FDI in Russian Energy:
Is There a Successful Strategy?

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In the decade following economic reform, the Russian economy received a trickle of foreign direct investment. Goskomstat reports that in 2001, Russia received $14.3 billion of total foreign investment, including $4 billion of foreign direct investment $0.5 of portfolio investment, and the balance in other investment, mostly trade credits (Russian Economic Trends, March 2002). At the same time, investment outflow was estimated to be $16.8 billion. Even more surprising, Russia's two largest export sectors, oil and gas, received only a modest share of this foreign capital. Only 11 percent of FDI was directed to the fuel sector.

Investors, themselves, had no difficulty explaining the reluctance to commit resources in Russia. They pointed to the high levels of political and economic risk, high taxes, corruption, and illegal activity, fuzzy property rights, weak rule of law, and weak corporate governance as some of the major impediments to investment. In the case of natural resources, there are particular problems in defining and enforcing rights of access, access to the world market, and a stable tax and regulatory framework. Foreign investors sometimes saw their ownership rights threatened by the activities of large domestic energy firms, seeking control of the same assets. For potential foreign investors, in the absence of a clear and enforceable framework, there is a high risk of expropriation, either by administrative fiat or by "creeping expropriation" through unpredictable changes in laws, taxation, and administrative regulation. With many overlapping jurisdictions, the firm is liable to hold up on many margins.

Depreciation of the ruble after the September 1998 financial crisis and rising world prices of oil in 2000 and 2001 generated a large merchandise trade surplus, a federal budget surplus, and renewed domestic investment in oil by Russia’s gigantic holding companies. However, the increased liquidity of domestic producers lessened

their interest in foreign participation, even in cases in which foreign producers contributed substantially higher quality technology.

Investment in offshore oil and gas development on the Sakhalin shelf is a crucial exception. In 2002, two major Western consortia, called Sakhalin-1 and Sakhalin-2, had committed more than $2 billion to exploration and development of energy in the Russian Far East. Four additional lease areas were under negotiation. Sakhalin-1 announced plans to construct a 24-inch oil pipeline to the port of DeKastri on the Russian mainland from which oil would be exported to customers in Northeast Asia. A second phase of development would see an undersea natural gas pipeline to Japan, connecting to Hokkaido and, from there to major Japanese cities.[1] In the meantime, Sakhalin-2 was producing about 3.6 million tons of oil. Sakhalin Energy Investment Company, operated by Royal Dutch Shell, was moving forward on plans to construct a liquefied natural gas (LNG) plant, oil and LNG export terminal, and two on-shore pipelines linking production facilities to offshore sites.[2] If the announced plans proceeded on schedule, each project would involve commitment of more than $10 billion, resulting in the two largest foreign investments in the Russian economy.

There are some unique features of Sakhalin's geographical setting that lower the risk of expropriation in the eyes of the Western multinationals. Moreover, both the Russian government and the Western firms have followed strategies designed to signal commitment. Nevertheless, the existence of large sunk costs and the presence of large state-owned or state-linked domestic produces suggests that the endogenous risk of expropriation remains.

The Risk of Expropriation in Theory

There is a large economic literature that considers how the risk of expropriation impacts the behavior of the investing firm and the behavior of a host country in the absence of a credible commitment not to expropriate. These papers ask to what extent implicit, self-enforcing agreements can provide a framework for cooperation. The problem with self-enforcing agreements is that each party must have the means to punish

[1] Pacific Russia Oil and Gas, V, No 1 (Spring 2002) 12.
[2] Ibid., 7.

a partner in the case of deviation from the *ex ante* contract. These classic models turn out to be prophetic in the case of some of the spectacular failures of Western investments in Russia.

Holdup problems arise when one or more partners invest in assets that are specific to a project. The specificity of an asset is measured as the share of the return to investment that would be lost if the assets were used outside of the specific project. When a foreign multinational company invests in an energy project in a host country, most of the investment committed to the project becomes a sunk cost, while the return is a quasi-rent, which must be shared between the foreign investor and the host country.

The inability to commit not to expropriate penalizes the host country as well as the multinational firm. Unless the structure of agreement between a host country (HC) and a multinational firm (M) provides safeguards against expropriation, the foreign investor will be unwilling to finance potential projects.

