



Plans of grid development in the North-West region of Russian Federation up to 2020

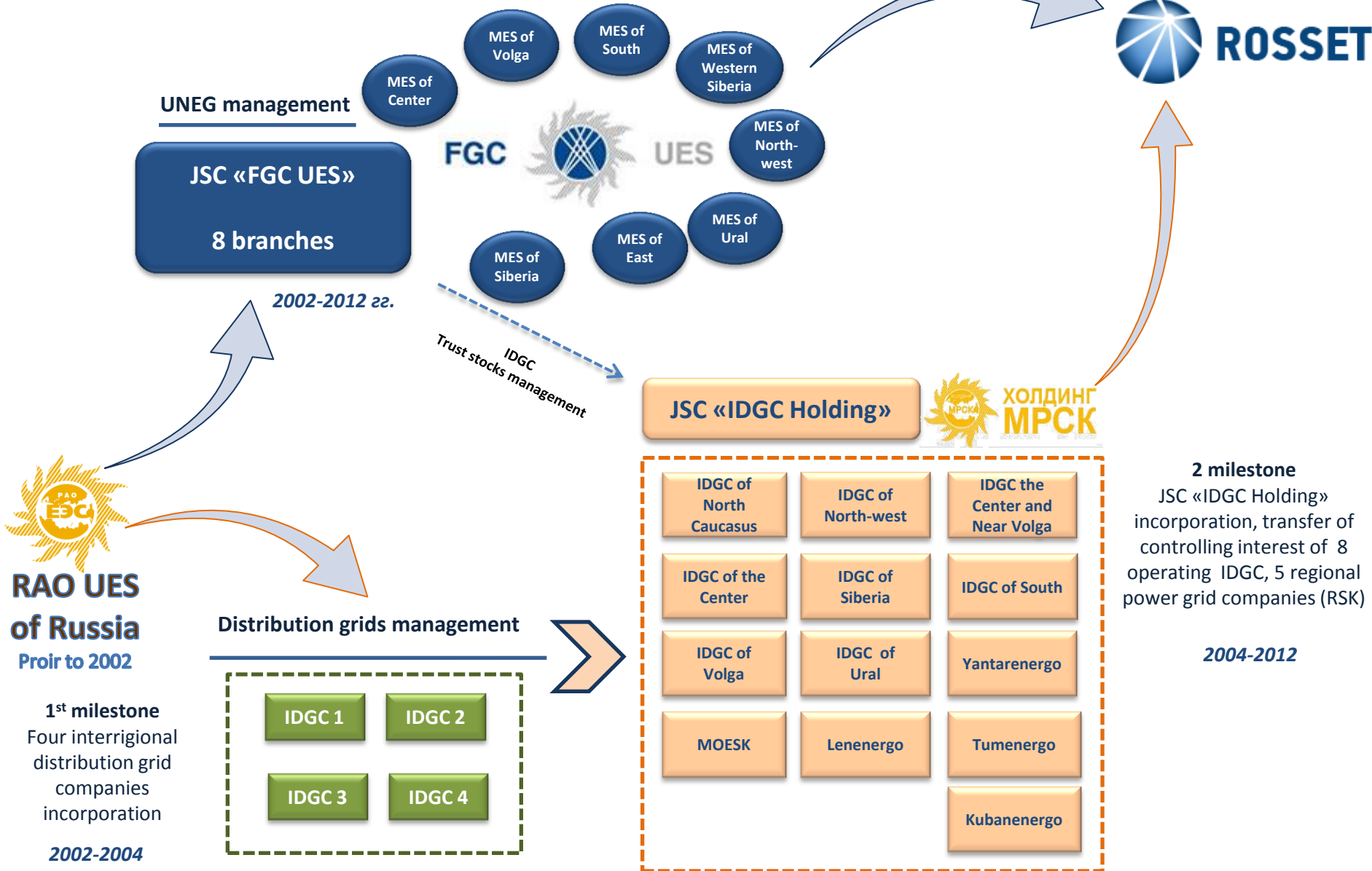
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Saint-Petersburg
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Restructuring of Russian power grid complex

Background



General Description

Stockholder capital structure

Russian Federation 	85,31%
Free float	14,69%

Power grid complex JSC «Rosseti»



