

MODULE # 2

RUSSIAN ENERGY POLICY & INTERNATIONAL ENERGY COOPERATION

MODULE OVERVIEW:

The Module is designed to familiarize students with the history and current shape of Russian oil and gas industry, its main drivers and possible future trends in its development.

The Module encompasses structural factors that have defined the industry since Soviet era, current corporate and competitive landscape, legislative and taxation regime that has an everyday impact on decision-making process of the industry's top management. The Module emphasizes the role of host governments, fiscal regimes and legal framework regulating development and production of energy resources.

The purpose of the Module is to assist students in the acquisition of broad spectrum of knowledge and facts allowing them to have an insight into the way business practices operate in a national, international and global context in the oil and gas industry.

Description of the Module core courses:

“INTERNATIONAL BUSINESS ENVIRONMENT FOR THE OIL & GAS SECTOR & CURRENT ENERGY POLICY OF RUSSIA”

COURSE DESCRIPTION AND TEACHING METHODS

1.1 The place and role of the Course in the overall curriculum:

The Course “International Business Environment for the Oil and Gas Sector & Current Energy Policy of Russia” is designed for undergraduate and graduate students who aspire to work in the Energy sector and who have a particular interest in the Oil & Gas or related sectors. The Course can be also attended by High School students as well as by PhD students.

The Course is specifically designed to prepare students for employment in major oil and gas development and production projects, including off-shore projects in the North, Barents and Kara Seas and in the High North in general. For this purpose students get closely familiarized with managerial and economic aspects using the example of the Norwegian “Snow-white” and Russian “Shtockman” mega projects.

A part of the Course focuses on current trends, purposes and challenges facing the production of hydrocarbons in Russia. It emphasizes the role of the Russian government, current fiscal regime and legal framework regulating development and production of energy resources in Russia in broad comparison with the best practices recognized by the international oil and gas community. It also describes the special role played by Russian major resource companies in economic development of the country.

In general terms, the Course is designed to contribute to preparing participants for managerial, advisory and academic positions in the energy sector - private sector and government, for efficient work at central governmental and municipal offices, at structures where graduates are engaged in entrepreneurial activities creating and developing their own businesses, at research institutions addressing and solving managerial problems for the Energy sector, at institutions of higher learning educating specialists for international energy cooperation.

It is also designed to develop self-confidence and the ability to present efficient, logical answers to complex problems; to give students methodological and problem solving skills designed to assist decision making in business situations. The Course will facilitate discussion, debate, and analysis of business issues and problems within an international environment and develop transferable skills particularly in working with groups as well as in presentation and communication skills.

The Course aims to provide an intellectually challenging academic plan of study, which will demand of the student the ability to analyze, synthesize and evaluate key theoretical concepts and practical applications in energy with an emphasis on the economic and managerial dimensions of the subject. This will prepare students for success in the rapidly evolving and highly competitive global business climate that characterizes the energy sector.

This interdisciplinary Course includes economic, legal, political, governmental, financial, technological and cultural issues related to international business in the energy sector. It focuses on opportunities for, threats to, and options facing the multinational or multicultural business enterprises (international vertically integrated oil and gas companies) planning to invest in major energy projects worldwide.

The Course also discusses issues which are seemingly unrelated to the energy sector, but in reality produce immense direct and indirect impacts on the international business environment for the energy sector.

1.2 The Course goals and objectives:

“The International Business Environment for the Energy Sector & Current Energy Policy of Russia” is an applied specialized field of study.

Course objectives are:

1. To enable students to combine a range of business and managerial subjects;
2. To assist students in the acquisition of broad spectrum of knowledge and facts about all facets of business in the world fuel & energy sector;
3. To allow them to have an insight into the way institutions and business practices operate in an international and global context in the energy sector.

1.3 Learning outcomes:

On completion of this course, graduates will have the ability:

1. To understand causal relationships between various economic, fiscal, political and technological variables, factors and conditions affecting business operations and behavior of energy companies.
2. To have a vision of major components underlying strategic decision-making in doing business in the energy sector and develop some skills of advising on investment issues.
3. To use instruments enabling them to critically analyze the international environment for transnational investment, foreign economic, cultural, and political environments and their impact on international oil and gas business;
4. To know how to attract foreign investments in the energy resources development process.