Expropriation of an investor's assets may take many forms. Early theories of expropriation, such as the papers of Eaton and Gersovitz (1981, 1983, 1984) and Fernandez and Rosenthal (1990) consider cases of sovereign default. In this literature, a sovereign borrower repays its debts only if the costs of default exceed the benefits. In the case of foreign direct investment, expropriation may take the form of outright nationalization of a project without paying adequate compensation or it may take the form of creeping expropriation.

While outright expropriation is a clear violation of international law, creeping expropriation is hard to identify and to punish. Outright expropriation transfers control rights to the host country, while creeping expropriation leaves control rights in the hands of the investor. Retaining control rights, the multinational may take actions to reduce the costs of expropriation on its profitability.

In Russia, the government attempts to capture the quasi-rents of a project by increasing taxes, transport charges, and export duties or through other administrative measures, such as bans on export or obligations to deliver output to the government at low prices. Although outright expropriation occurred frequently in the 1970s, creeping expropriation is more common today.

The economics literature on expropriation focuses on the ability of each party either to provide an alternative payoff that is more attractive than expropriation in each period or to provide a credible punishment in the case of deviation from the *ex ante* contract so that the partner foregoes the short run benefit of expropriation for the long run gain of a continued relationship.

A case study of two large energy projects on Sakhalin Island shows that risk of expropriation dominates all other sources of risk. The strategies that investors pursue and the sources of stability in successful projects are well described by classic economic models of expropriation. These models identify the characteristics, which have allowed the Sakhalin shelf projects to move forward at a time when other investment lagged. They show that the lack of experience of Russian producers in an offshore environment, the significant risks posed to the valuable Pacific fishery, and the significantly higher technical productivity of foreign-assisted energy projects all reduce the risk of expropriation, as does easy access to the world market. The fact that foreign investors have good outside options, providing a credible threat of withdrawal, deters Russia from excessive taxation. The fact that producing partners in Sakhalin are also major customers and that the operating partner of Sakhlin-2 is the major distributor of LNG in the Pacific (Shell) gives the multinationals some leverage against default. The existence of potential users of oil and natural gas in Khabarovsk and Primorye regions actually increases the risks of expropriation from the point of view of foreign investors, since these regions contain powerful political constituencies, such as military producers, which historically received energy from Sakhalin on highly subsidized terms.

In the theoretical literature, many different mechanisms are proposed to enforce agreements. Eaton and Gersovitz (1981) and (1983) provide a reputation model of foreign direct investment in which a host country loses access to future investment as a result of current expropriation.

In Eaton and Gersovitz (1984), foreign investment provides both capital and international management skills, such as technology and know-how. In deciding on whether to expropriate, a host country weighs the benefits of obtaining the income from project capital against the cost of losing access to foreign managerial services. Anticipating host country behavior, the firm chooses to deviate from otherwise optimal

factor combination and pricing decisions in order to deter expropriation. In the simplest case, the investor reduces the size of investment, assuring that the expected income from expropriation is less than the host country's tax revenue from continued operation.

Eaton-Gersovitz captures a key source of Sakhalin's success. The superiority of foreign know-how and management is a decisive factor in the viability of the Sakhalin projects. As we will see later, a Russian firm extracts a total flow of oil over the lifetime of a project averaging less than sixty percent of the flow from a similar Western project. Moreover, offshore extraction with Russian domestic technology would pose unacceptable risks to the valuable North Pacific fishery.

Thomas and Worrall (1994) consider the strategy of an investor in a dynamic context. The investor anticipates the host country's short-run incentive to expropriate by committing a small level of investment at the start, thus, choosing a time path for investment which offsets the short-run incentive to expropriate with a long-term incentive to gain access to a flow of investment in the future. In this case, the foreign investor, M, licenses technology to a domestic firm and extends a credit to finance investment. Under the contract, M provides investment I in period 0 and B, a domestic firm, contracts to return $D \geq I$ to be paid in period 1 to compensate M for her initial capital outlay and for granting a license. Then, B invests I, receiving the return $R_B > I$. After receiving the return, B chooses whether or not to honor his debt. If he reneges, an exogenously given punishment ensues, such as loss of access to capital markets, which yields a utility loss, -L. Thus, the payoffs are:

$$U_M = \begin{cases} D - I, \textit{if } B \textit{ pays} \\ -I, \textit{if } B \textit{ reneges} \end{cases}$$

$$U_B = \begin{cases} R_B - D + I - I, \textit{if } B \textit{ pays} \\ R_B - L + I - I, \textit{if } B \textit{ reneges} \end{cases}$$

In the Thomas-Warrall variant, M commits a small investment, I^0, in the initial period, yielding R_B^1. If B honors his commitment to repay, he receives R_B-D+ I^0- I^0 +I^1. Thus, the firm repays if $D \leq I^1$.

