFACTURING CAPABILITEIS

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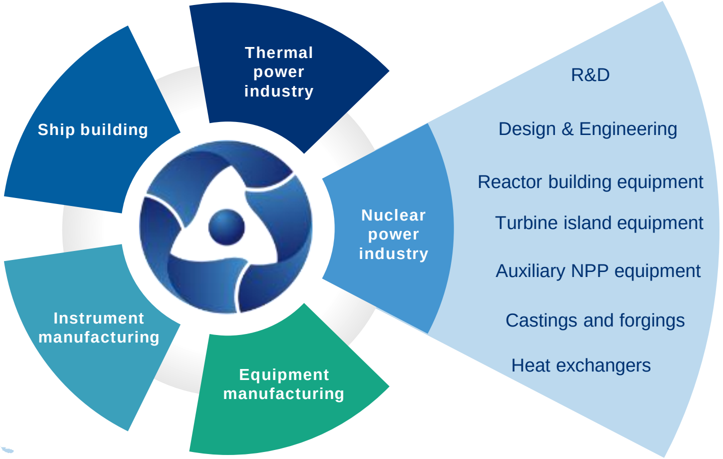
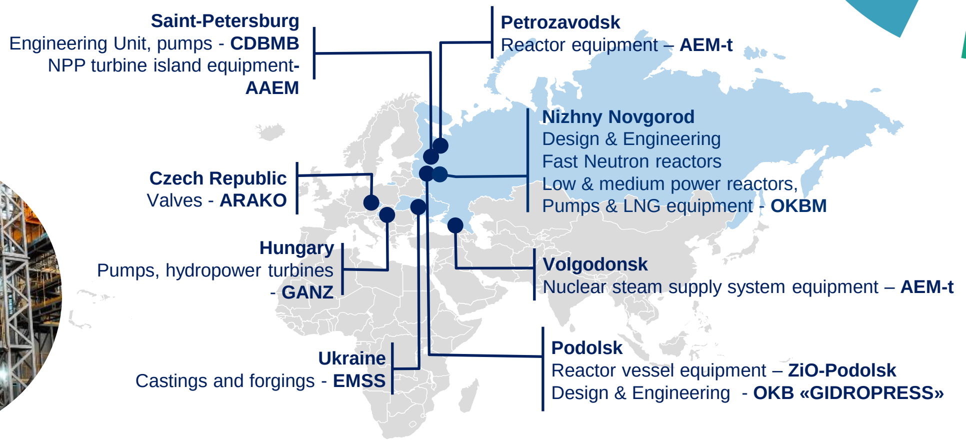
>20	countries use Rosatom equipment
3-4	sets of nuclear steam supply systems annual capacity
>20	enterprises in Russia and abroad



PRODUCTION FACILITIES



NPP OPERATION & MAINTENANCE THROUGHOUT THE WHOLE LIFE CYCLE

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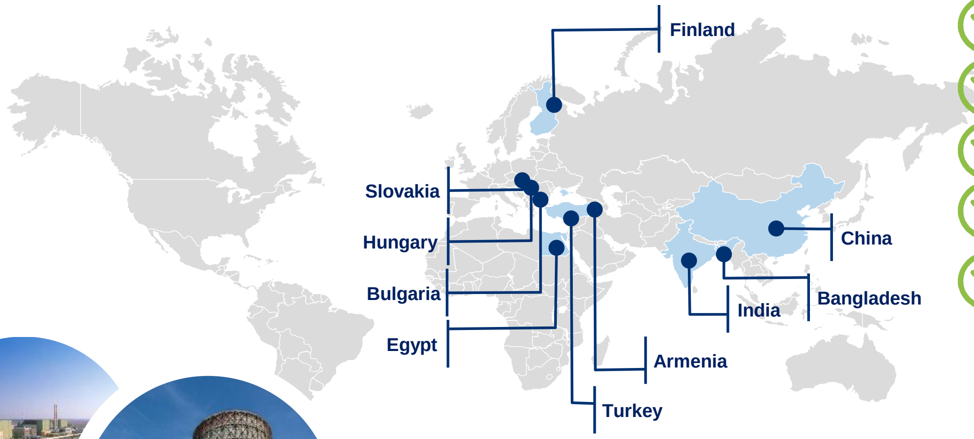
27 units in service

10 countries with operations

№1 on VVER market

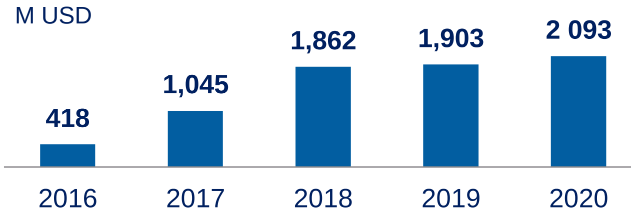
GEOGRAPHY OF PROJECTS



KEY SERVICES

- NPP & CNST INFRUSTRUCTURE DEVELOPMENT
- PERSONNEL TRAINING
- MODELING AND SIMULATION
- NPP COMISSIONING
- NPP OPERATION & MAINTENANCE

10-Year portfolio of overseas orders



RELIABLE SPENT NUCLEAR FUEL MANAGEMENT

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17	**countries sent NPP & RR SNF back to Russia for reprocessing**
ALL	**SNF types can be reprocessed**
The 1st	**fast neutron reactor loaded with MOX fuel in the world**

KEY SERVICES (present & under development)

SNF / HLW storage and transportation casks

- SNF/ HLW storage and/or transportation casks design and supply
- Interim SNF storage in Russia
- SNF packaging and transportation (incl. air shipment for RR SNF)

SNF reprocessing with HLW partitioning

- SNF radiochemical reprocessing recovering RepU and Pu
- HLW partitioning (Cs-Sr separation)
- HLW conditioning in compliance with customer's requirements
- Adaptation of customer's infrastructure for HLW disposal

RepU and Pu Fuel

- RepU and Pu recycling in fresh fuel both for LWRs & fast reactors

UNIQUE COMPETENCIES IN DECOMMISSIONING AND RADIOACTIVE WASTE MANAGEMENT

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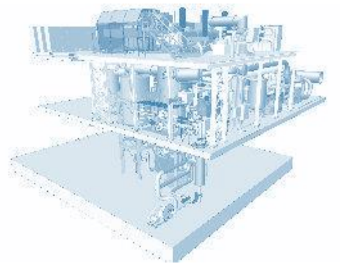
> 50 YEARS	OF PRACTICAL EXPERIENCE	ANY FACILITIES	NPP, NFC FACILITIES, RW STORAGES, NUCLEAR LEAGCY FACILITIES, NUCLEAR SUBMARINES, ETC	TURNKEY	ROSATOM PROVIDES ALL TYPES OF WORK

