

Module 9

Oil and Gas in the North Circumpolar World

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Key Terms and Concepts

- oil and gas resources
 - American and European models of resource development
 - vertically integrated companies
 - maturation phases of oil and gas regions
 - multinational oil companies
 - pipeline
 - royalties
 - economic rent
 - unitarian and liberal models of royalty collection
 - transfer prices
 - economic diversification
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Learning Objectives

The fundamental goal of this module is to provide a general introduction to the topic of oil and gas resource development, to identify existing practices in the northern regions of the world, and to explore how they differ from practices in other regions.

Upon completion of this module, a student will be able to:

1. Identify the basic models of resource development throughout the world and their applicability to northern resource-producing countries
2. Outline the phases in the evolution of an oil province
3. Identify the basic factors conditioning and facilitating the development of oil and gas resources in the North

4. Outline the basic forms of transportation for oil and gas resources
 5. Understand the financial considerations of developing oil and gas resources in northern regions
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Module Readings

Read the Overview and Lecture for Module 9, then read the assigned readings from the *Reading File* given below.

Reading 20: Leslye A. Korvola, “A re-examination of the social impacts of the pipeline boom in Fairbanks”

Reading 21: Arild Moe and Valeriy Kryukov, “Joint management of oil and gas resources in Russia”

Overview

The northern regions of the world hold colossal proven and potential reserves of oil and gas resources. These reserves are located on land, on the coastal shelf, and under the Arctic Ocean. The history of oil and gas development in the northern regions stretches over a century. The first oil and gas development in the north took place in Russia (Komi Republic) and then in Canada (Alberta). Today, oil and gas deposits at various stages of development are being produced in northern countries such as Russia, Canada, the United States (Alaska), and Norway.

During the resource development process, each region (including those in the north) passes through a series of development stages from exploration to declining output (which occurs when reserves have been exhausted to the extent that production is declining). States form policies that correspond to each stage of development. These policies tend to generally expand regional rights and authority for the management of oil and gas resources as the fields mature and it becomes more difficult and expensive to extract more oil and gas.

Oil and gas development in northern territories are distinguished by the great distances that separate oil and gas resources from markets and the high investment costs of building and maintaining the necessary infrastructure (pipelines and tanker ports) to transport the resources to market. Although, in many cases, private companies provide the impetus behind the development of

resources and infrastructure, in some countries, such as Norway and Russia, the state is a major source of investment in the oil and gas industries.

From a northern perspective, the fundamental economic issue of developing oil and gas resources is which level of government is responsible for collecting royalties from the development of resources and how these revenues are used to solve socio-economic problems in the resource producing regions. Although oil and gas development can bring substantial benefits to northern regions, such development can also have negative impacts on the environment and the lifestyles of northern people.

Lecture

The Particularities of Developing Oil and Gas Resources in the Polar Regions of the World

Two Models of Development: American and European

In most parts of the north, oil and gas reserves (and other minerals) in the ground are owned by the citizens of the state where they are found or, in the case of undersea reserves, by the people of the state adjacent to the reserves. This is usually referred to as state ownership. An examination of oil and gas developments in the northern regions of the world shows that there are two basic models of governance: the American model and the European, or North Sea, model. The basic distinction between the two models rests upon the differing rights of private enterprises to underground hydrocarbon resources and the role of the state in the oil and gas sector. In the American model (in the United States and, to a lesser degree, Canada), the state primarily plays a regulatory role. Private companies exercise considerable control over the development and production of oil and gas resources. Resource concessions are usually granted through an auction system involving both domestic and international resource companies.

By comparison, the European or North Sea model (in Norway and Russia) can best be described as an interventionist, or state-capitalist system. Although private companies participate directly in the development and production of resources, the state, in the form of a national oil company, plays an important role in resource management. The state controls the administrative allocation of production licenses and usually imposes stiff license requirements on private companies

The Soviet and Russian Experiences

The characteristic difference between oil and gas operations in Russia and those in other northern areas is that, until recently, a major part of the industrial infrastructure was controlled by a centrally planned Soviet economy. The state was the sole owner and developer of natural resources such as oil and gas, and excluded market forces from influencing resource management.

Oil was first discovered and produced in Baku and throughout the Caucasus region in the late nineteenth and early twentieth centuries. Like the Soviet Union, however, oil production and the industry it spawned really only reached “superpower” status after the Second World War with the discovery of significant oil fields in the Volga region in the 1950s and in Western Siberia in the 1960s. The Western Siberian oil fields, which were located mostly in the province of Tyumen, provided the bulk of the Soviet oil production in the 1970s and 1980s.

