

RUSSIAN-JAPANESE VECTOR IN THE EASTERN ENERGY STRATEGY OF THE RUSSIAN FEDERATION: PAST, PRESENT, LOOK INTO FUTURE

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PLAN OF THE REPORT

- 1. The Eastern vector is a strategic direction in Russia's energy development in the first half of the 21st century**
- 2. Initial conditions, targets and strategic directions in energy development in East Siberia and the Far East of Russia**
- 3. Russian- Japan cooperation in the gas area: possible directions and problems**
- 4. Russian-Japan cooperation in the other energy areas : electricity, coal industry, small and renewable energy source**
- 5. Russian-Japan vector of Russia's energy policy: a long way from research to implementation**
- 6. Conclusion - Necessary conditions and initiatives for successful mutually beneficial energy cooperation between Russia and Japan**

1. THE EASTERN VECTOR IS A STRATEGIC DIRECTION IN RUSSIA'S ENERGY DEVELOPMENT IN THE FIRST HALF OF THE 21ST CENTURY

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EASTERN VECTOR OF RUSSIA'S ENERGY POLICY

- National interests of Russia require intensification of its mutually beneficial cooperation with Japan, China, Korea and other countries in Northeast Asia
- Creation of new energy centers in East Siberia and the Far East will increase energy security of Russia, restore and strengthen broken fuel and energy ties between the regions and solve many important federal, interregional and regional problems
- Fast and large-scale development of energy sectors in these regions and penetration to the energy markets in Japan, China, Korea and other countries of Northeast Asia should be considered as a primary means of timely ensuring the appropriate positions of Russia in this strategically important region of the world
- Creation in the East of Russia and in Northeast Asia of a developed energy infrastructure in the form of interstate gas-, oil pipelines and transmission lines will decrease the cost of energy carriers, enhance reliability of energy and fuel supply to consumers in different countries and make easier the solution of environmental problems

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EASTERN ENERGY POLICY AS AN INSTRUMENT FOR SOLVING URGENT PROBLEMS IN RUSSIA

Eastern energy policy of Russia, as part of Eastern economic policy, is not an end in itself, but an instrument for solving many principally important problems of federal, interregional and regional levels

General problems (goals)

1. **Social** – increase of comfort, style, quality of people’s life in the eastern regions of Russia
2. **Political** – consolidation and integration of the RF entities, strengthening the unity of the economic and energy space of RF
3. **Geopolitical** – reinforcement of Russia’s positions in the world economic system, in the community of APR, Central and Northeast Asia countries
4. **Economic** – enhancement of the efficiency of functioning and competitiveness of the economy in the East of Russia, increase of provision with resources and accessibility to the remote areas of the country, expansion of active economic space of Russia, creation of conditions for attraction of foreign investments and advanced technologies, etc. to Russia

Energy problems (goals)

1. Improvement of **adaptability and reliability** of energy and fuel supply to consumers
2. Increase of **energy and environmental security** of the country and regions
3. **Perfection** of territorial and production structure of Russia’s energy sector and particularly in its eastern regions
4. Formation of **transport and energy infrastructure in Russia’s East** – oil and gas pipeline systems, transmission lines– and creation of **common transport and energy space** in Russia, etc.

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At present the material basis of the eastern vector of Russia’s energy policy is based on several large fuel and energy projects aimed at markets of NEA countries:

– Approval by the RF government and launch of “The program for creating the unified system of gas production, transport and supply in East Siberia and the Far East with potential gas export to the markets of China and other APR countries”, that suggests large-scale natural gas supply to the markets of NEA countries;

– Construction of the oil pipeline “East Siberia – Pacific Ocean” with the capacity 80 million t per year with a pipeline branch to Skovorodino towards China with the capacity up to 15-20 million t of oil per year;

– Studies on the possibility of annual electricity supply to China in the amount of 30-35 billion kWh starting from 2018-2022 with its increase to 60-70 billion kWh by 2025-2030.

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2. INITIAL CONDITIONS, TARGETS AND STRATEGIC DIRECTIONS IN ENERGY DEVELOPMENT IN EAST SIBERIA AND THE FAR EAST

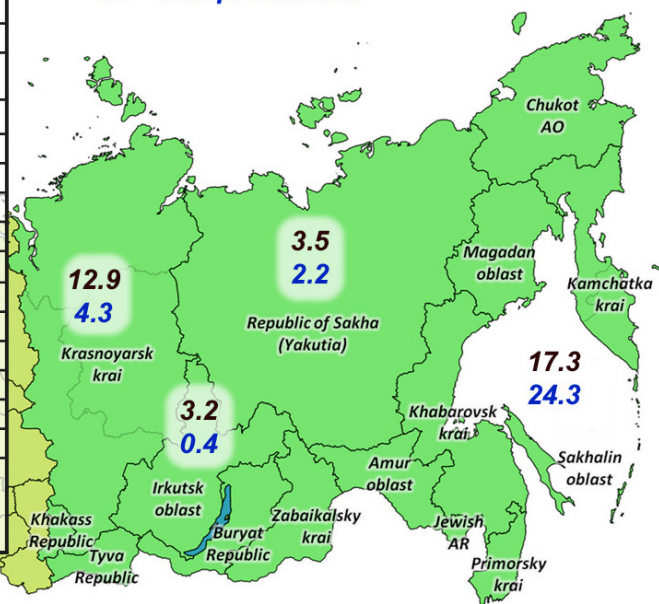
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ROLE OF ENERGY SECTOR OF EAST SIBERIA AND THE FAR EAST IN RUSSIA (AS OF 2010)

Indices	Russia	Total for East Siberia and the Far East
Territory, mln. km ²	17.1 *	10.3 (60.2%)
Population, mln. people	142.9	14.5 (10.1%)
Gross Domestic Product, trln. rub	32.1	3.3 (10.3%)
Potential of resources:		
Hydro, bln. kWh	1660	1345 (81%)
Coal, bln. t	274	126 (46%)
Oil, mln. t	19013	2852 (15%)
Natural Gas, bln. m ³	65825	7899 (12%)
Production:		
Electricity, bln. kWh	1037	195 (18.8%)
Heat, mln. Gcal	1355	186 (13.7%)
Coal, mln. t	317	118 (37.2%)
Oil, mln. t	505	37 (7.3%)
Natural Gas, bln. m ³	649	31.2 (4.8%)
Oil Refining, mln. t	249	28.3 (11.4%)

* A share of Russia in percentage terms is given in brackets
Calculations were based on: Russia 2010. Statistical collection. Official issue. – M.: Ross stat. Russia, 2011 – 581 p. (in Russian); 2) Economic and social situation of Russia. – M.: Ross stat. Russia, 2011 – 531 p. (in Russian)

12.9 - Oil production
4.3 - Gas production



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Russia completed the work on preparation of a large number of policy documents determining the strategic development of the economy and energy in the East of the country until 2030 in the context of energy cooperation between Russia and EAST Asia countries, such as "Energy Strategy of Russia until 2030", "Program for Creation in East Siberia and the Far East of a Unified System of Gas Production, Transport and Supply with Potential Gas Export to the Markets of China and other APR Countries" (Eastern Gas Program), "Strategy of Socioeconomic Development of the Far East and the Baikal region until 2025", "Strategy of Socioeconomic Development of Siberia until 2020", "Energy Development Strategy of East Siberia and the Far East until 2030", "Program for Development of Oil Refining Capacities in East Siberia and the Far East", etc.