1.4 Course requirements:

The Course provides education and in-depth knowledge in the following fields: energy resources development management based on the principles of sustainable development; political, ethnic, economic and other risk analyses in the course of implementing oil and gas projects. It is **competence-focused** and provides for a broad application of active and interactive forms of classes, including dialog-type lectures, discussions, case analyses and group discussions. Interactive classes amount to 30 % of the Course.

Directed and additional readings will be provided at the beginning of the course.

Learning methods include interactive lectures, case-studies, directed reading, and project work.

The course is assessed individually. Assessment is based on verbal presentations of analytical reports.

Grading Plan:

Class participation, test discussions	60 %
Project research (development of an analytical report)	20 %
Verbal presentations of analytical report (in class, 15 minutes)	20 %

2. COURSE CONTENTS

2.1 Types of work

Types of work	Academic hours	Credits
Total	22	2
Total for lectures & seminars	22	
Written exam	-	
Homework	8	
Essay (Project)	8	
Preparation for seminars	-	
Course works	Project research (development of an analytical report)	
Course assessment	The course is assessed individually. Assessment is based on verbal presentations of analytical reports	

2.2 Course outline

Course Outline	Academic hours			
	Lectures	Seminars	Home work	Total hrs. per topic
1. Petroleum Basics Petroleum Formation, Sedimentary Basins, How Oil & Gas Industry Operates. Upstream, Midstream, Downstream Sectors. Geophysics & Geological Exploration. Drilling and Oilfield Services. Oil Refining; Reserves/resource Classification Schemes Used in Russia and Western Countries: A Review And Comparison. Definitions and Guidelines for Classification of Oil and Gas Reserves. Reserve Assets. Assessment of the Economic Viability of an Oil and Gas Project	2		1	3
2. Mineral Rights Management and Development of Energy Resources in a Federal State. Issuance and Management of Exploration Licenses, Significant Discovery Licenses and Production Licenses. Rights Issuance Process. Call for Nominations. Call for Bids. Issuance and Management of Licenses. Incorporation of Aboriginal, Environmental and Northern Interests in the Mineral Rights Management Regime. Revocation of Licenses. Public Hearings and Environmental Impacts Assessment of Energy Projects. Building Good Community-Company Relations. "Sakhalin II" Case-study. World Bank Directives Regulating Implementation of Bank-Assisted Projects which Have an Impact on the Lands and Resources Occupied or Used by Indigenous Peoples. Co-Management of Natural Resources. Impacts Benefits Agreements – "Lukoil Case-study"	2		1	3
3. Stages of an Oil and Gas Venture Mineral interest acquisition/contracting. Exploration (Exploration Surveying, Exploration Drilling). Commercial Discovery. Appraisal. Development. Production. Other Upstream Exploration and Production Activities. Decommissioning and Rehabilitation. Procurement, Installation of equipment. Installation of pipelines.	2		1	3
4. Petroleum Revenue Management Fair Share for the State; Progressive Taxation; Cost Containment;	2	2	1	5

