



ROSATOM

STATE ATOMIC ENERGY CORPORATION "ROSATOM"

Rosatom Global Development: projects in South East Asia region

Nuclear Industry Suppliers Forum Atomex Asia 2014

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Hồ Chí Minh, VietNam

Rosatom: an overview

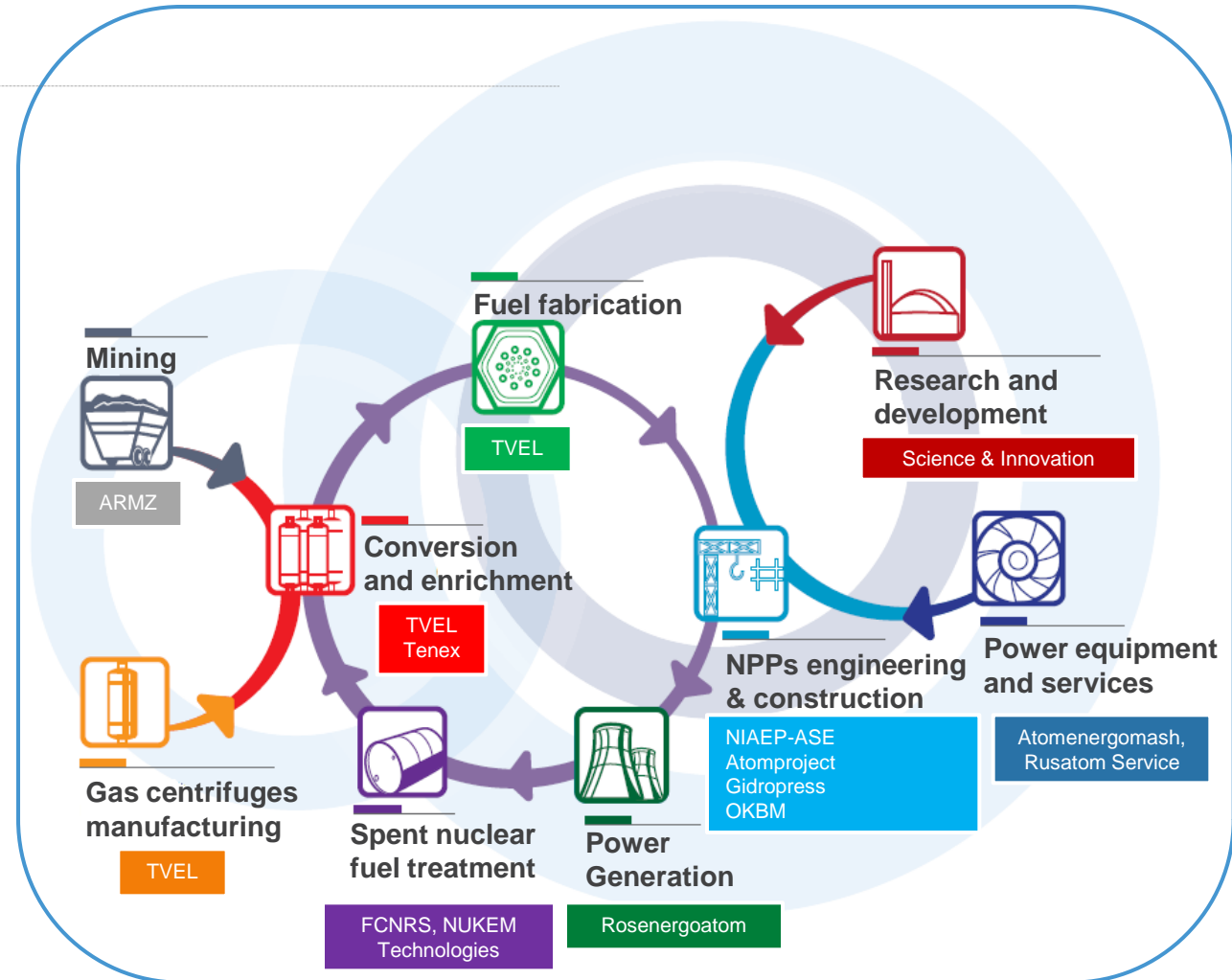
Rosatom offers complete solution from uranium supplies to NPP construction operation and decommissioning

Key Activities of Rosatom*

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



* Boxes include names of key Rosatom's subsidiaries in the relevant sector

Rosatom: key figures 2013

\$16 bln

Revenue

\$5 bln

Export revenue

255 000

Number of employees

\$73 bln

Export contracts portfolio
for the 10-years term

Nuclear Innovation – Variety of Applications

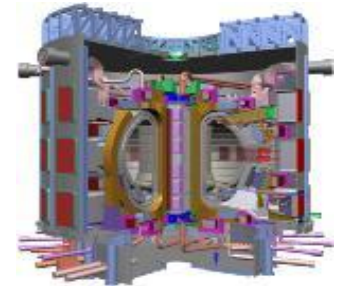


Nuclear Icebreaker Fleet

- #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



Radiation Technologies

- Isotope production
- Nuclear medicine
- Irradiation facilities



Rosatom Global Operations

#1 in key segments

5 continents. More than 40 countries.

