



PRIMORSKY TERRITORY GOVERNMENT

Primorsky Territory Energy Policy - Perspectives for Development

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Power Industry Situation in the Far Eastern Federal District of the Russian Federation

Current Situation in FEFD Power Industry

At present the power industry in the Far Eastern Federal District of the Russian Federation (FEFD) is characterized by the following topical issues:

- high depreciation and obsolescence of power generating equipment and network facilities;
- shortfall and weakness of electric connections under condition of the remoteness of the large power plants from the main consumption areas;
- high electrical and heat power dissipations;
- current system of energy and heat tariff setting does not allow to cover completely the costs for technical re-equipment and capital funds reconstruction as well as to meet economically justified expenses;
- up to 70% of the cost of electric power production accounts for fuel costs.

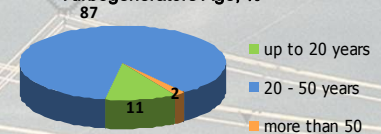
Technical Condition of Energy Facilities in FEFD Territory

More than 80% of power station generating facilities went through their rated service life.

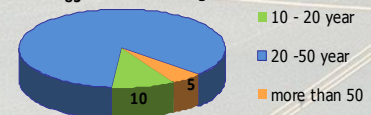
Units to be replace:
Turbogenerators of total capacity - 1600 MW (20%),
Boilers of steam capacity – 7400 t/h (21%).

61% of electric networks and 66% of heat networks have been operated for more than 20 years, at the same time the networks wear level exceeds 70%, that demands their urgent replacement in the nearest future.

Turbogenerators Age, %



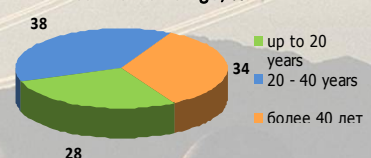
Boilers Age, %



Electric Networks Age, %



Heat Networks Age, %



Main Approaches to the Formation of Generating Capacities Development Strategy

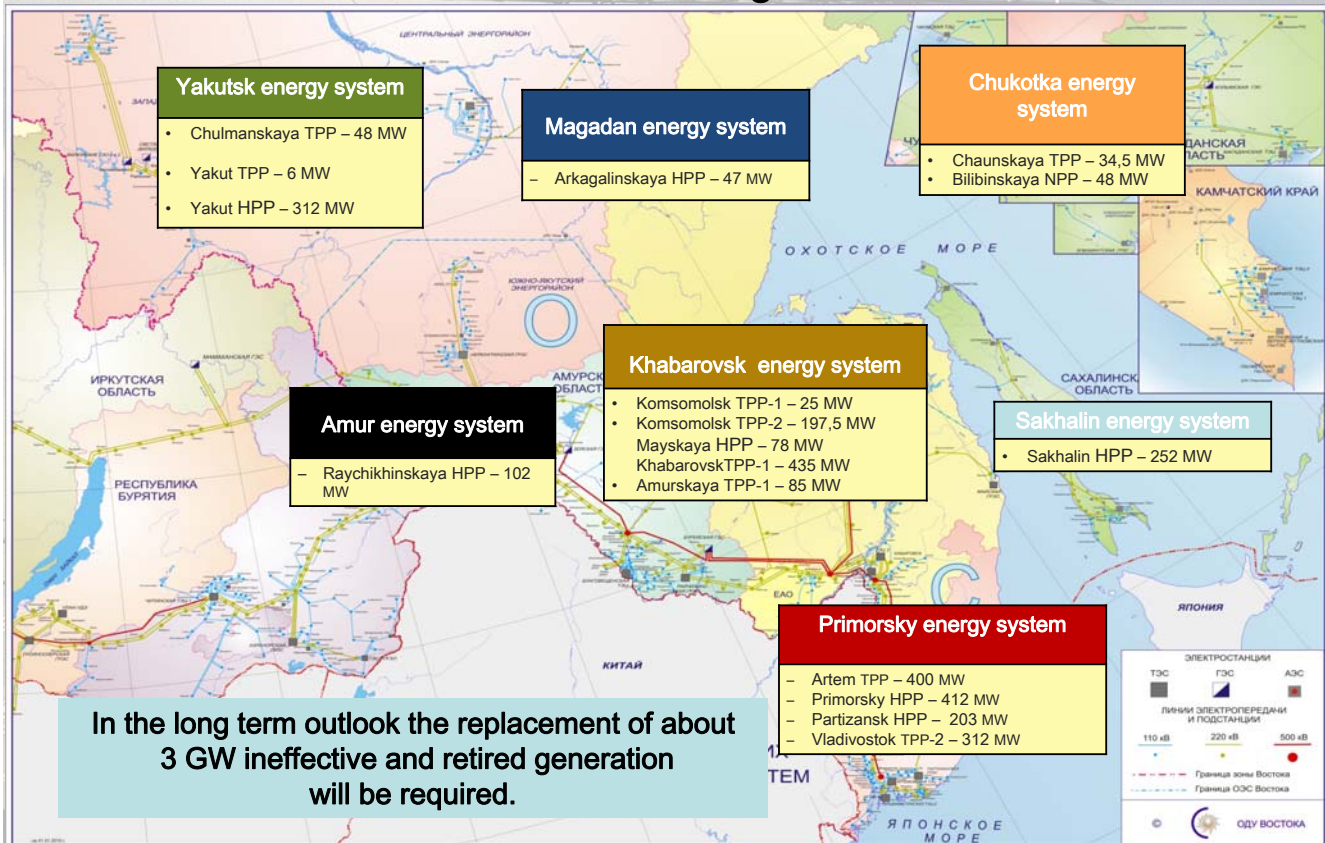
Priorities of Strategy Formation:

1. necessity of existing capacities replacement based on the operation time and service hours for capital equipment;
2. replacement and removal from the operation of the ineffective capacities that do not meet modern requirements;
3. coverage of forecasting demand in electric and heating power taking into account power flows.

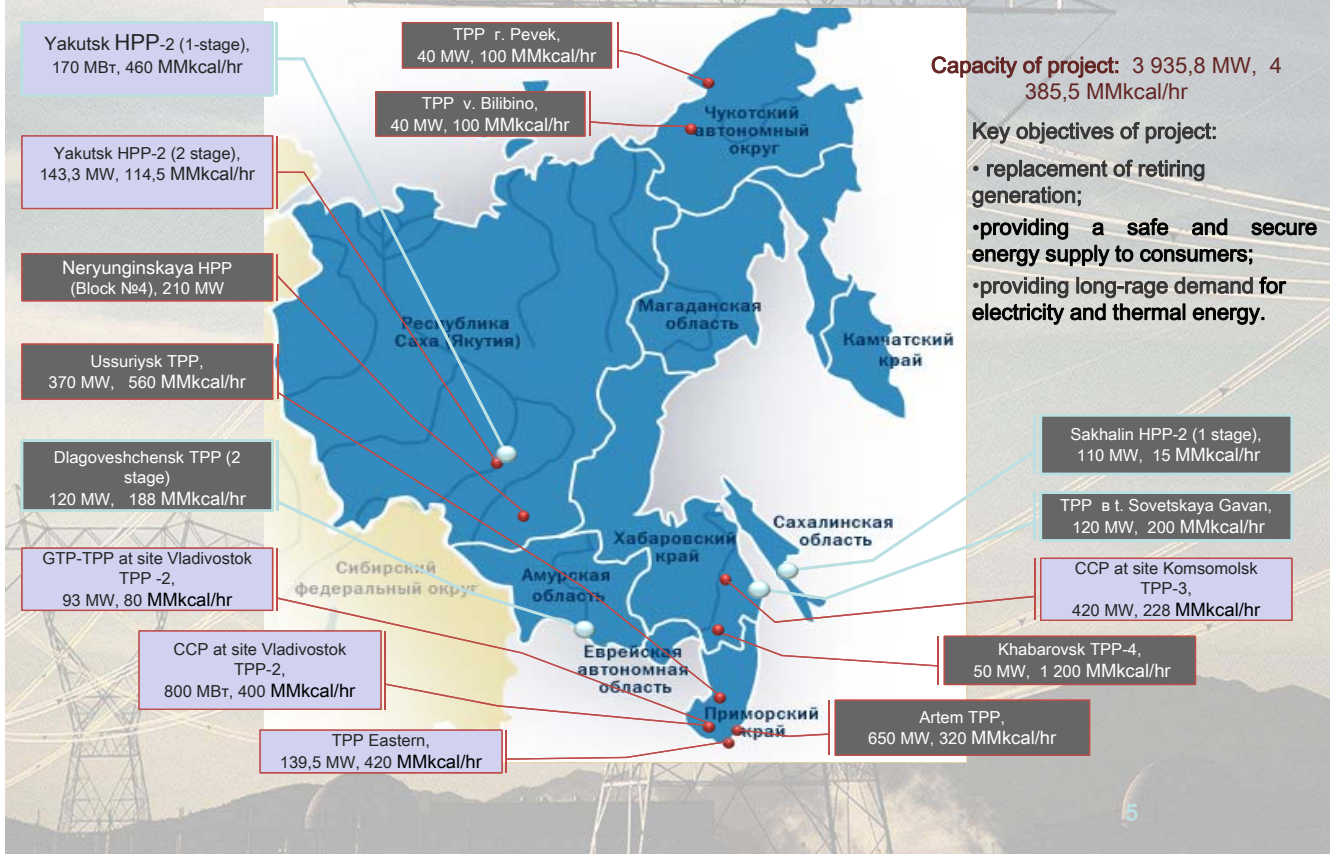
In these circumstances:

- ✓ If the expert's estimated remaining life till retirement of equipment (reaching of limit state):
 1. not exceeds 5 years, the technical solution is chosen that oriented on the equipment dependable service in partial load mode and preparing for its future replacement. In this case any unprofitable technical solution in order to increase such equipment efficiency and reliability rates is not rational;
 2. varies from 5 to 10 years, the technical solution is chosen that promoted the increasing of efficiency and reliability rates of equipment operation. Upon that the low-cost technical solution should be used under modernization with the payback period not more than 5 years;
- ✓ For TTP located in the power-hungry areas the following procedure of technical re-equipment should be implemented: construction of new facilities (using new building or new site), dismantling of retired equipment and replacement for modern and perspective.
- ✓ The shaping factor for equipment replacement or reconstruction should be:
 1. equipment service life more than 30 years;
 2. more than twice extension of the operation time limit.
- ✓ In the period up to 2015 the development of the generating resources will be determined by their comparative technical-and-economic indexes, terms of fuel supply, scale and structure of energy consumption, ecological and social factors.
- ✓ In the period from 2015 till 2020 proposals will be formed on the base of the criteria of efficiency of energy industry in the whole;
- ✓ In the period from 2021 till 2030 proposals will be formed on the base of target code of development as included in the Energy Strategy of Russia for the period up to 2030.

A list of Generating Equipment to be Planned for Decommissioning until 2025



Development of Thermal Generation in the Far Eastern Federal District



Characteristics of Energy Sector of Primorsky Territory

- The peculiarity of Primorsky Territory is its energy deficiency almost in all types of primary energy - electricity, boiler and furnace fuels, motor oil.
- More than 20% of electric power consumption, up to 40% of coal burned in the region and the entire amount of used fuel oil are supplied to Primorsky Territory.
- Part of the remote areas of Primorsky Territory are provided with power service by inefficient and outdated diesel-run power plants.
- According to the energy security from the combination of these indicators Primorsky Territory belongs to a class of disadvantaged.