ENGINEERING SERVICES (DESIGN AND ENGINEERING)

- DEVELOPING DECOMMISSIONING STRATEGIES AND CONCEPTS
- PERFORMING SITE SURVEYS
- DEVELOPING DESIGN DOCUMENTS
- PREPARING LICENSING DOCUMENTS



DEACTIVATION, DISMATLING AND DISASSEMBLY OF EQUIPMENT AND STRUCTURES

- REMOVAL OF NUCLEAR PRODUCTS AND SNF
- DEACTIVATION
- DISMATLING OF EQUIPMENT, SYSTEMS, AND CIVIL STRUCTURES
- REHABILITATION AND RESTORATION OF LANDS

RW MANAGEMENT

- RW REMOVAL AND SEPARATION
- RW PROCESSING, STORAGE, AND TRANSPORTATION
- RW CHARACTERIZATION, CONDITIONING, AND PASSPORTIZATION
- RW DISPOSAL IN REPOSITORIES

NUCLEAR INDUSTRY PIONEER

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ROSATOM HISTORICAL MISSION AS THE PIONEER IN NUCLEAR ENERGY –
TO PROVIDE FOREIGN PARTNERS WITH **ALL–ENCOMPASSING SUPPORT**
IN **SUSTAINABLE DEVELOPMENT** OF THE REGION

First NPP ever constructed

OBNINSK

48 YEARS of successful operations

1954

First research reactor built overseas

BUCHAREST

Operation began in **1957**

First NPP ever built by vendor overseas

BOHUNICE

Construction began in **1958**

First VVER NPP built overseas

RHEINSBERG

Construction began in **1960**

IMPRESSIVE PORTFOLIO OF SUCCESSFUL PROJECTS

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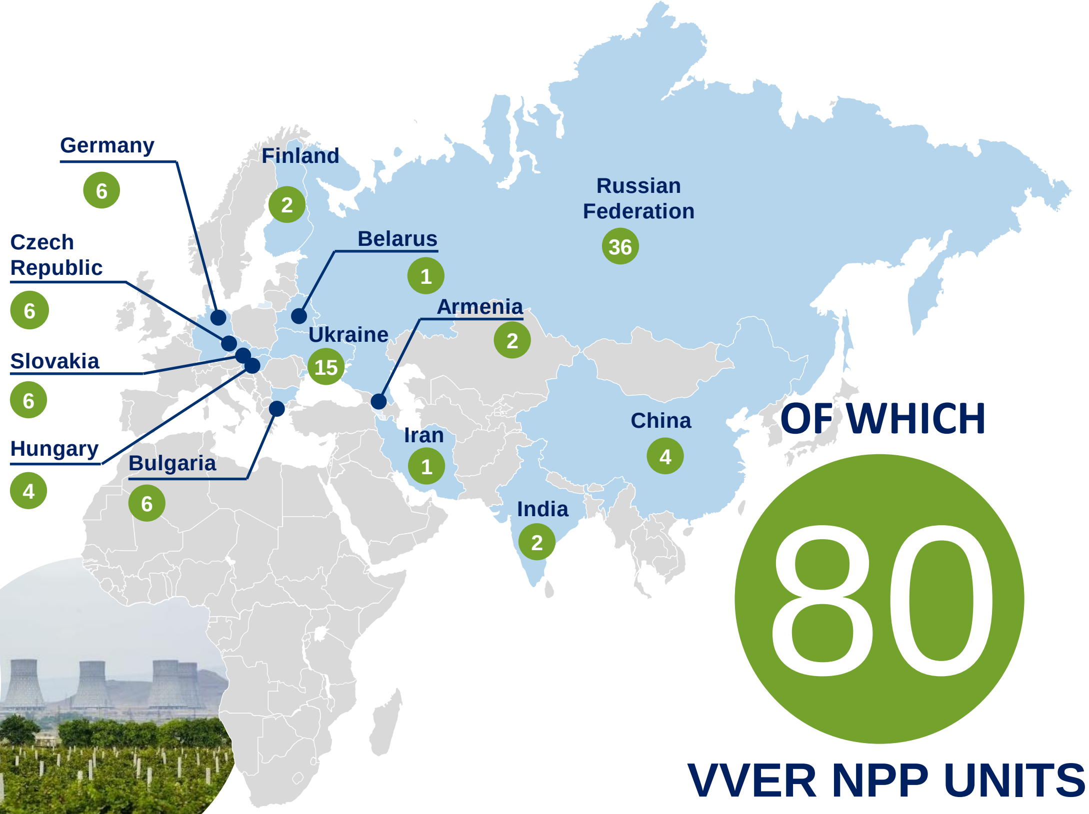
106

RUSSIAN-DESIGNED NPP UNITS HAVE BEEN BUILT GLOBALLY



OF WHICH

80

VVER NPP UNITS

THE ONLY COMPANY IMPLEMENTING SERIAL NPP CONSTRUCTION GLOBALLY

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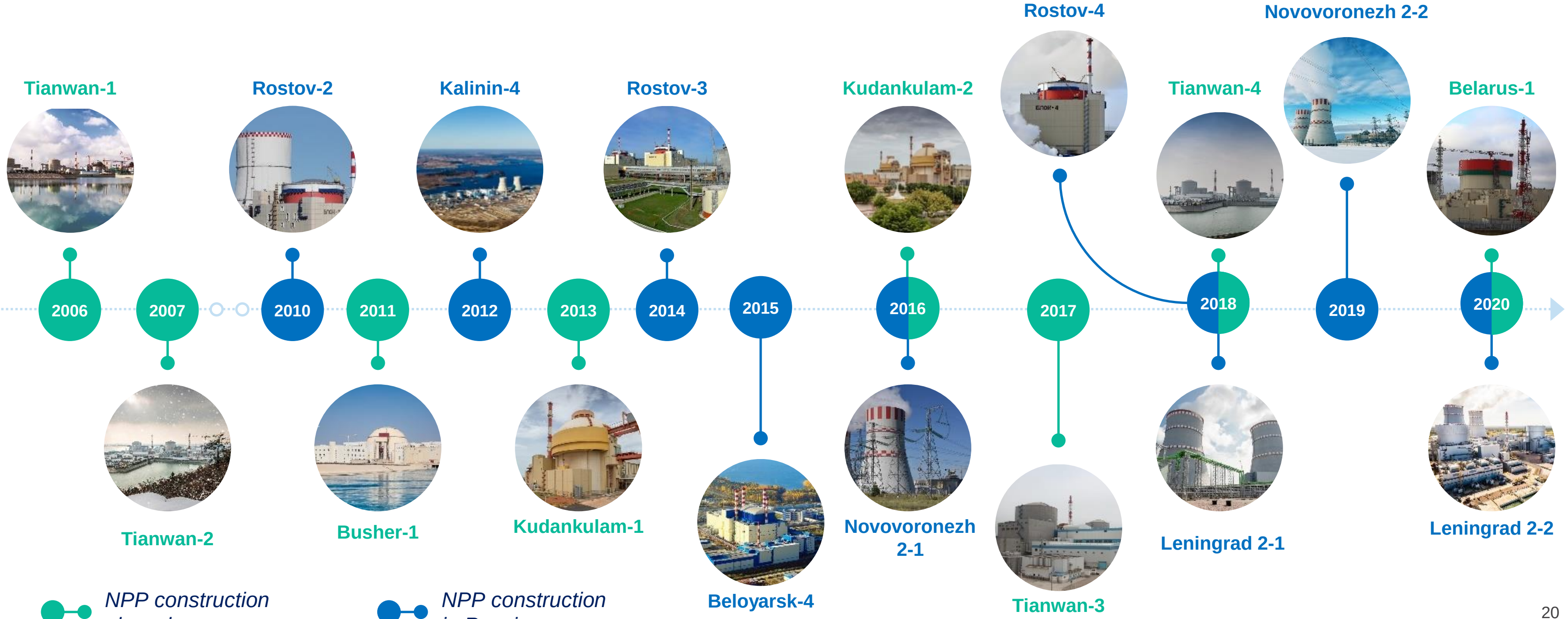
17 NPP UNITS IN 15 YEARS CONNECTED TO THE GRID



