

Russia's oil and gas sector strategy and its prospects in North East Asia markets

1. Raw base and organizational environment for oil and gas sales

The survey and forecast of Russian and international energy supply systems shows further increase in the coming decades of the world energy demand, primarily for hydrocarbons. In the regional aspect, the fastest oil and gas demand will be registered in the APR, mainly in China, India, Indonesia and the Philippines. Along with that, on the global scale only a few larger raw hydrocarbons resource bases are left that can satisfy the prospective energy demand.

They are the politically unstable Middle East and Africa, the economically and technologically remote and geologically poorly described Arctic Seas shelves and also the North of Western Siberia (Yamalo-Nenetsky and Khanty-Mansiysky Autonomous Okrugs) and the territory of the Siberian platform (the Irkutskaya oblast, the united Krasnoyarsky krai and the Sakha Republic).

There are also opportunities to boost oil and gas production on the Far Eastern shelves (Sakhalin island et al). From among the prospective energy sources the closest to the fast growing and large-capacity markets, of China first of all, are Western Siberia, Eastern Siberia and the Far East.

In June 2002 RF Government approved of Siberia's Economic Strategy. It stresses "the need in new oil and gas production centers in Eastern Siberia". The Strategy pays particular attention to transport communications. "Building trunk export oil and West-East gas pipeline, says the Strategy, will enhance the growth in the fuel and energy sector of Eastern Siberia and the Far East, will help solve the acute strategic tasks connected with the exit to the prospective market of the Asia Pacific."

In August 2003 the RF Government approved of Russia's Energy Strategy as far as 2020. It targets at a greater role of the country's eastern regions in the oil and gas sector, the diversification of exports and exit to the Asia Pacific market. It is expected that the core of the new large centers of oil and gas industry in the east of the state, meeting the domestic demand of these regions, and starting long-term oil and gas shipments to the APR in particular China, will be the fields in Western and Eastern Siberia and the Sakha (Yakutia) Republic. Sakhalin shelf fields will give birth to another large oil and gas supply system mostly of export orientation.

2. Oil production prospects of Russia and exports to the east

According to Russia's Energy Strategy long-term oil sector development will resolve two key tasks: (1) efficient use of located oil reserves, supporting the greater reproduction of the oil sector raw base; (2) resource and energy conservation, cutting down on losses at all stages of preparing the reserves, at production, shipment and processing of oil; (3) more deep and thorough oil processing, a complex recovery and use of all valuable associated and dissolved components; (4) the formation and development of new large oil production centers, first of all in Eastern Russia regions and on the Arctic and Far Eastern shelves; (5) greater presence of Russian oil companies in foreign markets, acquisition of processing and trade infrastructure in the recipient states; (6) greater involvement of Russian oil companies in foreign production and transportations assets, first of all in the CIS, Europe and the Asia Pacific.

The main source of oil shipments from Russia to China, especially at the first stage will be the national largest oil region of Western Siberia. In this respect of particular impact is the forecast of oil production in Russia detailed by the macro-region as to supplies to the domestic market and exports in the traditional westward and the new eastward directions.

The prospective oil production in Russia will be influenced mainly by the world prices, the level of the transportation infrastructure, tax environment and research and technology progress in survey and development of the fields, as well as the quality of explored reserves. The lower oil price margins will be set by the production costs at large fields with final costs, while the upper one by the costs of opportune mass production of alternative to oil motor fuels.

The world oil price will be formed depending on the rate of the world economic growth, the intensity of introducing the alternative energy sources, the oil offer on the world markets and the transport opportunities for its shipment to the consumer. In forecasting the oil prices the influence of various political, economic and technological factors was taken into consideration that tell on the formation of the world oil market conjuncture.

The top international oil prices will keep for approximately as far as 2010 – 2012 though the tendency to go down will be felt already in 2006 – 2007. This is tied with the inert character of technological schemes for oil demand that are now being employed by the developed states and continue being introduced on a mass scale in China and other APR states. By 2010 – 2012 the developing states will face a technological saturation of traditional motor transport so the global demand for oil will slow down. This will cause lower oil price to the level of \$40 – 45/bbl and with inflation in mind it correlates to the current \$35 –

40/bbl.