#1

in uranium enrichment

#1

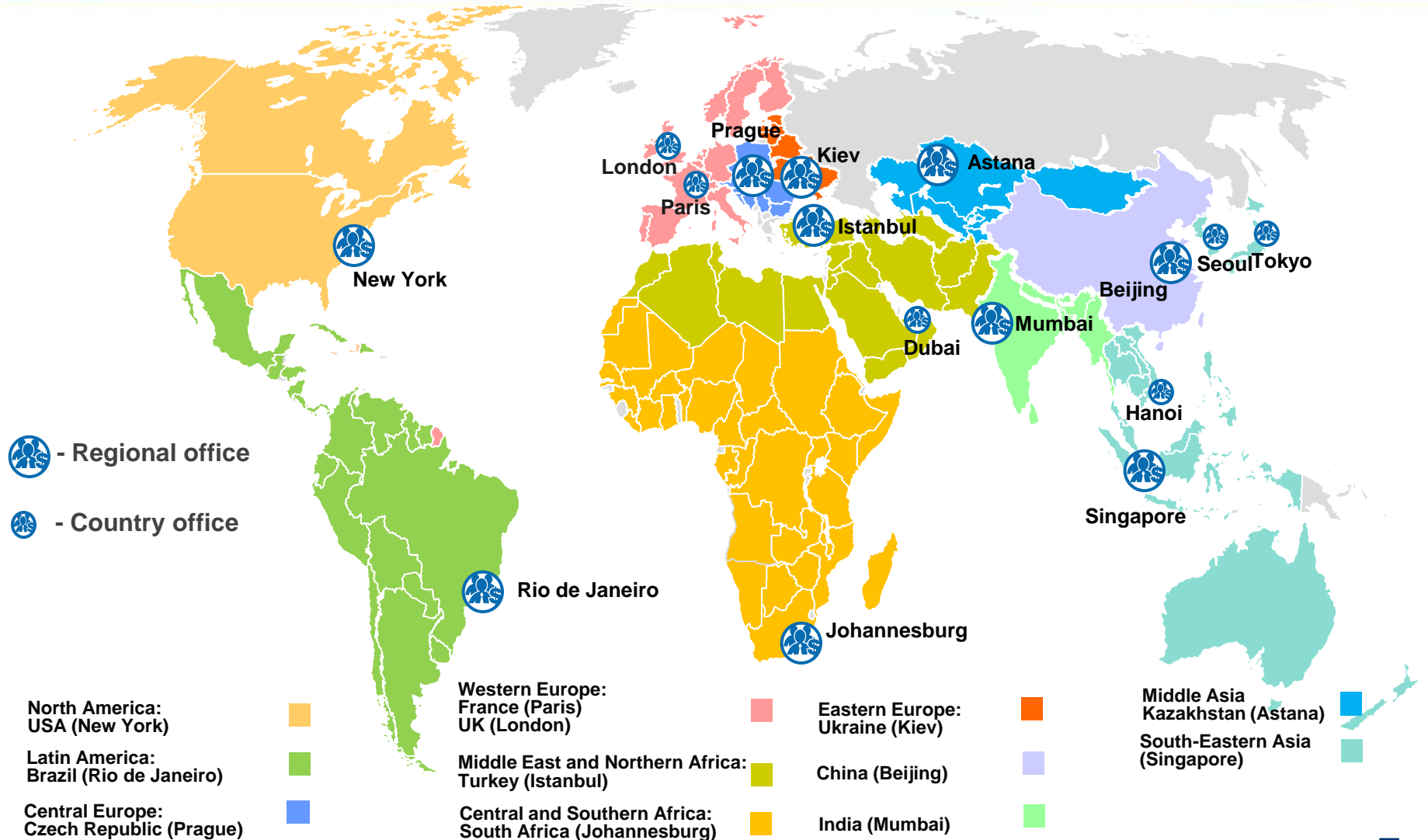
in new NPPs construction

#1

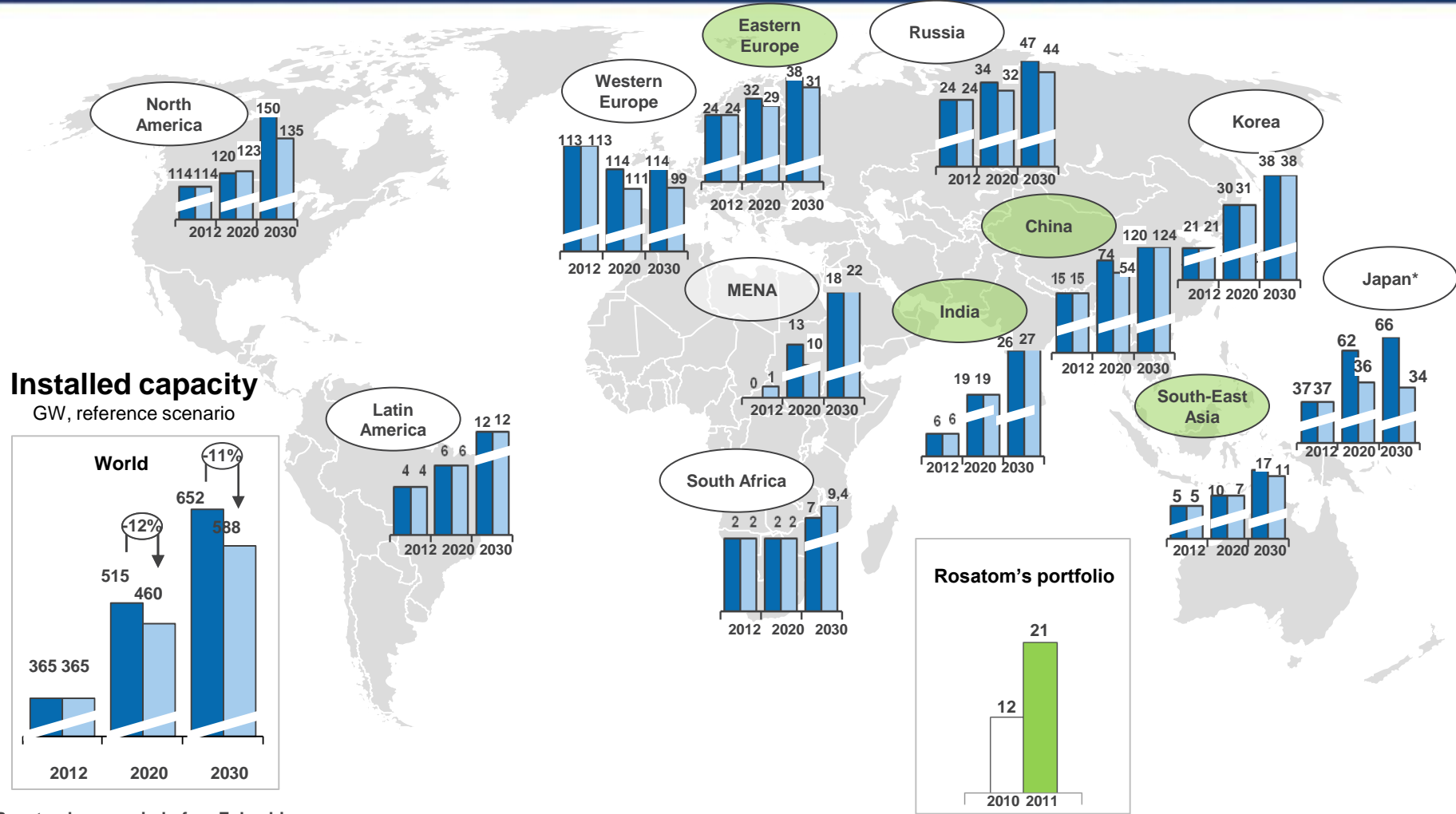
Russian electricity generation company, 25,2 GWe installed capacity