After the dissolution of the Soviet Union in 1991, Russia underwent a period of socio-economic reform that resulted in the introduction of market forces. Furthermore, in February, 1992, the highest governing bodies of the newly independent Russian Federation passed the Law on Underground Resources. This legislation laid the foundation for a system for the use of underground resources that included the interests of both the “centre” and the regions—the constituent units of the Russian Federation.

The Russian model of developing oil and gas resources conforms to the “principle of two keys,” whereby authority in deciding questions of rights over the use of underground resources is constitutionally shared by both the federation and the regions. Given the transitional nature and political instability of the Russian Federation, the two keys approach has caused a number of conflicts between the federal and regional governments over issues such as ownership and control of natural resources.

In northern Russia, the Khanty-Mansiisky Autonomous Okrug (district) is the uncontested leader in the establishment of legislation on natural resources. In recent years, based on its constitutional rights and authority, the okrug begun the process of establishing a clear and well-developed legislative framework to serve as the basis for oil and gas development. A specialized academic research centre was founded to study problems in the exploitation of underground resources and to finding solutions to the question of how to make more effective economic use of oil and gas resources.

Paralleling the formation of new systems of resource legislation in Russia was the restructuring of the oil and gas sector. The establishment of private and quasi-private vertically integrated companies that engaged in all production

activities, ranging from exploration to refining and sales, was a major departure from the Soviet system. The state still plays a key role as a regulator and a producer of oil and gas, but the emergence of private companies in the 1990s has brought Russia closer to the American model.

The Norwegian Experience

Norway's key goals in the oil and gas industry since the early 1970s have been national management and control, building a Norwegian oil community, and state participation. The Storting, the government, and a new state agency—the Norwegian Petroleum Directorate—are all responsible for administering petroleum operations. Decisions regarding the opening of new fields rests with the Storting, while licences for petroleum operations are awarded by the government. Since Norway is a unitary state, authority over matters of resource exploitation and development rests with the central government.

In the initial phase of oil and gas development, foreign companies dominated exploration off the coast of Norway and were responsible for developing the country's first oil and gas fields. While these multinational firms were supposed to play important long-term role, the goal of building up a Norwegian oil community was defined at an early stage. Statoil was created as a state-owned oil company, and the principle of fifty per cent state participation in each production license was established. The Storting later decided that the level of state participation could be higher or lower than fifty per cent, depending on the circumstances. The first production licences north of the 62nd parallel were awarded in 1980. A total thirty-five licences have been awarded in the Barents Sea since 1980, leading to a number of minor and medium-sized discoveries in these waters.

The Canadian Experience

In Canada, like Russia, resource politics is influenced by two important variables: the regional concentration of natural resources and the constitutional division of powers between the federal government and the provinces. Canada's oil and gas deposits are concentrated in the western provinces of Alberta and Saskatchewan and in off-shore deposits off the coast of Newfoundland and Nova Scotia in eastern Canada. Historically, the resource provinces have occupied a peripheral position in relation to the more politically and economically powerful provinces of central Canada (Ontario and Quebec), a situation that has given rise to feelings of interregional and intergovernmental animosity. The western provinces in particular have accused the federal government of using their natural resources as a cheap source of energy to fuel economic development in central Canada. The energy crisis of the 1970s and early 1980s reinforced such feelings by pitting resource producing provinces against resource consuming provinces and the federal

government. The federal government's decision to create Petro-Canada, a state-owned resource company during the energy crisis also brought about a shift in Canada's resource management orientation from the American model to the European model. During the past thirty years, the Canadian model of resource management, therefore, has displayed features of both models.

According to the Canadian constitution, jurisdiction over land-based natural resources, such as oil, rests exclusively with the provinces. This means that the provincial governments, like some of the regional governments in post-Soviet Russia, have played a key role in the development of legislation and policies for managing natural resources. At the same time, however, the federal government has control over off-shore resources and resources located on or below federal lands (including the northern territories), as well as a responsibility to oversee the development of the Canadian economy as a whole. The federal government's use of interprovincial trade, and trade and commerce powers, has also enabled it to legislate in areas of provincial jurisdiction such as the oil and gas sectors.