PARTICIPATION OF ENERGY SYSTEMS INSTITUTE SB OF RAS IN THE PROJECTS ORDERED BY FEDERAL AND REGIONAL AUTHORITIES IN 2007-2011

In the framework of the Energy Strategy of Russia 2030 (ordered by the Ministry of Energy of RF)

- The strategy for energy development in East Siberia and the Far East until 2030
- The study on prospects for electric power industry development in Russia until 2030

Ordered by the regional authorities (Governments of the RF entities)

- The concept of reliable operation of energy facilities and energy security of **Sakhalin region** until 2020 – ordered by Administration of Sakhalin region
- The strategy for energy development in **Amur region** until 2010 and for the time horizon until 2030 – ordered by Administration of Amur region
- The strategy for electric power industry development in **Chukot Autonomous Area** until 2020 – ordered by Administration of Chukot AA and JSC "Chukotenergo"
- The strategy for energy development in **Irkutsk region** until 2015-2020 and for the time horizon until 2030 – ordered by the Government of Irkutsk region
- The energy strategy of **Sakha Republic (Yakutia)** until 2020 and for the time horizon until 2030 – ordered by the Government of Sakha Republic (Yakutia)

TARGETS AND STRATEGIC DIRECTIONS IN ENERGY DEVELOPMENT IN EAST SIBERIA AND THE FAR EAST

1. *In the coming 15-20 years Russia will be unable to intensively develop untouched territories of East Siberia and the Far East. Therefore, it is most important to preserve and strengthen the existing economic potential for future development*

This can be achieved by implementing the so called strategic scenario of economic development in these regions

The strategic scenario of economic development in the Eastern regions suggests that their economy should quantitatively and qualitatively approach the current level of advanced European countries. The rates of economic growth in the considered regions should be higher than on average for Russia and the share of these regions in the total population number of the country should also rise

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2. Energy development in East Siberia and the Far East for the considered time horizon will aim not only to meet their demand for energy carriers but also to export Russian energy resources to the energy markets in the East Asian countries

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RUSSIA'S ROLE IN ENSURING GLOBAL ENERGY SECURITY

• **Russia possesses 19% of the world proved coal reserves, 27% of the world proved natural gas reserves and 7% of the world proved oil reserves**

• **Russia produces (as of 2010):**

• Electricity	-	1037 billion kWh (4.9%)
- Coal	-	317 million t (4.4%)
- Oil	-	505 million t (12.9%)
- Natural gas	-	649 billion m³ (18.4%)

(%) – of the world production

• **Russia is the largest exporter of fuel and energy products**

Sources: Russia in Figures, 2011
BP Statistical Review of World Energy, June, 2011

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EXPORT OF RUSSIAN ENERGY RESOURCES (2010)

Electricity	-	20 billion kWh (0.1 %)
Coal	-	116 million t ($\frac{12}{7}$ %)
Gas	-	200 billion m³ (21 %)
Oil	-	247 million t (13 %)

(%) – share in the world trade

($\frac{12}{7}$ %) : 12% – steaming coal share in the world trade

$\frac{7}{7}$ % – coking coal share in the world trade

Source: Fuel and energy complex of Russia in 2000-2010. Reference and analytical survey. – M.: Energiya, 2011. – 422 p. (in Russian)

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EXPORT OF FUEL AND ELECTRICITY FROM RUSSIA IN 2010

Fuel and electricity	Export, total	Including export to East Asian countries
Oil, mln. t	247.0	38.0 (15.4%)
Oil products, mln. t	132.0	11.8 (8.9%)
Gas, bln. m ³	200.0	13.3 (6.7%)
Coal, mln. t	116.0	28.0 (24.1%)
Electricity, bln. kWh	20.0	1.1 (5.6%)

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POSSIBLE EXPORT OF ENERGY RESOURCES FROM RUSSIA

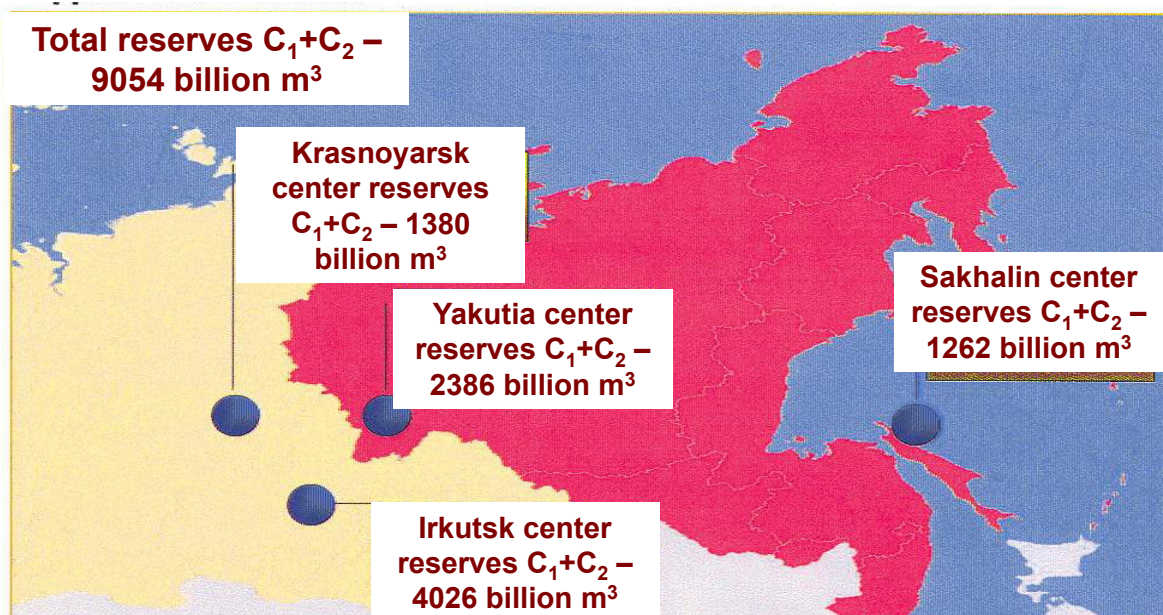
Indices	2010 fact.	Forecast		
		2015	2020	2030
Export, mln. tce., total	826	916-928	952-1027	969-993
including:				
<i>Oil, mln. t</i>	<i>247</i>	<i>229-239</i>	<i>236-251</i>	<i>213-243</i>
Eastern direction	38	39-40	59-60	68-73
<i>Gas, bln. m³</i>	<i>200</i>	<i>266-287</i>	<i>252-293</i>	<i>257-313</i>
Eastern direction	13	20-25	50-70	78-80
<i>Coal, mln. t</i>	<i>116</i>	<i>120-125</i>	<i>125-130</i>	<i>140-150</i>
Eastern direction	28	30-35	35-40	50-60
<i>Electricity, bln. kWh</i>	<i>20</i>	<i>21-25</i>	<i>30-85</i>	<i>48-105</i>
Eastern direction	1.1	4-8	10-60	25-85

