



2014 North Pacific Arctic Conference Proceedings



The Arctic in World Affairs

*A North Pacific Dialogue on International Cooperation
in a Changing Arctic*

Edited by

*Oran R. Young
Jong Deog Kim
Yoon Hyung Kim*



The Arctic in World Affairs: A North Pacific Dialogue on International Cooperation in a Changing Arctic addresses future cooperation in five areas: patterns of Arctic investment, national Arctic strategies, Arctic state/non-Arctic state engagement, innovations applicable to the Arctic and indigenous responses to Arctic development. Bringing together prominent experts from the three North Pacific Arctic coastal states (Canada, Russia, and the United States) and three leading North Pacific non-Arctic states (China, Japan, and Korea), the book goes beyond generalities; it attempts to identify and evaluate the effectiveness of innovative measures that will contribute to maintaining the Arctic as a zone of peace and promoting sustainable development in this region.

Regarding patterns of Arctic investment, the book addresses Arctic natural resource development and linkages to global markets using Arctic shipping as a prominent example, but also taking a broader perspective on business and the investment environment in the Arctic.

On national Arctic strategies, the book compares the national Arctic strategies of key Arctic states (Canada, Russia, and the U.S.) and those of key non-Arctic states (China, Japan, Korea), focusing on the main themes of these strategies and prospects for their implementation. Comparing national Arctic strategies will provide an understanding of the driving forces and interests behind Arctic policy formulation.

In the case of Arctic state/non-Arctic state engagement, the book examines the efforts of non-Arctic states to play a role in addressing Arctic issues. The book briefly identifies areas of interest and priority issues for China, Japan, and Korea, and will review any previous experiences with the Arctic Council working groups (AMAP, PAME, EPPR, SDWG, CAFF and ACAP) and other subsidiary bodies.

On innovations applicable to the Arctic, the book reviews developments in the area of R&D and explore their implications for the development of Arctic infrastructure.

Regarding indigenous responses to Arctic development, the book devotes special attention to enhancing the understanding of non-Arctic actors regarding Arctic peoples and exploring opportunities for cooperation across this divide. Now that Korea, Japan and China are Arctic Council non-Arctic state observers, the new reality for these nations is that there are six indigenous groups sitting at the table with the Arctic states as Permanent Participants (and most are joining in the work of the technical working groups).

The book attempts to fill gaps in knowledge regarding the maritime Arctic, identifying remaining uncertainties, and developing policy innovations that can promote peaceful and sustainable uses of Arctic resources in the future.

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KMI/EWC SERIES ON THE ARCTIC IN WORLD AFFAIRS

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This volume, *A North Pacific Dialogue on International Cooperation in a Changing Arctic*, from the 2014 conference, was edited by Oran R. Young, Jong Deog Kim, and Yoon Hyung Kim.

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A JOINT PUBLICATION OF THE KOREA MARITIME INSTITUTE
AND THE EAST-WEST CENTER

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Published by
Korea Maritime Institute
KBS Media center bldg., 45 Maebongsan-ro, Mapo-gu,
Seoul, 121-270 Republic of Korea
www.kmi.re.kr

East-West Center
1601 East-West Road
Honolulu, Hawaii 96848-1601, USA
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Published in December 2014
ISBN 978-89-7998-968-7 93300

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Preface

The sense of a few years ago that the development of Arctic resources would take the form of a giant, unstoppable “gold rush” has abated. Serious constraints affecting the use of the Northern Sea Route (NSR) for commercial shipping have become evident. Many now expect that commercial use of the NSR will mainly take the form of destination shipping, rather than through traffic, for the foreseeable future.

Furthermore, North America’s shale gas revolution has dramatically altered the economic attractiveness of Arctic hydrocarbons. As a result, the development of once-promising projects (e.g., the supergiant Shtokman gas field in the Barents Sea) has been delayed indefinitely. This has serious implications for Russia, whose economic redevelopment is tightly coupled to the exploitation of Arctic resources. In some parts of the Arctic, interest in mining (e.g., lead, nickel, iron ore, and uranium) may outstrip the development of oil and gas reserves, which now seem less attractive than they did even three or four years ago.

For the most part, this is good news. It provides a little more leeway to think about innovative ways to address governance needs now arising in the Arctic. But it is important to treat this development as an opportunity to establish mechanisms designed to ensure that the Arctic’s resources are developed in a responsible manner; it is not a basis for complacency. For this reason, we will devote the North Pacific Arctic Conference (NPAC) 2014 to an examination of international cooperation in the Arctic in an effort to identify and evaluate the effectiveness of innovative measures that will contribute to maintaining the Arctic as a zone of peace and promoting sustainable development.

Cooperation can take many forms. Intergovernmental arrangements, perhaps the most obvious form of cooperation, can range from bilateral initiatives (such as Norwegian/Russian cooperation in managing the fisheries and potential energy resources of the Barents Sea) through regional actions (e.g., the work of the Arctic Council on search and rescue and oil spills) to multilateral steps (for example, the development of the Polar Code for commercial shipping in the Arctic under the auspices of the International Maritime Organization). In some cases, there are differences among states regarding the proper forums for addressing particular issues. A current example involves the issue of how to deal with the possibility

that fisheries of commercial significance could develop in the Arctic Basin during the next several decades. The five Arctic coastal states have taken the initiative regarding this issue; they are considering the merits of a proposed agreement that would impose a moratorium on commercial fishing, at least until more is known about the status of potential fisheries in the Arctic and their capacity to sustain a commercial harvest. But this approach is controversial. Some major environmental groups (e.g., the Pew Charitable Trusts and the Ocean Conservancy) have expressed strong support for this approach, while others (including the remaining members of the Arctic Council, some indigenous peoples' organizations, and some distant-water fishing nations) have been more skeptical about it.