Oil and Gas Resources in the Circumpolar Region

The Dynamics of Exploiting Oil and Gas Deposits

According to Øystein Noreng (1981), the differences in concessionary terms, taxation levels, and rules between different countries should be understood with reference to the different degrees of maturity of oil provinces. Factors such as discovery rates, field sizes, marginal adversity, and the nature of bargaining between companies and governments differ depending on the level of maturity of a particular field. The level of maturity also affects the kinds of industrial organization preferred and the level of taxation tolerated. A dynamic sequence of four phases of maturity can be identified (see Table 9.1).

Table 9.1

The Evolution of an Oil Province

Parameter	Phase			
	Pre-discovery	Pre-maturity	Maturity	Post-maturity
Knowledge	Low	Rising quickly	High	High
Geological Risk	High	Falling quickly	Low	Rising
Technical Risk	High	Falling quickly	Low	Rising
Marginal Cost	High	Falling	Low	Rising moderately
Case for Innovation	Strong	Weakening	Weak	Strengthening quickly
Operations	Decentralised risk taking required	Rising economies of scale	Economies of scale predominant	Rising diseconomies of scale, benefits of decentralisation
Industrial Organisation	Competitive	Rising oligopoly	Oligopoly strengthened	Oligopoly weakening, more competition
Petroleum Industry Compared to Other Industries	Different, high risk and high reward	Increasingly different by risk and reward	Highly different by risk and reward	Higher risk

Pre-discovery Phase: The first phase, where information is scarce and geological risk is high, as are the potential rewards. The first phase occurs before commercial finds are made and usually lasts several years. The companies willing to take risks in this phase by exploration are large multinational oil companies, independent companies, small newcomers, and state-owned oil companies looking for secure supplies. This phase ends with the first commercial resource discovery.

Pre-maturity Phase: The second phase, where geological knowledge about resources in a particular province improves rapidly, causing a diminishing risk. Companies steadily make more and larger discoveries as their knowledge of the geology improves. Marginal unit costs fall and the development of infrastructure to service the oil province commences. Increasing economies of scale in infrastructure and field development tend to favour the large multinational and state-owned oil companies, both of which strengthen their positions during this phase. The economies of scale also favour co-ordination both within and between large integrated companies. The outcome is usually a less than fully competitive environment, with strong features of oligopoly and vertical control of subcontractors. Independent oil companies and the small newcomers gradually lose out. In this phase, companies consider smaller finds

with less interest, because they anticipate larger discoveries with lower unit costs. After an oil province has been put on the map, risk is much reduced. This phase ends when the size of new finds peaks. This was reached in both the United Kingdom and Norway around 1980.

Maturity Phase: The third phase is the maturity phase, when the discovery rate stabilizes, but where finds gradually diminish in size. It is during this phase that geological knowledge is high, risk is low and marginal unit costs stabilize. The infrastructure is practically completed, which contributes to cost stabilization because it is essentially financed by large fields. Strong economies of scale are clearly apparent in infrastructure and large field operations. Smaller fields may qualify for development, but only usually if they have a favourable location close to the existing infrastructure. In an established, mature oil province with low risk, the large multinational oil companies are in a dominant position together with state-owned companies, in particular, the state oil company of the host country. The outcome is usually an industry dominated by a few companies, co-ordinating activities vertically within themselves and horizontally between each other. The result is that the oligopolistic features of the industry become even stronger and independent oil companies and small newcomers generally find themselves in a fairly weak position. This phase ends when oil production for the first time peaks. This usually indicates an advanced depletion of large fields with production moving to more marginal prospects.

Post-maturity Phase: The fourth phase is the post-maturity phase, where knowledge remains high, but risk rises again. Discoveries essentially consist of small fields or fields with adverse characteristics such as high water content. Smaller, unexploited finds also remain from earlier phases. The infrastructure in place, coupled with the enhanced knowledge and technical and organizational innovation gained from earlier experience, permits the economic exploitation of more marginal fields. The combination of infrastructure, knowledge and innovation usually makes marginal costs stabilize or increase slowly, permitting the prolongation of the post-maturity phase for decades. Economies of scale become gradually less important than low costs, flexibility, and inventiveness. The United States, which contains some of the world's oldest and most mature oil provinces, is the best historical example. Here, oil production dropped significantly after the 1986 oil price decline. Subsequently, the smaller oil companies have managed to restore their oil output to previous levels, whereas the large companies have been unable to do so and hence lose output share.

