Sakhalin Energy; Problems and Prospects

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For decades, energy experts have promoted energy prospects in Northeast Asia. Here is a rapidly growing region with an energy deficit and high energy prices adjacent to Pacific Russia, a major potential supplier of oil, gas, and electricity. Here is a region where capital-rich lenders could unlock the wealth of resource-rich producers. Yet, while the Asian economy boomed, nothing happened.

Authors from the National Pipeline Research Society of Japan, the Hyundai Research Center, the Royal Institute of International Affairs, and East-West Institute produced elaborate programs--the Asia-Pacific Energy Community, the Vostok Plan, the Energy Silk Route Project, Kovyktinsk Gas Project, Trans Asian Gas Pipeline Network.[2] The L. A. Melent'ev Energy Systems Institute in Irkutsk estimated multi-level, multi-sectoral models of each program for four regions, 18 sectors, and 25 years.[3] Yet, few of these paper plans were realized.

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[1] I am grateful to the International Research Exchange Committee for a short-term travel grant to collect data and interview oil company executives and government officials on Sakhalin Island in September 1999. I received valuable help from Michael Allen and the staff of the American Business Center in Yuzhno-Sakhalinsk. I would also like to thank the National Bureau of Asian Research, the Carnegie Endowment, and the Institute for Economic Research, RAN DV, in Khabarovsk for assistence with interviews in other regions of the Russian Far East in October 1999. A visit to the William Davidson Institute, University of Michigan in March 2000 allowed me to survey economic models of expropriation.

[2] Keun Wook Paik, Gas and Oil in Northeast Asia Policies, Projects and Prospects. The Royal Institute of International Affairs, Energy and Environmental Programme, 1995, Kengo Asakura, "Concept for a Natural Gas Pipeline that will Support Asia's Symbiosis," Energy (November 1998).

[3] Iu. D. Kononov, E. V. Gal'perova, O. V. Mazurova, V. V. Posekalin, energoemkost' ekonomiki i tseny na energonositeli: global'nye tendentsii. Irkutsk: Institut Sistem Ekergetiki im. L. A. Melent'eva SO RAN, 1999.

In the cold-war era, political differences complicated agreement on long-term economic projects. Then, with the onset of economic reform, competition for ownership of Russia's resource wealth, weak rule of law, and capital flight led to higher, not lower, levels of political and economic risk. In 1992, with the opening of the Russian market, Western oil and gas producers and equipment suppliers began to seek links to Russia's newly privatizing oil giants. Companies which initiated projects found a chaotic environment with fuzzy property rights and rapidly changing regulations and taxes, so many withdrew after a few unprofitable ventures to wait until the business environment improved, convinced that Russian policy-makers saw little role for foreign producers in their domestic energy sector.

In the decade following economic reform, the Russian economy received a trickle of foreign direct investment. In 1998, foreign direct investment in Russia totaled $1.5 billion according to balance of payments figures, or $3 million if one included loans within Russian firms and their subsidiaries. Of that modest amount, about 60 percent was directed to Russian industry, and, within industry, only 15 percent went to the fuel and oil sectors.[4]

Investment into the development of the offshore oil and gas on Sakhalin Island's shelf is a crucial exception. At the beginning of 2000, two major Western consortia, called Sakhalin-1 and Sakhalin-2, have committed more than $1 billion to exploration and development of Sakhalin's energy, making direct payments of $67 million into the local Sakhalin Development Fund.

In July 1999, Sakhalin-2 celebrated production of first oil, announcing plans to undertake production at the rate of 90,000 barrels per day during the summer of 2000. Their total cost of the first phase of development of the Piltun-Astokhsky field is estimated to be $733 million, $348 million of which is funded by loans from the EBRD, OPIC, and the Export-Import Bank of Japan. Both producers are seeking commitments from potential consumers of natural gas in Asia, while the Russian government, itself, has allocated a modest first installment of investment to an extension of the local pipeline

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[4] Peter Westin, "Foreign Direct Investment in Russia," Russian Economic Trends. Vol 8, No 1, 1999, 42.

network between Sakhalin Island and adjoining Khabarovsk territory to deliver energy to consumers in the Russian Far East (RFE).[5]

Although promising, the success of energy development on the Sakhalin shelf is by no means assured, for there are barriers on both the supply and demand sides of the market. Russian policy-makers, themselves, are badly divided on whether to develop their energy sector as part of the international market. Earlier, with world oil selling at $10 a barrel, it seemed that only foreign multinationals could bring in the investment to reverse declining production, but, today, with oil selling for more than $25 a barrel, there are strong pressures from domestic producers to enforce domestic control of energy against possible foreign participation. At the same time, Russian domestic consumers, whose value-subtracting enterprises depend on hidden subsidies of cheap energy, seek to block export of energy to world markets. Thus, Russia's energy wealth could play a catalytic role in fostering regional growth, but, just as in other countries, there are also strong protectionist interests that would benefit if high levels of political and economic risk protect them from foreign competition and preserve their monopoly role in the domestic economy.

In the pages that follow, I look closely at foreign involvement in the energy sector of Sakhalin's shelf, asking several questions. How has the small energy sector of Sakhalin managed to attract major international investment at a time when other Western investment was fleeing from Russia? What strategies do the operating partners use to protect investment from expropriation, due to either administrative intervention or "creeping expropriation" through unpredictable changes in laws, taxes, and regulations? How are the benefits and costs of development divided between foreign investors, the Russian Federation government, and local communities? Then, looking ahead, I inquire: What domestic and foreign developments will determine the directions and prospects of these projects? Can Sakhalin's energy sector play a decisive role in reversing the fortunes of what will otherwise be Russia's declining periphery? More broadly, could a network of pipelines and ports linking energy producers in Russia with consumers in Japan,

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[5] Goskomstat Rossii. Regiony rossii; Informatsionno-statisticheskii sbornik. Moscow: 1997, Vol. 1, p. 180.

Korea, and China create economic links among the economically and politically fragmented states of North East Asia?

The Risk of Expropriation

Investment on Sakhalin has gone ahead in the face of significant risk. Investors point to high levels of political and economic risk, corruption and illegal activity, fuzzy property rights, weak rule of law, weak corporate governance, and unequal competitive conditions as some of the major impediments to investment. In the case of natural resources, where rights of access are defined and controlled by the government, foreign investors lament the lack of a "level playing field," claiming that insider elites with close relationships to government administrators gain control of resource rights and the resulting incomes. In the absence of a clear, enforceable framework defining ownership, taxation, and regulation, foreign investors face a high risk of expropriation, either by administrative intervention or by "creeping expropriation" through unpredictable changes in laws, regulations, and taxes.