There are important questions regarding the identity of the participants in cooperative measures relating to emerging Arctic issues. We tend to think first of states and intergovernmental agreements regarding matters of mutual interest. Arrangements of this sort are common in the Arctic, though some of the most important ones (such as the Arctic Council) are informal arrangements based on agreements (e.g., the ministerial declaration establishing the council) that do not involve legally binding obligations. A particularly interesting aspect of cooperation in the Arctic, however, is the prominent role of various non-state or semi-autonomous actors that are associated formally or informally with national governments.

The alliance among Gazprom, Statoil, and Total regarding the development of the Shtokman gas field, or the alliance between Rosneft and ExxonMobil regarding exploration for oil in the Kara Sea have taken the form of coalitions of private corporations, though the links between Gazprom and Rosneft on the one hand and the government of the Russian Federation on the other are strong. Others, like the partnership among Novatek, Total, and the China National Petroleum Corporation to establish a liquefaction facility on the Yamal Peninsula in northwestern Siberia, include enterprises that are state-owned but able to operate with a high degree of autonomy.

Other forms of cooperation that have emerged in the Arctic are less conventional in nature but potentially important not only for their ability to contribute to peace and sustainability in the Arctic, but also as experiments that may prove interesting in other settings. A distinctive feature of the Arctic Council is the engagement of indigenous peoples' organizations as Permanent Participants able to play a role in all the activities of the council.

A development in 2013 of particular importance from the perspective of NPAC was the acceptance by the Arctic Council of five non-Arctic Asian

states (China, India, Japan, Korea, and Singapore) as council observers. They join seven European countries as members of the corps of Arctic Council observers. Recent developments, including climate change and economic globalization, have strengthened the links between the Arctic region and the global system and brought the region to the attention of political and economic decision makers worldwide. The members of the council, the eight Arctic states, now recognize that it is impossible to address a range of emerging Arctic issues without finding a means of engaging major non-Arctic states. As a result, all parties concerned are interested in exploring the extent to which it is possible to develop informal but effective practices through which the council can become an effective forum not only for addressing issues of concern to the eight Arctic states, but also for dealing with matters (e.g., the effects of black carbon, environmental issues associated with energy development, and commercial shipping) that require cooperation on the part of key non-Arctic states as well as the Arctic states themselves.

The 2014 NPAC, jointly organized by the Korea Maritime Institute and the East-West Center, was held in Honolulu, Hawaii, to discuss these issues under the theme “International Cooperation in a Changing Arctic.”

This volume contains the papers presented at the Honolulu conference, covering patterns of Arctic investment, national Arctic strategies, Arctic state/non-Arctic state engagement, innovations applicable to the Arctic, indigenous responses to Arctic development, and opportunities for international cooperation in a changing Arctic.

On publishing this volume, we would like to thank Dr. Oran R. Young, professor emeritus at the University of California, Santa Barbara, Dr. Jong Deog Kim, research fellow at the Korea Maritime Institute, and Dr. Yoon Hyung Kim, senior fellow at the East-West Center and professor emeritus at the Hankuk University of Foreign Studies for coordinating the conference and preparing this volume for publication. We are grateful to Dr. Nancy Lewis at the East-West Center for her support of the NPAC program. We also wish to thank the paper writers, commentators, and others involved in contributing to the success of this conference. Our sincere gratitude goes to June Kuramoto of the East-West Center for her expert management of the conference logistics.

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1. Introduction and Overview

Yoon Hyung Kim, Oran R. Young,
and Jong Deog Kim

BACKGROUND

The Arctic continues to experience rapid change. But the changes now occurring in the region are producing a more complex situation than the one envisioned just a few years ago by those who predicted that increased accessibility resulting from the melting of sea ice would ignite a scramble for control of the region's resources and the emergence of a new "great game" in the Arctic. This more complex situation calls for innovative thinking that can provide the basis for increasingly sophisticated forms of cooperation at the international and transnational levels. Both states and non-state actors can play constructive roles in the effort to maintain the Arctic as a zone of peace and prosperity and to develop the region's resources in a sustainable manner as links between the region and the global system continue to grow. But realizing this potential will require a willingness to break the conceptual grip of old antagonisms and to embrace new approaches to problem solving on the part of all parties concerned.

Sea ice in the Arctic Basin reached an all-time low in the late summer of 2012, but it bounced back in 2013, trapping a number of vessels that had ventured into the Northwest Passage expecting to be able to make ice-free transits. Serious constraints affecting the use of the Northern Sea Route (NSR) for commercial shipping have become evident. Many now expect that commercial use of the NSR will take the form mainly of destination shipping, rather than through traffic, for the foreseeable future. Ship traffic in the NSR during 2014 was well below the level reached in 2013. More generally, the growing impact of climate change in the Arctic is intensifying pressure to relocate coastal communities (e.g., Kivalina in northwest Alaska), shortening the season for the use of ice roads critical to the extraction of raw materials, and threatening the integrity of infrastructure (such as airfields, pipelines, and commercial buildings) located in areas underlain by permafrost. None of this runs counter to the fact that Arctic resources are becoming more accessible. But these conditions do emphasize

the importance of avoiding simplistic assumptions about the likely trajectory of Arctic development.

Because Arctic resources are expensive to extract and to transport to southern markets, their economic attraction is sensitive to fluctuations in world market prices. North America's shale gas revolution, for example, has dramatically altered the economic attractiveness of Arctic hydrocarbons. As a result, the development of once promising projects (e.g., the supergiant Shtokman gas field in the Barents Sea) has been delayed indefinitely. The sharp drop in the world market price for oil during the second half of 2014 has raised fundamental questions about the economics of extracting oil in the Arctic. Among other things, this has serious implications for Russia, whose economic redevelopment is tightly coupled to the exploitation of Arctic resources. In some parts of the Arctic, interest in mining (e.g., lead, zinc, nickel, copper, iron ore, and uranium) may outstrip the development of oil and gas reserves, which now seem much less attractive than they did even three or four years ago. A particularly interesting prospect is the development of Greenland's deposits of rare earth, a potential source of income that could strengthen the hand of those Greenlanders who wish to achieve full independence from Denmark.