Enrico Perotti (1992) focuses on the ability of each party to penalize deviations from agreement by means of cross-ownership. In Perotti's model, cross-ownership functions as an exchange of hostages, creating incentives for stockholding owners to

penalize the manager of any firm that violates informal arrangements, assuring a large penalty for defection from agreements. The Perotti model explains nicely why Russian financial industrial groups succeeded in investing during the 1990s, at a time when most capital flowed out.

Finally, turn to Monica Schnitzer's "Debt vs. Foreign Direct Investment: The Impact of Sovereign Risk on the Structure of International Capital Flows," which best captures the essential elements of the Sakhalin energy projects (Schnitzer, 2000.) In this model, a foreign multinational, M, is assumed to carry out an investment project in host country, HC. After investment costs are sunk, HC has the option of nationalizing the project without compensation. After nationalization HC owns and controls the project, realizing the return, R_H. Again, nationalization triggers the penalty, -P. Thus, if M invests and HC expropriates, M receives –I and HC receives R_H-P.

Instead of nationalizing outright, HC can attempt to capture some of the returns to investment by imposing taxes on M's income. As long as M controls the project, she may (partially) withdraw her resources from the host country. If M remains, the project will generate a return of R_M. If M shifts production out of the host country, the project produces a lower return R_{ML}, ($0 \leq R_{ML} < R_M$) while an additional profit *r* is received abroad. Since HC can guarantee himself an income of at least R_{ML} he will never choose $T < R_{ML}$. Further, he will never choose $T \geq R_M - r$, since this would induce M to withdraw.

Using this information, the payoffs from creeping expropriation are given by

$$U_M = \begin{cases} R_M - T - I, \text{ if } M \text{ remains} \\ r - I, \text{ if } M \text{ withdraws} \end{cases}$$

$$U_{HC} = \begin{cases} T, \text{ if } M \text{ remains} \\ R_{ML}, \text{ if } M \text{ withdraws} \end{cases}$$

The foreign firm receives R_M-T-I if she does not withdraw and r-I if she withdraws. The host country receives T if the foreign firm does not withdraw and R_{ML} if M withdraws.

Looking at the details of the Sakhalin situation, we can observe how its unique characteristics alter the underlying payoffs in a manner that reduces the incentives to expropriate. (See the diagram at the end of the paper.) In the case of outright expropriation, HC receives $R_H - P - F$, where –F represents the expected damage to the

fishery from domestic production. Consider each term. The productivity of the project with domestic operation, R_H is significantly lower than under foreign operation; if $R_H = aR_M$, then a is equal to about 0.6 if the host country retains existing asset. It will be lower still if foreign-controlled assets are removed. In addition to the penalty, –P, which the market imposes for expropriation, we assume that domestic management imposes a cost, -F, representing damage to the fishery. In Pacific Russia, this annual fishing harvest is worth about $1.5 billion. On the positive side, if M remains, the host country gains both tax, T, and an increment to its human and physical capital stocks, dK.

$$U_{HC} = \begin{cases} T + \Delta K, \textit{ if } M \textit{ remains} \\ R_{ML} - F, \textit{ if } M \textit{ leaves} \end{cases}$$

There are a number of conditions under which the payoff to HC from outright or creeping expropriation would be very low. First, the offshore drilling platforms are mobile. They are towed into place from abroad and may be towed off again. In the case of a LNG plant, which is fully integrated into Shell's supply and delivery matrix, Russia lacks the capacity to use the energy domestically, should it choose to nationalize, and it would have difficulty finding alternative customers in a market based on long-run supply contracts. Thus, it is possible that the value of operation under domestic management, R_{ML}, might be close to zero (in which case, the ability to harm the fishery would also be small.)