Timing and Stability of Tax Revenues; Federal/Regional Revenue Sharing; Legal Framework for Resource Revenues. Economics of Petroleum Revenue. Resource Rent. The Investor's Required Rate of Return. A "marginal" project. A "profitable" project. Special Factors Affecting Taxable Rent. "Dutch Disease": the failure of petroleum wealth to lead to development. Uncertainties: Geologic uncertainty, Production uncertainty, Price uncertainty, Cost uncertainty, Investment uncertainty, Technological uncertainty, Strategic uncertainty. Setting the Price of the Resource. Fiscal Policy and Resource Revenues. Operations of Resource-related Funds. Taxes and Windfall Gains. Production Sharing Agreements. Predictability of fiscal regime for petroleum. A fiscal regime for petroleum and the pace, intensity and efficiency of petroleum development. Tax Burden and Tax Structure: progressive tax structure, regressive tax structure, average tax burden. Tax Instruments: Profits-based Taxes, Revenue and Excise Taxes, Flexible Taxes, Cost Recovery Provisions, Bonuses, Environmental Penalties and Incentives. Other Elements of the Regime: Ring-fencing, Indirect Taxes, Bonuses and Nontax Payments. Equity Participation. National Resource Companies. Quasi-Fiscal Activities (QFAs) of Resource Companies.				
5. Resource Base of Russia Reserves and resources of hydrocarbons. Midstream logistics (transportation pipelines) Russia in the oil and gas markets. Europe and APR. Ice-free and Ice-bound hydrocarbon production activities. Russia in the Arctic off-shore. Regulatory regime and international institutions in the Arctic. Rosneft and Gazprom Arctic ambitions.	2		1	3
6. Current Energy Policy of Russia Current trends and perspectives defining the energy strategy of Russia. Official energy policy doctrine. Legal Acts. Socio-economic development of the Russian Far East and Western Siberia: the role of Gazprom and Rosneft. Russia & China, Japan, EU	2		1	3
7. Competitive Advantage and Organizational Structure. Mergers and acquisitions. Global Strategic Alliances. Process for Formulating a Competitive Strategy. Global Industries.		2	5	2
8. Identification of Topics for Analytical Reports		2	5	2
9. Shale Gas Revolution: is it Global or Confined to America? Shale Gas Production: Pros & Cons. Role in the Ukrainian Crisis. Discussion & Assessment of Students' Presentations		4	3	7
TOTAL (22)	12	10	19	41

UPSTREAM & DOWNSTREAM SECTORS IN RUSSIA: CURRENT SITUATION (14 hours)

Professors Bogdan Volostrigov and Stanislav Michailov

CONCEPTS OF OIL INDUSTRY

Periods of Industry's development

This class starts with a short crash course explaining the basic terms and concepts of oil industry, essential for facilitating further discussion: what are the stages of oil production, basics of oil refining and marketing, oil product pricing and other important concepts. The second section covers the main periods of industry's development during pre-soviet and soviet era, timeline of oil discoveries, main forces, driving the growth of oil business in Russia, outlining major traits

that found their way into the current state of the industry. The third section deals with major restructuring that was imminent after the fall of the Soviet Union.

Readings:

1. Yergin Daniel. The Prize. The Epic Quest for Oil, Money and Power – Free Press, New York, 1992
2. LeVine, Steve. The oil and the glory: the pursuit of empire and fortune of the Caspian sea / Steve LeVine – Random House Inc., New York, 2007
3. Goldman, Marshall I. The Piratization of Russia: Russian Reform Goes Awry / Marshall Goldman – Routledge, London, 2003

Russian Oil Majors

This class deals with competitive landscape of the Russian oil business, covering all major companies operating on the market. It has a section, devoted to each of the Top 5 major Russian oil companies, including upstream assets, downstream portfolio (refineries, marketing regions, access to export terminals), strengths and weaknesses and future strategies.

Russian oil companies boast different backgrounds in terms of creation and development, as well as various shapes, sizes and structures, and are a great tool for learning the typical patterns that are prevalent in the industry.

Readings:

1. Corporate web-sites of Rosneft, LUKOIL, TNK-BP, Gazprom Neft and SurgutNefteGaz
2. Annual reports of Rosneft, LUKOIL, TNK-BP, Gazprom Neft and SurgutNefteGaz

Downstream: Basics of Petroleum Refining

Within this class we will learn the key link in the Downstream value chain of the vertically integrated oil company. Typically neglected by Energy Studies teachers in their classes, refining still has a lot of relevance for understanding how the industry works.

During this class you will learn how refineries add value to the crude oil, what processes are used for production of oil products, how refineries price their products. Extremely important and industry-driving concepts of Refining Margin and Netback are introduced here as well.

