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THE MISSING LINK:
Siberian Oil & Gas and the Pacific Economy

Emma Kiselyova, Manuel Castells, and
Alexander Granberg

University of California at Berkeley
Institute of Urban and Regional Development

ABOUT THE AUTHORS

Emma Kiselyova, M.A. (Novosibirsk State University), has been a Research Associate at the Institute of Urban and Regional Development, University of California, Berkeley since 1993. Previously, she served as Assistant Director for International Relations of the Institute of Economics and Industrial Engineering, Russian Academy of Sciences, Siberian Branch, and as Deputy Director of the Siberian International Center for Regional Studies in Novosibirsk.

Manuel Castells, Ph.D. (University of Paris), has been a Professor of City and Regional Planning and of Sociology at the University of California, Berkeley since 1979, and currently serves as Chair of the University's Center for Western European Studies. He has been a visiting professor in Moscow, Tokyo, Taipei, Hong Kong, and Singapore.

Alexander Granberg, Ph.D., is a Professor of Economics and a full member of the Russian Academy of Sciences. He is currently Director of the Council for the Study of Productive Forces and Economic Cooperation in Moscow, as well as Chair of the Russian National Committee for Pacific Economic Cooperation. Formerly, he served as Director of the Institute of Economics and Industrial Engineering, Russian Academy of Sciences, Siberian Branch, and as State Councilor for Inter-Republican Relations with President Yeltsin's cabinet.

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I. INTRODUCTION:
SIBERIA, THE RUSSIAN FAR EAST, AND THE PACIFIC RIM

The transformation of world economic order in this end of the millennium is dominated by two major processes: the emergence of the Pacific Rim as the most dynamic area of the new global economy; and the transition of Russia from the Soviet Union to a market economy and an open society. Both processes come together in the gradual integration of Siberia and the Russian Far East in the Pacific economy. This is a phenomenon of historic proportions, in spite of obstacles that must be overcome, because of the complementarity between the needs and offerings of Siberia and the Asian Pacific. The Asian Pacific economy, arguably the fastest growing and most productive industrial area for the years to come, is highly dependent on energy and natural resources. China and, to a lesser extent, Indonesia and Malaysia, certainly have considerable energetic and mineral resources. Yet the extraordinary acceleration of economic growth in China, Japan, and the newly industrialized countries in Asia increases exponentially the demand for such resources in the Pacific region.

Siberia and the Russian Far East conceivably constitute the Earth's largest reservoir of natural resources, including energy, still largely untapped. Furthermore, Siberia's skilled scientists and technicians, as well as an educated population, provide the necessary labor force for a process of economic development, investment, and trade that will certainly go beyond the limits of a natural resources economy. While it is true that markets for energy and raw materials are global, the scale of Siberian reserves, transportation costs, and political volatility in other areas of the world (particularly in the Middle East) provide a unique opportunity for interaction between the 32 million people of Siberia, with its huge assets in natural resources, and the Asian Pacific countries (with a population in the billions, depending upon the units of counting), currently engaged in a process of industrialization, urbanization, and trade of unprecedented scale. Furthermore, firms from all over the world — and particularly American firms — are now so deeply entrenched in the Asian Pacific and in Pacific trade that their prosperity increasingly depends on the prosperity of the Pacific Rim. The Pacific economy will be to the 21st century what the Atlantic economy was to the 20th century. And Russia, because of the extraordinary potential of Siberian resources, could be a major factor in the new Pacific-centered, geo-economic system. Siberia could well be the missing link in the Pacific Rim.

However, the obstacles for the dynamic integration of Siberia into the Pacific economy are formidable — not only geographic and climatic, but technological, economic, and institutional as well. The Russian Far East was closed to foreigners as recently as 1992, and the region has a tormented history of missed opportunities (Stephan, 1994). In the early 1990s, the chaotic management of post-Communist Russia's transition to a market economy induced a deep economic crisis and reduced to shambles much of the industrial, transportation, and urban infrastructure of Siberia and the Far East. Foreign investors

were attracted by the prospects of high profits and huge markets, but were soon discouraged by uncertainty, bureaucracy, risk, and lack of support, so they often withdrew, leaving the field open for speculators and smugglers. The conversion of the defense industry largely failed, and the management of energy industries was troubled by infighting and undermined by technological obsolescence and short-sighted exploitation strategies. Furthermore, Russia's Pacific neighbors often clung to their historical nationalist claims, aiming to take revenge on a weakened power rather than look forward to new cooperative links. And yet, without Russia, the Pacific economy would be burdened by extreme dependence on energy and natural resources. Without the Pacific connection, Russia would not be able to bring into value most of its territory, and would lose the opportunity to redefine its economic history and geography. Without the Pacific connection, Siberia and the Far East would remain the harshest, most forgotten regions of an impoverished, weakened nation, triggering centrifugal tendencies that could contribute to destabilizing an already tense Asian Pacific area.

This study attempts to contribute to the understanding of the complex process of integration between Siberia and the Russian Far East and the Pacific Rim by analyzing empirically current trends of regional development and foreign investment and trade. While we open the study with an overview of economic relations between Siberia and the Pacific, we will focus our investigation on the oil and gas industry. This is both for practical and analytical reasons. From a pragmatic point of view, the limited resources allocated to this study forced us to concentrate on one industry in the area about which we already had some level of knowledge. From an analytical point of view, it is around oil and gas that most prospective foreign investment and trade seems to gravitate. And it is oil and gas that are the most important strategic resources in Siberia, in spite of the current and future importance of other resources such as coal, precious and rare metals, timber, and fish, among others. Indeed, Siberia accounts for about one-third of the world's reserves of natural gas, and for about 10 percent of its oil reserves (a higher figure than that of any other country outside the Middle East).

Our study will try to identify both the prospects of and obstacles to the process of internationalization of Siberian oil and gas, starting with the analysis of the process of formation of the industry, since the institutional past and industrial history still cast a giant shadow on current developments. After reviewing the overall evolution of the oil and gas industry in Siberia since the 1960s, we will focus on current developments in Sakhalin, the most promising Pacific connection of Siberian energy resources, and the one that, because it is still in its preliminary stage, better allows us to observe the formation of the 21st century's Siberian oil and gas. We will conclude our study by integrating our findings into the broader framework of alternative scenarios for the evolution of economic and political relationships between Russia and the Asian Pacific.

The data and analyses used in this study come from a variety of sources, gathered through different methodologies by the three researchers who are co-authors of the study. The core of our empirical research is the field work conducted by Emma Kiselyova and Manuel Castells in Tokyo, Khabarovsk,

Sakhalin, Novosibirsk, and Moscow from May to July 1995. We conducted a series of interviews with government officials, company managers, experts, and researchers in this field of inquiry (see list of interviews in Appendix). Our knowledge of the oil and gas industry in Siberia was initially built by a study that Valery Kuleshov and Manuel Castells directed in 1992-93 at the Institute of Economics and Industrial Engineering in Novosibirsk. In the framework of that study, Manuel Castells and Emma Kiselyova conducted field work research in Tyumen and Nizhnivartovsk in 1992. Some of the findings and insights of this field work have been used in our current study. Additionally, documentation from different sources was collected and analyzed in Berkeley from 1994 through 1996. The overview of Siberian-Pacific economic relations was prepared by Alexander Granberg on the basis of data gathered and analyzed at the SOPS Institute in Moscow. Throughout the two years of the research process, the three researchers involved in the study corresponded and interacted in and between Berkeley, Moscow, and Novosibirsk, face to face or by e-mail or fax, to coordinate and integrate findings and analysis. Ultimately, the convergent data analysis led to the present report, whose sources are specifically indicated in the text and in the endnotes for each argument presented. While the character of our research is exploratory, we have attempted to ground our hypotheses on the state of empirical knowledge on the topic to build a foundation from which to proceed in the investigation of an essential theme that has rarely been the object of scholarly research: the integration of Siberia's new market economy into the Pacific Rim.

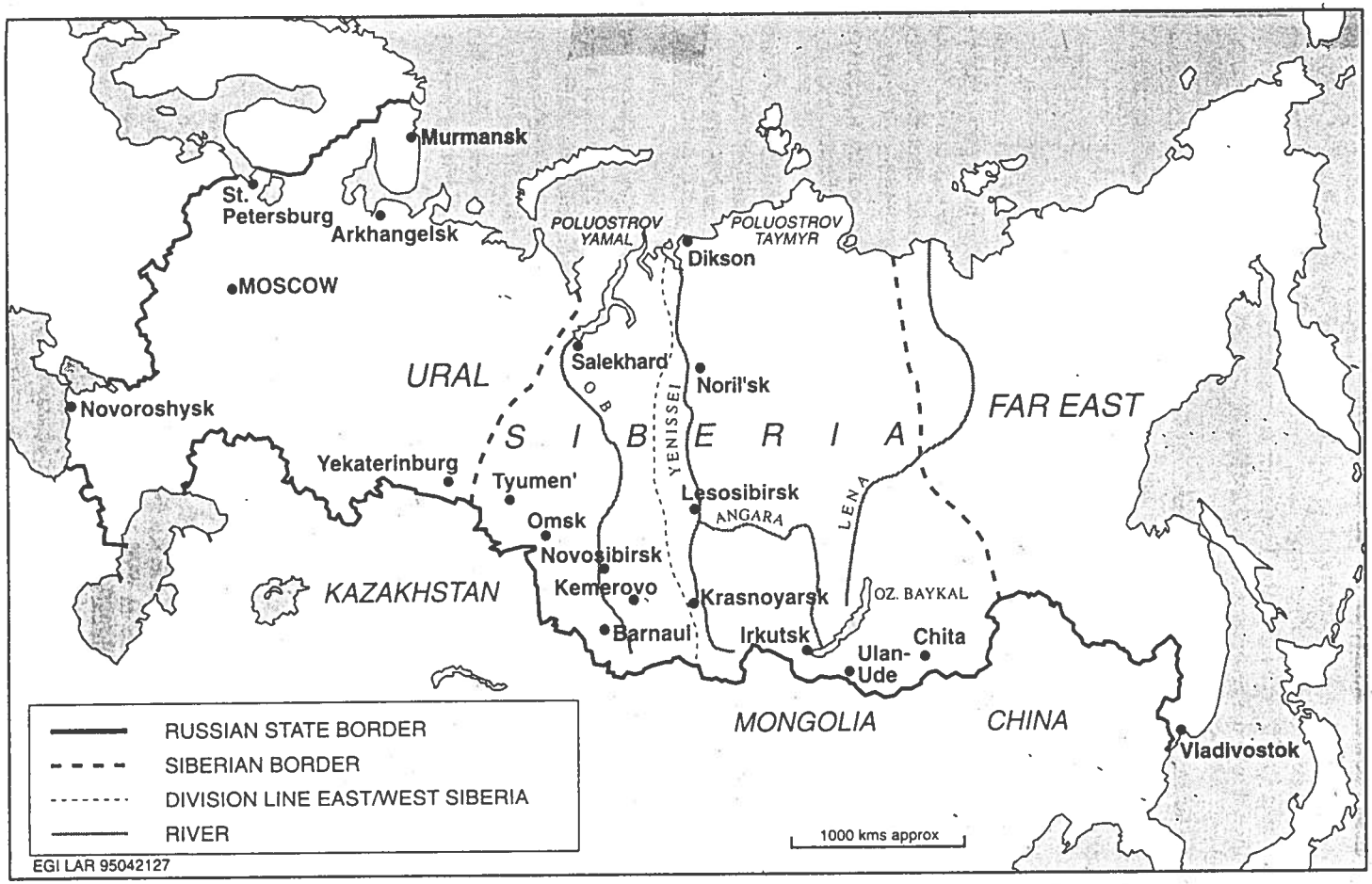
II. GREATER SIBERIA AND THE PACIFIC RIM: PROBLEMS OF ECONOMIC INTEGRATION

II.1. INTRODUCTION

The Russian Federation is a Eurasian country in the process of integrating itself into the global economy. However, this integration, as the global economy itself, is geographically differentiated. While European Russia aims at the European Union, Russia beyond the Urals may show an increasing orientation towards the Pacific economy. Yet, this immense area of the Asian continent comprises three regions that have been, and are, historically, geographically, and administratively distinct: Western Siberia, Eastern Siberia, and the Russian Far East. The common assumption is that the privileged Pacific connection is through the Russian Far East. The authors of this study take exception to this notion. The Far East has too small a population (8 million), is too distant from Moscow, and is too important for Russia to be allowed to integrate by itself into the Pacific economy without triggering centrifugal tendencies towards a de facto separation from Russia. This might facilitate the rapport of Far Eastern areas with the Asian economies, but it would jeopardize their Russian character. Because of the important geopolitical, strategic, and natural resources of the Russian Far East, the resurrection of a kind of Far Eastern Republic, such as the one that existed with the temporary permission of Stalin in the 1930s, would be unacceptable for any future Russian government.

Thus, the Far East is economically integral to Siberia, and is politically and culturally an essential part of Russia, now and in the future. Consequently, the only feasible integration of Russia into the Pacific Rim economy would involve a much larger entity, Greater Siberia, bounded on the west by the Ural Mountains, on the north by the Arctic Ocean, on the east by the Pacific Ocean, and on the south by Kazakhstan, Mongolia, and China. So defined, Greater Siberia comprises three economic regions (Western Siberia, Eastern Siberia, and the Far East), and includes 29 institutional subjects of the Russian Federation (5 republics, 4 krais, 11 oblasts, 1 autonomous oblast, and 8 autonomous national districts). (See Figure II.1.) It has an area of 12.8 million square kilometers and a population of 32 million. Provided that this mega-territory reinforces its internal economic linkages, its communication networks, and its institutional cooperation, it has the critical mass in population, resources, and economic development to measure up to the Pacific Rim economies and to become the actual bridge between Russia and the Pacific. The development of inter-regional associations of economic cooperation, such as the "Siberian Agreement" and the "Far East Association," shows the potential for integration of economic linkages over the whole of Greater Siberia. Furthermore, the structure of natural resources and existing manufacturing facilities of the three regions of Greater Siberia complement each other well (Schiffer, 1989: 28-29). To be sure, the distance and difficult communications between Western Siberia and the Pacific will be an obstacle

Figure II.1. Siberia in Russia



Source: Bandman et al., 1995.

for direct exports of natural resources and energy. Yet, the integration of Greater Siberia into the Pacific economy should be thought of as a process of building a system of interconnected nodes, with some areas (the Far East) engaging in direct export/import activities, and others (Western Siberia) providing the resources needed for the Russian market once the dynamism of the overall economy makes this market attractive. The macro-regional system should be thought of as the linkage of five different sub-systems: Greater Siberia's direct linkages to the Pacific; its direct linkages to the global economy, including Europe; its linkages to European Russia; the linkages between Western Siberia, Eastern Siberia, and the Far East; and the internal structuring of each one of these three areas. It is this system of inter-regional relationships that will enable interaction with the Pacific economy in the 21st century.

Thus, throughout this study we will use Greater Siberia as our unit of inquiry, although we will differentiate each one of its components in our specific analyses of energy development. In this chapter, however, we will consider the characteristics of economic development of Greater Siberia as a whole, with emphasis in the current economic linkages between Siberia, the Far East, and the Pacific. The chapter will focus on three main topics: assets and conditions for the link-up between Greater Siberia and the Pacific Rim; the current economic situation in the area; and strategies currently debated for expanding international economic relations and integrating Siberian resources, markets, and firms into the Pacific economy.

II.2. NATURAL RESOURCES OF GREATER SIBERIA: THEIR SIGNIFICANCE FOR RUSSIAN AND WORLD ECONOMIES*

Greater Siberia has most of Russia's minerals, raw materials, and energy resources. It contains 79 percent of Russian recoverable oil reserves, 85 percent of natural gas, 91 percent of coal, 86 percent of lead, 76 percent of gold, over 90 percent of diamonds and graphite, over 80 percent of molybdenum, over 70 percent of nickel, copper, zinc, and manganese, and almost all of Russian tin (see Table II.1).

Some of these reserves are strategically important for the world economy. This is the case for the deposits of petroleum and natural gas in the northern part of Western Siberia and in the Northern Pacific continental shelf; the nickel and platinum metals near Norilsk; diamonds in Yakutia; gold in Yakutia and Magadan; and coal in several basins, particularly in Kuznetsk, Kansk-Achinsk, and Lena. Although the exploitation of mineral resources in Siberia has taken place for several decades, the largest deposits are still located in economically underdeveloped areas, with the exception of coal deposits in the industrial belt along the Trans-Siberian railway. Table II.2 displays the "degree of development" (measured by the ratio of annual output to total reserves) for various mineral resources.

It is remarkable that in most cases this ratio is 1 percent or lower — a powerful indicator of the potential for future exploitation of valuable mineral resources.

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*Data presented in this section have been compiled and elaborated by the Council for the Study of the Productive Forces and Economic Cooperation (later referred as SOPS) in Moscow, under the direction of Academician Granberg, from various Russian statistical sources (see appendix for detailed sources).

Table II.1. Minerals and Raw Materials of Greater Siberia (% of Total Russian Reserves)

Coal	90.9
Oil	79.4
Natural gas	84.6
Iron ores	16.6
Copper	70.3
Nickel	71.3
Lead	96.3
Zinc	71.2
Gold	76.0
Molybdenum	80.3
Tungsten	59.3
Tin	99.7
Cobalt	63.7
Niobium	67.1
Tantalum	62.1
Graphite	95.9
Fluor-spar	94.0

Table II.2. Degree of Development of Mineral Reserves in Siberia and in the Far East (%)

	Western Siberia	Eastern Siberia	Far East	Greater Siberia
Coal	0.1	0.1	0.2	0.1
Oil	1.4	-	0.3	1.3
Natural gas	1.2	-	0.1	1.1
Iron ores	0.15	0.2	-	0.13
Copper	0.1	0.7	2.4	0.7
Nickel	-	1.0	-	1.0
Lead	0.3	0.1	2.0	0.3
Zinc	0.3	0.04	3.8	0.3
Gold	1.1	1.2	-	0.4
Molybdenum	-	0.4	-	0.4
Tungsten	-	0.5	1.3	0.8
Tin	-	-	1.2	1.1
Cobalt	-	1.0	-	0.9
Niobium	-	-	1.4	-
Graphite	-	0.05	-	0.05
Fluor-spar	-	0.2	1.7	0.9

Source: Computed by SOPS on base of data from State Balances of Mineral Resources.

This dominance of Greater Siberia in strategic minerals and energy resources explains its decisive role in Russian exports to the world economy. Greater Siberia accounts for about 60 percent of all Russian exports, including 88 percent of oil exports, 99 percent of gas exports, 16 percent of exports of petroleum products, 92 percent of coal exports, 86 percent of aluminum exports, 73 percent of copper,

45 percent of nickel, 55 percent of round timber, 40 percent of sawn timber, 35 percent of cellulose, 35 percent of nitrogen fertilizers, and 59 percent of fish production.

However, in recent years, federal government financing of geological exploration and prospecting in Greater Siberia has all but stopped. Many prospecting organizations have halted operations, particularly in areas of new development. Geological exploration is now dependent on the enterprises of extractive industries. In fact, potential reserves of petroleum and natural gas in Eastern Siberia, in the seas of the Arctic Ocean, in the Bering Sea, and in the Sea of Okhotsk, as well as many deposits of lead, zinc, tin, gold, etc., are not presently counted as commercial reserves. These years of interrupted prospecting and evaluation will become a serious obstacle for the future development of the region. Because of difficulties of government financing, systematic exploration of Siberian wealth will increasingly depend on foreign investment and on foreign special-purpose loans.

Greater Siberia also has the greatest concentration of Russia's hydro-electric resources, which also have global value, particularly in light of the development of superconductive transmission lines which will reduce the substantial energy loss of long-distance transmissions. Table II.3 offers some data on hydro-electric resources. In these calculations we have not included sea tidal energy, although this source of energy could become important in the future because of very favorable conditions in many bays in the Okhotsk Sea and Bering Sea. For instance, the plan for the construction of a tidal power plant in the Penkin Guba (Sea of Okhotsk) provides for an annual production of 100 billion kilowatt hours.

Table II.3. Hydro-Energetic Resources of Greater Siberia

	Western Siberia	Eastern Siberia	Far East	Greater Siberia Total	Greater Siberia % of RF
Potential reserves of hydroelectric power, billion kwh	144	848	1008	2,000	83.6
Commercial reserves of hydroelectric power, billion kwh	46	350	294	690	81.0
Available water resources, cubic km:					
Total,	420	1118	1417	2,955	
including:					
Surface waters of 95% provided	406	946	1365	2,717	
Ground waters	2.3	1.5	1.5	5.3	
Water reservoirs	11.5	170	50	231.5	

Source: Energy resources of the USSR, Nauka, Moscow, 1968.

Natural lakes, rivers, underground reservoirs, and artificial lakes formed by hydro-electric power plants contain one of the planet's largest reserves of fresh water. Indeed, Lake Baikal alone, still a rather pure reservoir, contains about 20 percent of all fresh water reserves in the planet.

Greater Siberia also has 78 percent of total Russian timber reserves, and the share climbs to 83 of the valuable coniferous timber species (see Table II.4). In spite of unskilled forest management, unsuita-

ble location for timber cutting, and frequent fires affecting large areas of the taiga, in many regions timber production could be substantially increased. In Eastern Siberia, with 48 percent of Greater Siberia's reserves, only 21.5 percent of the allowed cutting is actually exploited.

Table II.4. Forest and Land Resources of Greater Siberia

	Western Siberia	Eastern Siberia	Far East	Greater Siberia Total	Greater Siberia Percent of RF
Total timber reserves, million cu m,	9,565.0	27,156.1	19,710.3	59,934.4	78.0
including conifers	6,792.7	24,934.8	17,559.2	49,286.7	82.0
Arable land, thousand hectares	34,322.5	22,591.7	6,215.5	63,129.7	30.0

Sources: Lesnoi fond SSSR, v.I, Moscow, 1990; Sel'skoye khozyaistvo Rossii, Moscow, 1995.

The area of cultivated land in Greater Siberia includes over 64 million hectares (or 2 hectares per inhabitant). While their productivity varies widely, fields currently exploited are sufficient to provide the population of the southern regions of Siberia and the Far East with the products of plant and livestock farming (grain, potatoes, meat, dairy products, etc.). Reserves of fish and sea food in the northern and Far Eastern shores of Greater Siberia account for over 3/4 of total Russian fish and seafood resources.

This exceptional natural resource base largely determines the pattern of industrial specialization of Greater Siberia (see Table II.5): extraction and processing of fuel; energy production; ore mining and production of non-ferrous and precious metals; diamonds; timber cutting and processing; fishing; processing of fish and seafood. In many of these industries, Greater Siberia accounts for the bulk of Russian production.

The chances for increasing the economic exploitation of natural resources of Greater Siberia in the future will be largely determined by the conditions of transition to an open, market-oriented economy, as well as by the development and orientation of Russian foreign trade. Three factors will play a decisive role in such future trends:

1. Relative decrease in the demand for fuel and raw materials in European Russia, as a result of rising prices and transportation costs. Thus, European Russia, which currently consumes 80 percent of the fuel and raw materials of Greater Siberia, will introduce energy-saving policies, and refrain from its wasteful consumption of raw materials in response to unbearable transportation costs. The only long-distance transportation system that will remain affordable will be oil and gas pipelines, but with decreasing capacity vis-à-vis future production increases.
2. Some strategic raw materials that, in the Soviet Union, were extracted mainly in Ukraine, Georgia, and Kazakhstan will have to be exploited now in Russian territory: they are all found in Greater Siberia. This is the case for manganese, chrome, and titanium, among other strategic materials. Therefore, their production will be increased, aimed mainly at the Russian market.

Table II.5. Production of Raw Materials and Some Semi-Processed Products in Greater Russia in 1993

	Western Siberia	Eastern Siberia	Far East	Greater Siberia Total	Greater Siberia Percent of RF
Crude oil & condensate, million tons	243.1	0.01	1.6	244.7	69.5
Natural gas, billion cu m	562.0	4.8	3.2	570.0	92.2
Coal, million tons	107.7	84.6	39.0	231.4	75.9
Timber, million cu m	17.9	37.5	14.7	70.1	40.1
Electric energy, billion kwh	114.1	147.2	43.3	305.2	31.9
Steel, million tons	8.1	0.3	0.6	9.0	15.4
Alumina					28.9
Lead concentrate					95.6
Zinc concentrate					43.9
Tin concentrate					100
Aluminum					81
Refined copper					51
Nickel					40
Saw-timber, million cu m	4.1	8.0	1.8	13.9	48.6
Cellulose, thousand tons	-	1,121.5	163.3	1,284.8	79.7
Fish and sea products, thousand tons	-	-	2,734	-	62.1

3. Prospective increase in exports of fuel and raw materials and their processed products, mainly towards the Asian Pacific countries. How feasible this export-oriented Pacific strategy is, is still a question mark. Our study intends to evaluate, tentatively, such a perspective.

II.3. TRENDS AND PROBLEMS OF ECONOMIC DEVELOPMENT OF GREATER SIBERIA IN THE 1990S

In the 1990s, Siberia and the Far East entered a period of political and economic transformation with a burden of chronic problems: obsolescence of fixed capital; underdevelopment of processing industries; backwardness of basic industries, such as civil machine engineering, ferrous metallurgy, construction materials production, etc.; major shortcomings in industrial infrastructure; lack of basic social services; and serious ecological conditions around the sites of industrial concentration.

The economies of Siberia and the Far East developed faster than those of Russia and the USSR overall — up until the second half of the 1980s. Share of this macroregion of Russia (Greater Siberia) in industrial production increased from 17.5 percent in 1970 to 27.2 percent in 1990. However, economic growth of the main areas in Greater Siberia had slowed down already in the early 1980s. The north of Tyumen oblast (the pre-eminent oil and gas province) remained the only area of fast economic growth.

In the early stage of economic transition (until 1992), the situation in Greater Siberia became worse than in other regions due to a policy of asymmetrical decentralization and liberalization: the Center (Moscow) had begun to allow some economic independence and liberalization of prices for consumer goods and services, so that prices and revenues, accordingly, started to increase. But the raw

materials, energy, and military industries remained under tight central control and were not allowed to increase their prices. These were precisely the industries concentrated in Greater Siberia. Consequently, investment in these industries dropped; the system of central planning and distribution broke down before a market system was in place; and the regional economy experienced a substantial shortage in consumer goods. All these factors contributed to the economic crisis of Greater Siberia.

The Specificity of Economic Crisis in Greater Siberia

Thus, the position of Greater Siberia's economy on the eve of the leap forward to market reforms was particularly unfavorable. Although the main characteristics of this economy coincide broadly with those of Russia's overall crisis, there are some features specific to Siberia:

1. Much stronger devaluation of the population's monetary savings and of the working capital of enterprises.
2. Major impact from increasing transport tariffs, resulting in broken linkages not only with European regions of Russia but between regions of Greater Siberia itself.
3. Damaging, scarcely controlled exports of fuel and raw materials, — mainly to foreign markets, and at dumping prices.
4. Depression of most developed industrial and research centers as a consequence of huge cuts in military orders and research budgets.
5. Beginning of mass emigration (reverse flow) of population from some regions (mostly from the North) towards the European areas of Russia.

These movements deeply affected the economic structure of Greater Siberia. A brief reminder of the characteristics of such a structure is necessary to understand the problems and prospects for its future reorganization in an open, market economy.

The Sectoral Specialization of Siberian Economy

The macroeconomic structure of Greater Siberia differs from the Russian structure, first of all, by its higher share of construction and transport industries, and by its lower share of agriculture — which is consistent with the huge and underdeveloped territory of a region with a harsh climate (see Table II.6).

As noted above, by the mid-1980s Greater Siberia had lost its edge in the growth rate vis-à-vis Russia and the USSR. Its share in industrial production during the last 10-year period has been growing solely at the expense of rapid price increases for fuel and raw materials. However, since current prices, at present, are approaching world prices, Greater Siberia's share in the national and world economy will be measured much more objectively than under the old system of fixed-by-plan prices (see Table II.7).

The industrial production structure of Greater Siberia is characterized by a higher share of fuel industry, non-ferrous metallurgy, and forest industry vis-à-vis primary processing industries, and, in particular, "final product" industries (civil machine building, consumer goods, food processing). However,

Table II.6. Population Employment in Greater Siberia in 1993 (in %)

Economic Sectors	Western Siberia	Eastern Siberia	Far East	Russia
Industries	28.7	28.9	26.6	29.6
Agriculture & timber industry	10.3	9.5	8.1	14.3
Transport & communication	10.3	10.5	12.7	7.8
Trade, public catering, supply, & sale	8.6	8.8	10.0	7.9
Construction industry	15.0	13.7	13.5	11.0
Other sectors of material production & non-production sectors	27.1	28.6	29.1	29.4
Total	100.0	100.0	100.0	100.0

Table II.7. Share of Greater Siberia in Industrial Production of Russia (in %)

	in (then-)current prices			in 1993 prices				
	1970	1980	1985	1990	1991	1992	1993	1994
Western Siberia	8.2	11.8	11.3	13.6	13.4	13.5	13.6	13.1
Eastern Siberia	5.0	5.4	5.7	7.4	7.3	7.7	7.5	6.4
Far East	4.4	4.6	4.7	6.3	6.3	6.3	6.3	6.6
Total, Greater Siberia	17.5	21.7	21.6	27.2	26.9	27.4	27.4	26.1

there are major structural disparities inside Greater Siberia. In the Far East, the fuel and energy complex is the most vulnerable element in the economic structure; ferrous metallurgy is concentrated only in Western Siberia (in fact, in just one city — Novokuznetsk); and food industry in the Far East is reduced mainly to fishing and fish processing (see Table II.8).

The high share of mining industries in Greater Siberia (three times higher than the average for Russia) is often interpreted as a structural flaw, which puts this macroregion in unfavorable position. This is a simplistic assessment. In the Russian and world division of labor, Greater Siberia's specialization in fuel and raw materials mining is economically justified — particularly if these sectors become profitable and competitive. The problem is the lack of on-site materials processing, which causes excessive transportation cost and loss of added value.

In total Russian output, Greater Siberia has the highest share in fuel industry (over 60 percent, including Western Siberia alone at about 46 percent) and electrical energy (over 30 percent); and the lowest share in machine-building (13.2 percent) and in light industry (13 percent).

In accordance with this, Greater Siberia's share in the total output of main industrial products goes down along the scale from primary products (see Table II.9) to end products (see Table II.10).

Main structural changes in industries of Greater Siberia during recent years are related to efforts of conversion of military enterprises and to a decrease in cooperation with Kazakhstan and Central Asia,

Table II.8. Industrial Structure of SFE* in 1993 (in %)

Industries	Western Siberia	Eastern Siberia	Far East	RF
Electrical energy	5.1	5.9	2.5	9.1
Fuel industry	32.2	7.3	9.7	17.4
Ferrous metallurgy	5.0	0.9	0.9	8.9
Non-ferrous metallurgy	1.6	21.5	27.9	8.1
Machine-building & metal-processing	20.3	10.7	14.9	20.2
Chemical & petrochemical	8.0	4.7	0.9	7.5
Timber, cellulose, & timber-processing	3.7	14.6	8.4	3.9
Construction materials	3.6	3.8	6.0	3.2
Light industry (consumer goods)	6.5	14.2	2.0	5.2
Food processing	10.0	12.8	24.1	13.6
Other industries	4.0	3.6	2.7	2.9
Total	100.0	100.0	100.0	100.0

*Siberia and Far East

Table II.9. Share of Greater Siberia in Total Industrial Output of Russia in 1993 (in %)

	Western Siberia	Eastern Siberia	Far East	Greater Siberia
Electrical energy	12.8	12.6	5.9	30.4
Metallurgy	6.3	12.6	3.4	22.3
Fuel industry	45.8	7.7	6.9	60.4
Machine building	7.7	2.7	2.8	13.2
Chemical & timber complex	9.8	8.7	3.9	22.4
Construction materials	11.1	6.9	8.8	26.8
Light industry	5.9	5.5	1.6	13.0
Food processing	7.5	3.8	11.0	22.3
Total industry	13.6	7.5	6.3	27.4

particularly in non-ferrous metallurgy, tractor and agricultural machine building, and light industries. Table II.11 illustrates roughly the steep decline in orders for military enterprises of the Far East.

Military conversion is proceeding slowly and with little positive effect. Change to production of traditional consumer goods does not allow for maintenance of enterprises with higher levels of technology and thus those products cannot stand up to competition. There are only a few positive examples available: an electrochemical enterprise producing CDs, a chemical mining enterprise near Krasnoyarsk producing Samsung TV sets, and a tank-repair enterprise in Chita oblast assembling cars.

The agriculture of Greater Siberia has been stagnant for as long as 20-30 years. Per capita output of main raw material foods is close to the Russian average. The population of Greater Siberia makes 21.8 percent of the total in Russia. In 1993, Greater Siberia produced 17.6 percent of total Russian grain, 21.2 percent of potatoes, 17.9 percent of vegetables, 20.9 percent of meat (in livestock), 20.9 percent of milk,

Table II.10. Output of Some Products in Material Processing Industries in 1993

Products	Western Siberia	Eastern Siberia	Far East	Share of Greater Siberia in RF, %
Rolling of ferrous metals, million tons	6.2	0.2	0.44	16.0
Synthetic resin & plastic, thousand tons	312.5	250.6	5.6	2.6
Rubber, thousand tons	68.2	18.1	-	7.8
Chemical fibers & filaments, thousand tons	56.6	46.5	-	29.6
Mineral fertilizers, thousand tons	406.4	176.6	-	6.8
Cellulose, thousand tons	-	1,121.5	163.3	79.7
Paper, thousand tons	-	56.9	62.5	4.1
Cardboard, thousand tons	39.9	251.0	51.8	21.7
Cement, million tons	3.94	3.53	1.82	18.6
Metal-cutting machines, items	470	513	580	4.2
Cargo wagons, items	5000	1000	-	89.5
Tractors, thousand items	22	-	-	15.2
Meat, thousand tons	374.5	175.8	86.7	20.1
Diary products, thousand tons	826.0	331.0	261.0	18.3
Catch of fish & seaproducts, thousand tons	-	-	2,734	62.1

Table II.11. Share of Military Products in Total Output of Enterprises Belonging to Military Industry Complex (%)

	1990	1991	1992	1993	1994 (Jan-March)
Maritime province	68.9	51.4	43.0	56.5	26.7
Khabarovsk krai	73.0	65.9	78.0	62,0	4.1
Amur oblast	33.9	31.1	9.0	43.6	0.1

and 19.7 percent of eggs. However, even for these products, Greater Siberia's own production is not enough to meet the demand of the regional market which, in addition, needs imported fruits, vegetables, and various industrial products. Shortages of supplies of these products add to harsh living conditions for the population.

Social Problems

In the period prior to market reforms, the population of Greater Siberia had a higher nominal income than the Soviet Union as a whole, but less chance of realization of that income, because of scarcity of goods. Siberians also experienced serious deficits in social services and public goods, such as housing, medical and health services, culture, education opportunities, etc. The majority of Siberian regions suffered from labor shortage and recruited workers from other regions (mainly from the European part of the USSR), offering them permanent residence or seasonal migration.

The worsening of social conditions in Greater Siberia coincided with the economic and social downturn in the Soviet Union as a whole, during the period of economic reform and transition, as

shown by data on social indicators in 1993. However, all regional indicators have stronger negative trends in Greater Siberia than in Russia in matters of inflation, decline in real consumption, drop of investment in social services, unemployment, health conditions, etc.

Although the general analysis of the social situation in Greater Siberia is beyond the scope of our study, one aspect of the issue should be considered: *how social problems may affect international economic relations of Greater Siberia.* From this angle, current processes could be synthesized under two main headings:

1. There has been a relative worsening of living conditions for the population of Greater Siberia, which strengthens the motivation for emigration to regions in less critical conditions, particularly in European Russia. The main factors contributing to this worsening of social problems are:
   - Devaluation of monetary savings due to the "shock therapy" anti-inflation policy in early 1992 (higher income and savings had been the main stabilizing factor for many people oriented to temporal residence);
   - Loss of a considerable part of bonuses to current income which used to be guaranteed by the state (e.g., regionally indexed salary scale);
   - Long-distance transport became inaccessible for much of the population due to growing tariffs in passenger transportation;
   - Much higher prices for most consumer goods and services (in contrast to regional differentiation for planned prices that were not high); and
   - Growing unemployment, especially painful in industrial regions and cities specialized in mining and military industries (see Table II.12). Most experts agree that conversion should be a gradual process and that it is necessary to look for more opportunities to export arms — and to look to Asian-Pacific markets first.

For Greater Siberia, with its extremely low density of population, spontaneous emigration not only will worsen economic perspectives, but will also aggravate the geopolitical situation.

An objective reflection of the absolute and relative decrease of living standards in Greater Siberia is the gradual decline in the reproduction of population (even accounting for cyclical fluctuations) and the beginning of migrational outflow. (see Table II.13).

2. A second set of factors have to do with the growing loss of homogeneity of the social-economic space of Greater Siberia and the weakening of inter-regional social relationships. The main processes contributing to regional disarticulation are the following:
   - Growing regional differentiation of nominal income of the population (see Table II.14);
   - Growing differentiation of consumer goods and services prices (see Table II.14);
   - Significant reduction of population movement among Greater Siberia's regions, as well as between Greater Siberia and the Western regions of Russia and the former Soviet Union.

Table II.12. Labor Market in Greater Siberia in 1994

	Western Siberia	Eastern Siberia	Far East	Share of Greater Siberia to RF, %
Number of people not working & looking for job, thousand persons	144.9	100.9	101.7	19.0
Number of unemployed, thousand persons	94.4	58.8	65.0	4.1
Labor demand, thousand persons	38.8	17.2	16.3	20.2

Source: Social-economic situation of Russia, Goskomstat RF, Moscow, 1994, pp. 379-387.

Table II.13. Change in Demographic Indicators in Greater Siberia in 1985-1993

	Western Siberia			Eastern Siberia			Far East		
	1985	1990	1993	1985	1990	1993	1985	1990	1993
Population, mil. persons	14.0	15.1	15.2	8.9	9.2	9.2	7.5	8.0	7.9
Natural growth (+), decrease (-) per 1,000 persons	8.3	4.3	-3.4	10.5	6.6	-2.0	10.0	7.3	-1.3
Migration saldo per 1,000 persons	7.5	3.2	1.7	1.0	-1.0	-2.5	5.6	2.1	-12.9

Thus, there is an ongoing process of disintegration of the consumer market and of the pre-existing social space. As a consequence of this, some regions of Greater Siberia are more oriented to nearby foreign markets of goods, services, and labor. This trend is being aggravated by the dollarization of the Russian economy.

Economic Ties of Greater Siberia with Regions of Russia and the Former Soviet Union

Greater Siberia is an active player in inter-regional economic relations in Russia — its market is 1.5 times more open than average for Russian regions.

The export structure of Siberia is fairly unique; industrial raw materials, fuels included, account for 90 percent of total exports in current prices, while final industrial-technical products account for 3 percent, and consumer goods and food for 7 percent (see Table II.15). This export structure remains stable under conditions of crisis as well. Furthermore, the share of raw materials exports has increased. This is also true for Russian exports structure.

The most negative trend is a swift drop in physical volumes of inter-regional exports and imports. During 1992-1993, in comparable prices they fell by 60-65 percent, according to estimates of SOPS. This situation is a consequence of decline in production overall, as well as worsening of financial climate in regions (insolvency).

Table II.14. Differentiation in Income, Wages, and Consumer Prices in SFE Regions (Federation Subjects) in 1994

	Russia	Western Siberia	Eastern Siberia	Far East
Income per capita, thousand rubles	378.6	156.0-772.7	206.8-362.7	270.3-854.3
Income per capita, % of Russian average	100	41-204	55-96	71-226
Average wages, thousand rubles	281.6	207.1-702.1	257.5-433.6	326.3-749.9
Wages, % of Russian average	100	74-249	91-154	117-266
Cost of "food basket," 19 main food products	100	82-123	86-114	140-257

Table II.15. Structure of Exports and Imports of Siberia and the Far East in 1993, %

	Siberia		Far East	
	Exports	Imports	Exports	Imports
Industrial raw materials	92	54	44	46
Final industrial & technical products	1	9	1	5
Consumer goods & food	7	37	55	49
Total	100	100	100	100

Source: calculated by SOPS.

In 1990-1993, Siberia's share in inter-regional exchange with Russia was growing (from 22 percent to 35 percent). Exports in excess of imports were growing as well: 1990 — 22.6 billion rubles, 1993 — 3,924 billion rubles (including positive export balance for Goods Category I — 5,345 billion rubles, and negative export balance for Goods Category II and III — 464 and 1,429 billion rubles, respectively). This situation results mainly from trade with CIS countries, as well as from increase of the fuel exports into "far abroad." The overall trade balance of Russia was more than 7 trillion rubles in 1993, mainly due to the fuel exports from Siberia.

According to SOPS estimates, it is only after the year 2000 that inter-regional trade relations could be restored at the previous level of intensity. To do this, major investments will be necessary in order to reconstruct the capabilities of Siberia itself to export products at the previous level. In addition, trade partners of Siberia should restore their solvency and production of competitive goods for exchange.

One more difficult task related to maintaining inter-regional ties is that transportation tariffs have increased dramatically. Many enterprises had to stop delivery of their products to some regions because some regions could not pay for transportation. This may be acceptable in terms of rational market logic; however, it should be taken into consideration that it will take many years to reach a new balance between capacities of producers and consumers. At present, the abrupt increase of transportation tariffs has caused largely destructive consequences.

Siberia is a crucial player in Russia's economic relations with republics of the Former Soviet Union (FSU), particularly with respect to supply of fuels, metals, and timber products. In turn, Siberia is totally or partly dependent on deliveries of geological exploratory, oilfield, and mining transportation equipment as well as specific types of agricultural machinery, welded oilpipes, and raw materials for aluminum production from Ukraine, Kazakhstan, Uzbekistan, Belarus, and Azerbaijan. Significant volumes of food products, fruits, and vegetables, as well as some consumer goods, have been imported to Siberia from the states of Central Asia and from Ukraine. The present drop in production and, accordingly, in volumes of deliveries has played havoc with economies of most of the republics; however, the feedback effect is strong as well. Siberia suffers much from reduction in deliveries of equipment, cotton, consumer, and food products. There is a search for solutions concerning how to replace imported aluminum raw materials from Kazakhstan, Ukraine and from "far abroad" via ports of Ukraine and how to find substitutes for lead and zinc that used to be imported from Kazakhstan. Construction projects for new industrial enterprises in Siberia are being developed now in order to compensate for previous broken ties — in particular, large-diameter pipes, oilfield equipment, output of polymetal raw materials, and development of a local raw materials base for the aluminum industry.

One of the most vital questions for Siberia is its future relationship with Central Asia and Kazakhstan. It is worthwhile to recall the story of the project to partially re-route the flow of Siberian rivers to Central Asia and Kazakhstan. When IEIE (Novosibirsk) received the task to do a feasibility study for this project, it decided, instead of accepting the idea of diverting the rivers, to study the issue from a broader perspective: what would be the most efficient way to integrate the economies of Siberia, Central Asia, and Kazakhstan? If such a broad study could provide arguments for the rivers' deviation, the project itself could then be theoretically supported. That was the beginning of the "Middle Region" study, to integrate Kazakhstan, Central Asia, and Western Siberia. At present, the idea of re-routing Siberian rivers is out of the question, as it is economically, ecologically, and politically impracticable, at least for many decades. However, the integration of Siberia with Central Asia and Kazakhstan remains a very important question to solve.

II.4. THE INFLUENCE OF STATE POLICY IN THE SOCIO-ECONOMIC DEVELOPMENT OF GREATER SIBERIA

During the Soviet period, the development of Siberia and the Far East was declared to be a priority for the state and the party. There were special decrees, programs, special tasks in state plans, and, moreover, very substantial state investments in Siberia.

In the last few years, these priorities have become less important. This is mainly because the federalization of Russia sets a limit to regional preferences of the federal government — in particular, in distributing financial resources and fiscal privileges. Second, the state has much fewer economic resources at its disposal to make a direct impact on the regional economies. Third, there are many "hot

spots" in the country now, where resources have to be sent quickly to stabilize the situation; therefore, tactical political decisions usually put aside the strategy of regional economic development.

Let us examine current developments of state policy concerning regional development of Greater Siberia in the 1990s. The main forms of current state regulation are: (1) direct investment into specific regional projects and programs, (2) financial transfers from federal to regional budgets, and (3) providing some regions with economic preferences.

Direct state investment dropped in Russia more than 10 times vis-à-vis the period of maximum active investment activity. With what has remained, it is impossible to solve problems of a macroregion as vast as Greater Siberia — no matter which preferences would be given. State investment policy has to be reduced to supporting federal infrastructure, financing some projects providing economical safety as well as to partial participation (with maximum share of 20 percent) in performing most effective projects of private investors (about 1.3 trillion rubles were assigned in 1995 federal budget for these purposes).

In its general outline, the current system of budget federalism was created in Russia in 1993-1994. A significant part of revenues of the federal budget (about 15 percent) is being transferred now into a fund of financial support for Federation subjects, and then distributed between regions in accordance with an accepted formula. The funds received are spent mainly for social needs.

In economic programs of the government in 1992-1993 and in the Message of the President in 1994, creation of a special regional development fund was envisaged, so that regional programs and some effective projects could be financed. A new "territorial rent" was supposed to be the major source for such a fund. However, the tax system evolved in such a way that rent duties make up only a small part of federal revenues (about 5 percent).

Economic preferences (in tax, excise customs, etc.) were the main instrument of selective economic policy in 1991-1994. It was especially true in regard to conditions of foreign economic exchanges. Privileges were given to regions spontaneously, mainly during visits to certain regions by state leaders. Sometimes, these impromptu-granted privileges were cancelled later. In March 1995, most of these regional privileges were cancelled by decrees of the President and of the federal government. It was declared that, from then on, financial privileges could only be given to regions with special status: free economic zones, regions suffering specially harsh conditions (e.g. Extreme North), etc.

In relationship to the policies of social and economic stabilization of Greater Siberia, all forms of state regulation are used to different degrees.

In 1994, only one federal regional program was at work, in the Kurile Islands. However, many sectors and regions of Greater Siberia were taken into consideration for special measures (examples: Republic of Sakha, Nizhneye Priangar'ye — over 10 regions of Greater Siberia will be given state support). Extreme North and Far East are in the list of regions eligible for priority support in the state economic program for 1995-1997. A new program for "Far East and Transbaikal Region" has been launched by a Presidential decree (however, this is the third such program announced since 1986).

Thus, Greater Siberia remains as the economic area that benefits most from priority status decreed by the Center. The problem is that the Center has not performed well in any of the regional programs implemented during the last decades.

The majority of Greater Siberia's regions are financial recipients in the system of budget federalism (republics of Altai, Khakassiya, Tuva, Buryatiya and Altai Krai, Chita, Sakhalin, Magadan oblasts, and almost all autonomous okrugs, in particular). Meanwhile, there are only a few financial "donors": Tyumen oblast, Krasnoyarsk krai.

Budget relations between the federal government and the Republic of Sakha were suffering from lack of regulation for a long time. Sakha stopped paying its dues to the federal budget several times. An agreement on power-sharing between the Russian Federation and Sakha Republik (including budget dues) was signed in June 1995. It strengthens legal warranties for mutual financial obligations.

A new policy of granting regional privileges gives priority to some of Greater Siberia's regions as regions with special economic status: coastal and border free economic zones, and regions of Extreme North. Creation of special economic status will also be considered for the whole territory of the Far East as well, primarily to compensate for remote distance from Central Russia. A strong example of such a policy is that railroad tariffs for cargo transports to and from the Far East for distances over 3,000 km were cut twice. Chita oblast and the Republic of Buryatiya were added to this "special" region, as well.

A new phenomenon in the institutional structure of the Russian Federation is that of inter-regional associations of economic cooperation, such as the "Siberian Agreement" and "The Far East Association" (see Appendix). These are self-governing organizations without interference from the Center. Both the President and the Prime Minister prefer these associations, rather than institutional subjects of the Federation, to be their direct partners for discussing many economic, state-legislative, and political issues. In all probability, this economic cooperation will evolve into joint financing and coordination of integrated inter-regional programs (for instance, for Far East and Trans-Baikalian) and into drawing up concerted regional policy.

A new program of socio-economic development of the Far East and Trans-Baikalian was being developed in 1995. In 1994, a scheme for the economic stabilization of the Far East was completed; priority actions defined by this program were:

- regulation (restraining) of tariffs for passengers and cargo transportation by railroad, air, and sea transport;
- regulation of electric power and thermal energy tariffs;
- the share of export and custom revenues which were used at the disposal of Far Eastern enterprises and administrations should be increased;
- providing Far East regions with seasonal delivery of raw materials, parts, equipment, and food to ensure basic living conditions in this area.

The new program of regional development being prepared by the federal government includes:

1. Analysis of the general economic situation in the Far East and Trans-Baikalian.
2. Conception of long-term, socio-economic development of the region.
3. System of urgent actions to pull the regional economy out of crisis.
4. Methods of restructuring the region's economy.
5. Social protection and stabilization of the population.
6. Integration of the region into the world economy through more active cooperation with the Asian Pacific region.

II.5. FOREIGN ECONOMIC RELATIONS OF GREATER SIBERIA: THE PACIFIC CONNECTION

The Evolution of Soviet/Russian Foreign Trade with the Pacific

Trade between the USSR/Russia and Pacific states was historically characterized by uneven development, alternating from rise to stagnation and to sharp decline, mainly reflecting changes in international politics.