In this context Russia will continue its oil production though the rates in Western Siberia will slow down and in the European part of the state the absolute indicators will also go down. By 2010 the annual oil production in the country can reach 500 MT, in 2020 550 MT, in 2030 600 MT; production of Western Siberia in the same time framework will be 344.5, 350 and 355 MT correspondingly (Table 1). Western Siberia under stabilizing and a graduate decrease of oil production in the Khanty-Mansiysky Autonomous Okrug will grow in the north of the macro-region, i.e. in the Yamalo-Nenetsky Autonomous Okrug.

Table 1

**Forecast of oil and gas condensate production in Russia as far as 2030
by the macro-region, MT**

Region / Year	2010	2015	2020	2025	2030
Western Siberia	344.5	345.0	350.0	351.0	355.0
Incl. Yamalo-Nenetsky Aut. Okrug	55.0	60.0	65.0	70.0	80.0
Khanty-Mansiysky Aut. Okrug	265.0	260.0	260.0	256.0	250.0
Tomskaya oblast	15.0	15.0	15.0	15.0	15.0
South of Tyumenskaya oblast	6.2	7.5	7.5	7.5	7.5
Novosibirskaya oblast	1.8	1.5	1.5	1.5	1.5
Omskaya oblast	1.5	1.0	1.0	1.0	1.0
European part	120.0	115.0	110.0	106.4	100.0
Eastern Siberia and the Sakha Republic	12.5	42.0	100.0	110.0	130.0
Far East (Sakhalin)	23.0	25.0	30.0	32.6	35.0
Russia, total	500.0	527.0	590.0	600.0	620.0

In recent years in the Russian sector of the Caspian Sea several oil gas bearing structures have described in detail for deep drilling and many non-anticline structures are in for a more profound survey, among them highly prospective traps of the reef type and 5 new fields were discovered. After the long-term geological survey program by 2010 the area will increase oil and condensate reserves by 348 MT.

This will enable Russia by 2015 to produce in the Russian sector of the Caspian at least 8 MT, and by 2020 up to 20 MT oil and condensate. The exploration of the North Caspian and Timano-Pecherskaya oil and gas bearing provinces will in the future stabilize and grow oil production in the European part of the state up to 140 – 150 MT.

Besides an increase in oil production by Russian companies will be registered abroad, first of all in the states of the Caspian region, Kazakhstan, Turkmenistan, Uzbekistan, Azerbaijan. Russian operators can ship oil from these states to the APR, first of all China. Here leading will be LUKOIL, Gazprom (including Sibneft assets) and Rosneft.

In the future Eastern Siberia and the Far East will become Russia's larger oil exporters to China and the other APR states. The oil of the considered regions is marked with high quality, exceeding the parameters of the Russian export Urals brand. They are mostly light and low-sulfur brands. A larger part of Eastern Siberia and the Far East reserves have density below 0.87 g/cm³ and sulfur content below 0.5%.

After the forecast of Siberian Branch RAS the region creates a serious background for discovering new fields and for growing the mineral resource base. The Russian Federation Government in a number of documents (Siberia's Economic Development Strategy, approved by the RF Government decision #765 of 06.07.2002; Russia's Energy Strategy approved by the RF Government decision #1234-r of 08.28.2003; RF Government Decision of 03.13.2003) authorized the formation of new large oil and gas production region on that base.

Several serious discoveries were made in the north of the Siberian Federal Okrug, in the Turukhansky rayon of the Krasnoyarsky krai and in the Taimyrsky (Dolgano-Nenetsky) Autonomous Okrugs.

Estimates show that oil production in Eastern Siberia and the Sakha Republic can reach 100 – 105 MT by 2020 and up to 120 – 132 MT by 2030.

By 2010 oil production of Eastern Siberia and the Sakha (Yakutia) Republic may come up to 12 - 13 MT. In the same period the commercial operation of the Talakansky, Yurubcheno-Tokhonsky, Kuyumbinsky fields is expected. Condensate will be recovered in the Kovyktinskoye field. Sakhalin-1 and -2 shelf projects will be fully launched and the total output of the Sakhalinskaya oblast will amount to 23 MT.

In the future under active state policies in mineral resource use and licensing and a sharp increase of the geological survey, growth of the processing and transportation infrastructure oil production in Eastern Siberia and the Far East (with regard to Sakhalin and its shelf) will reach 140 MT by 2020 and 165 MT by 2030.