There are inducements to Russia to foster foreign participation, as well. Before the fact, if FDI does not come in, then Russia bears two costs: providing subsistence for a large, unemployed population in the Russian Far East, -E, and the loss of income from the region's heavy industrial capacity, much of which would be unused in the absence of energy development, –rK. While the multinational remains in the region implementing a project, Russia anticipates that training of personnel and 70 percent domestic content requirements generate an increase in the productivity of human and physical capital stocks, dK, which supplements tax revenues. This simple framework provides several testable hypotheses that shed light on the risks and potential of Sakhalin's prospects. Turn, next, to a brief survey of the two projects, which demonstrates how accurately the theoretical models describe real world tradeoffs.

Investment on Sakhalin

The oil and gas industry is Sakhalin's oldest. The first well was drilled in 1911, the first oil field established in 1928. 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. During the 1976-1982 periods, 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. 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 a sub-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. Today, the operating partner of that project, called Sakhalin-2 is Royal Dutch Shell.

During the 1990s, the Russian government decided to tender exploration and development rights to several potential sites on the Sakhalin shelf, offering sites separately in order to generate competition between potential investors. A table at the end of the paper, *Sakhalin Shelf Projects*, identifies seven separate projects, listing the relevant fields, reserves, and operating partners. With the exception of Sakhalin-2, which is foreign owned, all of the potential projects include Rosneft, a government-owned holding company. Several include Sakhalinmoreneftegas (SMNG), a subsidiary of Rosneft. Recently, Sakhalin-2 acquiesced to the inclusion of Gasprom into their future activities.

Rosneft 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. 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. Two state-owned firms, Rosneft and Zarubezhneft, control all negotiations for implementation of production sharing agreements.

State-owned Sakhalinmorneftegaz is a medium-sized oil producer, formed on the basis of a former government production association. Two-thirds of its oil production is exported to the world market. In 1995, under a presidential decree, it was amalgamated with Rosneft, which now holds a 51 percent stake in it.

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) and other regional governments organized two pipeline companies, Dalneftegas and Daltrans.

Western participants in the first three offshore projects are major international oil companies together with Sodeco, a Japanese consortium, originally organized around Japan's national oil company. Exxon Neftegas Ltd, an affiliate of ExxonMobil is the operator of Sakhalin-1. Other participants are Rosneft-Astra and Sakhlinmorneftegas-Shelf (Russian), Japanese owned Sodeco, and India's ONGC Videsh Ltd. The project consists of three fields: Chayvo, Odoptu, and Arkutun-Dagi located on the northeast shelf of Sakhalin Island. Total recoverable reserves are estimated at 2.3 billion barrels of oil (307 million tons) and 17.1 trillion cubic feet of natural gas (485 billion cubic meters.) Plans for initial development focuses on oil from Chayvo beginning in 2005 and Odoptu in 2008, with limited gas production for domestic Russian demand. Investment in this phase is estimated to total $4 billion.

The second phase will involve construction of an undersea natural gas pipeline to Japan, initially connecting into Hokkaido, tapping gas from Chayvo and Arkutun-Dagi. Between them, the three fields are expected to supply a production rate of 10 billion cubic meters per year for 40 years.

The project is already producing oil from extended reach drilling from onshore and is drilling at Chayvo from the Orlan offshore platform. Oil is delivered to the De-Kastri oil export terminal in Khabarovsk Krai.

Sakhalin-2 obtained a Production Sharing Agreement in 1994 and began oil production in 1999. Its fields are Piltun-Astokhskoye (oil and associated gas) and Lunskoye (gas with associated oil and condensate.) Production began at Piltun-Astokhskoye in 1999 from the Molikpaq offshore drilling platform. Reserves for the two fields are an estimated one billion barrels of oil and 19 trillion cubic feet of gas.

Sakhalin Energy Investment Company (SEIC) brings together a consortium of companies in Sakhalin-2. Shell Sakhalin Holdings (55%) is the majority operator. Mitsui Sakhalin (25%) and Diamond Gas Sakhalin (20%), a subsidiary of Mitsubishi, are marketing the oil and gas in the Pacific. Its Supervisory Committee includes six Russians, including the Sakhalin Governor, representatives from the Sakhalin Oil and Gas Department, and the Federal Government (Ministries of Fuel and Energy and Defense) and six members from SEIC. $348 million in project financing has come from EBRD, Japan's Export-Import Bank, and US Overseas Investment Corporation (OPIC.)

On the Piltun-Astokhskoye field, oil is transported to a storage tanker and off-loaded directly onto tankers during the production season. In 2001, the Molikpaq platform produced 3.6 million tons of oil, three-fourths of which was exported to South Korea.