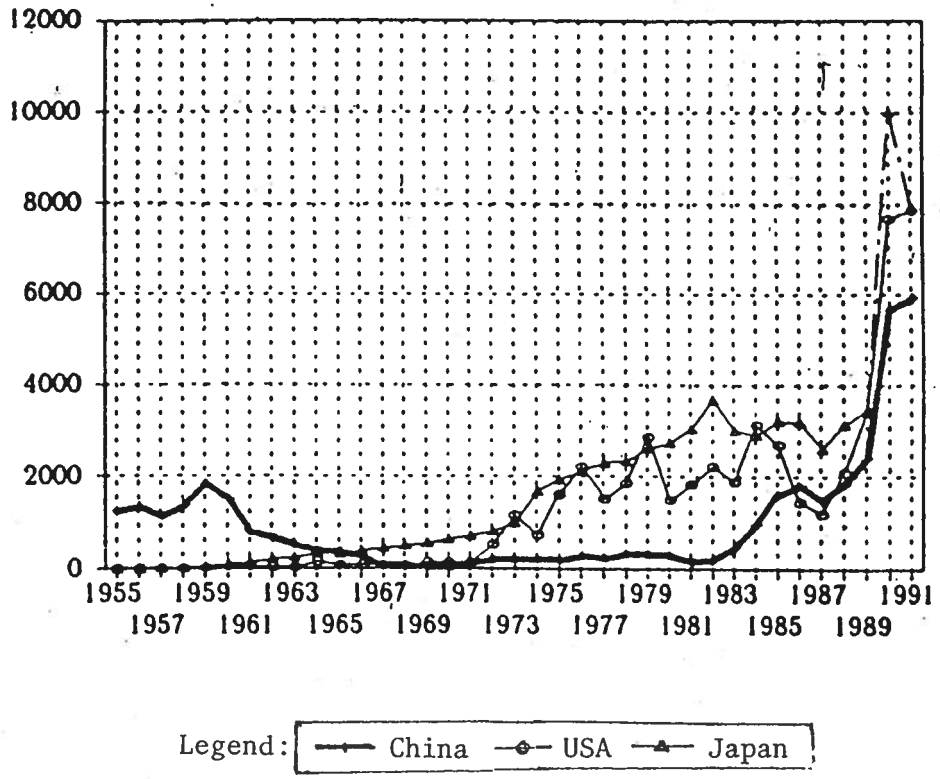
Prior to World War II, the USSR's share of trade turnover with Pacific states varied between 3 percent (1920) and 33 percent (1939). But the peak of intensity for foreign trade turnover was, in fact, passed before 1930; the U.S. accounted for 239.4 million rubles in 1930; China accounted for 54.7 million rubles in 1928; Japan accounted for 25.8 million rubles; and Australia accounted for 23.4 million rubles in 1925 (Kovaleva, 1995).

As for the commodity structure of the USSR-Pacific States trade, it had been dominated by many conjectural factors during the period prior to the 1930s; later on, it reflected resource capacity and capability of domestic industries to be competitive and strive for further development. Thus, the share of agricultural raw materials, fish products, fuel, ores, etc., in overall exports grew over time, while machines and equipment took leading positions in the import structure.

It is worth mentioning that during World War II, the Pacific route was actively used for deliveries of military cargo and food to the USSR from the U.S. and Canada. There was an air bridge "Alaska-Siberia" established to transport aviation equipment to Russia.

After War World II, the changing geography of foreign trade between the USSR and Pacific States reflected changes in political relations between the states. Commodity structures of exports and imports were dominated essentially by twists in intensity of USSR trade with developed countries, "socialist orientation" countries, developing countries with market economy, and new industrial countries (see Bradshaw, 1994: 234-246). Foreign trade expanded in the 1950s and stagnated in the 1960s (both at the expense of trade with China). Increase in foreign trade between the USSR and the Pacific in the 1970s resulted from stronger ties with the U.S. and Japan, and in the 1980s the growth was accelerated by reviving trade with China and by linkages to newly industrialized countries (see Figure II.2).

Figure II.2. Foreign Trade of the USSR with several Asian-Pacific States (in current prices, million rub.)



Source: Elaborated by SOPS.

The maximum share that the Asian Pacific accounted for in USSR foreign trade was reached in 1950 — 23 percent (at the expense of China again!) — and then it dropped to 10 percent. The USSR's foreign has been dominated since then by its Euro-Atlantic orientation.

Table II.16 provides information on the USSR's foreign trade with the Pacific during the last two years of the USSR's existence. Accounting of foreign trade activity of the Russian Federation started in 1992 (see Table II.17). In 1993, the Asian Pacific accounted for 21 percent of Russia's foreign trade (excluding CIS states). Among Pacific states, China is the most active trade partner of Russia, followed by the U.S. and Japan. (Worldwide, Germany takes first place in foreign trade with Russia, and China second.)

Regionalization of the Foreign Trade

Foreign trade was the absolute monopoly of the central government in the USSR. Commodity and geographical structure of export and import, export deliveries and distribution of import products, hard currency sharing, all these were decided by the Center with no participation of regions. Indeed, the central government kept the lion's share of foreign currency earnings.

Table II.16. Foreign Trade of the USSR with APS in 1990-1992 (million rub., in current prices)

	1990			1991		
	export	import	saldo	export	import	saldo
Australia	49.8	641.1	-591.3	15.3	691.2	-675.9
Indonesia	48.4	152.8	-104.4	71.9	52.1	19.8
Canada	155.2	1,882.6	-1727.4	133.4	2,036.2	-1902.8
China	2,390.6	3,277.5	-886.9	2,882.7	3,047.6	-164.9
South Korea	482.9	687.8	-204.9	573.2	445.3	127.9
North Korea	1,049.5	724.9	324.6	307.6	298.7	8.9
Malaysia	65.6	265.0	-199.4	58.9	184.5	-125.6
New Zealand	35.8	382.5	-346.7	2.1	295.3	-293.2
Singapore	162.0	590.7	-428.7	257.8	445.6	-87.7
USA	1,577.9	6,112.2	-4,534.3	1,267.8	6,606.8	-5,339.0
Thailand	164,3	192.0	027.7	334.4	155.3	179.1
Philippines	34.3	32.6	1.7	41.3	15.1	26.2
Japan	4,071.8	5,961.3	-1,889.5	3,734.3	4,216.2	-481.9
Total Pacific	10,288.1	20,903.0	-10,614.9	9,669.7	18,378.8	-8,709.1
Share of Pacific (%)	8.6	15.2	-	11.9	23.2	-
Total USSR	119,838.0	137,628.0	-17,790.1	82,418.9	79,230.1	2,188.8

Source: Goskomstat RF, 1992

Table II.17. Foreign Trade of Russia with the Pacific in 1992-1993, US$ mill.

	1992			1993			ratio, %	
	export	import	saldo	export	import	saldo	1992	1993
Canada	191	1,087	-896	248	294	-46	1.7	0.77
China	2,781	1,816	965	3,068	2,335	733	6.1	7.72
Korea	264	801	-537	391	306	85	1.4	1.00
Singapore	157	526	-369	242	290	-48	0.9	0.76
USA	760	3,041	-2,281	1,997	2,304	-307	5.0	6.14
Thailand	271	225	466	-	-	0	0.6	0.00
Japan	1,757	1,748	9	2,005	1,367	-2,138	4.6	4.82
Total Pacific	6,181	9,244	-3,063	7,951	6,896	2,066	29.4	21.0
Total Russia	42,391	36,990	5,401	44,297	36,807	17,490	100.0	100.0

Source: Rossiiskaya Federatsiya v tsifrakh. Moscow, 1994.

Therefore, it is impossible to make a rigorous assessment of exports and imports of specific regions in foreign trade statistics of the USSR. However, it is possible to say that Soviet exports to the Pacific Rim (excluding the Atlantic part of the U.S.) comprised mainly products of Greater Siberia. This follows from the simple fact that Greater Siberia accounts for most of the oil, gas, coal, non-ferrous metals, timber, and fish (see Table II.9) which used to be the core of exports of the USSR, and now of Russia.

Enterprises and regional administrations were given much greater autonomy through the process of liberalization and decentralization started in the late 1980s. It is natural that peripheral regions, Greater

Siberia in particular, were the first to feel the consequences. Border barter trade and enterprise-to-enterprise trade boomed. Direct trade (i.e., beyond any agreements or treaties between countries) accounted for up to 90 percent of total turnover with China in the early 1990s. Hundreds of foreign trade companies and associations, with participation of enterprises and administrations of several regions, emerged in Greater Siberia. Regional administrations launched their own programs of foreign economic activity.

From the point of view of foreign partners, the mechanism of Russian foreign trade is not perfect and it is risky. It keeps features of the former bureaucratic system, to which are added some specific weaknesses of the transition period such as lack of clear responsibility-sharing between central and regional bodies; excessive regimentation; absence of guaranties against non-commercial risks; unstable legislation; and growing crime and corruption. Moreover, current judicial and economic mechanisms do not provide enough protection for the business interests of either foreign or Russian firms. Because of these flaws in the institutional environment, it is possible to export raw materials and metals with artificially low prices, since lack of coordination of exporters deteriorates general trade conditions. There is also a possibility of uncontrolled hard-currency export. Constant changes in customs duties do not take into account specific features of regional markets, thus harming stability of foreign-oriented regional trade.

Overall, however, there has been an expansion of economic linkages between Greater Siberia and Pacific countries that deserves our careful consideration. Yet, before we proceed with this analysis, we must point out the very serious statistical problems facing such an analysis.

Russia's federal statistics do not directly record the regional characteristics of foreign economic exchanges. Customs declarations are the main source of data about regions. However, in accordance with present regulations for export deals, in the case of export with participation of intermediary companies, the customs declaration is filled in by the trade mediator and it displays his address, not the address of the producing company. The result is that data for many regions which produce "strategic" raw materials and their processed products for export — usually with help of intermediaries from Moscow — are not adequate: they show regional exports far below the reality, or do not reflect them at all. So, based on analysis of customs declarations, Tyumen oblast (the pre-eminent oil and gas exporting province) had no exports in 1990 and only 90 million hard currency rubles in 1991. This situation is typical for exporters from eastern regions; they are especially dependent on foreign economic companies from central regions which mediate export of their products. Neither illegal export of Russian products via territories of states of the former Soviet Union, nor commercial export by individual merchants, are taken into account by current statistics. Furthermore, statistical data for foreign trade of Siberia (Western and Eastern) and of the Russian Far East were systematized by different research institutions. Therefore, very often data from different sources are contradictory.

With all these caveats in mind, let us examine the data available on foreign trade of Greater Siberia.

Table II.18 displays estimates for total exports of Greater Siberia made by Moscow's SOPS Research Institute. These exports account only for 3.1 percent of exports of North-Eastern Asia (Russia excluded), but Greater Siberia accounts for 63.6 percent of total Russian exports.

Data of Goskomstat presented in Table II.19 widely differ from those in Table II.18: according to this source, the total share of Greater Siberia's exports is 4 times lower, but exports of the Far East are estimated as more than 5 times higher.

Table II.18. Exports of Russia and of Greater Siberia in 1990-1993

Economic Areas	Units of Measurement	1990	1991	1992	1993
Total for Russia	$ billion	53.9	36.7	32.7	30.3
	%	100.0	100.0	100.0	100.0
including:					
Greater Siberia	$ billion				19.27
	%				63.6
Western Siberia	$ billion	23.45	16.22	16.0	16.85
	%	43.5	44.8	49.1	55.6
Eastern Siberia	$ billion	2.81	2.42	2.22	1.85
	%	5.2	6.7	6.8	6.1
Far East	$ billion	1.19	1.39	0.86	0.57
	%	2.2	3.8	2.6	1.9

Source: Estimates of SOPS.

Table II.19. Foreign Trade of Greater Siberia in 1993, US$ million

	Western Siberia	Eastern Siberia	Far East	SFE	SFE/Russia, %
Export	3,700	1,157	1,856	6,713	15.6
Import	1,931	435	1,216	3,582	13.3
Foreign trade turnover	5,631	1,592	3,072	10,295	14.7

Source: Goskomstat RF, 1994.

Table II.20 provides still another estimate, this time from OECD sources. While we include this table in our study to illustrate the discrepancy of statistical appraisals on this difficult topic, we will base our analysis mainly on the statistics provided by SOPS, because the authors of this study have been more directly involved in their research.

Foreign trade of Western Siberia and of Eastern Siberia was stimulated during the first period of perestroyka. For instance, exports of Western Siberia (oil and gas not included) increased by 90 percent during 1987-1989. Siberian enterprises exported their products to nine states of the Pacific Rim, including Australia, Hong Kong, Indonesia, Canada, Korea, the U.S., Thailand, and Japan. Commodity structure

Table II.20. Role of Siberia and the Far East in Soviet Exports to OECD (Million US $)

Commodity	1970	1975	1980	1982	1983	1984	1985	1986	1987
Oil SITC 33	0	1,153	7,084	9,034	9,598	10,039	8,288	5,447	7,138
Gas SITC 34	0	36	1,028	1,826	1,720	2,224	1,447	1,960	1,158
Coal SITC 32	43	161	119	100	99	130	198	271	298
Non-Ferrous Metals SITC 68	115	232	527	401	470	518	348	476	732
Cork & Wood SITC 24	236	490	864	502	506	456	428	553	614
Diamonds SITC 66	23	110	475	351	272	388	371	556	609
Others	56	93	166	150	149	181	171	235	342
Total	474	2,277	10,228	12,464	12,813	13,936	11,251	9,510	10,902
OECD Total	2,555	8,493	23,789	25,060	24,749	25,893	21,143	18,341	21,081
SIBFE as %									
OECD Exports	18.6	26.8	43.0	49.3	51.8	53.8	53.2	51.8	51.7
(Fuel)	1.7	15.9	34.6t	43.7	35.1	47.9	47.0	41.9	40.8
(Non-Fuel)	16.9	10.9	8.4	5.6	5.7	5.9	6.2	9.9	10.9

Source: Elaborated by Bradshaw, 1991.

of these exports included coal, coke, cast iron, rolled iron, aluminum, round timber, and sawn timber; in addition to these traditional Siberian products, exports of machine-building products also increased. There was an opportunity for Siberian enterprises to enter the machine-building market of developing Pacific countries. However, after some limitations for direct foreign trade were restored in 1990 and enterprises were obliged to sell 40 percent of their hard currency revenues to the state, direct (enterprise-to-enterprise) imports and exports declined.

In 1991-1993, Greater Siberia was active in opening up Asian-Pacific markets; direct foreign trade was set up with all states of the Asian Pacific except Brunei. According to customs data, trade turnover of Greater Siberia with the Pacific in 1991 made up only 873 million currency rubles, which accounted for slightly more than 3 percent of total Soviet trade in this region. In 1992, Siberian share in total Russian turnover with the Pacific increased to 7 percent, and in 1993 it grew three times more. Trade balance changed as well; in 1991 and 1992, imports were much higher than exports, but in 1993 exports grew up to one-third higher (in value) than import purchases.

Being dominated by internal and external causes much more than foreign trade with the rest of the world, trade with the Pacific undergoes continuous structural changes. In 1991-1993, China, Japan, Singapore, the Republic of Korea, and the U.S. occupied the first five positions in Siberian exports. China was the first in terms of turnover. In 1991, China had the highest position, both in exports and imports, but in 1992 China ceded its first place in imports to Canada (over 40 percent). In 1993, there was a new grouping of trade partners: the USA became the major importer, and China remained the major exporter; however, only by a small difference. In 1993, Japan and the Republic of Korea increased their trade with Greater Siberia, taking the third and fourth places, respectively, in the list of countries of destination for Greater Siberian exports. Table II.21 shows trade data for 1992.

Table II.21. Foreign Trade of Western and Eastern Siberia with Pacific Rim Countries in 1992

Exports			Imports		
Country	$, 0000s	%	Country	$, 0000s	%
China	237,129	68.1	Canada	331,940	41.6
USA	80,506	23.1	China	264,428	33.2
South Korea	12,078	3.4	Japan	99,149	11.0
Japan	8,286	2.3	Singapore	45,437	5.7
Singapore	3,541	1.0	USA	32,327	4.0
North Korea	2,374	0.6	Hong Kong	15,280	1.9
Hong Kong	2,078	0.5	South Korea	9,175	1.1
Thailand	1,451	0.4	North Korea	5,664	0.7
Australia	193	0.06	Taiwan	2,226	0.2
Canada	99	0.03	Australia	1,642	0.2
Indonesia	6	0.00	Thailand	154	0.0
			Indonesia	25	0.01
			New Zealand	13	0.00
Total	347,741	100.0	Total	796,464	100.0

The export commodity structure of Western and Eastern Siberia changed substantially during 1991-1993, due mainly to changes in customs statistics. In 1991-1992, primary exports were fertilizers (28.3 percent and 33.9 percent of total exports, respectively); in 1993, aluminum (45 percent). Main volume of exports comprises of 10-15 commodity groups (about 85 percent of total exports). Table II.22 shows the foreign trade commodity structure for 1993.

Table II.22. Commodity Structure of Western and Eastern Siberia's Exports in 1993, In %

Aluminum & aluminum products	45.04
Non-ferrous metals	18.72
Mineral fuels, oil, & oil products	7.40
Timber & products; charcoal	4.62
Ground transport equipment (railroad not included)	4.29
Aircraft, space vehicles, & parts	3.83
Ferrous metal products	3.61
Nuclear reactors, boilers, equipment	3.20
Chemical fibers	0.97
Rubber & products	0.94
Fertilizers	0.89
Pharmaceutical products	0.82
Plastic & products	0.65

The commodity structure of Siberian imports from the Pacific is also unstable. In 1991, imports were primarily electronic consumer equipment, computer memory devices, and digital switches of various applications (these three groups account for over 56 percent of imports from APS). Import of

automobiles account for about 6 percent of total imports of Siberia. The rest of imported goods, with import volumes more than 1 percent, also represent various consumer products.

The commodity structure of imports changed dramatically in 1992, due to large imports of grain (more than 50 percent of total imports). Electrical machinery and sound-reproducing equipment accounted for 14 percent of total imports. Sugar increased its ranking into the list as one of the top 10 positions of import (with 3 percent of total). In 1993, equipment and ground transportation, boats, and ships accounted for about 30 percent of imports; electrical machinery, equipment, sound-reproducing devices, and mechanical devices, 13 percent; metals and metal products, 10 percent; clothing, shoes, and textiles, 11 percent; grain and food, 18 percent (see Table II.23.)

Table II.23. Commodity Structure of Imports of Western and Eastern Siberia from APS in 1993, in %

Nuclear reactors, boilers, equipment	19.69
Electrical machinery & equipment	13.18
Sugar & confectionary	9.69
Ground transport equipment	9.54
Ferrous metal products	9.31
Clothing & accessories	3.37
Ores, slags, & cinders	3.17
Optical & photography devices, cameras	2.98
Mineral fuels, oil, & oil products	2.86
Clothing & accessories, knitted wear	2.60
Shoes, leg-warmers, etc.	2.22
Food & fish products	2.14
Various industrial goods	1.93
Cereals	1.78
Meat & food sub-products	1.50

The largest import deal in this region was done by Krasnoyarsk aluminum plant, which bought ores and ore concentrates in the U.S. The second largest was import of sugar and sugar products from China to Irkutsk oblast. Kemerovo oblast imported parts of metallurgy equipment from Japan. Oil coke was imported, in large volumes, from Japan and the U.S. by metallurgical plants of Krasnoyarsk krai. Tyumen oblast imported oil pipes, pumps, equipment parts from Japan and the U.S., and cars and trucks from Canada. Equipment for oil and gas industries of Tyumen was imported primarily from the U.S., Japan, and Canada.

A major shortcoming in the foreign economic and structural policy of Siberia is that it is not enough directed toward import substitution. Current imports include large volumes of simple goods, both for industrial-technical and consumer markets. This results in additional raw material exports and in a slow process of diversification and upgrading of the industrial structure.

Foreign Trade of the Far East

Export and import data available for regions of the Far East take into account not only regional customs data but central records as well. Pacific countries are the main importers and exporters for enterprises of the Far East. The commodity structure of exports and imports of the Far East are presented in Tables II.24 and II.25.

Table II.24. Commodity Structure of Exports of the Far East

Commodities	1992		1993	
	$, millions	%	$, millions	%
TOTAL EXPORTS	1,539.2	100.0	1,822.6	100.0
Machinery, equipment				
Means of transportation	204.2	13.3	211.9	11.6
Fuel, mineral raw materials, metals, including:	328.1	21.3	605.3	33.2
coal	142.4	9.3	141.0	7.7
scrap-iron (ferrous metals)	55.7	3.6	316.0	17.3
scrap metals (non-ferrous)	18.3	1.2	39.0	2.1
mineral products	33.1	2.2		
oil products	62.8	4.1	96.6	5.3
Chemical products, : including	112.7	7.3	33.3	1.8
fertilizers	74.8	4.9	10.8	0.6
Consumer goods	7.1	0.5	9.2	0.5
Construction materials	4.6	0.3	5.7	0.3
Raw materials, manufactured products, including:	191.2	12.4	366.6	20.1
timber products	187.2	12.2	165.3	20.0
cellulose	1.7	0.1	0.9	0.0
Foodstuffs, including:	629.0	40.9	548.9	30.1
fish products	622.7	40.5	540.5	29.7
Material services	35.0	2.3	18.6	1.0
Others	27.3	1.7	23.1	1.4

Table II.25. Commodity Structure of Imports of the Far East

	1992		1993	
	$, millions	%	$, millions	%
TOTAL IMPORTS	1,189.7	100.0	1,216.7	100.0
Machinery, equipment, means of transportation	357.1	30.0	389.2	32.0
Fuel, mineral raw materials, metals	25.0	2.1	14.7	1.2
Chemical products	8.1	0.7	21.5	1.8
Construction materials	9.1	0.8	4.9	0.4
Raw materials & manufactured products			47.5	3.9
Consumer goods, including:	697.1	58.6	635.1	52.2
industrial	426.6	35.9	342.1	28.1
foodstuffs	270.5	22.7	293.0	24.1
Material services			57.0	4.7
Others	93.3	7.8	46.8	3.8

After a sharp increase in regional exports and imports in 1992 (exports increased by 30.4 percent, imports by 26 percent), this growth slowed down in 1993 (exports grew by 18.4 percent and imports only by 2 percent, vis-à-vis 1992). However, this is still much better than for Russia on average — exports increased only by 1.4 percent and imports dropped by 30 percent. However, this development of foreign economic exchanges can hardly be taken as an indicator that the Far East is transforming into a region with a genuine open economy oriented towards export. Exports grew simultaneously with a sharp drop in production in related industries, which means undermining the export potential of these industries in the future. The commodity structure of exports is very unstable and is not connected to long-term needs for development of the Far East economy. More and more important commodity groups (oil products, iron-rolling, scrap, and alloys of non-ferrous metals) are exported by a limited number of enterprises, which means gradually reducing the export base of the region. What is important is that the growth of exports is not related, in practice, to imports geared towards the modernization of export-oriented production. Eventually, low commodity diversification of regional exports signifies that the Far East has no protection against wide fluctuations in the world market.

At present, Japan is the main export market for the Far East. However, China is gaining more and more importance. Share of exports to China grew from 27.3 percent in 1992 to 33.6 percent in 1993. China is now the second-largest external market for the Far East. Growth of exports to China is related, besides re-export deals, to changes in the commodity structure of regional exports, in particular to increase exports of ferrous metals. Exports to South Korea, the U.S., and some others are unstable; they undergo significant fluctuations. As a whole, the export structure of the Far East is not very diversified geographically; it becomes increasingly oriented to Japanese and Chinese markets.

Insignificant growth of imports can be accounted for by a drop in hard-currency value of the ruble, as well as by a value-added tax for imported goods, introduced in 1993. Food products and consumer goods kept their top positions in imports. At the same time, the imports share of investment goods, necessary for maintaining current production and securing structural changes in the Far East economy, remains extremely low (these are, primarily, one-time equipment deliveries for new joint ventures). Imports from China account for 47.8 percent of total imports of the Far East, from Japan 18.3 percent, from the U.S., 7.6 percent.

Even if it is too early to say that the region has changed its orientation from domestic markets to foreign markets, foreign trade has become the most important stabilizing factor for the Far Eastern economy. Significant growth of foreign trade, especially in exports, contrasts with the shrinking of foreign economic linkages of Russia as a whole. Indeed, Professor Minakir, a leading expert on the Far Eastern economy, thinks that the Far East's predominant orientation towards export markets is now a well-established feature of the regional economy (interview with Prof. Minakir, June 26,1995).

II.6. FOREIGN INVESTMENT IN GREATER SIBERIA

The new strategy of economic development in Greater Siberia assumes that direct foreign investments, together with natural and scientific/technological resources, can provide a strong impetus to the development of industrial structure of the region and of its foreign trade, primarily with the Asian-Pacific countries.

Fifteen percent of total ventures with foreign capital participation in Russia were located in Greater Siberia. They accounted for 25 percent of production and 34 percent of exports performed by enterprises of their sector. This is evidence of the fact that direct investments in Greater Siberia are larger and more oriented toward production for export markets.

The largest foreign investments are located in the Far East (eastern areas in Far East account for 64 percent of total Far Eastern joint ventures, with 38 percent of their production and 65 percent of exports) and in Western Siberia (see Table II.26).

Table II.26. Ventures with Foreign Capital in SFE in 1993 (% of Russian total)

	Western & Eastern Siberia	Far East	SFE
1. Number of active ventures	7	8	15
2. Exports	10	11	21
3. Sales in Russia			
4. for hard currency	4	5	9
5. for rubles	6	3	9
6. Imports	19	22	41

More detailed data on performance of joint ventures are available for the Far East economic region.

The process of formation of ventures with foreign capital in the Far East accelerated in 1991. In the beginnings of market reforms, foreign investors were attracted by easier access to natural resources of the region, and by decentralization and liberalization of foreign economic and hard currency deals. Prospective profits of an opening market outweighed the danger of higher risks for investments in a politically unstable country. Even in 1993, in spite of continuing political instability and legal chaos in terms of foreign investments in Russia, joint ventures and wholly foreign subsidiaries kept growing. By early 1994, over 1,500 companies with foreign participation were registered in the Far East, which is 70 percent more than during the 1988-1992 period. As before, the southern areas of the Far East and the Sakhalin oblast benefit mostly from this process; they account for about 90 percent of total ventures with joint and fully foreign capital (see Table II.27).

Table II.27. Ventures with Foreign Capital in the Far East (Registered/in Active Operation)

Regions	1988-1991	1992	1993
Republic of Sakha (Yakutiya)	16/7	12/13	7/3
Primorskiy kray	131/28	235/18	244/42
Khabarovsk kray	52/18	155/19	207/131
Amur oblast	13/3	36/5	50/44
Kamchatka oblast	23/17	29/5	11/20
Magadan oblast	15/12	30/9	5/12
Sakhalin oblast	77/35	59/53	74/13
Jewish autonomous oblast	28/7	35/20	
Total	327/120	584/129	633/285

Source: Data from statistical territorial agencies of the Far East. Data for Primorskiy kay, Magadan oblast, and Yakutiya for 1993 are given as estimated ones.

In 1992, 28 percent of ventures with foreign capital were in active operation; this proportion grew to 35 percent in 1993. However, the process of expanding investment and production activity is over. The value of exports and imports (in $, million) from these ventures dropped:

	1992	1993
Exports	386.9	239.1
Imports	215.8	131.8

As before, foreign investors are careful in investing in the Far East, and are even more cautious about putting capital into real operations. Investment programs in oil and gas development for export, such as "Sakhalin 1, 2, 3," (for in-depth analysis of the projects see Chapter III.5) are very special and are practically unrelated to the general investment situation in the Far East.

Joint ventures with Chinese partners accounted for more than 40 percent of all joint ventures located in the Far East, most of them in the South — Primorsky and Khabarovsk krais and Amur oblast. The second largest partner is Japan (15.5 percent of the total of joint ventures). Chinese capital is expanding its presence in the Far East, primarily in foreign trade activity, both internal and external, exchanging raw material to consumer goods. Only a limited number of joint ventures are engaged in the construction industry or in manufacturing of consumer goods. Thus, commercial profits created by the difference in market prices of raw materials and consumer goods in the two countries, continue to be a decisive factor in the activity of Chinese-Russian joint ventures. Many joint ventures, mainly ventures fully controlled by Chinese capital, are fictitious in their nature; they are engaged into buying up real estate or in some other deals, often beyond the list of activities they have been certified for in their regulation documents.

Changes in the foreign investment situation are dominated more by national factors than by regional ones. According to common opinions of foreign investment experts, conditions necessary to attract foreign capital are the following:

- political stability, which would secure steadfast position of representative power and government in economic policy, with concerted action of central and regional bodies;
- legislation to secure a legal and judicial platform for foreign investors (it should at least be comparable to that of other countries competing for potential investors);
- sufficient scale and rate of growth of the market sector of the economy;
- access for foreign investors to privatization of state and municipal property.

In terms of these parameters, Russia does not offer, at present, a favorable investment environment to foreign investors. Transition from a centrally administered economy to a market economy is hindered by opposition of political powers, chaotic changes in legislation, excessive taxation regime, and a corrupted bureaucratic machine.

In 1994-1995, some steps were undertaken by the President and the government to provide more favorable conditions for foreign investors; intergovernmental agreements on investment cooperation have been signed. The Russian economy's annual demand for foreign investments is evaluated by experts as $5 billion at minimum, and potential capacity of internal market is over $10 billion per year. In the long run, Russia will continue to attract foreign investors because of rich natural resources, enormous market potential for industrial and consumer goods, relatively cheap labor force, mighty scientific and technical potential, and opportunities for conversion of military industry as well. Most of these factors favor Greater Siberia over other regions in Russia (with the exception of market size). To evaluate prospects for foreign investments in Greater Siberia, it is necessary to take into account world market situations and regional entrepreneurial climates. It is true that potential foreign partners have less interest in development of natural resources in Greater Siberia at present than in the 1960s and 1970s (with the major exception of oil and gas). Yet, prospects for economic cooperation in opening up diverse natural resources in Greater Siberia look promising. Objectively speaking, in the coming decades the Pacific economy will remain the largest consumer of raw materials and fuels (unprocessed or partly processed), while Greater Siberia will be bound to sell its products for internal and external markets of fuel, mineral raw materials, timber, non-ferrous metals, and fish products. This orientation should be reinforced by the export potential of a modernized military industrial complex.

II.7. GREATER SIBERIA AS A TRANSCONTINENTAL BRIDGE?

Prospects for economic integration of Russia into the Pacific region, as well as the possible function of Siberia bridging West and East, depend on development of the transport system. It should be taken into account that competition in the market of transport services in the Pacific Rim is increasing,

and that alternative transportation routes between West and East via China and Central Asia may be constructed (new seaports, railroads, and new airlines, with added routes).

At present, there are four large transit seaports in the Russian Pacific, with a total turnover of goods of 32.6 million tons (see Table II.28).

Table II.28. Turnover of Goods in Russian Pacific Transit Ports in 1993 (Million Tons)

Cargo Mode	Vladivostok	Nakhodka	VOSTOCHNY	Vanino
Total turnover of goods, including:	6.087	11.240	7.800	7.500
"General" goods, including:	2.777	3.110	2.480	1.790
metals	1.548	2.560	0.280	1.150
in containers	0.215	-	1.650	0.100
in lighters	0.530	0.420	-	-
on ferry-boats	-	-	-	3.700
"Piled-up" goods, including:	0.931	1.590	4.540	1.300
coal, coke, ore	0.016	0.540	3.640	1.220
grain, raw sugar	0.842	1.050	-	0.050
Timber goods	0.029	1.200	0.780	0.690
Liquid petroleum goods	1.200	4.450	-	-
Fishery goods	1.150	0.890	-	0.100

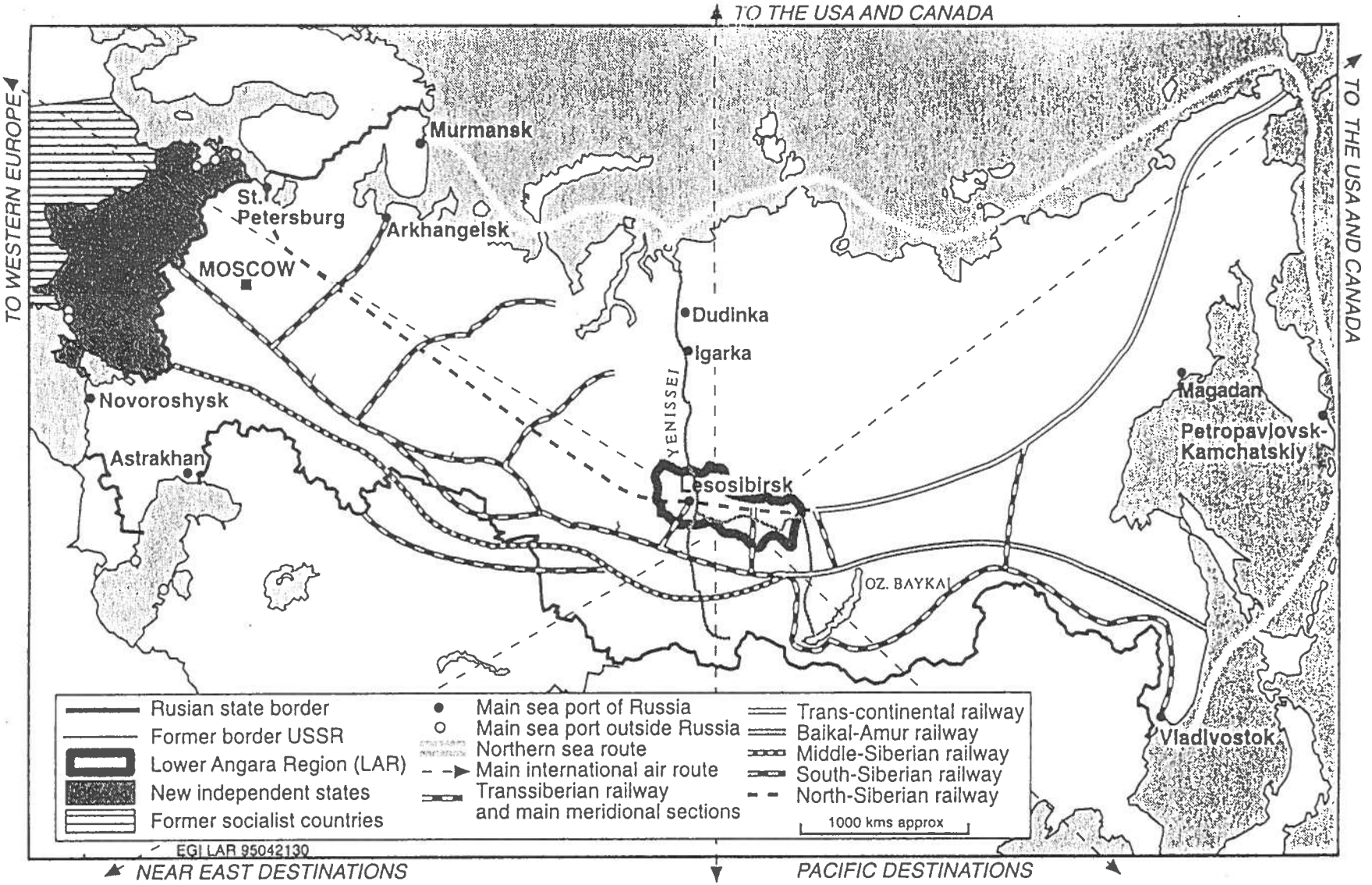
Transit ports in active operation still have capacity for expansion. Various projects have been developed for seaports in Nakhodka (with prospects for a free economic zone there), Vostochny, and Vanino. An international project for construction of a larger port in the Tumen-gang area has been completed.

The possibility for transcontinental transit to be expanded and for goods to be hauled between western and eastern regions of Russia is restrained by the limitations of railroads — Middle-Siberian and South-Siberian railways mainly go through Kazakhstan and the Trans-Siberian railway also crosses the northern part of Kazakhstan. Outlooks for prolonging BAM (Baikal-Amur mainline) to the West and building a through North-Siberian mainline as the second Trans-Siberian route deserve a new consideration (see Figure II.3).

Since seaports on the Baltic and Black Seas are much less accessible for Russia now, the role of a Northern Sea route gains more importance. To explore the use of a Northern Sea route, including trans-oceanic transportation, an international research team was set up in 1994/95 (with experts from Japan, Norway, and Russia), which is expected to complete the "INSROP" project in the first half of 1996. The project will specifically discuss the economic efficiency of transit movement via the northern sea route between eastern Asia and western Europe, northern America, and western Europe.

The situation in air transportation is now more favorable, due to the fact that Russia's air space has now opened up and major airlines provide new service in intercontinental transportation. A good

Figure II.3. New Conditions in the Geopolitical and Economic-Geographic Position of Siberia



Source: Bandman et al., 1995.

example there is construction of an international airport in Novosibirsk. According to Aeroflot experts, just one Boeing 747, scheduled once a week for the route from Europe to south-east Asia, with landing and technical service in Novosibirsk, will reduce flight time by 4-6 hours and save over $7 million/year.

Expanding the transport system of the Far East and Siberia in directions presented above is a priority for future development projects. It is important to realize that if world routes between Asia and Europe completely shift to the South, then the major part of Russia would move even further away from the Pacific, Siberia would lose its bridging function, and the coastal Far East would gravitate towards the Asian Pacific.

In the long-term perspective for Pacific and world economic integration, there is one additional idea that may be of considerable interest: to build an intercontinental railway to bridge the United States and Russia by tunneling under the Bering Strait. The route would go from Yakutsk (after the Amur-Yakutsk mainline is completed) via Chukotka (with branch to Magadan), via tunnel under the Bering Strait, to Alaska and then to Fort Nelson, North Canada, where it would meet with the main North-American railway system. A Russian-American corporation, "Transcontinental," has been established to develop a project for the construction and utilization of this railway (*The New York Times*, Sept. 17, 1995; for economic analyses of the project, see Granberg, 1995; Kin et al., 1995). The potential importance of such a revolutionary project is that the junction of the worldwide railway system would be completed, with Siberia and the Russian Far East, as well as Alaska, integrated into it. It may well be that the transportation linkage of Siberia with the Pacific Rim could be partly realized by land, thus fundamentally changing the planet's economic geography in the 21st century.

Appendix II-1

Greater Siberia: Economic-Geographical and Administrative-Territorial Structures, Territory, and Population

Economic Regions and Subjects of Russian Federation	Territory, thousand sq. km.	Population in thousands (1-1-1995)	
West Siberian Economic Region	2427.2	15139.1	
Altai Republic	92.6	200.0	
Altai Kray	169.1	2697.2	
Kemerovo oblast	95.5	3077.9	
Novosibirsk oblast	178.2	2748.5	
Omsk oblast	139.7	2179.5	
Tomsk oblast	316.9	1079.2	
Tyumen oblast,	1435.2	3156.8	
including:			
Khanty-Mansi AO*	523.1	1326.2	
Yamalo-Nenets AO	750.3	479.7	
East Siberian Economic Region	4122.8	9165.5	
Buryat Republic	351.3	1052.8	
Tuva Republic	170.5	308.0	
Khakassiya Republic	61.9	584.6	
Krasnoyarsk Kray,	2339.7	3116.6	
including:			
Taimyr (Dolgano-Nenet) AO	862.1	47.3	
Evenky AO	767.6	20.8	
Irkutsk oblast,	769.9	2804.5	
including:			
Ust-Ordynsky Buryatsky AO	22.4	143.0	
Chita oblast,	431.5	1299.0	
including:			
Aginsky Buryatsky AO	19.0	79.4	
Far Eastern Economic Region	6215.9	7625.4	
Sakha Republic (Yakutiya)	3103.2	1035.8	
Jewish AO	36.0	211.9	
Chukotsky AO	737.7	99.7	
Primorsky Kray	165.9	2273.1	
Khabarovsk Kray	788.6	1588.1	
Amursk oblast	363.7	1040.8	
Kamchatskaya oblast,	472.3	423.6	
including:			
Koryaksky AO		301.5	33.8
Magadan oblast	461.4	279.33	
Sakhalin oblast	87.1	673.1	

*AO = Autonomous Okrug

Appendix II-2

Composition of Inter-Regional Associations for Economic Cooperation

Economic Regions	"Siberian Agreement" Association	"Far Eastern" Association*
West Siberian	Altai Republic Altai Kray Kemerovo oblast Novosibirsk oblast Omsk oblast Tomsk oblast Tyumen oblast Khanty-Mansi AO Yamalo-Nenets AO	
East Siberian	Buryat Republic Tuva Republic Khakassiya Republic Krasnoyarsk Kray Irkutsk oblast Chita oblast Taimyr AO Evenky AO Aginsky Buryatsky AO Ust-Ordynsky Buryatsky AO	Chita oblast
Far Eastern		Sakha Republic (Yakutia) Primorsky Kray Khabarovsk Kray Amursk oblast Kamchatskaya oblast Magadan oblast Sakhalin oblast Jewish AO Koryaksky AO Chukotsky AO

*As reported by Finansovye Izvestiya (January 20-26, 1994), the Far Eastern Association for Economic Cooperation (FEA) was replaced by the Association of Territories of the Far East and Transbaikal, which consists of heads of territories of administration of all krais, oblasts, and republics from the Kuril Islands to the Buryat Republic.

III. THE ENERGY SECTOR AS A KEY LINK BETWEEN SIBERIA/RUSSIAN FAR EAST AND THE PACIFIC RIM

III.1. THE ENERGY DEPENDENCE OF THE ASIAN PACIFIC ECONOMY AND THE POTENTIAL ROLE OF SIBERIA/RUSSIAN FAR EAST AS ENERGY SUPPLIER

The Asian Pacific economy is, and will be in the early 21st century, the most rapidly growing region in the world (Fouquin, Dourille-Feer, and Oliveira-Martins, 1991). Manufacturing is, and will be, the driving force in this growth process. In addition, a process of urbanization of unprecedented historical scale requires the building of transportation, energy, and public services infrastructure of equally daunting proportions. Altogether, the process translates into a substantial increase in the energy demand of the region in the next 25 years. According to the International Energy Agency (1995 World Energy Outlook: 29 et seq.), total oil demand in the world is projected to increase by 39.4 percent between 1994 and 2010. If we calculate the combined total oil demand for OECD-Pacific, China, and East Asia, assuming extrapolation of current consumption patterns, oil demand in the Asian/Australian Pacific area is projected to increase by 64.4 percent. At this rate, the demand for the whole region will reach the level of 24.3 million barrels of oil per day in 2010, a figure to be compared, as of the same date, with the projections for Europe (15.1 million barrels per day), and North America (25.4 million), for a world total of 95.2 million barrels. Thus, over a quarter of total world oil demand (almost equivalent to that of North America) will originate in the Asian Pacific.

Demand for natural gas should also be included in the picture, since gas is expected to be the fastest-growing fossil fuel, with global demand increasing 2.5 percent per year through the years 1992-2010, as compared to a 2.1 percent average annual growth for world total primary energy demand in the same period. The share of natural gas in the world's total primary energy mix is projected to increase from 22 percent in 1994 to about 24 percent in 2010, most of this increase coming at the expense of solid fuels (declining 0.5 percent) and oil (falling 1.0 percent). Carbon-based fuels will continue to account for approximately 90 percent of total primary energy demand in 2010 (International Energy Agency, 1995: 17-34). Global gas demand is projected to grow from 1745 mtoe (millions of metric tonnes of oil equivalent) in 1992 to 2708 mtoe in 2010, or an increase of over 55 percent. Data for projections of gas demand under the same model of the International Energy Agency for the Pacific region are not available, because statistics do not follow, unfortunately, the same regional classification as oil data. Only three categories are differentiated: OECD, Former Soviet Union/Eastern Europe, and Rest of the World. Of course, the Pacific Region is present in all three areas, thus making it impossible to estimate its differential in growth of gas demand. Therefore, the share of Asian Pacific demand of this total growth demand cannot be estimated, but it can be assumed, at least, to parallel the differential of growth rates between total demand and Asian

Pacific demand in the case of oil (because of the overall lower growth rate of oil demand in the world). Making this safe assumption, it may be reasonable to think that gas demand in the Pacific between 1992 and 2010 could increase by about 70 percent. This is critical, because, as the International Energy Agency writes:

> Contrary to the oil market, there is no global market for natural gas. This can mainly be explained by the difficult and costly transportation of natural gas due to its relatively low energy content in relation to its volume and the uneven distribution of gas reserves throughout the world. . . . Currently, around 16 percent of global gas production is internationally traded. . . . In spite of high costs of transportation of gas and the fact that some future supply regions will be further away from potential markets, it is assumed that the trade in gas will increase throughout the outlook period [1992-2010]) (pp. 33-34).

Thus, gas demand, unlike oil demand, is highly dependent on relative geographic proximity, given the cost of transportation. Rapidly growing gas demand in the Asian Pacific will encourage location of gas production in the area in order to obtain a steady and cheaper supply, all other conditions being equal.

After reviewing projections for demand of oil and gas in the Pacific, let us now consider where oil and gas reserves are in the world, as of January 1st, 1996, using data compiled by David H. Knapp (Knapp, 1995) (see Table III.1.1). Considering *estimated proved reserves*, let us compare Russian production with other potential suppliers, with emphasis on suppliers in the Asian Pacific. Unfortunately, in this source, data are merged for all CIS countries. We know, nonetheless (Dienes et al., 1994), that Russia accounts for the bulk of such reserves, and that Siberia and the Far East comprise over three-quarters of Russian reserves for both oil and gas. Looking at this table, two major remarks are analytically relevant for our inquiry:

On the one hand, CIS oil reserves (57 billion bbl) are substantially higher than those of all other oil producers in the Asian Pacific (24 billion for China; 5.167 billion for Indonesia; 4.3 billion for Malaysia; 1.56 billion for Australia; 1.35 billion for Brunei), as well as much higher than those of the U.S. or Western Europe. On the other hand, they are clearly inferior to oil reserves in the Middle East (659.555 billion). Furthermore, the globalization of the oil market, and the growing incorporation into such a market of new oil-producing areas, especially in Latin America (Knapp, 1995), make the ex-Soviet republics just one set of players among other suppliers for Pacific growth.

On the other hand, the potential supply of gas is increasingly dependent on the ex-Soviet republics, and particularly on Russia. Indeed, CIS estimated proved reserves amount to 1,977,000 bcf — that is, 40 percent of world reserves, for a total equivalent to that of gas reserves in the Middle East, United States, and Western Europe combined. As for the Pacific, China, Indonesia, Australia, Malaysia, and Brunei reserves combined amount to less than 11 percent of former Soviet Union reserves.