Overall, the Arctic remains a zone of peace, but complex political issues affecting the region are developing rapidly. Competing claims to jurisdiction over the seabed extending beyond the limits of Exclusive Economic Zones are coming to the fore. Canada, Denmark/Greenland, and Russia have articulated claims that overlap to a significant extent in the area around the North Pole. Although all the Arctic coastal states have pledged to resolve these differences under the provisions of the UN Convention on the Law of the Sea, the political intensity of national seabed claims is worrisome. Under the most optimistic scenario, it will take years to resolve the conflict arising from these overlapping claims. Meanwhile, Russia is taking steps to rebuild its military presence in the Arctic, based in part on claims that this is necessary to counter the capacity of the United States Navy to operate in Arctic waters as well as the prospect of increased interest in the Arctic on the part of NATO. Despite the fact that most observers see no basis for serious conflict in the Arctic, the danger of an action/reaction process involving the buildup of military forces is real.

Broader changes in the international system are also affecting the Arctic. In the 1990s, at the time of the creation of the Arctic Council, the Arctic was peripheral to the main currents of international affairs. The

hegemonic role of the United States as the sole remaining superpower sheltered the region from the impact of broader geopolitical developments. Today, the links between the Arctic and the broader international system have become considerably stronger. The dominance of the United States is fading, and rising powers like China, Germany, and Korea are developing Arctic strategies to guide their activities in the region. China, for example, is flexing its muscles with regard to the Arctic, largely through the development of bilateral relationships with Greenland, Iceland, and Russia focusing on the exploitation of energy resources and minerals. It is important not to exaggerate the significance of the resultant political tensions. Nevertheless, ignoring them would be equally inappropriate at this stage.

The sense of a few years ago that the development of Arctic resources would take the form of a giant, unstoppable “gold rush” has abated. For the most part, this is good news. It deflates some of the alarmist projections regarding the rise of severe conflicts in the Arctic and provides us with some leeway to think about innovative ways to address needs for governance now arising in the region. It is important to treat this change as an opportunity to establish mechanisms designed to ensure that the Arctic’s resources are developed in a responsible manner and to strengthen measures dealing with the protection of the region’s environment; it is not a basis for complacency. For this reason, we focused the 2014 North Pacific Arctic Conference (NPAC) on an examination of international cooperation in the Arctic in an effort to identify and evaluate the effectiveness of innovative measures designed to contribute to maintaining the Arctic as a zone of peace and promoting sustainable development in the region.

Cooperation can take many forms. Intergovernmental arrangements, perhaps the most obvious form of cooperation, can range from bilateral initiatives (e.g., Norwegian/Russian cooperation in managing the fisheries and potential energy resources of the Barents Sea) through regional actions (e.g., the work of the Arctic Council on search and rescue and oil spills) to multilateral steps (e.g., the development of the Polar Code for commercial shipping in the Arctic under the auspices of the International Maritime Organization). In some cases, there are differences among states regarding the proper forums for addressing particular issues. A current example involves the issue of how to deal with the possibility that fisheries of commercial significance could develop in the Arctic basin during the next several decades. The five Arctic coastal states have taken the

initiative regarding this issue; they are considering the merits of a proposed agreement that would impose a moratorium on commercial fishing in this region, at least until more is known about the status of potential fisheries in the Arctic and their capacity to sustain a commercial harvest. But this approach is controversial. Some major environmental groups (e.g., the Pew Charitable Trusts and the Ocean Conservancy) have expressed strong support for this approach, while others (including the remaining members of the Arctic Council, some indigenous peoples' organizations, and some distant-water fishing nations) have been more skeptical about it. In any event, it is worth noting that a sizable fraction of the water column of the Arctic Basin will remain high seas under the terms of the UN Convention on the Law of the Sea, however the claims of the coastal states regarding jurisdiction over the seabed are resolved. This means, among other things, that non-Arctic states will have the right to engage in fishing and other activities in these waters, regardless of the measures that the Arctic coastal states adopt.

There are important questions regarding the identity of those who can and should participate in cooperative measures relating to emerging Arctic issues. We tend to think first of states and intergovernmental agreements regarding matters of mutual interest. Arrangements of this sort are common in the Arctic, though some of the most important ones (such as the Arctic Council) are informal arrangements based on agreements (e.g., the ministerial declaration establishing the Council) that do not involve any legally binding obligations. A particularly interesting aspect of cooperation in the Arctic, however, is the prominent role of various non-state or semi-autonomous actors that are associated formally or informally with national governments. The International Arctic Science Committee, for example, is a nongovernmental organization in formal terms, but its members are national academies of science and national research councils.

Many examples involve economic relationships. Some, like the alliance among Gazprom, Statoil, and Total regarding the development of the Shtokman gas field, or the alliance between Rosneft and ExxonMobil regarding exploration for oil in the Kara Sea, have taken the form of coalitions of private corporations, though the links between Gazprom and Rosneft on the one hand and the government of the Russian Federation on the other are strong. Others, like the partnership among Novatek, Total, and the China National Petroleum Corporation to establish a liquefaction facility on the Yamal Peninsula in northwestern Siberia, include enterprises

that are state-owned but nevertheless able to operate with a high degree of autonomy. Still others, like the proposed Isua iron ore mine in Greenland, feature complex partnerships in which private entities (in this case, the London Mining Company) and government entities (here, agencies of the Chinese government) join forces to develop mineral deposits in distant locations. In all these cases, cooperation is sensitive both to world market forces (e.g., the postponement of development of the Shtokman gas field for economic reasons) and to larger political forces (e.g., the freezing of the Rosneft-Exxon/Mobil collaboration due to sanctions associated with the Ukraine conflict).