Table 9.2

Phases of Development and Oil Companies

Type of company	Pre-discovery	Pre-maturity	Maturity	Post-maturity
State owned	Take risk	Participate	Participate strongly	Continue
Large multinational	Wait and see	Take exploration risk	Large share	Pull out
Independent	Take risk	Weaker position	Small share	Rising share
Small Newcomers	Take risk	Lose out	Squeezed out	Coming back

Oil and Gas Resources in the Circumpolar North

The Circumpolar North may contain some of the world's largest oil and gas resources. These resources are located both on land and on the continental shelves. The map at the website (<http://amap.no/maps-gra/jpeg/s10147-1.jpg>) shows some of the major oil and gas fields that are currently being produced as well as those where exploration activities are underway. The key areas with current production are the Norman Wells oilfield on Canada's Mackenzie River, the Prudhoe Bay oilfield on Alaska's Beaufort Sea coast, oilfields in the Nenets, the Yamalo-Nenets and Khanty-Mansiisk Autonomous Districts in Russia, and two oilfields on the Norwegian shelf. In addition, off-shore exploration activities are heading toward production in the Barents Sea, off the northwest coast of Russia, on the Norwegian shelf of the Barents Sea, off the west coast of Greenland, and on the North Slope of Alaska.

Table 9.3

Stages of Resource Development in Northern Oil Regions	
County/ Area/ Field	Development Stage
Canada	
Mackenzie Delta and near shore Beaufort Sea	Pre-maturity
Tar sands on northwest Melville Island, gas on Sabine Peninsula and in offshore Hecla Fields	Maturity
Norman Wells, Mackenzie River	Pre-Maturity
United States	
Prudhoe Bay, Beaufort Sea coast	Maturity, Pre-discovery
Russia	
Nenets-Autonomous Okrug	Pre-maturity
Komi Republic, Yamal-Nenets Autonomous Okrug,	Maturity, maturity
Chukotka sea - offshore area	Pre-discovery
Norway	
Norwegian Sea	Pre-maturity
Barents Sea	Pre-discovery
Greenland	
Nuussuaq, Davis Strait	Pre-discovery

Basic Factors Conditioning and Facilitating the Development of Oil and Gas Resources in the North

Intensive development of oil and gas resources in the North began at the end of the 1960s and at the beginning of the 1970s. In this period, large oil fields were opened in Alaska, Western Siberia and in the Arctic Ocean shelf. One of the fundamental reasons that stimulated the rapid development of the North was the unstable political situation in the countries of the Near and Middle East, the main suppliers of the world's oil and gas resources. Despite the fact that the USSR remained outside the economic system of the Western countries at this time, Soviet oil and gas exports to the countries of Western Europe was one of the most important reasons for the acceleration of the development of oil and gas fields in northwestern Siberia.

Political instability in the Middle East at the beginning of the twenty-first century is once again the driving force behind the present American government's desire to explore and develop oil fields located in the Arctic National Wildlife Refuge and the National Petroleum Reserve in Alaska. In the opinion of analysts, however, an intensification of the development of oil and gas resources within the northern territories of the United States will not solve the problem of guaranteeing energy supplies for the country because the internal demands of the American market are much greater than the potential oil and gas resources located on this undeveloped territory. All the reserves located in the existing territory would only be sufficient to meet six months of the oil consumption needs of the United States. Additionally, this project would require ten years of drilling and development before crude oil could reach American markets. The development of these resources would endanger more than 200 rare northern wildlife species.

Regional Considerations Concerning Oil and Gas Development

In addition to protecting the natural environment from indiscriminate resource exploitation, one of the fundamental rationales behind modern systems of underground resource extraction from the perspective of northern regions is the establishment of systems of social and economic safeguards against the negative consequences of exhausting irreplaceable, mineral, non-renewable resources. To solve this task requires the "inclusion" resource-producing territories in the decision-making process, policies of price-setting, and the formation of effective and competitive environments in the non-renewable resource sector.