Therefore, the CIS, and by extension Siberia and the Russian Far East, constitute the fundamental source of gas supply relatively adjacent to the Asian Pacific economy. In the face of potential increasing

Table III.1.1. Worldwide Look at Reserves and Production (page 1 of 2)

COUNTRY	ESTIMATED PROVED RESERVES				OIL PRODUCTION			
	Jan. 1, 1996		Jan. 1, 1995					
	Oil (1,000 bbl)	Gas (bcf)	Oil (1,000 bbl)	Gas (bcf)	Producing oil wells* Dec. 31, 1994	Estimated 1995 (1,000 b/d)	Change from 1994 (%)	Actual 1994 (1,000 b/d)
ASIA-PACIFIC								
Afghanistan	....	3,500	....	3,500	....	....	....	....
Australia	1,560,090	20,082	1,614,720	19,606	1,209	558.0	4.3	535.0
Bangladesh	5,439	10,087	4,000	25,200	31	1.1	....	1.1
Brunei	1,350,000	14,000	1,350,000	14,000	858	159.0	–1.9	162.0
China	24,000,000	59,000	24,000,000	59,000	49,700	2,989.0	0.9	2,961.0
China, Taiwan	4,000	2,400	4,000	2,400	85	1.0	–9.1	1.1
India	5,814,000	24,967	5,776,000	24,967	3,344	708.0	13.8	622.0
Indonesia	5,166,867	68,916	5,779,000	64,388	8,622	1,329.0	0.8	1,319.0
Japan	48,873	958	49,329	965	223	15.2	1.3	15.0
Malaysia	4,300,000	68,000	4,300,000	68,000	550	685.0	7.0	640.0
Myanmar (Burma)	50,000	10,000	50,000	9,800	450	16.0	....	16.0
New Zealand	104,000	2,842	136,600	3,008	62	29.0	–31.0	42.0
Pakistan	203,284	27,000	203,284	27,500	120	55.0	–3.5	57.0
Papua New Guinea	400,000	3,000	229,000	15,000	29	100.0	–17.1	120.6
Philippines	216,100	3,880	239,000	3,452	8	3.3	–34.0	5.0
Thailand	230,749	5,901	218,114	6,162	392	52.0	–4.4	54.4
Viet Nam	500,000	4,000	500,000	3,700	28	176.0	25.7	140.0
Total Asia-Pacific	**43,953,402**	**328,533**	**44,453,047**	**350,648**	**65,711**	**6,876.6**	**2.8**	**6,691.2**
WESTERN EUROPE								
Austria	100,800	777	100,800	777	1,145	23.0	–3.0	23.7
Denmark	1,031,529	4,026	735,908	4,273	151	186.0	0.6	184.9
France	138,312	1,074	151,590	1,282	465	50.0	–13.6	57.9
Germany	338,720	11,301	368,398	10,700	1,605	57.0	0.5	56.7
Greece	14,000	300	41,000	300	12	9.4	–12.1	10.7
Ireland	....	418	....	518	....	....	....	....
Italy	620,500	13,200	620,500	13,200	219	92.0	4.5	88.0
Netherlands	106,927	65,156	113,217	66,215	208	67.5	–17.5	81.8
Norway	8,422,056	47,498	9,415,846	70,912	436	2,720.0	5.4	2,579.5
Spain	20,000	600	20,242	670	36	15.0	–6.8	16.1
Turkey	487,670	400	487,670	371	776	68.0	–4.2	71.0
United Kingdom	4,292,950	23,308	4,516,930	22,248	839	2,515.0	1.9	2,469.0
Total Western Europe	**15,573,464**	**168,058**	**16,572,101**	**191,466**	**5,892**	**5,802.9**	**2.9**	**5,639.3**
EASTERN EUROPE and C.I.S.								
Albania	165,000	70	165,000	70	2,408	12.0	4.3	11.5
Bulgaria	15,000	250	15,000	250	100	1.0	....	1.0
C.I.S.	57,000,000	1,977,000	57,000,000	1,977,000	122,820	6950.0	–1.1	7,030.0
Croatia	150,000	1,250	150,000	1,250	901	37.0	....	37.0
Czechoslovakia	15,000	500	15,000	460	400	7.0	–12.5	8.0
Hungary	128,535	3,354	132,143	3,450	1,138	70.0	....	70.0
Poland	31,334	5,336	35,310	5,491	2,179	8.0	–38.5	13.0
Romania	1,606,000	13,000	1,606,000	12,290	6,000	137.0	–0.7	138.0
Serbia	77,500	1,580	77,500	1,580	646	20.0	....	20.0
Total Eastern Europe and C.I.S.	**59,188,369**	**2,002,340**	**59,195,953**	**2,001,841**	**136,592**	**7,242.0**	**-1.2**	**7,328.5**
MIDDLE EAST								
Abu Dhabi	92,200,000	188,400	92,200,000	188,400	993	1,818.0	–0.9	1,835.0
Bahrain	210,000	5,295	210,000	5,295	376	105.0	....	105.0
Dubai	4,300,000	4,400	4,300,000	4,400	151	335.0	–0.6	337.0
Iran	88,200,000	741,609	89,250,000	741,609	751	3,654.0	1.9	3,585.0
Iraq	100,000,000	109,500	100,000,000	109,500	58	600.0	9.1	550.0
Israel	4,107	13	3,295	13	9	0.1	....	0.1
Jordan	300	200	300	200	4	0.1	....	0.1
Kuwait	94,000,000	52,400	94,000,000	52,400	700	1,800.0	–0.6	1,811.0
Neutral Zone	5,000,000	1,000	5,000,000	1,000	614	400.0	5.8	378.0
Oman	5,138,000	25,200	4,828,000	22,248	2,099	846.0	4.9	806.4
Qatar	3,700,000	250,000	3,700,000	250,000	288	438.0	7.6	407.0
Ras al Khaimah	100,000	1,100	100,000	1,100	7	1.0	....	1.0
Saudi Arabia	258,703,000	185,400	258,703,000	185,400	1,400	7,867.0	0.7	7,811.0
Sharjah	1,500,000	10,700	1,500,000	10,700	48	50.0	....	50.0
Syria	2,500,000	7,000	2,500,000	7,000	964	606.0	5.6	574.0
Yemen	4,000,000	15,000	4,000,000	15,000	243	345.0	2.1	338.0
Total Middle East	**659,555,407**	**1,597,217**	**660,294,595**	**1,594,265**	**8,705**	**18,865.2**	**1.5**	**18,588.6**

Table III.1.1. Worldwide Look at Reserves and Production (page 2 of 2)

COUNTRY	ESTIMATED PROVED RESERVES Jan. 1, 1996 Oil (1,000 bbl)	Jan. 1, 1996 Gas (bcf)	Jan. 1, 1995 Oil (1,000 bbl)	Jan. 1, 1995 Gas (bcf)	OIL PRODUCTION Producing oil wells* Dec. 31, 1994	Estimated 1995 (1,000 b/d)	Change from 1994 (%)	Actual 1994 (1,000 b/d)
AFRICA								
Algeria	9,200,000	128,000	9,200,000	128,000	1,273	760.0	1.3	750.0
Angola	5,412,212	1,800	5,412,212	1,800	403	640.0	16.6	549.0
Benin	28,900	43	27,000	....	6	2.5	4.2	2.4
Cameroon	400,000	3,900	400,000	3,900	153	100.0	–9.1	110.0
Congo	1,505,913	4,311	830,000	2,700	409	178.0	–3.8	185.0
Egypt	3,879,420	22,100	3,260,000	19,290	1,228	890.0	–0.4	894.0
Equatorial Guinea	12,000	1,300	12,000	1,300	10	7.0	40.0	5.0
Ethiopia	428	880	....	800	....	....	....	....
Gabon	1,340,000	500	1,340,000	500	379	354.0	7.6	329.0
Ghana	16,000	800	500	800	3	6.0	....	6.0
Ivory Coast	100,000	800	50,000	500	0	10.0	....	0.0
Libya	29,500,000	45,800	22,800,000	45,800	1,087	1,370.0	–0.7	1,380.0
Madagascar	....	70	....	70	....	....	....	....
Morocco	1,190	40	1,736	53	9	0.2	....	0.2
Mozambique	....	1,740	....	2,702	....	....	....	....
Namibia	....	2,000	....	2,000	....	....	....	....
Nigeria	20,828,000	109,710	17,899,820	120,000	1,938	1,887.0	0.2	1,883.0
Rwanda	....	2,000	....	2,000	....	....	....	....
Somalia	....	200	....	200	....	....	....	....
South Africa	26,700	959	40,400	959	9	10.4	....	10.4
Sudan	300,000	3,000	300,000	3,000	34	2.0	....	2.0
Tanzania	....	2,000	....	4,100	....	....	....	....
Tunisia	416,000	2,600	416,000	1,069	187	88.0	–3.3	91.0
Zaire	187,000	50	187,000	50	128	28.0	12.0	25.0
Total Africa	**73,153,763**	**334,603**	**62,176,668**	**341,593**	**7,256**	**6,333.1**	**1.8**	**6,222.0**
WESTERN HEMISPHERE								
Argentina	2,225,895	18,583	2,216,787	18,246	11,709	714.0	7.2	666.0
Barbados	2,541	5	2,784	5	90	1.3	....	1.3
Bolivia	138,874	4,460	138,874	4,460	384	28.0	8.9	25.7
Brazil	4,200,000	5,170	3,797,000	4,852	6,673	696.0	4.6	665.1
Canada	4,898,460	67,027	5,037,984	79,231	43,758	1,798.0	3.2	1,742.0
Chile	300,000	3,900	300,000	3,900	390	10.5	–14.6	12.3
Colombia	3,500,000	10,000	3,393,044	7,882	5,819	580.0	27.2	456.0
Cuba	100,000	100	100,000	100	228	27.0	17.4	23.0
Ecuador	2,115,000	3,800	2,014,000	3,800	1,021	392.0	3.4	379.1
Guatemala	488,000	10	488,000	10	14	9.8	27.3	7.7
Mexico	49,775,000	68,413	50,776,000	69,675	4,740	2,689.0	0.1	2,685.0
Peru	808,400	7,046	800,000	7,031	3,568	129.7	1.3	128.0
Suriname	74,000	....	81,900	....	317	7.0	11.1	6.3
Trinidad & Tobago	490,000	10,570	488,100	8,458	3,346	132.7	2.6	129.4
United States	22,457,000	163,837	22,957,000	162,415	582,768	6,545.0	–1.8	6,661.6
Venezuela	64,477,000	139,900	64,477,000	130,400	14,789	2,565.0	4.1	2,463.0
Total Western Hemisphere	**156,050,170**	**502,821**	**157,068,473**	**500,465**	**679,614**	**16,325.0**	**1.7**	**16,051.5**
TOTAL WORLD	**1,007,474,575**	**4,933,572**	**999,760,837**	**4,980,278**	**903,770**	**61,444.8**	**1.5**	**60,521.1**
Total OPEC	**778,214,867**	**2,037,335**	**770,248,820**	**2,033,597**	**33,098**	**25,228.0**	**1.4**	**24,889.0**

EDITOR'S NOTE: All reserves figures except those for the C.I.S. (and gas for Canada) are reported as proved reserves recoverable with present technology and prices. C.I.S. figures are "explored reserves" which are understood to be proved plus some probable. Canadian gas figure, under criteria adopted by Canadian Petroleum Association in 1980, includes proved and some probable. *Does not include shut in, injection, or service wells.

Source: Knapp, 1995.

demand in energy from the Pacific Region, and particularly from the Asian Pacific, Siberia and the Russian Far East could become an essential energy source for the development of the "Pacific century." However, as we will show below, geographic, institutional, and infrastructural obstacles make such prospect a daunting challenge. This leads to the subject matter of our investigation.

Although coal and hydroelectric power are important sources of energy in the region, we will focus our analysis on oil and gas, since these seem to be the main exportable fuels and for which prospective reserves in Siberia/Far East seem to be considerable.

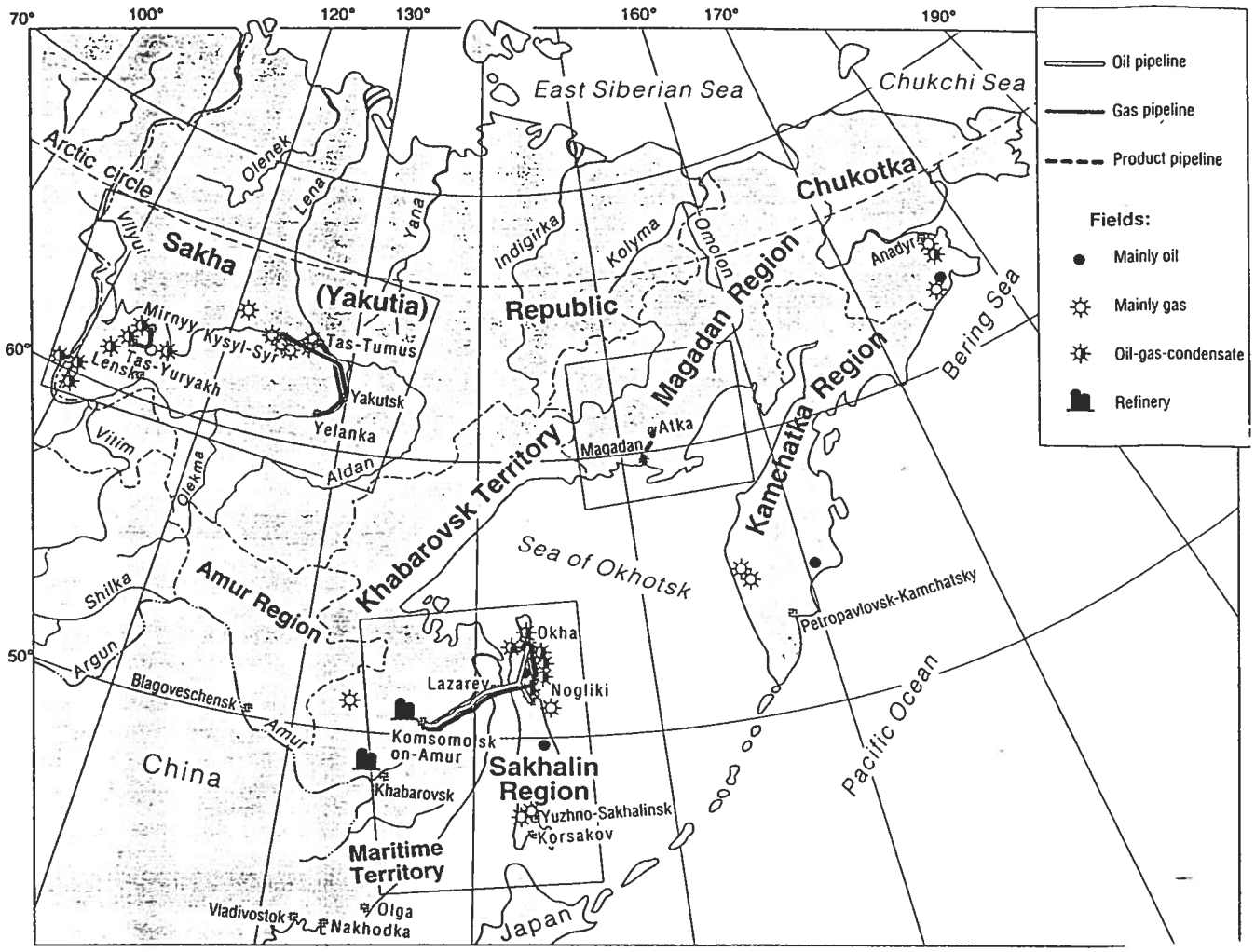
The largest production and reserves of Russian oil and gas are in Western Siberia — indeed, one of the world's main areas of hydrocarbon resources. Their exploitation started in the 1960s and has substantially declined in the last decade, due to a number of factors that we analyze in detail in this report. Exports from the Western Siberia oil and gas complex are overwhelmingly directed to Europe. This, together with deficiencies in the management system of Western Siberian enterprises and the exhaustion of a number of fields, leads us to conclude that the direct role of Western Siberia in the Pacific economy will be very limited. However, it is important, for our analysis, to understand the development and crisis of the Western Siberia oil and gas complex for two reasons: (a) it yields very important lessons for the development of the new production and export complex in the Far East, and (b) given the role of Western Siberia in the supply of energy for Russia, and in Russia's external sector, the development of the new production complex in Eastern Siberia and the Far East will be largely conditioned by the overcoming of the structural crisis of Western Siberia's energy industry.

However, the most direct linkage between Russia and the Pacific economy in the years to come depends on the development of oil and gas production and exports in the Far East. It is estimated that currently identified gas reserves in this region could provide an aggregate exportable surplus of 30 billion cu m/year of gas. As for oil, in 1993, there were 59 oil fields in the Russian Far East, with an estimate of initial potential resources of 8,922.3 million tonnes (Khartukov, 1994a: 69).

Hydrocarbon resources in Eastern Siberia/Far East are mainly located in three areas: Sakhalin Island (on-shore and, above all, off-shore); in shelf areas of the Sea of Okhotsk; and in central and southwestern Yakutia (see Figure III.1.1). Additional, much smaller areas of exploration exist also in the Khabarovsk and Primorsk krais, and in the Amur and Kamchatka regions, although for the time being they do not seem to be commercially interesting. The most important fields, both for oil and gas, are in the continental shelf (about 4 million square kilometers to be explored): a fundamental matter, because Russia lacks sufficient technology and experience to proceed with off-shore deep drilling, thus making the cooperation of foreign companies essential. Tables III.1.2 and III.1.3, elaborated by Khartukov (1994a), provide an overview of estimates of oil and gas reserves in the region.

Considering explored recoverable reserves of oil, 59 percent of the Far East reserves are located on and off Sakhalin island (1.4 billion barrels). Another 40 percent, or 956 million barrels, are in Yakutia, while reserves in Magadan account only for 43.8 million barrels. Potential gas resources in the Far East

Figure III.1.1. Key Oil, Gas Areas in the Russian Far East and Eastern Siberia



Source: Khartukov, 1994a.

are estimated at 24.2 trillion cubic meters (TCM), equivalent to 854 trillion cubic feet (TCF). Explored recoverable reserves are put at 1.6 TCM, with Yakutia (27.6 TCF) and Sakhalin (7.3 TCF) containing most of them. In 1994 only 3 percent of these explored gas reserves had been depleted. Practically all large fields in the Russian Far East have a level of stable condensate sufficient for commercial exploitation. (For alternative estimates of hydrocarbon reserves in Eastern Siberia and the Far East, from the Russian Academy of Sciences, see below, Chapter III.4.)

Prospective areas of interest, still unexplored, are (Khartukov, 1994b): (a) the Magadan shelf, with about 175,000 sq.kms of likely fruitful exploration, given the thickness of its sediments. Potential reserves in this area are evaluated as at least 53.6 TCF of gas (more than all other current known reserves

Table III.1.2. Explored Crude Oil Reserves in the Russian Far East

Area	No. of fields	Reserves category† A	B	C_1	A+B+C_1	C_2
		Million tons				
Sakha (Yakutia) Republic	11	—	—	438.3	438.3	667.4
	—	—	—	131.4	131.4	131.5
Magadan region	3	—	—	13.7	13.7	26.8
	—	—	—	3.4	3.4	6.2
Sakhalin region	45	85.4	110.8	677.0	873.2	753.3
	—	12.3	21.7	159.0	193.0	146.0
Total	59	85.4	110.8	1,129.0	1,325.2	1,447.5
		12.3	21.7	293.8	327.8	283.7

*Numerator shows oil in place; denominator indicates reserves as of Jan. 1, 1992. †For the rule-of-thumb comparisons, Russian (ex-Soviet) reserve category A + B corresponds to proved reserves and category C_1 + C_2 to probable and partly possible reserves. Explored recoverable reserves in Russian classification (category A + B + C_1) roughly correspond to the sum of proved and a part of probable reserves as they are understood in the U.S. petroleum industry.

Source: Khartukov, 1994a.

Table III.1.3. Natural Gas Reserves in the Russian Far East

Area, field status	No. of fields	Cumulative production	Reserves 1-1-92 A+B+C_1	C_2
		Billion cu m		
Sakha (Yakutia) Republic				
All fields	30	18.5	959.0	375.0
Under production	4	16.95	197.3	28.2
Prepared for commercial development	6	1.43	502.4	50.6
Under exploration/ appraisal	15	0.11	241.5	282.8
Under conservation	5	0.04	17.7	13.4
Magadan region				
All fields	2	—	6.9	7.8
Under exploration/ appraisal	2	—	6.9	7.8
Kamchatka region				
All fields	4	—	16.0	6.6
Prepared for commercial development	2	—	13.7	0.8
Under exploration/ appraisal	2	—	2.3	5.8
Sakhalin region				
All fields	55	26.4	615.2	223.2
Under production	22	24.8	45.6	11.1
Prepared for commercial development	7	0.07	480.7	145.4
Under exploration/ appraisal	10	0.44	85.7	66.5
Under conservation	16	1.06	3.3	0.1
Khabarovsk territory				
All fields	1	—	0.4	1.6
Under exploration	1	—	0.4	1.6
Total	92	44.9	1,597.6	614.2

Source: Khartukov, 1994a.

in the Far East), and 7.3 billion barrels of liquids; (b) the West Kamchatka shelf also has prospective areas of about 115,000 sq.kms, with potential reserves of 26 to 34.8 TCF of gas, and 3.65 billion of liquid hydrocarbons; and (c) additional areas with indications of promising reserves are on the shelf of the Bering Sea, especially the Karagin-Olyutor zone with sediment thickness of 3,000 to 4,000 m.

None of these areas has been drilled as yet, which means that, provided the right business environment and technological infrastructure, the Russian Far East may indeed play the role of strategic oil and gas supply base in the Pacific.

However, the most immediate prospects for exploitation are in the gas and oil fields in the Sakhalin shelf. While Yakutia has also substantial proven reserves (indeed, the most important known gas reserves in the region), the transportation problems are much greater than for Sakhalin, and it is likely that the first destination of Yakutia's reserves, when exploited, would be to supply the Russian Far East itself, a region that, at this moment, experiences dramatic energy shortages.

Foreign companies have been interested in Sakhalin oil and gas exploration for some time. Indeed, Japan's national oil company initiated such a project with the Soviet Union as early as 1975, although the difficulties of the project, and the improvement of the world's oil market supply and prices, halted this joint venture until the 1990s. After the opening of the Far East and Sakhalin to foreign trade and investment in 1992, a renewed interest in Sakhalin's energy resources from American and Japanese companies has transformed the island into the potential platform for Pacific supply of oil and gas ("a Pacific Kuwait," as a Sakhalin oblast official told us, only half joking). Indeed, Sakhalin's location, only a few kilometers from Japan, and very close to Korea and China, extraordinarily simplifies transportation problems that have been the major obstacle for export of energy resources from Siberia. Sakhalin does have substantial reserves offshore, and the beginning of an oil and gas industry on its shore (until now linked to small onshore fields). It also enjoys a warm-water port open all year around in Korsakov, at the island's southern tip. Additionally, it has a relatively developed urban structure (including hotels, business services, and satellite telecommunication link-ups) that could prove essential in establishing the support base for the entire exploitation system in the area, maybe including in the future more remote locations in the Okhotsk and Bering Seas. For all these reasons, American and Japanese companies have already set up permanent offices in Sakhalin. And for all these reasons, our study in the Far East focuses on Sakhalin, as the testing ground of the prospects and problems for linkages between foreign companies and Russia in the emergence of a new Pacific economy.

III.2. LEARNING FROM HISTORY: THE DEVELOPMENT OF THE OIL AND GAS COMPLEX IN WEST SIBERIA (1970-1991)[1]

Introduction

West Siberia's oil and gas complex is one of the largest energy production areas in the world. It is around the formation and development of this complex that the Soviet oil and gas industry was constituted. We will present in this chapter a historical overview of Western Siberia's oil and gas development, in order to understand the origins of the crisis and subsequent restructuring of the industry in the 1990s.

The evolution of the Western Siberia complex is characterized by a sharp contrast between the "boom" of the 1970s and the stagnation of the 1980s. The identification of the factors underlying the 1980s' decline will yield valuable lessons in assessing the problems and prospects for new oil and gas developments in the 1990s, both in Western Siberia and in the Far East. We will proceed by examining in sequence the periods of boom (1970-1980) and bust (1980-1991).

III.2.1. The Boom Period: 1970-1980

During the first period of its history, the economic efficiency of the West Siberian oil and gas sector was high: one year's investment returned in a half-year as revenue from sales in the domestic oil market.

The West Siberian oil and gas complex (WSOGC) was created in the late 1960s as a system of interrelated enterprises of oil and gas and their ancillary industries: construction, energy, transportation, machine engineering, and maintainance establishments. We will first describe its territorial setting, then analyze its productive performance in the 1970s, and ending with an analysis of management and policy errors that undermined the future growth of the production complex.

Territorial Organization of the WSOGC

The WSOGC is located on the territory of the Tyumen and Tomsks oblasts, with a population of over 3.5 million (as of January 1, 1991); 60,000 of them are aborigines of the North: Nenets, Khanty, and Sel'kup people. There is a high labor potential in the region: labor force makes up to 60 percent of the total population settled in the area.

The territory of the WSOGC contains a considerable variety of natural and climatic conditions, of mineral and other natural resources potential, as well as of transport accessibility and industrial development. North and South are different in terms of intra-regional labor specialization. In economic-geographical terms,

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[1]This chapter is based on two studies jointly conducted by the Institute of Economics and Industrial Engineering (IEIE) and the Siberian International Center for Regional Studies (SICRS), Russian Academy of Sciences, Siberian Branch: 1. Zapadno-Sibirskii Neftegazovyi komplex: Ekonomicheskaya, Tekhnicheskaya, Sotsial'naya Politika (West Siberian Oil and Gas Complex: Economic, Technological, and Social Policies), Research Report, Novosibirsk, 1992/1993; 2. Institutional Strategies of Sustainable Development: The Development of West Siberian Resources, Research Report, Novosibirsk, 1993. All data cited were collected in 1992/93. Calculations of costs and prices are also for 1992/93.

the petroleum province territory, located in the north of West Siberia, is divided into three zones: Near North (58"-62" of northern latitude), Far North (62" to North Polar Circle) and Arctic Zone (Figure III.2.1).

The Arctic Zone covers the Kara Sea shelf, and the Yamal, Gydan, and Tazovsky peninsulas. Its southern boundary coincides with the line of the Polar Circle. This is mainly a gas province. It is a region of the seasonal reindeer pasture and of other traditional activities of native people living in Yamal-Nenets Autonomous District (*Okrug*, later referred to as AO), such as fishing and hunting. The Arctic Zone is not suitable for permanent residence because of extreme temperatures in winter. The severe climatic conditions require special measures to be taken for health protection. Cost of construction work in this area is 10 times higher than in southern West Siberia.

The Far North includes the territory of the Yamalo-Nenets AO. Main resources of gas and gas condensate as well as significant oil reserves are located there. Natural and climatic conditions are harsh and not suitable for non-indigenous people to reside there year-round. The cost of construction work here is three to five times higher than in the south of West Siberia.

The Near North covers the territory of Khanty-Mansi AO and some areas of Tomsk region. The West Siberia major oil reserves are deposited there. There are arable lands suitable for agriculture. Year-round residency there is possible for non-indigenous people. Besides oil and gas resources, peat, timber, and fish are of industrial value. Construction cost in the region is 1.3 to 1.5 times higher than in the Southern Zone.

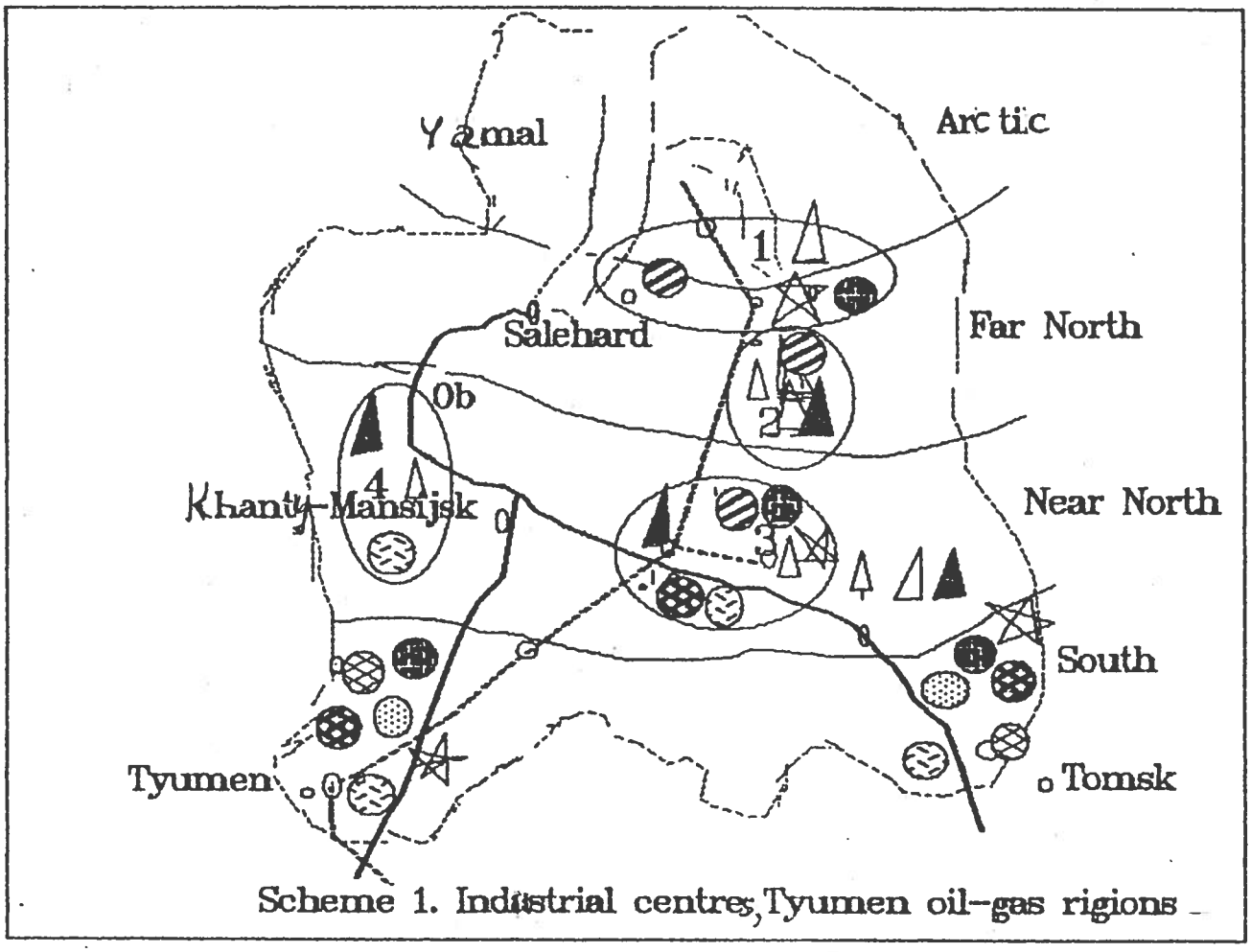
The Southern Zone covers the territory of Tyumen and Tomsk oblasts. It extends to 58 degrees latitude north, where the towns of Tobolsk and Kolpashevo are located. This area has a relatively developed industry: machinery, timber-cutting, petrochemistry, food industry, and construction industry. The conditions are relatively good for agriculture.

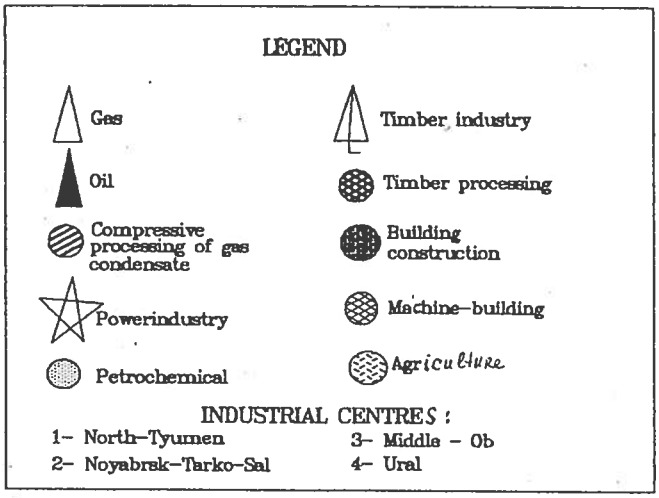
At the beginning of industrial development, the petroleum province was a residence site for about 200,000 people. The economically active population was mainly engaged in forestry, fishing, hunting, and agriculture. The most important industry — lumber — was concentrated in the area connected by the railroad to the Urals (railroad Ivdel'-Ob' and Tavda-Sotnik). On the rest of the territory, rivers were used for transport connections with the south of West Siberia.

The oil and gas industrial boom resulted in the formation of an oil and gas complex (1970-1980), and about half of the territory of the region was affected by dramatic changes. The rest of the territory was developed extremely slowly: the rate of economic growth in the North of Tyumen region was equal to 2-3 percent per year, compared with 10-15 percent in the oil and gas industry area. In the 1980s, the main part of the forest industry of the area close to the Urals remained stagnant, and this led to the stagnation in development of production and transport as well as in social infrastructure of the whole region.

Areas not involved in development programs lacked sufficient resources to be considered competitive with oil, and therefore they were left out of government priority and suffered from lack of investment.

Figure III.2.1. Industrial Centers in Tyumen Oil and Gas Province





Source: IEIE Research Report, 1993b.

As a result, by the 1990s the social infrastructure of these areas, especially in the areas of settlement of the native people in the North, suffered a serious decline. Housing became obsolete, with standards 30-40 percent lower than in the oil and gas areas. In such important items as sewage system and hot water supply, standards were two times lower than in the oil region. The development of the WSOGC radically altered the economic structure and the system of population settlement in the area, particularly in the Khanty-Mansi and Jamalo-Nenets AOs.

In the 1968-80 period, the formation of the West Siberian oil and gas complex was carried out by the intensive industrial exploitation of the Near and Far North areas, with the industrial development of the Middle-Ob area and North Tyumen area in Jamalo-Nenetsky AO given priority (see Figure III.2.1).

The Middle-Ob region was unique in the concentration of oil reserves: about 50 percent of the total for West Siberian province, with 80 percent of them located in several giant fields. These fields enjoy favorable technical-geological conditions for development: high concentration of hydrocarbons, relatively shallow formation, soft rocks. Consequently, the cost of increase in oil production there is the lowest in the whole West Siberian oil province.

The core of the oil industry in the Middle-Ob agglomeration was four giant fields: Ust'-Balykovskoye, Samotlor (usually considered as the "pearl" of the region), Fedorovskoye, and Sovetskoye; smaller fields located there were supposed to be included in development later. The above-mentioned fields became centers of the Nefteyugansky, Nizhnevartosky, Surgutsky, and Strezhevskoy industrial complexes ("knotes").

In addition to the oil industry, these complexes included the gas processing industry (for production of stripped petroleum gas), electrical energy (Surgut hydroelectric power station), and the construction industry.

The development of the North-Tyumen industrial agglomeration was projected for five years later than the Middle-Ob one. North-Tyumen industries associated with the main production are locally oriented, expected to distribute their products and services within their regional industrial complexes. Similar to the Middle-Ob agglomeration structure, the North-Tyumen agglomeration was developed around the largest gas condensate deposits, Medvezh'ie (Nadymsky industrial complex) and Urengoy (Novo-Urengoysky industrial complex). Output from these deposits was projected to meet 40 percent of the USSR natural gas demand at the beginning of the 1980s.

In the 1968-1985 period, the industrial agglomerations named above received the largest investments: more than 60 percent of the total investments in the WSOGC were applied for their development. Although capacity of the non-productive infrastructure was never high enough to satisfy the needs of the growing population, during the whole period of the WSOGC development there was a relatively well-developed social infrustructure in large towns and settlements of the Middle-Ob and North-Tyumen industrial agglomerations (i.e., funds for health service and medical care were about 80 percent of the level for the average Russian) (Table III.2.1).

Table III.2.1. Spatial Structure of Capital Investments in WSOGC in 1970-1990

Industrial Regions	1970-1980 bln rub	%	1981-1985 bln rub	%	1986-1990 bln rub	%
1. Arctic Zone	-	-	25	5.0	1.6	2.1
2. Far North,	7.4	3.7	20.0	40.0	29.1	33.6
incl. North Tyumen	3.0	15.0	10.0	20.0	11.7	14.6
3. Near North,	12.0	60.0	26.0	52.0	45.2	56.7
incl. Middle Ob	10.0	50.0	19.0	38.0	30.7	38.4
Priuralsky	-	-	1.0	2.0	8.6	10.8
4. Southern Zone	0.6	3.0	1.5	3.0	4.1	5.2

The whole region (WSOGC) is unique in diversity of mineral resources and in natural resources: oil, natural gas, gas condensate, coal, iron ore, timber, peat, fish, and furs. More than 50 percent of all Russian prospective hydrocarbon resources are concentrated there. While the Middle-Ob industrial area is the primary oil base of Russia (50 percent of Russian oil is produced there), the North-Tyumen is its gas base (more than 95 percent of natural gas was extracted there).

There are large towns with populations between 50,000 and 250,000 people in these two agglomerations: Nizhnevartovsk, Surgut, and Nefteyugansk in the Middle-Ob and Nadym and Novyi Urengoy in the North-Tyumen. Started as bases for development of giant oil and gas fields, these cities were later supposed to become stationary sites accommodating the personnel working on a shift-time basis, thus creating long-term economic conditions for more sustainable social development provided that the West Siberian oil and gas province be fully developed.

However, this conception failed to become reality because of the oil industry's prevailing interests in extracting more oil in the area. During the period 1981-1990, the strategy changed to start exploitation of the medium-size fields and to build new towns and settlements, with the population engaged in the processing of raw materials. This resulted in construction of several satellite towns built near Nizhnevartovsk and Surgut (Meguion,Raduzhnyi, Languepas) which nowadays are facing the problem of finding alternative sources for their development, due to the depletion of the hydrocarbon deposits in the area.

Oil Output and Technical-Economical Efficiency

A combination of many factors played in favor of reducing the social cost of hydrocarbon production in the region under discussion: high territorial concentration of oil and gas production (more than 90 percent of the total for the West Siberian province) and of urban (cities) settlements (by 1990 more than 86 percent of the population of these two agglomerations lived in cities).

Oil production in West Siberia (Middle-Ob area) started in 1964 in tandem with intensive economic development of the region. By 1975, West Siberia's share in the national oil output had already reached more than 30 percent, and by 1980 the region provided about two-thirds of total energy production in the country (in conventional fuel equivalent) (Figure III.2.2).

Development of the new major fuel and energy complex in West Siberia not only contributed to essential structural improvement of the energy balance of the Soviet Union but also made it possible to fully compensate for oil production decrease in other regions of the country and to provide overall national oil output growth (including about 80 percent of national production of natural gas) (Figure III.2.3a).

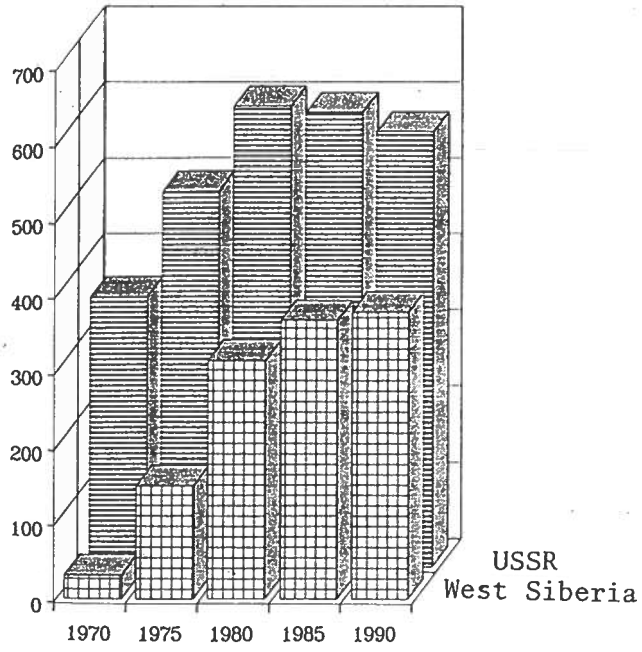
As early as in 1980, final products of the oil and gas industry made up a substantial part of the country's oil and natural gas exports, therefore providing for an essential part of hard currency revenues.

In fact, the oil industry in the WSOGC during this period of development achieved performance unprecedented in the world economy. In Libya, for instance, oil output reached 160 million tonnes during the 1961-1970 period, then dropped. In the province of West Siberia, where conditions for economic exploitation were much more complicated than in Libya, oil output reached almost the same volume approximately during the same time period (148 million tonnes in 1975), and kept growing: in 1980 the output had reached 315 million tonnes. During 14 years (1964-1977) the Middle-Ob oil complex yielded about 1 billion tonnes of oil. (To evaluate this performance, a point of comparison would be the following: the Tatar oil industry yielded the same amount of oil during 25 years of production, while Kuybyshev oblast produced 700 million tonnes of oil during 40 years of development of its oil fields.) Eighty-six percent of the total oil output increase in the USSR was provided in 1971-75 by West Siberia. It was West Siberia that made the Soviet Union the world's largest oil producer by the end of the 1980s.

Samotlor yielded more than half of total Siberian oil in 1971-1980. The best technical-economical indicators in oil production were displayed in this particular field: capital investment for 1 tonne of new production capacity made up 11.2 rubles/tonne in 1971-75, with the prime cost of production 1.2 rubles/tonne, which was five times lower than in the other oil deposits in West Siberia. After 10 years of development, Samotlor reached the maximum projected level of production — 140 million tonnes; later the output grew to 150 million tonnes. A key factor explaining the extraordinary cost efficiency in the oil industry of West Siberia in 1971-1980 was the forced exploitation of the high-flow-rate wells of the Samotlor deposit, flowing wells development. In addition to this, there were about 40 percent of production investments of the oil industry concentrated in the Nizhnevartovsky region (Samotlor).

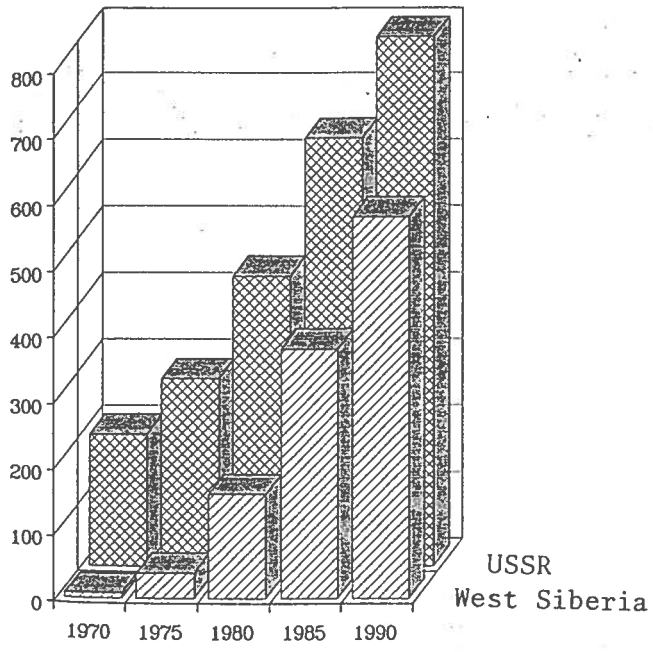
However, factors that explained the boom of the 1970s seem also to have contributed to the bust of the 1980s. Forced increase of production rates along with increasing retardation in infrastructure development became one of the main contributors to the unstable development and decrease in production efficiency in the following years. The first symptoms of negative trends appeared in 1978, when rates of production increase declined to 5 percent, and when it became necessary to put into operation eight new fields every year in order to keep production growing at the same rate for West Siberia as a whole. Another factor which contributed to the efficiency fall was artificial-lift well operation in the fields of Middle-Ob, put into operation in 1966-1970. Table III.2.2 presents data on trends in efficiency indicators of the oil industry of West Siberia: capital investment grew by 2.5 times and prime cost of production increased 25 percent.

Figure III.2.2. Oil Production in the USSR and West Siberia in 1970-1990, in million tons



Source: IEIE Research Report, 1993a

Figure III.2.3. Production of Natural Gas in the USSR and West Siberia in 1970-1990, in BCM



Source: IEIE Research Report, 1993a

Table III.2.2. Changes in Efficiency Indicators in Oil Industry in West Siberia in 1971-1980

	1971-1975	1976-1980
Well average production rate, tonnes/day	113	95
Prime cost of oil production, rubles/tonne	4.6	5.8
Capital investment per 1 ton of added capacity, rubles/tonne	14.5	34

Along with this major oil industry complex, a new site of production of natural gas started its development at the beginning of the 1970s, 500-600 km to the north of the Middle-Ob region. In 1975 its efficiency made up about 25 percent compared to the oil complex (in oil equivalent), and in 1980 it amounted to approximately 50 percent.

As a whole, we can evaluate the efficiency of development of the WSOGC by the following data. In 1976-1980, the investments amounted to about 20 billion rubles; total output of hydrocarbon raw material was 1.7 billion tonnes, and its cost in world prices exceeded by far 100 billion rubles; absolute efficiency factor (calculated for net output) in the WSOGC was twice as high as in the national economy at that time. The unusual conditions of economic development should be taken into consideration: for the first time in world experience, an oil complex had been built on a marsh, with limited parts of "dry" soil, with large territories of the region flooded every spring. In the initial stage of opening up this region, there were no equipment, materials, and technologies available in the Soviet Union to keep up with the soil and climatic conditions of the region. A railroad came there belatedly, when the oil base was already set up. All these factors contributed to a rise in production costs.

As for the gas industry, it was developed in an even more complicated geographic environment, including permafrost conditions, which made construction of main establishments extremely difficult and caused many problems in preserving the natural equilibium in the tundra.

Nevertheless, some appropriate technologies were discovered in well drilling, construction works, setting up of transport communications; highly efficient equipment was lorries, bulldozers, pipe rackers, etc. It helped to accelerate opening up of deposits and to cut production costs of some resources; i.e, over 300 millions rubles were saved by development of the Samotlor deposit; construction costs of one kilometer of road was reduced two times in a 10-year period.

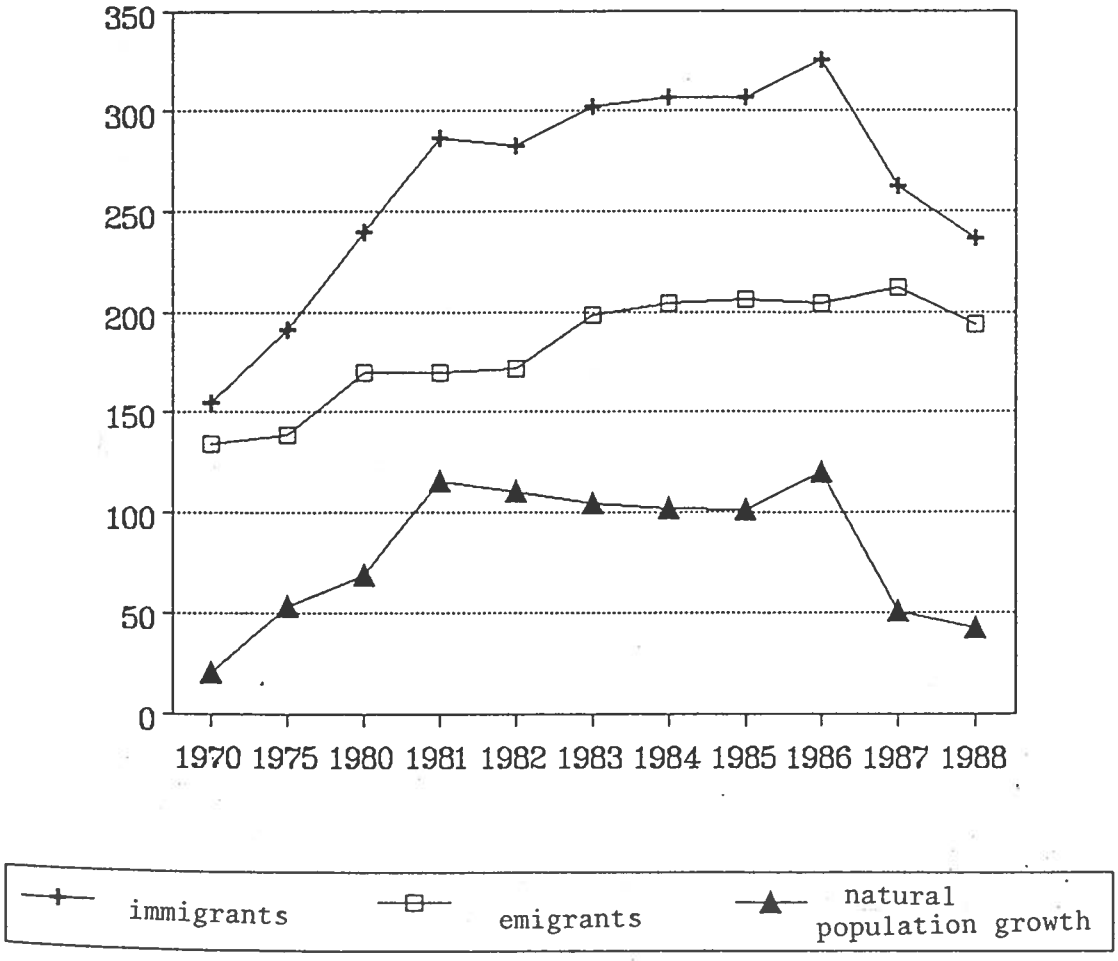
At the same time, high growth rates in oil production called for significant development of associated industries (electric power, wood cutting, local agriculture for providing residents with nontransportable food-stuffs) as well as of public amenities and productive infrastructure (transportation, construction, maintenance services).

Flaws in the Development Process in the 1970s

While the 1970s witnessed the extraordinary expansion of a major oil and gas production complex, a number of errors in the exploitation and management of the Western Siberian complex planted the seeds for future crises.

The most serious error was the disregard for elementary needs of the population in material goods and services. The share of non-production capital investments did not surpass 10-15 percent of total investments during that period. As a result, the population of the region was provided with inferior services in health care, education, and culture, at a level equivalent to about 50 percent lower than the average for the Russian Federation. As for the housing, the standards were 1.5 times lower than in the rest of the RSFSR. Such a low standard of living was caused to a considerable extent by a too-high labor demand in associated sectors which brought into the region an immigration flow far above what was projected: about 150,000 people (Figure III.2.4).

Figure III.2.4. Evolution of Population in Tyumen Oblast in 1970-1988, in thousand people



Source: IEIE Research Report, 1993a.

An additional problem was lack of adequate economic forecasting. Growth rates of oil and gas production due to medium-term and short-term plans were 1.2 to 1.5 times higher than in the forecasts and in the long-term plan of economic development.

In *technological policy*, the principles of direct labor-saving were not implemented as planned. Maximum cost efficiency in the oil industry was attained by means of realization of capital-saving techniques in fields development. This approach hampered the much needed infrastructure of roads, pipelines system for collecting and transporting oil, and services for operating control of fields maintainance.

Investments policy gave excessive priority to financing of oil deposits and of the main pipelines transportation system. Up to 75 percent of total capital investments were concentrated in this area. The subsequent deficits in infrastructure and maintenance services (their share did not surpass 5 percent of total investment) induced the use of old technologies in maintenance and related services. As a result, the ratio between the numbers of employees in the oil-producing sector and in the maintenance sector was 1:10.

These investment and technology policies resulted in rapid growth in oil production in the initial stages of oil flow; the negative consequences appeared later, during the transition to artificial-lift well operation. Multiple effects of lag in road construction and deteriorating accessability of wells were experienced in 1981-1985.

Social policy proved to be problematic in two aspects. The first priority was to provide oil production with labor resources, with little respect for normal life and living conditions for immigrant workers. On the one hand, workers received high wages; on the other hand, housing construction proceeded very slowly. The discrepancy between salaries and living conditions was especially striking in the initial period of development. "Northern incentives," provided by the companies after a certain length of service in the Northern areas, could not compensate for the absence of decent housing under harsh conditions. This was one of the main reasons for the high migration turnover. While total population growth reached 500,000 people, the total migration reached over 2 million people (Figure III.2.4).

This social policy hampered development of the oil and gas province. The solution to this situation was found in the system of work on the shift-time basis. Already in 1978-1980, about 20 percent of drilling works were performed by this method. However, social problems caused by a low standard of living continued to be acute. To find some solution to this untractable problem, help was requested from Moscow and Leningrad and from other areas of the Soviet Union. As a result, several housing construction enterprises were relocated to the Middle-Ob region, and building materials and pre-fabricated construction elements were delivered to the new oil settlements. These moves alleviated somewhat the harsh living conditions of oil workers and their families, but they did not solve the dissatisfaction of workers with their way of life in the Western Siberian oil and gas complex.

