



PRIMORSKY TERRITORY GOVERNMENT

STRATEGY OF DEVELOPMENT FOR PRIMORSKY TERRITORY FUEL AND ENERGY COMPLEX

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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- ✓ Part of the remote areas of Primorsky Territory are provided with power service by inefficient and outdated diesel-run power plants.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.

Generation Facility

Title	Electric capacity, MW	Heating capacity, gcal/h
Primorsky HEP	1467	---
Artyom TPP	400	297
Vladivostok TPP-1	---	350
Vladivostok TPP-2	497	1051
Severnaya TPP	---	555
Partizanskaya HEP	203	160
Mobile HEP	45	---

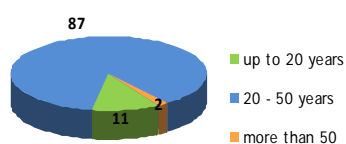
MAIN ISSUES

1. High runout and aging of equipment

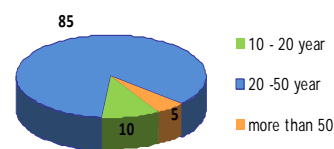
- 55% to 85% - average runout of generation facilities;
- Over 30 years – average exploitation term;
- 1298 Mw – capacity to be withdrawn until 2025;
- Low effectiveness of energy supply;

2. High relative rates.

Turbogenerators Age, %



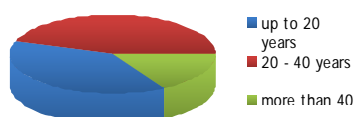
Boilers Age, %



Electrical grids

Object	Properties
Electrical grids with voltage over 500 kV	Comprise four combined overhead powerlines with a total length of 970,7 km.
Electrical grids with voltage over 220 kV	Combined length of electrical grids 1690km.
Electrical grids with voltage over 110 kV	2 581,9 km
Electrical grids with voltage over 35 kV	2 777,1 km
Capacity of substation 110 kV	2 916,5 MW
Capacity of substation 35 kV	1 530,0 MW

Electric Networks Age, %



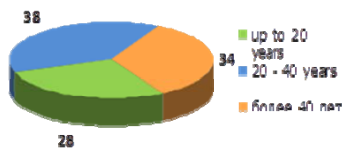
MAIN ISSUES:

1. Actual and functional depreciation of electrical grids exceeds 40 years.
2. Exploitation period of transformers on transformer substations exceeds 25 years.
3. Limited transfer capacity of several energy objects of energy system.
4. Does not provide stable energy supply of southern part of Primorsky territory.

Heating networks

Agglomeration title	Properties
Vladivostok	Combined length of heating networks is 220 km
Artyom	Length of main heating system is 148 km
Partizansk	Length of heating networks is 90 km
Ussuriisk	Length of heating networks is 255 km

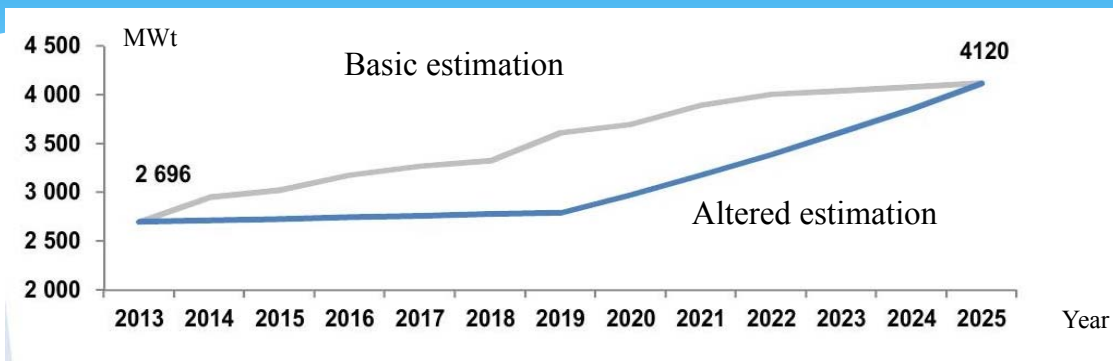
Heat Networks Age, %



MAIN ISSUES:

- 1. 1.61% of water supply main pipelines in Vladivostok are under repair or are under use of 20 years and should be replaced.
- 2. 2.95% of network heating pipelines in Artyom are under use of 20 years and should be replaced.
- 3. 3.64% of network heating pipelines in Partizansk are under use of 20 years and should be replaced сетевых трубопроводов
- 4. Heating supply of Ussuriisk urban center is decentralized.

Energy consume and load increase estimation



Average annual increase rates for maximum load in Primorsky energy system shall be 3,1%.

Total volume of load increase shall be 750 Mw.

Total volume of increase in energy consume shall be 7091 mil. kW/h.

Estimated annual rates of increase in energy consume shall be:

- Until 2018 – 0,6%;
- After 2018 – 6,2% due to the fact of additional load of Liquefied Natural Gas Plant consume.