NPP construction abroad

NPP construction in Russia

ADVANCED GENERATION III+ NUCLEAR TECHNOLOGY

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VVER–1200* – FUSION OF TECHNOLOGICAL HERITAGE AND INNOVATION

ADVANCED PWR TECHNOLOGY

meets all the **IAEA safety standards** and **requirements**

1st	gen III+ reactor in operation
1200 MWe	nominal output
60+ years	lifecycle
> 90%	availability factor
1500	reactor years of safe operation
Active & Passive	combination of safety systems

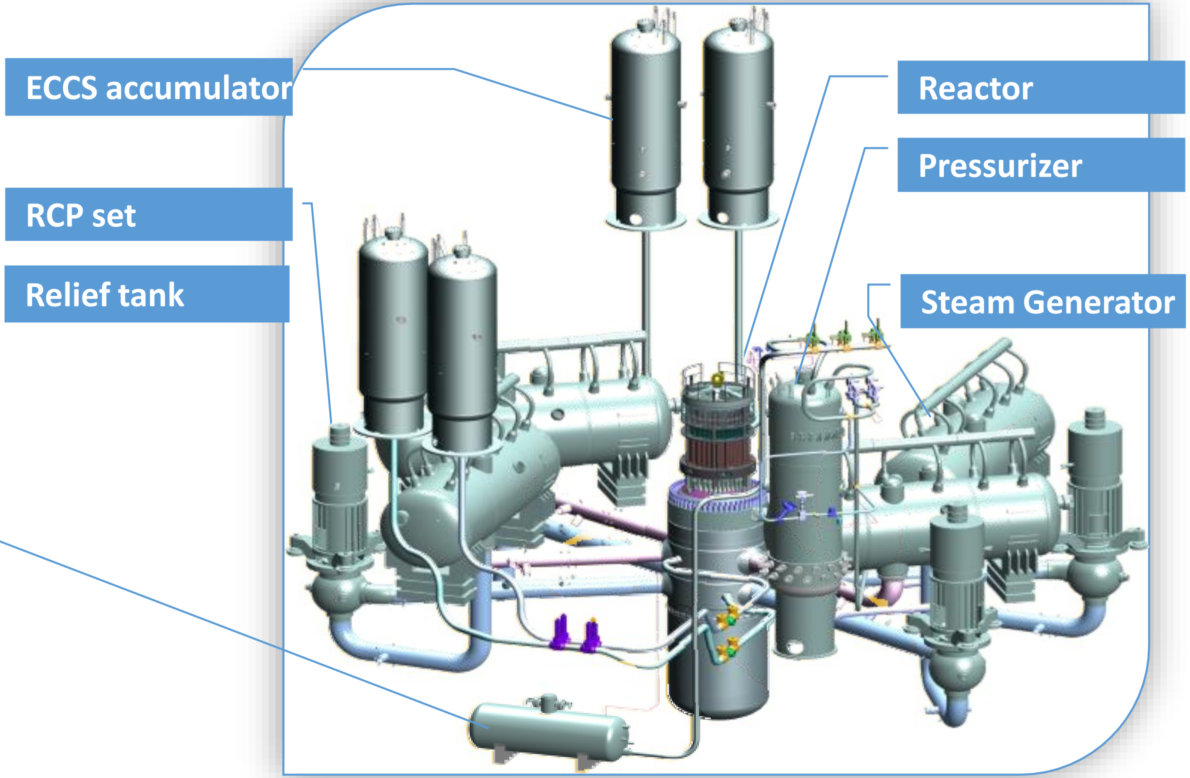
**in commercial operation since Feb, 2017*

VVER 1200 – Some Key Figures

1) Emergency Boron Injection System

Nominal Thermal Power	3200 MW
Nominal Electrical Power	1198 MW
Efficiency (gross)	37.5 %
Primary system pressure (nom/design)	16,2 / 17,6 Mpa
Coolant Temperature (inlet/outlet)	298 / 329 °C
Steam Pressure at SG outlet	7,9 MPa
Active Safety Trains	4x100% / 4x50%[1)]
Design Lifetime	60 years
Containment	Double
Autonomy after accident	>72 hours
Number of FA / RCCA	163 / 121
Mass of UO_2 in the core	87065 kg
Operational Cycle	12 / 18 months
Airplan Crash (Design Basis / DEC)	Small / commercial