Other forms of cooperation that have emerged in the Arctic are less conventional in nature but potentially important not only for their ability to contribute to peace and sustainability in the Arctic, but also as experiments that may prove interesting in other settings. A distinctive feature of the Arctic Council is the engagement of indigenous peoples' organizations as Permanent Participants able to play an active role in all the activities of the Council. The Barents Euro-Arctic Region, launched in 1993 and encompassing the northern counties/oblasts of Norway, Sweden, Finland, and northwestern Russia, is distinctive because it has a dual structure encompassing both the intergovernmental Barents Council and a separate Regional Council whose members are subnational governments in the areas covered by this arrangement. This initiative has fostered cooperation in a wide range of areas, including education, health, and cultural survival, as well as economic development. The Northern Forum, founded in 1993 as an association of subnational governments throughout the Circumpolar North, has sought to foster cooperation among its members regarding issues of common concern that are often poorly understood or ignored in the southern capitals of their respective nation states. Although the forum is now struggling to reinvent itself following a relocation of its administrative apparatus from Alaska to the Sakha Republic in Russia, it has provided an important example of the prospects for transnational relations carried out by subnational governments operating independently of their national governments. Indigenous peoples' organizations, such as the Inuit Circumpolar Council and the Saami Council, offer additional lessons in the efficacy of transnational initiatives. A particularly important feature of these arrangements is the role they have played in articulating the political rights of aboriginal peoples who are citizens of their respective nation states but who argue that they are entitled at the same time to exercise certain

forms of sovereignty regarding the control of their own destinies. These less-conventional forms of cooperation that have taken root in the Arctic over the last several decades constitute the leading edge of a development that seems destined to become more and more important on a global scale.

A development in 2013 of particular importance from the perspective of NPAC was the acceptance by the Arctic Council of five non-Arctic Asian states (China, India, Japan, Korea, and Singapore) as council observers. They join seven European countries as members of the corps of Arctic Council observers. Recent developments, including climate change and economic globalization, have strengthened the links between the Arctic region and the global system and brought the region to the attention of political and economic decision makers worldwide. In formal terms, observer status in the Council provides limited opportunities to participate in Arctic affairs, especially at the policy level. Yet the members of the Council, the eight Arctic states, now recognize that it is impossible to address a range of transregional issues affecting the Arctic (e.g., climate change, contaminants originating beyond the confines of the region, the protection of migratory species) without finding a means of engaging major non-Arctic states. As a result, all parties concerned are interested in exploring the extent to which it is possible to develop informal but effective practices through which the Council can become an effective forum not only for addressing regional issues of concern to the eight Arctic states, but also for dealing with transregional issues that require cooperation on the part of key non-Arctic states as well as the Arctic states themselves. NPAC 2014 provided an early but significant opportunity to examine the efficacy of the new practices of the Arctic Council regarding the role of observer states, to consider adjustments that could improve the existing situation, and even to compare this situation with possible alternative arrangements.

This volume contains the thematic papers and shorter presentations prepared for NPAC 2014. Part I consists of two thematic papers and seven commentaries examining patterns of Arctic investment. Part II compares the experiences of six states in the formulation and implementation of Arctic policies. Individual papers explore the approaches and challenges of three Arctic states (Canada, the Russian Federation, the United States) and three non-Arctic Asian States (China, Japan and Korea). Part III presents one chapter and four international commentaries on avenues of Arctic state/non-Arctic state engagement. The two thematic papers and five comments in Part IV address R&D innovations applicable to the Arctic. The thematic

paper and three commentaries in Part V examine indigenous responses to Arctic development. Part VI, the product of a roundtable discussion, contains six perspectives focusing on visions of Arctic development and paths to sustainability, funding mechanisms, and the role of the Arctic Council.

PART I: PATTERNS OF ARCTIC INVESTMENT

The authors of the chapters and commentaries included in Part I address three key questions regarding patterns of Arctic investment: (i) What is the magnitude of investment in Arctic projects, and what are the trends over time in this regard, both onshore and offshore? (ii) Who are the actual and potential investors (private corporations, state-owned enterprises, governments)? and (iii) What are the likely growth areas for investment in the future, and what factors will determine trends in this area?

Whereas it is difficult to provide a comprehensive estimate of investments needed to realize resource development and improve infrastructure in the Arctic, scattered data indicate that these needs are enormous. The authors of the thematic chapters, all the commentators, and most of the participants in the discussion agreed that oil companies are now more reluctant to go ahead with Arctic offshore development than they were a few years ago. Among the reasons mentioned were the revolution in unconventional gas and oil, changing world market prices, increasing costs due in part to the strengthening of environmental regulations, and pressure from shareholders to produce short-term dividends.

Increasing expectations for a future climate-constrained world may have an impact on Arctic energy investments in the short term because of the long lead times associated with energy projects in this region. Historically, fluctuations in the price of oil have produced a stop-and-go pattern of development in the Arctic. Arctic projects are marginal in economic terms and are among the first to be cut when prices fall. Nevertheless, some argued that oil companies also would be interested in amassing oil reserves in the Arctic, even though they may put off production in the face of an uncertain future.

Mineral projects, on the other hand, have a different logic. Legal frameworks and the climate for investments are not favorable to such projects. In fact, they have become less friendly over the last six years, at

the same time as the resource base is becoming more heterogeneous and in need of new technologies and approaches for development. The most interesting part of the Russian Arctic in these terms is Northern Siberia. One big investment project in the Norilsk area is underway, initiated by a private group that is big enough to handle the institutional complexities.