Businesses undertake many strategies to reduce the costs and risks of expropriation, recognizing that they may be subject to "hold up" once their capital is sunk in a host country. When a weak legal framework makes third-party enforcement of agreements difficult, parties seek to set up implicit, self-enforcing agreements to provide a framework for cooperation. Agreement is possible when both partners' benefits from continued agreement are greater than the potential gains to either from deviation, but one of the difficulties of self-enforcing agreements is that each party must have the means to punish a partner who deviates from the contract.

What strategies can companies and governments use to create self-enforcing agreements and reduce the risk of expropriation? Multinational corporations attempt to spread risk by involving a group of complementary firms and international banks in each project. A consortium can share both risk and information about the reliability of a partner. Reputation is a powerful mechanism for enforcing contracts, because a host country that lives up to agreements and provides a transparent framework of business law gains access to international capital markets on favorable terms.

Although limited at present, production-sharing legislation in Russia is a potential means for reducing certain sources of risk, such as the risk of arbitrary changes in taxation. Production sharing allows the operating company and the host government to share the price risk of changing costs and prices on the world market.

Some mechanisms involve "posting a bond" or holding each other's assets hostage to guarantee good performance. For example, revenues from energy sales may be held in escrow, or a domestic firm may accumulate its earnings as equity in a foreign firm in order to balance its control of the foreign firm's assets in the home market. In other cases, investors may commit resources gradually so that a host-country's short-run incentive to expropriate will be offset by the long-run incentives to gain access to future finance, technology, and know-how.

A self-enforcing arrangement requires that each party to an agreement at every point in time is better off abiding by the mutual commitment than deviating from it. In an uncertain world where costs and benefits are impacted by unanticipated shocks it is difficult to negotiate arrangements that will survive every contingency. In the case of Sakhalin, issues of fiscal federalism further complicate formal agreement. There is considerable evidence that territories that earn increased direct budget revenues are penalized by losing an offsetting amount of federal transfers.

It is the federal government that is the legal owner of the shelf's resources. In its choices, the federal government may trade off the revenue benefits of a current project against the interests of the domestic oil and gas industry—expressed in their lobbying and political support-- which may want to hold an option to invest in the future.

Large capital-intensive projects are particularly difficult because capital must be sunk before production begins to provide a flow of earnings. Natural gas projects, which extend across national borders and over many years, are particularly difficult, because both producers and consumers must commit to long-term guarantees even when they face great uncertainty as to future costs, prices, and technologies. So, even when energy projects offer great potential benefits, there are significant obstacles to their realization as well.

Sakhalin's Energy Sector

A case study of development of Sakhalin's shelf provides a test of attempts to build a framework for investment when the domestic framework for contract enforcement is weak. In September 1999, I visited Sakhalin to interview executives of Western energy firms, subcontractors, local government officials, and academic specialists. I asked what strategies the firms and policy-makers used to establish agreement, resolve disputes, and minimize the risk of outright or creeping expropriation and what benefits each party expected to receive from the projects.

Before reform, Sakhalin Island was a heavily subsidized military outpost, but, after reform, few workers could support themselves in the region's fishing, farming, and forestry. Civilian employment fell from 395,000 to 254,000. Population fled to more prosperous regions, and local officials had enormous incentives to stem the decline on Russia's periphery. Development of oil and gas promised to serve as a catalyst, generating know-how and employment, and reducing energy costs for the whole region.

[Insert Table: Sakhalin Population and Employment]

The oil and gas industry is Sakhalin's oldest. When native people told of a "black lake of death," Russian surveyors in the 1890s found surface deposits of oil in northern Sakhalin. The first well was drilled in 1911. The first oil field with 20 derricks was established at Okha in 1928. Soon, a railroad and pipeline connected Okha to the coast. Sakhalin produced about 2.4 million tons of oil per year from 1965 until the late 1980s. Today, nineteen of these on-shore fields are still in operation, although most are nearing the end of their commercial life.

After the oil shock of the early 1970s, the Soviet Union agreed with an international consortium to undertake exploration of offshore sites. Exploratory work began in 1976 with a Japanese consortium, Sodeco. Under terms of the agreement, Japan advanced credits of $176 million to be repaid only if sufficient fuel was found and the Russian side deemed it profitable. In this case, Japan was to receive half of the output. During the 1976-1982 period, the project, Sakhalin-1, discovered two fields, Chaivo and Odoptu, but neither field was deemed profitable at the lower fuel prices prevailing in the 1980s.

Subsequently, several additional offshore fields were discovered, including Piltun-Astokhsky, Lunsky, and Arkutun-Dagi. In 1988, the Russian government authorized the Ministry of Oil and Gas to develop the first two of these, but the lack of experience of the domestic industry in an Arctic offshore environment meant that foreign participation would be required.

In May 1991, Russia invited competitive international bidding for a feasibility study of two large deposits in northeastern Sakhalin, Lunsky and Piltun-Astokhsky.

After intense competition between six consortia, a group that included Marathon Oil, McDermott, and Mitsui was chosen to undertake exploration, and a holding company, Sakhalin Energy Development Company was established. Later, Royal Dutch Shell and Mitsubishi joined the group and, subsequently, McDermott withdrew.

The resource stocks that have attracted such intense interest are large, but not giant. They are located in North East Asia, a region of energy deficit, although Sakhalin's offshore environment presents Arctic conditions, violent storms, and risk of earthquakes. A recent publication by the Sakhalin Administration estimates total recoverable reserves of oil, gas, and condensate at 99.6 mil tons of oil equivalent onshore and 791 mil tons on the Sakhalin shelf.[6] This is more than half the size of reserves in Alaska's Prudhoe Bay. However, it appears that three-quarters or more of reserves are natural gas, consumption of which will require either an expensive pipeline network or facilities to process and transport liquefied natural gas (LNG). A table in the appendix provides a conservative itemization of reserves by individual field, which shows that Pilton-Astokhsky and Odoptu represent the primary stocks of oil and condensate (104 and 70 mil. tons respectively), while Chaivo and Lunsky are primarily gas fields (147.5 and 350 bcm.)[7] With much of the region still unexplored, recoverable reserves may prove considerably larger.

[Insert Table: Sakhalin Shelf Projects]

The four large fields under current development are:

- Odoptu - 15-20 kilometers offshore, 22-40 meters depth. Oil is found at 1200-2000 meters deep in 13 layers.
- Chaivo - 12-15 kilometers offshore, 18-32 meters depth. Oil is found at 110-2800 meters deep in 10 layers.
- Lunsky - 112-15 kilometers offshore, 40-50 meters depth, 5 blocks.
- Piltun-Astokhsky - 12-15 kilometers offshore, 26-33 meters depth. Oil is found in 14 layers.

The Russian Partners

The main Russian partners in all prospective projects are Rosneft and Sakhalinmorneftegas (SMNG). A branch of SMNG, SMNG-shelf, participates separately as a partner in Sakhalin-1. Although most of the Russian oil industry has been privatized

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[6] Ibid., p. 123.