The total estimated budget of Sakhalin-2 is $10 billion, including $8-billion in the phase-2 investment in LNG facilities. SEIC's phase two plans call for year-round production of oil and LNG to begin in 2005/2006. There are two main pipelines-one for oil and one for gas, the latter serving a liquefied natural gas plant in the south of the island. Demand for LNG is growing rapidly, but new capacity is coming on line in Malaysia, Australia, Indonesia, and Qatar as well.

Since 2000, the status of the remaining potential projects on Sakhalin and of development under Production Sharing Legislation in general has been highly uncertain. The existing PSA legislation contains many contradictory elements. Implementation of new PSA agreements requires formal approval of the Russian Duma, which has not happened. Bureaucratic rivalries at the center have blocked regulatory reform and attempts by German Gref's Ministry of Trade and Development to amend the PSA enabling laws. Cash-rich domestic Russian oil producers have little interest in

strengthening the legal infrastructure for foreign producers, since they expect to benefit from a protected market.

The Legal Framework for Foreign Investment in Energy

Production Sharing Agreements simplify the legal framework and provide risk-sharing between the investor and the host country. 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.[3] 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, exploration payments (levied on the user of subsoil resources), land use payments, and insurance coverage of Russian employees, but, in practice, the Treasury and Customs Authority imposed many taxes that contravened PSA legislation.

A number of enabling laws and regulations followed, which eliminated some inconsistencies between PSA and pre-existing legislation[4] 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. They ruled that 80 percent of employees and 70 percent of inputs should be Russian. In addition, the Federal Duma passed the Law on the List of Fields Eligible for Development under

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3 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.

4 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, passed in February, 1999, amended twelve federal laws to remove inconsistencies with PSA legislation.

Production Sharing Terms, requiring Duma approval for PSA and limiting the number of projects that would be eligible. Passage of Part I of a new Tax Code in January 1999 and Part II in the summer of 2000 simplified the general business tax regime, but Part II specifically precluded payment of tax revenue in the form of natural resources.

In 2001, President Putin identified the improvement of production sharing legislation as a cornerstone of his proposed measures to attract investment and technology, instructing a Working Group headed by Gref to identify legislative barriers to the implementation of PSA. This Working Group, which includes top officials of the ministries of energy, resources, taxation, justice, and customs committee, prepared a list of 6 amendments and 10 government resolutions which are required to remove discrepancies between PSAs and other regulations. However, during the past two years, the ministries that lost influence, such as Fuel and Energy and Natural Resources succeeded in blocking change. In addition, the Ministry of Finance continued to impose a heavy tax burden on the PSA regime in contradiction to the PSA law itself. Currently, a state-owned oil producer, Rosneft, and a state-owned oil exporter, Zarubezhneft, have authority to negotiate any proposed PSA agreements, which has had a chilling effect on future projects. (In July 2002, British Petroleum announced that it had awarded a 5-year exploration license for part of the Sakhalin-5 block to Rosneft in an attempt to retain an option to invest in the future.)

According to the legal framework in place, 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 by 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 24 percent.[5] 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. (Considering the risk of expropriation, a reversal of that ratio appears more realistic.)

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 Development Fund after a commercial discovery is announced and annually for 5 years after that. In the case of Sakhalin-2, these early payments were a $15 million signing bonus, $15 million commercial development payment, $16 million reimbursement of Russian exploration costs and a total of $100 million in payments into the Sakhalin Development Fund over a period of five years. Royalty payments are 6 percent for Sakhalin-2, 8 percent for Sakhalin-1, and 10 percent for Sakhalin-3.[6]

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:[7]

Regional Share **Percentage**

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5 The tax data provided by Jack Holton, "Sakhalin--giant reserves and hungry markets," Petroleum Economist. Gas in the Former Soviet Union, 1993, updated with information provided by Jonathan Russin, Moscow partner in Russin and Vecchi, LLC.

6 Data from a discussion by Michael Allen, August 15, 2000 at Foundation for Russian American Economic Cooperation, Seattle Wa.

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

Sakhalin Development Fund	100
Royalties	50
Bonuses	60
Profit oil	50

Out of the 24% profits tax on investor income, Sakhalin receives 16.5%.

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
• CUMULATIVE REVENUE TO 2005	470.	