Distribution grid
68 regions

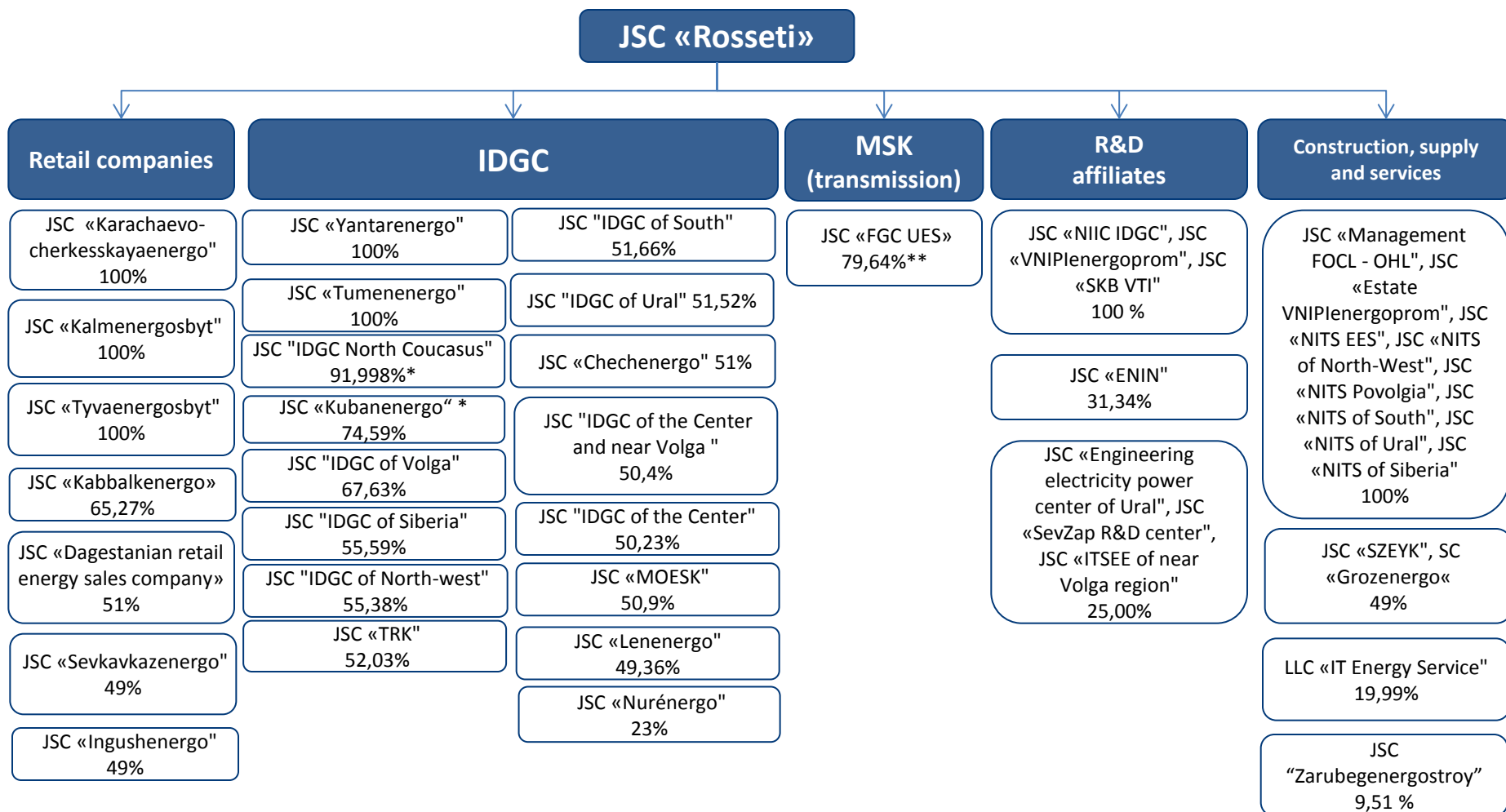
Transmission grid
75 regions

Indicators

	Distribution grid	Transmission grid
Operating Area, thousand of km ²	7 761	14 800
Substations	461 886	891
Transformer capacity, thousand of MVA	404	335
Transmission lines length, thousand km	2 110	132
Electricity supply, billion kW*h	649,9	498,3
Energy losses, billion kW*h	52,7	21,9
Energy losses, %	8,11	4,24
Medium staff, thousand people	193,9	24,9