Source: Substantiating materials to "The Energy Strategy of Russia until 2030", Estimations of the author's

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3. Russian- Japanese cooperation in the gas area: possible directions and problems

PROSPECTIVE GAS PRODUCING CENTERS IN EAST SIBERIA AND THE FAR EAST



Source: Program of constructing a unified system of gas production, transportation and supply in East Siberia and the Far East taking into account potential gas export to the markets of China and other APR countries (main provisions) – JSC “Gazprom”, 2007. – 289 pp.



FACTOR 1

Large-scale involvement of natural gas in the economy of the eastern regions is a strategic priority of their socioeconomic development.

The natural gas market will be determined primarily by solvent demand and necessity to solve the environmental problems. An annual demand of the eastern regions for natural gas as a furnace fuel in 2020-2025 is estimated at 20-25 bln. m³.

Natural gas production capabilities in the East of Russia considerably exceed the demand of the regions, therefore, reliable supply of Russian natural gas to the energy market of the East Asian countries is highly probable

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FACTOR 2

Russian gas and oil resources become *more and more attractive* in the markets of NEA countries as a result of increasing investment and other risks in the Middle East

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FACTOR 3

Prices of natural gas become the priority in negotiations

Natural gas will not be cheap in Russia, since the policy of leveling the prices of energy carriers and adjusting the price structure of some kinds of fuel to the world ratios comes into play

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FACTOR 4

At present the necessity to deliver not only hydrocarbon resources, but products of their advanced processing **with higher value** added to the international markets is clearly recognized at all levels in Russia. For this purpose it is planned to increase in the eastern regions of Russia output of oil products and create **gas-chemical industry**, whose products are in rather high demand in Russia and in NEA countries

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FACTOR 5

- Natural gas of the Siberian platform is unique in the content of helium and ethane, which essentially increases *its consumer value*
- Natural gas of the Siberian platform contains more than 0.3% of helium and 5-7% of ethane
- Helium reserves in the gas fields of the Siberian platform are estimated at 8.6 billion m³, or above 20% of the world helium reserves
- In the future Russia can be the world largest helium exporter

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FACTOR 6

The Russian government, regional authorities and companies have started large-scale development of energy resources in the East of the country

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PROSPECTS FOR NATURAL GAS SUPPLIES TO THE MARKET OF APR COUNTRIES



Source: V.P. Timoshilov, FIEF-2011



4. COOPERATION BETWEEN RUSSIA AND JAPAN IN OTHER ENERGY AREAS

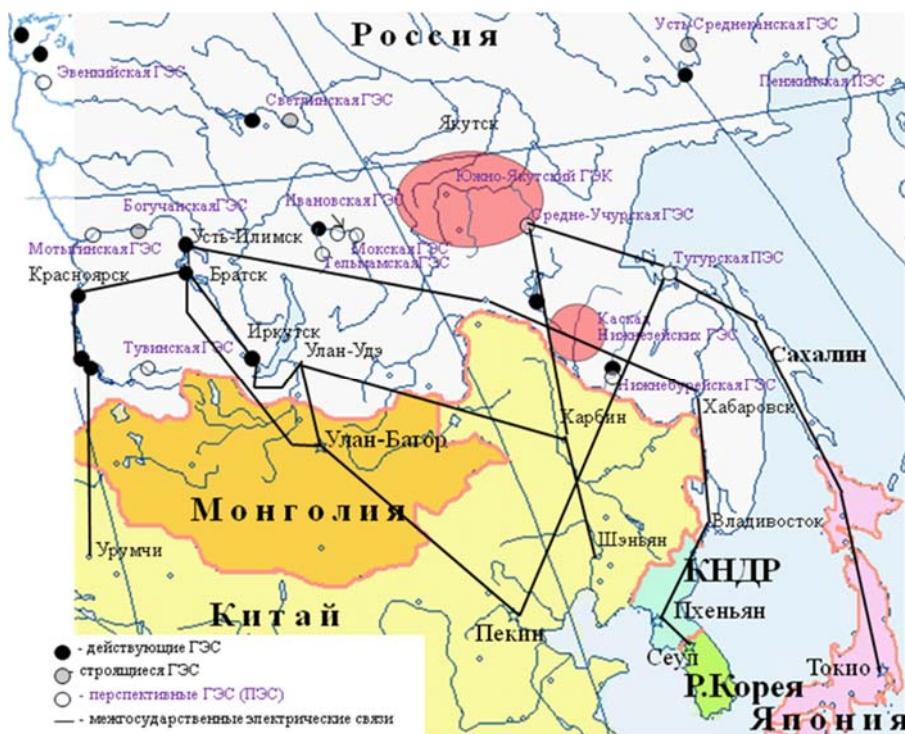


(1) Formation of cross-border transmission lines in NEA

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POTENTIAL DIRECTIONS OF CROSS-BORDER TRANSMISSION LINES FROM RUSSIA TO NEA



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EXPORT-ORIENTED POWER PLANTS IN EAST SIBERIA AND THE FAR EAST

Power plant	Capacity , MW
East Siberia	
Lenskaya condensing power plant (CPP)	800-1000
Berezovskaya CPP-2	3000
Gusinozerskaya CPP (expansion)	1200
Kharanorskaya CPP (expansion)	900-2100
Far East	
Urgalskaya CPP	400-600
Erkovetskaya CPP	1200
Elginskaya CPP	1800
Sredne-Uchurskaya HPP	3300
Uchurskaya HPP	365



POSSIBLE LARGE-SCALE ELECTRICITY EXPORT FROM RUSSIA TO CHINA (60-70 bln. kWh of electricity in 2025-2030)



Breakthrough of Inter-State E. Transportation in NEA

Korea-Russia Electricity Network Interconnection

- 1,200km HVDC interconnection passing through DPRK
 - Kraskino-Cheungjin: 150km
 - Kraskino-Seoul: 1,200km