There are big differences among the Arctic coastal states regarding government involvement in energy and mineral development. In North America, development is entirely dependent on private capital. In Russia and Norway, private capital also plays a major role, but governments are involved both as shareholders in state-owned or state-dominated companies and through direct public investment. Both these countries have resource-dependent economies in which oil and gas play crucial roles. As a result, the governments see support for energy development in the Arctic as essential. Government support also focuses on creating a favorable investment climate. In the U.S. and Canada, by contrast, governments are often indifferent. Foreign investment in offshore development is possible in all these countries. But in Russia, which has the largest share of the resources, the options for foreign investors are limited due to monopolization in the sector.

Normally, Arctic maritime infrastructure would be the responsibility of the governments. On the federal level in the U.S. and Canada, there is less willingness now than in earlier times to engage in infrastructure development. Needs are identified, but little is happening. Norway, which has the most developed Arctic coastline, has the means and tradition for public investment, but is undecided about future port priorities. Russia has large ambitions for upgrading decaying Arctic infrastructure, but faces financial constraints. Financing for the NSR derived from user fees is not sufficient. New state investments are lacking. Private–public partnerships are presented as a solution, but proper mechanisms have not been developed. One recent example of state investment in Arctic infrastructure, however, is the new port of Sabetta on the Yamal Peninsula, which will mainly serve the Yamal LNG project but may also be useful to other emerging hydrocarbon projects in its vicinity.

The key determinants of investment growth are expectations regarding profitability and risk mitigation. The various joint ventures and cooperative arrangements set up to finance and operate tankers for Yamal LNG illustrate the broad cooperation needed to mitigate risk and pull off major Arctic resource projects. To help reduce uncertainty and risk, high political

priority plus state involvement in infrastructure development seem to be important. The factors that hold back investment in the U.S. and Canada would have to be altered to encourage growth. In Russia, investors found a solution three years ago by persuading big foreign oil companies to pledge huge investments in offshore development. But these are high-profile prestige projects for Russia. In the minerals sector, which has a potential for many smaller projects, problems concerning stable property rights and respect for contracts remain constraints on investment activity. The present tense international situation, with accompanying political uncertainty in Russia, increases investment risks. Sectors hit by sanctions will have big problems satisfying their investment needs, although sanctions may create opportunities for companies in countries not participating in the sanctions.

PART II: COMPARING NATIONAL ARCTIC POLICIES

Part II contains six thematic papers exploring national experiences in the formulation of Arctic policies in three Arctic states (Canada, Russian Federation, U.S.) and three Asian non-Arctic states (China, Japan and Korea). Each chapter addresses seven key issues: (i) Does the country have an overall Arctic strategy or policy? (ii) Are there sectoral policies, for example, on shipping, oil and gas, fisheries, or foreign relations? (iii) To what extent is there a balance between development and environmental protection? (iv) What institutional arrangements exist to develop national policy, for example, a lead department, interdepartmental committee or task force? (v) What forces have spurred or hindered the development of Arctic policy? (vi) What is the status of national Arctic policy implementation? and (vii) To what extent are Arctic issues considered in national positions and approaches in international fora, for example, in climate change negotiations and implementation of the Stockholm Convention on Persistent Organic Pollutants?

The three Arctic states are similar in having established overarching Arctic policies, even though they rely on multiple documents. Canada's main policy documents include *Canada's Northern Strategy* (2009) and *Canada's Arctic Foreign Policy Statement* (2010). Russia issued an *Arctic Fundamentals* policy in 2008 followed by a 2013 *Arctic Strategy*. Recent policy documents in the United States include the *National Strategy for the Arctic Region, 2013* and the *Implementation Plan for the National Strategy*

for the Arctic Region, 2014.

Among the three Arctic states, Russia has produced the clearest policy vision for the future of Arctic shipping. The Russian Federation has identified the opening of the Northern Sea Route to international shipping as a matter of priority, with detailed plans for supporting infrastructure, such as ice-breaking assistance and search and rescue centers. Canada and the United States are less clear in their policy positions toward the future of Arctic shipping. Canada has no active vision for opening the Northwest Passage to international traffic. Discussion during this session suggested that this may be explained by two factors. Canada may have underlying concerns regarding the potential adverse impacts of increased shipping on coastal communities and the marine environment. Also, Canada is sensitive about giving the impression that the passage is a strait used for international navigation. The United States also has not formulated clear policy directions for developing shipping infrastructure such as port facilities and ice-breaking capacities. The Arctic receives limited political attention in the U.S. due to the fact that Alaska has only two senators and one representative in Congress. The Arctic also has been marginalized in the media and public awareness with some maps of the United States even failing to show the State of Alaska.

The three non-Arctic Asian states have yet to formulate comprehensive Arctic policies. Nevertheless, political attention and public awareness regarding the Arctic have been growing in all three countries with an emphasis on concerns relating to the impacts of climate change including decreasing ice cover and interests in Arctic transportation routes and potential access to natural resources.

At the same time, the Asian States differ in the development of their Arctic policies. Korea is perhaps the most advanced as reflected in the publication of an *Arctic Policy Master Plan* in December 2013, although the Plan is not a comprehensive policy but more of a collection of existing government priorities. Japan has given Arctic issues “secondary treatment” through the adoption of the *Second Basic Plan on Ocean Policy* in April 2013. Arctic shipping routes, climate change and ocean acidification, and the need for international cooperation in studying and protecting the Arctic Ocean were all identified as important issues to be addressed. China has lagged in Arctic policy formulation, although a white paper on Arctic policy is being considered for publication within the next few years.