Organization chart



*The share is inclusive of shares actually placed the current issue

** Joint management with the State in accordance with the shareholders' agreement



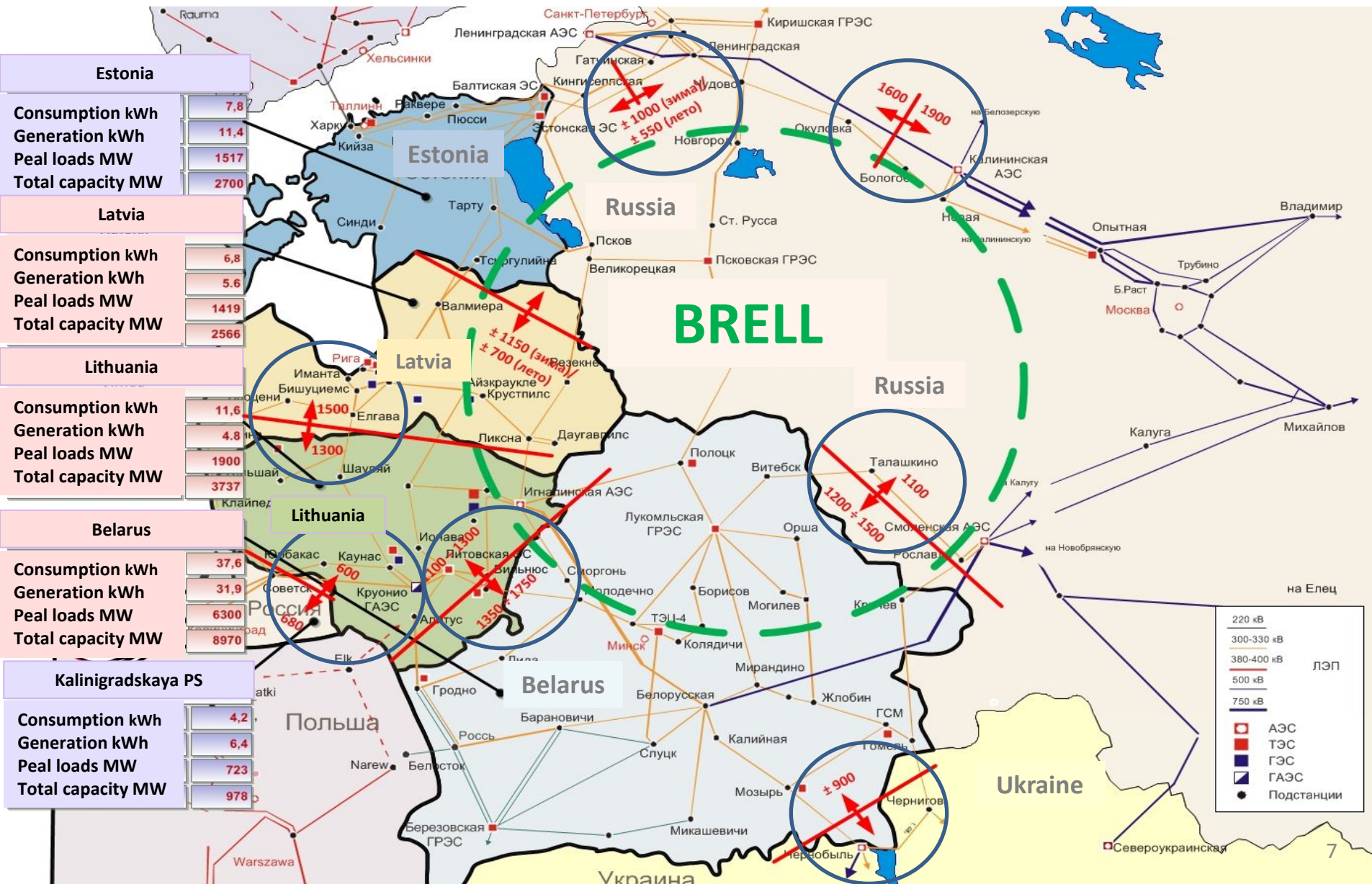
- Transmission and input of energy power with 11 neighboring states via 140 interstate power transmission lines
- 4 intergovernmental agreements On measures to ensure power system parallel operation
- 8 agreements on technological issue about power system parallel operation