The accumulation of technological problems, lack of productive and transportation infrastructure, and deteriorating living conditions set the stage for the gradual decline of productivity and efficiency of the oil and gas complex in the 1980s.

III.2.2. From Slow Growth to Stagnation in Western Siberian Oil and Gas Complex: 1981-1991

At the beginning of the 1980s, WSOGC was of key importance to the fuel and energy complex of the USSR, accounting for the bulk of hydrocarbon production in the country (see Figures III.2.2 and III.2.3). WSOGC made the USSR a major exporter of oil and gas, to the extent that oil and gas exports became the essential foundation for the Soviet trade balance.

During the next decade, major changes sharply modified the characteristics and conditions of this energy complex:

(a) Cost efficiency was reduced and oil production pace slowed down.

(b) Production of natural gas increased its growth rate, thus converting West Siberia into the major gas extraction region in the USSR and Russia (60 percent of Soviet and 97 percent of Russian output of natural gas).

(c) New major hydrocarbon processing capacities were developed, particularly with the construction of refineries in Tobol'sk and Tomsk.

(d) An accelerated development of subsidiary industries took place as well, particularly in electrical power, transportation, and construction materials.

The diversification of the sectoral structure of the oil and gas complex economy became essential to increase its efficiency as well as the safety of its operation. The scale of development of extracting industries, the growing spatial size of development, the need to correct blatant bad management in the utilization of petroleum and gas — all these factors called for the creation of new, large enterprises to secure the maintenance of production and processing of hydrocarbons.

It was also necessary to extend geological exploration for identifying commercial hydrocarbon reserves.

All these new tendencies in the development of the oil and gas complex coincided with changes in investment policy. For the first time, the share of extracting industries in national capital investments reached 80 percent, while total investments increased up to 130 billion rubles. During the 1980s decade, the lion's share of investment (over 60 billion rub.) was provided for the oil industry and for the accelerated development of the gas industry.

Changes in Oil and Gas Output and in Efficiency Indicators

At the very moment when West Siberian oil and gas became essential for the fuel and energy balance of the USSR, the growth rate of industrial development in the WSOGC went down from 10 percent per year in 1981-83 to 4 percent in 1984-85, and to 3 percent in 1986-88. Oil output became unstable; it dropped twice during this period: by 19 million tonnes in 1985 and by 12 million tonnes in 1989 (see Table III.2.3). After reaching an of output 300 million tonnes per year, the oil industry showed a dramatic slowdown: while output growth in 1976-80 was 160 million tonnes, it made up only 56 mil-

Table III.2.3. Changes in Efficiency of Resources Use in Oil Production, 1980-1989

	1980	1985	1989
Oil output, million tonnes	313	366	399
Well average production rate, tonnes/day	90.9	43.4	22.3
Capital investment per 1 ton of added yield, rub/ton,	46	62.4	109.8
incl. index numbers (1980 = 100)	100	135	246
Prime cost of 1 ton of oil (in index numbers)	100	194.8	141.6
Energy coefficient	100	180	260
Labor coefficient	100	120	120

lion tonnes during the next five years, i.e. growth rate fell almost three times. In 1988 oil output reached its peak — 408 million tonnes. After that, oil production started to decline irreversibly — much earlier than was foreseen by many national economy forecasts.

Until 1989 the oil production in West Siberia had been compensating for the drop of oil output in other regions of the country, providing national output at the level of 590-600 million tonnes. In 1986-89, the oil industry of West Siberia influenced the rates of economic development of the USSR directly: decrease of oil output by 1 percent caused the loss of national income by 4 percent in that period.

At the beginning of the 1980s, West Siberian oil was of crucial importance for satisfying the national hydrocarbon demand of the USSR and became one of the major exports. Mainly due to growth of crude production in West Siberia, it was possible to take advantage of favourable conditions in the world market in the second half of the 1970s and the beginning of the 1980s. At the peak of prices of crude in the 1974-83 period, the value of Soviet oil and oil product exports accounted for $45-50 billion in world prices, although real revenues were much lower, since only about 1/3 of total oil exports were sold to the West for hard currency.[2]

This special position role of the oil industry had, paradoxically, a negative influence on its own development. Being the first priority, oil industry received all kinds of resources. However, with no stimulus for wise use of resources, enterprises adopted a strategy of extensive development which resulted in wasteful use of material, technical, and labor resources, and in careless exploitation of oil deposits.

The gas industry of the region played the most important part in stabilizing fuel and energy balance and hard currency revenues of the country. In 1981-89, rates of development of the gas industry

[2]Economists and Sovietologists from the West cannot explain the goal pursued by the Soviet Union in selling massively crude oil on the world market at dumping prices, starting in 1958. Super-cheap oil transformed Western economies in these 15 years (1958-73) by providing for their sustained high growth. German and Japanese "economic miracles" were greatly favored by cheap energy supply, largely related to a large supply of underpriced Soviet oil in world markets. One of the possible explanations suggested by some observers is that first Khrushchev and later Brezhnev were convinced by their then-ally Ghamal Abdel Nasser, president of Egypt, to dump world prices to weaken Saudi kings, the Arabian peninsula emirs, and the Shah of Iran , thus inducing revolutionary processes in these countries. If this was in fact the policy, it proved to be partly successful: monarchies in Iraq (1958) and in Libya (1969) collapsed, and "Arab socialism," similar to Egypt's own regime, seized power in these countries (Medvedev, 1994).

were comparable to that of the oil industry in 1975-80 (see Figures III.2.2 and III.2.5). However, such large-scale compensatory effect was short-lived; the possibilities for production growth of natural gas deposits in the Yamal-Nenets district were already exhausted to a considerable extent.

Causes of Unstability of Oil Industry Development in 1981-89

There are many reasons for the decline of the oil industry in the 1980s, but the most important ones stem from the strategy of the industry itself, namely by the extensive development policy implemented during the "boom" period of the 1970s. Strategy of primary development of the giant fields was characterized by extracting oil too intensively while intensifying production — a well-known effect of this is a steep decline in the final stage of field development. Major fields were put into production almost simultaneously, and accordingly they came to depletion at the same time (Figure III.2.6). To compensate for lost capacities, first medium-size fields were brought on-stream (1983-85), and then small fields in the Middle Ob region, with less productivity (1986-1990). Thus, the Nadym-Purskaya oil and gas province began to be developed. In order to compensate yield loss from one well at the Samotlor field put in operation in 1980, in 1985 it was necessary to bring on-stream 2.2 wells, and in 1990 seven wells. The costs of these additions (calculated for 1 tonne of oil) in 1983-85 were 1.5-2 times higher than before 1980, and in 1986-1990 already 4-5 times. As a comparison: 8 oil fields were brought into production before 1975, 30 fields by 1985, and about 60 fields by 1990.

Forced development of giant fields caused rapid growth in the number of flooded wells, leading to steep decline in their productivity. During 1986-89, all fields of the Middle Ob region became equal in terms of their wells' capacity (Figure III.2.7). Average well yield accounted for 20 tonnes/day in 1991, in other words, it dropped to an average national yield, losing the comparative advantage that Western Siberian fields had traditionally enjoyed.

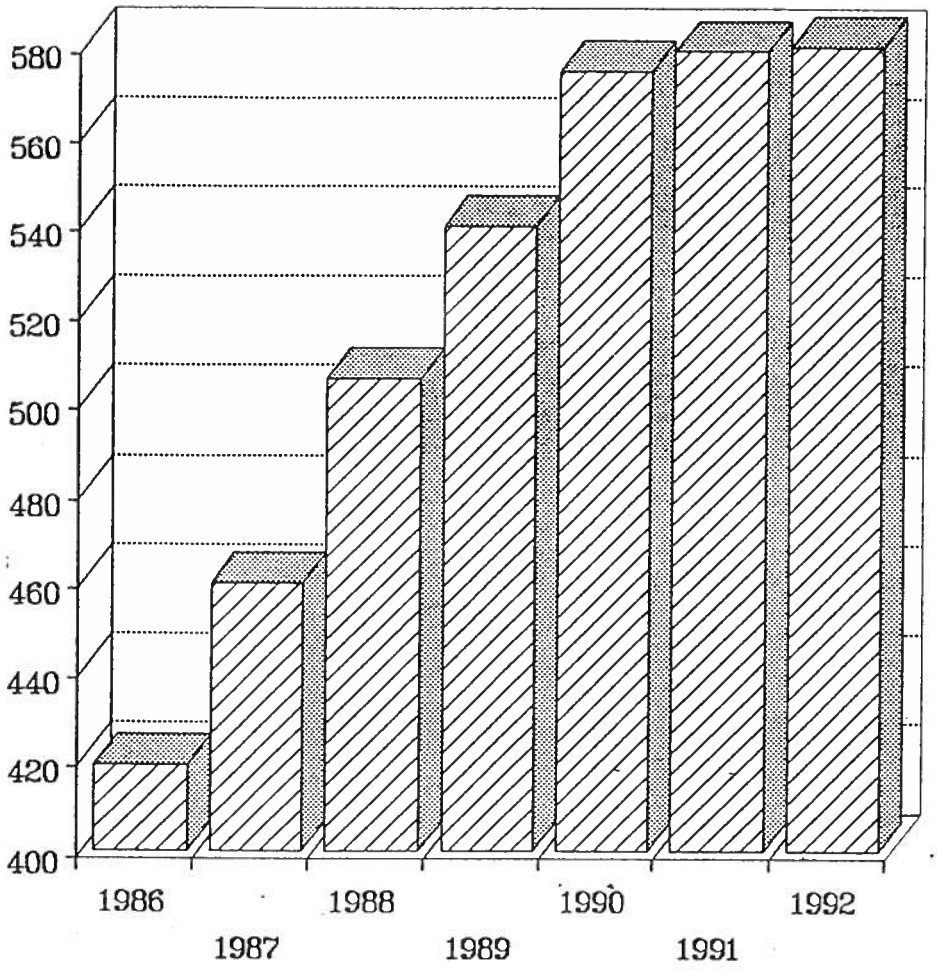
The extensive method of oil production, giving priority to drilling new wells rather than looking for other alternatives to increase extraction, was another cause of declining efficiency of oil production. **By 1990, 60 percent of all out-of-operation wells in the oil industry of the USSR were in West Siberia.** Emergency wells and drowned wells made up 62 percent of total out-of-operation stock in 1992. By 1992, crude loss related to inefficient use of wells in operation was comparable to the new wells' yield. Under these conditions in 1983-1990, in spite of massive conversion to artificial-lift well operation, it was impossible to avoid an efficiency drop in capital investments, and a rise in costs caused by growth of energy and labor consumption in the production process (see Table III.2.3).

Territorial Strategy in Oil and Gas Development

Oil production in the region was supposed to be developed as follows:

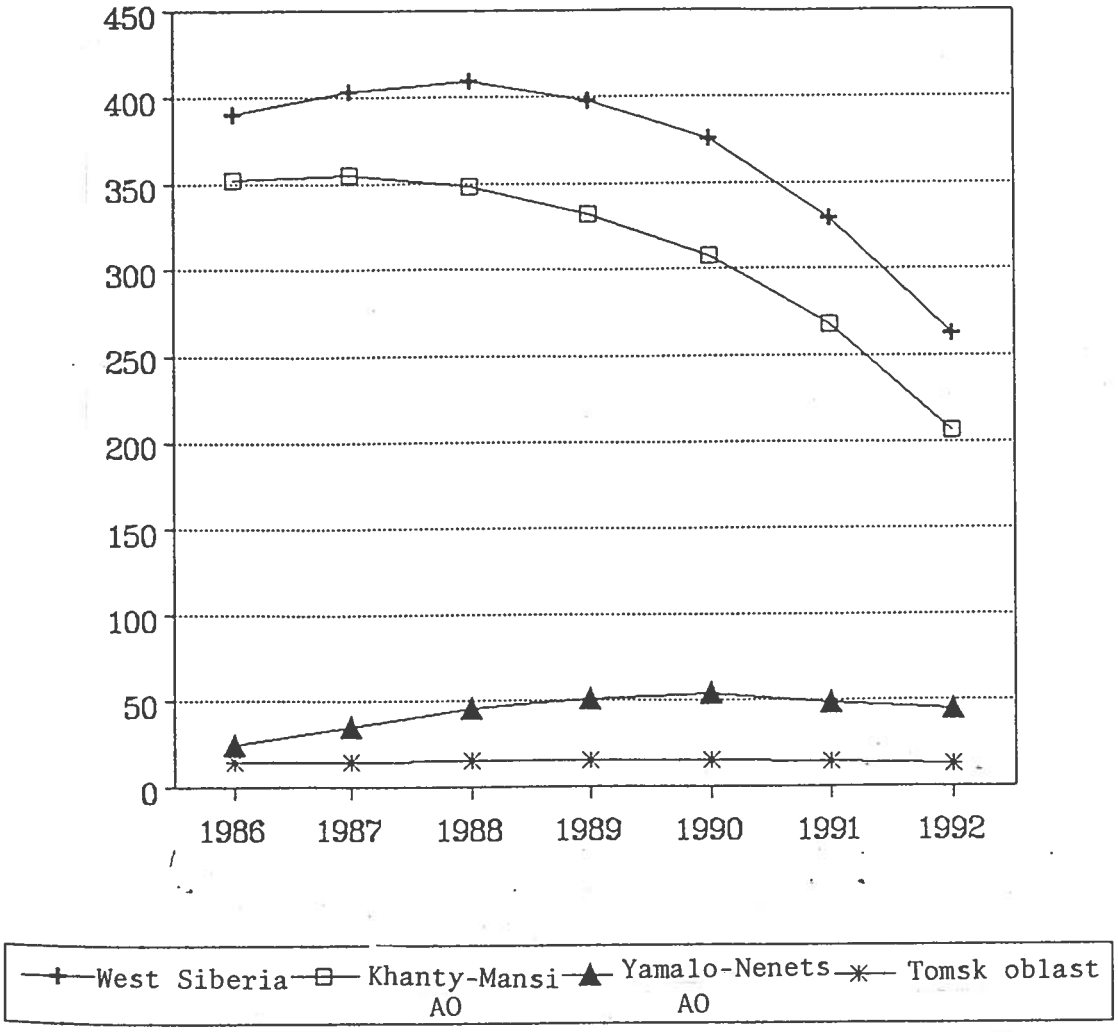
(a) bringing in operation medium-size deposits of the Middle Ob;

Figure III.2.5. Gas Production in West Siberia in 1986-1992, in BCM



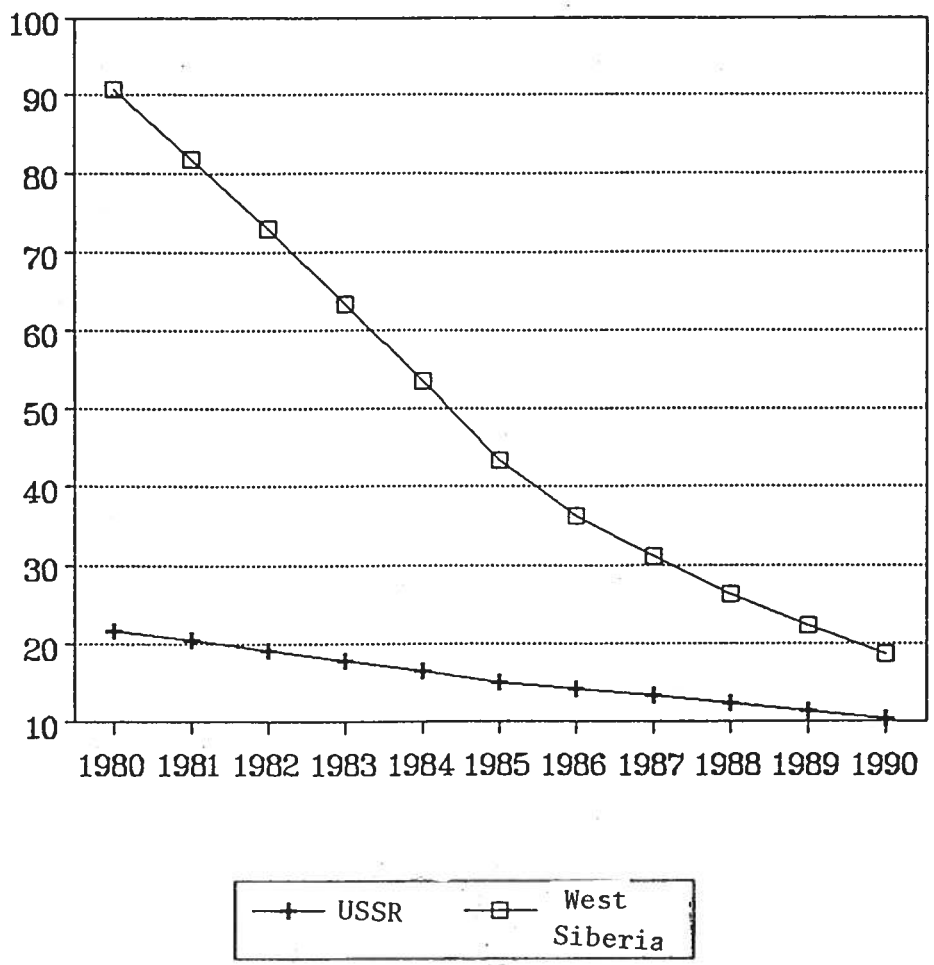
Source: IEIE Research Report, 1993a.

Figure III.2.6. Oil Production in West Siberia by Oil and Gas Regions, in million tons



Source: IEIE Research Report, 1993a.

Figure III.2.7. Average Well Yield in the USSR and West Siberia in 1980-1990, in tons/day



Source: IEIE Research Report, 1993a.

(b) economic development of new oil-and-gas bearing areas in Nadym-Purskaya oblast(Yamalo-Nenets AO) and in Krasnoleninsky svod (Khanty-Mansi AO).

Development of deposits of the Middle Ob had priority in terms of time, in spite of the fact that it had less reserves per one deposit than in Nadym-Purskaya. Such priority was chosen because of hopes of discovering a unique commercial pool similar to Samotlor. These dreams did not come true: large deposits in Yamalo-Nenets AO yielded no more than middle-size pools in the Khanty-Mansi area (Figures III.2.8 and III.2.9). At the same time, geological and climatic conditions in these new areas were more complicated than in Middle Ob; wells were 15-25 percent deeper, and capital consumption in production 1.5-2 times higher.

The process of increasing yields was carried on exclusively by extensive production methods: 20 pools were in operation in Middle Ob in 1981, 54 by 1986, and 60 by 1990. In the Tomsk region, there also was a high pace of development of new fields: 16 deposits were brought on-stream, located hundreds of kilometers away from the base deposit, Strezhevoye. Shift-time labor was the usual basis for the exploitation of these fields. As a result, temporary settlements, with low living standards, were erected in vast areas around the fields, with a population between 30,000 and 50,000 people.

Starting in 1983, the development of pools in Yamalo-Nenets AO (Noyabrsky and Purovsky industrial agglomerations) was accelerated, and their yield's share grew from 3 percent to 15 percent in 1990.

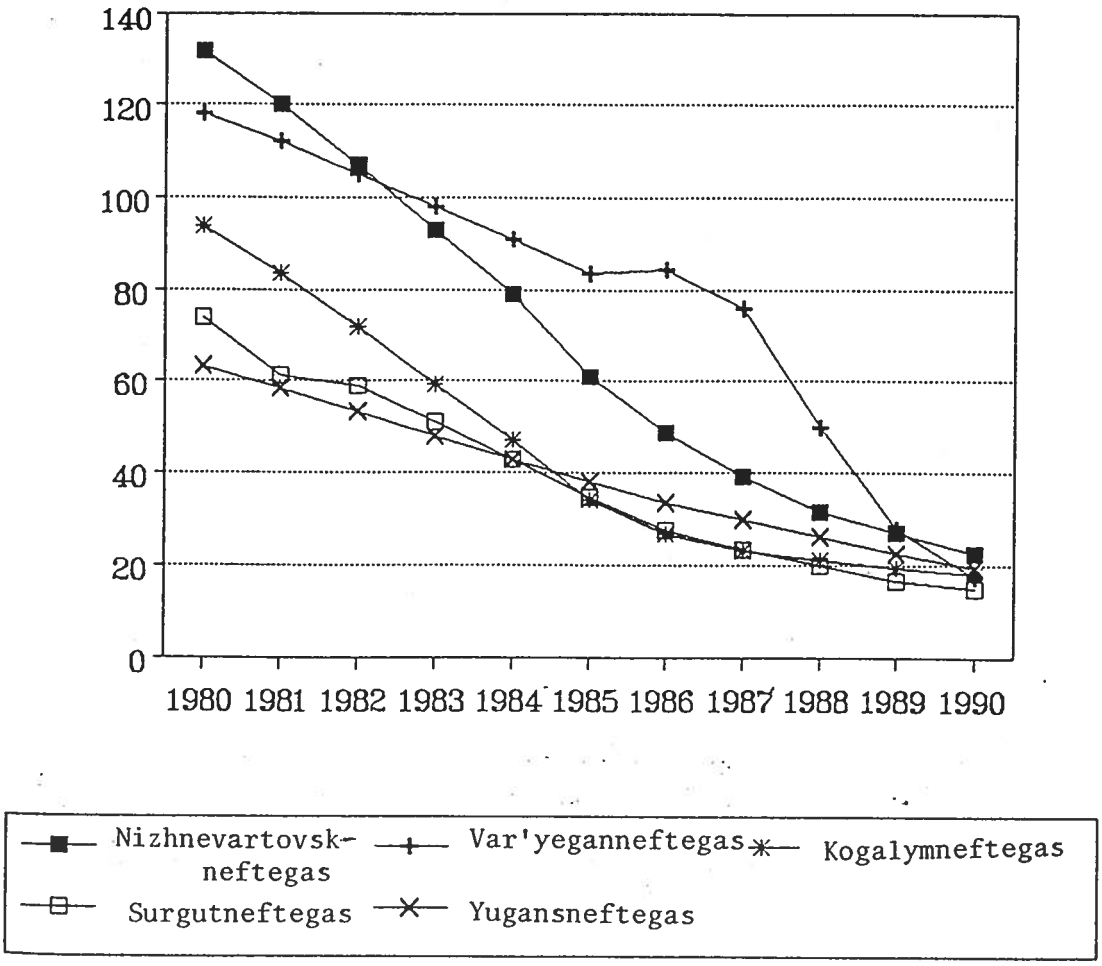
In 1981-85, the main features of spatial development of the industry were:

1. Capital construction related to bringing into operation new deposits, both in the Middle Ob region and in the Noyabrsk industrial agglomeration, went on in a vast territorial scale;
2. Wells-in-operation were converted to artificial-lift production with considerable time lag behind-what was originally planned;
3. Drilling works at new deposit sites were done much faster than the installation of new infrastructure: the lag averaged 1.5 years. In fact, from the very beginning of artificial-lift production, the oil industry was lacking in equipment supplies. Only 40-60 percent of pumping units and 50 percent of electric centrifugal-pump units in demand were actually provided.

As for investment policy, expenses for development drilling increased up to 40 percent. This was partly because the technological structure of capital investments reproduced the structure of the boom period of 1971-80, without taking into consideration the new, more difficult conditions of development.

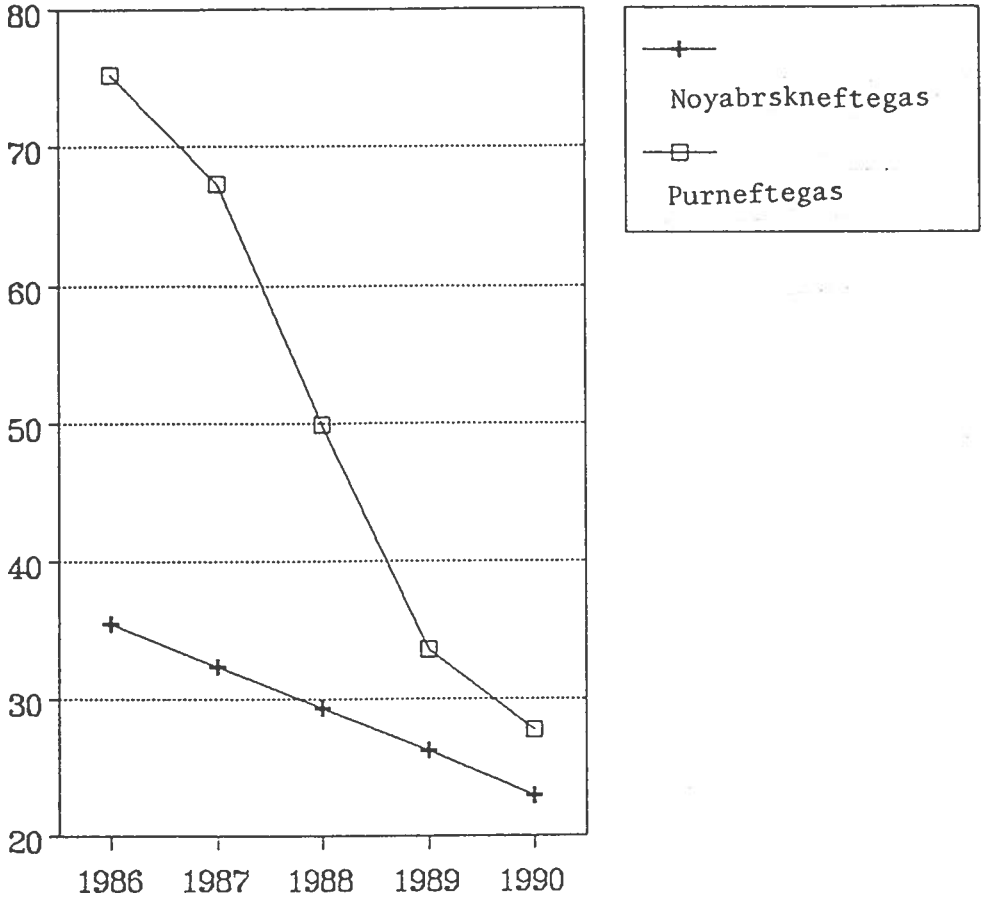
The territorial strategy of development of the oil and gas industry in 1981-1990 caused a significant shift of construction and investment activities from Near North, Khanty-Mansi AO, to the Far North (1981-85) and then to the Arctic Zone (1986-90).

Figure III.2.8. Average Well Yield in Middle Ob Area by Production Associations in 1980-1990, in tons/day



Source: IEIE Research Report, 1993a.

Figure III.2.9. Average Well Yield in Yamalo-Nenets AO by Production Associations in 1986-1990, in tons/day



Source: IEIE Research Report, 1993a.

Unlike 1981-1985, the pace of development advancing to the Far North slowed down in 1986-90. Production growth was hampered by technical development problems at the Nadym-Pursky oil deposits as well as by the fact that some reserves could not be located or confirmed, often due to bad drilling. New wells saw their efficiency plummeting — an indirect indication of the obsolescence of the technology used for development of new pools.

At the same time, major oil fields were kept on maximum production level: Samotlor (Nizhnevartovskneftegas), Fedorovskoye (Surgutneftegas), and Mamontovskoye (Yuganskneftegas) continued to be main oil producers in West Siberia by the early 1990s, although their reserves were depleted by more than 70 percent, and their wells' productivity dropped to the average of the overall oil industry. These giant fields were responsible for the high growth of oil production in 1971-80. But by the beginning of the 1990s they led the industry's precipituous fall in efficiency, as a result of continued extensive development.

Technology Policy

The technological basis of the oil industry designed during the "boom" period lagged far behind new demands in 1981-91. Technologies of the 1965-80 era were mainly related to large-scale concentrated production. Economic efficiency, under such technologies, was obtained by adding new wells in clusters, by increasing the power of oilfield equipment, and by expanding tanks' capacity as well as the size of pipelines. The whole technological system was geared towards the development of gigantic oil fields with highly concentrated reserves.

During the second stage, with large-scale development of oil reserves, such oilfields made up not more than 10-15 percent of the total. Those technologies did not work well for medium-size deposits with hard-to-recover reserves: their use caused over-expenditure of material resources 5-6 times higher, and oil recovery did not exceed 30-40 percent. (As an illustration, the power of pumping stations and pumping compressors produced in Tyumen exceeded by far the level of power necessary in small oilfields.)

Another unsolved technical problem was the conversion of directional wells to the artificial-lift operation. At the giant fields, a compressor gas-lift or natural pressure gas-lift was successfully applied in this situation. At smaller oilfields, pumping units or electrical submersible centrifugal pumps were applied, thus using traditional technology. However, a significant number of working wells in West Siberia were controlled directional wells. So, traditional electrical submersible pumps — designed for vertical wells — required repair twice as often as their usual obsolescence rate.

Oil-producing enterprises were not technically equipped for efficient underground servicing of controlled directional wells. At the beginning of the 1980s, demand for equipment at the WSOGC was already so high that regional industry of mechanical engineering was not capable of meeting it. It would have been possible to do it through a timely retooling of the national industry to fulfill the needs of WSOGC. A special program along these lines was indeed designed, but it never materialized. Some

purchases of imported gas-lift equipment were made at the beginning of the 1980s, and funds were assigned for construction of a gas-lift equipment enterprise in Kazan. However, as for the overall program of modernization of equipment, the factory was never built.

Imported equipment was used, but only 25-30 percent of demand was satisfied; Soviet-built compressing and pumping equipment was generally used. Special machine engineering was developed in the region for repair and production of small parts. Yet oil and gas machine engineering in the region was essentially flawed. This was mainly due to two reasons: (a) investment in the development of this industry was far too low, particularly if we take into account how much was being invested in hydrocarbon production, without thinking that engineering, and its machinery, was the basis for future production yields; and (b) oil and gas producers did not have the possibility to select the machinery that was suitable to their needs because of the monopoly of domestic machine engineering enterprises, and because foreign equipment was purchased by the Ministry according to its own considerations, without consultation with the producing enterprises.

The Crisis in Construction Works

The oil and gas industry also suffered from inadequate technological basis in construction works. Industrial methods were applied only in a narrow sector of oilfield equipment and pipeline construction; their share in total construction and assembling works did not exceed 10 percent. Construction of power lines, roads, and non-production installations remained, in the 1980s, at the technological level of the mid-1970s, for the most part highly labor-intensive.

Construction materials were delivered primarily from other regions of Russia, Ukraine, Kazakhstan, and Belarus. These distances, together with the bulky characteristics of these materials, and the underdevelopment of transport system and roads, increased transportations costs of construction materials dramatically, thus driving up the cost of construction by about 50 percent. Also, up to 10 percent of transported materials were lost on their way to construction sites.

Summing up the technological problems in the oil and gas industry of Western Siberia in the 1980s:

1. While in 1970-80 there was a search for new technical solutions in every sector directly connected to production and transportation of oil, this concern was lost in the 1980s both in the oil industry and in the oil and gas construction industry.
2. Diffusion of new technologies within the oil industry became uneven. Priority was given to new schemes of development of oilfields, while no progress was made in finding positive solutions to intensification of production.

   Practically at the level of the second half of 1970 remained:

   - exploration and development of reserves;
   - exploration drilling;

- oil conditioning;
- monitoring and maintenance of wells-stock.

3. There was little implementation of new technologies in construction of roads, pipelines, or electric power lines, with the consequent stagnation of labor productivity.
4. Growth in the scale of oil production and capital construction went on in parallel with a decrease of intersectoral coordination in decisionmaking in general, and in technological policy in particular. Therefore, any positive effects of new technologies were absorbed by the inertial of the old technological system.
5. Labor-saving technologies were only introduced in a few sites. As a result, labor costs in oil production (including direct and indirect labor costs in linked industries) grew by between 3 and 3.5 times. Expanded scale of oil production and extensive territorial strategy, together with the use of outdated technologies, caused growth in labor demand to double during 1981-90. This growth peaked in 1981-85, which saw the peak of immigration flow into Tyumen oblast (Figure III.2.4).

Social Policy

The main lines of social policy in the region did not change in 1981-89 vis-à-vis the preceding decade: the overarching goal was to provide the oil and gas complex with an adequate labor supply.

Migration policy kept its distinctive features of the previous period:

- Intake of new labor stimulated by higher wages and benefits received after five years of work in Northern regions;
- There was no medical control or selection of immigrants;
- Spontaneous migration prevailed; no more than 20 percent of the total immigrants were recruited by enterprises; and
- Migration of people close to pension age was stimulated by offering special conditions for purchase of apartments in warm climate areas or by permitting them to keep their own apartments at home during the years of work in Northern regions.

Settlement and town-planning systems directly depended on the location and scale of oil production.

Towns and settlements were still built near oil deposits, in spite of the fact that new deposits were smaller and, correspondingly, their "life cycle" much shorter.

The settlement system underwent significant changes due to growth in labor consumption of extracting industries as well as modifications to the intraregional economical structure. The population in oil and gas areas (South Zone not included) was growing faster than in the rest of the region. Immigration flows moved farther to the North: in 1981-85, maximum population growth was at the Near North (over 700,000 people) and in 1986-90 at the Far North. As a result, about 30 percent of the population in oil and gas areas lived in small towns and settlements with populations of up to 50,000 people.

In contrast to the first phase of development, social and service infrastructure in towns and settlements was built more rapidly. Construction of housing, schools, kindergartens, and medical facilities received priority in financing. In 1986-89, increase in housing construction was at its highest level, compared to all other periods of economic development of the WSOGC (see Figures III.2.10a and b).

However, quality of housing deteriorated: for workers without families, dormitories were built. In 1988, the share of these dormitories represented 25 percent of total new housing. Together with the lack of recreational, sports, and cultural facilities, this policy testifies to the technocratic approach dominating social policy in the region.

Organization of Production: The Method of Work by "Tours-of-Duty-at-Remote-Sites"

Rapidly growing demand for labor force raised a difficult question: how to attract about 400,000 healthy workers and to provide them with social services at a level not lower than the average for Russia. The solution to this problem led to the extensive use of the work method on the shift-time basis, which allowed bringing into the region a labor force from the European part of the Soviet Union, from its old oil and gas regions: Volga province, Ukraine, Krasnodarskiy Kray, and Belarus.

From 1978 to 1987, the number of people employed increased in the region almost three-fold: from 50,000 to 150,000. The average distance between work site and permanent residence site increased from 1,000 km to 2,500 km.

In 1981-87, already 25 percent of total employed labor in the WSOGC worked by this method. Unlike in the first phase of development, "tours-of-duty" were used not only in geological exploration and pipeline construction, but in development drilling, in oilfield maintenance, in transport, and in public amenities and social services as well. By 1990, the sectoral structure of the workers employed by this method reproduced the overall employment structure in the oil and gas complex: there were six people employed in sectors linked to oil production for each one employed in oil production as such.

Thus, labor-wasting technological policy and intensive use of manual labor in maintenance sectors caused an excessive use of work by the "tours-of-duty-at remote-sites" method and this, correspondingly, entailed a wide scope of new economic and social costs: excessive cost of transportation of workers to work sites, drop in quality and safety of oilfield maintenance, discontinuity of production process, and higher accident rates.

Down the line, after the oil production peak was over (in 1988), the "shift-time-expedition" work method was used less intensively, and by 1990 only 80,000 people worked by it (12 percent of all employed in the WSOGC).

Social consequences were even worse. First of all, the health of "shift-time-workers" was affected: after four to five years of such work, symptoms of overfatigue became permanent, ability to work dropped, and chronic diseases appeared. These workers drank 20-30 percent more alcohol than permanent residents of Northern oil and gas areas and almost twice as much as the average in Russia.

Figure III.2.10a. Provision of Housing in the WSOGC by Regions in 1985-1990, in square meters/person

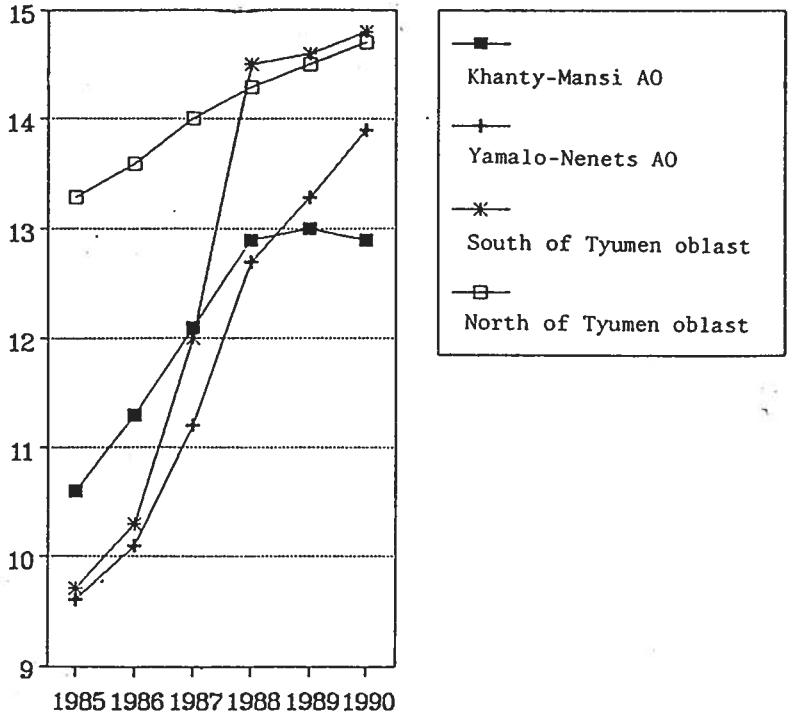
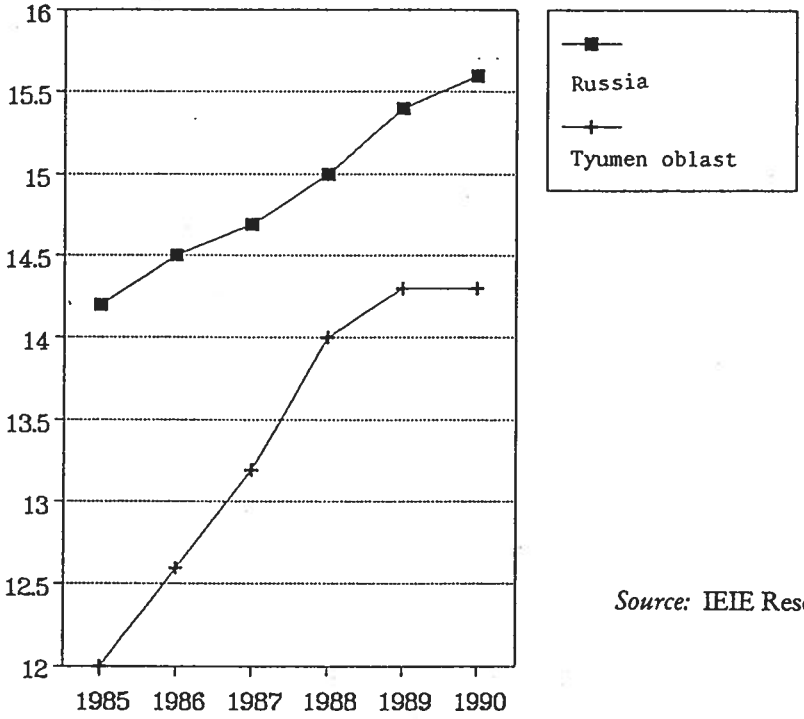


Figure III.2.10b. Provision of Housing in Russia and Tyumen Oblast in 1985-1990, in square meters/person



Source: IEIE Research Report, 1993a.

Thus, the low organizational and technical performance level of this work method was aggravated by the bad living conditions endured by non-resident workers.

Last but not least: the concentration of so many temporary residents in the region brings in the psychology of the provisional, a transient spirit, inducing a negative social and psychological atmosphere, as well as provoking a brutal attitude towards nature, including the neglect of traditions and the needs of the aboriginal population.

Environmental Issues and Problems of the Indigenous Population

The oil and gas industry has brought serious environmental pollution to Western Siberia. In a related development, it has also worsened natural conditions of life and economic activity for the indigenous peoples living in Khanty-Mansi and Jamal-Nenets autonomous okrugs, provoking growing social tensions.

Environmentally insensitive, extensive development of the oil and gas industry brings about a wide range of environmental disasters. Flora and fauna, and fish in particular, are heavily impaired by emissions of oil, drilling fluid, and various chemicals used in oil production. According to some estimates, annual spills of oil and oil products during the period of development exceeded 1 million tonnes, and sewage water emission amounted to about 70 million cubic meters per year.

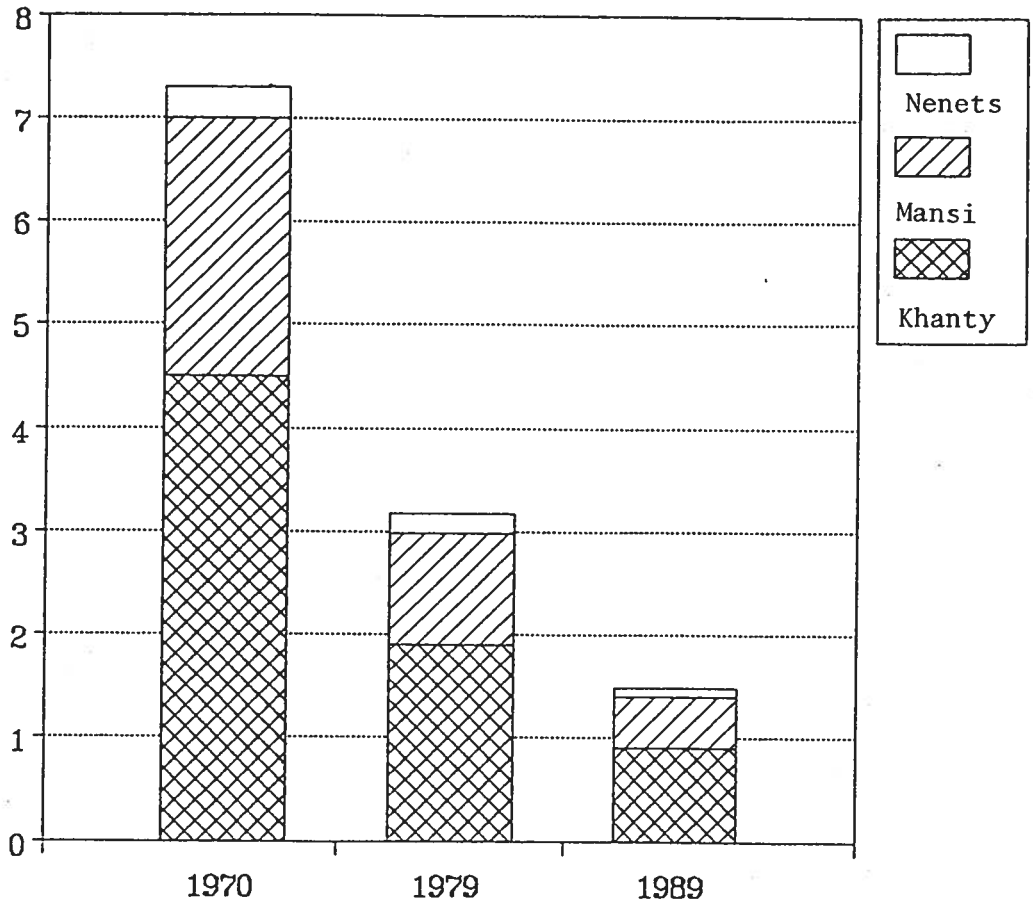
Another problem stems from continued exploitation of oil deposits without a system for collecting associated gas. According to estimates by the Russian Academy of Sciences, burning off dissolved gas in torches of oil fields alone takes about 35 billion cubic meters (=25 million tonnes) of oxygen out of the atmosphere; about 18-20 billion cubic meters (= 35-40 million tonnes) of combustion products are diffused instead, including carbon and nitric oxides, and cancer-causing emissions.

Forest resources are adversely affected by geological exporation and oil-producing works. When laying cuttings in the forest, for geophysicists to do their job, when burying communication cables in the ground, and laying roads, oil or gas pipelines, electric power transmission lines, etc., as well as during construction work at the oil and gas fields, a great quantity of timber is being cut without use, left to rot or burned on-site. Vast forest areas are destroyed as a result of oil spills, drilling fluid, and contaminated waters. Additional substantial damage is produced by water from melted snow and groundwater which flood territories when communications and road construction are being made without any drain systems.

Excessive industrial development of the Tyumen North has endangered the most fragile ecosystem of the region and has posed an enormous threat to the indigenous peoples of the North, Khanty, Mansi, Nenets's and Sel'kups. Proposals to create preferential land use zones, where any industrial activity would be banned, were not adopted. Traditional economic activities of the aboriginal population suffered considerably from the consequences of aggressive, uncontrolled industrial development on their land. As a result, the number of reindeer livestock decreases in the Khanty-Mansi AO every year, the fish catch is declining, and procurement of fur-skins is reliant mainly on caged animals.

In Yamal-Nenets AO, the number of reindeer livestock has been growing until recently, mainly through reindeer-breeding state farms on the Yamal peninsula. However, the process of decollectivization and the future development of the gas industry poses a real threat to this major economic activity. The gas industry directly threatens the lives of Northern native peoples, increasing the number of premature deaths, lowering life expectancy, and generally reducing their population (see Figure III.2.11).

Figure III.2.11. Share of Indigenous Population in Total Population in Khanty-Mansi AO in 1970-1989, in %



Source: IEIE Research Report, 1993a.

Indigeneous populations in the area have found their living space reduced and their economies based on their own resources increasingly difficult to maintain. Some indigenous people are leaving the region. Others are suffering through the deterioration of their material and social status, resulting in increased alcohol addiction and economic parasitism, because they are the least prepared to adapt to the new conditions.

Since 1980, the state and local authorities have finally paid some attention to the needs of Northern natives, and certain measures have been adopted. Some positive changes in the demographic situation of minority peoples occurred in the 1980s: they increased in number from 44,000 to 49,500 between 1979 and 1989. They also heightened ethnic self-awareness and developed their instinct of self-preservation (Pakhomov, 1995). Some benefits were granted to the aborigines: the lifting of prohibitions on catching valuable species of fish, various kinds of one-time grants, and the like. Nevetherless, these benefits by and large contributed to the corruption of traditional culture, and modified Northern natives' attitude towards work. Employment statistics show a discernible trend toward increasing unemployment among persons of working age both in traditional and non-traditional sectors.

The development of natural resources in regions inhabited by minority peoples destroys the natural environment of the aboriginal population, undermines the functional base of traditional sectors, and has tremendous negative sociocultural effects on the region. The reduction in the production of industrial branches, declining employment (and, as a result, hidden and open unemployment) are the economic consequences of the aggressive, expansive industrial development in regions of traditional natural resource exploitation. In fact, the socio-economic situation in the Tyumen North opened, among others, a new area of concern for Russian policymakers and raised a difficult, important question: how to avoid the deterioration of social conditions and the environment while proceeding with the development of the hydrocarbon industry in the region.

Conclusion

The model of extensive development of oil and gas found its own limits in the late 1980s on several grounds. An inadequate technological policy led to obsolescence of machinery, exhaustion of fields, and rising production costs, thus inducing the stagnation and subsequent decline of production levels. Unreasonable exploitation methods depleted fields ahead of their time. Subsidiary industries were not able to keep apace with the growth of oil and gas production. Supplies of materials were irrationally organized. Short-sighted social policies led to labor shortages, deteriorating living conditions, and the installation of a costly and inhuman rotating labor system. Carelessness in the treatment of environmental conditions, and in the preservation and respect of native Northern peoples, brought the region to the edge of ecological catastrophe and ethnocide. While the West Siberian Oil and Gas Complex allowed the Soviet Union to survive economically for more than two decades, the structural problems undermining the Soviet economy ultimately brought the Western Siberia complex into a deep crisis. The fundamental issue arising in the 1990s is that of the ability of the new Russia to revitalize one of the most important hydrocarbon-producing regions in the world, while recognizing the technological, social, and environmental conditions of its new stage of development.

III.3. THE OIL AND GAS INDUSTRY IN THE 1990S: THROUGH TRANSITION PHASE TO CRISIS

The energy industry being at the very heart of Russia's economy, its development also reflects as in a nutshell all the upheavals of the economic reform in the country. As early as 1985-1986, when the first indicative decline in oil output occurred, the state reacted to this by old and well-proven means: a significant share of new investment was injected into the industry, and a system of state measures stabilized the situation — but only for a while. From 1988 to 1991, oil production fell in Russia from 559 to 451 million tonnes; in 1992 it fell to 393 million tonnes, about 30 percent less than the peak output of 1988 *(Ekonomika i zhizn'* 6, 1993). By early 1992, 13,800 oil wells were out of circulation (9.5 percent of total wells in exploitation), and over 22,000 (15 percent) one year later. In January 1996, the number of non-operating wells totalled about 40,000 (*Izvestia*, 2.3.1996). Change in average daily output of oil was a dramatic indicator of the situation: from 1,142 thousand tonnes in December 1991, it fell to 985 thousand tonnes in December 1992 (Kryukov, 1993, Novosibirsk: 14).

By the late 1980s, it became evident that the situation could not be improved without profound systemic changes in the industry. In 1991 the "destatification" of the energy sector started, along with the reform of the management and pricing systems of the industry.

A sharp slide in hydrocarbon production is usually accounted for in various ways, the most important being lack of financial and technical resources invested into the industry; a growing number of idle wells; reduction in exploration and drilling works; depletion of existing deposits and reduced number of new fields brought into exploitation; wrong pricing policy; excessive burden of taxes and duties; crumbling of existing production infrastructure; etc.

The main objective of the following section is to explore the current situation in the oil and gas industry of Russia, particularly in West Siberia, and to consider the importance of these crisis factors, comparing opportunities for future development in two regions: West Siberia vis-a-vis the Far East of Russia. In doing this, we will divide causes of crisis into two groups: (a) internal to the industry, structural, and (b) external, i.e. economic and political factors.