Sakhalin shelf will form a new large oil supply network and exports to China, South Korea, India, Japan, the Philippines and other APR states as well as to the US Pacific coast will go up. Besides Komsomolsk oil refinery will be more fully loaded with Sakhalin oil. Shipments to Khabarovsk oil refinery will perhaps be from the Sakha Republic fields. Now Komsomolsk oil refinery is loaded a little over 70% of its capacity, the Khabarovsk one below 60%. They get from Western Siberia over 80% and 100% of raw respectively.

By 2010 in view of the production and processing forecast for Russia with detailed export description by the macro-region concerning western direction shipments from Eastern Siberia and the Far East oil refineries, and annual exports of crude oil from Russia to the APR states may reach 44 MT, in that from Western Siberia 20

MT, from Eastern Siberia and the Sakha Republic 6 MT, from Sakhalin 18 MT (Table 2). By 2020 oil exports will make about 135 MTPA, by 2030 140 MTPA.

Table 2

Oil and petroleum products exports from Russia to the APR as far as 2030, MT

Region / Year	2010	2015	2020	2025	2030
Crude oil					
Western Siberia	20	30	35	35	30
Eastern Siberia and the Sakha Republic	6	20	75	75	75
Sakhalinskaya oblast	18	20	25	27	35
Total	44	70	135	137	140
Incl. to China	32	50	81	85	90
Petroleum products					
Total	9	10.2	11.5	11.8	12
Incl. to China	8.5	9.7	11	11.3	11.5
Oil and petroleum products					
Total oil and petroleum products	53	80.2	146.5	148.8	152
Incl. to China	40.5	59.7	92	96.3	101.5

Crude exports from Russia to China (including their transiting Kazakhstan) will grow from 8.5 MT in 2005 to 32 MT in 2010, over 80 MT in 2020 and 90 MT in 2030.

Petroleum products exported to the APR (mainly China, Mongolia and Japan) will become feasible from the refineries in the cross-border regions or close to ports (Angarsk, Khabarovsk and Komsomolsk-na-Amure). The total exports under a considerable improvement of production quality can reach 12 MTPA, in that to China up to 11.5 MT. Shipments will take place by rail, sea and river.

Annual exports of LPG to the APR may by 2015 reach 1.0 MT, including to 800 KT minimum to China. It seems feasible to foresee the obligations to purchase in Russia the relative amounts of petroleum and petrochemical products in the contracts for raw shipments.

3. Prospects for natural gas production in Russia and its exports to the east

Russia's Energy Strategy as far as 2020 considers the following as strategic goals: (1) sustainable non-stop economically feasible satisfaction of the domestic and foreign demand for gas; (2) development of the fast growing United Gas Supply system of the state and its extension to East Russia; (3) improvement of the organizational structure of the gas sector to attain higher economic results and to form a liberalized gas

market; (4) Provisioning of sustainable revenues of the state budget and spurring demand for production of involved industries (metallurgy, heavy engineering, etc); (5) securing Russia’s economic interests in Europe and the adjoining states as well as in the Asia Pacific and North America.

The state and prospects of increasing located gas reserves under the corresponding investments and a favorable domestic and foreign gas market situation allow to grow the gas output by 2010 to 681 BCM, in 2020 to 890 BCM, in 2030 to 910 BCM per annum with subsequent leveling at this rate upon commissioning new fields expected for discovery (Table 3). This allows for satisfying the domestic demand of the country and forming new large export flows – to China and other APR states, also to the USA.

The main gas supply sources from Russia to the APR first of all China will be the fields in Western Siberia, Eastern Siberia and the Far East. Western Siberia gas production may reach 670 BCM per annum, that of Eastern Siberia up to 120 BCM, of the Far East up to 30 BCM per annum.

For developing Eastern Siberia and Sakha Yakutia gas industry we have to regard a high content of such elements as propane, butanes and condensate in the natural gases there. Annual helium production of Eastern Siberia and the Sakha Republic can amount to 135 – 150 BCM per annum by 2020. In development of the Leno-Tunguskaya province the construction of plants for extracting helium and its storage should be considered.