	Country	Actual power export million kWh		Actual power import million kWh	
		2012	2013	2012	2013
1	Azerbaijan	55,770	57,422	240,757	128,606
2	Belarus	3 698,125	3 596,726	3,731	1,934
3	Georgia	517,049	460,547	369,438	370,607
4	Kazakhstan	2 284,458	1 668,318	1 973,181	3 930,688
5	China	2 630,173	3 495,300	0,000	0,000
6	Latvia	0,000	0,000	0,000	0,000
7	Lithuania	4 780,170	3 567,968	0,000	99,252
8	Mongolia	392,750	413,595	21,006	23,290
9	Ukraine	81,795	38,609	0,093	6,400
10	Finland	3 793,845	4 107,178	0,000	2, 758
Total:		18 364,346	17 539,452	2 068,206	4 563,540

In order to ensure electricity export/import in/to neighboring states, as well as maintenance of neighboring states power systems and UNEG operation:

- **Vyborg converter reconstruction (back-to-back complex 400 кВ)**
- **Cross-boarder synchronous area BRELL links development**
- **Project development of links in the section of the Russia – Norway**
- **«Karelian power bridge» project**
- **Baltic NPP construction**
- Participation in CASA-1000 project in Central Asia
- Power links development projects between eastern regions of Russian and China, Republic of Korea, North Korea, Japan and Mongolia.





Interstate power system project north-west UES

(united energy system)

“North power bridge” project
 Electricity export from Kola peninsula Nickel substation to Norway the nearest 400 kV substation
Composition:
 - 330 kv and 400 kv OHL (according to feasibility study) through Russian territory to Russia-Norway border;
 - DC link in Nickel substation area of 300 MW
 Expected annual volume – 2, 4 billion kWh

Условные обозначения

	Существующие на 01.01.2010г.	Начиная с 2010 – 2012 гг.	Начиная с 2013 г.	Начиная с 2014 – 2016 гг.
ГЭС и ГАЭС				
ТЭС				
АЭС				
ПС 750 кВ				
330 кВ				
220 кВ				
ПС мест. типа				
ВЛ 750 кВ				
400 кВ				
330 кВ				
220 кВ				
Ниже 220 кВ				
Границы ЭЭС				
Границы государств				
Границы России				

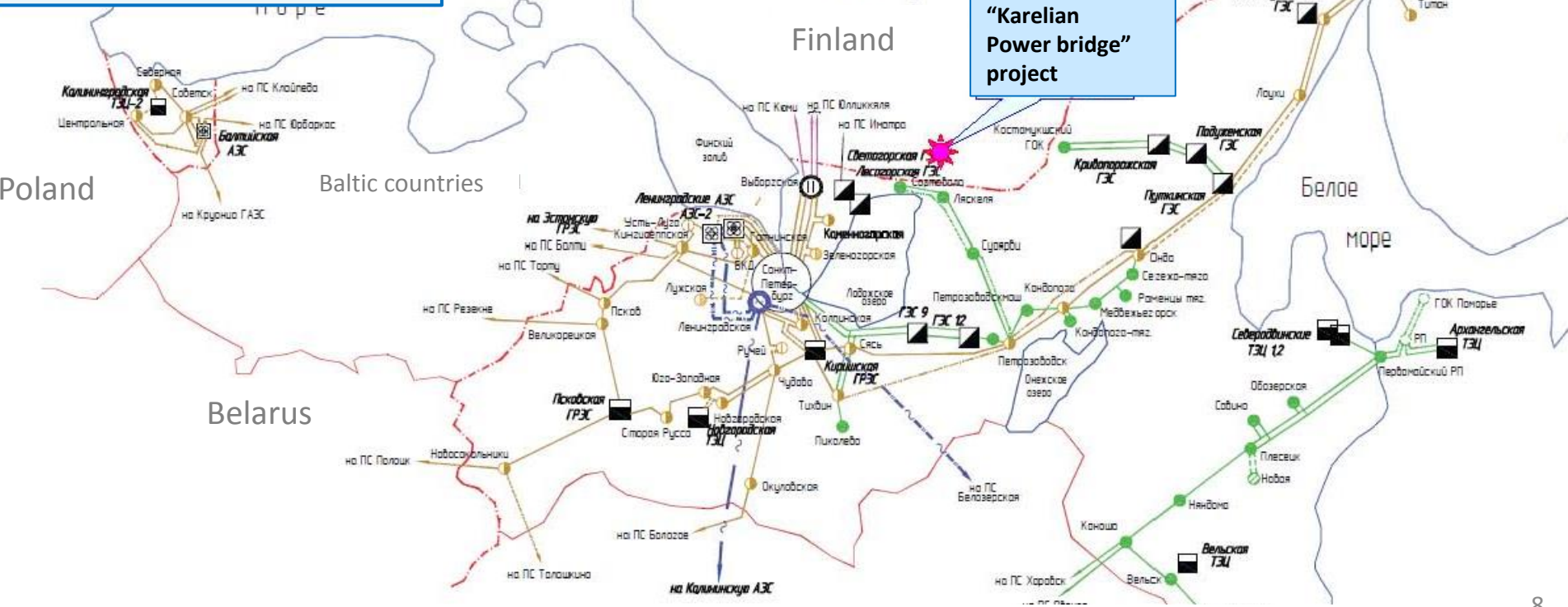
Expansion project of existing electricity power export to Norway