[7] Exploration drilling indicated that the Odoptu reserves were less promising than originally expected.

into about eight vertically integrated closed joint stock companies, Rosneft and SMNG operate as separate, mainly state-owned corporations.

Rosneft is a state oil holding company that controls a miscellaneous assortment of assets that were not integrated into the original dozen vertically integrated closed joint stock companies formed after the break-up of the former Soviet Union. Although Rosneft lost its main production subsidiary, Noyabrskneftegaz, to Sibneft in 1995, it serves as the federal government's exclusive exporter of the Federation share in all oil sector production-sharing contracts and runs a vast sales network for refined products. It controls the Komsomolsk-na-Amure oil refinery in Khabarovsk territory, which receives Sakhalin crude oil by pipeline and processes it, exporting half of these products to the Pacific market. Officials of the Federation government have announced conflicting plans either to sell the state share of Rosneft or to establish a national oil company in the future. In 1998, low oil prices made Rosneft unprofitable, so it was unable to contribute to development costs of Sakhalin-1, but its financial balance has improved with current high prices for oil.

Sakhalinmorneftegaz is a medium-sized oil producer, formed on the basis of a former government production association. It currently produces about 1.49 million tons of oil and 1.78 billion cubic meters of gas annually, delivering both to the Russian market by two pipelines. Two-thirds of its oil production is exported to the world market. It was partially privatized in 1994, when an 18.36 percent stake was sold at a voucher auction and another 0.31 percent of the company's charter capital was sold at a cash auction. In 1995, under a presidential decree, it was amalgamated with Rosneft, which now holds a 51 percent stake in it. In early 1997, SMNG, Rosneft, and ABN-AMRO bank signed an agreement under which the bank would provide $8 billion of a total of $13 billion in capital costs over the lifetime of the Sakhalin-1 project.[8] The Russian partners have also received credits from US OPIC, Japan's export bank, and the EBRD.

Recently, new state-owned corporations have appeared as Russian bureaucracies vied for control and cash flow rights to oil projects. The Sakhalin regional government set up Sakhalin Oil Company (SOC), which, they argued, should receive a percentage share of ownership in each project without cost. In 1999, Rosneft-SMNG did, in fact, sign over a 10 percent stake in the Kirinsky block to a joint venture with SOC, named Vostok-Shelf.

This spring, a new subsidiary of Rosneft was created, AO Dalneftegas, to represent Russian regional interests in gas development. Fifty-one percent of its shares

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[8] Sakhalinmorneftegas Company Report April, 1997. ISI Emerging Markets.

went to Rosneft and its subsidiary, Sakhalinmorneftegas. The other 49 percent were divided between Rosgasifikatsiya (the gas pipeline contractor) and the regional governments of Khabarovsk, Primore, and Sakhalin, the primary domestic demanders of natural gas. The agreement stipulates that the Rosneft and SMNG shares of gas production must be delivered to the domestic market--on what terms, it is not clear. The three regional governments also organized a state pipeline company, Daltrans, to construct pipeline capacity between Sakhalin and the mainland, funding it initially with a federal allocation of 97.5 million rubles ($3.4 million).

Current and Future Projects

Western participants in the first three offshore projects are major international oil companies together with Sodeco, a Japanese consortium organized around Japan's national oil company.

Sakhalin-1 brings together Exxon Neftegas (30 percent), Sodeco (30 percent), Rosneft-SMNG (17 percent) and SMNG-shelf (23 percent) in a project to develop Chaivo, Odoptu, and Arkutun-Dagi fields. A production sharing agreement was signed in 1995, and work has been underway since 1996. However, the project is still in the exploration phase, meaning that the partners have yet to determine commercial feasibility. After completing 3D seismic surveys and appraisal drilling, Exxon found potential commercial reserves of gas rather than oil, but development of natural gas would require long-term agreements with consumers before a project could be funded.

Exxon has contracted for a pipeline feasibility study from Japanese Sakhalin Pipeline Study Consortium, including Japex, Marubeni, and Itochu. This group is to investigate both a land route to Northeast China and an underwater pipeline to Hokkaido.

Exxon cancelled exploration drilling during the summer season of 1999 when they failed to reach agreement with the Russian environmental agency, Goskomekologia, about the treatment of drilling mud and cuttings, but local officials announced that the issue has been resolved in April 2000.[9]

The Sakhalin-2 consortium was luckier in finding commercial quantities of oil. In July 1999, they began production of early oil under a production sharing agreement. The operating company, Sakhalin Energy Investment Company, (SEIC) brings together Marathon (37.5 percent), Mitsui (25 percent), Mitsubishi (12.5), and Shell (25 percent) in

[9] See discussion in Gubernskie Vedomosti, 24 March 2000 and 19 April 2000 (excerpted by Sakhalin Oil and Gas News, Pacific Russia Information Group).

developing the Piltun-Astokhsky, and Lunsky fields. The project began slowly in 1991 and accelerated after signing of a production sharing agreement in 1994. SEIC proposed a phased development of the Piltun-Astokhskoye field starting with Astokhskoye.[10] In 1999, production started at SEIC's Vityaz complex, which consists of the Molikpaq offshore drilling rig and an adjoining offshore oil storage tanker from which oil transport tankers offload product for transport to the market. In September, the first tanker of oil was shipped to Korea, and the company announced plans to undertake production during 2000, at a rate of 90,000 bpd.

Sakhalin-2 has taken the lead in the proposed construction of a natural gas pipeline to the south of Sakhalin, intending to build a liquefied natural gas (LNG) plant with an eventual capacity of 8.9 million tons per year. If this option were implemented, LNG would be shipped to electric power utilities in Japan, South Korea, Taiwan, and coastal China.

In the case of LNG, too, there are constraints from both the investment and demand sides. Funding of an LNG plant at a port site in south Sakhalin would require a guarantee of long-term purchase commitments at a price sufficient to justify investment. Until Japan enjoys renewed growth, it is unlikely to be interested in committing to additional purchases of LNG. In southern China, where capacity to handle LNG is under construction, Sakhalin gas would compete with Southeast Asian suppliers, such as Indonesia. So, in the near term, only South Korea appears likely to commit to a rapid increase in consumption of LNG.

The Sakhalin-3 tender involves Pegastar, owned by Mobil-Exxon and Texaco, in the Kirinsky field and Exxon-Mobil, separately, in the Ayashsky and East-Odoptinsky fields. Both projects are joint with Rosneft-SMNG. The Kirinsky field, with an estimated 450 million tons of oil, 970 billion cubic meters of gas, and 62 million tons of condensate has received authorization for production sharing, but the Ayashsky and East Odoptinsky fields, with 114 million tons of oil and 513 billion cubic meters of gas, are still pending.