Readings:

1. Jean-Pierre Wauquier, Jean-Pierre Favennec, Petroleum Refining: Refinery operation and management
2. William L. Leffler, Petroleum refining in nontechnical language, Fourth edition
3. http://www.eoearth.org/article/Petroleum_refining
4. http://en.citizendium.org/wiki/Petroleum_refining_processes

Downstream: Marketing and Retail

“Marketing” in *oiler-ese* means “small wholesale and retail sales”, mainly through gasoline filling stations. This sphere differs from the rest of the industry so dramatically, that it deserves its own chapter. This lecture covers the place Marketing has on the value chain, its advantages as a supply channel, and some specific tips on what makes a great filling station.

Readings:

http://www.nacsonline.com/NACS/Resources/campaigns/GasPrices_2009/Documents/AAAPresentation_030609.pdf

Downstream: Industry -- The Bigger Picture

This class primarily deals with main distinctive features of Russian oil industry in its current form. We compare Russian oil industry to its US counterpart and learn a lot about both: how does orientation on production or consumption shape the structure of the industry? What is more beneficial for the industry: being artificially engineered by Gosplan, or emerging under wild capitalism? What is a “supply envelope” and how it influences pricing? What are key infrastructural constraints that hold Russian industry back? How comes that Russian refineries are much older and obsolete, but are much more profitable than Western? This class answers this and many other questions.

GOVERNMENT POLICIES IN THE OIL INDUSTRY

Downstream: Government and Taxation

In Russia, the government has been extremely influential in managing the oil industry, since the industry itself is of utmost strategic importance to the country. The government has a set of efficient tools at its disposal, that it utilizes to achieve its goals.

The class covers the goals that the government pursues both in short-term management and on long-term strategic basis. Special attention is paid to export duty: the variable that has the highest influence over strategic decisions in the industry. The class also covers excises, fuel quality regulations and anti-trust measures as major sources of governmental influence on the markets.

Readings:

Taxation Code of the Russian Federation

PROBLEMS AND PROSPECTS

Downstream: Problems and Prospects

It's apparent that an industry that has been developing under such drastic conditions has a lot of burning issues of structural, modernization and "attitude" origins. Within this class we examine these problems, pointing out unavoidable constraints and ways to work around those. We will also touch upon measures, that would help mitigate technical and technological lag that is typical for Russian oil industry. The lecture will examine the flaws in current strategies of companies and governments that may lead the industry into the abyss if not dealt with in timely fashion..

INTERNATIONAL ENERGY SECURITY: RUSSIAN PERSPECTIVE (12 hours)

Professor Nikolai Mironov

Nikolai Mironov

Director, Section of International Organization, Department of Economic Cooperation, Ministry of Foreign Affairs of the Russian Federation.

PhD (Economics), Associate Professor, Department of International Issues in Fuel and Energy Industry, MIEP MGIMO-University.

Area of expertise: IEA, OPEC, Forum of Gas Exporters, World Energy Forum, Energy diplomacy in the Caspian area and APR.

SHTOCKMAN PROJECT, RUSSIAN – NORWEGIAN ENERGY COOPERATION (4 hours)

Professor Andrey Krivorotov- Expert of Russian-Norwegian cooperation.

Position - Board of Directors' Secretary, Shtockman Development AG.

Shtokman Development AG is a joint venture registered on 15th of February 2008 for financing, design, construction and operation of the first phase Shtokman gas condensate field development.

PJSC Gazprom holds 100% of Shtokman Development AG shares.

The Company Headquarters is located in Zug, Switzerland. Company branches are opened in Moscow, Teriberka village, Murmansk region.

Shtokman Development AG will be the owner and the operator of the first phase infrastructure of the Shtokman gas condensate field for 25 years after its commissioning.

Phase 1 of the development will provide production of 23.7 billion cubic meters of natural gas per annum.

The Shtokman structure (field) was identified in 1981 from offshore geophysical surveys performed by Sevmorneftegeofizika specialists on board the research vessel *Professor Shtokman*, which gave its name to the field. Geological study of the field was launched at the same time. In 1985 the structure was made ready for evaluation by drilling. In 1988 the first exploration well, with a design depth of 4500 meters, was drilled. Drilling was completed on July 27, 1988 at

3153 meters. Well testing resulted in the discovery of two formations of free gas and gas condensate, and as of January 1, 1989 more than 2.4 trillion cubic meters of commercial-grade free gas was added to the State reserves balance. The field is located in the central part of the shelf zone in the Russian sector of the Barents Sea.