HPP Pazskiy cascade allocation to radial operation with Norway

“North Powerbridge”

“Kola Power bridge” project

“Karelian Power bridge” project



«Karelian power bridge» project description

The construction of new power transmission between Russia and Finland with the installation back-to-back complex 150 MW

Project implementation in 2 stages:

- Stage 1: 80 MW, export up to 700 million kWh per year.;
- Stage 2: extension of up to 150 MW, export to 1.1 billion kWh per year

Capital construction under the project includes: construction of 220/110 kV back-to-back complex in the substation Sortavala, 110 kV cross-border power transmission line through the Russian (28 km) and Finnish (22 km) of territory

In order to realization of the second stage also requires significant strengthening of the Finnish grids (preliminary, a new 110 kV overhead line length the construction of about 100 km)



Project implementation will expand the existing infrastructure for electricity power trade with Finland and enhance customers supply reliability.

Negotiations with the Finnish Transmission System Operator “Fingrid” are fulfilled.

The project «Karelian power bridge» is recognized as technically feasible

«Kola power bridge» project

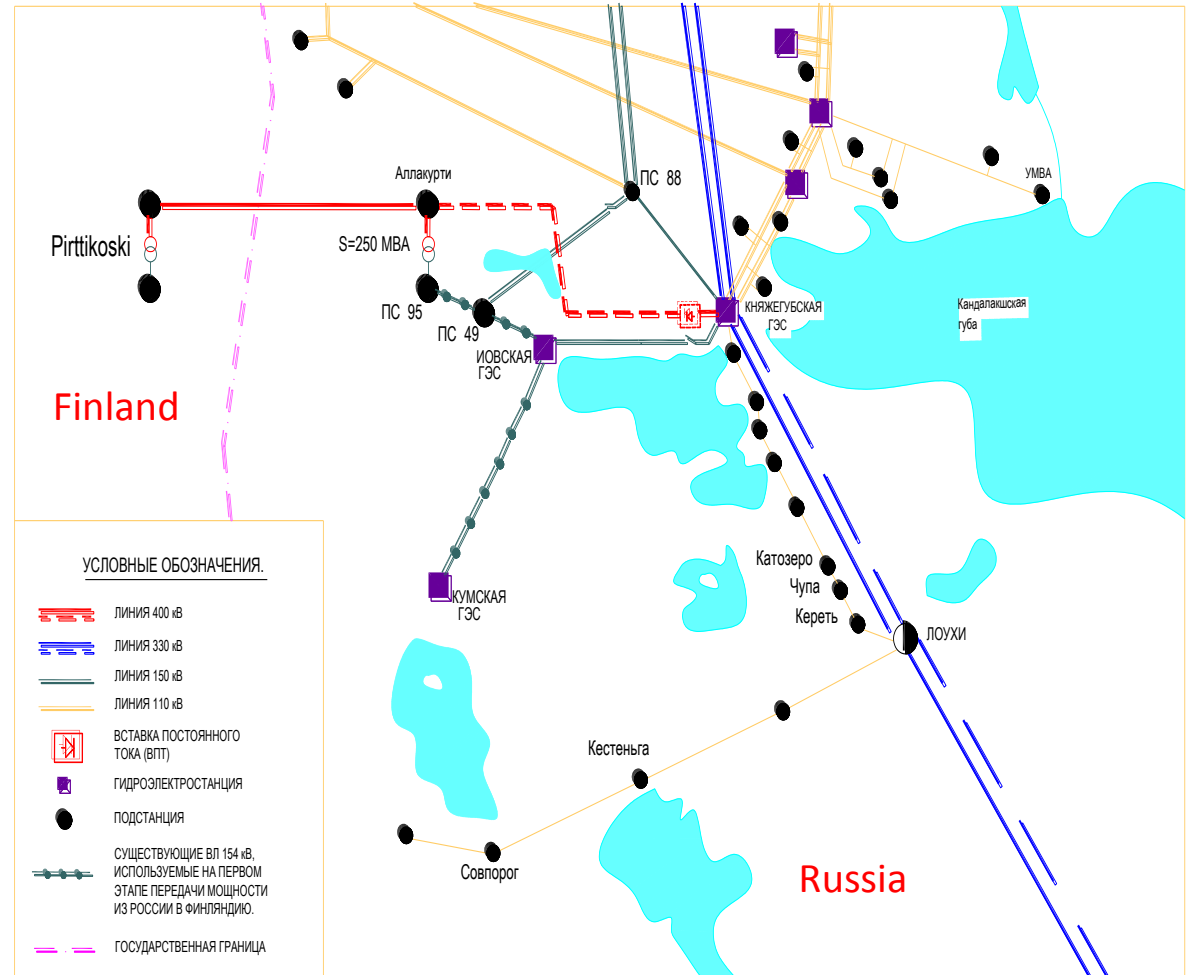
Starting stage: the selection of HPP Jovskaia units (2x48 MW) and Kuma HPP (2x40 MW) on the parallel operation with the Scandinavian energy system.