Target Map of Rosatom Regional Marketing Offices



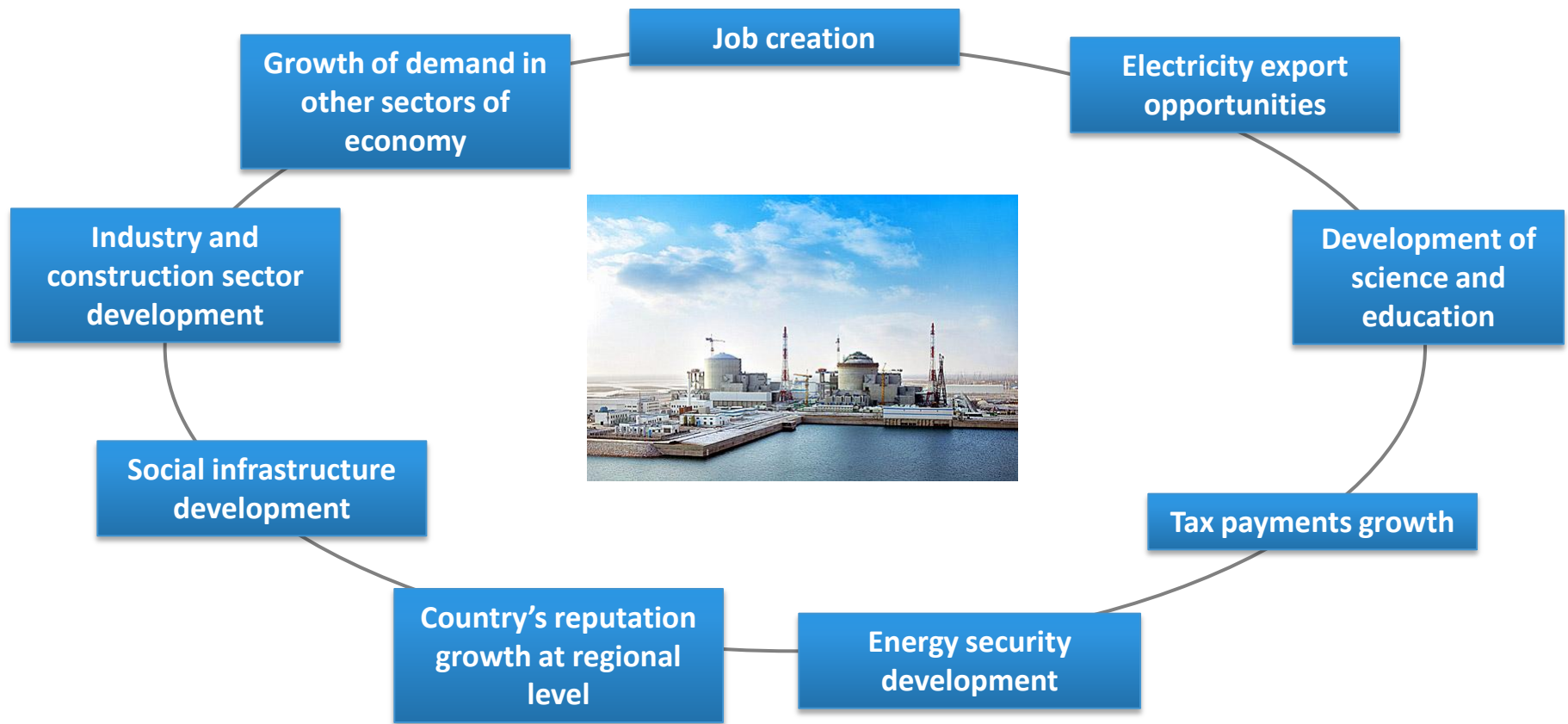
Fukushima accident haven't strongly affected the plans for nuclear energy development globally



* Does not include national nuclear power program potential strategy revision (to be revised shortly)

Nuclear power brings more than just energy

Additional gains from nuclear energy development



Rosatom safe and mature VVER technology is one of the most referenced in the world