Basic field characteristics:

- Field discovered in 1988
- Located 550 km from shore
- Proved reserves of natural gas in the Shtokman field are among the largest in the world. The geological reserves of the field are 3.8 trillion cubic meters of gas and around 53.3 million tonnes of gas condensate.
- Sea depth is 340 m
- Wave height is up to 27 m
- Annual temperature range from -50°C to $+33^{\circ}\text{C}$
- Presence of icebergs weighing up to 4 million tonnes

OPTIONAL COURSE

“DEVELOPMENT OF ARCTIC ENERGY RESOURCES: CHALLENGES & PERSPECTIVES”

PART 1. COURSE DESCRIPTION AND TEACHING METHODS

1.5 The place and role of the Course in the overall curriculum:

The region above the Arctic Circle accounts for only about 6% of the Earth’s surface area, but it could account for as much as 20% of the world’s undiscovered but recoverable oil and natural gas resources. The existence of hydrocarbon resources in the Arctic has been known for decades, but only in recent years has the opening to full-scale resource development and navigation - such as the fabled Northwest Passage that would connect the Atlantic and Pacific Oceans, or the Northern Sea Route that will connect Europe and western Russia with eastern Russia and Asian markets - become technically and economically feasible.

Only about one-third of the Arctic is covered by land; another third consists of the offshore continental shelf, with waters generally less than 500 meters deep and the remaining third comprise ocean waters, typically deeper than 500 meters. Much (if not most) of the Arctic waters are currently ice-covered for most of the year. However, the polar ice cap has been noticeably receding in recent years, quite possibly as a consequence of global climate change.

The Arctic region contains portions of eight countries - Canada, Denmark/Greenland, Finland, Iceland, Norway, Russia, Sweden and the United States. Finland and Sweden do not border on the Arctic Ocean and are the only Arctic countries without jurisdictional claims in the Arctic Ocean and adjacent seas.

Large oil and natural gas fields are particularly important in reducing the cost to develop Arctic resources because they help pay for the infrastructure required for smaller fields. Large Arctic oil and natural gas discoveries began in Russia in 1962, with the discovery of the Tazovskoye Field, followed in 1967 with the discovery of the US Alaskan Prudhoe Bay Field. Approximately 61 large oil and natural gas fields have been discovered so far within the Arctic Circle - 43 are in Russia, 11 in Canada, 6 in Alaska and 1 in Norway.

The Arctic Ocean represents the next exploration frontier for oil and gas. Over the next two decades it will succeed the current delivery from deepwater exploration in terms of discovered volumes. Given this context it is important for IOCs, NOCs and Arctic states to build a widely shared understanding of the present Arctic context. The risks and impacts of Arctic offshore development must be clearly identified. It should be demonstrated that those risks and impacts are being properly managed and mitigated by way of improving the existing industrial context and the evolution of the oil and gas industry in the Arctic Littoral region; engineering practices that will be required by companies operating in the Arctic in the future. The industry and

governments must show the local and global community that the Arctic Ocean can be developed safely and sustainably.

The Course “Development of Arctic Energy Resources: Challenges & Perspectives” is designed for master students who aspire to work in the Energy sector and who have a particular interest in the Oil & Gas or related sectors.

The Course is specifically designed to prepare students for employment in major oil and gas development and production projects in the off-shore areas in the North and Barents Sea and in the High North in general. For this purpose master students get very closely familiarized with managerial and economic aspects of such mega projects as “Snow-white” in Norway and “Shtockman” in Russia.

In general terms, the Course is designed to contribute to preparing participants for managerial, advisory and academic positions in the energy sector - private sector and government, for efficient work at central governmental and municipal offices, at structures where graduates are engaged in entrepreneurial activities creating and developing their own businesses, at research institutions addressing and solving managerial problems for the Energy sector, at institutions of higher learning educating specialists for international energy cooperation.