Decommissioning Equipment and New Construction in Primorsky Territory

Plant	MW	Work activities/equipment	Power change MW	Period of construction	Note
Decommissioning - 1 372					
Primorsky HPP	1467	Decommissioning ineffective equipment	- 412	2024 - 2025	2024 ep. № 1-2 2025. ep. № 3-4
Artem TPP	400	Decommissioning generation equipment of plant	- 200	2019	TG-7,8
			-200	2022	TG-5,6
Partizansk HPP	203	Decommissioning generation equipment of plant.	- 203	2015 - 2020	2015 TG-3, 2020 TG 1-2
Vladivostok TPP-2	497	Decommissioning	- 312	2021 – 2025	2021 TG – 2,3; 2025 TG-4
Mobile GTPP	45	Decommissioning	-45	2016	
New construction + 1 552,5					
TPP «Eastern»	-	Construction GTP-TPP at site CSWBH (TPP «Eastern» 139,5 MW, thermal - 420 MMkcal/hr)	+ 139,5	2012 - 2015	
Primorsky HPP	-	Construction power block 210 MW p. №10 и №11	+ 420	2024 – 2025	2024 ep. № 10 2025 ep. № 11
Artem TPP	-	Construction new coal TPP - 650 MW и 320 MMkcal/hr.	+ 650	2016 - 2021	p. №№ 1,2 – 2019 (220 MW); p. № 3 – 2020; p. № 4 - 2021 (no 215 MW)
Vladivostok TPP-2	-	Construction CCGT in Vladivostok TPP-2 (with the commissioning of two turbine units)	+ 250	2016 - 2021	
Vladivostok TPP-2	-	Construction GTP at site of Vladivostok TPP-2	+ 93	2014 - 2018	

Socio-Economic Impact of Projects Implementation

Energy companies

- Substitution of retired capacities and providing reimbursement of future demand for electricity and thermal energy.
- Decrease in specific fuel consumption.
- The ability to use depreciation from constructed facilities for the of investment project's financing.

Population

- Creation comfortable living conditions for 6.5 million people living in the Far Eastern Federal District.
- Creation new jobs, increase the level of employment and reducing its outflow from the region.
- Improvement of quality and reliability of services for the supply of electricity and heat.

Government

- Providing a reliable and smooth operation of the power system in the Far Eastern Federal District.
- Creating the conditions for the further development of the industry in the region.
- Creating an additional source of tax revenues to the budgets of different levels.⁸

Direction for the Development of the Far Eastern Federal District Power Sector

JSC “RAO ES Vostok” plans of generating capacitance development and also development trends of cross-border regions give an opportunity for the further region electricity development as follows:

- Power export
- Development of renewable energy resources projects
- Cogeneration technology use

Development of renewable energy resources projects (RER)



Key objectives of “RAO ES Vostok” Holding in RER sphere

Long-term development programme for RER Holding for the period till 2016, in prospect till 2020

RER projects implementation:
60 MW – till 2016
120 MW – till 2020

Pilot project implementation of solar plant construction in Bagatai settlement (4MW) till 2015

The effects of RER projects implementation in the Far Eastern Federal District

Annual saving of fuel cost is:
 •by 2016 – **1 013 million rubles** and 20,6 thousand tonnes of diesel fuel oil
 •By 2020 – **2 257 million rubles** and 35 thousand tonnes of diesel fuel oil

Partial solution of cross-subsidisation problem of diesel power engineering, slowdown in growth of energy rates*

Improvement of reliability and quality of energy supply

Reduction of air pollutant emissions

* - после периода окупаемости проектов


Brief Description of Power Supply System of Primorsky Territory Municipal Units Supplied by Diesel-Run Power Plants