VVER Global Fleet

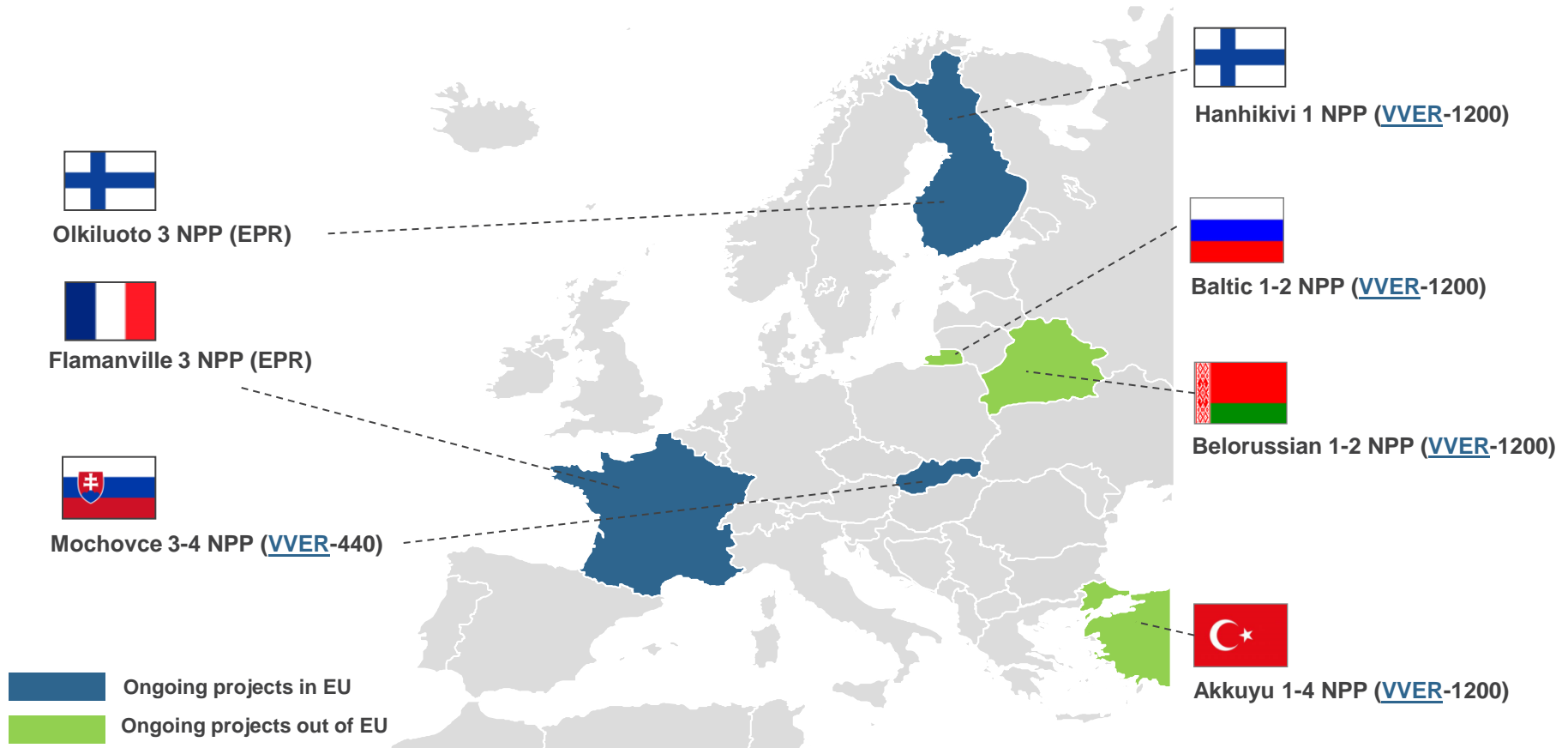


Country	Constructed	In operation
Armenia	2	1
Bulgaria	6	2
China	2	2
Czech Republic	6	6
Finland	2	2
Germany	6	-
Hungary	4	4
Iran	1	1
India	1	1
Russia	19	17
Slovakia	6	4
Ukraine	15	15
TOTAL	70	55

- All Russian designed reactors, including 38 VVER units operating outside Russia, successfully passed stress-tests, among those - 18 VVER units in 5 EU countries
- Rosatom actively supported and is confident in the results

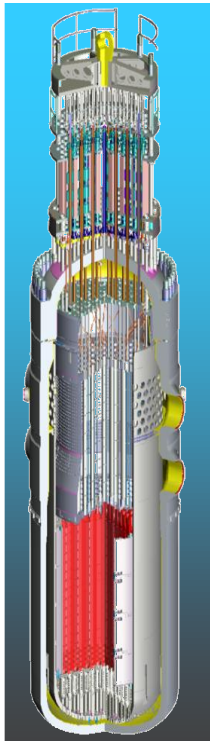
For example, in Europe 13 units are under construction, majority of them are of VVER design

- 4 units are under construction in the EU and 2 of them are of VVER design
- Additionally, 1 in EU and 8 VVER units in neighboring countries are on implementation track



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 – **1000-1250 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



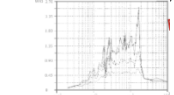
Hurricanes, tornadoes



Snow load



Tsunamis, floods



Earthquakes

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

Recent commissioned NPP EPC projects

**Russia, Rostov NPP, Unit 2
1000 MW, 2009**



**Russia, Kalinin NPP, Unit 4
1000 MW, 2012**



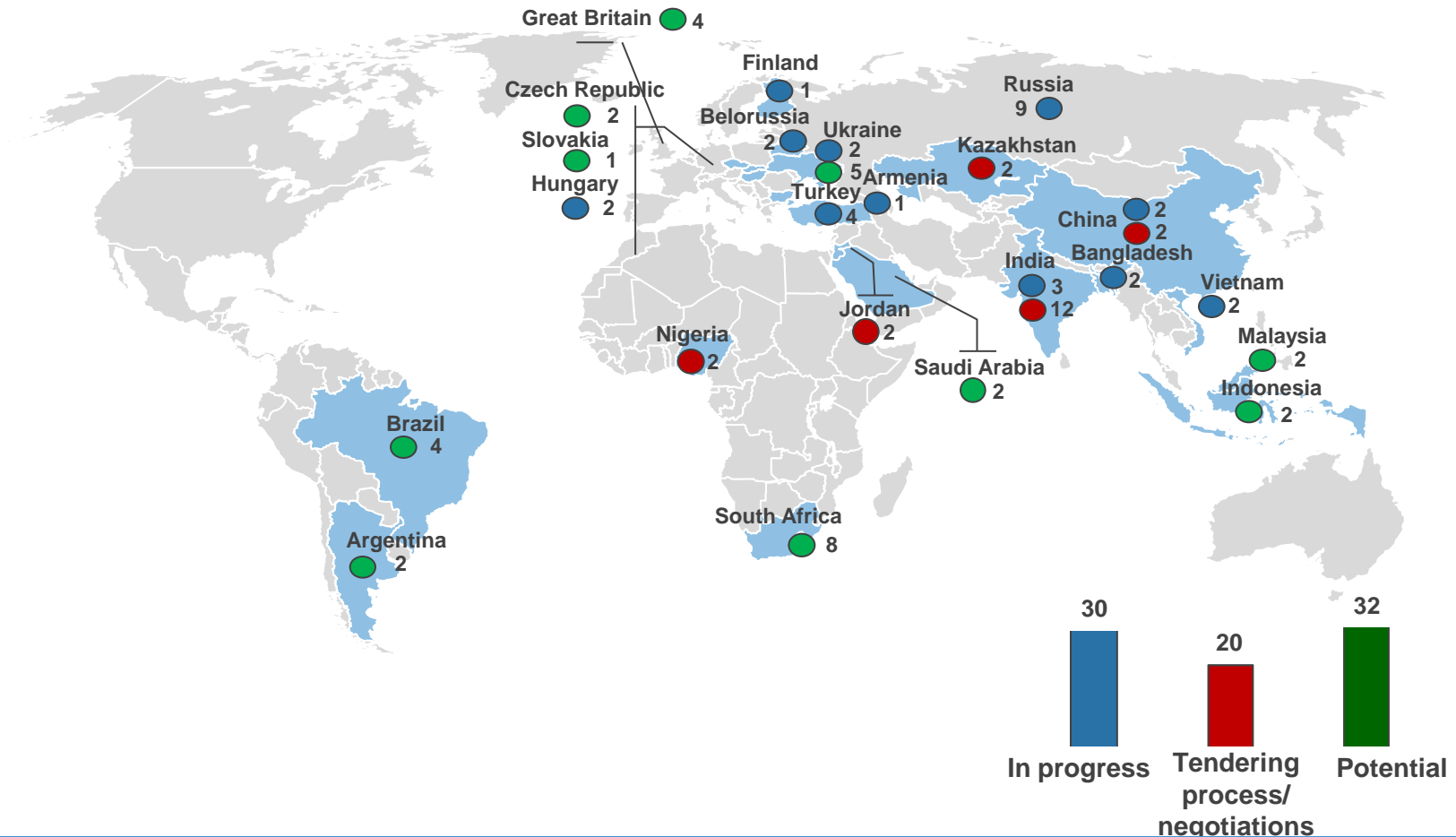
**Iran, Busheh NPP, Unit 1
1000 MW, 2011**