Sakhalin-4, a collection of offshore and onshore fields licensed to Rosneft-SMNG, was originally to be developed jointly with Arco. Arco withdrew this spring when the project failed to receive authorization for production sharing. Rosneft-SMNG intends to finance exploration during the summer of 2000 amid speculation that Arco's new parent company, British Petroleum, might have renewed interest in the project.

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[10] Sakhalin Energy Investment Company Ltd. Development Plan for Phased Development of Piltun-Astokhskoye Field. (Processed draft.)

Sakhalin-5 would tentatively involve British Petroleum and Sakhalin-6, Pegastar, both joint with Rosneft-SMNG.

Taxation and the Legal Framework for Use of Natural Resources

Western interest in the Russian energy sector was delayed by the need to put in place the legal structure for production sharing agreements similar to those used in most other countries. Production sharing legislation was intended to simplify the complex and changing tax structure that businesses faced and to divide project risk between the operating companies and Russian government. The following table provides a list of the taxes that a conventional resource project in Russia could expect to pay in the absence of a production sharing agreement.[11] They would pay royalties (6-20%), geology fund payments (10%), VAT (20%), excises (approx. 14%), and sales tax (4%) on production or sales; profit tax (30%) on profits; payments to pension fund (28%), state employment fund (2%), social insurance (5.4%), medical insurance (3.6%), education fund (1%), militia fund (2%), and transport fund (1%) on wages. On imports there would be customs duty, excise, VAT, and customs clearance. Then there would be assets tax (2% of assets), land use payments, and, in the case of oil, payments for loss of fish, and fines, if applicable. The firm would withhold 12-35% of employee wages for income tax.

[Insert Table: Tax Calculation]

Production Sharing Agreements simplify the legal framework. The original Russian Federation Law on Production Sharing Agreements, signed in 1995, allowed the Federation government to enter into an agreement with an investor granting the investor exclusive rights to prospect for and extract mineral raw materials from a designated site.[12] A license was to be issued jointly by the Federal Agency for State Mineral Resource Management and the territorial administration. However, international contracts were subject to parliamentary approval, and there were strict domestic content conditions. Moreover, the Russian side reserved the right to make unilateral changes in arrangements in response to changes in world markets. There were few safeguards for the foreign investor in the event of a dispute. The Production Sharing Law explicitly exempted the investors, their contractors, and subcontractors from taxes, fees, excises, and other obligatory payments except for profits tax, royalty payments, bonuses,

[11] Tax estimates provided by Sakhalin government authorities, September 1999.

[12] Russian Federation Law No 224-FL on Production Sharing Agreements, Moscow, 30 December '95; Passed by the State Duma on 6 December, approved by the Federation Council on 19 December '95 (Cited in Rossiiskiya Gazeta, 11 January '96, 3-4.

exploration payments (levied on the user of subsoil resources), land use payments, and insurance coverage of Russian employees.

A number of enabling laws and regulations followed.[13] In addition, the Federal Duma passed the Law on the List of Fields Eligible for Development under Production Sharing Terms, limiting the number of projects that would be eligible for PSA. The Duma placed a cap of 30 percent on the share of sites that could be developed under PSA in any individual region. For "strategic resources" (such as the shelf) the ceiling was 10 percent. Passage of Part I of a new Tax Code in January 1999 further simplified tax accounting and provided some guarantees against *ex post* taxes.

Russian tendering of resource stocks is based on a set of model Production Sharing Agreements. Tenders for offshore fields are conducted by the Committee on Geology and Sub-Soil Resources of the Russian Federation (Goskomnedra) and the Sakhalin Administration after authorization by a Federation decree. For each project, a tender committee of federal and territorial officials considers the bids. Interested firms receive a copy of a model Production Sharing Agreement (PSA) and submit sealed bids by a specified deadline. Submitted bids must include a minimum guaranteed commitment of exploration activity for each of the first five years as well as any proposed changes to the PSA.

The PSA for Sakhalin-4 is an example. It includes a royalty of 8 percent on production and profit tax of 35 percent.[14] There is a cost recovery limit of 80 percent. Production shares depend on the company's accounting internal rate of return after payment of profit taxes. At a rate of return lower than 22 percent, the split is 70 percent to the company, 30 percent to the Russian Federation. For rates of return 22-26 percent, there is a 60-40 split. Above that point, the production split changes by 10 percent for every 2 percent increase in rate of return. Based on long-run projections of production and cost, the model PSA provides a company-Federation division of 55-45.

The Sakhalin-1, -2, and -3 contracts additionally provide bonus payments to the Federation government upon reaching certain milestones, such as initial signing and the start of production. Under the PSAs, each consortium contributes to the Sakhalin

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13 The President's Decree on Measures for Enforcement of the Federal Law on Production Sharing Agreements, issued in 1997, allowed the Ministry of Finance and State Tax Committee to establish taxes. The Federal Law on Amendments and Additions to the Russian Federation Legislative Acts following from the Federal Law on Production Sharing Agreements amended other, conflicting legislation.

14 The tax data provided by Jack Holton, "Sakhalin--giant reserves and hungry markets," Petroleum Economist. Gas in the Former Soviet Union, 1993.

Development Fund after a commercial discovery is announced and annually for 5 years after that.

Negotiations between federal authorities and the territorial government determine the division of payments between the Federation and territorial governments. The Federation Treaty and Federation Law on Sub-Soil Resources specify a division of the royalties giving the federal government 40 percent, territory 30 percent, and local government 30 percent. Under an agreement negotiated between the Sakhalin administration and the federal government, Sakhalin is to receive the following income shares:[15]

Regional Share	**Percentage**
Sakhalin Development Fund	100
Royalties	50
Bonuses	60
Profit oil	50

Out of the 32% profits tax on investor income, Sakhalin receives 22%.

The Sakhalin Energy Investment Company's Development Plan for the Piltun-Astokhskoye Field provides the following estimates of Russian government revenues for Phase I of the project (prior to development of natural gas reserves.) They project Russian government income of $2.7 billion dollars, including $470 million received by 2005.

Estimated Russian Income (Without discounting)	Total ($ Mil)	Region ($ Mil)
• Royalties	417.	208.5
• Profit Shares	1137.5	568.8
• Sakhalin Development Fund	100.	100.
• Exploration Reimbursement	160.	
• Bonuses	30.	18.
• Profit Tax	854.9	581.3
• TOTAL RUSSIAN INCOME	2699.3	1476.6

[15] Interview with Galina Nikolaevna Pavlova, Head, Department on Development of Mineral Resources of Sakhalin Shelf 15 September, 1999.

- CUMULATIVE REVENUE TO 2005 470.