VVER 1200 - a 4-loop Pressurized Water Reactor



Evolution of designs from VVER-1000 to VVER-1200

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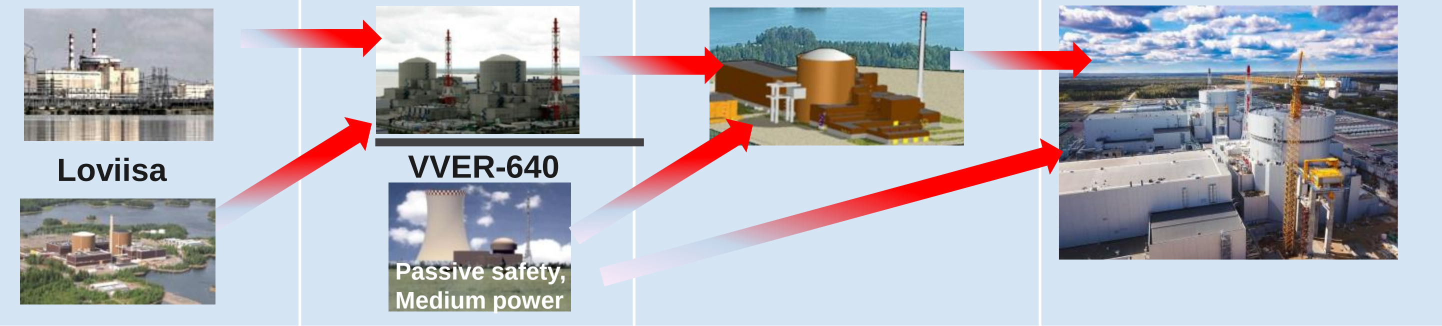
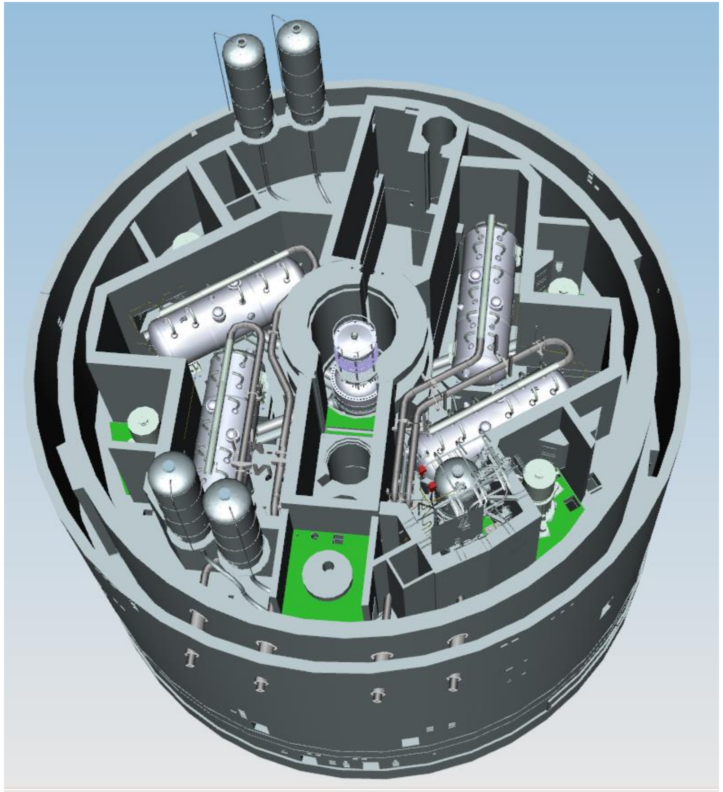
VVER-1000 RU V-320	VVER-1000 RU V-428 (AES-91)	VVER-1000 RU V-466 (VVER-91/99)	VVER-1200 RU V-491
Standard Russian design	Improved safety design with increased technical and economic parameters	Design complying with modern European and International standards (EUR and YVL)	Serial design satisfying modern Russian, European and International requirements for new NPPs
Implemented in NPPs in Russia, Ukraine, Bulgaria, Czech Republic	Developed for Finland Implemented at Tianwan NPP (China)	Bid for FIN5 NPP in 2003	Leningrad NPP-2 (LNPP-2) Belarus NPP, Baltic NPP Hanhikivi 1, Paks, El Daaba



1970s 1980s 1990s 2000s 2010s

Selected Inherent Safety Features

- Negative coefficients of reactivity;
- Considerable coolant inventory in the primary circuit;
- Horizontal steam generators;
- SG tubes are made of stainless steel;
- Considerable water inventory in steam generator secondary side;
- Extensive use of passive components and systems;
- the core is made up of hexagonal fuel assemblies;
- RPV without longitudinal welds;
- No penetrations in the reactor bottom;
- Two-lines arrangement of the RPV nozzles.



Diverse and redundant safety systems

The leading philosophy in the design of the VVER 1200 plants is:

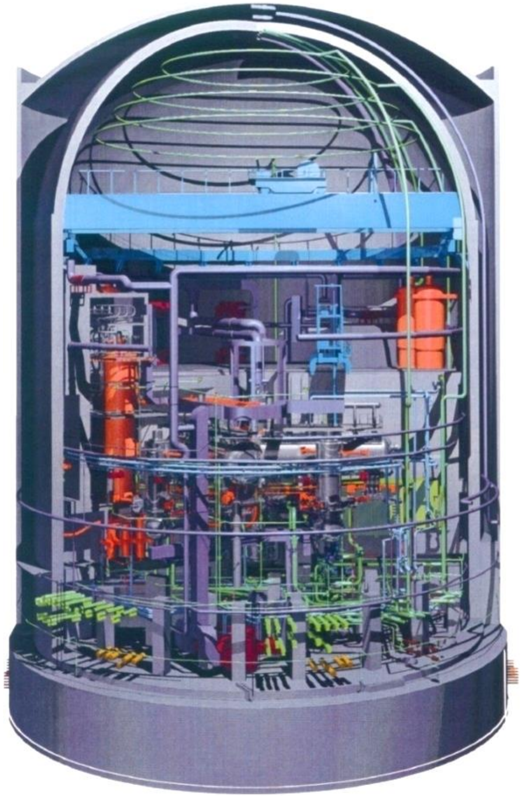
All fundamental safety functions shall be provided both with

- **active systems** that have very reliable AC power supply and
- **passive systems** that do not need electrical power at all

This gives the operators a possibility to use different safety systems independently of each other and in a flexible manner, depending on the accident scenario.

Double Containment

- **Inner containment**
  - prestressed reinforced concrete
  - 1.2 meters in cylindrical part
  - Inner surface with 6 mm welded steel liner..
- **Outer containment**
  - Reinforced concrete up to 2.2 meters thick in cylindrical part
- **Annulus**
  - 1.8 meters gap
  - Maintenance of negative pressure
  - Filtered ventilation to atmosphere
- **All process penetrations with isolation valves**



Containment of Radioactive Materials after a Severe Accident (hypothetical)

The target for protecting the reactor containment after a possible core meltdown accident was set in the USSR soon after the Chernobyl accident.