**India, Kundankulam NPP, Unit 1
1000 MW, 2013**

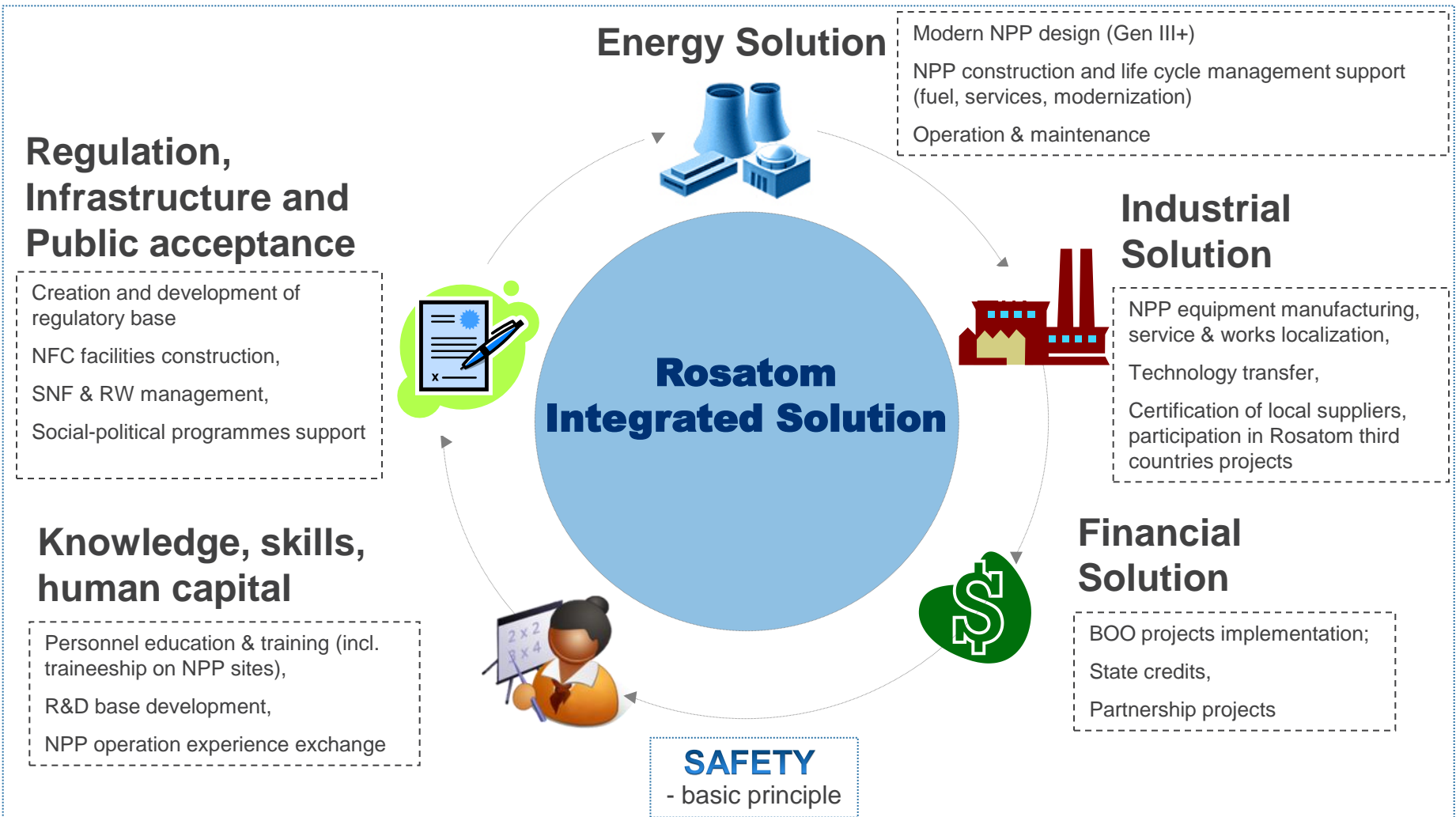


...and is highly welcomed worldwide...



Rosatom NPP construction perspective backlog – more than 80 units

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



Rosatom strategic international partnerships



Cooperation with EdF

- Long-lasting successful commercial relations in securing needs of EdF fleet in NFC goods and services
- June 2010 MoU on cooperation was signed
- Working groups on cooperation development in several areas created, including NFC, R&D, production and engineering, cooperation in 3rd countries



Cooperation with Rolls-Royce

- September 12, 2011 MoU on cooperation was signed
- Working groups on cooperation development in several areas created, including supply chain management, I&C, service and modernisation, special steels