Galina Pavlova, Head of the Department on Development of Mineral Resources of the Sakhalin Shelf said that she expects the Sakhalin-2 project to generate government revenue of about $500 million by 2005.[16]

The financial projections of Pegastar for the South Kirensky portion of Sakhalin-3 are similarly optimistic.[17] If South Kirensky contains a recoverable reserve of 450 million tons of oil plus 720 billion m^3 of gas, then the Russian government would receive:

Before production:

- PSA signature bonus $25 million
- Exploration bonus 10 million
- Discovery bonus 5 million
- Sakhalin Development Fund 100 million

During peak production, the Russian government would receive about $1 billion per year from royalties, taxes, and sale of profit oil. This would total $20 billion over the life of the project (without discounting).

Although, in theory, introduction of Production Sharing Agreements should represent a breakthrough, in practice, their implementation remains chaotic. The PSA legislation contradicts many existing laws, and it will take considerable time before new legislation is put in place that recognizes the exceptions and provides a framework of conforming decrees, regulations, and instructions. In the meantime, each ambiguity creates an opportunity to block or delay progress in an environment in which there is still considerable opposition to foreign participation in Russia's resource sectors.

Sakhalin Island; A Test Case

How has the small energy sector of Sakhalin managed, in 1999, to become the second-largest recipient of foreign investment in Russia after Moscow? In a number of respects, Sakhalin differs from other resource-rich regions. Its location on Russia's periphery, but only 60 kilometers from Japan, raises strategic concerns in Moscow. Moreover, the rapid fall of population from 714,000 to 608,000 between 1990 and 1998 signaled the consequences of Moscow's inability to provide its previous rate of subsidy.

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16 Ibid., 15 September, 1999.

17 Sakhalin Administration. Neft i gaz Sakhalina. 1998, p. 172-173.

(A recent source refers to a decline from 607,000 to 526,000, suggesting that there are still about 80,000 people in the military or other federal security agencies whose support involves direct federal subsidies.)[18] So, policy-makers are concerned with the economic health of Russia's Pacific gateway, recognizing that farming, logging, and fishing could support no more than a small share of existing population.

Moreover, Sakhalin's remoteness from Moscow weakened the interest of competing domestic oil and gas interests in blocking foreign involvement in immediate development. The domestic oil industry faced severe capital constraints. Investment in the sector was inadequate even to maintain existing wells and pipelines, so oil production was falling. The natural gas resources of the shelf were separate and distant from Gasprom's network of pipelines linking West Siberia to Europe, and new Gasprom investments largely were directed toward forging links with Western European customers.

There were technological reasons, as well, favoring involvement of Western companies with experience in offshore development in difficult environments such as Alaska and the North Sea. Russian domestic firms had little such experience. Domestic equipment available to them had many shortcomings. Drilling engineers mentioned large differences between Russian and Western drill bits, drilling fluids, and cement. Russian drill bits were said to last only one-fourth to one-fifth as long as Western equipment, lengthening the drilling process and risking damage to the reservoir. (Russian and Western firms, alike, face lengthy governmental certification processes before they can gain permission to use Western equipment in Russia.)

An empirical comparison of Russian and Western oil extraction shows that the Russian industry experienced rapidly declining yields and short reservoir life compared with similar reservoirs in the West. James Smith estimated that Russian producers lost approximately 40 percent of the total economic value of resource stocks compared with similar fields in the West.[19] So, policy makers could expect foreign development to provide a substantially larger flow of rents to the government budget, and they expected, through strict domestic content rules, to generate a substantial upgrading of the technology of domestic oil equipment and production as well. The local producing firms expected to gain new skills and to gain further employment with Western firms as the local on-shore fields were depleted.

[18] Goskomstat rossiyskoy federatsii, Regiony rossii 1998 and Rossiiskii statisticheskii ezhegodnik 1999.
[19] James Smith, "Cost of Lost Production in Russian Oil Fields," Energy Journal, Vol 16, No 2, 25-33.

Environmental concerns favored Western involvement as well. In the past, Russia's oil industry had demonstrated a weak environmental record. In an interview conducted by editors of *Petroleum Economist* in 1996, senior executives of Rosneftegazstroy, Russia's premier oil and gas contractor, explained:

> "…the majority of the pipeline construction projects, except for the trunk ones, did not comply with, or meet, world standards…No provision was made in the projects for monitoring pipeline conditions during operations…The inappropriate use of corrosion inhibitors and electrochemical protection units has resulted in high corrosion rates in pipelines…The lack of on-line pipeline diagnostics has meant it has been difficult to detect damage and so prevent leakage of gas, oil and oil products.
> "As a result, the number of registered accidents at pipelines runs to thousands a year. The number of 'insignificant' leaks exceeded 40,000/year…
> "Instead of the design service life of 15 to 20 years, many in-field pipelines become unserviceable, due to internal corrosion and erosion, within as little as two to five years."[20]

(In September 1999, I talked with the head of an environmental-remediation firm who reported that, in Komi, en route to inspect a major oil spill, he counted 16 other pipeline leaks in the space of 30 kilometers.)[21]

The Russian fisheries industry is concerned with the risk to their important fishery in the Sea of Okhotsk. Local policy-makers and scientists reversed their traditional opposition to energy development only after on-site visits to Alaskan offshore fields, such as Cook Inlet, where strict environmental monitoring allows offshore production to co-exist with a rich fisheries resource. They were willing to support offshore energy only if similarly strict safeguards were maintained.

The Interest of Western Firms

Large multinational energy companies assume that they must maintain a presence in any country that is both a major producer and a major market for energy, as Russia is. (Perhaps this practice helps explain the low valuation of energy assets on capital markets.)

[20] Interviewed in a Sponsored Supplement, "Seeking Western Involvement for Rebuilding and New Developments," Petroleum Economist, January 1996, 10-14.
[21] Interview on Sakhalin Island, September, 1999.

Nevertheless, energy executives found the Russian environment uniquely difficult. In industrialized countries, they argued, the oil producer finds strong physical and institutional infrastructure, a strong network of suppliers and services, developed financial markets and an effective legal framework. But there are also many competitors in such markets.

In developing countries, there is little local infrastructure or industrial support, a weak capital market, and an incomplete legal framework. But, in these markets, policy makers are open to modernization and willing to construct physical and institutional infrastructure to foster development. Here, the formation of strong relationships can create a relatively stable business environment for the firm and provide some barriers to competition.

The Russian environment represents a third case in which there is a large and politically powerful domestic oil and gas industry that has incentives to block foreign competition. There is also a large body of administrative regulation and practice, most of which is unproductive in a modern, competitive business environment. New legislation, reflecting world practice, contradicts past administrative law. When the two legal frameworks conflict, administrators usually follow past administrative practice.

In spite of these difficulties, Western firms were attracted to Sakhalin's location because they could have direct access to the Pacific market without facing potential hold up by Transneft, the Russian government pipeline monopoly. They expected production sharing legislation to establish a secure framework of taxation, eliminating some of the opportunities for creeping expropriation of potential rents. On this score, they have been disappointed.