All countries and territories that hold oil and gas resources strive to maximize the effect of oil and gas production in the development of local economies and the resolution of social problems such as unemployment. It is worth noting, however, that the principal distinction between the oil and gas sector of Russia and other countries is that, in the Russian oil and gas sector, there remains a very high comparative level of employment (if calculated by number of employees as compared to production output). In Alaska, Norway and other northern oil and gas regions, by comparison, the share of employment in the oil and gas sector is very small. In Alaska, in the 1990s, the share of the oil and gas sector in the regional GDP stood at approximately thirty per cent and employment in that sector did not exceed five per cent of the general population. In the oil and gas sector of the Khanty-Mansiysky Autonomous Okrug, the share of the oil and gas sector in the regional GDP in the 1990s exceeded seventy per cent and the proportion of the population employed in this sector reached almost fifty per cent. During the 1990s, the number of people employed in the oil and gas sector in Russia more than tripled. One of

the main factors is the comparatively low labour cost compared to the level of start-up capital.

In order to strengthen the influence and the role of the oil and gas sector in solving social and economic problems, various different approaches are required. These include stipulating the terms of service and the use of domestic manufacturers and transportation, hiring a local workforce, and developing local labour and transport infrastructure, among other things. These above conditions can only be achieved in their entirety if there is a functioning economy, stable norms and laws, and a state that fulfils its basic responsibilities in guaranteeing that laws are respected. It is for these reasons that the residents of Alaska and its Indigenous populations are not entirely opposed to the planned development of new territories, such as the North Slope, as their past experiences have been relatively positive.

At the same time, in Russia, the ineffective system of controls and of monitoring ecological and social impacts of the oil and gas industry in the 1970s and 1980s became a reason for the populations of the northern territories to oppose new oil and gas exploration and development in the Yamal Peninsula. Past oil and gas development in Northwestern Siberia contributed to the sharp increase in the population of the North; for example, the population of the Tyumen region increased to two million (from one million) following the boom of the 1960s and 1970s. New cities were built in environmentally difficult conditions. In the future, these cities will experience considerable social problems, especially as oil and gas companies operating in market conditions rationalize their labour force and the rate of unemployment rises.

Specific Factors Affecting Oil and Gas Development in Northern Regions

The primary factors that distinguish the oil and gas resources of the North from those of most other regions are the difficult natural and environmental conditions in which they are found. Ocean wells are located in a large, deep seas that are frozen over for long periods of time. Drilling platforms on land are located on continuous permafrost and in environmentally fragile territories.

Since about 1985, the development of new construction technologies for oil and gas rigs and platforms on both land and sea, and new methods of exploration (such as 3-D seismic profiling), have drastically changed our understanding of the economic viability of developing and producing oil and gas fields that were previously considered uneconomical. It should be noted that these advances also create favourable conditions for the emergence and operation of flexible, innovation-oriented, small and medium-sized

companies. Such companies are especially effective in the development of small and remote oil and gas fields, as well as in working in larger oil fields at the final stages of extraction. For example, technological developments and the large reserves of oil and gas located in the Arctic Ocean have allowed Russia to consider drilling in the Pechorsky and Barents Seas and to consider developing the deposits of natural gas in the Obskaya and Tazobskaya Inlets.

Factors Relating to the Transportation of Oil and Gas Resources in Northern Regions

The Basic Forms of Transportation for Oil and Gas Resources

The distinguishing characteristic that shapes oil and gas development in northern regions is the relative distance and isolation of resource deposits from the major markets. The northern regions could never consume all of the oil and gas produced in their territories and, therefore, developing an effective system of transporting hydrocarbons is one of the determining factors in the development of oil and gas fields. Crude oil and natural gas extracted in the North must be shipped south either by pipeline or by ocean tanker. Although there are cases in which hydrocarbons are transported by rail (for example, crude oil shipped by rail from the northern oil fields of the Komi Republic), this method of transportation is relatively rare and relatively expensive.

The cost of transporting oil and gas is comparable to the expense of developing oil and gas fields. For example, it is estimated that the construction of a pipeline from the Mackenzie River deposits in Canada to markets in the south will cost between \$US 2.3 billion and \$US 9.2 billion, depending on the route taken. The building of pipelines and other related infrastructure has direct and indirect influences on industries, the economies, and the social spheres of northern territories. The beneficial effects of construction activity, however, is short—the benefits only last as long as the construction project. As a case in point, Alaska underwent a rapid economic boom between 1973 and 1977 when the Trans-Alaska pipeline was built. In Northwestern Siberia, there was a construction boom that was much stronger and of longer duration. For each of the fourteen years between 1973 and 1986, at least one major construction project was undertaken either for major oil or gas pipelines.