Cooperation with AREVA

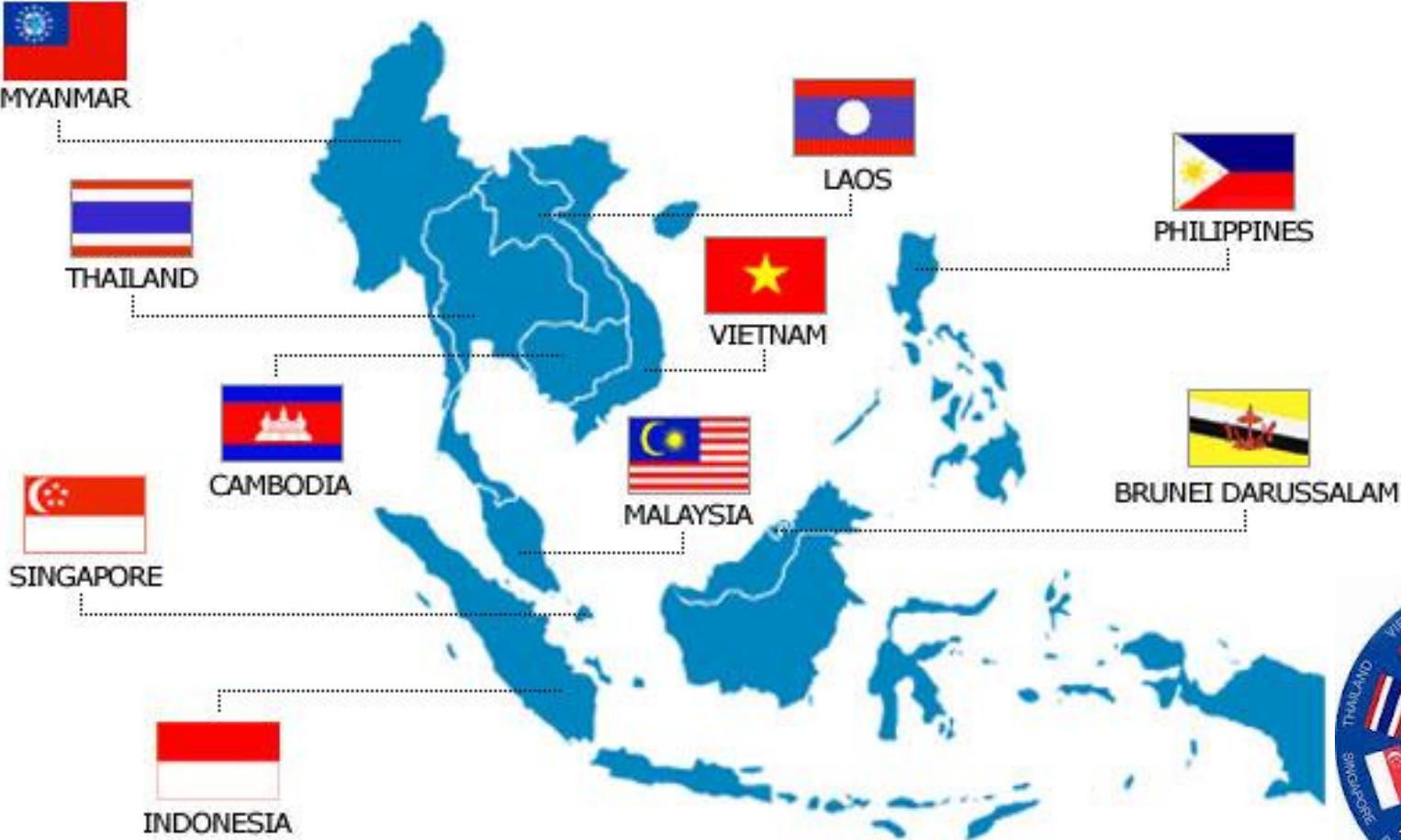
- Successful joint business in NF production and supply to world market, cooperation in I&C supply for Rosatom projects in Russia and abroad
- July 18, 2012 MoU on cooperation was signed
- Working groups on cooperation development in several areas created, including, NFC front and back end, power equipment, service and modernisation and etc.