Western firms have the ability to impose some potential penalties (or to withhold some benefits) in the face of expropriation. They can easily transfer their centralized technologies, skilled personnel, and support services to numerous other projects around the world. The potential loss of employment would be concentrated on skilled industrial workers and manufacturing capacities, which bore the sharpest drop in demand after economic reform. Unlike domestic plants, offshore production facilities have some limited physical mobility. If production were terminated, Sakhalin Energy Investment Company could physically remove their oil storage facility, the tanker, Okha, and even their oil-drilling platform, the Molipaq, which was towed to the Pacific from Newfoundland.

Implementation Issues

Interviews with oil company executives, subcontractors, and officials in the government administration in September 1999 brought up frequent examples of what might be called "hold-up" problems. However, companies anticipated many of these problems and were prepared to deal with them—albeit at a considerable cost. In some ways, the Sakhalin environment is like a "tragedy of the commons," with each regulatory agency trying to hold up the project for a piece of the rent. One executive of a company drilling an exploratory well listed 32 permits and licenses that were required before drilling could start. "None of these permits it trivial," he said. "Each requires reports, fees, and negotiations. Each agency can shut down everything." Often, the problem was competition between three or four agencies with overlapping jurisdictions, which had conflicting requirements. On environmental issues, Goskomekologiya, the environmental agency, the Committee for Sanitary-Epidemiological Oversight, and the Oblast Shelf Department often have three conflicting views. There are cases in which federal authorities at the center overrule both the territorial branch of the same federal agency and Sakhalin's own regulatory agency. For example, both the local branch of the Ministry for Emergency Situations and the Coast Guard Agency of the Ministry of Transport have been involved in developing a system for oil spill response, so they objected when federal authorities came in insisting on a totally new, centrally directed program.

Clearly, there is a necessary role for environmental, health, and safety regulation, however, on Sakhalin, more than 40 percent of the civilian employed population is in government service. The Director of Environmental Programs for one project estimated the annual extra costs of getting approvals and permits at approximately $500,000. However, this is a relatively minor impediment compared with other sources of uncertainty. The oil companies simply accept that a large part of the potential resource rents will be eaten up by regulation, so they make some effort to direct these overhead expenditures toward activities that will benefit the community, such as enhancement of fisheries stocks, resource-related biological research, and social welfare programs in the community. However, one company executive estimated that ninety-five percent of the regulatory delays were due, not to local, but to federal authorities.

Some of the interventions by federal agencies threaten the foundations of the production sharing legislation. Although the 1995 production sharing law specifically exempts project equipment from the Russian value added tax, the Customs Authority

levied VAT on all equipment imports. By mid-1999, more than $80 million in illegal VAT had been collected. The Tax Authority promised that investors would be allowed to add VAT to the eventual capital cost of the project before calculating profits, but this capture of taxes up-front before the projects produced any income sabotaged the timing of bonuses and payments to the Sakhalin administration. Payments to the Sakhalin Development Fund were set up to guarantee that the territorial government would enjoy a steady flow of revenue of at least $20 million per year for the life of the project. Now, there would be a delay before Sakhalin would eventually share in profits. Then, in March 2000, the federal government announced that Customs would no longer charge value-added tax on equipment imports.

Collapse of the Russian banking system in August 1998, disrupted project accounts. Many foreign companies lost the balances in their local hard currency accounts. One company, which had just transferred $10 million in payments into a Russian bank, lost the full amount when the bank went bankrupt.

In 1999, the State Environmental Agency issued a regulation requiring that all companies barge their drilling fluid to shore and deposit in a waste disposal site. "The drilling fluid contains salt water and bentonite," one engineer explained. "This is normally discharged at sea… But dumping salt water on land is certainly harmful. We will prepare a safe, well-designed disposal pit, but this will double our direct costs of drilling and raise the total project costs about 10 percent." Another engineer alleged, "One project paid SMNG to barge their drilling mud away, so SMNG barged it to a different location and dumped it in the sea." Exxon, which had two drilling rigs waiting, cancelled exploratory drilling in 1999. This spring, after lengthy discussion with an expert commission named by the environmental agency, it appears that drilling will be able to proceed.

On September 21, 1999, the tanker, Seamaster, loaded the first 81,000 tons of Sakhalin oil to transport to Korea. However, before they could set out, the Far Eastern Directorate of the Customs Authority issued a letter ruling that, since SEIC was not a joint venture, it did not have the authority to export oil. Again, the Customs ruling was directly contradicted by production sharing legislation, which guarantees the right to export product. Sakhalin Energy Investment Company was ultimately able to export its

oil, but the possibility that export rights could be blocked in contradiction to PSA legislation remained a concern.

Then, a week later, while SEIC president Alan Grant was meeting with consortium members in Houston, both lines on the oil storage tanker, Okha, broke loose at midnight in moderate seas. Automatic sensors shut down the oil flow and separated the oil delivery hose from the tanker. According to SEIC, oil spill response teams began working immediately, collecting about a barrel of the approximately two and one-half barrels of oil that escaped. Since no further oil could be found, calls for additional spill response resources were cancelled. Nevertheless, a week later the State Ecological Committee ruled that three and one-half tons of oil had been spilled, imposing a hefty fine on SEIC.

The strategy that SEIC uses is to try to assure that the government, and especially the territorial government, derives a substantial, predictable income from the project in every period beginning well before the project itself generates a flow of income. The implicit possibility of withdrawal comes up each time a serious problem arises. The withdrawal of Arco from Sakhalin-4 in the winter of 2000, combined with a slowdown in exploration by the other companies, led the Russian government to announce in March that they would no longer charge value added taxes on equipment imports.

Ownership Issues

Resource projects are considerably more complicated when there is joint foreign-Russian ownership. Rosneft-SMNG and SMNG, which are obligatory partners in most current projects, have claimed they were not able to contribute to project costs. Difficulties sometimes arose when SMNG wanted to function as project subcontractor, receiving payment from Exxon. Such a dual role makes it difficult to enforce cost and quality constraints on work, particularly when the PSA mandates high local content.

A future ownership issue is the request by the Sakhalin Shelf Development Department that their closed joint stock company, called Sakhalin Oil Company, should be given a 5 percent ownership share, deducted from the foreign partner's ownership

share, although SOC would not contribute to the cost of investment. SOC expects to market the territory's profit share as well.[22]

The Market for Sakhalin's Energy

Sakhalin's oil and gas condensate can find a ready market in the Pacific without influencing world price. At about 2 million tons per year, RFE total annual production is less than one percent of Japanese total consumption of 255 million tons. The main barriers to oil export are domestic taxes and regulations. Export taxes on oil depending on the level of world price. At a price of $24 per barrel, export tax is 20 ecu per ton. Export regulations restrict the share of refined products that may be exported. In the fall of 1999, refiners were required to sell most of their output on the domestic market at low, internal prices. The RFE fishing fleet was required to purchase fuel offshore at world price.