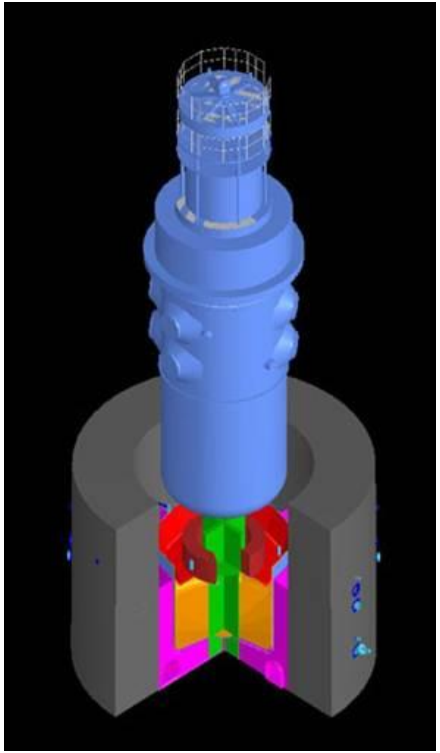
All European nuclear regulators agreed in 2010 that this target has to be met by all new NPPs in Europe.

After Fukushima Daiichi accident, this target has received worldwide support.

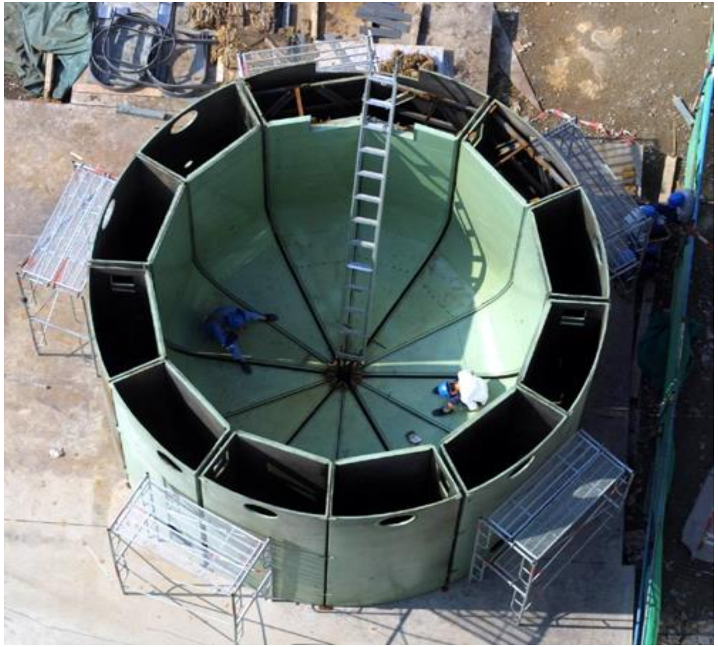
Installation of the shell of the core catcher

Core Catcher

- Failure of active and passive cooling systems could result in fuel melting and destruction of the reactor pressure vessel.
- Is placed below the reactor vessel to **protect the containment** against impact of molten core (T >> 2000°C), eliminating generation on non-condensable gases, including hydrogen and carbon monoxide.
- Adds neutron absorbers to the melt and maintains **long-term sub-criticality.**
- Transfers passively the heat to cooling water surrounding the “core melt pot” and **ensures long term cooling** and solidification of the molten core.
- Eliminates the need to vent the containment in the recovery stage.



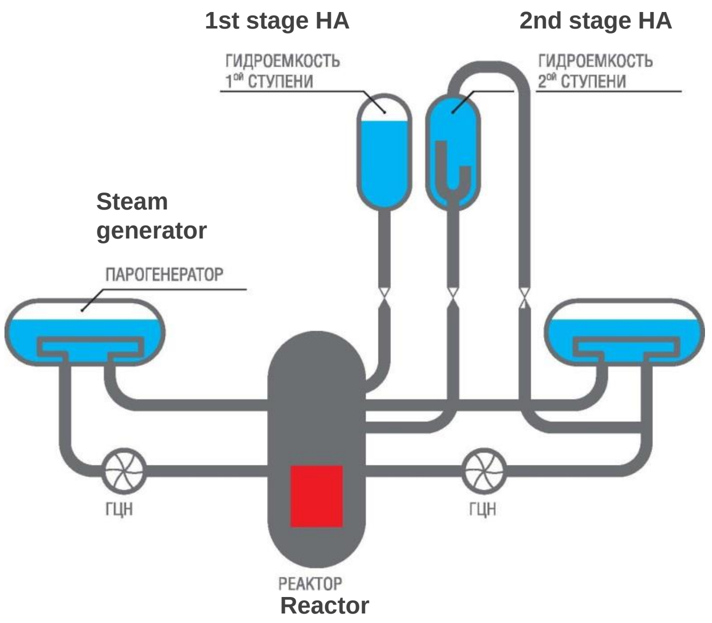
1st Core Catcher in the World – Tianwan 2007



Passive core cooling after loss of coolant accident
Two Stages provide additional safety margin

The **1st stage Hydro Accumulators** are fast flooding of the reactor core during large-break leaks. The system operates automatically when the pressure in the reactor coolant system drops below 5.9 Mpa.

The **2nd stage Hydro Accumulators** are passively flooding the reactor core in an emergency with boric acid solution.
The system operates automatically when the pressure in the reactor coolant system drops below 1.5 Mpa. It will keep the fuel covered with water for at least 24 hours after the largest possible pipe break without operator intervention.



The Additional Layer of Safety
Passive Heat Removal Systems (PHRS)

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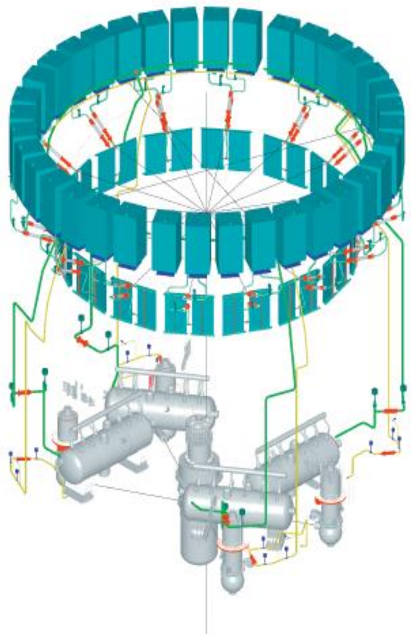
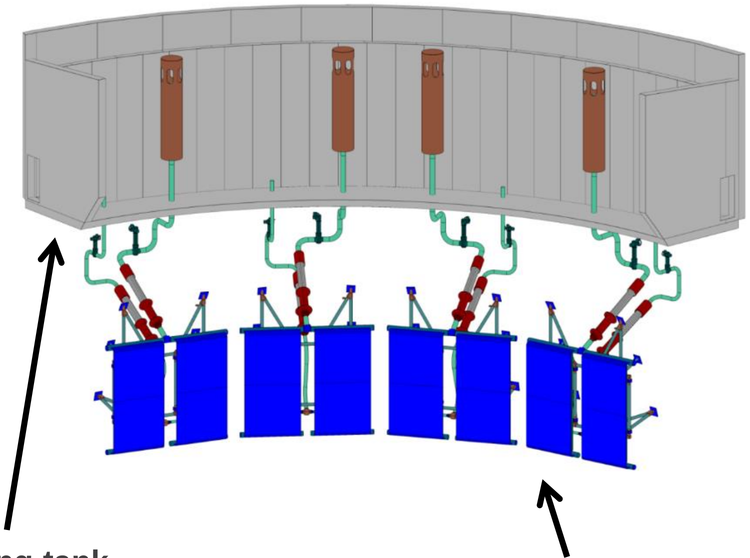
- Boiling off water from the Emergency Heat Removal Tank (EHRT) to the atmosphere.
- PHRS-SG: Provide fuel cooling via the SG during station blackout, loss of feedwater, small-break LOCA (BDBA).
- C-PHRS: Long-term heat removal from the containment in case of any BDBA / SA.
- Dedicated self-standing system for refilling EHRT from large condensate tanks inside protected buildings or via mobile equipment.