Conditions:

Part length of 114 km of 220 kV transmission line from state boarder to Pirttikoski,

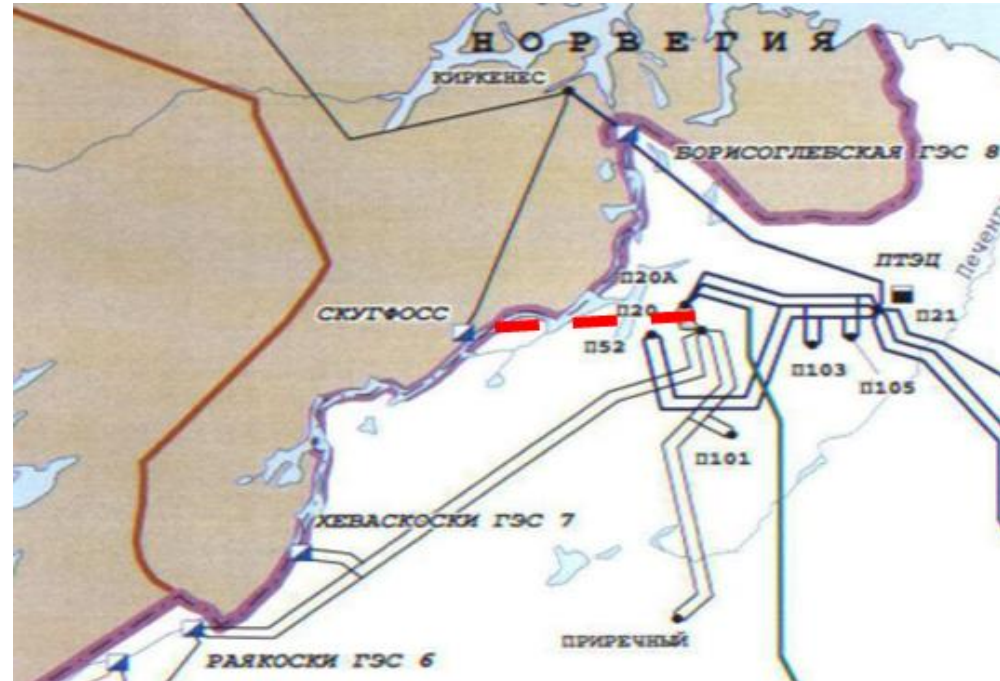
on the territory of Russia the area of 220 kv transmission line length of 63, 5 km from substation Allakurtti to state boarder.

