



ROSATOM

STATE ATOMIC ENERGY CORPORATION "ROSATOM"

Northern Dimension: nuclear perspective

Dr. Kirill Komarov

First Deputy Director General for Development
and International Business
State Corporation "Rosatom"

*April 7, 2016
Saint Petersburg*

Nuclear is already a significant part of the Northern Dimension energy mix



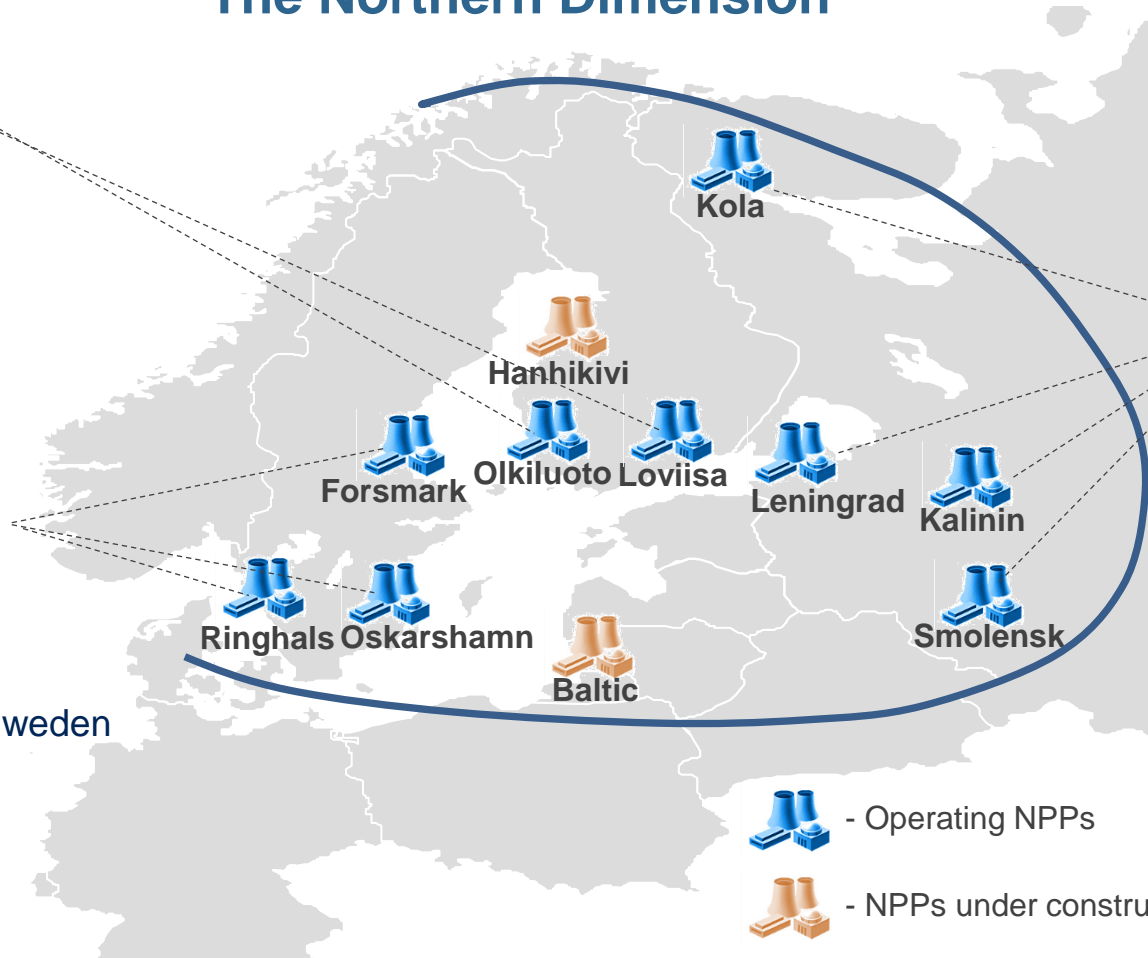
The Northern Dimension



- 4 NPP units
- 35% of power generation in Finland



- 9 NPP units
- 35% of power generation in Sweden



- 15 NPP units
- 37% of power generation in North-West region of Russia



- Operating NPPs



- NPPs under construction

28 NPP units of total capacity more than 23 GWe are in operation in the region

Hankhikivi-1 NPP – first purely commercial project globally

Key parameters

- Reactor design – NPP-2006 (VVER-1200)
- Total capacity – 1 175 MWe (1 unit)
- Reference plant – Leningrad-2 NPP
- Location – Northern Finland, Pyhäjoki
- Implementation period – 2013-2024

Project highlights

- Project is implemented by Fennovoima: majority shareholder (66%, VSF) is a pool of Finnish industrial companies and local energy utilities
- Rosatom is a minority shareholder (34%) in Fennovoima
- Rosatom will ensure provision of necessary debt financing (€ 5 bln), up to € 2.4 bln - from the National Welfare Fund of the Russian Federation
- June 2016 – application for NPP construction license (expected start of construction – 2018)
- Significant socio-economic effect is envisaged:
 - thousands of new jobs to be created;
 - potential share of local companies on the construction stage could reach €1.8-2.7 bln.