At 894.6 million tons, total Asian consumption of oil products accounted for about one-fourth of world demand (roughly equal to US total consumption). Over the next decade, production of oil and condensate on Sakhalin is projected to rise from 2 million tons to 8.5 million tons in 2005 and 16.2 million tons in 2010, bringing total RFE production (including Sakha) to about 18 million tons in 2010, still less than 2 percent of total Asian consumption.

The design of successful natural gas projects will be much more difficult. Small and large LNG projects have roughly similar average costs, but the average costs of supplying pipeline gas fall sharply as the size of the project increases. The largest single element in cost is the cost of the pipeline itself. The volume of gas moved through a pipe is proportional to the pipe's cross-section. However, the amount of steel going into the pipe (as well as the land area the pipeline occupies) depends on the pipe's circumference, which is proportional to the square root of the cross-sectional area. So, the average cost of pipeline gas falls rapidly until production rates equal about 20.5 billion cubic meters per year. In order to gain potential economies of scale, a natural gas pipeline from Sakhalin would need to be more than 10 times larger than the current pipeline delivering

[22] Interview with Galina N. Pavlova, Head, Department on Development of Mineral Resources of Sakhalin Shelf, Sakhalin Administration, 15 September 1999.

natural gas to Khabarovsk, built in 1942. Moreover, to supply this rate of output for 25 years, a natural gas reservoir would need to have about 800 billion cubic meters of gas. While the natural gas resources of the Sakhalin shelf are ample in total to justify construction of a pipeline, the Kirinsky field is the only single reservoir that is believed to be large enough by itself to assure an adequate long run supply to the Northeast Asian market.

There are also significant constraints on the demand side. Most natural gas consumption in Asia takes the form of LNG. In 1998, the largest Asian importers of LNG were Japan (69.5 billion cubic meters) and South Korea (15.6 billion cubic meters). China supplied most of its own natural gas consumption of 19.3 billion cubic meters.

[Insert Oil Production and Consumption in Asia]

[Insert Natural Gas Production and Consumption in Asia]

Before they will invest in natural gas projects, capital markets require firm, long-term contracts, supported by a strong legal framework. In industrial economies, construction of a pipeline requires legal rights of eminent domain, giving the energy producer a right of way to transport gas from a field to the consumer.

Where are the markets for Sakhalin's natural gas? Located just 60 kilometers from Hokkaido, Japan, Sakhalin is well situated in Northeast Asia, an energy deficit region enjoying impressive rates of economic growth. Its closest neighbor, Japan, pays the highest energy prices of any industrial country, although, with current low rates of growth, Japan has weak incentives to seek new energy sources. In contrast, China's growth has exceeded 9 percent per year for the past decade. It pays heavy environmental costs for the high share of coal in its current energy balance. With natural gas accounting for less than 2 percent of total energy consumption, China's has strong economic and environmental reasons to increase the share of gas in its expanding consumption of energy. South Korea, too, seems to be returning to a rapid growth track after the Asian financial crisis. Its focus on production of heavy industrial products means that several of its industries are energy-intensive. In the past, Korea has tried to foster growth by providing industry with access to low cost energy, so it is particularly well prepared to make use of Russia's natural gas.

The Russian Far East economy, itself, is a potential market for energy. In the Soviet era, when the relative prices of energy products were one-tenth or less of world prices, the region was a heavy consumer of energy for metallurgy, military machine building, fishing, and timber. Producers faced high fixed costs for district heating in a severe climate. Today, the region's industries seek access to energy on heavily subsidized terms, but they are unable or unwilling to cover its costs. Their presence increases the likelihood that Russia would have incentives to expropriate all or part of the production after the fixed capital was in place, contributing to the risk that investors foresee.

Sakhalin's natural gas could flow to one or more of these potential demanders, but there are barriers to be overcome in each case. In the case of Japan, Hikaru Yamada and Arlon Tussing argue that the most serious obstacle to introduction of piped gas (or even expanded use of LNG) is Japan's lack of an internal gas transmission and distribution network together with the high level of stranded costs that their existing energy utilities would bear if more efficient, lower cost energy suppliers were to emerge.[23] Currently, they claim, Japan is at a serious, competitive handicap, with LNG imported at 20 widely dispersed and unconnected terminals. A network of open-access gas pipelines could link the LNG import terminals with one another and with industrial and population centers. Without such links, Japan lacks the flexibility to shift supply from high-value district heating to interruptible industrial uses. With such flexibility, Japan might lower its energy costs to half of present levels.

Between 1989 and 1997, the Mitsubishi Research Institute organized the National Pipeline Research Society of Japan to study the feasibility of a pipeline system. The society, whose corporate members included Japan's main gas and electric companies and energy equipment manufacturers, drafted the design of a major gas trunk line system for Japan. This plan could serve as a blue print, allowing Japan to improve its gas transmission system. Without transmission infrastructure, Japan will have difficulty profiting from access to Sakhalin's natural gas.

[23] Hikaru Yamada and Arlon Tussing, "Japanese Gas Pipeline Grid Mapped Out: Seeking US Help," Natural Gas Journal (May 1998).

Accessing the Chinese market presents slightly different problems. China's energy balance is still heavily influenced by Chinese central plans and by the policies of China's energy monopolies, China National Petroleum Corporation (CNPC), China Petroleum Corporation (Sinopec), China National Offshore Oil Corp (CNOOC), and (recently) China National Star Petroleum Corp (CNSPC). CNPC , with 1.5 million employees, produces 90 % of China's oil and gas. It has been attempting to cut its costs and has signed dozens of onshore oil contracts with foreign partners. Sinopec, the flagship of China's petroleum industry, has been upgrading its existing refineries and petrochemical plants, but joint ventures with foreign partners have moved forward slowly.

Currently, Prime Minister Zhu Rongji is promoting a program to import LNG into Southern China. Construction has started on a 3 million ton per year import terminal in Guangdong that will link the cities of Shenzen, Dougguan, and Guangzhou by a 400 km pipeline. Sakhalin governor Igor Farkhudinov and his staff visited Southern China in the fall of 1999 to promote future sales. Royal Dutch Shell, a partner in Sakhalin-2, is expected to play a lead role in finding markets for Sakhalin's LNG.