- S. Korea-Russia Summit (September 2008)
 - Construction of 800kV HVDC transmission line passing through DPR Korea
 - Maximum 4,000MW per year

- Ministry Level Action Plan (August 2009)
 - Feasibility study by KEPCO and Inter RAO (2009-2010)
 - Contact and discussion with DPR Korea

- Negotiation with DPRK is ongoing

Source: Kyung Sool Kim Trans-Boundary Energy Transportation in North-East Asia, KEEI-ESI Workshop – 2011

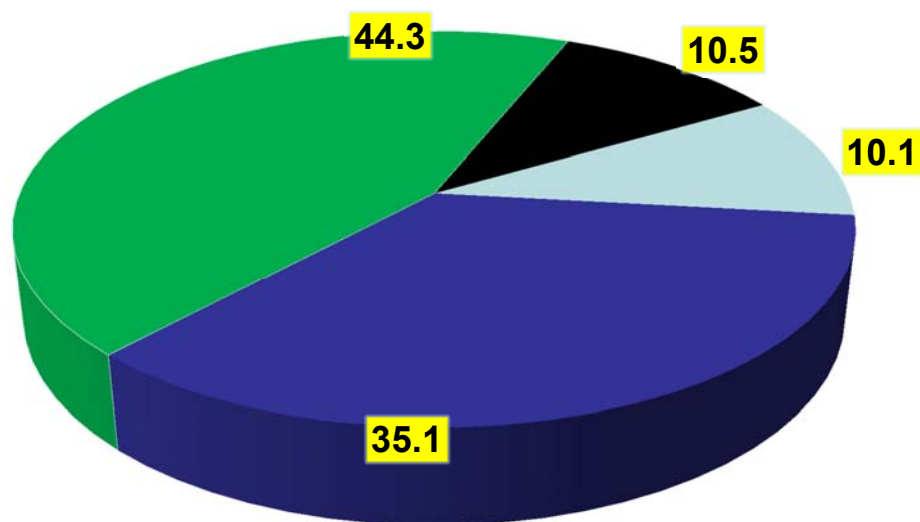


(2) Export of Russia's coal



DISTRIBUTION OF PROVED COAL RESERVES OVER THE TERRITORY OF RUSSIAN FEDERATION

Proved reserves, total 193.3 bln. t (100 %)



■ European part
 ■ Eastern Siberia
 ■ Western Siberia
 ■ Far East

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RETROSPECTIVE DYNAMICS OF RUSSIAN COAL PRODUCTION AND EXPORT, MLN T (IN ROUND FIGURES)

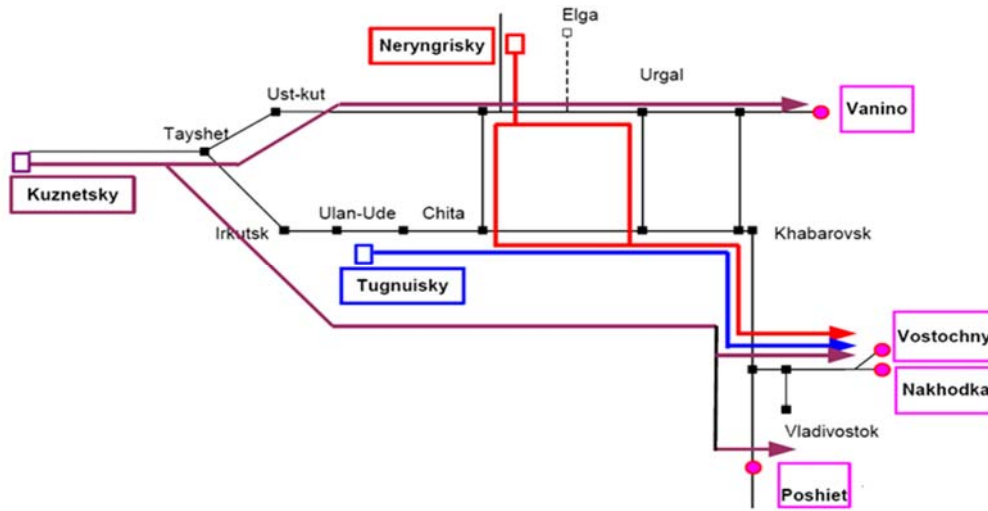
Index	Year				
	2001	2005	2008	2009	2010
Production	270	300	329	300	323
Export, total, including:	48	80	102	97	116
Eastern direction, total	6.5	15.2	16.6	27.7	28.0
including:					
Japan	5.4	9.8	9.0	9.0	
Republic of Korea	0.5	3.2	6.6	4.0	
China	0.1	0.5	0.1	13.1	
India	0.1	-	0.2	0.7	
Others	0.4	1.7	0.7	0.7	

For information: The supplies of Russian coal to China from January to October 2012 made up 15 million t, including: by sea – 12 million t, by railway – 3 million t.

Source: Saneev B.G., Sokolov D.A. Energy Profile and Policy and Energy Statistics of the Russian Federation // Energy Policy and Statistics in Northeast Asia. Country Report for Mongolia, Korea, Russia, China. / Working Group on Energy Planning and Policy, the Intergovernmental Collaborative Mechanism on Energy Cooperation in Northeast Asia. – Korea Energy Economics Institute, 2011