Goals and task of development of energy field of Primorsky territory until 2025

Goals	Tasks
Sustaining of reliable and safe energy consume of current consumers	Technical re-equipment and modernization of generating facilities, increasing of energy supplying reliability.
Containment of heating and energy rates	Increasing of effectiveness of generation, transferring of energy and heating
Supplying new consumers with energy infrastructure	Construction of new generating facilities, electric and heating networks. Supplying of new consumers with reachable infrastructure. Provision of demand for heating and electric energy

Decommissioning Equipment and New Construction in Primorsky Territory

Plant	MWt	Work activities/equipment	MWt	Period of construction	Fuel's
Decommissioning - 1 298 MWt					
Artem TPP	400	Decommissioning generation equipment of plant	-400	2020 - 2022	Coal
Vladivostok TPP-2	497	Decommissioning	- 283	2016 – 2022	Gas/Coal
Partizansk HPP	203	Decommissioning generation equipment of plant.	- 203	2015 - 2025	Coal
Primorsky HPP	1467	Decommissioning ineffective equipment	- 412	2024 - 2025	Coal
New construction + 575 MWt					
TPP «Eastern»	-	Construction GTP-TPP at site CSWBH	+ 140	2012 - 2015	Gas
ТЭЦ ВХК (ОАО «Роснефть»)	-	Construction	+ 225	2021 - 2025	Gas
ТЭЦ СПГ (ОАО «Газпром»)	-	Construction	+ 210	2018	Gas

Second overhead high-voltage powerline “Primorskaya HEP – Khabarovskaya” with total voltage 500V is planned for construction. It will increase downflow between Khabarovsk and Primorsky energy systems by 130MW.

Plans for construction of generating facilities

Object	Fuel	Terms of construction	Capacity, MW
Ussuriisk TEP *	Natural Gas	2017	226
Atyom TEP	Coal	2019-2022	740
Vladivostok TEP-2	Natural Gas	2017-2018	420
Mini-GTP Artyom	Natural Gas	2015-2016	59
Mini-GTP Vladivostok	Natural Gas	2015-2018	44
Nakhodka TEP	Natural Gas	2024	460

* -In case of increasing of gas rates it is possible to switch from gas to coal for Ussuriisk TEP.

- Commissioning of Eastern PetroChemical Company TEP with capacity 224 MW and LNGP TEP with capacity 210 MW for securing own needs of enterprises without supplying energy to outer network.

- Construction of overhead powerlines with a total length 281 km is scheduled
- Increase of transformer substation by 257 MW
- Development of Vladivostok, Artyom and Partizansk heating networks

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 of additional jobs for construction and exploitation of energy complex objects – about 2 400, which will lead to improvement in employment rate for local citizens and decrease in population outflow form region;
- Decrease of environmental pollution by 50% due to substitution of obsolete coal generation with new-generation coal gas generation.
- Increase of quality and liability of energy and heating suppliance.

Primorsky region

- Ensuring sustain and seamless operation of energy system;
- Combined increase of gross regional product for a period 2014-2025– about 405 billion roubles;
- Additional volume of taxes to budgets of all levels for a period 2014-2025– about 42 billion roubles;
- Creation of conditions for further development of manufacturing of the region.

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 kWt



Wind-powered generating plant - 9325 kWt

Major effects of Wind Power projects:

- Significant decrease of fuel expenditures and subsidies from local budget.
 - Decrease in energy rates.
 - Increase in reliability and quality of power supply.
 - Decrease in pollution of environment.
- Number of sunny days annually in Primorsky territory – 310
 - Duration of sun glow – over 2000 hours



Development of renewable energy sources in Primorsky territory. Solar water heaters.

Solar water heaters are being installed in Primorsky territory for needs of heating and warm water supply.

Combined area - over 3000 sq.m.



Office building Far Eastern Energy Company, OJSC

Area of surface: 41,85 sq.m.

Maximum heating capacity: 30 kW.



Residential house in “Snegovaya Pad” district.

Area of surface: 111,64 sq.m.

Maximum heating capacity: 80 kW.



Office building of Primteploenergo.

Area of surface: 32 sq.m.