Table 3
Gas output forecast for Russia as far as 2030 by the macro-region, BCM

Region / Year	2010	2015	2020	2025	2030
Western Siberia	610	630	670	670	670
Incl. Yamalo-Nenetsky Aut. Okrug	570	590	634	634	635
Khanty-Mansiysky Aut. Okrug	33	32	28	28	27
Tomskaya oblast	7	8	8	8	8
European part	40	52	80	88	90
Eastern Siberia and the Sakha Republic	11	85	115	117	120
Far East (Sakhalin)	20	23	25	30	30
Russia, total	681	790	890	905	910

LNG from Sakhalin fields to the APR can start already in 2007 and by 2010 the output and shipment of LNG under Sakhalin-2 may reach 9.6 MT or 13.4 BCM (Table 4). It is expected that after 2010 the project of network gas from the Kovyktinskoye field to China and Korea will be launched and after 2015 exports from other largest deposits of Eastern Siberia and the Sakha Republic will start. At the same time network gas exports of Sakhalin-1 will commence.

By 2012 – 2015 while the demand for gas grows including as motor fuel in China, there will start eastbound exports of gas from Western Siberia. The annual gas shipments from Western Siberia to China may get to 40 BCM by 2020 and to 60 BCM by 2030. After the domestic gas demand is met, Western and Eastern Siberia, the Sakha Republic and Sakhalin shelf gas exports to the APR may get to 78 BCM by 2020 and to 145 BCM per annum by 2030.

Table 4

Forecast of gas exports from Russia to APR as far as 2030, by the macro-region, BCM

Region / Year	2010	2015	2020	2025	2030
Western Siberia	0	15	30	40	60
Eastern Siberia and the Sakha Republic	0	30	60	82	82
Sakhalinskaya oblast	13,4	13,4	18	20	23
Total	13,4	58,4	108	142	165
Including to China	5	40	78	102	125

4. East Russia’s oil and gas pipeline network in development

The factor hindering growth of energy exports to China and the other APR states is a lack of efficient transportation system for oil and gas, first of all trunk oil and gas pipelines.

Russia has a developed network of oil and gas pipelines in Western Siberia and the European part but in the east of the country now the trunk network of Transneft JSC stops at Angarsk (Irkutskaya oblast), the Unified System of Gas Supply of Gazprom Public JSC stops at Proskokovo (Kemerovskaya oblast).

Exports of crude oil from Sakhalin island and its shelf are effected mainly via ports of the Khabarovsk and the Primorsky krajs (De-Kastri, Nakhodka) and from the Vityaz production platform in the Sea of Okhotsk. Oil shipments from Western Siberia to China take place by rail via Naushki and Zabaikalsk, and also transit Kazakhstan by the operating pipeline of Omsk – Pavlodar – Atasu and over by rail to Alashanjkou, Dushanjtse. From mid-2006 transit shipments via Kazakhstan are by the new pipeline Atasu – Alashanjkou.

Petroleum products are exported to China and other APR states mainly from Angarsk, Khabarovsk and Komsomolsk oil refineries by rail and from the ports of the Primorsky and Khabarovsk krajs (Vladivostok, Nakhodka, Slavyanka, Vanino, Bolshoi Kamen, etc.). Wholesale shipments of LPG to the customers in Eastern Siberia and the Far East and for export are also by rail.

To organize large oil and gas shipments to the Russian customers and to China and the other APR states, Eastern Siberia and the Far East need a network of super-long pipeline transport, plants for processing and liquefying natural gas, building the infrastructure for oil, petroleum products and LNG, condensate shipment.

An important oil transportation project is the trunk oil pipeline Eastern Siberia – the Pacific with a spur to China under construction now. The design capacity of the pipeline is 80 MTPA, and the first stage to be finished in 2008 is 30 MTPA. The first stage is being constructed from the Taishet side and from Skovorodino. After the decision of Russia's President the route will go beyond the watershed area of the Baikal, across the territory of low seismicity and high oil and gas bearing potential.

The oil pipeline route goes along the BAM railway along the Taishet – Ust-Kut, then from Ust-Kut to the north-east on the left bank of the river Lena (beyond the watershed area) over to the Talakasnkoye field and it means a sizable cut-down on the design and survey work and construction costs in general. The route then goes around the town of Lensk from the north, crosses the Lena at Olekminsk and goes east to the town of Aldan. From Aldan the route turns south passing by Neryungri to the settlement of Tynda and over to Skovorodino.