Meanwhile, Sakhalin-1 is focusing on the potential of pipeline gas, looking at the options of a pipeline from the south of Sakhalin to Hokkaido or a line to the Russian mainland and, from there, to Northeastern China and/ or South Korea. South Korea is clearly the country in the best position to make use of natural gas in the short-run. It already has a natural gas grid with two loops--one surrounding Seoul and the other in Southeastern Korea.[24] Although Korea's industry is undergoing major restructuring in the wake of the Asian financial crisis, its rapid economic growth and specialization in relatively energy-intensive industries makes it a strong potential customer for Sakhalin. For all of the major customers in Asia, Japan, China, and South Korea, Sakhalin's natural gas could be supplied sooner and at lower cost than alternative sources from Irkutsk (including Kovytinsk), the Vilyusk Basin of Sakha, or the Sobinsk field in Krasnoyarsk.

If strong institutional infrastructure were in place to support long-run international energy contracts, then Russian producers and Asian consumers could enjoy major

[24] Arlon Tussing and Samuel Van Vactor, "South Korea's Thirst for Gas," Financial Times Energy Economist (March 1998).

benefits from access to low cost energy. Northeast Asia could enjoy something of an energy boom. However, until the legal framework is strengthened, these projects may remain pipe dreams.

Prospects for the Domestic Market

If prospects for RFE natural gas depend on firm long-term contracts, then prospective domestic demand complicates, rather than resolves, future market conditions. For, currently, Sakhalinmorneftegas delivers natural gas to power stations, municipal, industrial, and government installations at prices that are well below its costs. In July 1999, net price equaled approximately $7 to $8 per thousand cubic meters, net of VAT and excise taxes collected at the rate of 24 rubles per dollar of revenue.[25] (This is equivalent to less than $.20 per million cubic feet, or less than half of cost.) Mikhail Korchemkin estimates that about two-thirds of natural gas consumer's pay for their gas, the remaining one-third accumulates arrears, which, after the fact, turn out to be an in-kind subsidy.[26] (In the case of oil, Rosneft compensates SMNG for non-payments in Khabarovsk by giving it the right to export one million tons of West Siberian oil, acquired under mandatory sales to the federal government, in Western Europe.) Under Russian law, it is illegal for energy suppliers to halt supply to government and strategic consumers.

[Insert: Natural Gas Balance]

How, then, should energy producers forecast revenues for a new energy pipeline? According to Korchemkin, a new 1,400-km, 40 inch pipeline from Sakhalin to Vladivostok, via Komsomolsk-na-Amure and Khabarovsk, would cost approximately $2.2 billion. The extension to South Korea and/or Harbin would add another one billion to the cost. If domestic consumers took 2.7 to 3.5 billion cubic meters either at subsidized prices or in lieu of transit fees, then prices paid by foreign consumers would have to be increased proportionately.

[25] Mikhail Korchemkin, "Local Gas Pricing Hurts Sakhalin Gas Export," Oil and Gas Journal, 19 July 1999, 61.
[26] Although Khabarovsk consumers were making partial payments, one Sakhalin source estimated that Khabarovsk had accumulated more than one year of arrears in non-payments for oil as well as gas.

Energy from Sakhalin faces competition from East Siberia. A pipeline to China from the Kovytinsk field in Irkutsk is currently expected to be highly competitive with Sakhalin gas. Each pipeline would need to access both the Chinese and South Korean markets in order to reach an efficient scale of operation.

[Insert: RFE Domestic Natural Gas Scenario]

On economic, technological, and environmental grounds there is a strong case for a rising share of natural gas use in Northeast Asia. Elsewhere, the natural gas share of world energy supply has increased from one-fifth to one-fourth over the past decade. Japan, South Korea, and China account for almost one-quarter of the world's population but only 4 percent of world consumption of natural gas.[27] Between 1986 and 1997, Northeast Asia's total energy consumption grew at 5 percent per year. Extrapolations based on this past rate seem unrealistic in the wake of the Asian financial crisis, yet, even at lower rates of increase, total energy demand in these three countries is likely to exceed either US or the European Union's energy consumption by 2010, accounting for more than a quarter of world energy consumption.

Foreign Involvement in Sakhalin's Energy

Development of Sakhalin's offshore energy has moved ahead with Western involvement because the Russian domestic industry had relatively little experience in an Arctic offshore environment, because the Russian Federation government hoped to stem the exodus of population from its gateway to the Pacific, and because the region's fishing and maritime industries feared that Russia's domestic oil and gas producers would damage the valuable Pacific fishery if they undertook development alone. Western multinational firms were willing to commit more than $1 billion, only after they received authorization for production sharing, because they expected to have direct access to the Pacific market without having to deal with Transneft, the national pipeline monopoly.

Both parties to Sakhalin-1 and Sakhalin-2 have adopted strategies to make agreement possible and to protect themselves against "hold up." The Russian government tendered the offshore fields in separate agreements. It tried to assure that

[27] British Petroleum. World Energy Statistics, 1999.

each project would have both an oil and a gas resource, which could be developed in sequence.

The Western partners designed their production sharing agreements to provide a steady flow of benefits to the local government in each period, even before production began. As cost escalation has threatened this goal, Western advisors and the Sakhalin territorial administration are designing a Development Bank which would allow the territory to borrow money to fund infrastructure projects, with repayment guaranteed by future oil and gas revenues.

Investment is phased over time, so that the government must tradeoff the short-run gain from expropriation against the long-run loss of future access to investment. Although, with current high world oil prices, capital constraints have expanded. Institutional barriers, which have been overcome in the case of oil extraction, will be more difficult in the case of a large-scale natural gas pipeline. Both Japanese and South Korean energy companies express interest in a multilateral governmental agreement providing investment guarantees. (China, on the other hand, appears to want to negotiate bilaterally with Russia.)

Under current plans, there are clear revenue-sharing rules for the division of royalties, profits, and profit-oil between the federal and territorial governments. However, in practice, the federal government uses its regulatory powers to impose in-kind taxes on energy producers and to give certain energy users in-kind subsidies. The prohibition of export forces oil producers to sell at low domestic prices. The obligatory delivery of natural gas to non-paying users creates enormous in-kind taxes and subsidies. Thus, the main risk to energy projects is not outright, but hidden, expropriation.

A survey of problems arising during implementation suggests that even relatively minor issues, such as the procedure for disposal of drilling mud, can threaten a whole project. However, the main barrier that needs to be overcome, at least in the case of natural gas, is the willingness of foreign partners to view Russia as a reliable long-term supplier. Until Russia overcomes these perceptions of high political and economic risk, potential foreign partners will be reluctant to invest in the infrastructure to consume Russian gas, and international capital markets will be reluctant to finance the pipelines to deliver gas.

In the long run, the Western policy agenda should include the possible establishment of a multilateral mechanism providing investment guarantees for large, multilateral projects. However, in the short run, members of the Paris Club of creditors will be quick to remind us that investment guarantees must be based on more than wishful thinking.

All of Northeast Asia would benefit from a network of pipelines and ports linking energy producers in Russia and elsewhere with consumers in Japan, Korea, and China. Sakhalin is poised to play a catalytic role in initiating such cooperation, but, as always, the devil is in the details.