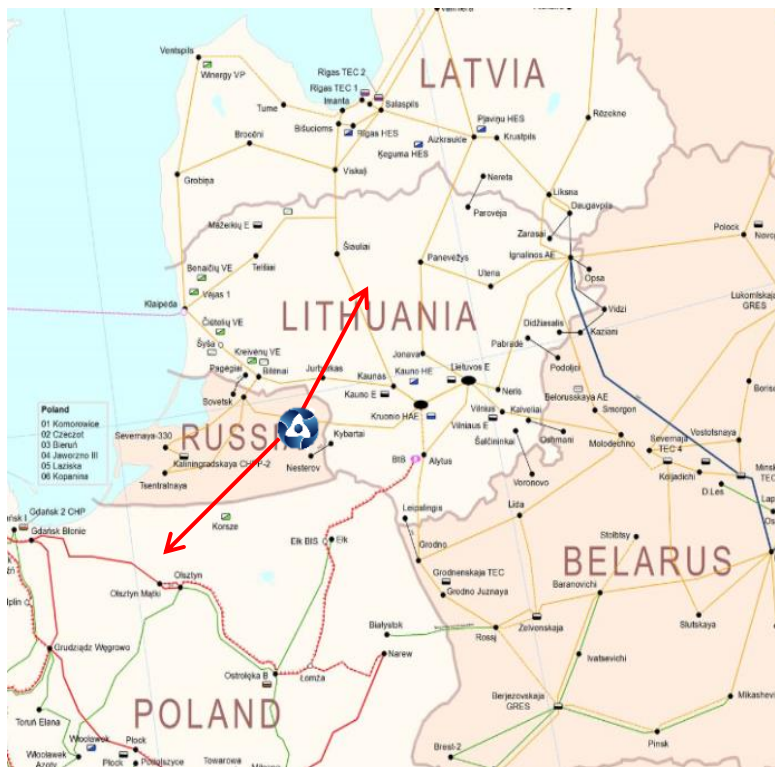


Aerial view layout of Hankhikivi-1 NPP in Northern Finland in Pyhäjoki



January 19, 2016 – pit start preparation ceremony

Baltic NPP - contribution to the development and preservation of environmental sustainability



Key parameters

- Reactor design – NPP-2006 (VVER-1200)
- Total capacity – 2 388 MWe (2 units)
- Location – Northern Finland, Pyhäjoki

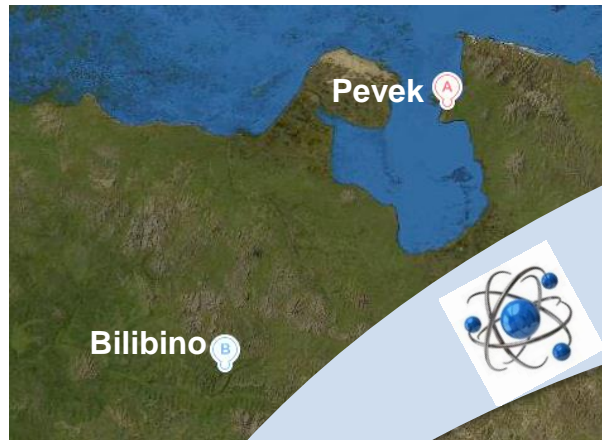
Complies with the objectives of the EU:

- ✓ **Decarbonizing economy**
 - Carbon-free and reliable electricity generation supports 40% CO₂ emissions reduction target
- ✓ **Improving security of supply**
 - Reliable base load through diversification of supply sources
- ✓ **Competitive electricity for households and businesses**
 - Contribute to decreasing energy price and to developing market interconnection
- ✓ **Stimulation of the economy**
 - Up to 50% of equipment comes from European companies
 - Price decrease and market interconnection without subsidies from EU countries
- ✓ **Win-win solution for market integration**
 - Additional interconnections for the Baltic States to achieve the 10% interconnection target