The second stage of the construction includes exit to the Russian ports on the Pacific and a spur to China at Skovorodino. Laying the pipeline along the Lena river will give an opportunity to use the river as a transport artery for cargo and equipment. Besides cargo will be delivered by rail and air and additional land passes and roads will be built too.

The pipeline route crosses the area prospective for oil; it is in the immediate proximity of discovered deposits that makes the region in general more attractive for investments in geological survey and development of oil and gas fields, it will accelerate the launching of separate located and forecasted deposits; it will sharply lower the investments needed for building the transportation infrastructure and decrease the project recoupment time; will lower transportation costs of Eastern Siberia and Yakutia oil to Skovorodino.

The filling pipelines from the fields of Talakan-Verkhnechonskaya oil and gas accumulation zone to the Eastern Siberia – Pacific Ocean pipeline and switches of Yurubcheno-Tokhomszkaya zone of oil and gas accumulation to Poima must be built. As a result there will emerge a new channel for shipping eastwards both Western and Eastern Siberian oil.

For oil exports to Western China regions the upgrading of the Omsk – Pavlodar – Atasu oil pipeline and increase of its throughput is urgent. Now the pipeline from Atasu in Kazakhstan to Alashankou in China is ready, 980 km long and with the initial throughput of 10 MTPA oil. The pipeline will get extended as far as the oil refinery of Sintsyang-Uygursky Autonomous Area and into the inland provinces of China and its capacity can grow to 30 MT.

In forming the new gas pipeline network in East Russia in the first line we should carry out gasification of Southern Eastern Siberia, including Zabaikalye and connect the Eastern Siberia network with the United Gas Supply System. This implies the construction of the following gas pipelines: Kovyktinskoye – Sayansk – Angarsk, Irkutsk – Ulan-Ude – Chita, Chayandinskoye – Kovyktinskoye, Kovyktinskoye – Irkutsk – Proskokovo.

For eastbound exports at the first stage it is possible to use the Baikal Amur and Trans Siberian Railways which also implies the construction of plants for liquefying natural and hydrocarbon gases and railway terminals for handling LNG and LPG in Ust-Kut and Angarsk. After 2010 while gas production is growing in Eastern Siberia and the Sakha Republic and while the gas supply infrastructure is developing a final decision should be taken on the construction of export gas pipelines. In that sense more economically feasible seems the route of Zabaikalsk – Harbin – Dalian – Beijing, Pyeontaek – Seoul.

In the period as far as 2010 intense gas and oil supply growth will be registered from Sakhalin. At the first stage non-integrated into the Eastern Siberian, Sakhalin shelf oil and gas shipment projects must secure the gasification of the Sakhalinskaya oblast and the Khabarovskiy krai, loading of Komsomolsk and Khabarovsk oil refineries and exports.

A new oil pipeline will be built, Northern Sakhalin – De-Kastri port and the following oil and gas pipeline projects will be implemented: (1) Northern Sakhalin –Southern Sakhalin and the construction of an LNG plant in the south of the island as well as terminals for shipping LNG and oil; (2) Komsomolsk-na-Amure – Khabarovsk. In the future these two projects may get united through oil and gas pipeline network of Eastern Siberia – the Far East at Khabarovsk.

In the future across Eastern Siberia and the Far East gas can be directed to Japan, Korea, North-East of China, Western US from Western Siberia, loading LNG on tankers in the Pacific ports. LNG exports from the Yamalo-Nenetsky Autonomous Okrug will go by the Northern Sea route.

Shipments of pipeline gas to the western regions of China may start in 2012 – 2015 across the Altaisky krai with a switch to the Trans-China gas pipeline West-East. This means the continuation of the inchoate gas pipeline of Barnaul – Biysk – Gorno-Altaysk in the direction of Kosh-Agach – Kanas – Burchun – Karamai – Urumchi. In the future with more exports the construction of additional pipe lines in the transport corridor of Urengoi – Surgut – Kuzbass – Altai – China will be needed.