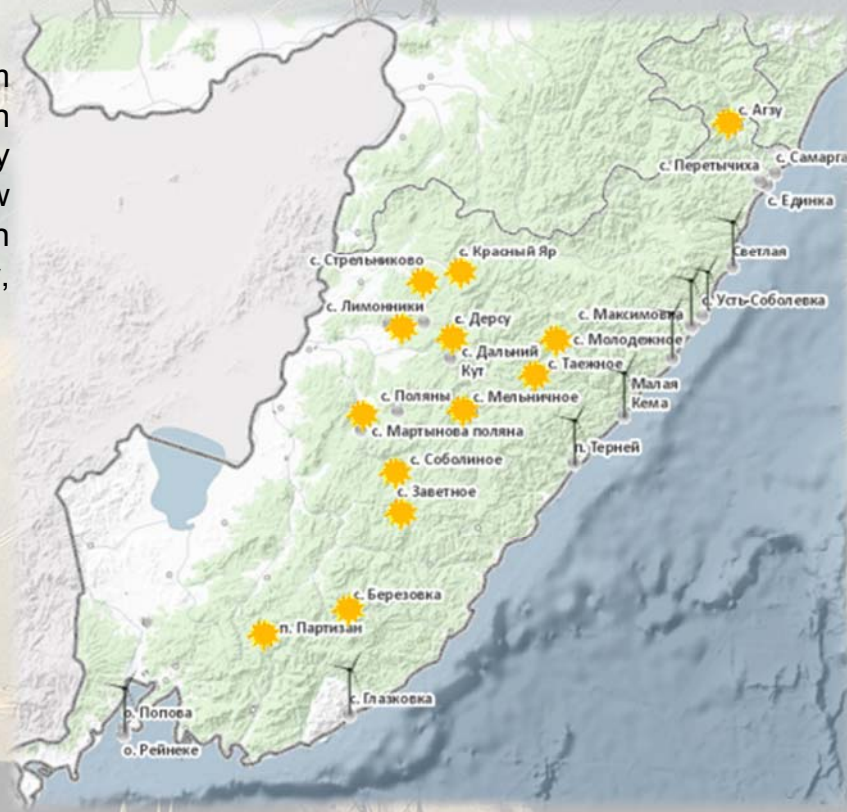
Municipal unit	Number of settlements, unity	Population	Existing diesel-run power plants	
			Number of power plants, unity	Installed capacitance, kW
ВСЕГО	28	14 996	73	15 482
Vladivostok urban district	2	1 524	9	2 390
Krasnoarmeisky municipal unit	7	2 306	13	3 940
Dalnerechensky municipal unit	2	620	4	200
Lazovsky municipal unit	1	402	4	887
Partizansky municipal unit	1	80	2	54
Pozharsky municipal unit	2	1 191	4	815
Chuguevsky municipal unit	3	873	10	1 188
Terneisky municipal unit	10	8 000	27	6 008

Proposals on Modernization of the Power Supply System in Municipal Units of Primorsky Territory Supplied with Electricity from Diesel-Run Power Plants

Implementation of the program will provide localities with electricity supply by commissioning of new generating capacity based on renewable sources of energy, including:

 Solar Electric Generating Station - 1420 kW

 Wind-powered generating plant - 9325 kW



Cogeneration Technologies



- A lot of boiler-houses use imported fuel,
- pay additional cost for fuel transportation;
 - have outmoded equipment
 - have poor technical position;
 - have low heater efficiency;

Modernization with cogeneration technologies and usage a local fuel will guarantee:

- Reliability and security of energy supply;
- Reducing of transmission loss;
- Decreasing of imported fuel usage;
- Raising of fuel utilization efficiency;
- Increasing of joint efficiency factor till 80%.



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NEXT STEPS

- **Far Eastern Federal District Development, including Power Industry Enhancement as a basement for further Industrial Development of the region;**
- **Construction of new electric power plants;**
- **Federal Support (government co-financial of advanced projects and preferences for investors);**
- **Active Development of Renewable Power Generation (including wind parks and solar electric generating stations);**
- **Cooperation with Asia-Pacific Region countries, regarding «Power Bridge» projects development and export of electrical power to China and Japan (mid-term and long-term outlook).**