III.3.1. Structural Factors of the Crisis in the Hydrocarbon Industry

(a) Deterioration in Quality and Size of Oil Reserves

In West Siberia, about 80 percent of proven oil reserves have been brought into operation, with the remaining 20 percent in need of additional exploration or located in smaller, less productive fields (Zhabreev, 1994). No large, highly productive fields have been found recently. From 1975 through 1991, the average size of reserves in new western Siberian fields fell fivefold (*Delovoi Mir*, 1993). Over 40 percent of reserves have been recovered from large deposits, which is close to physical constraint: after 40-50 percent of recovery, decline in production is attributed to significant reduction of oil content

in the extracted output. The best fields can achieve recovery factors of 60-80 percent, thus doubling the reserves for a given source of oil in place, compared with an average field (see Table III.3.1).

Table III.3.1. Reserves in Producing Oil Fields in West Siberia and % of Initial Reserves Withdrawn, 1990

Fields	*Remaining recoverable reserves (million tons)*	*% of initial reserves extracted*
Samotlor	1336	59
Fedorovskoe	415	45
Mamontovskoe	219	63
Tallinskoe	209*	20
Pravdinskoe	201**	9
Dovkhovskoe	194	6
Povkhovskoe	120	37
South-Surgut (Yuzhno)	109	49
Var'yega	109	59
Tarasovskoe	105	18
Sutorminskoe	95	29
Pokachevskoe	88	62
West Surgut (Zapadno)	87 (109)*	55
Sovetskoe	87	55
Vatinskoe	66	58
Vyngaiakhskoe	64	5
Yaunlorkskoe	62	38
Potochnoe	62	22
North Var'yega	59	36
Tagrinskoe	59	40
North-Pokurskoe	58	39
Ur'yevskoe	55	42
Danilovskoe	50	19
Lokosovskoe	43	60
Malorechenskoe	39	0
Karamovskoe	22	52
Barsukovskoe	22	35
Ombinskoe	17	0
Central Balyk	11	55
Total of above	4063	
Total for all West-Siberian producing fields	8441	39.6

Source: Dienes et al., 1994.

Oil production policy of the 1990s has not changed, thus ignoring lessons from the aggressive, short-sighted policy of the previous decades. Trying to get "bigger flows from higher yielding and easier to exploit deposits . . . (the oilmen) have practically ignored efficient development of other fields," declared Yuri Shafranik, Minister for Fuel and Energy of Russia, addressing problems of the industry at the Moscow meeting of oil executives in 1992.

At present, West Siberia is running out of cheap oil very quickly. According to Russian estimates of prospective hydrocarbon reserves, 1/3 to 1/2 of them (depending on area) are located in average to small-size fields (Zhabreev, 1994). Due to deterioration in quality and structure of commercial reserves, with a growing volume of hard-to-recover reserves from small and average fields and drop in production

rate of wells, exploration and production cost increase dramatically, requiring not only significant investment and better oil equipment but new technologies, such as enhanced recovery methods, horizontal well-drilling, and others.

(b) Natural Gas Reserves

The situation with natural and petroleum gas reserves in West Siberia is quite different from oil. Explored reserves are usually estimated at over 30,000 billion cu m (later refered as BCM) (Kryukov, 1995; Dienes et al., 1994). About 90 percent of total Russian reserves are in West Siberia, and they are still in the early stages of development. About 10,000 BCM of recoverable gas reserves are on the Yamal Peninsula, where development came to a standstill in the spring of 1989 — first up to 1992, then 1995, and then to 1997 at the super-giant field Bovanenkovo (the second-largest in the world after Urengoy) and Kharasavei, which is supposed to be brought into development in the next century: in 2003 (*Izvestia,* Feb. 28., 1994). The decision to conservate the Yamal deposits was made because of severe climatic and geological constraints, lack of appropriate technologies, and environmental opposition (*Gazovaya Promyshlennost'* no. 5, 1991).

At present, most West Siberian gas is being produced from two super-giant fields, Urengoy and Yamburg in the Nadym-Pur gas region (Yamal-Nenets AO). Total gas output from West Siberia, which is estimated about 27-28 percent of the world's total (Dienes et al., 1994) grew rapidly from 0.6 BCM in 1966 to 92.6 BCM in 1978 and then to 575.8 BCM in 1992 (see Table III.3.2); after that, production started to slide to about 550 BCM in 1994 (see Figure III.3.1). Here again we can see consequences from the Russian "pursuit of bigger flows from higher yielding and easier to exploit deposits" (as stated by Yu. Shafranik, see above). Due to a superhigh extraction level, inadequate prospecting and preparation which led to falling pressure, increasing water encroachment, technical production problems, and rising costs, the deposits will begin to decline in the very near future, thus repeating much of the history of the Siberian oil industry. To stabilize the output and then to maximize it, much of the exploratory and development work will have to be moved to the northern part of these two fields, into the deeper horizons; compressor capacities should be added, as well as additional geological information, new technologies, and substantial investment.

(c) Outdated Technology

Outdated technology is one of the most serious problems for the energy industry in Russia. Old technologies are based on a relatively uniform well pattern, on water injection to induce proper pressure in bed and oil displacement, and on driving oil out from well by pump or gas lift. From the 1950s on, new technological methods have been under discussion in Russia (Nigmatulin, 1993: 708); now it is a matter of vital importance. To increase oil and gas recovery from damaged or depleted reservoirs and to

Table III.3.2. Changes in Oil and Gas Production in Tyumen Oblast in 1964-1992

Years	oil mln of tons	gas billions of cubic m.
1964	0.2	–
1965	1.0	–
1966	2.8	0.6
1967	5.8	5.2
1968	12.2	8.3
1969	21.3	9.1
1970	31.4	9.3
1971	44.8	9.4
1972	62.7	11.6
1973	87.7	16.5
1974	116.4	24.7
1975	148.0	35.7
1976	175.0	47.8
1977	211.2	68.0
1978	245.7	92.6
1979	274.4	121.4
1980	302.8	156.1
1981	323.5	191.5
1982	341.4	231.0
1983	358.2	271.6
1984	365.4	322.8
1985	352.7	375.4
1986	375.9	419.1
1987	389.2	459.5
1988	394.4	505.5
1989	383.3	539.2
1990	353.6	568.9
1991	308.1	573.7
1992	251.0	575.8

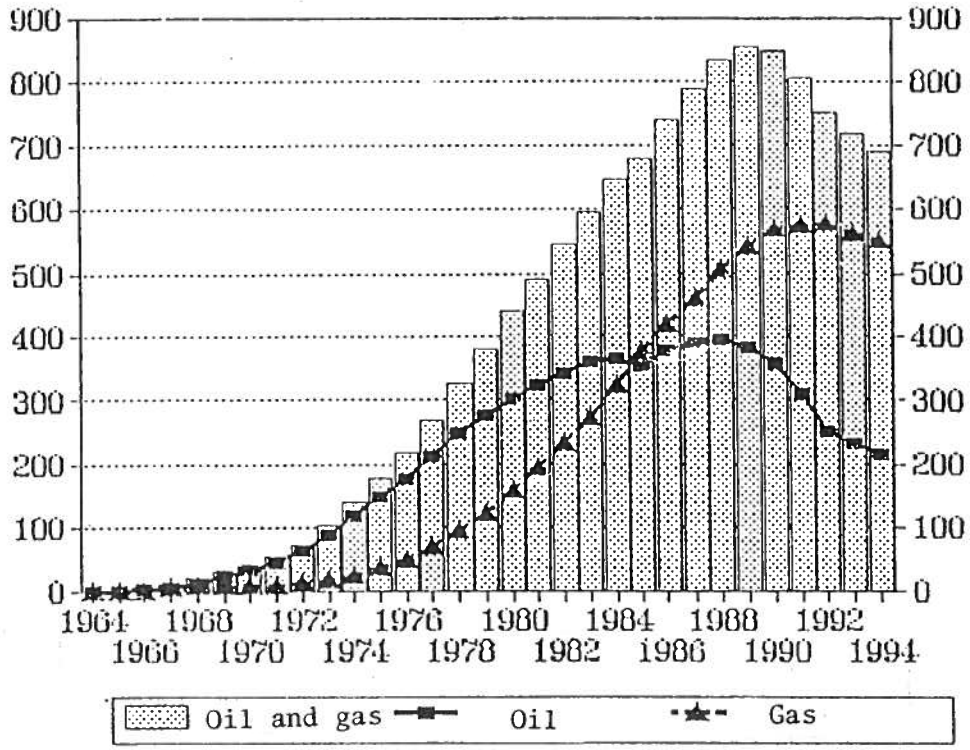
Compiled: data from year-books "Oil Industry", "Gas Industry" and bulletins of Tumen regional committee for statistics

Source: IEIE Research Report, 1993b.

be prepared for more difficult reserves, new technologies must be used, including horizontal wells, hydraulic fracturing, mechanical, physical, and chemical stimulation of formations, and well zones.

There are some areas in which foreign technology has compelling advantages. They include technologies connected with workovers and rehabilitation of existing wells, advanced drilling systems, offshore technologies, improved compressors, refinery upgrading, and technology transfer to improve production of oil and gas equipment currently made in former Soviet Union countries.

Figure III.3.1. Changes in Production of Oil and Gas in Tyumen Oblast in 1964-1994 (oil in million tons, gas in BCM)



Source: Kryukov et al., 1995.

However, economic and political factors in Russia significantly limit the role of imported technology. Due to an acute shortage of foreign exchange, Russia will probably rely on domestic equipment.

(d) Shortages in the Supply Industry

The Soviet Union had a comprehensive supply industry that was able to produce most equipment more cheaply, even if inferior to Western equipment. However, most of the enterprises producing energy equipment are located in former Soviet republics: 70-100 percent of the country's oil production equipment and tools are a monopoly of Azerbaijhan; pipe equipment is mainly produced in Ukraine and Azerbaijan. For the gas industry, production of large-size pipes (1400 mm in diameter, accommodated to northern conditions), advanced gas compressors, and cable production are located now outside the territory of Russia. With the breakdown of the Soviet Union, the Russian energy industry began to suffer shortages in equipment and irregularity in delivery. For instance, gas reserves in the Urengoi field are still big enough to maintain peak flow, but reservoir pressures are falling. Fifteen

compressor stations must be installed, but only nine of them had been built as of late 1993 (O&GJ, Sept. 20, 1993: 40).

No significant capacities in oilfield equipment have been added recently in Russia. Energy-machine-building enterprises in the Urals are old and need complete rehabilitation. At present, military enterprises are expected to tackle the problem, converting their technical potential to produce energy equipment, but this requires time, new investment, and better coordination among ministries involved (see Romanikhin, 1993). So far, the output of energy machinery is in decline: from 1992 to 1993 it fell 15 percent (SOPS report, 1994).

(e) Technical Infrastructure

Technical infrastructure in the oil industry is literally crumbling: more than half of the oil production equipment is worn out and over 50 percent is obsolete; only 14 percent of machinery and equipment was up to world standards in 1994. About 70 percent of total drilling rigs, manufactured by the Uralmash factory, are outdated rigs of types ZD, 4E, and BU-75, produced in 1950-1957. Every third workover rig (Bakinets-ZM, Azmash-4ZP) is a model taken out of production about 10 years ago (SOPS report, 1994).

Paradoxically, gas production being still in its infancy, the gas industry has already entered the stage of "intensive aging" (SOPS report, 1994). At least one-third of all material production funds are deteriorated (with practical operation rate 1.9 times in excess of the normative one) and need to be totally replaced. Domestic equipment is not only physically worn out but morally obsolete as well, and is not sufficient to fine-tune production at this stage and to accommodate it to current demands. The costs of technical rehabilitation and reconstruction work in the industry are growing rapidly (such costs made up 6.7 percent of total expenditures in 1985 vis-a-vis 12.4 percent in 1990).

(f) The Status of the Operating Well Stock

By Jan. 1, 1993, producing wells in Russia totaled 121,600. About 31,000 wells are non-operating, which is 21 percent of the total well stock. The number of idle wells has been growing in the last years. By January 1996, it has been reported to reach as much as 40,000 *(Izvestia*, February 3, 1996), vs. 10,000 in 1990. The production loss from non-operation wells standing idle beyond planned maintenance makes up to 38 thousand tonnes of oil per day. The greatest number of idle wells are in West Siberia, where half of the shut-in wells are down for minor repairs, accounting for 537,000 b/d of the province's total capacity of 983,000 b/d.

This dramatic decline in operating well reserves, and above all in West Siberia, can be attributed to several causes. The most historic of them is that the region is paying the price of the predatory, helter-skelter production practicies of the past, which resulted in damage to reserves. The most easily accessible oil has already been pumped, and West Siberia is now in need of new technologies and new equip-

ment to tackle production problems. The most common problems: water seeping into wells, stray tubing or other gear blocking the flow of oil, wellbore damage. etc. Much of the equipment available is of poor quality (see above) and tends to break down.

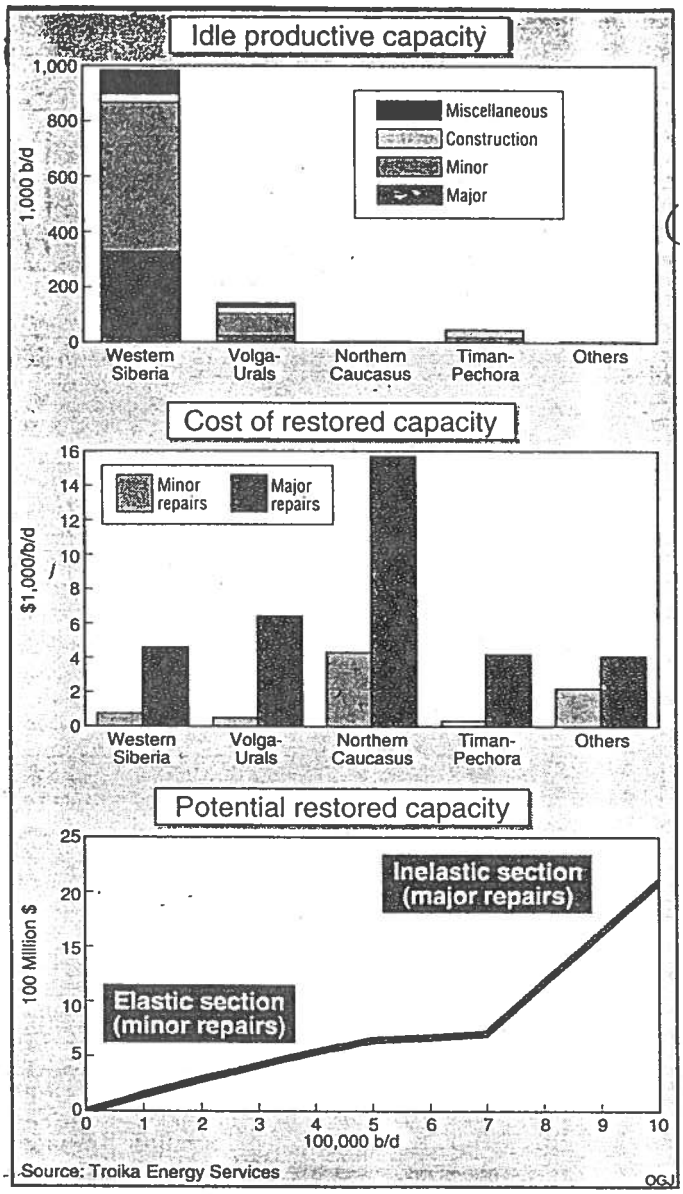
Russia's oil companies have little incentive to invest in production, because current oil prices still do not stimulate investment. "Wells are idle not because no one can do it, but because restored production will not recoup the cost of repair" (*Chastnaya sobstvennost*,' June 23, 1993).

However, according to the study done by consultants Troika Energy Services in Dallas, the situation is somewhat brighter. For the total of Russia's 27,592 wells idle but potentially productive following repair, restoration would increase the country's oil productive capacity by 1.2 million b/d (*O&GJ*, May 17, 1993). Troika developed a database of producing and idle wells, classifying them by types of repairs needed and estimates of post-repair productivity without stimulation (see Figure III.3.2). The most striking conclusion, says Troika, is that most production lost to idle wells is associated with wells needing only minor repairs. The cost of minor repair per barrel of restored capacity is estimated for West Siberia as an average $803/b/d (vs. $4,650/b/d for a major repair) — a very high return for minor repairs, with further cost savings possible by targeting fields where idle wells in need of minor repairs are clustered and the ratio of producers to injectors is high. Considering the fact that the Russian oil industry, while making some advances toward creating a reliable legal environment, is still in administrative and legal limbo, well restoration — combined with reservoir stimulation — could be cone of the most promising short-term programs for foreign investors in West Siberia. While the payoff is modest compared to what may be expected from the development of attractive new deposits, financial returns can also be much quicker. In addition, the Russian government supports foreign investment in this area. On January 4, 1992, the Decree of Government of the Russian Federation N 10-p was issued, authorizing 22 contracts of seven Russian companies with various foreign firms for the repair of 3,053 wells, among them Calgary Overseas (Canada), Frankenburg (USA), Sigma Granitsa (Czech Republic), and others. The Canadian Deb Industries, Ltd. set up to restore 700 wells, as reported by V. Ott, Chairman of the Oil Industry Committee, Ministry of Fuel and Energy of Russia, at the Moscow Oilmen Conference in 1992. Texaco, Inc. (USA), made a deal in 1993 with Sutorminskneft (Russia) to restore a total of 30,000 b/d of production from 150 idle wells in the area. Along with subcontractors like Schlumberger, Ltd. (USA), and Nabors Industry (Canada), they brought with them the latest technology and equipment. (*New York Times*, Nov. 26, 1993: C6).

(g) Problems in Geological Exploration

Extremely negative consequences for future oil and gas production have been caused by a sharp decline in financing geological exploration: between 1992 and 1993 it fell by 30 percent in Russia, which followed a drop of 36 percent in 1992 in relation to 1991, and 22 percent in relation to 1990 (Locatelli, 1995: 810). About 100 exploratory drilling crews of highly skilled specialists were disbanded during

Figure III.3.2. How Well Repairs Can Hike Russian Oil Flow



1988-1993, even in the most promising fields of West Siberia. Social tension is growing: because exploration companies typically are key employers in remote regions, sharp jumps in unemployment and shortages of goods are expected there.

Russia's development drilling totaled only 90.55 million ft in 1991 and was about 69 million ft in 1992 (O&GJ, May 10, 1993), compared to more than 203 million ft/year of development hole necessary

just to maintain the industry at the production level of 1993 (*Delovoi mir*, 1993). An unstable institutional structure (the old USSR Ministry of Geology was replaced by the new Ministry of Natural Resources Use and Ecology, now formally responsible for exploration and prospecting) added a lot to the collapse of exploration. Because of cuts in federal exploration spending, only general exploration work of national importance will be funded in Russia, notably for key onshore seismic surveys, geological mapping, and offshore surveys. Detailed surveys are left to local exploration companies. Now producers are supposed to sign contracts for exploration with various geological committees in the Ministry of Natural Resources Use. However, most production associations find further prospecting unprofitable under current conditions. Geological committees themselves are trying to set up companies with the right to do both exploration and production, mainly reaching out for foreign partners, but with modest success so far (Dienes et al., 1994). By the government's decree of April 25, 1995, geological companies were given the right to transport, via the main pipeline system and seaport terminals, all oil produced during the exploration or received as payment from oil-producing companies (the limit of 5 million tonnes is not relevant compared to 3.6 million tonnes performed in 1994), to export this oil abroad. This measure of state support for exploration companies, first of all because of their free access to the main pipelines, immediately raised the interest of other oil companies in buying shares of exploration enterprises and to enjoy their export privileges (*Kommersant*, May 23, 1995: 64).

In the gas industry, amount and quality of exploration become crucial for future development of the industry. Potential gas reserves in West Siberia are estimated at over 10,000 BCM; among them only 4,000 BCM have been explored. Most of the discovered or prospective reserves are in deep horizons (over 3 km), with complicated formation structures which impose heavy demands on efficiency of exploration, on use of new technologies, and, eventually, on the cost of the work.

(b) The Hydrocarbon Processing Industry

Despite its huge hydrocarbon resources, West Siberia is not the leading region of Russia's petrochemical production. Paradoxically, the most important West Siberia petrochemical complex, at Omsk, is not directly linked with the region's hydrocarbon production, but is based on the petroleum refinery whose operation pre-dates the development of the oil in gas deposits in West Siberia (Sagers and Kryukov, 1993). Historically it can be explained by the fact that the former USSR used mainly refinery-based petroleum liquids for petrochemical feedstocks, and as a result its petrochemical industry was concentrated in the Volga-Urals region in the 1950s-1960s (Sagers and Shabad, 1987 and 1990). However, in other countries with a large domestic hydrocarbon industry like Russia's, the petrochemical industry is based mainly on natural gas liquids (NGL) available as by-products in hydrocarbon-producing area. This switch from liquid to gaseous feedstocks has been occurring throughout the world since the 1970s, and future development in the industry leans toward geographical distribution close to natural gas production areas (OECD, 1985).

The problems of developing the hydrocarbon processing industry in West Siberia have been covered in the literature in considerable detail (*Soviet Geography* and *Post-Soviet Geography*, various issues; Sagers and Shabad, 1990; Sagers and Kryukov, 1993; *O&GJ*, various issues, etc.). Our objective will be to focus on current problems of the region's refining industry as directly related to its upstream sector.

Despite its enormous reserves of hydrocarbons, West Siberia continues to import fuels and chemicals from central Russia: 1.5 million metric tonnes/year of gasoline, more than 3.2 million tonnes/year of diesel fuel, and about 1 million tonnes/year of kerosene jet fuel (Plotnikov, 1993). In addition to petroleum products, the region imports basic petrochemicals and basic plastics, pipes, polyethylene film, textiles, other consumer goods, and specialty chemicals.

The cost of transporting a ton of crude oil to processing plants elsewhere and importing the refined product back to the Tyumen region in fact doubles the cost of developing and producing a tonne of West Siberia's crude oil in comparison to other regions of the former Soviet Union. Long-haul transportation is difficult due to severe climate conditions, a limited road network, great distances between widely spread major industrial towns and settlements, and the multiplicity of oil fields.

By Russian assessments, the aging structure of the industry is critical (SOPS report, 1994). A significant percentage of equipment and different production lines have been in exploitation, in average for the industry, 2 to 2.8 times longer than recommended by technical norms. Amortization rate of fixed assets of enterprises has reached 86-90 percent. Only 13-14 percent of total processing is deep refining, compared with over 30 percent in Western Europe and 50 percent in the U.S. As a result, refining depth, measured as the ratio of the output of all light products plus lubes against throughput, is usually estimated at 64-65 percent compared with more than 80 percent in Western refineries.

Liquified petroleum gas (LPG), which could feed new petrochemical facilities, is expected to increase through 2000, but its utilization suffered after the natural gas liquids (NGL) pipeline disaster near Ufa in 1989, which left the pipeline out of service. In that year, total LPG sales reached their peak: about 6 million tonnes/year. Tyumen region LPG production from associated gas grew from 970,000 tonnes in 1980 to 3.63 million tonnes in 1985, and then fell to 3.4 million tonnes in 1990 and 3.04 million tonnes in 1992 (Plotnikov, 1993). Petrochemical plants use most of the region's output of light hydocarbons. The main consumer in the region is the Tobolsky petrochemical plant, which produces 180,000 tonnes/year of a di-vinyl raw material for caoutchouc, a synthetic rubber. Other petrochemical plants are west of the Urals. (Since the Ufa pipeline catastrophe, LPG destined for these markets must be transported by railway).

In 1988-89, an attempt was made to radically change the utilization structure of light hydrocarbons through the construction of five very large petrochemical complexes in Tyumen oblast. After necessary governmental resolutions had been adopted, feasibility studies completed, and preparatory construction work begun, this large-scale project was cancelled, as a result of severe criticism from economists and environmental groups. It was the first and very remarkable example of changing pat-

terns in decisionmaking and the growing influence of public opinion in Russia (see more about this: IEIE report, 1993b: 42; Kryukov, 1995: 133).

The Tyumen region now has eight gas-processing plants (see Figure III.3.3), operated by Sibneftegaspererabotka (SNGP), which was established in 1975 to make use of 8 BCM/year of associated gas then being flared. Total installed capacity of the plants is 27 BCM/year, of which they currently handle about 19 BCM. SNGP assets also include seven compressor stations, a partially completed LPG gathering pipeline, and sections of natural gas pipeline.

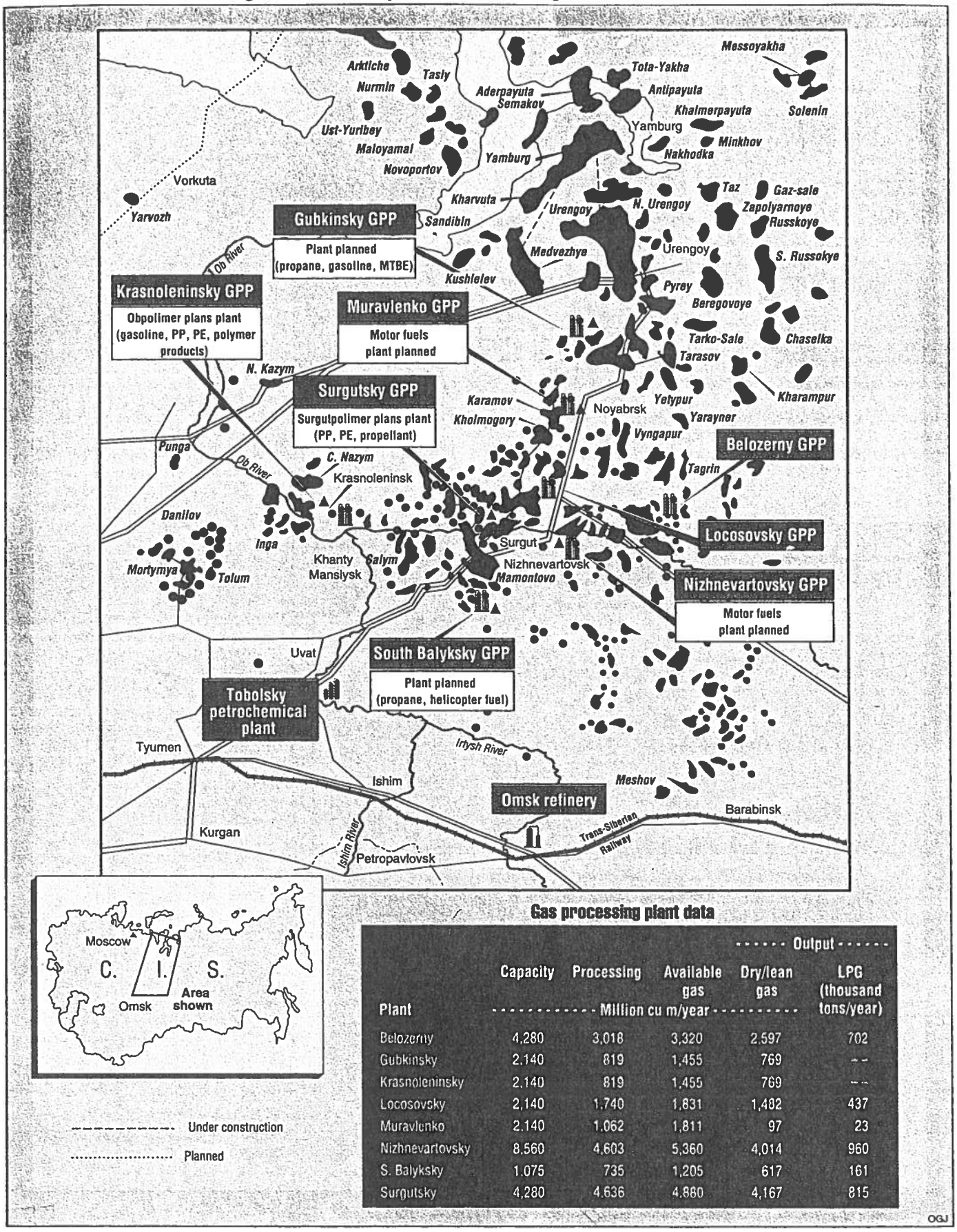
The continuing slide in crude oil production means a matching slump in refinery efficiency, and higher cost and reduced quality of refined products. In addition, rising oil prices and an aging, dilapidated infrustructure promise a massive shakeout of refining capacities. Refinery utilization rates in the Tyumen region was about 70 percent in 1993. Government plans include a major modernization and restructuring program in the refining sector of the country (17 of 28 Russia's refineries should be revamped).

A steep decline, as well as pattern changes, in product demand are expected in Eastern Europe and the former Soviet Union by 2000, according to a study by PlanEcon Inc., Washington, D.C., and DRI/ McGraw-Hill, Lexington, Mass. (*O&GJ*, May 31, 1993, and November 29, 1993). Consumption of mazut, gasoline, diesel, and kerosene is expected to fall by 2000 in the former Soviet Union, but it will grow substantially (about 7 million tonnes during the period 1993-2000) in Eastern Europe. Until now, limited refining capacities in Russia largely shaped products' use patterns rather than response to consumer demands. To reflect new market realities and to be able to deliver higher quality products for the European market, Russia's refineries launched an extensive upgrading and restructuring program in 1992. Among other projects, the program includes construction of major refineries in Tyumen oblast (to be built by Neftegaz) and in Tomsk oblast; a refinery on Sakhalin Island (as part of an offshore oil and gas development project in cooperation with the Marathon Oil Corp. and its partners); two small refineries in Noglikskiy Rayon, Sakhalin (as part of a project by the Russian Shell Oil Co.); a catalytic reforming unit at Khabarovsk and Komsomolsk; gas fractioning at Khabarovsk; and modernization of a fluid catalytic cracking unit at Angarsk refinery. In addition, there are about a dozen proposals and projects for small in-field topping units by nearly all the western Siberian oil and condensate producers.

As in the past, Russia's programs for refinery modernization are spreading limited resources too thin across too many projects, according to PlanEcon. Instead, the most viable and updated refineries should be selected; others will prove redundant because there will be no need for the refining capacity. Besides, the projects have not been subjected to economic and technological assessment to determine if they make sense in a new economic environment.

Another complicating factor for efficient development of the hydrocarbon processing is the trend toward vertical integration in the petroleum sector. Initially projected as the most important factor for stimulating formation of a competitive environment — as is the practice in the world petroleum business — in Russia it will probably not be the case. The newly organized vertically integrated oil companies

Figure III.3.3. Tyumen Processing Facilities, Plans



Gas processing plant data

Plant	Capacity	Processing	Output: Available gas	Output: Dry/lean gas	Output: LPG (thousand tons/year)
	Million cu m/year				
Belozerny	4,280	3,018	3,320	2,597	702
Gubkinsky	2,140	819	1,455	769	--
Krasnoleninsky	2,140	819	1,455	769	--
Locosovsky	2,140	1,740	1,831	1,482	437
Muravlenko	2,140	1,062	1,811	97	23
Nizhnevartovsky	8,560	4,603	5,360	4,014	960
S. Balyksky	1,075	735	1,205	617	161
Surgutsky	4,280	4,636	4,880	4,167	815

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will hardly foster competition because of the existing structure of propery rights. For example, over 92 percent of shares of the Lukoil company were sold in Moscow and only 0.4 percent in Tyumen oblast, including slightly more than half of them in Khanty-Mansy AO (see Kryukov, 1995).

Besides alleviating the refining sector's crisis, the upgrading program was intended to provide further opportunities for participation by foreign companies. However, the procedure that is currently set up has slowed penetration of western firms into the regional downstream market, particularly at the distribution and retail level, where regional monopolies will make it difficult to allow price liberalization and market forces to operate.

III.3.2. Financial Situation and Price Policy in the Energy Sector

The Russian oil and gas industry has suffered sharply from lack of investment since the late 1980s. Already in 1989, the gas industry was forced to self-finance, which extended to 97.7 percent of its funds in 1993. Investments in the oil industry (from all financing sources) fell 46 percent in 1993 vs. 1992 (SOPS report, 1994), and in 1995 only 15 percent of capital came from the federal budget (source: interview with a senior executive of the Ministry of Fuel and Energy in Moscow, July 1995), compared with nearly 40 percent of total industrial investment into the energy sector just before the collapse of the USSR.

From the outset of the radical economic reform in Russia began in 1992, energy was a major point of contention in the Russian political debate on reform (Aslund, 1995: 156). The amount of energy utilized per unit of Russian production was immense (it actually needed to be reduced), and energy was perceived as a price standard and as a determinant for the inflation rate; therefore, low, regulated prices were advocated by state industry leaders as well as by the general public. Initially, the reform government of Mr. Gaidar raised all energy prices fivefold by decrees, with the intention of freeing these prices later, by March 1992. Since then, the energy price policy of the Russian government has made several changes, along with changes of key personnel:

- In May-June 1992, reformist minister of fuel and energy V. Lopukhin, who advocated free energy prices, was fired and V. Chernomyrdin was appointed deputy prime minister in charge of the energy sector;
- In 1993, B. Fedorov (deputy prime minister) took charge of price policy, with his prime objective to cut subsidies to the energy sector and to raise state revenues, mainly through excise taxes on energy. The price of gasoline was officially liberalized on May 25, 1993 (after the referendum of April 25), but local price regulation remained common;
- In the summer of 1993, the price of natural gas was raised by 123 percent to 10 percent of the world price, and it was indexed monthly to the industrial wholesale index. By December 1993, it surpassed 20 percent of the world price (Aslund, 1995). It continued to rise faster than inflation, although it remained regulated by the state;

- After two and a half years, oil prices were finally let free. Although they have not reached world levels, they have come a long way: in July 1994, the domestic Russian oil price reached 38 percent of the world market price, though it fell to 27 percent of the world price at the end of 1994. From that, it started its continuous rise up to over 50 percent of the world market price by July 1995;
- The gas industry, much more monopolized (less competitive) than the oil industry, has insisted on keeping the lowest possible prices. By January 1993, the price of natural gas had fallen to 3 percent of the world market level. It was raised to about 8 percent in February 1993 (Aslund, 1995: 159). In July 1994, the natural gas price in Russia was 36 percent of the world price(Aslund, 1995: 161).

Price liberalization was the crucial issue.in the battle over deregulation of the energy sector. Gas industry leaders (who were already leaders of Gazprom) presented low prices as a public service: gas production remained high, and Gazprom needed to keep the price low in order to sell all its output. Indeed, it kept gas deliveries to customers in Russia and the CIS long after they had ceased to pay for them. Instead, Gazprom received from the government extraordinary subsidies, tax exemptions, and other non-transparent state transfers (Aslund, 1995: 159).

Failure to liberalize energy prices, as an important opportunity lost at the beginning of the reform process, was later acknowledged by Mr. Gaidar and even by Mr. Chernomyrdin *(Segodnya,* June 21, 1994).

Russia's long-term energy strategy was approved by a special interdepartmental commission in December 1994. This strategy envisages step-by-step increases in domestic fuel prices above energy replacement costs and toward world prices of oil and gas. It should gradually bring the domestic price structure in line with world price proportions.

Oil pricing is just one element of Russia's new energy policy. Inter-fuel price relations should also be changed. As at the beginning of the energy price reforms, domestic prices for natural gas are below full production and transmissions costs and are subsidized by modestly taxed huge gas-export revenues. This puts strong competitive pressure on deregulated prices of oil products and steam coal. (For more about current relations between various fuel prices see Khartukov, 1995.)

Starting in 1991, the World Bank, the International Monetary Fund (IMF), and the International Energy Agency (IEA) strongly advised that domestic oil prices in Russia be completely — and as soon as possible! — freed, along with the abolition of export duties. Later, it became a cliché to believe that liberalization of the crude oil prices would solve all problems in Russia's energy industry. However, some Russian economists argue that it may harm the economy as well: oil-processed products are already at about 90 percent of the world market price; rapid rise of prices of crude oil, which is almost exclusively used as refinery feed-stock, may have a disastrous effect on national refining, bringing final oil products well beyond the world price level. This will eventually hit the oil-producing industry and the Russian economy as well (interview with V. Kuleshov, Novosibirsk, July 1995). Similar arguments are developed by the World Energy Analysis and Forecasting Group (Gapmer) represented by E. Khartukov (Petroleum Economist, November 1995: 10). Instead, the whole energy price structure, currently dis-

torted by low domestic gas prices, should be reconsidered, giving priorities to serving the optimal and most efficient use of the country's available energy potential.

In search of the key measures to balance the federal budget and company investment needs, a new strategy of transferable prices within vertically integrated Russian oil companies was recently introduced. Whatever the prospective positive effects, this "will hardly stop Russia's oil majors from selling cheaper oil to their low-taxed affiliates abroad and offshore subsidiaries" (Khartukov, 1995: 11). Given the scale of corruption in the energy sector of the country, the threat to economic stability is serious.

III.3.3. Taxation Policy in the Energy Sector

The investment crisis in the Russian upstream oil sector is related not only to low prices but also to high taxes and payment arrears. Russian tax reforms still reflect some of the tax philisophy of the centrally planned system. Rather than allowing the industry to make sufficient profit to self-finance its investment needs — which was supposed to be the "way out" of financial difficulties — taxes are levied in such a way that the industry as a whole runs a deficit and becomes dependent on government subsidies in order to undertake the most urgent investments (for a schematic comparison of Russian and Western upstream price elements, see Table III.3.3).

Table III.3.3. Major Differences in the Price Structure in Russian and North Sea Crude Oil (based on 1993 average prices in US$/mt)

	Russian Crude	North Sea Crude
wholesale average crude price	42	125
- transport costs	5	4
= wellhead price	35	121
-taxes based on volume,costs or revenue	17	12
- payment to fed. oil investment fund	4	
= ex-tax wellhead price	15	109
- operating costs	10	30
- capital costs	10	35
= gross profit	-5	44
- corporate income tax	0	22
= net profit	-5	22
Tax take (incl inv. fund) in % of wholesale price	50	27

Source: OECD/IEA, 1994.

Rapid changes in tax policies not only stop foreign companies from investing but create no incentives and no possibilities for Russian companies to develop their production. At the conference of Russian oilmen in Moscow in 1992, there was a real outcry against the aggressive tax policy of the government: about 75 percent of the revenues obtained by Russian oil production associations were "eaten

up" by taxes, and only 16-17 percent were available to develop oil producion (*O&GJ*, April 1993: 27). In 1993, only about 15 percent of the oil companies could invest in production; the rest of them could hardly pay workers' salaries from their revenues.

By the Presidential decree of December 30, 1991, an obligatory conversion of hard currency revenues received from exports of crude oil and gas for rubles was introduced: 40 percent of hard currency revenues should be sold to the State at the low ("special commercial") rate, plus 10 percent of these revenues should be exchanged at higher ("market") rate. First announced to apply to all Russian enterprises, regardless of foreign ownership, the levy was soon limited to enterprises with foreign participation of less than 30 percent. Many companies which are subject to the mandatory conversion requirements are purchasing the equivalent amount of dollars on the same day that they are selling 50 percent of their hard currency earnings. The net effect is usually a windfall for the banks, as the companies have to pay an effective service charge on the sale and purchase (an average of about 2 percent for one transaction). Later the government had to yield to strong criticism from the West that the forced hard currency conversion would be a strong disincentive for foreign investors and in fact contravened guarantees contained in Russia's Foreign Investment Law. A 1993 amendment to the regulations, "On Procedures of Mandatory Sale of Currency Proceeds by Enterprises," allows exporters to cover all expenses related to a product's supply from their transferable currency accounts, and to sell to the State 50 percent of their remaining sales proceeds after expenses. These costs clearly include transportation and insurance; it is not clear if various extraction and export taxes or other items are included (Wilson, 1996).

The following is an incomplete list of special taxes that applied to crude oil and gas production. These taxes are levied even if the enterprise makes losses.

- Export tax: for crude and condensate, the export tariff was reduced from 23 ECUs to 20 ECUs per ton (approximately 7.2 U.S. barrels) by Decision of the Russian Government No. 304 of March 29, 1995. The export tax for natural gas was reduced from 5 ECUs to 2 ECUs per ton (about 1,150 cu m) by Decision No. 429, dated April 28, 1995, and effective Jan. 1, 1995. The rates for refined products will range from 8 ECUs for residual fuel oil to 20 ECUs for jet fuel (Decision of the Russian Government No. 147 of Feb. 20, 1995).
- Excise tax (from 0 to 42 percent depending on natural production costs): producers in the middle range pay 24 percent. Excise tax has to be paid on all oil sales, including those inside Russia; for exported crude, the tax base is the domestic market price. All joint ventures must pay the 24 percent rate even though their production costs vary greatly. Proceeds go to the federal budget. (Based on Decree No. 590, dated June 26, 1995, as of June 1, 1995, the excise tax for crude oil was raised from an average of Rb 21,600/t [US$ 5.1/t] to an average Rb 41,400/t [US$ 8.8/t]) (Khartukov, 1995). Many JVs have received the lowest rate of Rb. 20,000/t. Decree No. 590 removes exemption of the excise tax for some pre-1992 joint ventures which had enjoyed it prior to this latest ruling.

For natural gas, the excise tax was imposed at a rate of 15 percent on the value of exported gas. Recent regulations have taken the burden of the excise tax off the producer and put it on the transportation or marketing company (Wilson, 1996).

- Royalty: similar to the excise tax, the rate depends on natural production costs of oil and gas and varies between 6 percent and 16 percent. In the case of licensing of new fields, the rate is determined by negotiation or through bidding. The proceeds go to the federal budget (40 percent),to regional budgets (30 percent), and to local budgets (30 percent). The rate for oil and gas production royalty is established by Instruction No. 8 of the Ministry of Finance, dated February 4, 1993, to be specifically set by the local tax authorities, of the sales value of the crude less export duties, excise tax, and Price Regulation Fund (eliminated July 1, 1993) payments made.
- Geological fee: a rate of 10 percent is applied to all fields which have been explored by the State Geological Agency Roskomnedra or its Soviet predecessor. The proceeds pay for the contracts that the State Geological Agency conclude with the drilling enterprises. For companies which perform their own geological work on undiscovered areas, it is supposed that they could reduce their payments of this tax by the amounts spent on geological prospecting of new deposits. However, in practice the authorities have not been willing to accept this alternative (Wilson, 1996).
- Various special taxes are levied by regional and local administrations: exploration tax (1 percent to 2 percent of exploration costs); development tax (3 percent to 5 percent of development costs); land tax (1 percent); motor road use tax (approximately 0.4 percent of revenues), etc.

Besides taxes, payment into the federal investment fund is mandatory. The proceeds are redistributed within the oil industry, but the distribution criteria are not known (Russian energy prices, 1994).

Inconsistency in taxation and regulation, taxes imposed without warning, with unclear chances to get tax exemptions later, have resulted in cancellation of many exploration and development projects. For instance, the oil export tax decreed at the beginning of 1992 (US$5/bbl), was explained as an effort to balance the difference between international and domestic prices for Russian producers exporting part of their output and for brokers selling domestically produced oil outside the country. Soon after that, six non-Russian oil- and gas-producing groups won exemptions from the tax. Why was there selective exemption rather than outright removal of the tax? — Can other producer groups plan on exemption from the export tax? Many of these questions remain open. Reportedly the only preferential exemptions today are enjoyed by approximately 13 joint ventures which have been granted export tax exemption for periods up to three years under Government Decree No. 497. About 35 other JVs have applied for such exemption but have not yet officially received it. (Until March 1995, Russian production associations and Gazprom had enjoyed preferential export tariff rates which were abolished later. Prior to this abolishment, many of those companies received partial or full exemption from the tariff.)

The export tax has been expected to be repealed since 1994. In February 1996, details were released by the government on the commitment it made to the IMF. From April 1, 1996, export duty

will be cut from 20 to 10 ECU per metric ton, and abolished from July 1, causing an 8 trillion ruble (US$1.7 billion) loss to the budget. To compensate, excise duty will be raised from the current 39,000 rubles (US$8) per metric ton to 55,000 rubles on April 1 and then to 70,000 on July 1, 1996 — in spite of the fact that the Ministry of Fuel and Energy opposes these measures, fearing that they will harm energy consumers (*OMRI Daily Digest*, online edition, February 27, 1996).

The payment crisis is a serious handicap for the energy sector. Together with spiraling inflation rates and taxes, it brings the oil producers to the brink of bankrupcy. With payment from customers long overdue and the central government sharply cutting its oil investments, petroleum enterprises have been forced to borrow money from commercial banks at enormous interest rates. (Official agencies frequently regarded these loans as income and confiscated them to settle the petroleum associations' debts to the government (*O&GJ*, Apr. 19, 1993).

In 1993, debts to Russia's oil-producing associations totalled Rb 10 trillion (US$ 6.7 billion), representing more than half the country's bad debt owed by domestic and other former Soviet customers. Russia's biggest oil producer, Lukoil, alone was owed Rb 1 trillion. According to data of Mintopenergo of Russia, customers' debt to the energy sector grew 2.8-fold during the first half of 1993 and reached 4.969 trillion rubles, while its own liability to banks and customers was 3.632 trillion rubles (*EKO*, No. 1, 1994: 72). At the same time, there are different (almost 7 times higher) estimates available, and neither the Ministry of Fuel and Energy nor the Ministry of Finance can explain this statistical mess (see interview with Minister Yu. Shafranik and his two vice-ministers, in *EKO*, No. 1, 1994: 63-74). In short, "the situation borders on the absurd, with everybody in debt to everybody else," as put by the general director of Megionneftegaz production association from West Siberia (*O&GJ*, Apr. 19, 1994).

By November 7,1994, internal debt to oilmen of Russia amounted to 12 trillion rubles, as reported by Yu. Shafranik in his interview to Russian TV News.

Nonpayment of debts for petroleum supply often caused the producers to cut off deliveries to ex-Soviet republics. In August 1993, the Tyumen province had to drop crude oil delivery to Kazakhstan's Pavlodar refinery to only 1.4 million bbl from a promised 4.7 million bbl, because the refinery's debt to Tyumen producers had soared to 62.9 billion rubles (*O&GJ*, Sept. 13, 1993). Total debt of ex-Soviet customers to the Russian energy sector (including electric power) had reached 862.4 billion rubles by Aug. 1, 1993. About 80 percent of this debt accounted for delivered gas, including more than half of this to Ukraine (*EKO*, No. 1, 1994: 71).

III.3.4. Legal Environment

Legal framework for the exploration and development of natural resources in Russia was established in 1992 by a package of legislative and normative acts, with the most important of them the Federal Agreement, the Law on Subsoil Resources (or "Subsurface Resources"), the Regulation on the Procedure of Licensing the Use of Natural Resources, a number of presidential decrees, and resolutions of the

Supreme Soviet and the Government of Russia regulating the export of raw materials, processed minerals, and information products. These documents, together with other acts regulating land use, environment protection, payments for the use of natural resources, and procedures and rates of allocation to the mineral base reproduction fund, created much more a stable legal environment than existed before.

The most important regulations of the subsoil law are:

1. The balance of rights between federal and regional authorities. Natural resources of land and those of the 12.5-mile continental shelf zone fall under concurrent jurisdiction of the federal government and the administration of the territory ("subject of the Russian Federation"). Continental shelf natural resources outside the 12.5-mile zone are subject to exclusive jurisdiction of the Russian government. The major obligations and responsibilites for geological exploration and production of the mineral resource base are kept within the state and producing enterprises.
2. Equal opportunities to use natural resources for all businesses, including legal representatives and foreign subjects. Certain advantages are provided for enterprises previously entitled to use these resources and also for conversion of military enterprises and small-sized Russian enterprises.
3. Licenses for oil and gas exploration and development must be awarded by the state through competitive bidding in tenders or auctions.
4. Natural resource users are liable to payments: for the right to use natural resources, to the Mineral Resource Reproduction Fund, and to pay excise duties and royalties for land, water, and sea-bed areas.
5. The right to use natural resources is limited to five years (geological exploration), 20 years (exploration and development), and 25 years (exploration and subsequent development).
6. Property rights on geological and geophysical information belong to the party that has financed exploration. Information obtained during all previous years are state property. It can be sold to foreign companies only as an information package for portions of natural resources offered for tender.

Although this law provides some stability for oil and gas investors, there are important flaws in it which were pointed out by Russian and foreign specialists (see report of V. Orlov from the Committee on Geology and Use of Mineral Resources of Russian Federation, at the Conference of Russian oilmen in Moscow, 1992; Gazeev, 1993: 62-71; also comments of G. Hardy from the law firm Butler, Hardy & Stevens in *O&GJ*, May 24, 1993).

The initial documents package did not include, and had to be expanded by, specific laws on oil and gas, on the continental shelf, on concessions, etc. In addition, there were some contradictions already existing among provisions of the code. Altogether, these flaws made it possible for some republics and autonomous regions to ignore the document and adopt their own petroleum policies. Besides, upstream oil and gas licenses are treated by the subsoil law as "personal contracts or administrative allocations rather than statutory rights to underground resources, a financially important distinction" (Hardy, 1993). The most serious flaws contained in the whole legislative policy were that it did not secure equal rights for all

entities, including government enterprises; current pricing policy and taxation policy were inconsistent; and jurisdictions and property rights at various levels (federal, regional and local) remained intertwined.

The Law on Oil and Gas was designed to tackle these questions, or at least some of them. The law provides regulations to the licensing policy for oil and gas fields, taxation and duties for upstream and dowstream activities, and access to the pipeline system, as well as protection of underground resources and environment.