It is also designed to develop self-confidence and the ability to present efficient, logical answers to complex problems; to give students methodological and problem solving skills designed to assist decision making in business situations. The Course will facilitate discussion, debate, and analysis of business issues and problems within an international environment and develop transferable skills particularly in working with groups as well as in presentation and communication skills.

The Course aims to provide an intellectually challenging academic plan of study, which will demand of the student the ability to analyze, synthesize and evaluate key theoretical concepts and practical applications in energy with an emphasis on the economic and managerial dimensions of the subject. This will prepare master students for success in the rapidly evolving and highly competitive global business climate that characterizes the energy sector.

This interdisciplinary Course includes economic, legal, political, governmental, financial, technological and cultural issues related to the business of developing and producing energy resources a very special environment of the Arctic. It focuses on opportunities for, threats to, and options facing the multinational or multicultural business enterprises (international vertically integrated oil and gas companies) planning to invest in major energy projects in the Arctic, mainly offshore. The Course emphasizes the role of host governments, fiscal regimes and legal framework regulating production of energy resources in the Arctic offshore.

1.1 The Course goals and objectives:

Course objectives are:

1. To enable students to combine a range of business and managerial subjects;
2. To assist students in the acquisition of broad spectrum of knowledge and facts about all facets of business and technologies in the Arctic;
3. To allow them to have an insight into the way institutions and business practices operate in the oil and gas sector in the Arctic.

1.2 Learning outcomes:

On completion of this course, graduates will have the ability:

1. To understand causal relationships between various economic, fiscal, political and technological variables, factors and conditions affecting business operations and behavior of energy companies engaged in development of Arctic energy resources.
2. To have a vision of major components underlying strategic decision-making in doing business in the Arctic offshore.
3. To use instruments enabling them to critically analyze ecological, economic, cultural, and political environments and their impact on international oil and gas business in the Arctic;

4. To know how to attract foreign investments in the Arctic energy resources development process.

1.3 Course requirements:

The Course is **competence-focused** and provides for a broad application of active and interactive forms of classes, including dialog-type (interactive) lectures, discussions, case analyses and group discussions. Interactive classes amount to 50 % of the Course. Students will be required to attend at least 90% of classes and be prepared for discussions at scheduled workshops. Teaching is organized on a module basis, involving 36 hours of student effort and 18 hours of classes. It is delivered within one semester of 14-week duration. Directed and additional readings will be provided at the beginning of the course. Conscientious reading of the assigned materials is compulsory. The course is assessed individually. Assessment is based on verbal presentations of analytical reports. The report is a paper analyzing one or more aspects of the oil and gas business in the Arctic offshore of the student's choice, discussed in class and submitted as a Power Point presentation.

1.4. Grading Plan:

Class participation, test discussions	60 %
Project research (development of an analytical report)	20 %
Verbal presentations of analytical report (in class, 15 minutes)	20 %

PART 2. COURSE CONTENTS

2.1 Types of work

Types of work	Academic hours	Credits
Total	18	2
Total for lectures	8	
Seminars	10	
Written exam	-	
Homework	36	
Essay (Project)	16	
Preparation for seminars	20	
Course works	Project research (development of an analytical report)	
Course assessment	The course is assessed individually. Assessment is based on verbal presentations of an analytical reports	

2.2 Course outline

Course Outline	Academic hours			
	Lectures	Seminars	Homework	Academic hours per topic
1 Arctic Geography; Arctic Energy Resources, Infrastructure and Navigation: an Overview	2		2	4
2 Offshore Operations in the Arctic: Major Challenges. Competition for International Investments in the Oil & Gas Sector.	2		2	4