Turning to the implications for the Arctic Council, participants

identified regional buy-in and continuity over time as important challenges. Some participants suggested that Canada's emphasis on local economic development in the Arctic during its chairmanship may conflict with the priorities of other Arctic states. One participant suggested that the U.S. State Department may be "less than enthusiastic" about the creation of the Arctic Economic Council. Participants also identified ensuring implementation of national Arctic policies as a problem. Existing policies do not have reporting and accountability mechanisms; implementation is dependent on political will and proper financing. Understanding the status and roles of bilateral agreements and arrangements in the Arctic also was identified as a challenge. Transboundary cooperation is a key component of Arctic policy, yet information regarding the numerous bilateral arrangements in the Arctic is limited. The Arctic Council's *Arctic Ocean Review (AOR) Report*, issued in May 2013, did not examine the status of bilateral cooperation in the Arctic but focused on the adequacy of regional and global arrangements in protecting the Arctic's marine environment. Finally, confronting the difficulties of interagency coordination and multilevel governance is especially problematic in the formulation and implementation of Arctic policies. Numerous distinct departments/agencies at the national level seek to claim a "piece of the action." In the United States, there have been tensions between federal and State of Alaska perspectives over appropriate policy directions. The Canadian policy seascape is also complicated by the problems of coordinating multiple levels of governance, including federal and territorial governments and institutions created under land-claim agreements.

PART III: ARCTIC STATE/NON-ARCTIC STATE ENGAGEMENT

Part III of this volume comprises one thematic paper and four commentaries. The authors examine Arctic state/non-Arctic state engagement on Arctic issues in accordance with four sets of questions: (i) What are the lessons from past engagements by non-Arctic states in Arctic Council working groups or subsidiary bodies? What are the rules, criteria and working group operating guidelines for non-Arctic state participation in Council activities? (ii) Are there particular transregional issues relevant to the Arctic that non-Arctic states can highlight as areas for

possible cooperation? (iii) Are there examples of bilateral or multilateral cooperation between Arctic states and non-Arctic states in other fora that might provide models or best practices for cooperation in relation to the Arctic? and (iv) What are the particular circumstances of non-Arctic state/Permanent Participants relationships in the context of working group activities?

Key messages drawn from Part III include:

- ① The Arctic is a dynamic region. Environmental, geoeconomic, and geopolitical forces are causing transformative change in the high latitudes; linkages between the Arctic and the global system are growing stronger.
- ② The Arctic is not immune to geopolitical changes in the world at large.
- ③ An important feature of regional/global linkages is the extent to which the fate of the Arctic is affected by the actions of outsiders who often pay little attention to the consequences of their actions for the well-being of the Arctic's human residents or the integrity of the Arctic's biophysical systems.
- ④ No single existing or potential forum provides a complete answer to the challenges of Arctic state/non-Arctic state engagement. Numerous options across a range of levels and sectors exist for enhancing the engagement of non-Arctic states (and other non-Arctic actors) in Arctic affairs, while at the same time protecting the interests both of the Arctic states and of the region's permanent residents. As a result, policy makers should "mix and match."
- ⑤ Engagement is a two-way street: A balanced approach stressing both interests and responsibilities will be the key to progress in navigating the Arctic/non-Arctic interface.
- ⑥ The Arctic Council is evolving as a central forum for Arctic state/non-Arctic state engagement. However, there remains significant frustration about the effectiveness of existing structures and arrangements.
- ⑦ As the connections between the Arctic and the global system become stronger, there is a growing need to think about distinguishing between regional issues that can be dealt with effectively in Arctic venues (e.g. the Arctic Council) and transregional issues that require action within broader international or global venues in which

interested non-Arctic states are able to participate on an equal basis.

PART IV: INNOVATIONS APPLICABLE TO THE ARCTIC

The two thematic papers and four commentaries in Part IV explore technological innovations applicable to the Arctic. The first paper focuses on a major project involving the construction of a new fiber optic cable along Canada's Mackenzie River valley. The second paper presents the development of Korea's new ice model tank.

The four commentaries note the importance of several key Arctic R&D issues: the need for better coordination and collaboration in research strategies of the eight Arctic states and twelve non-Arctic state observers; the need to establish a compendium of Arctic R&D efforts; the value of drawing lessons from the history of icebreaker technology going back to the 1890s; the significance of new hull forms and technical approaches to icebreaking ships that optimize energy and are more economical than current ships; the possibilities for using new Arctic routes based on advanced knowledge of ice thickness and ice coverage; the need for new infrastructure related to information systems that can monitor ice cover and thickness, and the importance of Korea's Arctic research investments reflecting substantial economic interests in the Arctic region.

The discussion identified additional Arctic technologies, some available today and others under development, including: seabed and under ice technologies and the need for better communication with these systems; ice navigation training systems and the simulation of voyages through sea ice; satellite monitoring of sea ice and the continuing challenge of more accurately measuring sea ice thickness; online education for those located in remote Arctic regions; telemedicine technologies and opportunities for enhanced delivery of health services; new technologies for Arctic communities (e.g., cold climate housing, renewable energy sources, sewage systems), and the technical and operational challenges of operating larger ships in a future Arctic Ocean.

Several key messages emerge from Part IV:

- ① There are many new Arctic technologies being developed, particularly in the maritime shipping and offshore energy sectors. Innovations are aimed at improving efficiency and enhancing

safety. The Arctic and Asian states in the NPAC partnership are all increasing their Arctic innovation and research budgets.

- ② NPAC should consider ways to coordinate and enhance collaboration among the various Arctic state and non-Arctic state national strategies for research in the Arctic. It would be helpful to create a compendium to document the full range of Arctic R&D activities and projects initially including strategies of these 20 leading nations.
- ③ One of the challenges of sharing R&D advances is the proprietary nature of much of the technology developed in the commercial world. Corporations around the globe pay great attention to intellectual property rights; these rights are increasingly accorded special protections by national and international laws.
- ④ Monitoring of ship traffic and environmental factors (such as sea ice) is tied closely to new advances in satellite and land-based observation technologies, including AIS and related systems. New technologies are needed for the measurement of Arctic sea ice thickness to improve understanding of changes in sea ice volume and improve maritime domain awareness in coastal Arctic regions.
- ⑤ The Arctic Council does not appear to have paid close attention to R&D issues. However, many technologies relating to Arctic climate change, marine operations, and environmental protection (for example, Arctic oil spill response and cleanup) have important implications for the work of the Council. Enhanced international cooperation in R&D will be essential in the years ahead. Innovators should present new and advanced Arctic technologies at meetings of the Arctic Council's working groups and in other council venues to improve the knowledge of diplomats and government experts regarding future technologies related to matters of environmental protection and sustainable development.
- ⑥ Arctic R&D should be linked more closely to the improvement of environmental stewardship. R&D today is too isolated to support direct policy making. Innovative technologies must be developed with the needs of indigenous communities in mind.