Conflict of Interest Between Federal and Regional Authorities

Although the law claims the balance of rights between the central government and regions over licencing, it did not provide clear definition of this "balance." The idea was that specific conditions for licences for the use of deposits must be agreed on at the local level, and then the final decision must be taken according to the principle of "two keys," i.e. by both the federal and regional bodies. In practice, the center tries to strengthen its influence, "to improve a two-key lock, so as to open the lock only with its own key" (for detailed analysis of the problem see Kryukov et al., 1995: 287-313). For instance, by two President's decrees issued in March and December of 1993, licenses for development of oil and gas deposits were given without any competition or auction and without approval of regional bodies, under the pretext of "necessity to meet the state interests" or to enterprises which previously had been developing oil and gas fields; but additional license conditions were not discussed with regional administrations. Siberian regions claim also that some share of excise tax payments should be assigned to the regional budget (as part of economic rent); currently, all these payments go to the federal budget. Not only separate regions fight to secure more control over their hydrocarbon resources vis-a-vis Moscow but their associations as well. During 1992, the inter-regional association Siberian Agreement was given responsibility fodr some functions normally performed by the federal government: regulating the shipment of goods and resources by licences and quotas, fixing prices, setting taxes. From the beginning of 1993, in a series of meetings with central government ministers and officials, the Siberian Agreement began to tighten the pressure on the central government for more local economic control. In August 1994, it concluded, at the meeting of its Coordination Council for the use of underground resources, that the regions were put into the helpless position of being "the witnesses of uncontrolled issuing of licenses for the use of mineral resources of Siberia by the federal agences" (*Kommersant-Daily*, Aug. 3, 1994).

Some concessions have been made by the central government to delegate more control of export quotas and export licenses for oil and gas, but basically the control of them is in Moscow. As a result, continuing tension between central and regional authorities adds to political instability and increases a number of disincentives for potential investors into the petroleum sector.

III.3.5. Management Changes in the Hydrocarbon Industry

The gradual dislocation of the centrally planned economic system began with Gorbachev's laws on the Autonomy of State Enterprises in 1987 and 1991, followed by the State Orders system, and finally by the fall in centralized financing of investment, together with dislocation of links within the oil chain between producers and equipment suppliers. All this collapse of the planned economy demanded a reorganization of the entire energy sector. A form of restructuring was based on energy enterprises which took the form of a production association and regained some economic powers. In order to manage state enterprises in the sector, state financial holding companies were set up — Rosneft for oil and Gazprom for natural gas. These two companies were to carry out the necessary restructuring prior to privatization to be done later in the strict sense.

The 1992 Law on privatization required the production associations to become stock companies, with the shares initially being held by the financial holding companies. Gradually, part of the capital was to be opened up to private investors (through the distribution of vouchers to the population), and then to the staff of the enterprise in question. The state was to remain the majority shareholder, through Rosneft and Gazprom, for at least three years. Gazprom's capital was to be divided up with 40 percent of the shares in the state property, 10 percent going to the management, and the rest divided between the staff, the directors of different units, and the population as a whole, including 29 percent of the shares to be sold only in those regions where Gazprom units are located.

(a) Restructuring of the Oil Industry

The President's decree of November 17, 1992, on the privatization in the oil industry addressed a rsstructuring of the oil industry. Rosneft was regarded not only for managing changes of legal ownership, but also for reorganizing the industry on the basis of eight to ten *vertically integrated oil companies* (or VIC). One of the aims of creating VIC was to stimulate a degree of competition in the oil industry, among oil companies in the country and with international companies on the world energy markets. The companies had to be vertically integrated from exploration to production, refining, and distribution of oil and oil products. With this intention, seven VIC had been created by July of 1994 (Table III.3.4). By early 1996, 13 VIC had already been set up.

These companies have the structure of financial holding companies, with the state retaining the largest share of the capital (via Rosneft): 45 percent in Lukoil, 38 percent in Surgutneftegas and Yukos, and 51 percent in Vostochnaya Oil Company and Onako (Orenburg Oil) (Kryukov, 1994a). The capital is made up as follows: 38 percent from producers' assets, 38 percent from refineries' assets, and 24 percent from distribution companies' assets (Locatelli, 1995).

In spite of the fact that the state is a majority shareholder in the VIC, it does not control the oil provinces in Russia because of the territorial principle for formation of production associations. The latter embrace not only almost all production enterprises in the given territory, but the industrial infrastruc

Table III.3.4. Composition of the Integrated Oil Company Identity Sheet

Lukoil
This holding company is structured around:
- Production associations
  - Langepasneftegaz (production 21.9 Mt in 1992)
  - Urainefiegaz (production 6 Mt in 92)
  - Kogalymneftegaz (production 29.1 Mt in 1992)
- Refineries belonging to
  - Mazheikai
  - Ufa
  - Volvograd

Privatization should be launched in 1994.

Yukos
This holding company is structured around:
- Production associations
  - Yuganskneftegaz (production 39.4 Mt in 1992)
- Refineries belonging to
  - Kuybyskev
  - Syrzans
  - Novo Kuybyskev

Surguneftegaz
This holding company is structured around:
- Production association
  - Surguneftegaz (production 42.5M t in 1992)
- Refinery belonging to
  - Kirishnefteorgsyntez

To these three holding companies, will be added

Slavneft
structured around:
- Production association
  - Megionnefiegaz (production 4.6 Mt in 1992)
- Refineries
  - Mozir (Bielorussie)
  - Gorkneftegorgsyntez

Sidanko
- Production associations
  - Varyegannefiegaz (6.5 Mt)
  - Kondpetroleum (7.0 Mt)
  - Purneftegaz (9.3 Mt)
  - Udmurtneft (6.8 Mt)
- Refineries
  - Angarsk
  - Saratov

Vostochnaya Komp
- Production association
  - Tomsknefiegaz (10.9 Mt)
- Refinery
  - Achinsk

Onako or Orenburg Oil
- Production association
  - Orenburgneftegaz (7.2 Mt)
- Refinery
  - Orsk

Source: Locatelli, 1995.

ture as well — technological transport and all ancillary and complementary enterprises (specialized in conditioning, drilling, derrick erection, plugging, etc.). Thus, the real control over the industrial infrastructure and, as a result, over the access to the hydrocarbon resources is in the hands of the VICs or their affiliates on the specific oil-producing territory; through possibilities of using the industrial infrastructure and services they restrain activities of competing enterprises which do not belong to their structures. In fact, VICs are emerging as real regional monopolies; however, they do not operate in the interests of the oil regions because main profits of the companies as well as a significant part of tax payments move from the oil territory to places where the principal divisions or headquarters of the VIC are situated (Kryukov and Shmat, 1995). The evolving practice of the transferable prices within VICs, along with the centralization of financial resources, will contribute to shifting the control over the oil-producing territories toward the VICs, thus destroying the current apparent balance between the center and the regions.

"Independent" oil companies spontaneously emerged in tandem with VICs; however, their existence found justification in the government's "Management conception for the oil complex of Russia" (for detailed analysis of this contradictory document see Kryukov, 1994). According to its section "Evolution of the small business," small- and medium-size enterprises would absorb excessive capacities and labor resources from large oil companies, and that would strengthen their economy, tackle social problems, and serve to create a competitive environment in the oil sector.

Independent companies reflect very different realities. They vary greatly by origin, capital, and mission. As for origin, some of them arose from the geological, production, or other type of state enterprises (Sinco, Evikhon, Yugraneft). Even machine-building enterprises can participate in independent companies (Tekhneftegaz, Russia Petroleum); they operate on a leasing basis to manage part of an oil basin. Other types of independents, such as Hermes, Ritek, and Nipek, are financial and commercial companies which created their capital through intermediate activities (oil trading and exports).

Many new companies were created with direct participation of regional or local administrations. This became possible because regions as subjects of the Russian Federation gained more political autonomy and some favorable economic conditions, such as privileges for oil exports and quotas for commodity goods and raw materials, as well as part of the payments for natural resources into their regional budgets. In 1991-1992, when there was a strong belief in "free market" access opportunities and some new financial resources were available in the regions (and no payment crisis yet), the legislative and executive bodies in regions spontaneously formed their own "regional segment" of the oil and gas industry (see Kryukov et al., 1995; Aktual'nye problemy.., 1993; OGLTR, 1995). Many of them (Sameco, Sinco, and Russia Petroleum, among others) did not have the necessary support from the central authorities and obtained their licenses from the regional geological committees (*Petroleum Economist*, 1993: 5).

In Tyumen province, the following companies were set up by oil- and gas-producing and geological enterprises with the direct participation of regional legislative or/and administrative bodies (Kryukov et al., 1995):

- SINCO (Sibirian oil corporation). Nearly all the oil- and gas-producing associations and several geological associations, along with the administrations of the Tyumen oblast and of the Khanty-Mansi AO, were among its founders;
- The joint-stock oil company YUGRANEFT, with the regional committee for the management of state property among its members. Besides oil and gas production, processing, and marketing, one of its missions, as claimed in the registration documents, was "extensive economic development and enhanced economic independence of the Khanty-Mansi AO." In 1993, after serious preparation work to start the development of the Priobskoye oil field, the company ran out of available finances and failed to obtain a long-term investment credit from the administration Khanty-Mansi AO, which suffered from an acute non-payment situation, so that finally Yugraneft had to merge with a stronger company, EVIKHON (one of its own spin-offs; for the detailed story see Kryukov et al., 1995);
- The joint-stock oil company RITEK (Rossiiskaya Innovatsionnaya Toplivno-Energeticheskaya Kompaniya);
- The joint-stock oil company EVIKHON (see the story above);
- The joint-stock oil company TanlovOil , with administranions of the Yamalo-Nenets AO, of the city of Nadyma and of the Nadymskii rayon;
- The joint-stock oil company MAGMA, with administrations of the Nizhnevartovskii rayon and of the Khanty-Mansi AO;
- NIPEK (Narodnaya Neftyanaya Investitsionno-Promyshlennaya Evro-Aziatskaya Korporatsiya), with the administrations of the Tyumen oblast and of the Khanty-Mansi AO. In 1992, shares were sold to the population, making up an initial capital of about 3 billion rubles, while the production cost per well jumped from 2 to 80-120 million rubles due to inflation; this made their production plans unrealistic.

Among the independent companies listed above, not many were able to stand up to the declared goal of "oil production." In fact, only two of them — Magma and RITEK — are active in the oil-production process, and they produce their own oil. Most of the companies were short of capital to implement ambitious, long-term development projects and did not have access to the regional production infrastructure and services which are tied to larger production associations — in short, it is too difficult for independents to survive in this "competitive" environment. For instance, Chernogorneft, which emerged from Nizhnevartovskneftegas association as the product of its spontaneous reorganization, introduced a new (for the Russian oil industry) principle of accounting all expenditures not just for all subsidiary structures, but also for all specific production sites and fields. As a result, production expenditures became more rational; profit-oriented management was implemented at the enterprise; economic efficiency and

profit increased; and the enterprise was able to open personal bank accounts for all employees so that they could participate in the anticipated privatization of the enterprise. The reaction of the central bodies was not to foster a pioneer experience, but rather to punish: Chernogorneft had to pay the highest possible excise duty (30 percent), while all other (state) enterprises in the area (Nizhnevartovskii rayon) were exempt from the excise levy (Aktual'nye problemy..., 1993: 47).

Thus, independent companies tend to become autonomous in relation to the center, seeking to create their own infrastructure in order to gain privileged access to oil revenue. However, they do not have first-hand knowledge or experience in tackling organizational and management problems in a new environment; neither do they have enough financial or political influence to be a serious challenge for state structures and production associations, i.e. the established players of the oil sector.

Currently (since the end of 1995), *privatization in the oil industry is accelerating its pace.* Facing a growing budget deficit and therefore a need to raise cash to reduce it, the Russian government started the "next step" of privatization, putting several large oil companies up for sale. The equity auctions were announced to be open to all investors except foreign ones. Since federal oil shares are not to be sold for the first three years after an individual company's foundation, the buyers are required to pay "loans" for their purchases and then hold the stock in trust until they are given permission to sell. During this period, the government retains the right to buy back its shares. Some 70 percent of the profits from any eventual sale of shares will go to the federal budget, while the buyer ("creditor") will keep the remaining 30 percent. Under the deal, known as loan-for-credits, a few commercial banks with special connections to the government lent the government money in 1995 in return for a chance to buy shares in large oil companies at ludicrously low prices. Shares in some of the largest VICs, including Lukoil and Yukos, were sold off for what is considered to be a fraction of their real value, to be later sold on the open market for a windfall profit. With the communists' strong position in a new Duma, a political scandal was ignited against the favoritism to the banks involved in the deal, the government officials were fired because of power abuses, and a threat of re-nationalization of the strategic industries appears to be serious (*Petroleum Economist*, December 1995; *The New York Times*, Jan. 28, 1996).

(b) Reorganization of the Gas Industry

In contrast to the oil industry, the gas industry remains highly integrated; it enjoys a monopoly of production, transport, and distribution. The gas sector is a network industry, and this technological reality by itself can explain the contrasted development of oil and gas production in Russia. Unlike oil, which has substantial export possibilities and can be readily sold for hard currency, gas development is totally dependent on its inclusion into the existing technological system (Locatelli, 1995).

Gazprom became the subject of widespread debate, speculation, and rumors in Russia and abroad. These are only a few of the headlines and comments by the western mass media: "Estimates of Gazprom's asset value are staggering, ranging from $250 billion to $740 billion," "mysterious company,"

"the world's foremost exporter of gas. . . . It has no idea of its own worth," "a monster," "a political powerhouse," "the last Soviet-style giant to survive."

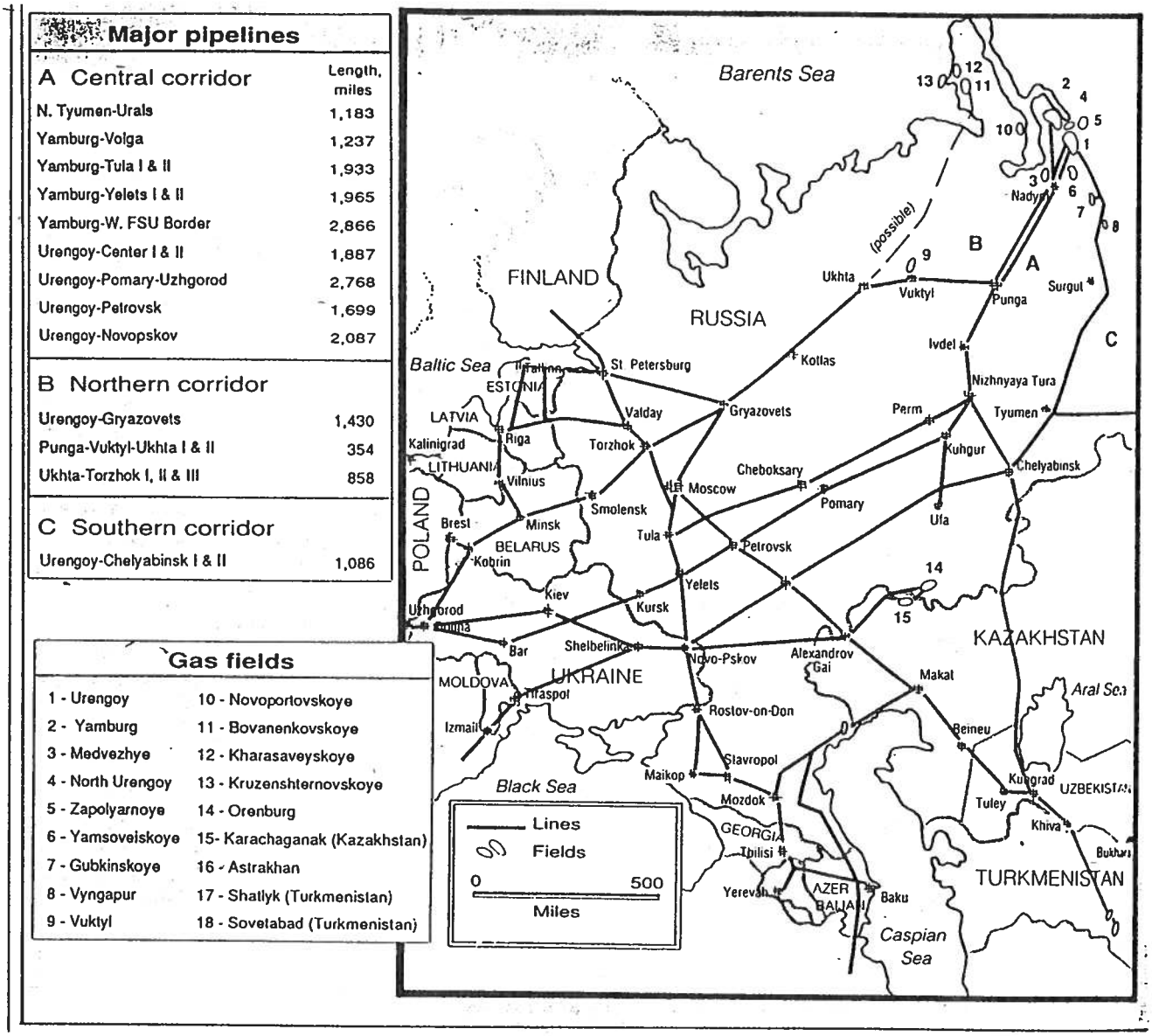
Evolution: Gazprom was the second-largest (after the oil industry) non-military ministry in the former Soviet Union. In July 1989, oil and gas sectors were merged into a giant Ministry for Oil and Gas, but soon after this (August 1989), the natural gas division stepped out and the state concern Gazprom was founded, with Viktor S. Chernomyrdin (former Energy Minister, Vice Prime Minister as of May 30, 1992, and finally Prime Minister of Russia at the end of 1992) in charge of it. The state concern became a state company under the same name (Russian Joint-Stock Company Gazprom), in order to carry out the necessary restructuring in preparation for the privatization of the gas industry to be done later. After the breakup of the USSR in December 1991, Gazprom attempted to transform itself into a multi-national joint-stock company but failed (Korchemkin, 1993).

Gazprom enjoyed special privileges from 1993. The natural gas selling price was raised almost five-fold; the hydrocarbon complex was exempt from export and part of import duties; and Gazprom was obliged to sell to the state hard currency. In fact, the impact of the Chernomyrdin personality on the development of the oil and gas industry, and therefore of economic reform in Russia, is difficult to overstate. An initial concept of the reorganization of the oil industry proposed by the State Property Committee (A. Chubais) was to found a wide network of small and competitive oil stock companies. However, V. Chernomyrdin, together with Minister of Fuel and Energy Jury Shafranik, newly appointed by Chernomyrdin, advocated and put through a different concept; Gazprom and oil-giant VICs (see above) were created. As a result, a powerful, branching oil and gas empire has emerged in Russia.

Gazprom embraces 95 percent of natural gas production in its monopoly (by mid-1995, only two production associations in Russia were operating independently of Gazprom: Yakutgazprom and Norilskgazprom) and the network of export gas pipelines reaching to all countries of the CIS. Along with the oil industry, Gazprom provides about half of the total hard currency for the Russian budget. They created their own banks for financial servicing of contracts (the most prominent of them were Imperial, with Gazprom, and the VIC Lukoil as majority shareholders). Financial resources accumulated by these powerful financial and industrial groups are invested in profitable investment projects in various industries.

Institutionally, Gazprom consists of 10 production associations, 14 territorial transmission companies ("transgas"), 6 gas-processing plants, 9 research institutes, several machinery plants, inspection units, equipment-procurement companies, and other entities. Among production associations, the largest are: Urengoygazprom (47 percent of Gazprom production), Yamburggazdobycha (29.6 percent), and Nadymgazprom (11.5 percent). Gazprom has a monopoly control over a 140,000-kilometer-long network of pipelines (UGSS, the United Gas Supply System). Figure III.3.4. shows the major producing fields and transmission pipeline routes within Gazprom.

Figure III.3.4. Gazprom's Domain



Source: Korchemkin, 1993.

The highest management body of Gazprom is the annual meeting of shareholders (which total over 1 million: 282,000 employees, including pensioners, and 747,000 residents from areas where the company operates). The annual meeting elects the board of directors, which in turn elects and supervises the executive board and its chairman. The first annual meeting of RAO Gazprom shareholders was held on May 31, 1995. In the report presented by Chairman Rem Vyakhirev, Gazprom's performance, plans, and problems were summarized (see a special supplement on Gazprom in *Petroleum Economist*, December 1995).

The gas industry *privatization plans* comply with the government's law on privatization and decrees. Gazprom stayed out of the mass privatization program, but since Summer 1994 it had to yield to the general process in Russia — in which a very complicated privatization scheme was introduced. Employees received 15 percent of the firm's shares; another 28.7 percent were exchanged for privatization vouchers in auctions in 61 regions of Russia. Residents of other regions were not allowed to bid for Gazprom shares. Market capitalization from the vouchers bid (by their secondary market value at the time of the auction) was $250 million — the figure that sparked a debate about the real value of Gazprom's assets (*The Economist,* Oct. 15, 1994).

After the initial phase of privatization, which ended on June 30, 1994, about two-thirds of Russian industrial output was moved from the state into private property. The market value of Russia's big energy, natural resources, and telecommunication companies are considered to cost 1 to 10 percent of what they would in Western markets. For Western companies, their value could be determined by assigning a dollar figure to their reserves in the ground (*Business Week*, Nov. 28, 1994). The market is valuing Gazprom reserves (see the section "Natural gas reserves" of given report), at 3/10 of 1 cent per barrel of oil equivalent, compared with $3.90 for British Petroleum and $10.30 for British Gas (*The New York Times*, Oct. 11, 1994). Estimates of the value of Gazprom assets were ranging from $250 billion to $740 billion ("The truth is somewhere in between," says Gazprom Deputy Chairman V. Remizov in *Business Week*, Nov. 28, 1994). However, the rules imposed by the Gazprom board make trading its shares extremely difficult. Sellers must first offer their shares to the company, which has the right to buy them back at "book value" (which is difficult to determine since the company publishes no accounts). No more than 9 percent of total shares should be sold for cash to foreign buyers, without a previous written consent from the board before the buy. This condition will mean that Gazprom shares will remain undervalued on the market (*The Economist,* Oct. 15, 1994). The right to negotiate with foreign enterprises and energy companies has been given to a British investment bank, Kleinwort Benson Group PLC.

There are some figures that show Gazprom's performance; in 1993, it produced 578 BCM of natural gas — twice the combined output of Royal Dutch/Shell, Exxon, Mobil, Amoco, British Petroleum, Chevron, and Texaco in that year (ibid). Revenues of Gazprom in 1993 were US$11.2 billion, profits US$1.4 billion; data on gas reserves vary greatly but it controls over one-third of the world's proven reserves of gas. It supplies 40 percent of the international trade in gas and 45 percent of all energy used in the CIS (ibid).

Among factors restricting the company's current performance, consumer insolvency is the major one, according to the report of the Chairman R.Vyakhirev (Petroleum Economist, December 1995). In 1994, less than half of the gas supplied to the CIS was paid for (at least a billion dollars are owed by Ukraine and other former Soviet republics), adding further to the total consumers' debt in early 1995 of 16 trillion rubles. However, given its economic potential, the company was able to achieve adequate payment capacity, and its debts are completely covered by its receivables. Another

important factor limiting the Gazprom performance is its huge social and political obligations, such as providing housing, schools, and health care for its employees, many of whom are not directly engaged in the gas business. Also, by the presidential decree of September 23, 1992, employees with over ten years in service in the gas industry in the far north or equivalent areas are entitled to be relocated to central regions. To fulfill these commitments, Gazprom has to build houses and buy apartments in central and southern regions of Russia with a total value of 67.9 billion rubles. In Ukraine and Belarus, these expenditures have been negotiated as a partial offset to their debt for Russian gas (ibid: *ii*).

Environmental costs are another constraint for Gazprom growth. In early 1989, development of Yamal' field Bovanenkovo was banned by the governments of Tyumen oblast and Yamalo-Nenets AO because of environmental damage caused by Gazprom activities. The additional environmental costs of the project were estimated at US$1.4 billion (Korchemkin, 1993). Since then, regional governments have become so much stronger that now it is even more difficult and expensive to operate (see section on conflict of interests in this chapter).

Nevertheless, Gazprom revenues allow it to compensate for overdue payments, pay for social needs, and extend industrial infrastucture. The company received a cumulative total of Rb 5.488 trillion in the 1994 fiscal year, and contributions to the state budget accounted for 36.5 percent of the total. The net revenue was Rb 3.433 trillion. In 1995, Gazprom companies raised and invested Rb 7.47 trillion, which is 20 percent more than in 1994 and compares with a general 26 percent fall in industrial investment in Russia (*Petroleum Economist*, December 1995).

Given the long-term perspective of the consumer insolvency, the company is actively searching for solvent buyers, foreign credits, and other revenue-raising opportunities, including shared payments to suppliers of equipment and materials, the approval of a bill system, treasury notes, and others. As for the foreign loan capital, about 38 percent of expenditures depended on the loans in 1995, and the rest (62 percent) were covered from Gazprom's own resources.

Despite being the most Soviet-style, huge, and centralized company, Gazprom has demonstrated good management and an ability to adjust to new market conditions. New technologies, innovation, and upgrading of the existent production capacities are a key focus of Gazprom, rather than increasing the output at any cost, as was the case in the Soviet hydrocarbon industry.

Currently, the Nadym-Pur-Tazov region is the main gas producing area, where virtually all of West Siberia's existing fields are located. The giant fields such as Urengoi and Yamburg will be effectively exhausted by 2000. Although there are numerous smaller fields available for development, these will be used to maintain existing output by replacing older, declining fields. To produce gas economically from these new fields, it will be necessary to use horizontal and highly deviated drilling techniques as well as physical and chemically enhanced recovery methods. These techniques and technology have, so far, been rarely used (see the section "Outdated technology" of this chapter).

Gazprom is currently developing new technologies to work on the extensive integration of large-scale facilities and to specify the quality of field output. Geophysical equipment and the associated software available are inferior to foreign equipment. Bed tomography technologies, 3D modelling of the subsurface structures and non-conformities, reduction in the length of gas-gathering lines (by changing to horizontal and highly deviated drilling) and other new techniques have started to be applied in some fields (in West Siberia in the Yamburg field).

New gas reserves will have a higher proportion of the heavier hydrocarbons, ethane, and other components. Gazprom is planning to increase separation of heavier hydrocarbons and to produce polyethylene and related products, as well as methanol and liquid synfuels. Among other initiatives of Gazprom to diversify the gas use are increased usage of LNG for aviation (gas-powered aircraft, designed by the Tupolev Bureau, has been displayed at international shows) and for railways.

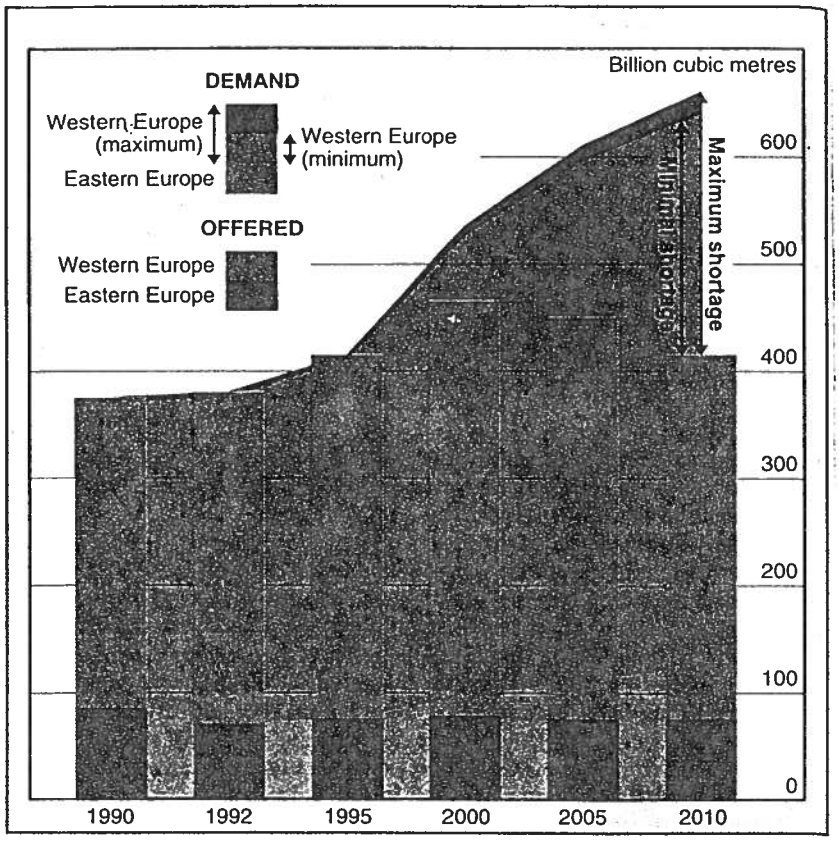
Improving domestic equipment to substitute for foreign, where possible, is Gazprom's goal in its supply strategy. The Voronezh engineering plant has started to produce different types of sulphur-resistent well-head equipment that was previously imported. Sulphur-resistent pipes are to be manufactured by pipe mills in Volzhsk, Vykhinsk, and Seversk. Also in Gazprom's plans are the replacement of low-efficiency, gas-turbine-driven gas compressors with new machines, using on domestic engineering enterprises converted from military plants. New gas compressors incorporate aviation and marine drives and reach efficiency level of 32-38 percent; gas use in compressor facilities is expected to be reduced by 25-30 percent. Military enterprises such as Kirovski Plant, AO Lulka-Saturn, and Perm Motors, as well as Kazan and Samara building companies, now offer equipment that meets international standards and is fitted with innovative control systems (Technical Progress and Innovation, in *Petroleum Economist*, December 1995).

The Yamal-Europe and Other International Projects of Gazprom

Natural gas demand in Europe is expected to grow while gas production will decline after 2000. To make up the shortfall, substantial imports will be required. According to Gazprom's estimates, it will have to supply by 2010 an additional 50 billion cubic meters of gas just to maintain its current market share (see Figure III.3.5). However, Russia is in a good position to expand gas production far beyond that. As declared by Chairman R. Vyakhirev, Gasprom can increase total gas production to 810-830 BCM by 2010. Additional gas supplies will initially come from existing gas fields in the Nadym-Pur-Taz region; however, the Yamal will be the major source of new gas, with its 25 fields holding around 10.2 trillion cu m of gas (ibid*; see also the section "Natural gas reserves" of given chapter*).

The Yamal-Europe project, with its estimated cost of US$35 billion (*Business Week*, Nov. 28, 1994), is considered by many western specialists to be a mistake — too risky and too big. Gazprom acknowledges the risk of expanding gas supplies because rising development costs for new, remote gas fields, high transmission costs, and, in addition, low gas prices in Russia could make the project eco-

Figure III.3.5. Gas Supply and Demand



Source: Petroleum Economist, Dec. 1995.

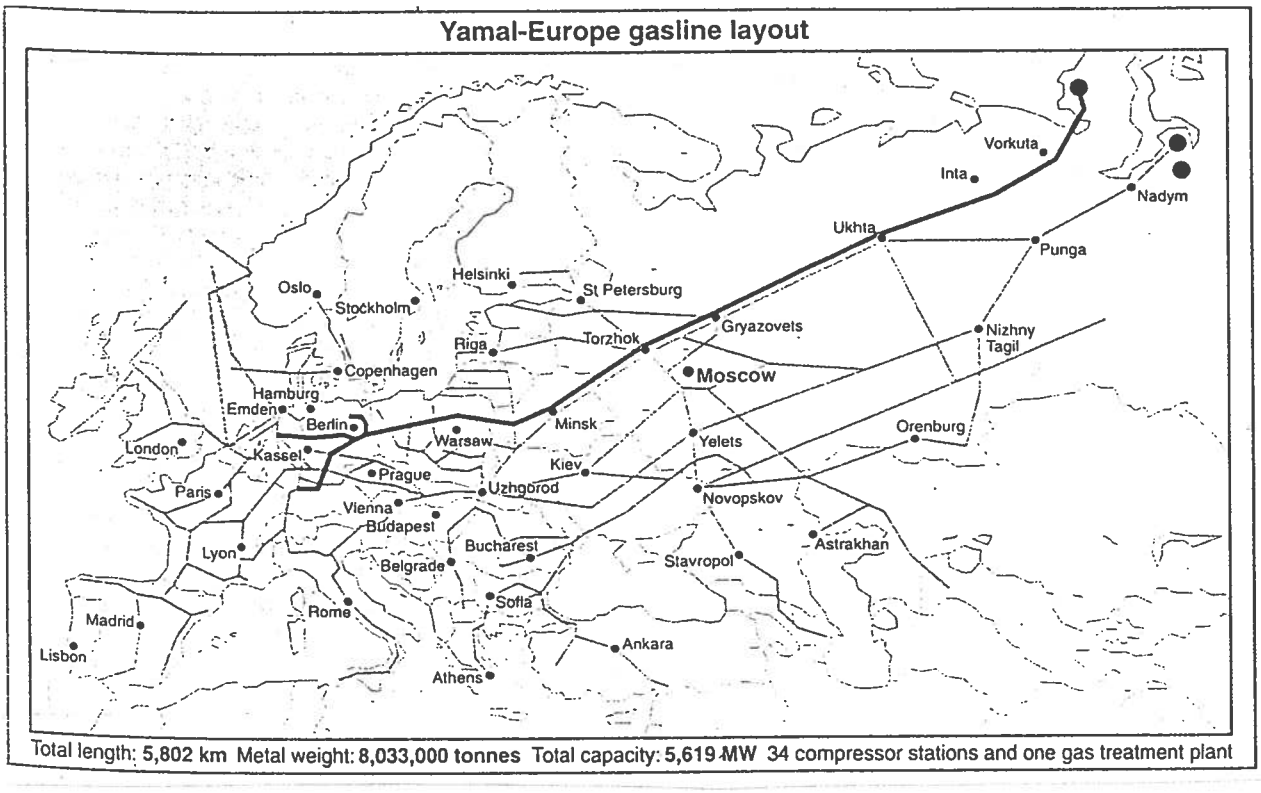
nomically inefficient. However, the importance of this project is such that the decision to forge ahead has been made, although the project is being developed in stages so "as to respond flexibly to possible market changes, in Russia, the CIS, and eastern and western Europe" (as stated by V. Rezunenko, Board Member of Gazprom, in *Petroleum Economist*, Dec. 1995). It is anticipated that gas supplies through parts of the system will start in 1996-1997 and reach full capacity in 2005.

The first stage of the project is based on production from Nadym-Pur-Taz fields. A new gasline (SRTO), linking the northern areas of the Tyumen oblast with Torzhok, has been under construction since 1994. In 1998, the SRTO is planned to be linked to the main transmission lines (see Figure III.3.6).

At a later date, gas deliveries will start from the Bovanenkovo field in the Yamal peninsula (see Figure III.3.7). (*For more about prospective development see ibid: 41.*) The full length of the pipeline from Yamal through Russia and Belarus to Germany is 5,802 km; it will include 34 new compressor stations.

In Europe, the pipeline will link into major European lines such as MEGAL and TENT in Germany, Gasunie's lines in Holland, and the Transgas line in the Czech Republic. To connect the UK and continental gas markets, a subsea pipeline — the Interconnector — has been under construction since

Figure III.3.6. Yamal-Europe Gasline Layout



Source: Petroleum Economist, Dec. 1995.

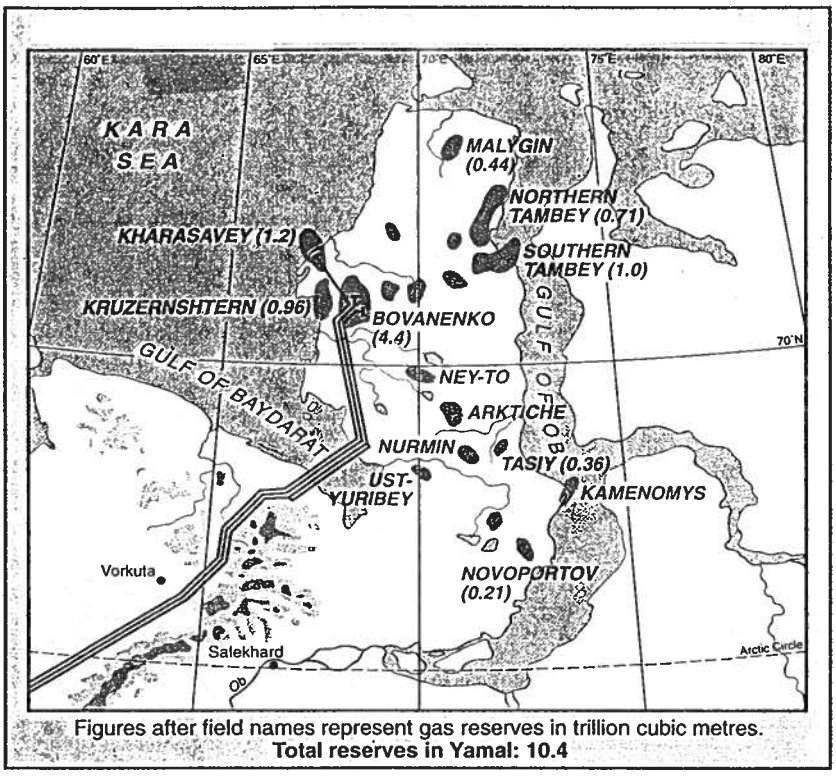
December 1994, when nine oil and gas companies including Gazprom formed a consortium, with completion of the Interconnector scheduled for the end of 1998.

Russia is already a major supplier of gas to western Europe and is expected to expand further. This makes some European gas suppliers worry that Gazprom could use its size along with alliances with British Gas and Ruhrgas to dominate their home markets and to influence price (*Business Week*, Nov. 28, 1994).

Other projects of Gazprom involve a joint venture with Conoco International Petroleum to produce petrochemicals for sale in Russia and internationally. The feed-stock would be the ethane-rich gas from the Valanzhin deposits in the Tyumen area. The project envisages a number of small gas-treatment facilities in the northwestern and northern regions of Russia, processing gas flow in existing lines. The separated gas would then be fed to the related chemical facilities to be built in the area. Conoco has finalized its project-evaluation studies, and they consider the project to be economically attractive.

Participation in the construction, operation, and ownership of power plants in Russia and abroad is another ambitious project of Gazprom. Upgrading of existing gas-fired power stations in Russia is planned, along with construction of new power plants.

Figure III.3.7. Yamal Gasfields



Source: Petroleum Economist, Dec. 1995.

Currently, Gazprom is actively looking for Western cooperation, especially in promoting the use of Western expertise, advanced technology, improving domestic equipment, energy-saving, and overall efficiency of the company. Latest news of Gazprom activities shows that the company is preparing itself for ambitious deep-water projects; a 240-channel offshore digital seismic data-acquisition system was bought recently from Whitehall Corp., Dallas, to upgrade geophysical seismic facilities (*O&GJ*, Jan. 16, 1996). An additional gas supply contract has been signed by Gasum Oy, a venture of Gazprom and Neste Oy (Finland), to increase imports from Russia by 10 percent (*O&GJ*, Jan. 22, 1996). Feasibility studies are being carried out for joint-venture projects in Belarus, Latvia, Poland, Hungary, Turkey, and Italy. The Italian companies Snam and Nuovo Pignonemm have made an evaluation of the condition of pipelines and compressor stations in the northern section of the pipeline system in Russia, with their upgrading proposals following.

Taking into consideration concentration of resources, power, and gas reserves, as well as ample time available for Gazprom's large-scale projects, the natural gas industry can be considered not just as keeping afloat, but as being the most promising of Russia's industries.

III.3.6. Foreign Investment Environment in Hydrocarbons Industry

Opening up Russia's mineral resources to foreign investment is a concept which began to emerge in the last years of the former Soviet Union; it was proclaimed by the Russian government as a means of reviving the falling hydrocarbon production, rebuilding the industry, and developing new reserves by introducing new technology and capital. In June 1992, several decrees had been issued (NN 368, 369, and 372) which specified short- and medium-term requirements for US$30 billion in external funding for oil production and refining. About 80 percent of this capital was supposed to come from direct private investments and the rest from governmental loans.

By unofficial assessments of the Russian government, foreign investors were ready to invest as much as $60-70 billion in the hydrocarbon industry of Russia (A. Konoplyanik,1993). However, only $3 billion was invested by foreign companies into the whole Russian economy by the end of 1994, while $10 billion at minimum could have been easily absorbed annually (*Segodnya*, December 30, 1994).

(a) Obstacles to Foreign Investment

Among the long list of obstacles to foreign investment, *high political instability* is usually named as Number One. Potential or real investors would hardly forget the shock experienced in Russia and abroad in December 1994, when the then-newly appointed Head of the State Committee for Property, Mr. Polevanov, announced that the economic course of the government must be changed and some "incorrectly privatized" industries be re-nationalized — exactly at a time when the government was discussing some changes and amendments to the Law on Foreign Investment, intended to create the most favorable operating conditions for foreign investors in Russia! This factor of political risks has been increasing in its importance since the December 1995 Duma elections, and will stay at its peak until the June 1996 Presidential elections in Russia. Resistance by nationalists and the oil lobby to allowing foreign capital participate in tapping the vast mineral resources of Russia is growing and is not likely to change before the election. Many recent decisions of the Russian government are marked with protectionism and wariness of the West (*New York Times*, Jan. 24, 1996). Currently, many western companies are delaying their investment decisions under the pretext of waiting for better legislation. In fact, they are waiting to understand the country's direction in political and economic matters. The recently declared high probability of political and economic reunion (confederation) of Russia, Belarus, and Kazakhstan (*OMRI Daily Digest*, online edition, March 6, 1996) only added to the feeling of uncertainty already prevailing in Russia's economic environment.

Another strong disincentive is Russia's *laws and regulations* applicable to foreign investments in oil and gas development. Not only the existing level of taxation is prohibitive (see, for instance, "Black Cloud over White Nights," *O&GJ*, Nov. 11, 1993), but the rules and regulations are constantly changing. Early joint ventures (like White Nights, formed by Phibro Energy Production Inc. and the Russian production association Varyegan-neftegaz in 1990) were based on the assumption that the application of the

tax laws at the time the investment was made will continue in the future. In practice, the tax laws have changed dramatically. In November 1990, the venture was subject to four taxes, and in October 1993 to 13 taxes! The process was characterized by Phibro's Chairman B. Lavers as "lethal to early investors and potentially harmful to any new investment" (Russian Research Center Conference, Harvard University, October 25, 1993).

The interpretation of the present tax situation also contains uncertainties. Some taxes are levied on the export price of oil, others on the domestic price. Sometimes this can change, as happened with the Subsurface Use Tax, which was originally levied on domestic price and then on export price, with the change back-dated by six months to January 1, 1993. Interpretations of the law offered by distinguished accounting firms differed markedly. There is already a precedent where joint ventures and production associates have joined together and filed a lawsuit in the Russian courts to prevent the retroactive application of the change in the tax basis (Wilson, 1996).

The export tariff, which was unexpectedly introduced in January 1992, led many joint ventures to the verge of bankrupcy. Six months later, an executive order was passed by the government to exempt joint ventures registered before Jan. 1, 1992; however, it was not yet enforced by the end of 1993 (when it equalled about one-third of world market prices), which created uncertainty about companies' futures. (For more on export tax, see the tax section of given chapter).

(b) Production-Sharing Agreements

The production-sharing agreement (PSA), as a generally accepted type of international contract, was long anticipated by Russian and foreign firms. The new law was under heated discussion in two houses of the Russian parliament for about a year, finally approved in June 1995 by the Duma and then (on December 19, 1995) by the Federation Council, and signed by President Boris Yeltsin on December 30, 1995. The outcome has been strongly criticized by Western analysts (*The Economist*, Jan. 20, 1996; *O&GJ*, Dec.11, 1995 and Jan. 29, 1996) as a "weak" law by the Russians (*O&GJ*, Feb. 12, 1996). Still, for an uninhibited Russian legislation space, it is a landmark law on production-sharing agreements, and it will provide a framework for completing several of the PSAs that are currently under final negotiations and begin the process of bringing new areas up for tender.

The new law, in combination with the existing Law on the Subsoil ("Underground Code"), provides for the following: procedures for the offerings and award of blocks; guidelines for PSA negotiations and signing; approval by federal law for agreements covering the continental shelf, free economic zones, and zones of state interest; a framework for fiscal terms including profit tax calculations; local and value-added tax reimbursements and exemption from other taxes; provisions for cost-recovery ceilings; andsome flexibility in setting levels of royalty and profit for hydrocarbon shares. The law provides for equal application to foreign and Russian companies, stabilization against adverse changes, terms of the agreement and extension mechanisms, investor title to share of hydrocarbons and property acquired in

performance of the project, state guarantee of investor rights and immunity waiver by the state on ruling of judicial and arbitration bodies. Standards for the protection of ecology and safety of personnel are also determined by the law.

One of the main flaws of the law is that it is contradicted by the previously issued Subsoil Law, while having a non-conflict clause in relation to it, which may potentially call for frequent legal actions in response to claims against the license holder. Also, the ambiguity in the stabilization clause is criticized by specialists (Nelson, 1996).

The new Russian Federation Law on production-sharing is far from being perfect; however, it is a very significant move towards establishing a solid and modern legislative base for foreign investment in the energy industry. According to Prime Minister V. Chernomyrdin, a new tax code introduced in February 1996 in the Duma will resolve many other problems facing foreign oil operators (*OG&J* Newsletter, Feb. 12, 1996).

(c) Investment Climate, Energy Lobbies, and Corruption

The foreign investment climate in Russia is far from being benevolent, for reasons ranging from political/philosophical to mercantile. Nationalist politicians, who are gaining in power these days, defend the idea of a great nation that does not need foreigners to run the country's property. Although most Russians do not share the nationalists' fight against "selling off Russia" or making it the "raw-material appendage to the West," the idea that a country that was the first to put men into space should have enough pride and common sense to keep control over its own wealth has helped nationalists in the last elections a lot. Very often, there are much more pragmatic interests of various energy lobbies hidden behind such political slogans; the interests of power structures and business are very much intertwined in Russia. The strongest interest group which confronts foreign investment is the oil and gas industry players — "the oil generals." Foreign competitors are not just a permanent source of annoyance and unfavorable comparison in efficiency, flexibility, management skills, etc.; they can bid with their money for the most "profitable" development sites, and they can offer a wide spectrum of services to numerous customers, which is a real challenge to managers in control of the industry (Kryukov, 1994b).

Local and regional authorities add to problems faced by foreign companies. Russian laws provide for a "balance of rights" between the federal and regional powers (see section on legislature in this chapter), so they can approve the contract or refuse to do so. Petro-Canada of Calgary, Alberta, had a contract to upgrade, together with a Russian partner, for an oilfield in West Siberia; on top of other problems, local authorities refused to honor the contract and shifted two-thirds of the fields to Russian applicants; finally, Petro-Canada had to give up and "come home poorer" (*Asian Wall St. Journal,* 22 Feb. 1994).

With few exceptions, the law grants equal chances in development of mineral resources for Russian and foreign companies; but in practice decisions are being made almost always in favor of the Russian ones, no matter how well they are prepared to meet technological or investment challenges. This is par-

ticularly true when a big development project is at stake, as was the case with an offshore gas project in the Barents Sea. After the Western consortium Arctic Star (comprised of Norway's Norsk Hydro, the U.S's Conoco, and Neste Oy, Imatran Voima Oy, and Oy Wartsila of Finland) had been working for several years on a feasibility study for developing the huge gas deposit Shtokmanovskoye (and spent $20 million on this), development rights were given to a new Russian state-owned company, Rosshelf. The study of Arctic Star was widely criticized on several grounds, including its cost estimates for developing the field, the need for financial guarantees from the Russian government to carry out the project, the consortium's own lack of capital, the limited degree of involvement of Russian equipment suppliers, for not creating enough jobs for Russian enterprises, and too high a share of gas exports vis-à-vis domestic consumption (*Post-Soviet Geography,* No. ,1993: 204; *Kommersant*, December 1, 1992; *Interfax Petroleum Report*, various issues, 1992).

However, the message of the Russian government was interpreted by the Western business world in a different way. It was a strategical decision to prevent saturation of the West European gas market and hence to avoid strong competition for Russian gas exports from other fields (*Interfax Petroleum Report*, October 2-9, 1992). The military's concern about any Western presence in this militarily sensitive area was another crucial argument for the decision made (Bergensen et al., 1987). Overall, this case respresents a strong example of the government's tendency to limit foreign access to strategic resources of the country.

The project described above is also very representative of decisionmaking in the Russian government. Rosshelf was set up especially to deal with this project, of 19 major enterprises (most of them defense-sector) and scientific institutes; other key founders include Gazprom and Arkhangelskgeologiya and the local governments of Murmansk and Arkhangelsk oblasts. Gazprom's support was crucial for the whole project, since in fact Gazprom defended its own monopoly and vigorously fought the fragmentation of the gas industry that was experienced by the oil industry. It is true that the winning proposal of Rosshelf is more consistent with the national interests of Russia; it envisions 40 percent less in capital investment, more orders for Russian supply industries, generating many more jobs, and does not require financial guarantees from the Russian government (see *Ekonomicheskaya Gazeta*, November 1992: 8). Still, without the forceful lobbying of Gazprom and the military-industrial complex, it would hardly have been possible to win the competition.

One more player resisting foreign participation in the development of the country's oil and gas resources is *Russian private business.* Companies like Hermes strongly and openly oppose foreign companies as direct participants of the oil business. To get "free" money from the Arab countries as payment for Russia to cut oil exports —and therefore oil production — would mean an economic disaster for the country and its key industry, but this scenario was advocated by Russian tycoons whose primary and only concern is money (*Delovoi Mir, May* 22, 1993).

Corporate and state financial companies are opposed to foreign investors, too, because the latter avoid using the Russian financial system at any price (Kryukov, 1994b). Crime in the credit and financial sector is the fastest growing among commercial crimes: it increased tenfold over the years 1994-95 (*Kommersant Weekly*, 13 June 1995). Financial crimes include swindles and illegal operations involving markets for hard currencies and securities. Different crimes in the financial credit sector include: embezzlement of financial resources using false payment documents and false bank guarantees; using false documents for getting credit; illegal movement of capital into the shadow economy and into foreign banks; money-laundering; crimes in insurance; and stock swindles *(Russian Far East Update*, August 1995). Once committed, these crimes are very difficult to deal with, since Russian law does not yet provide an efficient system of protection, although this may change down the line as more and more independent Russian business people make deals big enough to warrant legal protection. A branched system of economic laws is only beginning to emerge in Russia.