SCHEME OF RUSSIAN COAL TRANSPORTATION TO THE NEA MARKETS



Year	2005	2010	2015	2020	2025
Mln. t	14	28	30-35	35-40	45-50

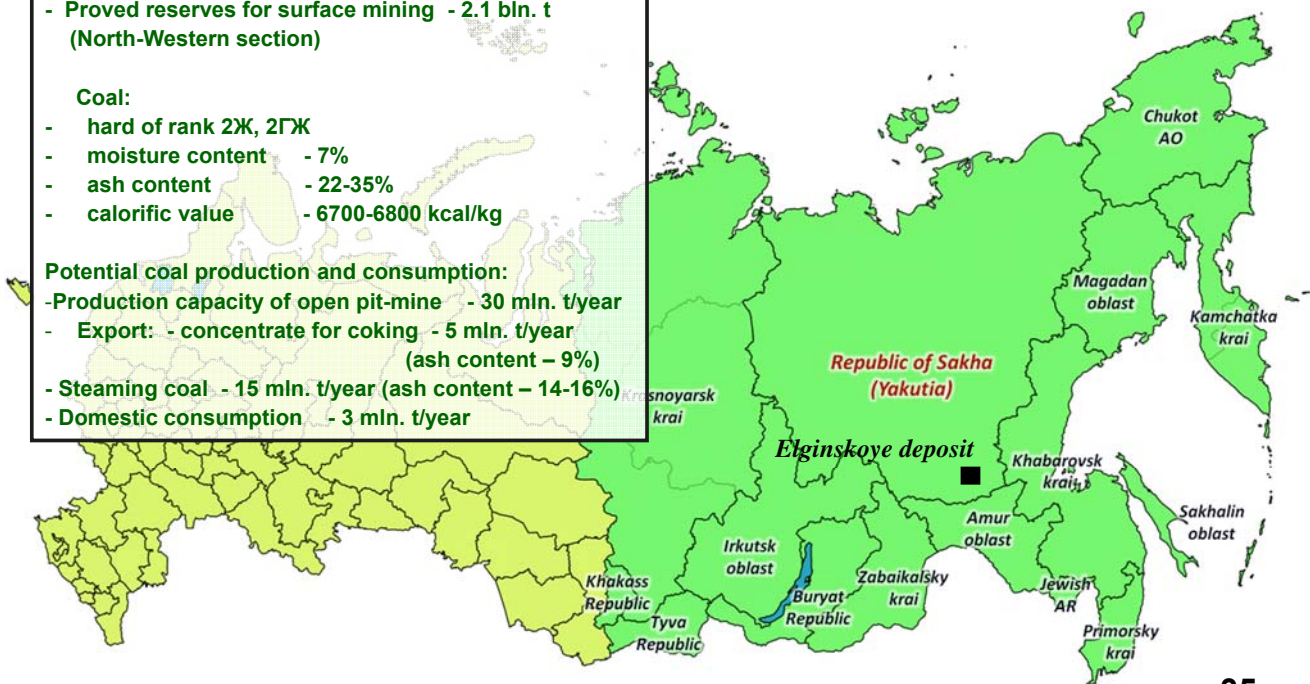


BASIC CHARACTERISTICS OF THE ELGINSKOYE DEPOSIT (REPUBLIC OF SAKHA (YAKUTIA))

- Estimated resources - 14 bln. t
- Proved reserves for surface mining - 2.1 bln. t (North-Western section)

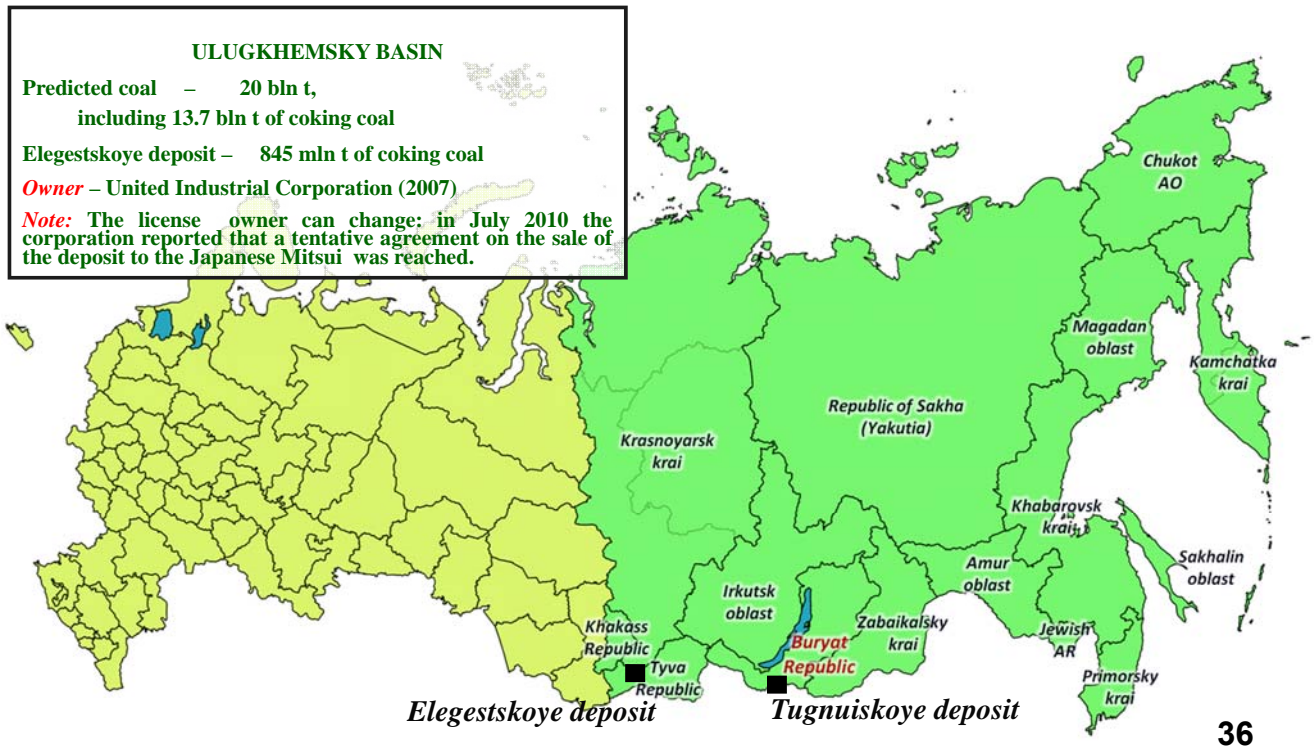
- Coal:**
- hard of rank 2Ж, 2ГЖ
- moisture content - 7%
- ash content - 22-35%
- calorific value - 6700-6800 kcal/kg

- Potential coal production and consumption:**
- Production capacity of open pit-mine - 30 mln. t/year
- Export: - concentrate for coking - 5 mln. t/year (ash content – 9%)
- Steaming coal - 15 mln. t/year (ash content – 14-16%)
- Domestic consumption - 3 mln. t/year





RESOURCE CHARACTERISTIC OF ELEGESTSKOYE DEPOSIT (REPUBLIC OF TYVA)