PART V: INDIGENOUS RESPONSES TO ARCTIC DEVELOPMENT

Part V comprises one thematic paper and three commentaries intended to enhance the understanding of non-Arctic policy makers and researchers regarding the circumstances of Arctic peoples and to explore opportunities for cooperation across this divide. Now that China, Japan, and Korea are Arctic Council observers, they must consider the fact that there are six indigenous peoples' organizations sitting at the table with the Arctic states as Permanent Participants and participating in the activities of the working groups. The indigenous peoples of the Arctic will be impacted both positively and negatively by increased ship traffic and coastal and offshore development.

The contributors to Part V address five key questions about indigenous responses to Arctic development: (i) How will large-scale resource development in the Arctic affect nearby communities? (ii) Are there opportunities for local communities to benefit from resource development while remaining sustainable in social and cultural terms? (iii) Can Arctic communities assert and exercise rights in the face of resource development driven by outside private and public actors? (iv) Will increased participation in the Arctic Council on the part of observer states dilute or even drown out the voices of the Permanent Participants? and (v) How can indigenous communities across the circumpolar Arctic effectively participate in and influence the development of government policies in the non-Arctic state observers as well as in the Arctic states themselves.

Key messages drawn from this session include:

- ① *Changes Affecting Indigenous Peoples.* Climate and socio-economic changes are already producing significant consequences for indigenous peoples of the Arctic region, and these changes are accelerating. To a large extent, the sources of these changes are global. The indigenous peoples of the Arctic have inhabited the region for thousands of years and evolved a culture and way of life that depends on the natural environment as a source of food, habitation, and other necessities of life. The prospect of large-scale development of natural resources, the opening of Arctic seaways, and demographic changes driven mainly by global forces are requiring these communities to adapt to mixed-economies and conditions that

are outside their historical experiences. The Inuit, Saami and other indigenous peoples have long histories of ingenious adaptations to changing conditions. Current trends in economic development raise a sense of vulnerability as the world comes north. These indigenous communities perceive that they are being asked to open their historic homelands to help support the world with northern resources, giving rise to a wave of development activities in which Inuit and others are asked to leave their subsistence-oriented cultures and become miners, oil/gas roughnecks, construction workers, or employees of development-based service industries. These are dramatic changes in their way of life. As Sheila Watt-Cloutier puts it in her paper: “*All of this has confirmed that the Arctic is an area of utmost importance in the minds of global policy-makers, economic decision-makers, and researchers. But this interest needs to be better informed by an awareness of what is happening to the largely indigenous and subsistence-oriented communities that provide the human face of the Arctic.*”

- ② ***Framing an Indigenous-Oriented Action Perspective.*** In general, Arctic communities are modest in size; they do not have significant political power or economic influence at the national and international levels. But they feel that they are the heart and soul of the Arctic. As Watt-Cloutier says: “I believe we must reframe the current debate, adopting a *rights-based approach* to Arctic development.” She has worked intensively both on the problem of persistent organic pollutants and on the connections between human rights and climate change. Her presentations at NPAC 2014 and elsewhere have focused on seeing the issues holistically and on recognizing the human face of the issues. She asks that researchers, policy-makers, and industry leaders consider how to adapt to a *rights-based approach* to Arctic development. The contributors to Part V suggest that Arctic policies are typically framed in global terms and are not sensitive to what is right or good for our Arctic communities. Despite the problems of poverty in many Arctic communities, they suggest, it may be better to leave resources underground as a signal to the world that those who are affected by the negative impacts of globalization have rejected the attractions of large-scale resource development. They see the opportunities as attractive. But the issues of cultural sustainability and human well-

being dominate their hopes for a sustainable future. In her main message to the NPAC community, Watt-Cloutier asserts that a *rights-based approach* to Arctic development must be the foundation for planning the future of the Arctic taking into account the welfare of its peoples and their cultures.

PART VI: OPPORTUNITIES FOR INTERNATIONAL COOPERATION IN A CHANGING ARCTIC

Part VI contains the reflections of six conference participants who explore opportunities for international cooperation in a changing Arctic and emphasize concrete options from a variety of perspectives. In contrast to other parts of this volume, Part VI does not begin with a thematic paper. Rather, this Part contains a record of a focused discussion in which six experts respond to a series of specific questions about opportunities for international cooperation in the Arctic. Panelists responded to three questions provided to seed the conversation: (i) Do recent biophysical and socioeconomic changes in the Arctic alter either the need for international cooperation regarding the region or the feasibility of achieving *effective cooperation* to address emerging needs? (ii) What are the appropriate venues for pursuing international cooperation regarding Arctic issues (e.g. bilateral settings, the Arctic Council, broader international venues like the International Maritime Organization)? and (iii) What is the proper division of labor in this realm among public arrangements, private initiatives, and public/private partnerships?

The discussion produced four key messages:

- ① *Visions of Arctic development and paths to sustainability.* In thinking about Arctic development, we often focus on the Arctic as a storehouse of natural resources of interest to advanced industrial societies located outside the region and assume that the emphasis will be on megaprojects requiring very large-scale capital investment and generating demands for cost-intensive infrastructure. But there is an alternative vision of Arctic development emphasizing smaller scale projects that are more compatible with sustainable development at the subregional and community levels. There is a tension between these visions with the megaprojects being preferred

by large multinational corporations and state-owned enterprises as well as by regional and national governments that see them as sources of tax revenues and the smaller scale projects being preferred by Arctic communities that see them as more compatible with rights-based development. These visions are not necessarily incompatible; both megaprojects and smaller scale projects can proceed at the same time. But the two types of projects present different issues regarding international cooperation, and the conditions governing their success are likely to be different.