Transmission power - up to 160 MW.



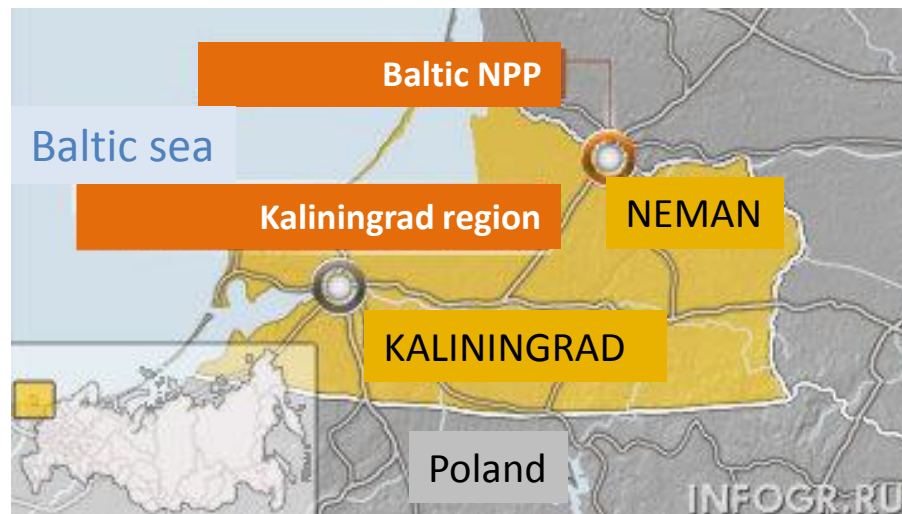
«North power bridge» project («Pechenga power bridge»)

- Purpose- electricity power export from Kola power system from 330kV Nickel substation to Norway
- Composition: 330 kv and 400 kv OHL (according to feasibility study) through Russia-Norway border, DC link in Nickel substation area of 300 MW
- «North power bridge» project provides electricity power delivery to Norway in bulk of 2,4 billion kWh in a year(capacity 300 MW).
- Negotiations with the Norwegian side for electricity supply are of preliminary nature.
- This project requires detailed feasibility studies and assessments of the economic and commercial efficiency.
- Promotion of the project associated with construction of Kola NPP-2 under the terms and conditions.