The financial projections of Pegastar for the South Kirensky portion of Sakhalin-3 are similarly optimistic.[8] 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

[8] Sakhalin Administration. Neft i gaz Sakhalina. 1998, p. 172-173.

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).

Sakhalin Island; A Test Case

How has the small energy sector of Sakhalin managed to generate the two largest foreign direct investments in Russia? In a number of respects, Sakhalin differs from other resource-rich regions. Its location on Russia's periphery, but only 60 kilometers from Japan, gives it strategic importance to 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. Thus, when development started, the consequence of not having foreign investment was considered dire. Moreover, in the past, Sakhalin's remoteness from Moscow weakened the interest of competing domestic oil and gas interests in blocking foreign involvement in immediate development. Before the recent rise in oil prices, the domestic oil industry faced severe capital constraints.

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.

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.[9] 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

[9] James Smith, "Cost of Lost Production in Russian Oil Fields," Energy Journal, Vol 16, No 2, 25-33.

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. This technological difference in productivity and yield is a key source of stability for projects. If domestic operation generates only 60 percent of the expected present value--if R_H after expropriation is 60 percent or less of R_M, then host country production sharing or taxation becomes relatively more attractive. The ability of a Western partner to actually remove or close down an offshore drilling rig and to close the market to LNG makes the prospect of domestic operation still less attractive.

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, described the problems of their domestic industry:

> "…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.
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> "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."[10]

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

[10] Interviewed in a Sponsored Supplement, "Seeking Western Involvement for Rebuilding and New Developments," *Petroleum Economist*, January 1996, 10-14.

pipeline leaks in the space of 30 kilometers.[11] He and others argued that high domestic content rules would pose significant risks to the environment.

The Russian fishing 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 they made 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.

The Interest of Western Firms

Western energy executives find the Russian environment uniquely difficult. In industrialized countries, they argue, 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, officials 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

[11] Interview on Sakhalin Island, September, 1999.

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 Russian 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.

Although construction of a natural gas pipeline involves a high sunk cost, the presence of major customers in the operating partnerships provides investors with some leverage. In this respect, the Sakhalin-2 LNG plant operated by Shell would derive its main value from its role as a node in an integrated Pacific network of suppliers and users. Russia would need to undertake considerable investment in infrastructure in order to use the resource as a separate producer.

Implementation

The tax and regulatory burden on all producers in Russia is difficult. Berkowitz-Li (1999) argues with considerable accuracy that multiple tax authorities in Russia treat the production sector as a common property resource, leading to over-taxation and, ultimately, extinction. On the other hand, the federal government has almost total explicit authority over taxation and expenditure policies, as locally-controlled taxes account for less than 10 percent of budgets. In its relations with regional authorities, the center provides little incentive for local governments to increase their own tax base, since increases in local taxes result in an almost totally offsetting decrease in federal transfers (Zhuravskaya 2000). In consequence, Sakhalin, like other regional governments, attempts to collect in-kind subsidies to local government services, which they hope will increase their implicit share in the total monetary and non-monetary budget. Thus,

Exxon and Shell are spending millions of dollars to construct roads and bridges, to subsidize a regional airline, fisheries research centers, housing, educational and social services.

Russia has an immense population of bureaucrats and federal police. With a total employed population of 65 million in 2000, federal government agencies employed 1.125 million federal officials, one third in Moscow and two-thirds in Russia's regions. (These in addition to regional and local officials.)[12] Separately, the Ministry of Interior employs 430,000 officers throughout the regions. Thus, my interviews in the region describe an extraordinary regulatory burden imposed mainly by federal agencies. 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.

The Market for Sakhalin Oil and Gas

Sakhalin's oil and gas condensate can find a ready market in the Pacific without influencing world price. Even at its peak a decade from now, Sakhalin production would remain less than 10 percent of Japanese total consumption. The main barriers to oil export are domestic taxes and regulations. Export taxes on oil depend on the level of world price. At current prices, producers pay $21 per ton of oil and 20-30 ecu per ton on

[12] L. I. Yakobson, "Chislennost' rabotnikov organov gosudarstvennoi vlasti I mestnogo samoupravleniya v rossiiskoi federatsii," Moscow: Institute for Economic Research working paper (20020.

exports of refined products. Export regulations (currently quotas) restrict the share of refined products that may be exported. Refiners are required to sell much of their output on the domestic market at low, internal prices. However, Western suppliers of bunker fuel report that fuel supply from Russia is available at $10 a barrel less than officially announced market prices, suggesting that export regulations and export taxes are easily evaded.