Containment PHRS

Passive containment overpressure protection system of VVER-1200



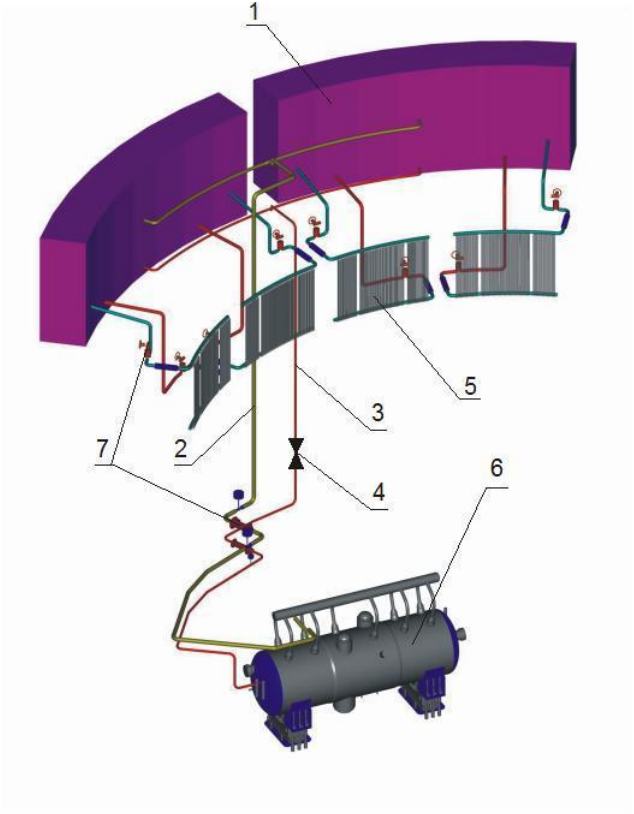
Cooling tank outside the containent

Condensing plates inside the containment

- No valves in cooling loops; circulation starts by gravitation if containment temperature increases.
- Capacity 4x33% increasing during event propagation.
- Cooling tanks adequate for 72 h operation without intervention.

Steam Generator PHRS

- Prevention of fuel damage by passive cooling in case of BDBA, with loss of active cooling systems.
- Steam from the secondary side of the steam generators condenses in the EHRT.
- Condensate drains back to the SG by gravity.



1 – emergency heat removal tanks (EHRT) outside containment ; **2** – steam lines ;
3 – condensate pipelines; **4** – SG-PHRS valves
[**5** – heat exchangers of containment];
6 – steam generators; **7** – cutoff valves

Containment Protection during Severe Accidents (hypothetical)

- Reactions of the molten core create hydrogen inside the containment and increase the risk of hydrogen explosions and subsequent containment failure.
- Passive catalytic recombiners maintain hydrogen concentration below the explosion threshold.
- Location of recombiners is based on detailed computer modelling.

Continuos Improvement of Active Safety Systems

In the first days and weeks after a severe accident, the release of radioactive iodine would cause the largest radiological risk to the people living in the neighborhood.

Today's VVER containments are equipped with a system that chemically binds the iodine released inside the containment. This reduces the risk of radioactive releases from the containment.

Summary: Diverse and Redundant safety systems

- **All fundamental safety functions are ensured by multiple different safety systems, both active and passive;**
- **All new VVER plants incorporate design features that take properly into account the main ”Fukushima issues”:**
  - Long term cooling of reactor core without electrical power
  - Long term decay heat removal, not relying on primary ultimate heat sink (sea, river, cooling tower, ...) and
  - Protection of reactor containment integrity with dedicated systems after a potential core meltdown accident.
- The VVER design incorporated most of these safety features long before the Fukushima Daiichi incident.

Reactor Pressure Vessel - Integrity For At Least 60 Years

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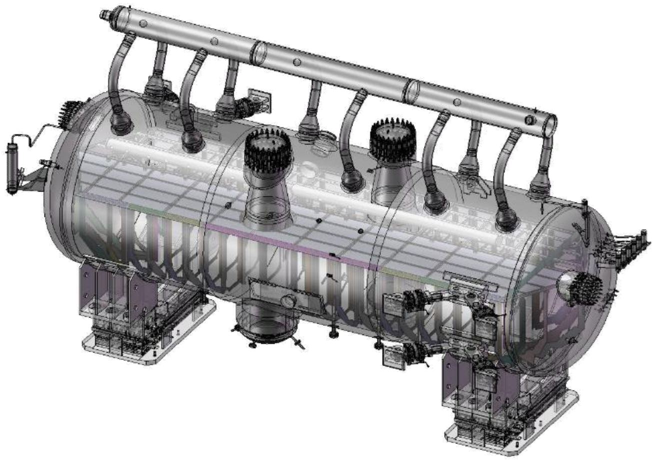
- **Enhanced RPV materials and structure**
  - less impurities in base metal and welds, less nickel in welds, increased vessel diameter in order to reduce neutron irradiation of the vessel;
  - extensive research and testing, certified to 6,4 x 10^{19} neutr/cm^2 (0,5 MeV);
  - Improved location of welds in the core area;
  - improved number and location of irradiation samples.
- **No Bottom penetrations**