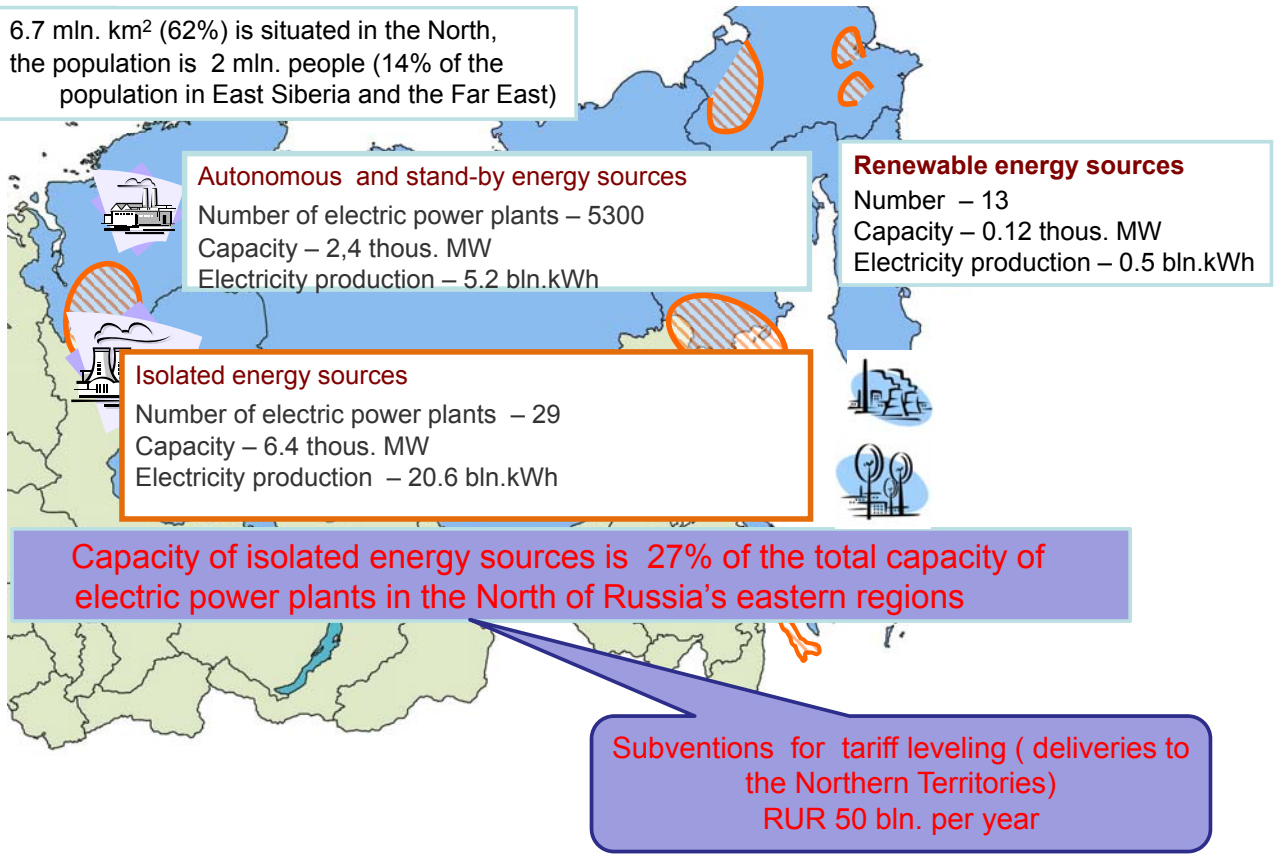


(3) Reliable energy supply to isolated and hard-to-access consumers in the eastern regions of Russia from small-capacity and renewable energy sources

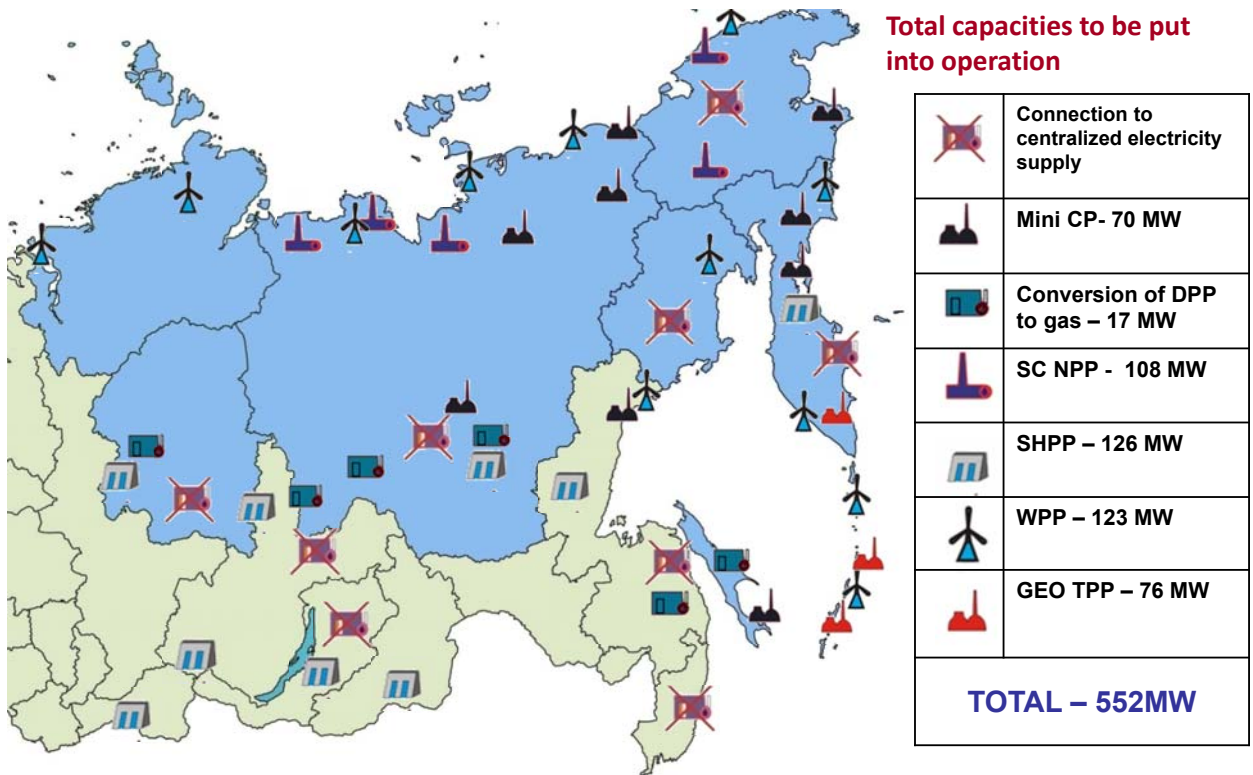


CHARACTERISTIC OF SMALL-SCALE ENERGY OF RUSSIA'S EASTERN REGIONS (Current state)

6.7 mln. km² (62%) is situated in the North, the population is 2 mln. people (14% of the population in East Siberia and the Far East)