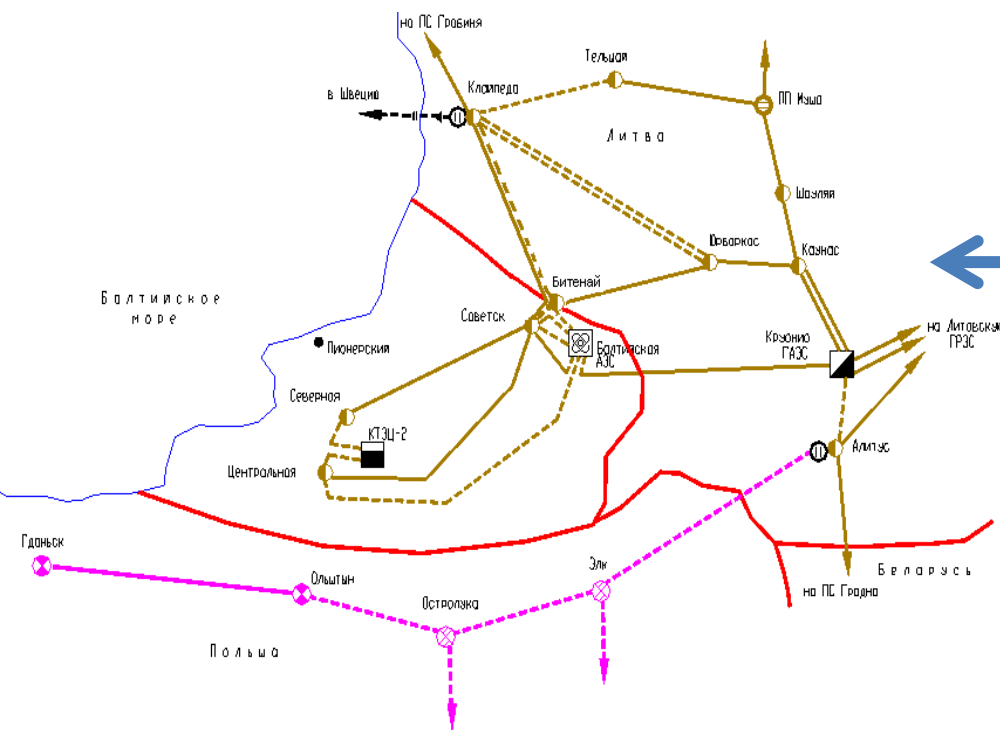


Baltic NPP power output

- Purpose of the project – the possibility to provide export of electric power from Baltic NPP.
- The plant consists of two units with the total power of 2300 MW.
- General scheme of power objects allocation provides for possibility to ensure power export from Baltic NPP starting from 2020 in bulk of 11,3 billion kWh per year (1800 MW).
- Negotiations are taken place thus far, scheme of power output from Baltic NPP could be determined (adjusted) taking into consideration concluded capacity delivery agreements. It may be necessary to ensure additional power grid construction to the west – cable lines to Germany and Sweden across Baltic sea or grid reinforcement for power transmission to Unified Energy System of Centre and North-west.

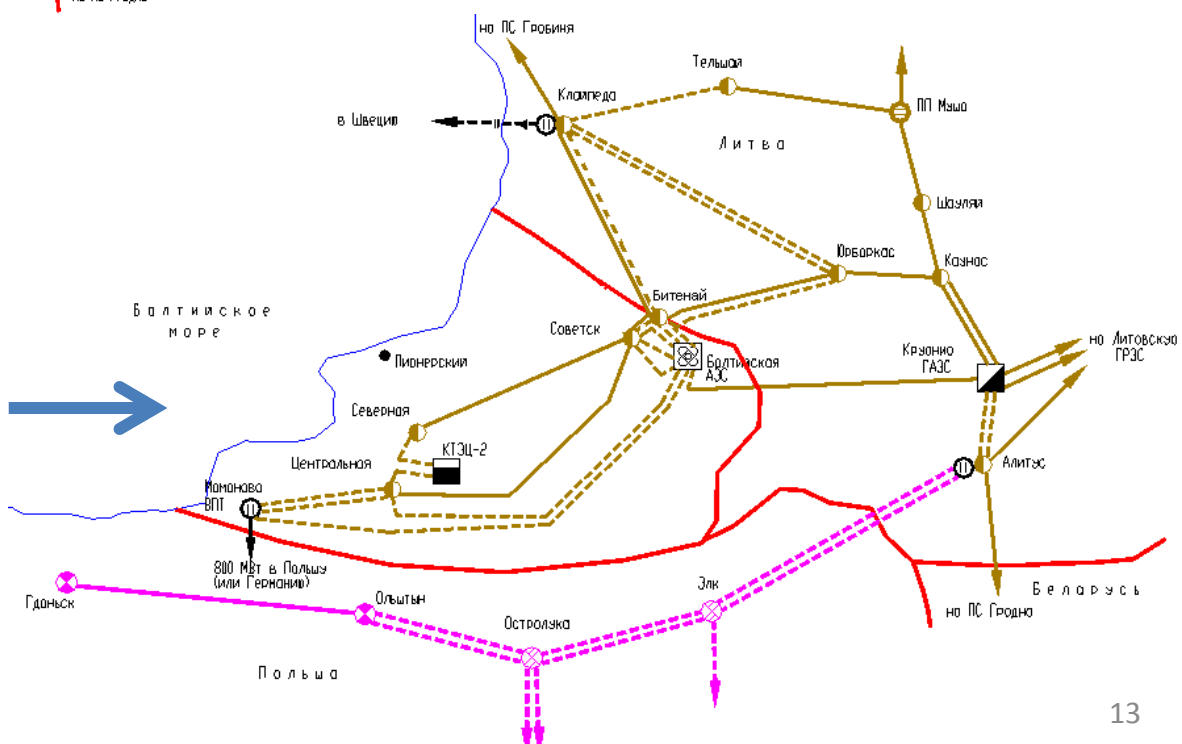


Baltic NPP power output (follow up)



Stage 1
Baltic NPP – 1150 MW.

Stage 2
Baltic NPP– 2x1150 MW



Thank you for attention!