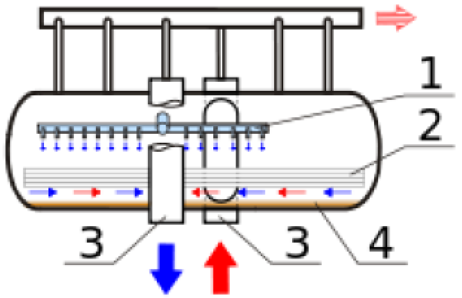
Steam Generators – Model PGV1200



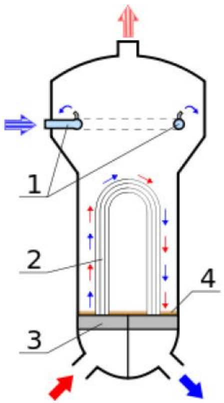
Design pressure (secondary	9,0 Mpa
Steam capacity	1502 t/hr
Feedwater temperature	225 °C
Heat exchange surface	6.105 m^2
Number of tubes	10.978
Size of tubes	16 x 1.5 mm
Vessel Length	14.020 mm
Vessel Diameter	4.200 mm
Total mass	330 t
Secondary water volume	63 m^3
Continuos blow-down	20 t/hr

Horizontal Steam Generators – The Superior Choice

- Enhanced resistance to dynamic loads;
- Reduced need for height of reactor building facilitates seismic design of containment;
- Continued primary recirculation in case of loss of coolant accidents;
- Larger water inventory, increased time to mitigate feedwater problems;
- Larger steam evaporation surface reduces steam velocity;
- Low steam velocity reduces tube vibration and eliminates tube fretting;
- Low steam velocity eliminates need for sophisticated steam dryers,
- Using the right tube material: «08X18H10T» steel (equiv. AISI 321) with ~10% Ni reduces primary and secondary SCC;
- Absence of tube-sheet substantially reduces fouling or denting;
- Superior water chemistry virtually eliminates inner bundle fouling or denting.



- versus -



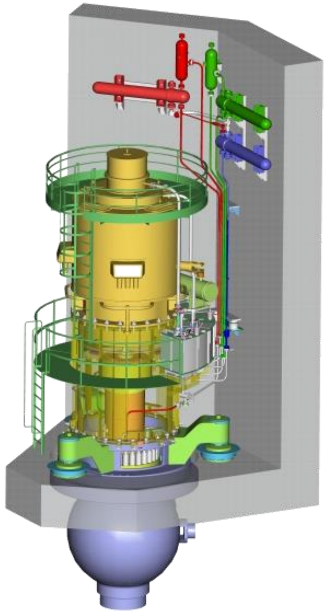
Replacement Frequency of vertical SG is <u>ten times higher</u> than for horizontal SG

Main Circulating Pumps (MCP) – State of the Art

SPECIAL DESIGN FEATURES OF MCPs:

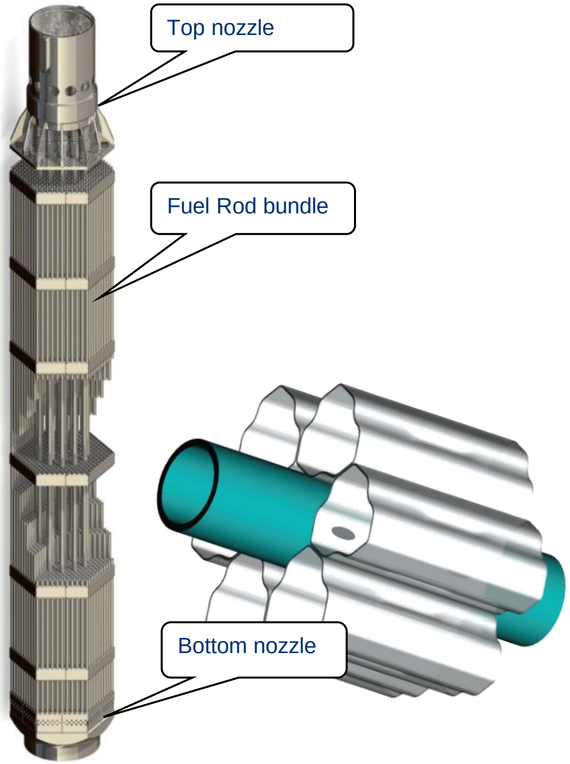
- Main circulating pump hydraulic and electrical part bearing ARE WATER COOLED and WATER LUBRICATED that reduces risk of oil fire inside containment.
- Optimized Stand-still seals reducing the leakage to less than 200 liters per day in case of loss of electricity
- Reactor cooling piping is designed in compliance with the "LEAK BEFORE BREAK" concept.

Capacity	22.600 m^3/hr
Head	0,624 MPa
Coolant Tempreature	298 °C
Intake Pressure (nominal)	16 MPa
Rotational Speed	1000 rpm



GCNA-1391

FUEL & CORE DESIGN



Fuel Assembly Height	4570 mm
Fuel Rods per FA	312
Fuel Rod Pitch	12.75 mm
Mass of FA	750 kg
Mass of UO_2 in FA	534.1 kg
Maximum burn-up (achieved)	59.14 MW·day/kgU
RCCA – drop time	< 2.5 sec

Why Hexagonal Fuel ?

More fuel in active zone compared to square arrangement;

More efficient fuel cooling compared to square arrangement;

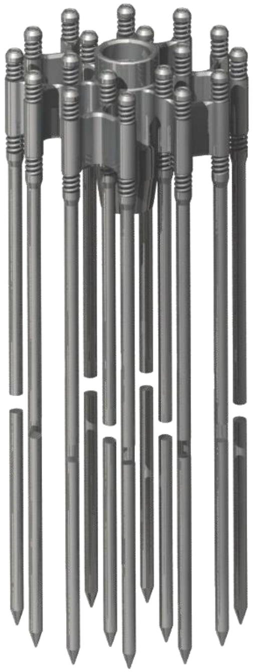
Increased rigidity eliminates the „banana fuel“ effect known to sqaure arrangement;

Criticality risk during transport and storage accidents is virtually eliminated.

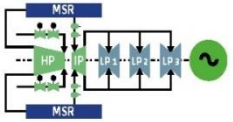
Superior Reactivity control

IF THE CONTROL RODS ARE INSERTED IN THE CORE THE REACTOR WILL STAY IN SHUTDOWN STATE EVEN AT LOW TEMPERATURE.

- This has been achieved by increased number of control rods and by their high effectiveness in capturing neutrons.
- It is not necessary to add boron to the coolant for ensuring long term safe cold shutdown. However, there is an option to release liquid with high boron concentration to coolant from passive pressurized hydro-accumulators during the cooling and depressurization (deep shutdown by rods permits cooling, which is not permitted at all in other PWR plants before adding boron to the reactor coolant by active systems).