However, the pervasiveness of corruption and smuggling in the oil and gas industry is not a specific feature of Russia. Unfortunately, this seems to plague the industry worldwide. Unlawful deals have been periodically uncovered in the oil industries of Nigeria, Indonesia, Mexico, and Ecuador, among other countries. Iran, Iraq, and other Middle Eastern oil producers have also fed the illegal spot markets of oil around the world. And in all these countries, as in Russia, the industry is deeply intertwined with government agencies and personnel.

To enter the Russian market, Western companies should be well prepared to prevent possible disputes by thorough "due diligence" *(expertiza)* and careful preparation of contracts, using competent local (not just Russian) counsel, who would verify registration requirements, land use and taxation assumptions, etc. Carefully written contracts should include some mechanism for dispute resolution, with all the details of the arbitration spelled out in advance. Very little formal dispute resolution, i.e., litigation, goes on in Russia, and Russian courts do not have enough experience enforcing foreign arbitration awards (international arbitration is expensive by itself); because of all this, the best advice competent lawyers can give to a newcomer is to avoid disputes (ibid: *7*).

Criminality is deeply infiltrated into many branches of Russian business, including the power structure. There now exists massive corruption in the government bureacracy, and organized crime (identified by "large scale economic crime, where loss is bigger than US$ 10,000") now participates in the political processes of the country. Bribes rose 33 percent between 1993 and 1994. Bribes, say the experts, are divided between organs of government (60 percent) and agencies whose job is law enforcement, including customs (40 percent — ibid: *3*).

All these factors make the investment climate in general uncertain and risky in Russia, and require a more thorough preparation than almost anywhere else. Large-scale, costly, and long-term development projects are unlikely to be carried through by a medium-size company. However, the potential of the Russian market is such that it is worth trying. Many potential investors are biding their time, to see

what will happen in this country. However, time is an important factor and in Russia "time" is becoming more closely associated with "money," just as in the rest of the world. Those who come first will get experience, first-hand knowledge, and a chance to find/create necessary business connections, partners, and more opportunities. It is critical to correctly identify the scale and site of an investment project. Small and medium-size projects — perhaps upgrade rather than begin new development? — would be more advisable from our point of view. As for "where," lessons learned from the history of the oil and gas industry in West Siberia, as well as its current state-of-the-art development, do not lead one to expect an evolution to a business environment benevolent to foreign private investors. In Western Siberia, with its immense oil and gas deposits, many of them untapped, development conditions are constrained by many factors. Too many players have made themselves at home and the rules of the game "go with the territory."

* * *

Compared to West Siberia's reserves, the Russian Far East is a very modest place. However, the Far East, and Sakhalin Island in particular, will be the focus of our comparative analysis in the next chapter, as a place where a "new generation" of the hydrocarbons industry of Russia is going to happen.

III.4. THE SLEEPING LAND: EASTERN SIBERIA

Eastern Siberia and the Russian Far East are known to have very substantial hydrocarbon reserves. In the 1960s-1980s, there were studies conducted by Siberian specialists on geological and economical estimates of these reserves (Trofimuk, 1971; Geologiya Nefti i Gaza Sibirskoi Platformy, 1981; Kontorovich et al., 1977; Robinson, 1985; etc.).

Siberian studies of that period demonstrated the significance of the new potential reserves base and raised the question of its rational development. The economy of Eastern Siberia and the Russian Far East badly needed new fuel and energy sources; however, at that period it was much cheaper to transport fuel and energy from West Siberia's oil and gas complex than to start development of a new, costly, and economically risky project.

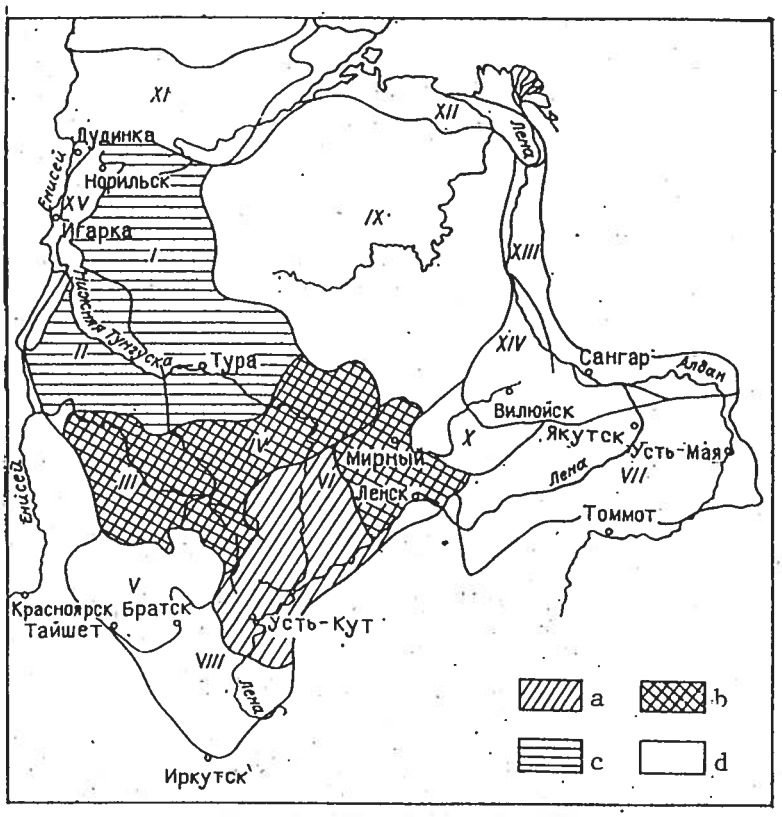
Huge distances, harsh climate, and undeveloped industrial infrastructure prevented active Soviet planners from extensive development of this "sleeping land" — fortunately so, because the fragile ecosystem of this land and complicated geological and geophysical conditions of hydrocarbon reserves would require the most advanced technology and immense cost in labor and capital.

Hydrocarbon deposits are widely dispersed in the Siberian Plateau, with no significant concentration in any of the areas studied until now. The best-explored areas are Leno-Vilyuiskaya, Nepsko-Botuobinskaya, Angaro-Lenskaya, and Yenisey-Khatangskaya oil and gas provinces (see Figure III.4.1). Oil and gas reserves are located in the most complicated climatic and natural zones and are deep-seated (1,500-2,500 m); their geology (non-anticlinal oil traps) requires a special preparation of hydrocarbon-prone reservoirs and makes geophysical exploration very costly (Robinson, 1985). Oils of the Siberian Plateau are of high quality, with sulphur-bearing components accounting for no more than 0.5 percent in most of the explored reservoirs; the share of other "undesired" components (paraffin, resin, asphaltin) is insignificant, which is important for processing and transport of oil. Many of the discovered deposits are complex, i.e., have oil, gas, and condensate. Natural gas is abundant in helium (up to 0.58 percent, which is unique, given the growing demand for helium on the world market and its importance as a strategical resource), as well as ethane and butane. These characteristics make East Siberian gas, from the Krasnoyarsk kray in particular, 1.5 times more valuable than northern gas deposits of the Tyumen oblast (Katsun et al., 1993).

New data on estimated hydrocarbon reserves in East Siberia and Russia's Far East have been reported recently by the Russian Academy of Sciences (*O&GJ*, Aug. 2, 1993). According to these estimates, potential gas resources in the area total about 32 trillion cu m (1.13 quadrillion cu ft), of which Eastern Siberian commercial (proved/probable) gas reserves total 944 billion cu m (33.3 tcf), including 654 billion cu m (23.1 tcf) in Krasnoyarsk kray and 290 (10.2 tcf) in Irkutsk oblast.

Potential oil reserves in East Siberia and the Far East are reported to be more than 8 billion (metric) tonnes (58.4 billion bbl) and commercial ones 313 million tonnes (2.3 billion bbl), including 133 million tonnes (971 billion bbl) in Krasnoyarsk kray and 180 million tonnes (1.31 billion bbl) in Irkutsk oblast.

Figure III.4.1. Oil and Gas Areas of East Siberia by Suggested Priority of Development



Oil and gas areas:
I - North Tungusskaya
II - South Tungusskaya
III - Baikitskaya
IV - Katangskaya
V - Prisayano-Yeniseiskaya
VI - Newsko–Botuibinskaya
VII - North Aldanskaya
VIII - Angaro-Lenskaya
IX - Anabarskaya
X - West Vilyuiskaya
XI - Yenissei-Khatangskaya
XII - Leno-Anabarskaya
XIII - Predverkhnoyarskaya
XIV - Vilyuiskaya
XV - Turukhano-Norislskaya

a - first priority for development
b - second priority
c - third priority
d - fourth priority

Source: Robinson, 1985.

In Yakutiya (Sakha Republic), commercial gas reserves are projected at 959 billion cu m (33.9 tcf), and commercial oil reserves at 131 million tonnes (956 million bbl).

In Sakhalin, commercial gas reserves were estimated at 615 billion cu m (21.7 tcf), commercial oil reserves at 193 million tonnes (1.41 billion bbl)(ibid).

Potential gas resources in Yakutia and Sakhalin were projected at 16.7 trillion cu m (589.5 tcf). Russian studies emphasize that the degree of exploration is still very low: for instance, Krasnoyarsk kray reaches only 2 percent for oil reserves, 1.7 percent for condensate, and 3.4 percent for gas (Katsun et al., 1993). This is indicative of great potential for increase in commercial hydrocarbon reserves in the area.

Some of Krasnoyarsk kray's and Evenky AO's deposits are reported to be the subject of continued exploration and feasibility studies, with the prospect of attracting Western companies to participate in the project (see report on Yurubchenko-Takhomskoye deposit in *O&GJ*, Aug. 30, 1993).

In Evenkiya, there are two adjoining basic areas of prospective oil and gas production: Baikitsky and Vanavarsky. The largest commercial oil reserves are in the Yurubchenskoye deposit (Baikitsk district). Oil recovery from it is expected to reach 6.80 million tonnes by 2010 (vis-à-vis 0.04 million tonnes in 1995) if proper technologies are used for deposit development. Along with two other oil fields in the area — Terskoye and Kuimbinskoye — total oil output could amount to 9.85 million tonnes of oil by 2010 (Bandman et al., 1995).

In Vanavarky district, the basic resource is natural gas; according to estimates made by Siberian specialists, prospected output by 2010 is 9 million cu m of gas, including 7 million cu m from Sobinskoye field and 2 million cu m from Paiginskoye field. Along with natural gas, Vanavarsku district is expected to produce some oil; however, due to low volumes (0.15 million tonnes of oil by 2010 from two fields) and poor transport possibilities, this oil can be refined on site at small-sized fractionation plants, with oil products to be used domestically, in the south-eastern area of Evenkiya and the Angara region (ibid). Yakutiya gas reserves are the focus of a project under negotiation with a South Korean consortium of eight companies (including Korea Petroleum, Korea Gas, Daewoo, and Yukong), for which an agreement between Russia, South Korea, and Yakutiya was signed in September 1992. This agreement calls for Yakutian gas development together with the construction of a 6,000-km pipeline to South Korea, capable of transmitting 20-25 BCM per year. In January 1993, a subsequent accord was signed on conducting a feasibility study for the project, which will take about three years to complete (Sagers, 1993).

However, most of these huge oil and gas reserves of Eastern Siberia can hardly be expected to be tapped into in the foreseeable future due to their geographical remoteness, harsh natural and climatic environment, complex geology, and lack of surface transport in the area. Many western analysts refuse to include these giant deposits in realistic scenarios of potential energy development (see, for instance, Dienes et al., 1994; Khartukov, 1994).

III.5. THE NEW ENERGY COMPLEX IN THE RUSSIAN PACIFIC: CASE STUDY OF SAKHALIN OIL AND GAS DEVELOPMENT PROJECTS

III.5.1. Introduction

Sakhalin Island is located only about 50 miles north of the Japanese island of Hokkaido. The corresponding territorial-administrative unit is Sakhalin Oblast. Outside of the prolific West Siberian Basin, Sakhalin remains the only producer of commercial quantities of oil in all of Siberia. In terms of natural gas, two other small producers (Norilsk and Republic Sakha in Yakutiya) are also in operation across the vast expanse of territory between the Yenissey River and the Pacific Ocean (Malov et al., 1991; Sagers, 1994). Historically, Sakhalin has been a relatively minor producer of both oil and gas, accounting for less than 0.5 percent of total Russian oil output and less than 0.3 percent of its gas output in recent years. Since the mid-1970s, Sakhalin's hydrocarbon production has been slowly falling: oil output (includes crude oil and gas condensate) peaked at 2.6 mmt in 1985, but by 1994 had declined to 1.5 mmt; gas output peaked at 2.0 billion cu m in 1989, and by 1994 had dropped to 1.5 billion cu m (Sagers, 1995).

With new development projects signed between Russia and Western companies (see below), prospects for the oil and gas industry in Sakhalin are improving dramatically. Today, Sakhalin represents a major strategic resource center to supply expanding demand for hydrocarbons not only in Eastern Siberia and the Russian Far East — in the long run, Siberia is bound to develop itself into one of the most dynamic regions in Russia — but in the Asian Pacific region as well. In 1993, Japan, Korea, and Taiwan imported over 75 percent of the total world trade of LNG, and their demand is predicted to more than double to 85-110 m t annually during the next 15 years (Petroleum Economist, 1995).

Furthermore, we argue that Sakhalin is the place where a new-generation oil and gas industry of Russia may develop: not as much constrained by the history and traditions of the old industry as the West Siberian oil and gas complex (see above, Chapter III.2). It may be able to use the benefits of Western technology, and foreign capital may become available. Also, Sakhalin benefits from geographical proximity to axpanding Asian markets. Finally, energy development are of manageable size. Altogether, these factors promise good prospects for Sakhalin to emerge as an important place on the world map of energy producers.

III.5.2. Geologic History of Sakhalin Island

Commercial development of oil and gas resources in the Sakhalin oblast started as early as 1928. The history of hydrocarbon exploration of Sakhalin Island can be divided into two distinct periods, very different in terms of efficiency and outcome of this work.

Until the mid-1970s, oil and gas exploration had been done only onshore of Sakhalin, almost all in oil- and gas-prone areas. However, most of the hydrocarbon deposits had been discovered in the north-eastern part of the island (over 50 out of a total of 62 deposits). In the central and north-western part of

Sakhalin, small-sized oil/gas, gas, and gas/condensate fields were discovered; on the Aniva Bay coast, three small gas fields had been explored; in the eastern part of the island, one oil field had been discovered in the Pogranichny Graben. Of the total 62 hydrocarbon deposits, 20 accounted mainly for oil reserves (more than 90 percent), 13 for gas, 17 for gas/oil and oil/gas, 7 for gas/condensate, and 5 for oil/gas/condensate. In terms of recoverable resources, seven fields were of medium size and 55 of small size (Borgdanchikov et al., 1995).

Exploration of the Sakhalin shelf began in 1971 via boreholes deviated from onshore. Since the mid-1970s, an intensive offshore exploration program started with participation of the Japanese consortium Sodeco, and resulted in the discovery of the large Odoptu and Chaivo oil, gas, and condensate fields, in 1977 and in 1979, respectively. By 1994, when exploration drilling on the Sakhalin shelf was temporarily suspended, eight hydrocarbon fields had been discovered, including seven fields in the north-eastern offshore basin of the island and one medium-sized gas field in the Tatar Strait, close to the south-west coast of Sakhalin. All deposits in the north-eastern shelf (except the small gas field Venino) account for large reserves, with the two largest of them Lunskoye (about 400 billion cu m of gas and 50 million tonnes of condensate) and Arkutun-Daginskoye (over 500 million tonnes of oil) (ibid: 19).

The offshore fields (all of the oil deposits and and 90 percent of the gas reserves) were discovered in a depth range of 10 to 50 meters. The Izilmet'yevskoye (gas) field and Kirinskoye (gas/condensate) field are located in a depth renge of 50 to 100 meters (see map in 86/281 and summary of reserves in 75/20).

According to Russian estimates, total geological reserves of hydrocarbons in the Sakhalin oblast amount to 7.8 billion of tonnes oil equivalent, including 3.8 billion tonnes for oil and 3.3 trillion cu m for gas; only 23 percent of oil reserves and 11 percent of gas reserves are located onshore, and the rest are offshore Sakhalin. Onshore resources are predominantly oil; offshore, oil and gas shares are about the same.

Geographical distribution of hydrocarbons is very irregular both for onshore and for the offshore shelf of Sakhalin. Fifty-two percent of all onshore reserves are concentrated in three out of 25 oil- and gas-prone areas: Okhino-Ekhabinskaya, Paromaisko-Chaivinskaya, and East Daiginskaya. An additional 20 percent of onshore reserves are located in three more areas: Espenbergskaya, Volchinsko-Sabinskaya, and Lunsko-Pogranichnaya. As for the Sakhalin shelf, there are only three zones with a high concentration of hydrocarbon reserves (69 percent of the total, taking up only 11.5 percent of oil and gas prospective area and including the largest reservoirs of oil and gas): Odoptinskaya, Nyiskaya, and Chaivinskaya. Other oil- and gas-bearing areas of the North Sakhalin shelf (Astrakhanovskaya, Espenbergskaya, Volchinsko-Sabinskaya, Okhino-Okhabinskaya, Vostochno-Odoptinskaya, and Lunsko-Pogranichnaya) could become sites of intensive exploratory work in the near future: taking over 15 percent of hydrocarbon-prone shelf area, they account for 17 percent of its reserves (ibid).

The two largest oil fields offshore of Sakhalin are Arkutun-Daginskoye and Piltun-Astokhskoye: they account for 73.5 percent of recoverable oil reserves of the shelf. Forty-seven percent of total gas

reserves are concentrated in the largest of the Sakhalin shelf gas/condensate fields, Lunskoye. None of the large fields is believed to be more than 20 km (12.4 miles) from shore.

Prospective and possible reserves of the island are estimated by Sakhalin specialists as 125 million tonnes of oil and 240 billion cu m of natural gas for onshore, and 380 million tonnes of oil and 2,140 billion cu m of gas for offshore (ibid: *21*).

There are many different estimates of recoverable and prospective reserves of the Sakhalin Oblast. Given the current state of the art of exploration work and technical difficulties for realistically comparing them, we provide here only two of these estimates made by the Western analysts Jack Holton, vice-president of exploration services at Wavetech Geophysical (Table III.5.1), and Matthew Sagers, known as an expert of the Russian oil and gas industry (Table.III.5.2).

Table III.5.1. Summary of Characteristics and Reserves of Major Offshore Sakhalin Fields

Field	Discovered	Productive intervals	Depth (Metres)	Porosity	Closure (Metres)	GKZ recoverable reserves Oil	Gas	Condensates
Odoptu	1977	NutovDagi	1 300-2 000	14-34%	300	314m b	3 trillion cf	20m b
Piltun-Astokh	1985	Nutov	1 500-2 300	14-28%	200	694m b	2.3 trillion cf	40m b
Arkutun-Dagi	1989	Nutov	1 680-2 800		350	Undeveloped		
Chaivo	1979	NutovOkobykay	1 300-4 100		500	144m b	4.9 trillion cf	86m b
Lunsk	1984	Dagi	1 700-3 000	23-25%	600	50m b	13 trillion cf	250m b

Source: Holton, 1995.

Table III.5.2. Estimated Reserves of the Fields in the Sakhalin Projects

Field	Oil (mmt)	Condensate (mmt)	Gas (bcm)
Sakhalin-I:			
Odoptu	42	2	84
Chayvo	19	0	140
Arkutun-Dagi	113	5	68
Sakhalin-II:			
Lunskoye	8	2	384
Piltun-Astokhskoye	89	6	77

Sources: Sakhalin-I Feasibility study; IPR, June 17-24, 1994, quoted by Sagers, 1995.

Regardless of the estimate we select, we can agree that even the largest of Sakhalin's discovered fields are far from ranking in the supergiant category, unlike giant and supergiant fields on West Siberia's Yamal Peninsula or the Barents Sea's Shtokmanovskoye field (see above, Chapter III.2), or the supergiant fields in the Kara Sea. Nevertheless, Sakhalin is considered to be a highly potential *realistic* supplier of considerable amounts of oil and gas for both domestic and Asian Pacific energy-hungry markets (*Petroleum Economist*, 1995).

One of the most attractive prospects is the North Okhotsk Basin, covering about 45,000 sq. km along the northern shelf area of the Sea of Okhotsk. However, the area is difficult to explore because of the almost perpetual flow of sea ice, so its potential remains uncertain. One more sedimentary structure in the general Sakhalin area is the West Kamchatka Basin (108,000 sq.km), located along the western shelf region of the Kamchatka Peninsula. Until now, it has not been explored properly, and only one small gas discovery has been made in the basin, in 1973, on the southwestern part of the Kamchatka Peninsula (Sagers, 1995).

Russian and western geologists believe some of the many promising structures found in deeper water off Sakhalin may hold larger hydrocarbon reserves than any of the currently identified fields. Most of the undrilled structures are believed to be gas-prone. Projects for development of other Sea of Okhotsk deposits are likely to emerge in the very near future (*O&GJ*, Aug. 23, 1993).

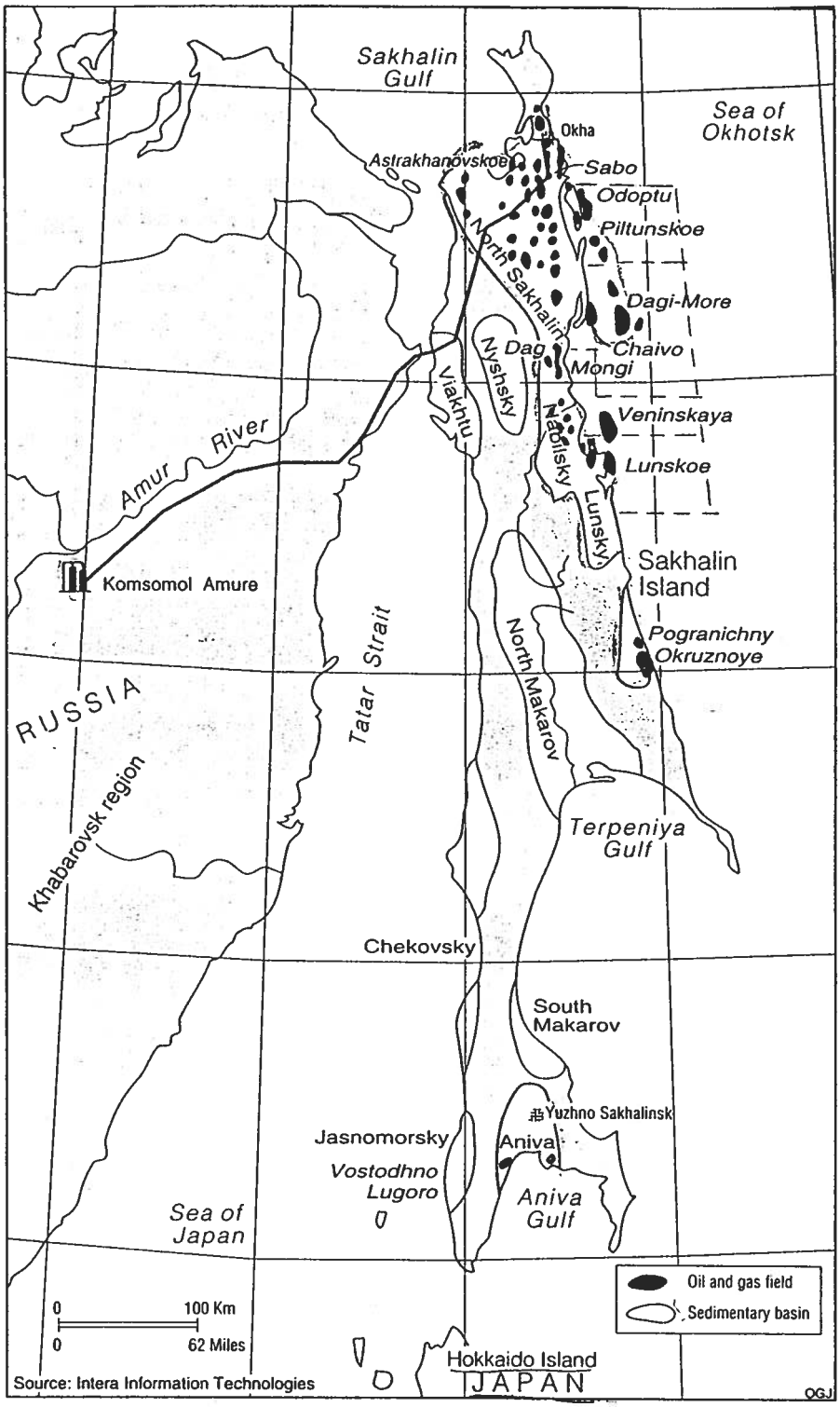
Currently, the main focus of the development projects with the foreign companies are offshore fields in the eastern portion of the North Sakhalin Basin (see Figure III.5.1). In addition, onshore Sakhalin basins were brought under scrutiny by Intera Information Technologies of the U.K., in collaboration with regional authorities (*O&GJ*, Oct. 4, 1993).

III.5.3. Development Projects Since 1991

An offshore exploration program was started by the Soviet Union in 1977 in cooperation with the Japanese Sodeco consortium (Sakhalin Oil Development Cooperation Co., Ltd.), which was created in 1975 by Japan National Oil Company when the Japanese government was trying to cope with the 1974 world oil crisis. This Sodeco-I was the first agreement in operation between 1977 and 1983, and this exploration resulted in the discovery of the large Odoptu and Chaivo offshore oil, gas, and condensate fields (Japan National Oil Corporation, October 1993). The SouthWest of Sakhalin offshore was explored too, without success. After energy prices fell in the early 1980s, Japan did not feel the need to continue the exploration, so the project was put on hold, without the Soviet government repaying the loan, which later gave Sodeco the right-of-way for future projects (source: interview with Sodeco general manager, Sodeco headquaters, Tokyo, June 1995).

Between 1983 and 1990, some exploration work had been conducted by Soviet geologists (Sakhalinmorneftegas — see details below), without direct foreign assistance, which resulted in the discovery of new, larger fields, Lunskoye and Piltun-Astokhskoye, and then Arkutun-Daginskoye. By then, it became clear to the Soviet government that development of the offshore fields was unlikely without direct foreign technologies and capital, and it was decided to open the oil and gas sector to Western investment. In 1990, an international bidding was announced for the offshore fields Lunskoye and Piltun-Astokhskoye (Sakhalin-2), while development of Odoptu and Chaivo continued to be governed by the terms of Sodeco, following the claim of the Japanese government to reactivate the project (Sakhalin-1). For this purpose, a new consortium, Sodeco-2, was created by the Japanese government.

Figure III.5.1. Areas of the Sakhalin Studies



(a) Sakhalin-2

In May 1991, an international tender was announced on the Sakhalin-2 development project, after several competing proposals from Western companies had been considered by the Soviet government. Among international consortia were Exxon-Sodeco, Australia's Broken Hill Properties (BHP), Mobil, and MMM Consortium, formed by McDermott International, Mitsui, and Marathon Oil. Later, in September 1992, Shell joined the MMM, and Mitsubishi Corporation in December 1992, so it became the MMMMS (or 4MS) consortium.

At the end of January 1992, the Russian government announced the award of the contract to the then-MMM, but this decision was immediately challenged by the government of the Sakhalin Oblast, which favored the competing Exxon-Sodeco bid. Initiated under the former Soviet government, the tender conceded a significant decisionmaking role to the Sakhalin Oblast administration. However, with the demise of the USSR, the Russian Federation government sought to assert its control, and in the uncertain legal environment of that period, Sakhalin-2 had to undergo several competing tenders by different Russian factions, some organized by the local Sakhalin authorities, other being under Russian Federation jurisdiction (Sagers, 1995; Winston, 1992). To resolve the conflict of interest, the Supreme Court and an executive branch commission had to review the decision on the tender winner, but the award to the MMM was not overturned. However, because of the local opposition, the winning bid in the tender was downgraded to the right only to produce a feasibility study, with the right of actual development to follow sometime later. The feasibility study was completed by the consortium and submitted to the Russian government for review by the end of 1992.

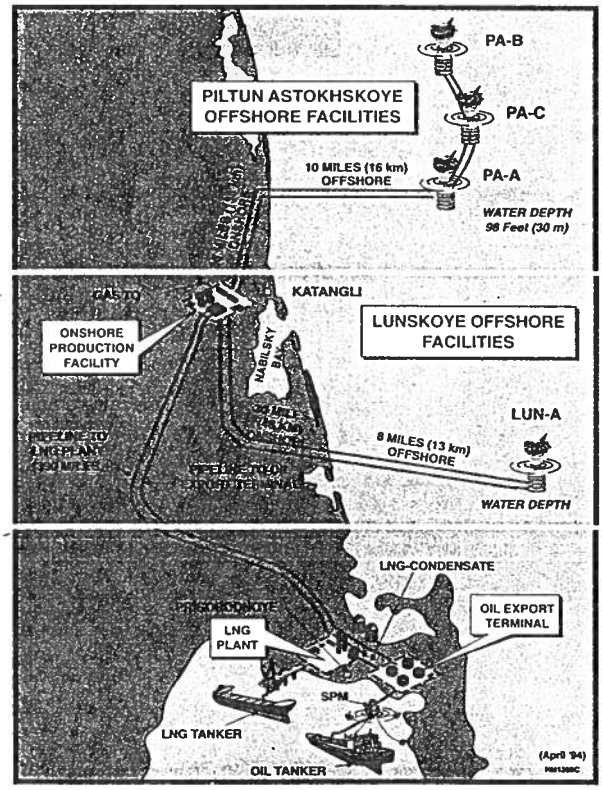
Two months later, positive decisions by both the Environmental and Economic Expertise committees were handed down to the consortium (according to other sources, the study was also approved by the Defense Ministry (SWB, March 1993: 9), and negotiation began for an agreement to carry out the Sakhalin-2 project (Sakhalin II Project Update, 1995). In March 1994, a joint protocol was signed by the consortium and the Russian negotiating teams declaring full agreement with the terms of the Sakhalin-2 Production Sharing Contract. A final agreement between the consortium and the Russian government was signed in June 1994 during the Gore-Chernomyrdin meetings (*Financial Times*, June 24, 1994); by then, the 4MS was legally incorporated into a single operating company, Sakhalin Energy Investment Company Ltd., referred to as Sakhalin Energy.

The project is programmed to be conducted over 25 years with a total investment US$10 billion; it envisages peak liquid output at about 9 million tonnes per year four years after project implementation, and peak output of gas at about 15.bcm per year. Feasibility studies for the development of the Lunskoye and Piltun-Astokhskoye fields cost reportedly around US$75 Million (Sagers, 1995); to evaluate previously supplied data about field reserves, several "evaluation" wells had to be drilled by 4MS. Western geologists were able to confirm its key parameters (SWB, August 28, 1992:

6). Current estimates for Sakhalin-2 given by the Japanese side are 750 million barrels of oil and 11 TCF of gas (from our interview with Mitsui, June 1995, Tokyo). The fields' exploitation will be managed mainly by Marathon, with liquefying of gas by Shell, while Mitsui will be mainly in charge of marketing in Japan, Korea, and Taiwan.

The currently preferred development scheme for the Lunskoye field consists of one monopod ice-resistant platform capable of producing 15.5 billion cubic meters of gas per year. At the initial stage of development, rigs are supposed to be rented. An underwater pipeline will transport oil, gas, and condensate to an onshore production facility (oil- and gas-processing center) at Katangli for further processing. The natural gas would be then transported to the south of Sakhalin through the pipeline and directed for both domestic use and for export. The gas to be exported will be converted to liquefied natural gas at an LNG plant to be located at Prigorodnoye and then shipped out by tankers. Oil and condensate will also be exported from this location (see Figure III.5.2).

Figure III.5.2. Sakhalin-2 Development Scheme



Source: Sakhalin-2 Project Update, 1995.

The most appropriate production plan for the Piltun-Astokhskoye field was under discussion longer than the plan for the Lunskoye. The physical shape of the field, which is very long and narrow, indicated that several platforms may be needed to efficiently produce oil and gas. An additional well had to be drilled and tested to determine the optimal development scheme.

In accordance with the the Production Sharing Contract (PSC), oil and gas produced over the life of the project are to be divided between the Russian partner, as the owner of the natural resources, and Sakhalin Energy. Profit, taxes, and royalties paid from production will provide a major source of revenue that will go directly to the benefit of mainland Russia and Sakhalin Island. Over the life of the project, the Russian share of the revenues will be greater than 50 percent of total revenues.

In addition to financial revenues from the project, the Sakhalin region will benefit from an expansion of regional employment opportunities. Russian content is to be up to 70 percent of the Sakhalin-2 work in construction, drilling, maintenance, and operation of the facilities, dependent on quality, price, and schedule. Also, as experience with similar development projects has proven in other parts of the world, projects of that scale usually create additional non-project jobs in transportation, communication, education, social services, etc.

The PSC provides for the payment of bonuses. The first US$15 million was paid to Russia upon signing of the 1992 Feasibility Study Agreement. Further bonuses are to be paid upon commencement of the project: US$15 million when Sakhalin formally begins, US$15 million upon the start of development of the Piltun-Astokhskoye oil field, and a further US$20 million upon the start of development of the Lunskoye gas field (Sakhalin-2 Update, 1995).

In addition, when development begins, a payment of US$100 million over a five-year period is to be made to establish the Sakhalin Development Fund, which is intended to provide an early source of cash flow to initiate the development of Sakhalin Island's social and economic infrastructure. Areas which are expected to benefit fron the fund are energy needs, health care, housing, environmental protection, agriculture, education, transportation, communication, finance, and other critical sectors.

(b) Sakhalin-1

The latest major agreement concluded in June 1995 is Sodeco's long-delayed oil and gas development project (see above). Delayed for 10 years, this project was revived in alliance with Exxon, after a protocol was signed on November 24, 1993, between a Sodeco/Exxon consortium and the Russian government *(SWB*, December 17, 1993: 5). According to this document, the large Arkutun-Daginskoye field was added to the two fields Chaivo and Odoptu. Arkutun-Dagi is the largest known oil/gas field on the Sakhalin shelf, and it was included into the project in exchange for a promise on the Japanese side to drop its claim for the payment of outstanding US$276.6 million to Sodeco-1 (Sagers, 1995). This loan is now counted as part of the Sodeco investment in Sakhalin-1 (source: our interview with Mitsui's Energy Division in Tokyo, June 19, 1995).

Discovered in 1989 by Russian geologists, the Arkutun-Dagi field is estimated to contain 113 million tonnes of oil, 5 million tonnes of condensate and 68 billion cu m of natural gas. Together, the three fields contain an estimated 291 million tonnes of oil and 421 billion cu m of gas (see Table III.5.2). The fields are expected to be in operation from 1996, but actual production will start only in the 21st century, according to the Japanese side (see below). The project covers a 40-year period.

The project will actually be operated by Exxon (through its subsidiary, Exxon Neftegas Ltd.), which has a 30 percent interest in the deal. Another 30 percent interest is owned by Sodeco, with the remaining 40 percent interest held by the two Russian partners in the project, Rosneft (17 percent stake) and the main regional company, Sakhalinmorneftegas (23 percent share). The latter participated in negotiations with foreign companies from the very beginning, because it had been granted the development license in October 1993 to prospect and develop the three fields. The Russian companies will have to come up with their share of investment: Rosneft has to provide about US$8.5 million per year just during the initial "evaluation period," whereas Sakhalinmorneftegas share will be about US$11.5 million (*IPR*, June 30-July 7, 1995: 11).

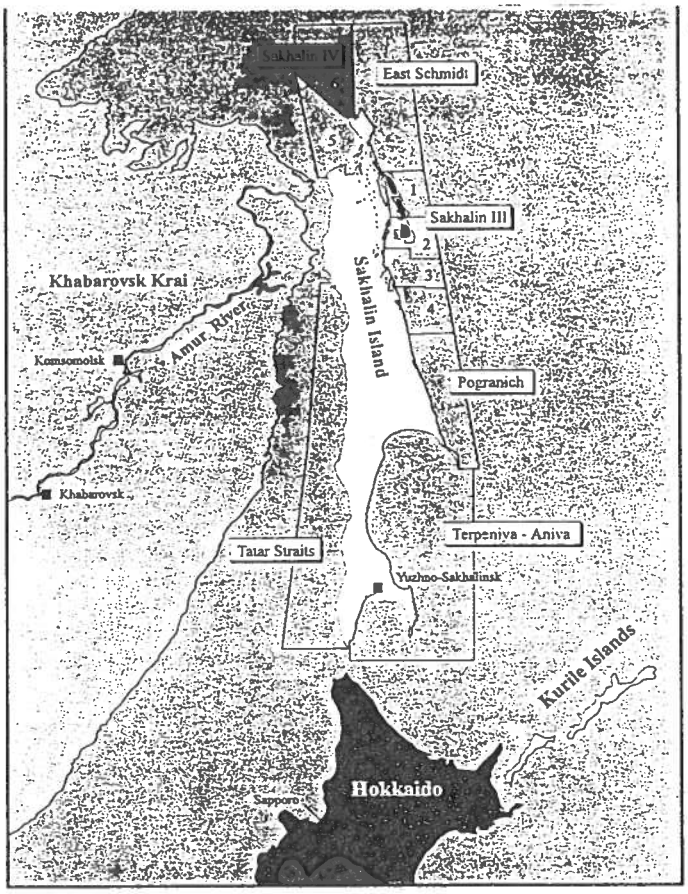
The proposed development program envisions that in its first stage, the Chaivo and Arkutun-Dagi fields will be developed, while Odoptu is to be further explored. The first stage of development is estimated to cost US$12.7 billion (ibid: *11*), whereas the total project is estimated as US$15.2 billion (*Japan Times*, June 30, 1995).

Development plans for Sakhalin-1 include three platforms (two at Chaivo and one at Arkutun-Dagi), located about 16 km offshore. From them, nearly 800 wells are to be drilled, most applying the slant-drilling method. An oil pipeline (530 mm) and a gas pipeline (1,000 mm) are to be constructed to reach offshore facilities located near Katangli and Korsakov. An export terminal is planned near Korsakov to handle 5 million tonnes of oil annually, as well as a LNG plant with a capacity of 6 million tonnes. An oil refinery is planned to be constructed, with a capacity of 3 million tonnes (*IPR*, February 17-24: 13-14). It is easy to observe that this part of the plan virtually duplicates the infrastructure projected for the Sakhalin-2 project (see above). A Moscow-based trade publication, *Nefte*, said that Sakhalin-1 is the largest oil production agreement signed to date in Russia by a group of foreign companies. The project is estimated at US$67.5 billion, against total investment of US$15.2 billion. The Russian Fuel and Energy Ministry expects the project to break even in 13 years (*Japan Times*, June 30, 1995).

(c) Sakhalin-3 Tender

In mid-1993, the Russian Federation launched an ongoing program of tenders with Sakhalin-3, another potential project of similar scale to Sakhalin-1 and Sakhalin-2. The tender included four blocks on the northeastern shelf, with a prospective area of 15,000 sq.km, overlapping with the area of the fields included under the Sakhalin I and II agreements (see Figure III.5.3). Piltun-Astokhskoye, Lunskoye,

Figure III.5.3. Areas of the Sakhalin-3 Tender



Source: Holton, 1995.

Chaivo, Odoptu, and Arkutan-Dagi fields are encompassed in the bidding area, but excluded from the Sakhalin-3 tender.

There are 35 prospective structures in this area and three already-dicovered gas fields: South Lunskoye and Kirinskoye in block 4 and Veninskoye in block 3 (*Petroleum Economist*, August 1993: 41). The largest among the undrilled structures are the East Odoptu anticlinal complex, just east of Odoptu field, on block 1; the Ayashsky complex in block 2, which forms the southern end of the Arkutun-Dagi field trend; and the very large South Kirin and Myngin structures of block 4.

Unlike the first two Sakhalin projects, in which the broad dimensions of the reserves base were generally established prior to negotiations, Sakhalin-3 is far more prospective, as recoverability of oil and gas has not been proven in the structures under consideration. Still, potential reserves at Kirinskoye and South Lunskoye alone are estimated at 100 billion cu m of gas and 50 million tonnes of condensate.

The tender was announced and the model Production Sharing Agreement (PSA) was released through Wavetech Geophysical, Denver, which acted as the project manager for the tender, along with

the Russian Geological Oil Research Institute (VNIGNI). In December 1993, bids were submitted by 30 companies, including Russia's Gazprom, Royal Dutch Shell, Arco, Chevron, and Broken Hill Properties (BHP) of Australia. The Sakhalin-3 tender committee announced the winners in January 1994: blocks 1 and 2 were awarded to Exxon and the southernmost block 4 was awarded to a consortium set up by Mobil and Texaco (*New York Times*, December 24, 1993). Block 3 was not awarded under the current tender.

Exxon is expected to spend US$102 million to explore block 1 and US$ 121million on block 2, whereas Mobil/Texaco is expected to spend US$151 million for exploration of block 4 (Sagers, 1995).

Russian and Sakhalin administration officials stressed that companies participating in the tender were bidding for the right to explore for and produce oil and gas under term of the model PSA, and not for the right to conduct a feasibility study or negotiate, as it was the case with Sakhalin-2, or for the right for joint exploration, as in Sakhalin-1 (*O&GJ*, August 30, 1993).

Negotiations with the Russian government about the PSC have been under way since early 1994. In June 1995, the next round of negotiations was postponed because of the necessity to adjust the draft agreement to the law "On production sharing agreements," which was approved by the Duma at that time (*Kommersant Daily*, June 23, 1995). The profit tax rate, which was 35 percent at that time, was supposed to be fixed in the project of the PSA, according to the Russian experts' opinion. American companies intended also to negotiate the size of royalties and the share of profitable oil according to the level of profitability (the Russian party insisted on a 52 percent share in "profitable oil" at the lowest level of inner profitability — less than 17 percent, — while Americal companies wanted this share be lower [ibid]).

Despite the absence of a signed agreement and a certain risk/uncertainty involved in the project, the American companies are eager to begin work on the project. Under a contract, Sakhalinmorneftegas will drill two exploratory wells in the project area, evidently in the East Odoptu structure (*IPR*, June 30-July 7, 1995: 11-12).

(d) Sakhalin-4

The next potential project in the island's shelf development, Sakhalin-4, was announced for a tender in Denver on September 27, 1994 (*Petroleum Economist* Special Report, 1995; Brodsky et al., 1995). It included three blocks: block 3, which was initially part of the Sakhalin-3 tender and was later withdrawn from it; and new blocks 5 and 6 in the Sakhalin Bay area, directly north of the island (see Figure III.5.3). A substantial number of companies conducted geological and geophysical evaluation of the Sakhalin-4 areas in preparation for the summer 1995 bid deadline.

The most promising in block 5 is the large Astrakhanov structure, located just offshore in Sakhalin Bay (10-15 meters of water in the area which is not subject to ice movement during the winter). Besides, there are two small onshore gas/condensate fields (lying on the southern flank of the Astrakhanov structure) and the thick Miocene sandstones, which are productive onshore, are also the primary target offshore.

Block 6 is located northeast of block 5, to the north of Schmidt Peninsula. The block contains numerous large structures. Block 6 is expected to be more oil-prone than block 6 due to a difference in source rocks. According to Sakhalinmorneftegas estimates, the three blocks included in the Sakhalin-4 tender may contain about 200 million tonnes of oil and 60-70 billion cu m of natural gas (Sagers, 1995). No open deposits existed in the Sakhalin-4 area by mid-1995, and reserves are forecast in C-3, D-1, and D-2 categories; licenses were granted only for exploration work (from our interview with the Sakhalin company Shelf, Yuzhno-Sakhalinsk, June 1995).

(e) Prospective Tenders for Sakhalin-5 and -6

An ongoing series of tenders is planned for the East Schmidt (located directly north of Sakhalin-3 area) and Pogranichny sectors, located directly south of Sakhalin 3 (see Figure III.5.3).

The potential of the East Schmidt sector is similar to that of Sakhalin-3. Several large structures have been identified on seismic data, and reservoirs on the structure should be similar to the prolific Nutov and Dagi sandstones which are productive at Odoptu and other offshore fields.

The Pogranichny sector contains parts of two basins: the Lunsk graben portion of the North Sakhalin basin and the Pogranichny basin. The large Okruzhnoye field is supposed to be the main oil reservoir. A series of similar structures have been delineated just offshore along the entire western side of the sector (*Petroleum Economist* Special Report, 1995).

No timetable for the two new projects had been set by the end of 1995. According to Sakhalin specialists, there would be no more new tenders announced in the near future until operations start under the new "Law on the PSA" (from our interview with the Chairman of the Sakhalingeolkom, Yuzhno-Sakhalinsk, June 29, 1995).

III.5.4. Tender Procedures

The RF's Ministry of Fuel and Energy conducts all tenders for offshore development projects, with the assistance of Sakhalingeolkom, which is a federal office representing the Russian Federation in the region (see below).

As was said by the Chairman of Sakhalingeolkom, in Sakhalin-1 and 2 there was no real competition but an agreement with foreign consortiums in the midst of a changing situation (as stated above, Sakhalin-1 reemerged from an old, unfulfilled project started in 1975).

The first really competitive tender for shelf development is Sakhalin-3, with Sakhalin-4 to follow and to improve tender procedures. According to Sakhalingeolkom, criteria for specific tenders are confidential, but the procedures for the Sakhalin shelf tenders are designed to ensure the fairness and integrity of the bidding process.

The tenders are conducted on the basis of sealed bids submitted by a specified deadline. For each tender, the model PSA is made available to interested companies shortly after the tender is announced.

Bids received by the tender committee, consisting of high-ranking officials from both the Russian Federation government and the Sakhalin Oblast administration, are publicly open within three to five days of the bid deadline, with the announceent of winners within 30 days thereafter.

The bids submitted for the Sakhalin shelf tenders must include a minimum guaranteed exploration work (expenditure) commitment for the five years of the contract, scheduled on a year-by-year basis. The bid must also contain any changes to the model PSA proposed by the bidder. The tender committee selects the winning bid on the basis of the amount and schedule of this exploration work commitment to the degree to which the proposed changes to the model PSA affect the major economic terms. Russian experts name the following as the main criteria for selecting the winners: the scale of the development project; the amount of payments by bidders to compensate Russian government for land; acceptance of the PSA; participation of foreign capital in developing local infrastructure; and the importance of construction works to be done (ibid).

The Sakhalin-4 PSA included a royalty of 8 percent and a profit tax of 35 percent. The cost recovery limit set is set at 8 percent. The production split specified in the contract is based on the company's internal rate of return (IRR) after profit tax. At an IRR of less than 22 percent, the split of profit hydrocarbons is 70 percent to the company and 30 percent to the Russian party. For IRRs of 22-25 percent, the split is 60 percent to the company and 40 percent to the Russian party. Above that point, the production split changes by 10 percent by every 2 percent IRR increase. Assuming a reasonable production profile and schedule of capital costs, the model PSA produces a total overall company/Russia party split of approximately 55/45 (*Petroleum Economist,* Special Report, 1995).

The term of agreement is 25 years, which may be extended. The contract also guarantees the company's right to export its share and cost hydrocarbons, as well as the right to sell for and to import, exchange, and export convertible currencies. The PSA also provides an important means for limiting a company's actual long-term exposure, so that the company may relinquish a block at any time, so long as the minimum exploration work commitment through that year has been satisfied. This provides an important financial risk mechanism in case the company is disappointed with the first drilling results, operational costs, or product prices.

III.5.5. Transportation and Infrastructure

Little infrastructure is currently available on Sakhalin to process and transport hydrocarbons from the island. Oil produced by local oil companies in the north of Sakhalin is transported from Okha to a refinery at Komsomolsk on the mainland (see Figure III.5.1), via 530-mm pipeline. Gas is carried along the same route, via 530-770-mm pipeline. The only known small-field-type oil refinery exists in the central part of Sakhalin's eastern cost, near the Okruzhnoye field. The refinery is owned and operated by the only joint venture in the region, Petrosakh (see below).

Transportation of hydrocarbons to Asian Pacific markets had been in the focus of discussions since the old Soviet-Japanese project was launched. The initial Soviet proposal was to build a pipeline from north to south Sakhalin, carrying then the hydrocarbon liquids to Hokkaido via an underwater pipeline which had to be built for this purpose. Given the shallow water in that area, it was a technically easy and economically efficient solution. However, the Japanese side opposed this plan for several reasons: coastal LNG tankers would be cheaper; an underwater pipeline would be under constant earthquake risk; in the rural Hokkaido area, there would not be sufficient potential users of the delivered gas, so the major market farther south on Honshu could be reached only via pipeline link between Sakhalin and Hokkaido. In addition, or perhaps on top of these considerations, there was a national security concern: this plan could make the northern part of Japan too much dependent on the one Soviet energy source (Sagers, 1995). Thus in 1981 agreement between the two sides was reached to build a LNG plant and transport liquified gas by tankers to Japan's main consuming area on Honshu.

These plans were never implemented, because the project was put on hold indefinitely. Currently, with the two new Sakhalin projects in action and the others under negotiation or in prospect, plans under consideration by international companies include a variety of options for the transportation and export of hydrocarbons. They include construction of an LNG facility to allow the export of gas, via tankers, to major markets in Japan, Taiwan, and South Korea. Port facilities near Yuzhno-Sakhalinsk, in Korsakov, would offer access to shipping without the problems with the winter ice pack that are common to northern ports. Gas transportation to southern Sakhalin by pipeline as well as construction of a power generation facility for the export of electricity to northern Japan are also under consideration (*Petroleum Economist*, Special report, 1995).