5. Conditions and mechanisms for launching new large oil and gas centers in the east of the country

For attaining the set goals, to develop the oil and gas sector of the east of the state the following preconditions should be observed:

- State, oil and gas and energy companies should bring in large-scale investments into building the transport and energy infrastructure;
- We need sharply increase funding of geological survey work (including of regional status from the federal budget) in the areas of expected oil and gas pipelines to enhance the investment attractiveness of already discovered deposits and broaden the number of facilities for licensing;
- We need successive narrowing of the gap between the Russian domestic and international prices for oil, petroleum products and gas less transportation costs and customs tax.

6. Conclusions

1. In the coming decades world demand for energy and hydrocarbons will primarily grow. In the regional aspect, the fastest growth of demand will be registered for oil and gas in the APR mainly in China, India, Indonesia and the Philippines.
2. Only a few large raw bases of hydrocarbons are left in the world and they can meet the prospective energy demand. They are the Middle East, Africa, north of Western Siberia (Yamalo-Nenetsky and Khanty-Mansiysky Autonomous Okrugs) and the territories of the Siberian platform (the Irkutskaya oblast, the united Krasnoyarsky krai and the Sakha Republic). From prospective energy sources Western Siberia, Eastern Siberia and the Far East are closest to the fastest growing APR markets, first of all China.
3. The highest international oil prices level will keep till approximately 2010 – 2012 though the tendency for a price fall must appear already in 2006 – 2007. In the future in the developing states technologies will get saturated with motor fuel so the global oil demand will slow down. This will cause a price

decrease to the level of \$40 – 45/bbl and with regard to the dollar inflation rate it will correspond to the current \$35 – 40/bbl.

4. Annual oil production in Russia by 2010 will rise up to 500 MT, by 2010 to 550 MT, by 2030 to 600 MT. By 2010 annual crude exports from Russia to the APR states may reach 44 MT, by 2020 135 MT, by 2030 140 MT. Crude exports from Russia to China (including transit Kazakhstan) will grow from 8.5 MT in 2005 to 32 MT in 2010, over 80 MT in 2020, 90 MT in 2030. Exports of petroleum products can reach 12 MTPA, including to China up to 11.5 MT. Shipments will be mostly by rail, sea and river. Annual exports of LPG to the APR already by 2015 can get to 1.0 MT, in that 800 MT to China.
5. The state and prospects for growing the explored gas reserves under the relative investments available in the favorable environment on the domestic and foreign gas markets allow for increasing gas production by 2020 to 681 BCM pa, by 2010 to 890 BCM, by 2030 to 910 BCM pa. Gas exports from Western and Eastern Siberia, the Sakha Republic and Sakhalin shelf to the APR may reach 78 BCM pa by 2020 and by 2030 up to 145 BCM pa.
6. First-priority oil transportation projects are the inchoate trunk pipeline of Eastern Siberia – Pacific Ocean with a spur to China at Skovorodino; the oil pipeline of Yurubcheno-Tokhomszkaya zone of oil and gas accumulation – Poima, oil pipelines from the Talakan-Verkhnechonskaya accumulation zone to Eastern Siberia – Pacific Ocean pipeline. For oil exports to Western China regions (Sintsyang-Uygursky Autonomous Area) the upgrading of the operating oil pipeline of Omsk – Pavlodar – Atasu must be carried out to increase its throughput.
7. Gas shipment network development includes the construction of new gas pipelines: Kovyktinskoye – Sayansk – Angarsk, Irkutsk – Ulan-Ude – Chita, Chayandinskoye – Kovyktinskoye, Kovyktinskoye – Irkutsk – Proskokovo.

After 2010 the export gas pipeline of Chita – Zabaikalsk – Harbin – Dalian – Beijing, Pyeontaek – Seoul will be built. Pipeline gas shipments to Western China regions may take place from the United Gas Network already from 2012 – 2015 across the Altaisky krai and the Altai Republic with switches to the Trans-China gas pipeline West – East.

This means the continuation of the inchoate gas pipeline of Barnaul – Biysk –Gorno-Altaysk in the direction of Kosh-Agach – Kanas – Burchun – Karamai – Urumchi. In the future with growing supplies

additional lines of gas pipelines must be built in the transport corridor of Urengoi – Surgut – Kuzbass – Altai – China.

8. The environment for developing the oil and gas sector of East Russia and for starting large-scale gas supplies to China is formed by (1) accelerated capital investments into the transport and energy infrastructure; (2) intensifying geological survey; (3) bringing Russian domestic and international oil and petroleum prices closer.