Steam Turbine – Currently Two Options



GE SPS

Arabelle

HP/IPC + 3 LPC

Intermediary MSR

1500rpm

Power Machines

Turbine К-1200-6,8/50

2 LPC + HPC + 2 LPC

Intermediary MSR

3000rpm

ROSATOM: KEEPING THE PACE

ROSATOM

SUCCESS

STORY:

35 UNITS	OVERSEAS NPP PORTFOLIO
12	COUNTRIES

Belarus, Belarus NPP, VVER-1200

Bangladesh, Rooppur NPP, VVER-1200

Turkey, Akkuyu NPP, VVER-1200

India, Kudankulam NPP, VVER-1000

Hungary, Paks II NPP, VVER-1200

Finland, Hanhikivi-1 NPP, VVER-1200

Egypt, El-Dabaa NPP, VVER-1200

China, Tianwan NPP, VVER-1200

HANHIKIVI-1 NPP

REIN ROSATOM

Pyhäjoki in Northern Ostrobothnia, FINLAND

Reactor	VVER-1200
Capacity	1 unit x 1200 MW
Highlights	▪ Rosatom is a partner with 34% stake in the NPP ▪ Capacity to cover nearly 10% of Finland's electricity demand
Milestones	▪ EPC contract signed (December 2013) ▪ Turbine supplier selected (July 2016) ▪ Licensing in progress ▪ I&C systems supplier selected (October 2019) ▪ Manufacturing of main components started (October 2019) ▪ Basic Design Stage 1 documentation submitted to customer (December 2020) ▪ Customer Fennovoima Oy submitted an update to Construction License Application (April 2021) ▪ Site preparation activities in progress

PAKS II NPP

Paks, Region of Tolna, HUNGARY

Reactor	VVER-1200
Capacity	2 units x 1200 MW*
Highlights	▪ Existing four VVER-440 units at Paks site supplying 40% of Hungary's electricity ▪ Strong safety requirements based on EUR and WENRA standards
Milestones	▪ First works on site commenced (2019) ▪ Basic Design is approved by Hungarian owner (September 2019) ▪ Set of licensing documentation for a construction license for two new power units is handed over to the Hungarian regulator (June 2020) ▪ Construction completed of the first two buildings of the construction and erection base (December 2020).

*maximum capacity

AKKUYU NPP

REIN ROSATOM

Mersin province, TURKEY

Reactor	VVER-1200
Capacity	4 units x 1200 MW
Highlights	▪ 1st NPP developed using BOO (Build-Own-Operate) model worldwide ▪ 1st NPP in Turkey
Milestones	▪ Construction licenses granted for Unit 1 (2018), Unit 2 (2019) and Unit 3 (2020) ▪ Strategic investor status granted (2018) ▪ Power purchase agreement signed (2018) ▪ Grid Connection Agreement signed (2019) ▪ Concreting of Unit 1 foundation (March 2019) and Unit 2 (June 2020) completed ▪ Core catchers of Unit 1 (October 2019) and Unit 2 (November 2020) installed ▪ Reactor pressure vessel installed at Unit 1 (May 2021)

BELARUS NPP

REIN
ROSATOM

Ostrovets District, Grodno Region, BELARUS

Reactor	VVER-1200
Capacity	2 units x 1200 MW*
Highlights	▪ 1st NPP in Belarus ▪ Largest Russian-Belarusian project ▪ Capacity to satisfy nearly 25% of Belarus' energy demand
Milestones	▪ General Contract for construction of Units 1 and 2 (2012) ▪ Commencement of the stage of cold and hot functional tests of the reactor plant at Unit 2 (March 2021) ▪ Unit 1 was put into commercial operation (June 2021)

*maximum capacity

EL-DABAA NPP

REIN
ROSATOM

Matrouh governorate, EGYPT

Reactor	VVER-1200
Capacity	4 units x 1200 MW*
Highlights	▪ 1st NPP in Egypt ▪ Largest Russian-Egyptian project since the construction of the Aswan dam
Milestones	▪ EPC and three lifecycle contracts accrued (2016-2017) ▪ The contracts came into effect (December 2017) ▪ Start of preparation works on site (2019) ▪ Start of construction of Pioneer Base (December 2020) ▪ Submission of PSAR for Units 1 and 2 to the Owner (March 2021)

*maximum capacity

KUDANKULAM NPP

Kudankulam, Tamil Nadu state, INDIA

Reactor	VVER-1000 (2 units in operation, 4 units in implementation)
Capacity	6 units x 1000 MW
Highlights	▪ High localization level ▪ Southernmost VVER power units in the world
Milestones	▪ Units 3 & 4 construction started (first concrete in 2017) ▪ Framework agreement for construction of Units 5 & 6 signed (2017) ▪ Contracts for the supply of equipment from Russia (2018) and from third countries (2020) ▪ Throughout the project, twenty five ship lots with equipment for Units 3 & 4 were sent from Russia to India

ROOPPUR NPP

REIN ROSATOM

Pabna district, BANGLADESH

Reactor	VVER-1200
Capacity	2 units x 1200 MW*
Highlights	▪ 1st NPP in Bangladesh ▪ Key energy project in Bangladesh ▪ Capacity to satisfy nearly 10% of Bangladesh's energy demand
Milestones	▪ Construction of Unit 1 started in 2017, Unit 2 – in 2018 ▪ Installation of reactor support truss of Unit 2 completed (June 2020) ▪ Reactor pressure vessel and steam generator for Unit 1 delivered to the construction site (November 2020) ▪ Installation of polar crane in the reactor building 10UJA Unit 1 has began (February 2021)

*maximum capacity

TIANWAN NPP

REIN ROSATOM

Lianyungang city, Jiangsu province, CHINA

Reactor	VVER-1000 (Units 1-4 in operation) VVER-1200 (Units 7-8 in implementation)
Capacity	2 units x 1060 MW 2 units x 1128 MW 2 units x 1200 MW*
Highlights	Largest Russian-Chinese high-technology project
Milestones	▪ Units 1 & 2 started commercial operation (2007) ▪ Units 3 & 4 started commercial operation (2018) ▪ Detailed Design documentation for concreting the reactor building foundation slab for Units 7 & 8 was developed and submitted to the customer (May 2020) ▪ License for construction of nuclear island of Units 7 & 8 obtained (May 2021) ▪ Milestone "Nuclear Island First Concrete Day" of Unit 7 achieved (May 2021)

*maximum capacity

XUDAPU NPP

Huludao city, Liaoning province, CHINA

Reactor	VVER-1200 (Units 3-4 in implementation)
Capacity	2 units x 1200 MW*
Highlights	Project for mutual nuclear cooperation extension
Milestones	▪ The general contract for construction of Units 3 & 4 signed (June 2019) ▪ Working documentation for the pit was developed and handed over to the customer (February 2020) ▪ Preliminary Safety Analysis Report (PSAR) was developed and handed over to the customer (July 2020)

*maximum capacity

Thank you for your attention

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