In contrast with oil, 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. So, the average cost of pipeline gas falls rapidly until production rates equal about 20.5 billion cubic meters per year. 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. The announced gas reserves of Sakhalin-1 are about half of that amount, implying that a successful pipeline project will depend on the development of further projects.

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.

Currently, Japan is the only market large enough to justify a large natural gas project. Energy prices in Japan are also significantly higher than in other Pacific economies. Still, until growth resumes, the price elasticity of demand for fuel in Japan will be relatively inelastic.

Normally, financing of a multi-billion dollar project requires long-term supply contracts and, frequently, guarantees. As yet, Shell has neither for Sakhalin-2. Still, it is going ahead with construction on Sakhalin, a choice that faces the company with an enormous fixed cost.

If prospects for RFE natural gas depend on firm long-term international contracts, then prospective domestic demand complicates, rather than resolves, future market conditions. For, currently, Russian producer, SMNG, 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.[13] (This was equivalent to less than $20 per million cubic feet, or less than half of variable cost.) Mikhail Korchemkin estimates that about two-thirds of natural gas consumers pay for their gas, the remaining one-third accumulates arrears, which, after the fact, turn out to be an in-kind subsidy.[14] (In the case of oil, Rosneft compensates SMNG for non-payments in Khabarovsk by giving it the right to export to Western Europe one million tons of West Siberian oil annually, acquired under mandatory sales to the federal government.) Under Russian law, it is illegal for energy suppliers to halt supply to government and strategic consumers. Thus, producers view the obligation to supply the domestic market at low prices as another in-kind form of taxation, while, for manufacturers it is an in kind subsidy.

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. However, progress in Asia is likely to require a strong political and economic framework to reduce the risk of creeping expropriation.

Foreign Direct Investment in Russia's Energy

The cautionary models that we surveyed at the beginning of this paper appear to be all too relevant to the large potential projects on Sakhalin. In these models, the host country is assumed to expropriate whenever the return after expropriation minus the costs incurred (withdrawal of assets, loss of reputation, and damage to the fishery) is greater than the tax and technology benefits of continued foreign management. The host country refrains from nationalizing only if:

$R_H - P - F < T + \Delta K$.

In addition, the host country refrains from setting taxes so high that the multinational chooses to leave. That is, he will never choose $T \geq R_M - r$, since the foreign producer would leave. Thus, a successful project requires high benefits to continuation and high

[13] Mikhail Korchemkin, "Local Gas Pricing Hurts Sakhalin Gas Export," Oil and Gas Journal, 19 July 1999, 61.

[14] 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.

penalties for expropriation. So far, the strategies of foreign investors and Sakhalin's unique geographic characteristics have allowed investment to move forward.

The risk of expropriation is the most difficult risk facing foreign investors. Since the risk of holdup is endogenous, the design of institutions to create commitment must be an important part of any large-scale investment program.