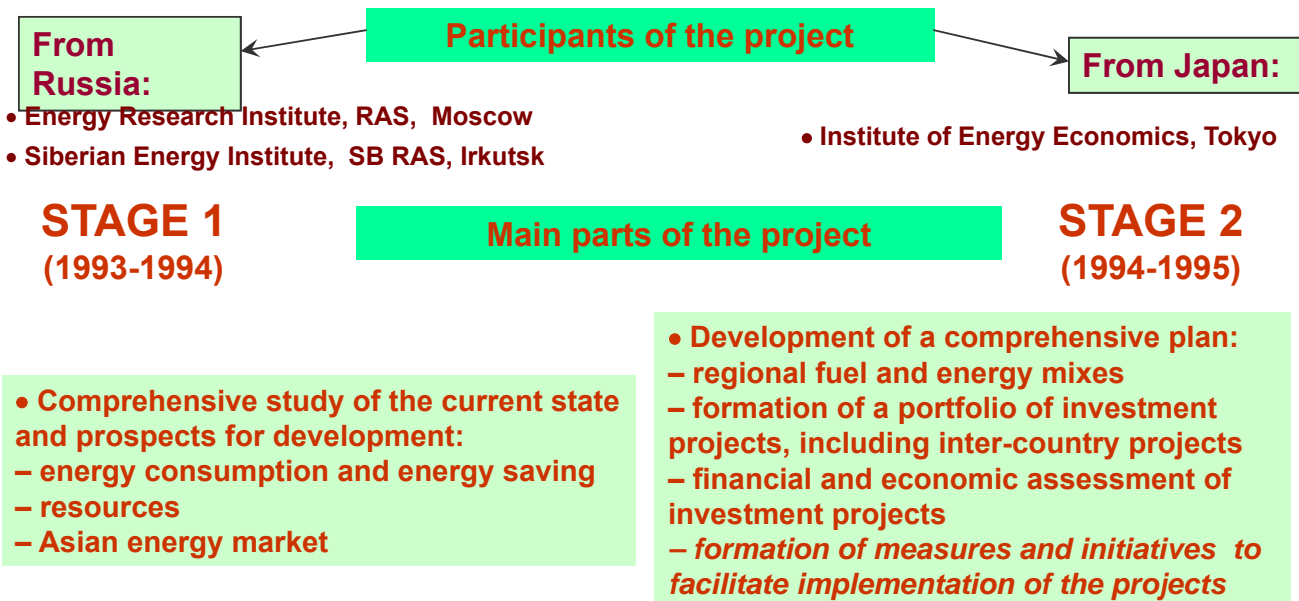
ALLOCATION OF NEW SMALL-CAPACITY ENERGY SOURCES OF DIFFERENT TYPES IN EAST SIBERIA AND THE FAR EAST (AS OF 2030)



5. Russian-Japanese vector of Russia’s energy policy: a long way from research to implementation

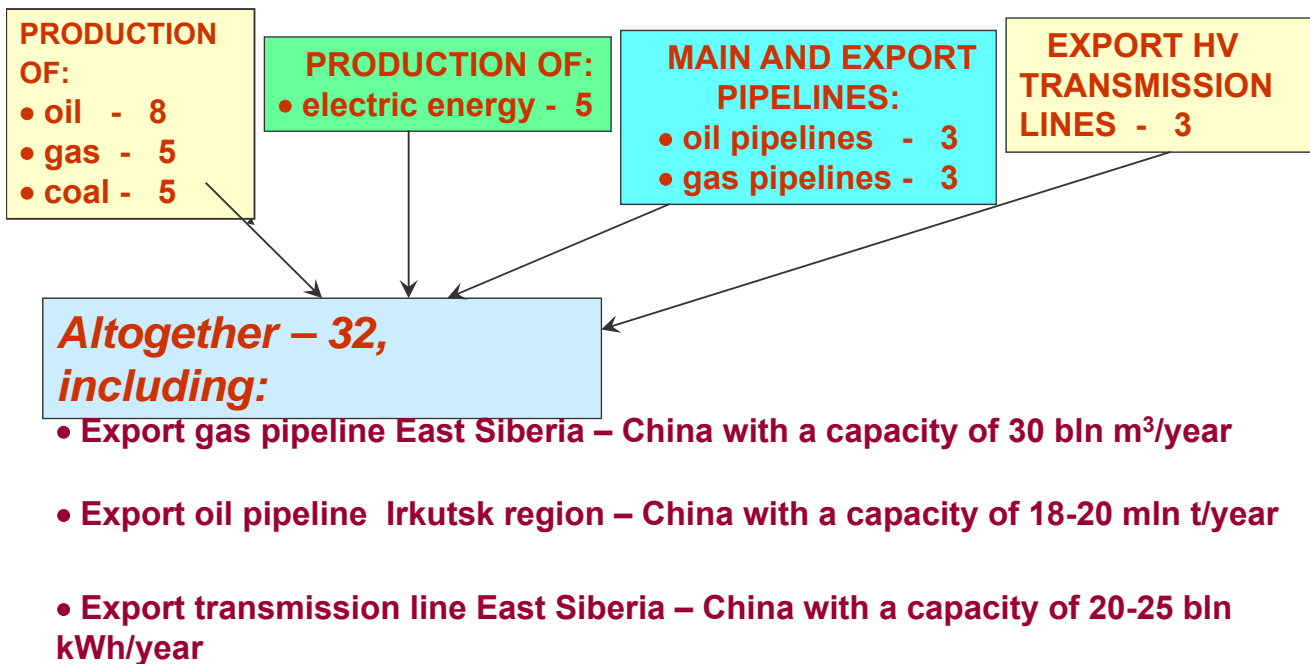


MASTER PLAN OF ENERGY DEVELOPMENT IN EAST SIBERIA AND THE FAR EAST TILL 2010-2015 TAKING INTO ACCOUNT THE EXPORT OF RUSSIA’S ENERGY RESOURCES TO THE APR COUNTRIES





CONSIDERED INVESTMENT PROJECTS AND THEIR NUMBER



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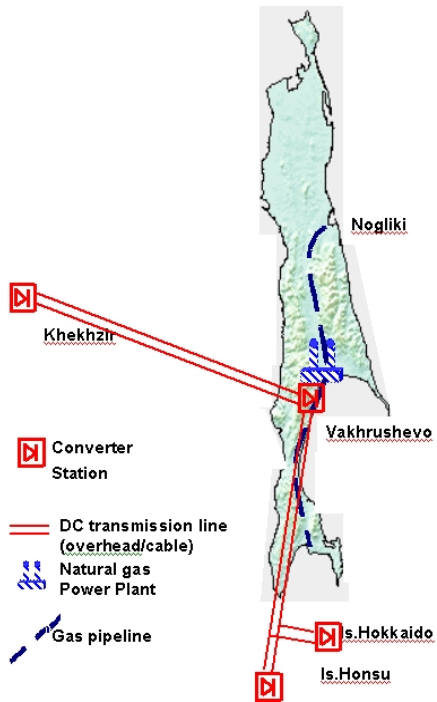
MAIN RESULTS OF THE RUSSIA-JAPAN PROJECT 1993-1995

1. Development of oil and gas resources in East Siberia and the Far East to meet internal demands and to supply surplus hydrocarbons to the markets of NEA countries is the strategic priority of socio-economic development of Russia's eastern region and provision of energy security in NEA.
2. The fundamental scheme of oil-, gas pipeline network and export oil-, gas pipelines in Russia's East is suggested.
The scheme of the gas pipeline network and export pipeline system in Russia's East was later specified in the framework of joint studies between the Russian research society "Rosaziagaz" and the Northeast Asian Gas and Pipeline Forum, Japan (NAGPF project).
3. Promising coal deposits that are attractive for the Japanese market, potential electricity sources for Russian electricity export to Japan, China and other NEA countries are presented.
4. The mechanisms for implementation of the suggested measures on strengthening the energy cooperation in NEA are proposed.