Construction of such infrastructure is a high-cost endeavour; however, the reserves involved on the Sakhalin shelf can justify the investment. Foreign operators involved in Sakhalin I and II projects already consider sharing the costs of creating common infrastructure (see above). The projects in prospect could joint these plans and further reduce the costs of creating and operating this infrastructure scheme.

III.5.6. Environmental Factors

Sakhalin Island is located inside of the so-called "Pacific active belt," which accounts for up to 80 percent of the total seismic energy of our planet. In this active seismic area, the danger of earthquakes always has been real. Until recently, there had been about 40 seismic stations in the Russian Far East; however, in the early 1990s, 30 of them were shut down because of lack of financing (*Priamurskiye vedomosti*, June 27, 1995). Five seismic stations of a total of six located on Sakhalin Island were closed too, including the one near Okha, just 100 km away from the epicentre of the earthquake on northern Sakhalin that leveled the oil town of Neftegorsk on May 28, 1995. The quake, registering 7.5 on the Richter scale (Sagers,1995), caused the deaths of 1,989 people, most of them in Neftegorsk, a city of 3,200 people (*Sovetskii Sakhalin*, June 28, 1995).

According to local geologists, the earthquake shock was at level 9, whereas the buildings of the city had been constructed with a potential resistance of level 3 (interview with 'Vostokgeology," June 29, 1995, Yuzhno-Sakhalinsk), and it resulted in more than 50 oil spills in Northern Sakhalin via ruptures in different pipelines. The location of the earthquake was also unexpected.

Because of these complicated seismic conditions, ice conditions, and tsunami danger, special ecological monitoring was included in the PSAs as a must, and research units in the Nortern Sakhalin (Okha) were recalculating the risks for offshore development projects. However, no direct impact of seismic activity on actual offshore drilling was expected. The main danger is oil spills in the transportation process; there are no known technologies to deal with oil spills on ice. A new agency for emergency situations is planned to be established jointly with the Sakhalin Energy.

Disposal of oil drilling residue is another matter of concern for environmental organizations. Until now, it was forbidden by Russian regulations to dispose drilling fluids into natural water reservoirs, in contrast to the rest of the world. In 1993, Exxon and Mobil Oil started an experiment to show that this is possible without ecological damage (interview with deputy manager, Department for development mineral resources of continental offshore Sakhalin, June 30, 1995, Yuzhno-Sakhalinsk). If the results are conclusive, they will be allowed to proceed. Otherwise, residues will have to be buried on land.

As a whole, Sakhalin's ecosystem is very rich and very fragile, and environmental organizations are quite strong now. They want to be sure that the rivers of Sakhalin and the waters around it remain unpolluted and that the main fishing wealth of the region, salmon, is not endangered. Every human activity related to this is under public discussion: until recently, procurement of sea animals was forbidden for more than a year, except for limited rights granted to the indigenous people of Sakhalin. This policy has resulted in a sharp increase in the sea animal population, which became somewhat dangerous for salmon live stock in the area. Hence the renewal of the trapping industry is currently under public debate in the region (*Svobodnyi Sakhalin*, June 30, 1995).

This is only one example of the ecological consciousness of the island's residents, among many others. There are extensive discussions of every possible threat to the ecosystem as a result of offshore hydrocarbon development. Precautions will have to be taken by operators, and very high fines will be levied on potential polluters (interview with Sakhalin environmental officials, June 30, 1995, Yuzhno-Sakhalinsk). However, Sakhalin officials also consider that energy development has to be profitable, and thus they are willing to work towards striking a balance between economic profitability and environmental sustainability.

III.5.7. Social Factors

Sakhalin officials seem to be satisfied with the foreign companies which are ready to comply with environmental safety requirements. Social factors are more complicated because foreign operators are much less sensitive to these issues. Although they show their "good will" (e.g. are ready to participate in

the job training of local population), they resist binding themselves to fixed numbers of local workers to be employed by them. However, there is a certain progress in the discussion, since, in the past, foreign companies would not even accept the issue, while in 1995 they agreed to talk about this (interview with Chairman of "Sakhalingeolkom," June 29, 1995, Yuzhno-Sakhalinsk). A joint committee representing the federal government, Sakhalin Oblast administration, and foreign companies was supposed to be set up to survey conditions of employment, social conditions of local population, and to assess where the equipment should be acquired and then to check on quality and prices of equipment supply.

Sakhalin officials are aware of severe social problems in West Siberia, where the region produced up to 70 percent of total Russian oil and got nothing from it but harm to regional development (see above, chapter III.2/3). They are concerned about the shift-work team system which is going to be used in the Sakhalin projects, too, although on a smaller scale. Tyumen province development is a point of negative reference for Sakhalin administration; they obviously do not want to repeat that experience. They argue that in Sakhalin, fewer social problems are foreseen and that currently people are more interested in working in Sakhalin rather than in Tyumen. Petro-Sakh, the joint venture with U.S. participation operating on the island, is a positive experience in this sense: their employees are more satisfied with working conditions than those who work for Russian companies.

However, it is not sure that widespread optimism by officials on the future of Sakhalin as "the Kuwait of the Pacific" (sic) is actually shared by the local population. We do not have evidence on the matter, but our casual observation and off-the-record contacts in Sakhalin seem to suggest that many people doubt that any of these potential benefits will trickle down into the population at large. They suspect foreigners and old-time bureaucrats of getting ready to appropriate the new wealth, while the environment is destroyed and shortages of supplies continue to afflict the resident population of the island. Indeed, some are trying to leave for more hospitable areas. It is up to the new Sakhalin entrepreneurs and administration to belie these pessimistic prognoses.

In general, Russian specialists advocate an idea of foreign investors being co-responsible for sustainable development of the regions involved in large-scale industrial projects. They are determined not to repeat the experience of Saudi Arabia in the 1920-30s, where foreign companies had launched oil development with all kinds of privileges and no obligations to the region (source: interview with an oil industry expert, IEIE, June 5, 1995,Novosibirsk). This philosophy is being implemented by Russian partners in actual negotiations on oil and gas development projects in Sakhalin. Until now, a dialogue on these issues seems to be constructive, and the Russian side is hopeful of continuing it this way, so that the Sakhalin projects may become a case of balanced interests of foreign investment and regional development.

III.5.8. Political Issues of Sakhalin Development

Elections to the Sakhalin Oblast legislature (Duma) in March 1994 displayed a significant political apathy of its people: about 25 percent of the registered voters turned out in most of the districts, and

in the capital of the island, Yuzhno-Sakhalinsk, the turnout was only 18 percent (*Rossiiskaya Gazeta*, March 29, 1994). The weather could have been a problem (a heavy snow storm that day resulted in no water in the south for several days, intermittent electricity and no bread delivery to stores). However, this apathy seems to be due mainly to economic decline.

Today's Sakhalin economy is geared to fishing (which accounts for about 50 percent of total industries), timber, and mining (over 70 percent for the three industries). Subsidies from the federal budget make up 51 percent of the oblast's revenues; this fact explains why there are not many people on Sakhalin who are in favor of an independent Far Eastern Republic (FER). While Sakhalin business-people agree with the region's economic claims to part of the money sent to Moscow, they do reject the idea of political separatism: with its underdeveloped industrial structure, Sakhalin will not survive economically on its own, and they fear being subdued to a new political center of FER, obviously Vladivostok ("New Moscow"). As a whole, this would not change the political and economic situation in the region for the better (*Vostok Rossii*, August 18, 1993).

The Sakhalin regional government,too, is opposed to political autonomy from Moscow. However, with the new oil and gas development projects in sight, the region is now aware of its increased importance as Russia's gateway to the Pacific economy. Admitting that without subsidies from the federal budget the island would not keep afloat in the turmoil of economic transformation, the governor of Sakhalin accused Moscow of ignoring legitimate demands and interests of Sakhalin and thus fueling up separatist ideas of "hotheads": "If the Far East is declared a republic, . . . it will be the center who has pushed us toward it" (*FBIS-Sov.* 93/181, Sept. 21, 1993).

The same idea was articulated by the Sakhalin administration in summer 1995: "If the center keeps ignoring demands and conditions of the Sakhalin oblast, then nothing will be left to us but to fully turn our face to the Asian Pacific Region; otherwise we will have no resources, no fuel, no badly needed investments" (interview with the chief of Department of foreign economic relations, Administration of Sakhalin Oblast, June 28, 1995, Yuzhno-Sakhalinsk; and "Sostoyanie . . ." (unpublished report, 1995).

While the current administration of the region is obviously market- and reform-oriented, communists' presence in the background is tangible. In 1993, Valentin Fedorov, Russia's deputy minister of economics and the former governor of Sakhalin, was removed from his Sakhalin office as a result of a fierce stand-off with the Oblast soviet, which blamed him for economic failure in the region. Although local communists failed to collect enough signatures to register their candidates to run for the State Duma in November 1993, the Sakhalin oblast soviet adopted an anti-Yeltsin resolution and supported the actions of the Supreme Soviet in October 1993(*Sovetskaya Rossiya*, September 28, 1993). The newly appointed governor of Sakhalin, Evgeny Krasnoyarov, temporarily transferred all powers and functions of the Soviet to the regional administration and then dissolved the local Soviets(*Itar-Tass*, Oct.18, 1993; *FBIS-Sov*, 93/199 and 201, Oct.18 and 20, 1993).

Currently, the communist position is represented through the newpaper *Vozrozhdenie* [Revival] (see, for instance "Razrusheniye Rossii . . .," 1995, as well as many communist symbols left in Yuzhno-Sakhalinsk: Lenin and Karl Marx statues, names of main streets, newspapers (*Sovetskii Sakhalin*), etc., although local residents seem not to care much about this fact: why bother to spend money in changing names and monuments, for all this hassle? Time will sort things out. . .

III.5.9. Main Actors on the Sakhalin Oil Scene

Federal Agencies in Sakhalin

Sakhalingeolkom (Sakhalin Geological Committee) is an office representing Roskomnedra (Russian Committee on Geology and Subsurface) in the region. It was established in 1992 to manage and control, on behalf of the Russian Federation, the use of underground resources in the Sakhalin Oblast, which is, according to the Russian Law, state property. Although the office is not responsible for offshore development, it assists Moscow in conducting tenders, in close collaboration with the regional administration.

The Representative Office of the Ministry of Foreign Affairs was established in Sakhalin in 1994. Similar offices were opened by the Ministry of Foreign Affairs in Khabarovsk, Vladivistok, Nakhodka, and other cities (there will be 18 offices soon). The office performs some consulate functions (issuing and extending entry visas) and helps foreign companies and businessmen to connect with Sakhalin; upon request, they check on reliability both of Russian and foreign partners. They work in close communication with Seattle, Alaska, and Hokkaido business. In some cases, this office fulfills the function of conciliatory or arbitrary place: it helps to settle up some problems between Russian and foreign partners. It also assists Russian parties in finding foreign business partners, working in collaboration with the Sakhalin administration (see below).

Regional Bodies

The Department of Foreign Economic Relations is the most important part of the Sakhalin Oblast Administration, where regional economic policy is defined and persued. No matter how fast negotiations and legal procedures for offshore investments projects will go on, Sakhalin officials do not anticipate Japan to start investing into these projects untill 2003, when Indonesia's fields would be depleted and not able anymore to cover Japan's fuel demand (interview with Head of the Department, June 1995, Yuzhno-Sakhalinsk). To attract investment capital before this time, short- and medium-term investment projects with expected pay-back time from three to five years were developed by the Department. As of January 1995, this list includes 53 proposals for foreign investors in different sectors: hydrocarbon development, petrochemical industry, biopharmaceutical industry, fish processing, fish breeding, coal mining, timber, construction, transport and communication, ecotourism, and light industry (see "Sostoyaniye. . .," 1995).

Currently, there are 340 companies with foreign participation registered in the Sakhalin oblast. Half of them do not actually operate, but they put their stakes in now, so as not to be late when a future market would expand. (Footnote: the process of registration of joint ventures brings a substantial replenishment to the local budget. In 1994 it was 87,188 million rub. and US$21.8 thousand, while in Jan.-March 1995 it was already 108,368 million rub. and US$4.5 thousand.) Among these 340 ventures, 40 have 100 percent foreign capital; 128 are with capital from Japan, 50 from the U.S., 56 from Korea, 18 from China, and 13 from Australia (a tota of 30 countries are involved). Due to dramatic increases in transportation costs and collapsed economic ties with the European part of Russia, the Sakhalin economy is more and more oriented towards the Asia-Pacific Region. In total trade turnover of the Sakhalin oblast, Japan accounts for 54.3 percent, South Korea for 24 percent, and the U.S. for 7.3 percent (for more details of current foreign economic relations of Sakhalin with APS, see the report "Sostoyaniye," 1995).

The Head of the Department, Vladislav V. Rukavets, himself underwent a quite remarkable transformation from being the First Secretary of the Sakhalin Oblast Committee of the CPSU to being the head of the Oblast Committee for State Property ("Chubais of the Sakhalin"), and then to the head of this Department. In his own words, he might be the only example in the country of a former CPSU Oblast First Secretary who was able to go through this profound transformation process.

The Department on Development of Mineral Resources Offshore Sakhalin represents the Sakhalin Oblast administration at all negotiations with foreign companies leading to the PSA, in direct contact to Moscow (federal agencies). The main responsibility of the Department is to make sure that offshore development projects (signed and prospective) comply with environmental safety requirements (see section "Environmental factors" above). They provide for information on tsunami danger, seismological situations, and ice conditions; it was this department that insisted on calculations for level-10 seismic resistance to be included in the feasibility studies, although initial calculations ware made for level 8. After the Neftegorsk earthquake, foreign companies have not cancelled their investments plans because they had been prepared to increased safety costs and do not need to reestimate.

Deputy manager of this Department is Dr. Galina Pavlova, who was involved in assessment of feasibility studies and preparation of PSA. She is a biologist specialized in environmental issues, who had been been working for 16 years at the Sakhalin Research Institute for Complex Studies (SakhKNII). Currently, she works in close cooperation with the Sakhalin Energy consortium and other foreign experts (interview with Dr. Pavlova, June 30, 1995, Yuzhno-Sakhalinsk).

Regional Oil Companies Operating on Sakhalin

Except for Rosneft, which will participate in the Sakhalin-1 project as one of the operators on the Russian side with the 17 percent stake of shares (see above), there is no other national oil company present on the Sakhalin scene currently. A remarkable move was done in September 1993 by Prime Minister V. Chernomyrdin, who signed a decree transferring "exclusive rights" for development of the

Sakhalin shelf to Gazprom. The details of this action "remain a mystery, " but this was a fresh confirmation that the struggle for control over mineral resources in Russia was not over and that Russian government was inclined to rely increasingly on its own producers (*Izvestiya*, September 3, 1993). Nevertheless, the experiment with the Barents Sea offshore tender (see Chapter III.3, "Investment climate") was not repeated, and at present, Gazprom is not involved into any of the signed Sakhalin deals.

The largest oil company operating currently in Sakhalin is **Sakhalinmorneftegas** (SMNG), which was transformed from a state company into a share-holding company. It holds 40 licences for exploration onshore Sakhalin and exploits around 35 oil and gas fields scattered along the north-east coast of the island. Crude oil is produced at 28 fields. From a total of 2,292 oil wells in early 1993, 1,839 were actually in production. From total SMNG gas-well stock of 80 wells, 51 wells were producing in 1993.

All signs of the crisis in traditional oil industry in Russia are evident in Sakhalin onshore development: the largest oil fields (Okha Tsentral'naya and Mongi, in particular) are fairly exhausted and are operated mainly by the pumping method; water-cut of lifted oil-water mixtures is increasing, due to intensive water-flooding. However, in gas production, the average daily flow of gas wells increased from 54,000 cu m in 1985 to more than 85,000 cu m in 1991 and 1992, and utilization of associated gas increased from 18 percent in 1985 to more than 61 percent in 1992, while the annual volume of flared gas fell ninefold over the same period (Khartukov, 1994).

The second large company operating in the region is **Vostokgeologiya**, which started in 1960 and was transformed into a joint-stock company in the course of privatization. This is mainly an exploration company which was involved in development under contracts (about 10 percent of total work). It has a good record of discovery of one of the largest oil deposits in onshore Sakhalin (Okruzhnoye), as well as an important coal deposit (Solntsevskoye) and thermal waters to be used for energy production. Starting in 1980, they worked in Kamchatka and Chukotka with very good results: in Kamchatka, gas deposits with estimated reserves of 10 billion cu m (Nizhnekvakchinskoye), and another 3 billion cu m deposit (Kshukskoye) was discovered. By now, the company has 1,000 employees (down from 5,000, due to the cut in finances) and a strong equipment base and experience, so that they can increase their activities at any moment. For instance, their Kamchatka department has equipment and office support to undertake 10 times more work than they currently do (interview with General Director of "Vostokgeologiya," June 29, 1995, Yuzhno-Sakhalinsk).

The company is engaged in a joint venture with the U.S. company Fairfield Industries, based in Houston. They jointly work on transition territory in shallow waters. Research is being done on seismological conditions, designing a map of the "land crust, " and prognosis of oil and gas reserves in the area. The work is being done on commision from the Petrosakh joint venture (see below).

Shelf is a new type of joint-stock oil company that was the first to break the monopoly of public companies in Sakhalin energy. It was formed in 1992 by service experts who managed to gradually buy off shares of about 30 small companies spinning off from a large state oil company. Currently, only

17 percent of Shelf's shares belong to the state; in general, they are referred to as a "private oil company, " the only one in the Sakhalin area. About 30 percent of its shares was sold to the British firm London Oil Refineries. Among a total of 53 shareholders, there are 20 companies (19 Russian and 1 British), and the rest are private persons. Shelf holds seven licences for 25 years for exploration and development of onshore Sakhalin.

As indicated by the company's name, it was set up with perspective to operate offshore (in fact, its President, Mr. S.Ryazanov, directed offshore drilling work in a state oil company in the past). However, its first attempt to submit a bid for the Sakhalin-3 tender, jointly with Unicol, a Taiwan State company, and the China Petroleum company, failed: after one year of negotiations, the whole consortium withdrew and then fell apart because the conditions of the tender were changed unexpectedly (a major gas field was taken off in favor of Sodeco, to Sakhalin-1).

Currently, Shelf wants to participate in the Sakhalin-4 tender but does not expect to win. Shelf feels that there is a real discrimination by the Russian government against private Russian companies: only onshore deposits are available for Russians, while offshore fields, with 100 times larger reserves, are given to foreigners. Offshore tenders are organized and decided by Moscow; private Russian companies have not enough capital and influence to be competitive against foreigners even if they have experience in offshore work (interview with the President of the Joint-Stock Company Shelf, June 28, 1995, Yuzhno-Sakhalinsk).

Petrosakh is the only joint venture operating in oil development in onshore Sakhalin. The venture was started in 1991 by the Russian companies Sameko (5 percent interest) and Sameto (45 percent interest) and a U.S firm, Smith Energy, which later was sold to the Saudi Arabian company Nimir Petroleum, based in the U.S. (50 percent interest). The Sakhalin administration also is identified as a shareholder, evidently through either Sameko or Sameto, or both (Sagers, 1995).

Petrosakh has two licenses to operate in two fields (Okruzhnoye and Pogranichnoye) located in the central part of the island's eastern coast, and has the right for additional exploration. A small oil refinery has been constructed near the Okruzhnoye field. Petrosakh is facing problems typical for the Russian energy sector, such as nonpayment by customers for delivery of its oil products, and it may have to terminate oil refining because of financial problems (ibid). However, in mid-1995 Petrosakh is reported to have beun producing high-octane gasoline, and expects to produce about 160,000 tonnes of oil per year (*IPR*, June 30-July 7, 1995: 4).

III.5.10. Conclusion

With the Law on Production Sharing Agreements approved by Russian authorities by the end of 1995 (see Chapter III.3.6), the necessary conditions for Sakhalin shelf development projects are provided. The law is far from being perfect, but it does secure state guarantees to all investors (foreign and Russian), regulates relations between the operator and the state, and provides for favorable

environment for foreign investors (*Free Sakhalin,* June 30, 1995). To be really effective, the law should be supported by other legislative acts and by changes in the taxation system. The Russian government is fully aware of this, and work in this direction is under way.

Political and economic instability in Russia is a serious factor hampering foreign investments in the energy sector. Until recently, absence of the PSA law was used as a pretext to delay investment decisions; currently, many potential investors are waiting for the outcome of the June 1995 presidential elections. In addition, divergent interests of foreign companies involved in Sakhalin projects, such as in Sakhalin-2 (see above), as well as heavy front-end portions of investment, are playing against the quick start. Many foreign companies, such as Amoco, Shell, and others, gave up their intention to participate in Sakhalin tendors and left(*Izvestiya,* October 19, 1994). The others remained, because along with the "contra's," there are some important "pro's" to consider.

Sakhalin Island offers a unique possibility to have a fresh start in the business. The "oil generals" who control the traditional oil industry in Russia are too busy within their territory in West Siberia; even the all-mighty Gazprom has not succeeded in reaching Sakhalin — at least, not until now. Undeveloped industrial infrastructure in Sakhalin can be considered as a disadvantage and as an advantage at the same time: by creating this infrastructure, rules of the game can be negotiated. In addition, several Sakhalin projects with overlapping development schemes offer a cost-sharing effect, which is a rare opportunity in itself. In fact, some sort of "international economic free-zone" can be created in the region. Geographical factors — the small size of the development area and its proximity to Asian Pacific market, — as well as the strong determination of Sakhalin government to defend their right to decide on regional economic policy, which is definitely Pacific-oriented, make all the above-mentioned risks worthwhile.

Appendix

List of Interviews

1. SODECO, high-level managers, Tokyo Headquarters, June 18,1995.
2. Director of the Project, Sakhalin Energy Department, MITSUI, Tokyo Headquarters, June 19, 1995.
3. Middle-level official, Energy Policy, MITI, Tokyo, June 15, 1995.
4. Vladimir V. Shmat, Researcher, Institute of Economics and Industrial Engineering (IEIE), Novosibirsk, June 12 ,1995.
5. Prof. Pavel A. Minakir, Director, Economic Research Institute, Far Eastern Branch, Russian Academy of Sciences; Former Vice-Governor of Khabarovsk kray; Khabarovsk,June 26, 1995.
6. Sergei I. Lopatin, Chief of Dept. of Foreign Economic Relations, Administration of Khabarovsk kray; Khabarovsk, June 26, 1995.
7. Vladislav V. Rukavets, Chief of Dept. of Foreign Economic Relations, Administration of the Sakhalin oblast, Yuzhno-Sakhalinsk, June 28, 1995.
8. Sergei Ryazanov, President, Joint-Stock Oil Company "Shelf"; Juzhno-Sakhalinsk, June 28, 1995.
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IV. CONCLUSION. THE INTEGRATION OF GREATER SIBERIA INTO THE PACIFIC RIM ECONOMY: 21ST CENTURY SCENARIOS

Greater Siberia's vast energy and natural resources could provide the much-needed basis for the full integration of the Pacific Rim as a self-sufficient, economic powerhouse. Our research on the oil and gas industry has shown, at the same time, the potential role of Siberia and the Russian Far East in Pacific development, and the important obstacles standing in the way of the fulfillment of such a promise. Furthermore, the actual implementation of energy development projects, through the joint operation of Russian and foreign firms, will ultimately depend on a number of institutional factors still difficult to assess. Foremost among them are the evolution of international relations between Russia and its Pacific neighbors, and the economic and political interplay between the federal government, the provincial governments, and various business groups in the different regions of this immense territory.

Therefore, to conclude our study, we will briefly examine the trends of evolution in the international and institutional environments of Siberian-Pacific relations, and we will venture some hypotheses on different scenarios influencing the process of Greater Siberia's integration into the Pacific economy in the early 21st Century.

IV.1. The International Environment of Asian Pacific Integration

In the past, both historical and recent, relationships between states in the Asian Pacific have largely influenced economic exchanges and development processes in the region. It would be a mistake to think that this fundamental fact has changed very much in the post-Soviet era, characterized by growing interdependence and market orientation of all Pacific economies (Rutland and Markus, 1995). Indeed, both Russia and China, while rapidly becoming market economies, are dominated by strong states, in which a nationalist military exerts considerable influence. To characterize Russia as a "weak state" on the basis of its dreadful performance in Chech'nya would be equivalent to demoting the U.S. of its superpower status after its defeat in Vietnam. In spite of serious economic and political difficulties, Russia remains a great power, not only militarily but politically, and its integration into the Pacific economy will be dominated by the articulation of its national interests by whomever is in power in Moscow. To be sure, provincial governments in Siberia and the Far East will play an important role in linking up with the Pacific economy (see below), but they will do so in the framework of the new Russian federalism, and ultimately under the guidance of the federal government.

Therefore, to assess the prospects for the integration of Russia into the Pacific economy, we must briefly survey the recent evolution of both economic and political international relations between Russia and the three major countries in East Asia — Japan, South Korea, and China — while adding some remarks about the potential role of other Asian countries in this set of relationships.

Russian-Japanese relationships appear to be in a stalemate as of the mid-1990s, with no significant breakthroughs on the horizon towards the early 21st century. This is mainly because of the Kuriles dispute, and the role played in this conflict by domestic politics in both Russia and Japan. From the Russian perspective, it is simply unthinkable to release national territory to Japan amid the climate of national humiliation that followed the disintegration of the Soviet Union and substantial weakening of Russia's military power and international status. The pressure of Russian nationalism, either in power or putting pressure on the Presidency, will last until Russia recovers a decent standard of living and economic and political stability. In a 1993 survey of graduate students in international relations at Moscow University (informed respondents with potentially important future responsibilities in the country), 63 percent were in favor of not returning anything to Japan, 23 percent for simply proclaiming joint sovereignty, and no one for the return of the two islands that the Soviet Union had initially agreed to return to Japan in the 1956 declaration (Chugrov, 1995). It should be noted that in addition to national and strategic reasons, Russia has also two important motivations for not yielding the four islands out of 56 that form the Kuriles chain: their 25,000 Russian inhabitants, and their considerable wealth in rare metals (many of these volcanic islands are some of the youngest and, therefore, the most active of Earth's laboratories) and perhaps in offshore oil and gas.

On the Japanese side, an equally important nationalist strain is developing in domestic politics, trying to find a more assertive international role for "Japan as a normal nation," to quote the well-publicized statement by Ozawa, probably Japan's most forceful political leader of the mid-1990s. The Kuriles, because of the old enmity with Russia in the North Pacific, have become the symbol of new nationalism, an expression that does not worry Western opinion, which generally leans towards Japan in this specific territorial dispute.

Furthermore, Japanese economic interests in Russia appear to be very limited. In the mid-1990s, Japanese investment in Russia was negligible, about 0.1 percent of total Japanese overseas investment. Institutional and political instability in Russia, as well as an impoverished economy, discourage Japanese investment and trade with Russia. On the other hand, according to Chugrov, Russian industrialists are also distrustful of Japanese investment, and they do not consider that foreign investment would help to solve their problems.

There is, however, a potential Japanese interest in securing access to natural and energy resources in the Russian Far East, particularly in fishing, timber, and oil and gas, as we have documented in our report. And a number of joint ventures in hotels, business services, and export-import are building ties between Japanese and Russian economies in the border areas, particularly in Khabarovsk and Sakhalin. So, beneath the surface of distant, official relationships, there is a process of considerable intertwining of business transactions that will play a significant role in the Russian Far East. However, unless political conditions open up large-scale trade and investment, we believe that the potential for Japanese invest-

ment will be concentrated in oil and gas exploitation around Sakhalin, and this only with American cooperation, and when and if Japan needs to tap into new sources of energy supply.

The limits of Japanese economic and technological cooperation have pushed Russia, since the late 1980s, into establishing closer links with South Korea, actually backing Seoul in the controversy over the building of nuclear capability in North Korea (Lee, 1995). After Gorbachev established diplomatic relations with Seoul, the number of South Korean investment projects permitted in Russia skyrocketed between 1989 and 1994 from 2 to 34, and from 480 million dollars to over 36 billion dollars in 1994. However, over the whole period only 24 billion dollars were actually invested. After a souring of the relationships in 1993, total trade between the two countries increased by 39 percent in 1994. There is a conscious strategy to link up Russia's scientific potential with South Korea's technological capacity and industrial competitiveness, precisely at the time when South Korean companies have to diversify their export markets and platforms to respond to protectionism in OECD countries and to competition from lower-cost Asian producers. Besides, South Korea's national strategic interests play in favor of an alliance with Russia. Such an alliance would be a factor to undermine Communists' hold in the north and to counter Chinese links with Pyongyang, thus improving the chances for Korean reunification, the paramount objective of South Korea's foreign policy. Thus, while Russia has kept sending some military supplies to North Korea, Russian interests seem to favor an inclination towards Seoul as a source of capital, technology, and industrial know-how. Additionally, the Korean Russian minority in Sakhalin and other areas of the Russian Far East could play an interesting role as an ethnic bridge between Korean companies and local societies.

Yet, the strategic play that appears in the historical horizon is a multi-dimensional alliance between Russia and China, overcoming centuries of distrust and hostility, in order to support shared interests of economic development and national power in an increasingly volatile Pacific area (Ferdinand, 1995). By 1993, China had become the second-largest trade partner for Russia, after Germany, with Russian exports accounting for $4.9 billion, and Chinese exports for $2.8 billion. Although trade declined in 1994, it seems to have picked up again in 1995. Increased economic exchanges are rooted in military exports from Russia to China, as well as in the perception of common political interests in defending both countries' autonomy vis-à-vis a post-cold war triumphant West. Both China and Russia have engaged in a fast transition to a market economy and global interdependence. But both want to do so on their own terms, forbidding foreign interference in political issues, human rights, and domestic ethnic conflicts. In spite of the differences in political regimes between the two countries, there is growing respect in Russia for the autonomous path that the Chinese state defined for its transition to capitalism, and a clear attempt to follow such a path among nationalist and Communist forces, a major power in Russian politics. China, trying to assert its military power in the Pacific, is highly dependent on Russian military technology and equipment. Russia needs the market. But it also needs China's cooperation to counter Japan, and to establish its presence in the Pacific region by diplomatic means. Thus, Russia played a major role in international

organizations to avoid condemning China for human rights abuses, and China supported the admission of Russia into the Asia-Pacific Economic Cooperation conference.

The main frictions between China and Russia concern territorial disputes in the Russian Far East-Chinese border, uncontrolled Chinese trade in Far Eastern cities, and illegal settlement of Chinese in Eastern Siberia and the Far East. Indeed, this settlement, officially estimated at one million Chinese — and by some sources as high as two million — is a time bomb in a vast region whose total population is 8 million, and which is actually losing population due to emigration to European Russia in the 1990s. Given the demographic imbalance between the two sides of the border, the notion of a "Chinese Siberia," actually going back to the blurred frontier of the 17th century, dangerously looms on the horizon.

And yet, in spite of Far Eastern governors' claims of widespread hostility to Chinese immigrants from the resident Russian population, Russia has been much more flexible towards China than towards Japan, actually accepting the return of some territory to China (15 square kilometers in the Primorsky krai), and engaging in a negotiation that is scheduled to redefine the boundary between the two countries by the end of 1996, possibly granting to China the left (northern) bank of the Tumen river, and permitting Chinese access to the Japan Sea north of the Korean peninsula.

Also, in order to maintain its privileged relationship to China, Russia has slowed down relationships with Taiwan, supporting China's position on sovereignty, and it has also reduced to symbolic proportions its military presence in Vietnam's Cam Ranh base, thus reversing the Soviet policy of using Vietnam and India as potential allies against China.

In this framework of increasingly close political and strategic relationships, economic exchanges between Russia and China are likely to be intensified, but in a curious pattern. Russia is, and will be, involved in technology-based exports and major infrastructural projects such as hydroelectric systems, mainly originated by former state enterprises. Chinese trade and exports in the Far East, on the other hand, seem to be characterized by entrepreneurial, highly speculative, petty capitalism, use of border areas to avoid controls and taxation, and flexibility to appropriate and re-sell assets from Russian firms in difficulty. In addition, a considerable part of the "kiosk economy" in the border region seems to be dominated by Chinese traders. As a result, while trade between the countries will flourish, frictions between Chinese and Russian populations are likely to increase.

Overall, the international environment of the Russian Far East seems to evolve towards increasing instability, and acute political tensions, with the potential of military confrontations. Between 1985 and 1993, total Asian defense spending rose by 44 percent in real terms (Rutland and Markus, 1995), and the trend has accelerated in 1993-95 with Chinese and Taiwanese military build-up. In this context, a political axis between Russia and China seems to be emerging to fight off what is perceived as a hegemonic project by Japan, to some extent backed by the West's military and technological superiority. As we argued above, Russian-Japanese relationships seem to be stalled both for domestic political reasons and for lack of real interest for Japanese investors, unable to control the conditions of operation in the volatile Russian

economy. On the other hand, there is a real chance that, South Korea, opposed to Japanese influence and yearning for reunification of the country, will step up links with Russia, as soon as the stabilization of the Russian economy allows such an investment. Therefore, rather than favoring the full integration of the region, the conditions of the international environment in the Asian Pacific may lead, in the early 21st century, to the consolidation of a series of linkages between Russia, China, and a reunified Korea that could counterbalance Japan's current hegemony in the region.

IV.2. The Institutional Environment of Regional Development in Greater Siberia: New Federalism, Local Autonomy, and Interest Groups

The opening of Russia to the Pacific is taking place amidst the most extraordinary process of social and institutional transformation. The construction of a new federal state, based on democratic elections and decentralization of power, has created a new set of relationships, not always well-defined, between Moscow and the Siberian/Far Eastern provinces. Local, provincial, and republican governments have tried to control as much as possible the linkages with the global economy, as they are aware that these linkages may be decisive in the betterment of their economies and living conditions. On the other hand, the federal government, responsible for keeping the principle of national unity and fighting tendencies of institutional disintegration, is particularly focused in keeping control of the most important internationally marketable resources of Russia. As we showed in Chapter II of this report, Greater Siberia's energy and natural resources are the main source of exports, and thus the necessary basis for imports to modernize the country and allow its dynamic incorporation into the global economy both as producer and as a major market. Therefore, a thin line must be walked between the reproduction of old Soviet-style centralism, depriving the regions of their resources, and the excessive centrifugal tendencies that would see the incorporation of Greater Siberia into the global economy by bits and pieces, for the benefit of an elite of intermediaries that would sell access to Siberia's riches to foreign firms.

Furthermore, conflicts and strategies around the control of resources and foreign trade and investment take place in Russia between different business groups and social actors. Thus, the actual opposition and negotiation is not between the federal government and provincial and local authorities, but between various coalitions of economic interests that have their connections both with Moscow and with local and provincial governments. Because the new system of investment, production, and trade in the 1990s is being established in Russia, there is considerable competition in securing positions of power within such system. Indeed, an advantageous position will yield extraordinary profits down the line, when the connection to the Pacific economy will be finally established. However, institutional instability induced by excessive infighting between different interest groups may well jeopardize, or delay, the very process of international integration as foreign firms and markets become fearful of uncertainty in their connection to Siberia and the Far East.

To illustrate this analysis, we will refer to a case that, while not having been the direct object of our study, is highly revealing of the tensions existing in the institutional environment for investment and trade in the region: the interplay between economic and political interests in the transition to a market economy in the Primorsk krai in the first half of the 1990s. According to Katherine Burns, author of a documented report entitled "Battling for Foreign Capital in Primorsk Krai" (1995), the economic reforms promoted by Governor Vladimir Kuznetsov in 1990-93 focused on stimulating the province's international economic relations and supporting small private firms. Local industrialists, mainly linked to large enterprises of the military-industrial complex, resented their lack of control over the process of foreign investment. In 1992, the state industrialists' lobby organized in a Primorsk Manufacturers Shareholders Corporation (PAKT) that put together financial resources and political influence to be able to control the opening of Vladivostok to foreign trade, pushing aside, at the same time, the reformist federal government and local private business development. They also found support in Vladivostok's local government against the Governor, appointed by the President.

On May 1993, the industrialists' group finally succeeded in convincing Moscow to remove Kuznetsov and to appoint by presidential decree a new governor, Yevgenii Nazdratenko, at the time president of Vostok, a mining corporation in Dalnegorsk. Soon thereafter, Nazdratenko was elected a member of the Federation Council, and his right-hand person became head of the local Duma. However, once in power, the PAKT lobby was torn by internal fighting between different personalities aspiring to control the privatization process of state enterprises. Moscow's reformers also became wary of Vladivostok's increasingly isolationist tendencies.

In May 1994, after the provincial administration was not able to handle a major crisis in energy supply, First Deputy Minister Anatoly Chubais created a commission to investigate the local administration, and some of the governor's allies were dismissed from the Duma. Yet the power game did not end there. In December 1994, another financial/industrial group, Primor'ye, again organized local state enterprises in connection with the krai government. Indeed, Primor'ye's capital was held in government stock, and so the provincial administration was in financial control of the group's strategy. Using their administrative position, the local industrialist elite extended their control over the Vladivostok-based airline (Orient Avia), over the local banking system, and over foreign investment ventures. On the other hand, the governor and industrialists together fought off Chinese merchants who were in control of a flourishing transborder trade, and mobilized public opinion against concessions towards China and against Chinese immigrants and travelers.

As a result of this turmoil, the promising perspectives of a Vladivostok at last open to Pacific trade faded away. Total trade turnover, which had skyrocketed between 1988 and 1992, sharply declined in 1994, falling from 865 million dollars in 1993 to 591 million dollars. Although trade improved somewhat in 1995, the overall economic and social situation in Vladivostok continued to deteriorate in 1995, with the city and the krai suffering dramatic shortages in the supply of energy, heating, and water, prompting

high levels of social tension. Thus, in spite of Vladivostok's unparalleled maritime location and tradition as the Russian Pacific's port, Khabarovsk, with the most important international airport in the Russian Far East, improved its position as economic capital of the Far East, attracting substantial foreign investment and business presence in 1994-95. (For more details on Primorsky krai, see Kirkow, 1996; Kirkov and Hansen, 1994.) Although further investigation would be necessary to be conclusive, it would seem that Vladivostok's crisis may be related to the destabilization of the institutional environment, as a result of excessively fierce competition between various interest groups attempting to control the mechanisms of integration into the Pacific economy.

Similar, if less destructive, processes have been identified in our own research on oil & gas development in Western Siberia and the Far East.

Therefore, dynamic, well-managed, inter-governmental relationships are essential in providing a stable institutional environment in the transition of Greater Siberia to an open market economy. But the tensions manifested in the construction of a new federalism cannot be understood under the simplistic form of the opposition between the central and local levels of government. The interests of old state industrialists and of new entrepreneurial firms fighting for position in the Pacific connection are essential ingredients in the formation of a new business environment, akin to link-up with foreign trade and investment. Such a competitive process is a normal, indeed beneficial, dimension of a market economy. However, when business penetrates government institutions and uses positions of power in the exclusive interest of some business groups, endlessly changing regulations and appropriating government subsidies, it may destabilize the whole system by inducing an unfavorable investment climate. Healthy competition within a stable, reliable, and transparent institutional framework seems to be a pre-condition for the full integration of Greater Siberia into the Pacific economy. The chances for the establishment of such an institutional framework depend on the evolution of a number of international, national, economic, and political factors whose complex relationship we will try to simplify by proposing some tentative scenarios.

IV.3. Siberian Scenarios for the Pacific Century

Introducing his marvelous book on the Russian Far East, historian John Stephan writes:

> What went wrong in the Far East? Why did it not develop like British Columbia or Hokkaido? How did such a rich land and littoral, settled by such talented and hard-working people, and bordering on such dynamic economies present a spectacle redolent of a Third World basket case? Geography, demography, and economics provide partial answers. Beneath unfulfilled potentials runs an undercurrent of tragedy that cannot be ascribed to any ideology, party, or regime. The tragedy has a Russian-Soviet mother and an Asian-American father. Both parents wrought havoc on the region with the best of intentions: oppression in the name of progress, militarization in the name of security, homicide in the name of race or class, ecocide in the name of growth. These destructive forces welled up from below as much as they descended from above. Thousands of ordinary people betrayed the land and one another out of idealism, envy, spite, greed, or fear. The Far East's socio-

cultural chemistry and geostrategic environment gave it a special place within Russia's tragedy (Stephan, 1994: 3).

Can the tragedy be overcome? Can the Russian Far East, and beyond it the Greater Siberia region, engage in a new historical departure towards sustainable development and an open market economy? Can the Pacific Rim include Russia as an essential component of what could be one of the world's most dynamic and prosperous economic areas in the 21st century, combining advanced industrialism and energy resources, technological know-how and scientific excellence, openness of economies and multi-culturalism of societies?

It really depends on a number of international and institutional factors whose evolution will condition the chances of success of the process of economic integration currently under way, and whose main features and obstacles we have tried to identify by focusing on the fundamental link: the energy industry.

At the risk of oversimplifying the analysis, but with the goal of maximizing its prospective character, we will conclude by elaborating a brief typology of processes of Pacific integration, as a result of the combination between three international scenarios and three Russian scenarios. We will not try to justify or document the accuracy of these scenarios (since this could only be seriously done by an additional study), leaving the reader to judge the usefulness of this exercise.[1]

The evolution of the Pacific international environment may evolve around three possible scenarios.

Under the first scenario, the forces of globalization, technological modernization, market dynamism, and multi-lateral security would combine to induce the growing integration of the Pacific economies, including the United States, Canada, Australia, and New Zealand, together with Russia and Asian Pacific countries. The gradual dismantlement of protectionism, and the mutual benefits of open trade and investment, would stimulate economic growth and social redistribution, creating the foundations

[1]The methodology of scenario-building is based on the construction of ideal-typical situations to which some fundamental trends empirically observed seem to lead. These types emphasize the coherence of the trends and minimize the complexity of real history and contradictory tendencies. Therefore, they should not be considered as predictions, or as alternative sets of mutually exclusive predictions. They are parameters whose only value is to help the thinking of the actual, messy developments of life, and to understand their inner logic through the complexity of combinations of various scenarios that cross their path in their historical development. The time frame considered for these scenarios, without being precise, refers approximately to the first decade of the 21st century. After all, it is only by the middle of this decade that major new energy development projects in Siberia, Sakhalin, and in the Northern Pacific continental shelf could be operating, in the most optimistic projections. Finally, all proposed scenarios are considered to be possible, considering our current knowledge of international and political evolution. The fact that we do not consider other equally coherent scenarios, such as the reconstruction of Soviet communism and of the Soviet Union in its former structure, means indeed that we do not foresee it as a real possibility, regardless of the success or failure of reconstructed Communist parties. Therefore, our choice of scenarios, and our omission of others, is already an analytical choice and a policy bet that, unfortunately, we cannot justify within the limits of this text. See, however, for some analytical elements that may give some credibility to our claims: Castells and Kiselyova, 1995; Aslund, 1995; Khazanov, 1995; Radigyn, 1995; Burawoy and Verdery (eds.), 1996; Appelbaum and Henderson (eds.), 1992; Johnson, 1995; and Overholt, 1993.

for peaceful cooperation and bringing nationalist extremism under control. Although it is unlikely that the Pacific Region would ever engage in full economic integration, such as the one practiced by the European Union, this scenario would include a very deep interpenetration of the Pacific economies and the building of international institutions to manage conflicts and organize cooperation. We call this scenario **Pacific Integration** (with the expressed caveats concerning the historical limits of the integration process).

A second scenario could see the intensification of economic exchanges between some countries, in the midst of a climate of political distrust, and nationalist affirmation among some of the countries in the Asian Pacific. Several options appear possible on the basis of the analysis presented above. For instance, Japan may find itself increasingly isolated vis-à-vis China, Korea, and Russia and, as a result, try to build a sphere of influence in Southeast Asia from Indonesia to Thailand. Russia and China may find themselves allied not only to counter Japan, but to exert their political and military power in the Pacific in a bargaining process with multi-national companies and/or U.S. presence in the region. Under such a scenario, peace would be maintained but militarization would increase, and governments would be crucial decisionmaking centers in the process of economic integration. However, the forces of the global economy would be such that considerable interdependence between at least some economies would be created, with Chinese business networks in the Pacific being a major driving force in this metapolitical, business-oriented process of economic interaction. We call this scenario **Pacific Segmented Cooperation**.

Finally, it is certainly possible that new political and military conflicts will arise in the region in the process of transition to a globalized market economy and new geopolitical order. The riskiest element in this scenario would be a partial political destabilization of China that could trigger a militaristic-nationalist reaction, which might tempt China to use its new economic and technological power to mark the Pacific century as a Chinese-dominated era. Under such conditions, Japan would certainly re-arm and the U.S. would reinforce its military presence. The two Koreas could again became a front line of confrontation. And Russia would find itself confronted with the difficult choice between riding the Chinese tiger, thus undermining Russia's integration with the West, or being forced to devote scarce resources to protect Siberia and the Far East militarily against Chinese ambitions. We call this scenario the **Pacific Cold War**.

The **Russian political/economic evolution** in the coming years may be summarized under three possible scenarios.

Under the first scenario, Russia completes its transition to a market economy, although some industry (e.g. gas and oil), may still be largely oligopolistic. It also consolidates its democracy, perhaps by integrating a reconstructed communist coalition into the democratic institutions. As genuine entrepreneurialism flourishes in Russia, the influence of crime over business recedes, and the most successful mafia and ex-nomenklatura capitalists become honorable members of national and international finance, interested in putting some order in the markets. New federalism takes root both at the Center and in the regions, and different levels of government learn to give and take, representing their constituencies within

the framework of democratic federal institutions. The ex-Soviet republics, with the exception of the Baltic states, find a form of autonomous, institutionalized cooperation, creating a de facto unified economic area around the ruble. Under such conditions, a fairly democratic, by and large capitalist Russia reconstructs itself, and opens itself up to the promises of a booming Pacific economy. We call this scenario **Democratic Federalist Capitalism.**

A second scenario would, instead, see the reinforcement of the central state, probably around a collective leadership, still elected but scarcely accountable, with authoritarian tendencies but refraining from dictatorship. The economy, while market-oriented and broadening the role of its external sector, would be organized around the interests of mega-conglomerates, originated in the former state enterprises, that would interlock major industries with major financial groups under the close protection of the state. We call this scenario **State Monopoly Capitalism.**

A third scenario would contemplate, on the contrary, the dramatic weakening of the central government, unable to manage the integration of Russia in the complexity of the new global economy and incapable of satisfying the demands and pressures from the population and enterprises from the different regions. Under such circumstances, it could well happen that many regions, particularly in Siberia and the Far East, abandoned to their fate but still controlling considerable resources, would assert their autonomy in the strongest possible terms, not declaring political independence (since most of the regions, particularly in Siberia and the Far East, are ethnically Russian), but creating the conditions for economic self-determination. For instance, there is a movement for the revival of the Far Eastern Republic and its integration in the Russian Federation. Its leaders believe that only in such political form can the Far Eastern crisis be overcome (Tass report, July 3, 1994, Khabarovsk: cited by RA Report, July 1994: 141). A demoralized army would not intervene in the conflict, since it would not really threaten national unity, and a disorganized, impoverished, and corrupt central government would have to yield to increasingly powerful regional governments. Most of these governments would not necessarily be very democratic, since in most cases, particularly in Siberia and the Far East, they would build their strength on local alliances of powerful economic interests — e.g. "oil generals," former managers of state enterprises, or export-import bureaucrats controlling access to foreign markets. Yet other provincial or local governments (let us say, of the Nizhni-Novgorod type) could rely mainly on the support of new entrepreneurs and still converge with other regions in their opposition to Moscow centralism. In some cases, when ethnic components radicalize the drive for autonomy (as in Tatarstan or in Sakha), separatist tendencies may well appear. The net result of this process would not be the break-up of Russia (an unthinkable hypothesis because of the strength of Russian identity), but the fragmentation of its government structure. We call this scenario **21st Century-Feudalism,** because it would lead to the formation of a multitude of largely autonomous fiefdoms, generally under the control of local notables.

If we now cross the two axes of possible Pacific and Russian scenarios, we obtain nine different contexts that would shape the process of Siberian and Far Eastern integration into the Pacific Rim (see

Figure IV.1). Each one of the nine contexts may induce a form of relationship between Greater Siberia and the Pacific that we have tried to synthesize into one sentence in each cell of the Chart. Indeed, to develop in detail each one of the possible forms of relationship would push our scenarios-building exercise further than its actual empirical basis would allow, thus indulging in pop futurology, something we reject. By examining this range of possibilities, we are simply proposing a mode of strategic thinking, flexible enough to take into account variations of history in extremely unstable and changing situations, such as those characterizing both Russia and the Pacific at the end of the millennium.

Figure IV.1. Scenarios for Integration of Greater Siberia in the Pacific Economy (Horizon 2010)

Scenarios of International Relations in the Pacific	Scenarios of Political Economic Evolution in Russia		
	Democratic Federalist Capitalism	**State Monopoly Capitalism**	**21st Century Feudalism**
Pacific Integration	*Free-market integration in the Pacific economy*	*Oligopolistic control over economic integration*	*Local economies under control of foreign capital*
Pacific Segmented Cooperation	*Regional transborder integration and opening to foreign investment*	*Neo-mercantilism (economic agreements with AP states)*	*Formation of regional transborder economic complexes*
Pacific Cold War	*Shift towards European orientation*	*Expansion of Pacific military markets*	*Political protectorates of Siberian/Far East regions by foreign powers*

Depending on these contexts, the promise of energy development, whose potential and difficulties we have examined in this study, may or may not become the heart of a process of economic complementarity that could anchor the Pacific era on cultural interdependence and peaceful cooperation.

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