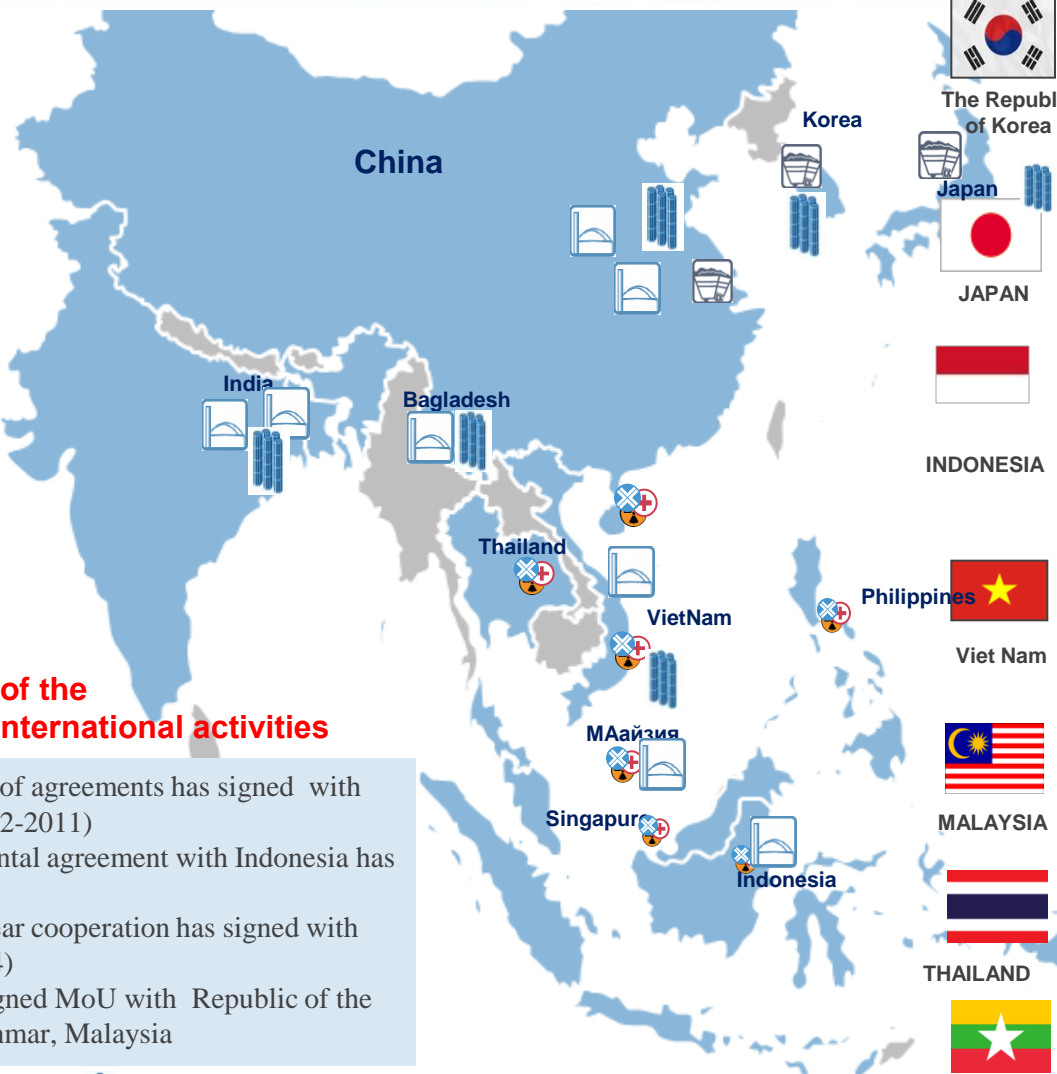
Cooperation with Alstom

- July 2007 – creation of JV AAEM between Rosatom and Alstom on Arabelle steam turbine & generator
- March 2012 - contract for supply of Arabelle steam turbine & generator for Baltic NPP
- Market opportunities for cooperation within Rosatom VVER NPPs construction projects in third countries

Rosatom in South East Asia region



Cooperation State Corporation "Rosatom" with the countries of the Asia region: prospects for business development



- Supply of goods and services to the nuclear fuel cycle, Supply of isotopes
- Scientific and technical cooperation (fuel components, etc.)

- Supply of goods and services to the nuclear fuel cycle, supply of isotopes

- NPP construction of high power and / or low / medium power
- Construction of the center of radiation and the National Center production radiopharmaceuticals

- Construction of 1-2 units at NPP site "Ninh Thuan 1"
- Construction of the Center of Science and Technologies

- Construction of NPP
- Construction of the Center of irradiation

- Participation in tenders for the construction of nuclear power plants and research reactors
- Nuclear medicine and radiation technology applications (agriculture, security, etc.).

The results of the Rosatom's international activities

Great package of agreements has signed with Viet Nam (2002-2011)
 Intergovernmental agreement with Indonesia has signed (2007)
 MoU in nuclear cooperation has signed with Thailand (2014)
 Ready to be signed MoU with Republic of the Union of Myanmar, Malaysia

NPP construction
 Supply of fuel
 Enrichment of natural uranium
 radiation technology



The Republic of Korea



JAPAN



INDONESIA



Viet Nam



MALAYSIA



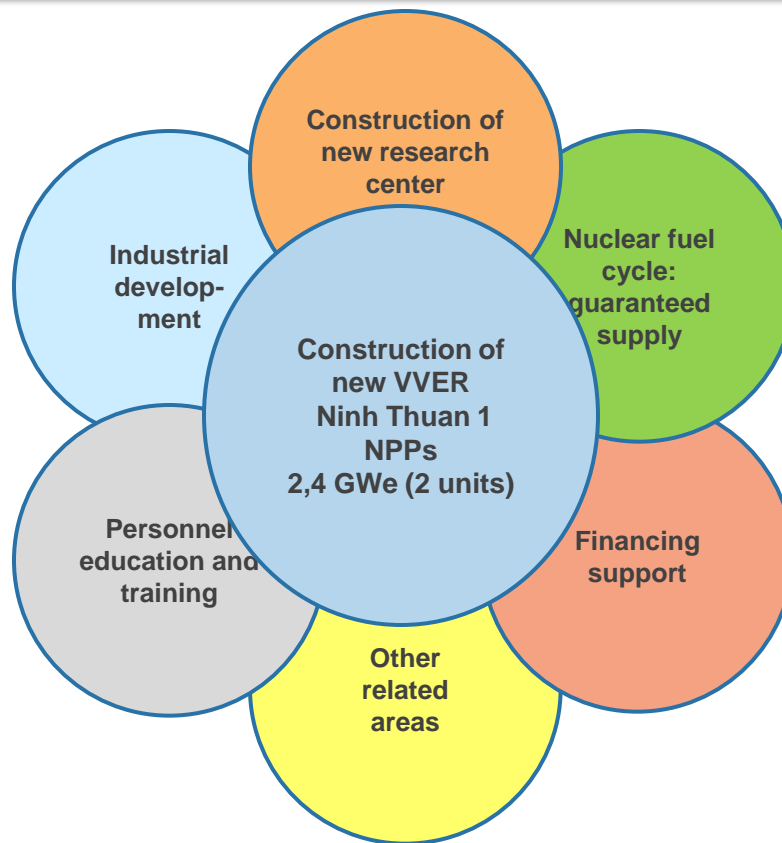
THAILAND



Myanmar

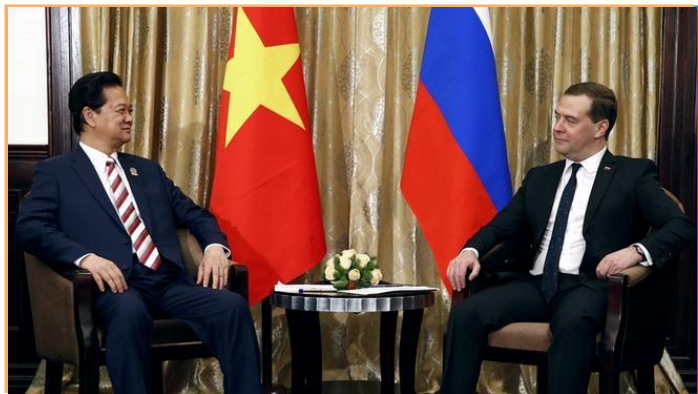
Russian – Viet Nam in Nuclear Field – Prospective Cooperation

**Strategic partnership in nuclear field:
comprehensive support in re-establishment of Viet Nam Energy cluster and further
joint activities on global market (in particular, in Asia)**