The results of the Russia-Japan project were discussed in December 1996 in Moscow at the Russia-Japan round table organized by the Ministry of Economy, Ministry of Energy of the RF and Ministry of Foreign Trade and Industry of Japan.



CONSTRUCTION OF POWER PLANT AND EXPORT TRANSMISSION LINE SAKHALIN – JAPAN

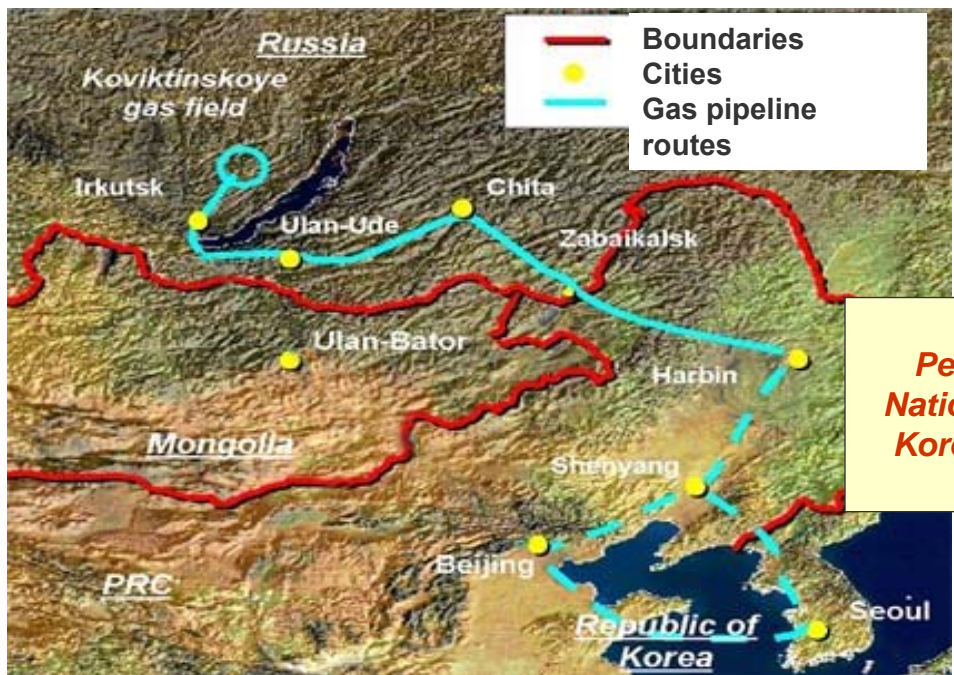


Installed capacity, MW	4000
Electricity production, bln kWh	23
Construction period, years	8
Total investments, bln USD	9-10
Electricity price at Japan border, c/kWh	5-6

*JSC "EES Rossii" and Marubeni Corp.
"Russia-Japan Power Bridge",
Feasibility study 1999*



EXPORT GAS PIPELINE IRKUTSK REGION – CHINA – KOREA



*JSC «RUSIA Petroleum», China National Oil Company, Korea Gas Company.
Project 2003*



RUSSIA-JAPAN STUDIES 1998-2001

1. A series of studies on development of master plans for gasification of large industrial centers in East Siberia and the Far East (the cities of Krasnoyarsk, Irkutsk, Angarsk, Ulan-Ude, Chita, Blagoveshchensk, Khabarovsk, Vladivostok, Petropavlovsk-Kamchatsky)

Developers

**Energy Systems Institute
Japan SB RAS**

Institute of Energy Economics

Financial support and assistance

**JSC “Irkutskenergo”
JSC “Vostokenergo”**

Toyo Engineering Corporation



RUSSIA-JAPAN STUDIES 2005-2006

The study on potential coal production and consumption in East Siberia and the Far East and its export

Developers

Energy Systems Institute
Japan SB RAS

Institute of Energy Economics

Financial support and assistance

JSC “SUEK”

NEDO

JSC “Yakutugol”
 (“JCOAL”)

Japanese Coal Energy Center

JSC “Sakhalinugol”



BASIC CHARACTERISTICS OF THE TUGNUISK OPEN-PIT MINE (REPUBLIC OF BURYATIA)

Design capacity – 10 mln t/year

Coal:

- hard of rank Д;
- moisture content – 10%;
- ash content – 18.3%;
- calorific value – 5200-7600 kcal/kg;
- sulfur content – 0.3-0.5%;

Coal mining in 2006 – 5.4 mln t

Coal supplies for export in 2006 – 3.5 mln t



6. CONCLUSION - NECESSARY CONDITIONS AND INITIATIVES FOR SUCCESSFUL MUTUALLY BENEFICIAL RUSSIAN-JAPANESE ENERGY COOPERATION

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6.1. FIVE REQUIREMENTS FOR MUTUALLY BENEFICIAL ENERGY COOPERATION

- 1. Political will and serious intentions of participants to implement a specific energy project mutually beneficial for each country*
- 2. Coordination of economic and energy policy among the central, regional authorities and business circles of the countries in development of interstate energy projects*
- 3. Comprehensive and system estimation of consequences (effects) of implementation of large-scale interstate energy projects, particularly under high uncertainty of future development, economic risks and global challenges for the countries, regions and energy companies*
- 4. Generation of mutually acceptable mechanisms for implementation of interstate energy projects (organizational, economic, legal and other mechanisms)**
- 5. Development and implementation of interstate projects by the international team (at all stages: from feasibility study and design works to their implementation)*

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6.2. MAIN CONCLUSIONS

1. **There is an urgent necessity to develop a scientifically grounded strategy of energy cooperation between Russia and Japan.**
2. **Nowadays the main outlines of such a strategy for energy cooperation between Russia and Japan are quite clear. It is necessary to carry out joint research, determine a list of mutually beneficial projects on energy cooperation between Russia and Japan on the basis of its results, and develop mechanisms for their implementation. Special focus should be placed on pricing formulas for energy products.**
3. **Such a strategy can be developed only on the basis of close cooperation between the Russian and Japanese teams of research and design institutes, companies, banks etc. with an active support of Governments and regional authorities.**

Energy and economic institutes of Russia and Japan should and can take an active part in solving this complex problem, which is very important for Russia and Japan and for all countries of the NEA

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**Thank you very much for
your kind attention!**

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