3 Sustainable Development of Arctic Hydrocarbon Resources and Incorporation of Indigenous Interests. Environmental Impact Assessment in Arctic States.		2	7	9
Round-table Discussion: Oil and Gas Activities in the Arctic Offshore : by Companies and by States.		2	7	9
Round-table Discussion: Arctic Offshore Energy Resources Development Concepts. Strategic Innovations in the Oil and Gas Sector: Subsea Production Systems, Production of Unconventional and Difficult to Recover Resources.		2	7	9
4 Multilateral International Cooperation and Strategic Stability in the Arctic. Regulatory Regimes in the Arctic Offshore. International Arctic Institutes.	2		2	4
5 International Regulation of Oil and Gas Economic Activities in the Arctic. Taxation of the Oil and Gas Sector in the Arctic.	2		2	4
Students' Presentations on Topical Issues: Arctic States' Policy Regarding the Development of Energy Resources (including Norway and Russia).		4	7	11
TOTAL (18)	8	10	36	54

2.3. Course Contents

Arctic Energy Resources: an Overview

The region above the Arctic Circle accounts for only about 6% of the Earth's surface area, but it could account for as much as 20% of the world's undiscovered but recoverable oil and natural gas resources.

Only about one-third of the Arctic is covered by land; another third consists of the offshore continental shelf.

Much (if not most) of the Arctic waters are currently ice-covered for most of the year.

The Arctic region contains portions of eight countries - Canada, Denmark/Greenland, Finland, Iceland, Norway, Russia, Sweden and the United States. Finland and Sweden do not border on the Arctic Ocean and are the only Arctic countries without jurisdictional claims in the Arctic Ocean and adjacent seas.

Large oil and natural gas fields are particularly important in reducing the cost to develop Arctic resources because they help pay for the infrastructure required for smaller fields. Arctic as a Prize in Competition for International Investments in the Oil & Gas Sector. The Arctic Ocean represents the next exploration frontier for oil and gas. Over the next two decades it will succeed the current delivery from deepwater exploration in terms of discovered volumes. It is important for IOCs, NOCs and Arctic states to build a widely shared understanding of the present Arctic context. The risks and impacts of Arctic offshore development must be clearly identified. It should be demonstrated that those risks and impacts are being properly managed and mitigated by way of improving the existing industrial context and the evolution of the oil and gas industry in the Arctic Littoral region; engineering practices that will be required by companies operating in the Arctic in the future. The industry and governments must show the local and global community that the Arctic Ocean can be developed safely and sustainably.

Arctic Infrastructure and Navigation

The existence of hydrocarbon resources in the Arctic has been known for decades, but only in recent years has the opening to full-scale resource development and navigation - such as the fabled Northwest Passage that would connect the Atlantic and Pacific Oceans, or the Northern Sea Route that will connect Europe and western Russia with eastern Russia and Asian markets - become technically and economically feasible. LNG and pipe-line projects.

Offshore Operations in the Arctic: Major Challenges

The Arctic Ocean Challenging conditions

Sea ice

Freezing temperatures

Wind and waves

Fog and seasonal daylight

Oil spill response gap

Limited infrastructure

Ice - the most unique challenge to operational safety;

Darkness and extreme cold for six months of the year and the region's extreme remoteness.

To respond to these challenges, the industry needs to develop new knowledge, technology, and capability in the areas of the Arctic environment itself; the dynamics of ice and the engineering required to deal with it; the engineering concepts needed for oil and gas exploration and development among ice, and below it.

Regulatory Regimes in the Arctic Offshore

International Convention on the Law of the Sea

Regulation of Exploitation of Transboundary Resources

Russian and Norwegian Arctic Cooperation

Former Disputed Zone;

“Snow-White” and “Shtockman” Projects

Sustainable Development of Arctic Hydrocarbon Resources and Incorporation of Indigenous Interests

Principles of Sustainable Development of Energy Resources as Applied to the Arctic

Incorporation of Indigenous Interests in the Concept of Development of Arctic Energy Resources

Role of the Arctic Council, ICC, RAIPON

Arctic Offshore Energy Resources Development Concepts

FPSOs

Subsea Production Systems

Arctic seasonal drilling limits

Arctic OCS well capping and containment system performance standards

Arctic OCS emergency plans

Polar Class support vessel requirements for Arctic oil spill response

Protection of Arctic resources of special economic, cultural, or environmental importance