Small sized NPPs: practical power solution for Arctic



POCATOM



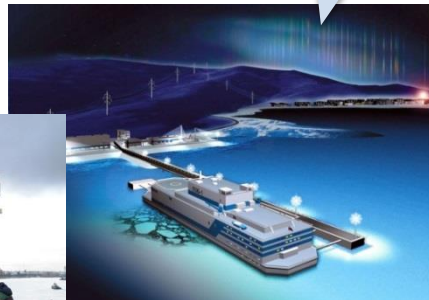
1974



Bilibino NPP
48 MWe



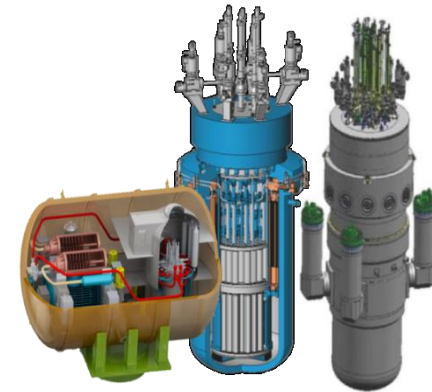
FNPP "Academic Lomonosov"
70 MWe



2019



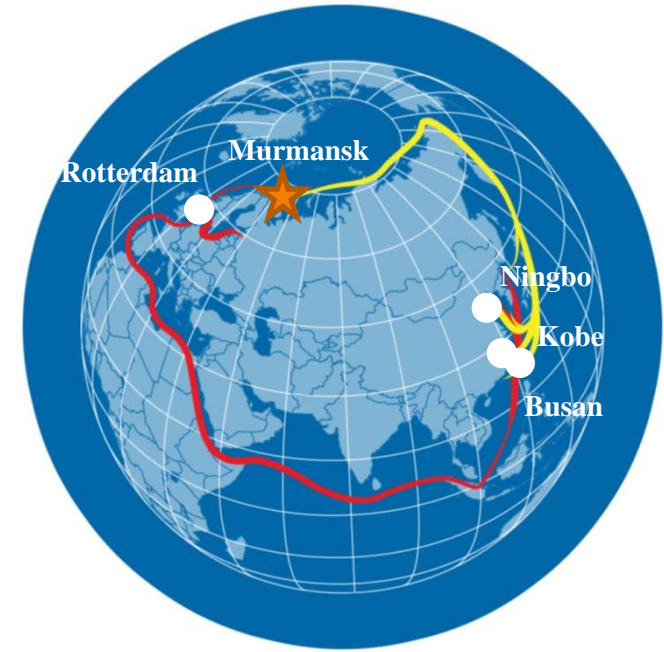
2021



- ✓ *Rosatom's practical experience in NPP SMR construction and operation is more than 40 years.*
- ✓ *Land and floating NPP SMR power range is 10-250 MWe*

Nuclear icebreakers: unique transport opportunities via Northern Sea Route

- Northern Sea Route – unique natural transport infrastructure object used for exploration of new territories and connection with the mainland.
- From 90-s cargo transportation via Northern Sea Route have grown about 400% (8 mln. tonnes in 2016).
- Rosatom possesses the only nuclear icebreakers fleet (4 vessels) in the world - Atomflot
- In 2015 Atomflot nuclear icebreakers performed pilotage of 195 vessels of overall gross tonnage of 2 mln. tonnes.
- Atomflot is involved in project of oil & gas exploration on Arctic offshore, in particular Yamal LNG project.
- Creation of a fleet of new class nuclear icebreakers, providing year-round navigation. The first icebreaker will be floated in May 2016



| From Rotterdam to Asia | | | |
|------------------------|--------------------|-------------|------------|
| | through Suez Canal | through NSR | Time saved |
| Kobe | 33,1 days | 23 days | 30% |
| Busan | 32,5 days | 23,2 days | 28% |
| Ningbo | 31,2 days | 24,7 days | 20% |

Ecology and nuclear & radiation safety enhancement

International cooperation initiatives

- Northern Dimension Environmental Partnership – “Nuclear Window”
- G8 Global Partnership
- MNEPR agreement
- Bilateral cooperation with Scandinavian countries



Specific areas of joint activities

- ✓ Disposal of 120 nuclear submarines
- ✓ Creation of SNF & RW management infrastructure in Andreeva Bay and Gremikha
- ✓ Collecting and disposal of 500 RITEGs from Subarctic region
- ✓ Establishment of radiation control and monitoring systems in Leningrad, Murmansk and Arkhangelsk regions
- ✓ Interaction in nuclear accidents information with Sweden, Finland and Norway



FTP “Disposal of nuclear submarines...”

FTP "Ensuring nuclear & radiation safety"



Preservation of Arctic nature

Rosatom supports a number of environmental initiatives aimed at the maintenance and development of populations of rare species of animals in the Arctic.



In the framework of special projects of the President of Russia with support of Rosatom several studies have been carried out aiming at forecasting of population of polar bear and white whales in the Russian Arctic.

The Northern dimension is our common home



Thank you for your attention!