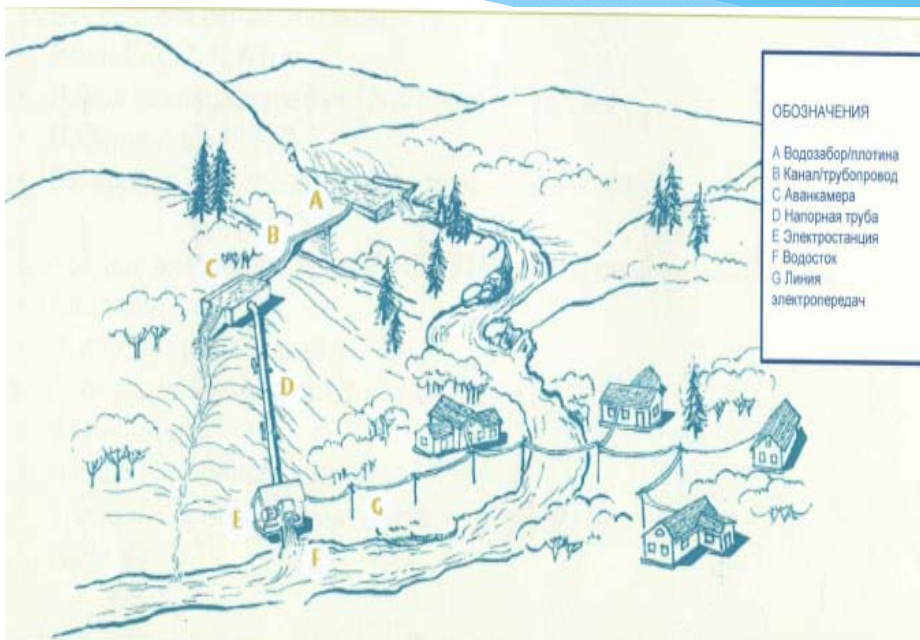
Maximum heating capacity: 26 kW.

Development of renewable energy sources in Primorsky territory. Wind-Diesel power unit.



- Primteploenergo has experimentally launched wind-diesel generator with a capacity 0,15 Mw for needs of Peretychiha settlement in Terneysky district.
- Height of unit, taking into account fan-span – about 30 meters.
- Unit is fully automated.
- Unit works on basis of mutual reservation of wind energy and diesel-generator.

Mini HEP in Terney district



ОБОЗНАЧЕНИЯ

- A Водозабор/плотина
- B Канал/трубопровод
- C Аванкамера
- D Напорная труба
- E Электростанция
- F Водосток
- G Линия электропередач

- A – Dam
- B – Channel
- C – Forechamber
- D – Riser-pipe
- E – Power plant
- F – Drain
- G – Powerline

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
TOTAL:	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

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%.



Mining industry of Primorsky territory

Entity	Coal rank	2012	2013	PLAN for 2014
		thous. ton	thous. ton	thous. ton
Primorskugol, OJSC		4 692,900	4 145,000	4000,000
Mining-board “Vostochnoe”	“D”	1 269,600	1 332,000	1250,000
Quarry-board “Novoshakhtinsk”	“1-B”	3 423,300	2 813,000	2750,000
Luchegorsk coal quarry, CJSC		4 201,351	3 800,000	3500,000
Luchegorsk coal quarry	“1-BR”			
Ugol ASO, CJSC		18,650	20,000	20,000
Voznovsky quarry,	“3-BR”			
KINGCOAL Far East , Co., LTD		265,000	265,000	260,000
Surazhevsky quarry	T (0-50)			
“Rakovsky” Coal Quarry, CJSC		524,350	600,000	600,000
Rakovsky Quarry				

LIQUEFIED NATURAL GAS PLANT

LNGP objects overview



CONSTRUCTION OF GAS AND CHEMICAL PLANT

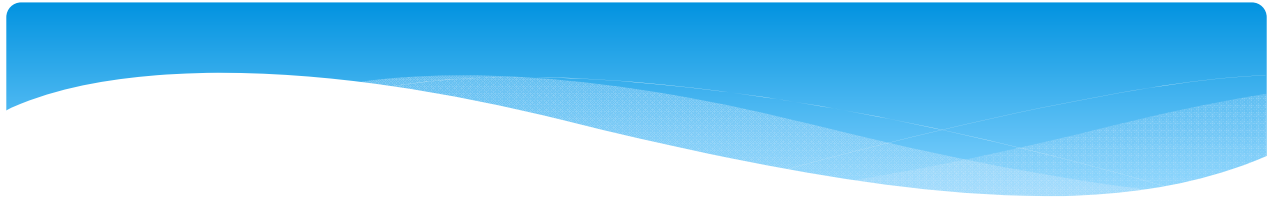


Project goal	Manufacturing gas and chemical goods. Supplying goods to Russian internal market as well as to Asian-Pacific region
Refinement capacity	Over 8 billion cubic meters of natural gas annually
Investor:	National Chemical Group, CJSC
Project value:	436 billion rubles
Development term:	2013-2021
Production:	Synthetic ammonia Grain ammonia Methanol
Location area	Nakhodka urban district

Construction of oil-processing complex of Eastern Petrochemical Company in Primorsky territory



Project goal	Manufacturing and selling petrochemical goods to Russian internal market as well as to Asian-Pacific region
Refinement capacity	Up to 30 billion ton of hydrocarbon crude annually
Investor:	OC Rosneft, OJSC
Project value:	1 313 billion rubles
Development term:	2013-2028
Production:	mono-ethylene glycol polypropylene Polyethylene Alfa-olefine
Location area	Partizansk district, Elizarov pad' area



Thank you!

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