It is worth noting that pipelines play an additional economic role in Russia because they act as rent collectors. The state owns Transneft, the company that runs the system of pipelines, and collects a form of rent from the oil companies. Similarly, the giant oil and gas company Gazprom controls a massive system of pipelines for the transportation of natural gas and acts as a rent collector for the federal government, thereby drastically decreasing the

tax base of the Yamalo-Nenetsky and the Khanty-Mansiisky Autonomous Okrugs where the gas is located.

In the United States, by comparison, the ocean transport of crude oil is increasingly oriented towards the domestic market. The American government prohibits of export Alaskan crude oil and requires that this crude be shipped to the western coast of the United States by American tankers.

Some Examples of Oil and Gas Transportation Projects

Trans-Alaska Pipeline System

The defining issue in the construction of the Trans-Alaska pipeline system was the concern over the environmental dangers that the pipeline would pose. Discussions over the construction of this pipeline system stretched over almost five years and resulted in the implementation of modern engineering and technical solutions to safeguard the environment. In all, the entire project lasted almost ten years and involved the construction of almost 800 miles of pipeline. The cost of the work in 1977 was valued at \$US 8 billion. In October 2001, preparations began for the extension of the contract for the continued use of the existing pipeline over a thirty-year period starting in 2004. All basic materials concerning this project have been made available to the public.

The System of Magisterial Pipelines in Northwestern Siberia

In 1990, the amount of oil and gas extracted in northwestern Siberia exceeded 450 million tonnes and 550 billion cubic meters respectively. In order to transport this colossal quantity of hydrocarbons, a unique system of pipelines was established: in total five oil pipelines and twenty natural gas pipelines extend over 40,000 km. The basic direction of the transport of hydrocarbons is from Eastern and Central Russia to the countries of Central and Western Europe. One massive pipeline that runs for over 2000 km was built in the centre of this pipeline network.

In contrast to the Trans-Alaska pipeline project, environmental and safety concerns received little attention during the planning process in Western Siberia. Discussions concerning the construction of massive pipelines in the North only became public in Russia in the late 1980s during the period of glasnost in the Soviet Union. At the time, public input usually came in the form of protests. It is clear that Russian oil and gas development in the near future will be increasingly constrained by the poor state of industrial pipeline technology, rather than by pipeline routes.

Financial Aspects of Developing Oil and Gas Resources From the Perspective of Northern Regions

Royalties and their Influence on the Process of Developing Oil and Gas Resources

The difference between the market value of the extracted oil and the costs of exploration, development, and extraction, including a normal rate of return for capital, labour and materials, can be considered a free gift of nature. It is this *economic rent* that is usually the target of special petroleum taxation. The economic rent can be seen as the difference between the accounting profits and the return on investment that are required to attract fresh capital and keep the industry going. In simple terms, economic rent is the profits above and beyond the cost of such capital investments.

The division of economic rent between the government-landowner and the company investing in oil extraction is the subject of bargaining which is specific to each situation and is essentially determined by field size and the state of the market. The fiscal measures used can take the form of royalties, excise taxes, or taxes on economic rent. Excise taxes essentially represent a cost element, contributing to a floor below which the market value of oil does not fall. The rise and subsequent decline of economic rent strongly affects the level of profits and the ability of governments to tax. Hence, in the pre-maturity and maturity phases, profits rise quickly and are followed by tax increases. Often, the government will also impose a high degree of state participation. In many cases, the government's objective is to develop a large oil service industry and to use the oil wealth for industrial policy purposes. As maturity advances, and especially in the post-maturity phase, economic rent subsides, particularly in new prospects. Declining profits force governments to reduce tax levels in order to maintain exploration and development. Gradually, in late maturity and post-maturity, the oil industry becomes like an ordinary industry in its return on investment and especially in terms of its treatment by government.

Table 9.3

Economic and Political Parameters of Oil Province Evolution				
<i>Parameter</i>	Phase			
	Pre-discovery	Pre-maturity	Maturity	Post-maturity
Economic rent	Small	Rising	High	Declining
Profits	Modest	Rising quickly	High	Subsiding
Government bargaining position	Weak	Strengthening quickly	Strong	Weakening
Fiscal conditions	Lenient	Tightening	Tight	Loosening
Case for state participation	Weak	Strong	At first strong, then weakening	Weak
Industrial imperative	Strong	Stronger	Weakening	Weak