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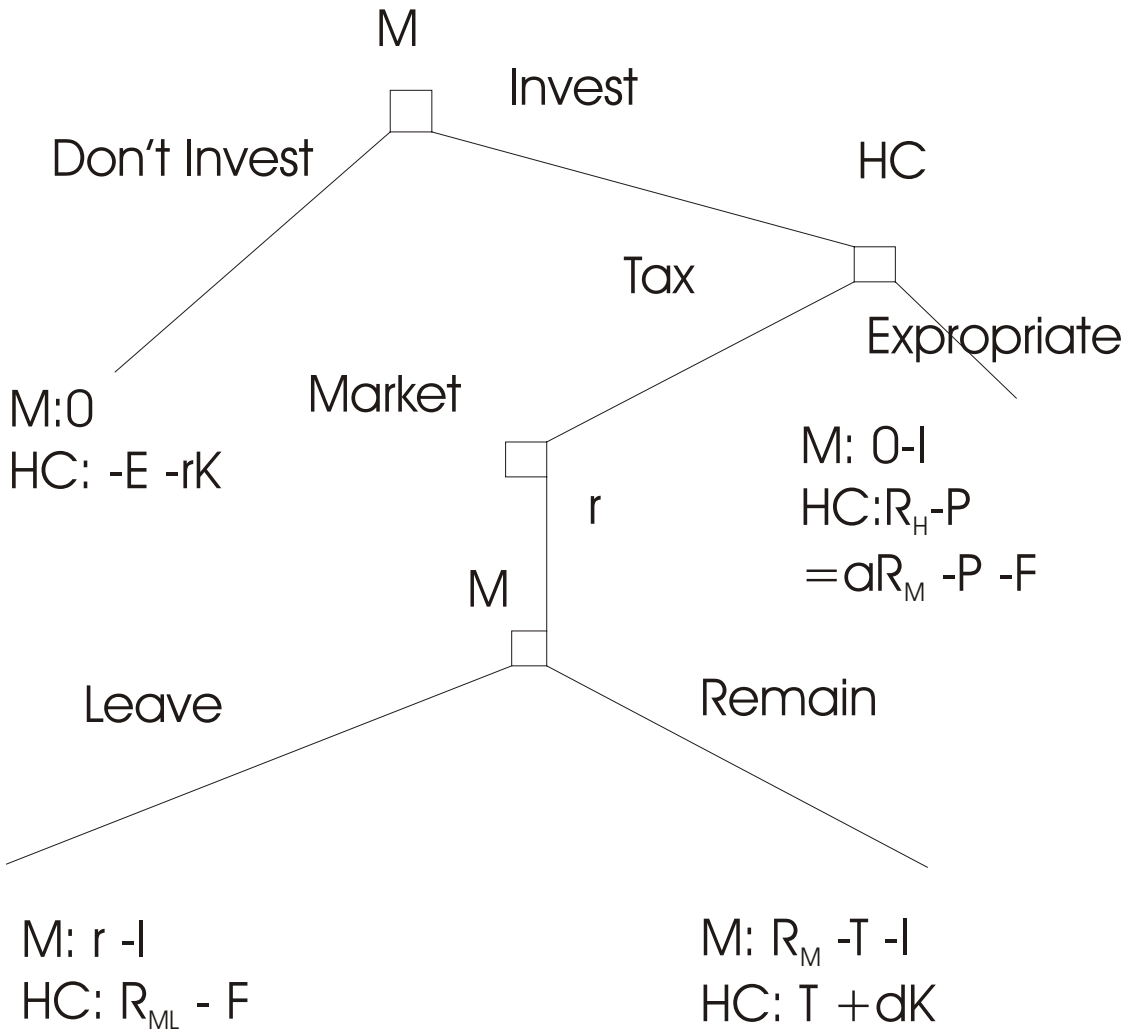
Sakhalin Shelf Projects

Project	Fields	Reserves Oil	Reserves Gas	Operating Company	PSA	Duma List	Members	Investment
Sakhalin-1	Chaivo	310 mil t	335 bil m3	Exxon Neftegas	1995	yes	Exxon, Sodeco, SMNG Shelf,Rosneft	$12 bil
	Odoptu	70 mil t						
	Arkutun-Dagi							
Sakhalin-2	Piltun-Astokhsky	70.3 mil t	93 bil m3	Sakhalin Energy Investment Co.	1994	yes	Shell, Mitsui, Mitsubishi	$10 bil
	Lunsky	3.8 mil t	350 bil m3	(Shell)				
Sakhalin 3a	Kirinsky	452 mil t	970 bil m3	Pegastar	yes	yes	ExxonMobil, Rosneft, Texaco	$15 bil
	Mynginskaya							
Sakhalin 3b	Ayashsky	114 mil t	513 bil m3	Exxon Neftegas	no	no	ExxonMobil, Rosneft, Rosneft-SMNG	$13.5 bil
	East Odoptinsky							
Sakhalin-4	Astrakhanovsky	115 mil t	440 bil m3	Rosneft, SMNG	yes	yes	Rosneft, SMNG	
	Shmidtovsky							
Sakhalin-5	East Shmidtovsky	115 m t	450 bil m3	BP Amoco	no	no	BP Amoco, Rosneft	
		30 mil t con						
Sakhalin-6	Pogranichny	150 mil t	200 bil m3	Pegastar			ExxonMobil, Rosneft, Texaco	


M
Invest
Don't Invest
HC
Tax
Expropriate
M:0
HC: -E -rK
Market
M: 0-I
HC:R_H-P
$=aR_M$ -P -F
r
M
Leave
Remain
M: r -I
HC: R_{ML} - F
M: R_M -T -I
HC: T +dK