Public and joint agency review process for Arctic oil spill response plans

Arctic OCS oil removal benchmarks

Oil spill recovery calculations and minimum equipment requirements for the Arctic OCSA

Oil and Gas Activities in the Arctic Offshore : by Companies and by States

Activities of Rosneft, Statoil, Eni, BP, and ExxonMobil

Activities in Russia, Canada, Norway, Greenland, USA

Environmental Impacts Assessment Process of Major Production Projects in the Arctic Offshore

Arctic environmental standards

Principles to guide Arctic policy and management decisions

Local communities have a meaningful voice in decision-making

Safeguard ecosystem health and a subsistence way of life

Require that science guide decision-making

Arctic in the Global Context

Futures Source of Energy Resources

Strategic Route and Access to Sea Resources

International Law as Applied to the Arctic

Arctic Claims: the Arctic Council States, Japan, China, and South Korea.

Identification of Topical Issues for Analytical Reports

The presentations can be prepared in groups of two or three and should analyze the issues discussed in lectures or at round table discussions. The students should provide a specific, independent and substantive analysis.

Presentations with description but no analysis will receive a low grade.

The report should:

- include only that background information that is relevant for the issue being reviewed;
- the company information and presentation of the problem should be clearly separated from the analysis;
- the report should contain analysis, rather than background data.

Students' Presentations on Topical Issues

The audience actively participates in discussion and offers a critical assessment of the presentation. Such discussions are also designed for broadening of the students' outlook.

2.4 Exam Timing

- **Fall semester – the last but one week of December;**
- **Spring semester – last week of May- early June**

2.5 Reading List

Directed Reading

“Recent Developments in Arctic and Ice Management Technologies”

Mikko Niini, President, Aker Arctic Technology Inc, Finland, 2013

“Arctic Operations and Technologies” DNV, Oslo, Norway, 2012

“Arctic Standards. Recommendations on Oil Spill Prevention, Response, and Safety in the U.S. Arctic Ocean” the PEW Trust Report, September, 2013

“ARCTIC OFFSHORE TECHNOLOGY ASSESSMENT” Xiaobing Shi and Walter Rodriguez, American Global Maritime Inc., 11767 Katy Freeway, Suite 660, Houston, TX 77079, June 2011

“ARCTIC OFFSHORE OIL AND GAS GUIDELINES”, ARCTIC COUNCIL, 2009

“Основы государственной политики РФ в Арктике на период до 2020 года и на дальнейшую перспективу” Пр. 19.9.2009

“THE NORWEGIAN GOVERNMENT’S HIGH NORTH STRATEGY” Norwegian Ministry of Foreign Affairs, 2012

“STATEMENT ON CANADA’S ARCTIC FOREIGN POLICY - Exercising Sovereignty and Promoting Canada’s NORTHERN STRATEGY Abroad” Federal Government of Canada, 2010

“Denmark, Greenland and the Faroe Islands: Kingdom of Denmark Strategy for the Arctic 2011– 2020” Copenhagen, Ministry of Foreign Affairs of Denmark, 2011

General Reading

Arctic Council, Guidelines for Environmental Impact Assessment (EIA) in the Arctic, 1997.

Feasibility Study Report—The Russian/American/Norwegian Project, Safety and Environmental Regime for Russian Offshore Oil and Gas Operations, 1998.

Minerals Management Service, Offshore Minerals Management Strategic Plan.

Minerals Management Service, Proposed Final Outer Continental Shelf Oil & Gas Leasing Program 1997 to 2002: Decision Document, August 1996.

President's Council on Sustainable Development, Towards a Sustainable America: Advancing Prosperity, Opportunity, and a Healthy Environment for the 21st Century, May 1999.

Optional Reading

Daniel, James A., 2003, "Hedging Government Oil Price Risk," in Davis, Ossowski, and Fedelino, Fiscal Policy Formulation.

Daniel, Philip, 2002, "Petroleum Revenue Management. An Overview," paper prepared for the World Bank, Washington DC

Daniel, Philip, 1995, "Evaluating State Participation in Mineral Projects: Equity, Infrastructure and Taxation," in Otto, 1995.

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