For northern regions, royalties from the sale of oil and gas are one of the fundamental sources income for economic diversification, building infrastructure, and creating new employment. First, it is important to note that the collection and accumulation of royalties differs in regional and municipal budgets. The “unitarian” model of collection and accumulation of royalties is characteristic of Norway while the northern territories of Canada and Alaska are characterized by a “liberal” model. The “unitarian” model proposes the centralized accumulation of royalty revenues in the state budget. A portion of the royalty revenues are then transferred to regions in the form of transfer payments. By contrast, the “liberal” model proposes that territories immediately receive royalty revenues upon their payment. At that time, the distribution principles of such revenues is usually based on the status of the oil producing territory and for this reason, for example, in Alaska and in Canada, royalty revenues are paid directly to First Nation bands (or municipalities) and families. At present, Russia is located somewhere between the unitarian and the liberal models. The regions receive substantially more revenue than they did in Soviet times when the system of revenue collection was highly centralized. However, due to practices such as transfer pricing (tolling)¹ and the fact that the federal government collects a large proportion of royalty

¹ Transfer pricing can take many different forms, all of which affect the level of revenues collected. For example: lower values can be assigned to produced oil products in the early stages of development (usually, at the stage of extraction and primary transformation of crude oil); internal payment schemes can be utilized to benefit companies (promissory notes in lieu of cash payments); different stages in the scheme of internal tolling (exchange crude for tolling) can be implemented; and crude and materials can be purchased at an earlier stage of transformation and the final transfer of crude can take place at the stage of basic scheme of internal tolling.

revenues (60%–80% of the total), oil producing regions such as the Yamalo-Nenetsky, Khanty-Mansiisky, Nenetsky Autonomous Okrugs and the Komi Republic have not received the colossal sums that are owed to them. The absence of such sums of money has restricted the ability of Russia's northern regions to engage in the diversification of their economies and create new employment opportunities. On the whole, therefore, the northern regions of Russia are not in a position control and manage their economic futures as is the case in other regions such as Alaska and northern Canada.

Conclusion: Can We Speak of a “Northern” Model of Oil and Gas Development?

While it is difficult to speak of a “northern” model of oil and gas developed based on such parameters as the position of the state in the resource industry and the nature of royalty collection, there are a number of distinct characteristics which distinguish oil and gas development in the North from other regions in the world. These characteristics include:

- much higher requirements of basic technology and expertise in order to cope with the difficult geological and climatic conditions in northern regions
- the leading role of, and difficulties associated with, transportation of oil and gas to distant markets
- the delicate nature of the northern environment
- dependency of northern communities on resource production and questions surrounding the issue of economic diversification

Due to the fact that there are substantial untapped oil and gas reserves in northern regions, resource development in the North will only grow in importance as existing reserves in the South become depleted. It is the responsibility of the governments administering these northern regions (at the central, regional, and local levels) to not only ensure that the people living in the North can participate in the political decision-making processes concerning subsoil resources, but that the exploitation of the oil and gas resources located in the North is conducted in a measured and environmentally friendly manner.

Study Questions

1. Compare the role of the state in the two basic models of resource development.
2. Illustrate your answer with examples taken from the text.

3. Describe the four stages in the evolution of an oil province.
4. What are some of the social, political and economic considerations affecting oil and gas development in northern regions?
5. What are the most common methods of transporting oil and gas from northern regions to major markets? Use examples from the text to illustrate your answer.
6. Compare the two basic models of royalty collection. How would you characterize the current system in place in Russia and why?

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Internet Resources

Explore North: <http://www.explorenorth.com/resources.html>

World Conservation Monitoring Centre-United Nations Environmental Program: <http://unep-wcmc.org>

Canada

Department of Energy, Mines and Resources, Government of the Yukon: <http://www.economicdevelopment.yk.ca>

Northern Oil and Gas, Department of Indian Affairs and Northern Development: http://ainc-inac.gc.ca/oil/index_e.html

Norway

Ministry of Petroleum and Energy: <http://www.mpe.dep.no>

Norwegian Petroleum Directorate: <http://www.npd.no>

Russian Federation

Ministry of Natural Resources: <http://geol.msu.ru/rgs>

United States

American Petroleum Institute: <http://api.org>

Arctic National Wildlife Refuge, 1002 Area, Petroleum Assessment, 1998, United States Geological Survey: <http://geology.cr.usgs.gov/pub/fact-sheets/fs-0028-01>

Division of Oil and Gas, Department of Natural Resources, State of Alaska: <http://www.dog.dnr.state.ak.us/oil>