Vietnam - main partner in region

Ninh Thuan NPP project profile



Ninh Thuan 1 NPP is the first to be constructed in Vietnam



Customer NPP - EVN
 Customer New Research Center - VINATOM
www.rosatom.ru

Key parameters Ninh Thuan 1 NPP

- Legal basis – Governmental Agreement of October 31, 2010
- Reactor design – NPP (VVER)
- Total capacity – 2-2,4 GMW (2 units)

New Research Center

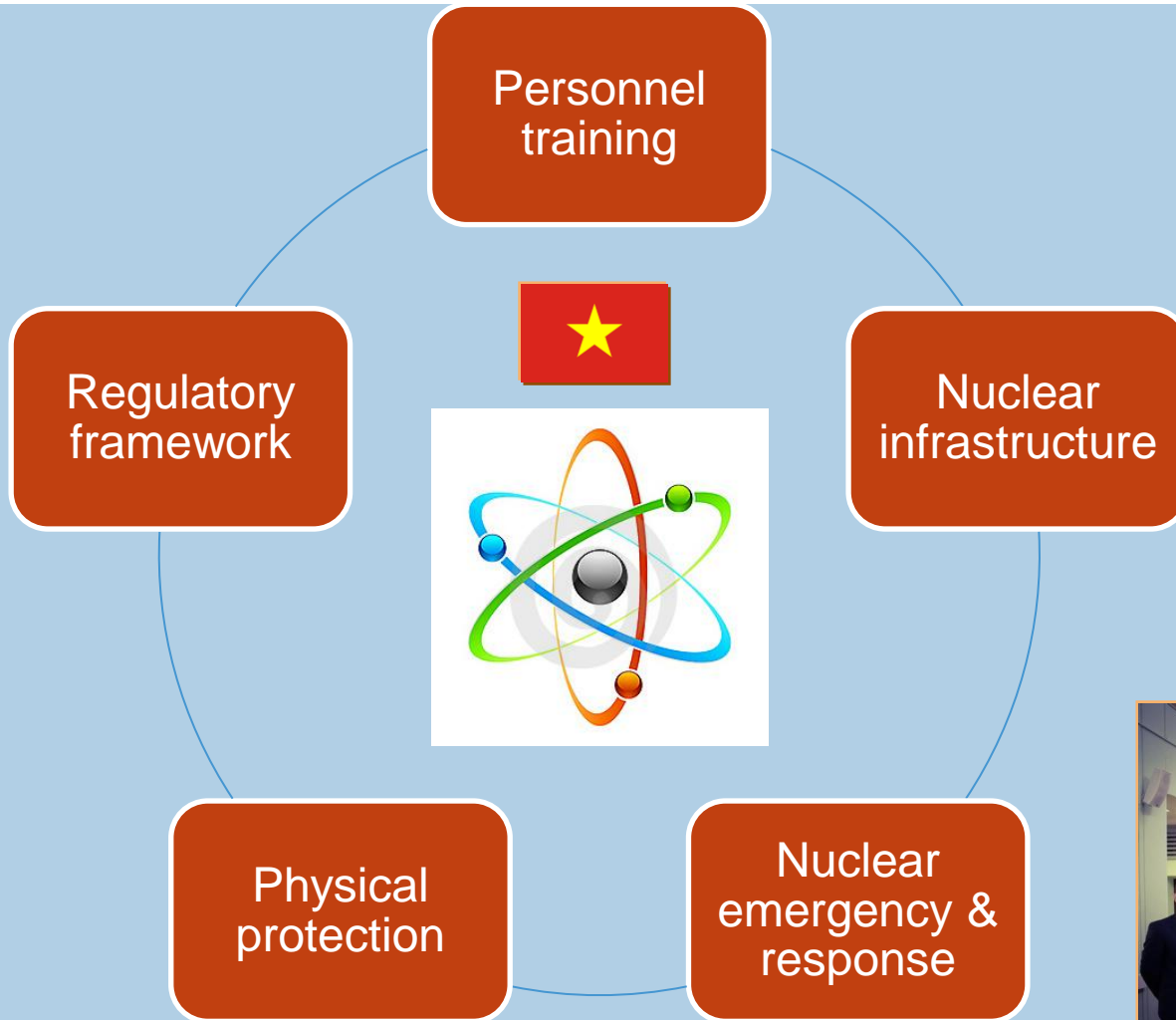
- Reactor type: Research pressurized water pool reactor
- Capacity: up to 15 MW
- Scheme implementation: EPC
- Legal basis: Governmental Agreement on the construction of (21.11.2011)

Project highlights

- Broad localization programme envisaged
- Significant local content sourcing, especially in civil construction
- Russian state credit comprehensive financing solution
- Strong support to Vietnam with regulatory system establishment and personnel training
- First NPP project in Vietnam
- Ninh Thuan 1 NPP meets VietNam electricity needs



Rosatom's activities to support Vietnam projects



Students short and long term internship programs On-site training for client's and subcontractor's personnel

Rosatom human capital development opportunities and options for Vietnam

340 students - «Nuclear power plants: design, operation and engineering» (Specialist degree taught in Russian language) and «Nuclear Power Installations Operation» (Master degree taught in English language)
at NRNU MEPhI (Moscow/Obninsk); Far East Federal University (Vladivostok); UrFU (Ekaterinburg); TPU (Tomsk); SPbSPU (St.Peterssbourg); MGSU (Moscow); MPEI (Moscow); Mendeleev UCTR (Moscow).

Internships and onsite training for clients/partners

For preparation of construction of NPP Ninhthuan-1 – arrangement of training and probation of the Vietnamese engineers and workers at a NPP's construction site in Russia.

As of May 2014, 106 Vietnamese welders, installation and concrete workers were engaged at the construction sites of Rostov NPP- 3 & 4. By the end of 2014 , the number of Vietnamese workers and specialists at the Rostov NPP's build will amount to 150



Russian – Viet Nam Cooperation in Nuclear Field – Prospective Cooperation



A new era of Russian – Viet Nam cooperation
backed by strong presidential support from
both sides



«Our cooperation in energy goes far beyond hydrocarbon production. Russia helps Vietnam to develop a nuclear industry which is a totally new sector for the country. *Rosatom* will be responsible for the construction of the first Vietnamese nuclear power plant in the province of Ninh Thuan. Plans are being discussed to jointly construct a Nuclear Science & Technology Center».

Vladimir Putin, President of the Russian Federation
(November 11, 2013)

Thank you for your attention!

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