- ② ***Funding mechanisms.*** A recurrent theme in the session centered on funding mechanisms that may be available to provide the resources required to implement international agreements. The panelists discussed a variety of mechanisms including: multilateral arrangements (e.g., a development bank oriented toward financing Arctic projects), international banking consortia, a dedicated funding arrangement operating under the auspices of the Arctic Council, bilateral arrangements managed by public agencies, purely private project funding, and various forms of public/private partnerships. Panelists and other participants debated the relative merits of these different mechanisms. Commentators also sought to clarify and evaluate experience with the Nordic Environment Finance Corporation (Nefco), the Project Support Instrument (PSI) associated with the Arctic Council, and the funding arrangements operating under the Barents Euro-Arctic Region. One practical suggestion called for the development of a menu of alternative funding mechanisms relevant to the Arctic to serve as the basis for a systematic assessment of the strengths and weaknesses of individual options as sources of support for specific initiatives involving Arctic cooperation. Most speakers expressed the view that the challenge is to develop the skill needed to make use of a variety of funding mechanisms, selecting the most appropriate arrangement on a case-by-case basis.
- ③ ***Role of the Arctic Council.*** Although international cooperation can take a variety of forms, there was extensive discussion of the role of the Arctic Council as a particularly important means of organizing cooperation relating to the Arctic. The Council has accomplished a lot. But there are problems with this arrangement as a mechanism for organizing cooperation going forward. The Council

launches lots of projects but has little capacity to follow through to determine whether the projects achieve their intended goals. The Council lacks an adequate funding mechanism of its own; it is at the mercy of those who are prepared to provide funding to carry out various initiatives. There is a widening gap between the Senior Arctic Officials and the working groups, a situation that can lead to incoherence in the day-to-day activities of the Council. No solution has emerged for the problem of providing adequate support to allow the Permanent Participants to engage fully with the growing array of Council activities. The observers are still not integrated adequately into the activities of the Council. The role of the Arctic Economic Council, initiated under the current Canadian chairmanship, remains unclear. Some participants suggested that it would be timely to initiate a general review of the structure and procedures of the Council with the goal of enhancing its capacity during the coming years to orchestrate international cooperation regarding Arctic issues. Others felt that such an effort would consume a great deal of time and energy and might well fail to produce useful results. Overall, it seems clear that the Arctic Council will be central to the pursuit of international cooperation regarding Arctic issues. But there is no consensus on how to maximize the effectiveness of the Council going forward.

- ④ ***Broader factors.*** In reflecting on opportunities for international cooperation, we tend to think in terms of political calculations or in terms of somewhat narrow benefit/cost calculations. Of course, such considerations are central to any assessment of the prospects for international cooperation. But they do not tell the whole story in this regard. There is a need to build trust and confidence across cultures and across levels of social organization. There is also a need to develop operating principles that can underpin cooperative initiatives and to encourage the emergence of honest brokers who are able to facilitate communication among all parties and to craft the terms of agreements that are acceptable to all those engaged in cooperative activities. One concrete step that might help in this regard would be to emphasize the importance of open information/data and to take steps to ensure that all parties concerned are on an equal footing regarding the best available information about the issues at stake.

CONCLUSION

We began NPAC 2014 by posing a set of challenging questions about the prospects for international cooperation in a changing Arctic. The contributions included in this volume provide some tentative answers to these questions. But many important issues remain to be addressed in a compelling manner. These include: the implications of climate change in the Arctic for both Arctic and non-Arctic actors; the future course of the commercialization of the Arctic Ocean; the rising concern for marine stewardship in the Arctic; the impacts of global geoeconomic and geopolitical forces on the Arctic, and the dynamics of multilevel governance affecting efforts to maintain the Arctic as a zone of peace and prosperity. These and other related concerns will provide a rich array of topics for discussion during the 2015 NPAC. As always, the goal will be to identify emerging issues and opportunities for cooperation and to provide a forum in which both policy-makers and analysts can exchange ideas about these issues in an informal and wide-ranging discussion proceeding under the Chatham House Rule.

PART I

PATTERNS OF ARCTIC INVESTMENT

2. Offshore Petroleum and Maritime Infrastructure¹

Arild Moe and Svein Vigeland Rottem

Despite the considerable attention given to Arctic offshore petroleum resources in recent years, actual industrial activity remains limited. In fact, only two fields are in production on the Arctic continental shelf—one in Norway and one in Russia. The main activity is exploration, but here also the activity level is lower than commonly portrayed in the media. The purpose of this paper is to provide an overview of commercially relevant Arctic investment projects related to offshore petroleum and maritime infrastructure, in order to understand likely developments and to comment on the relationship of public vs. private investments. For these purposes, the Arctic is loosely defined as ocean areas north of the Arctic Circle and the adjacent coasts. Figures are scarce and usually not comparable, thus the assessments are mainly made on a qualitative basis.

OFFSHORE PETROLEUM ACTIVITIES AND MARITIME INFRASTRUCTURE

There are big variations in the intensity as well as organization of offshore petroleum activity among Arctic coastal states (Russia, Canada, United States (Alaska), Denmark (Greenland), and Norway). The various states will be discussed along the following lines: petroleum activities, maritime infrastructure and future prospects.

Canada – Promising but Uncertain

In offshore Arctic Canada, the Beaufort Sea is considered the most promising. From 1972 until 1989, a total of 86 wells were drilled offshore in the Beaufort Sea. From the mid-80s, however, the Arctic offshore was mostly abandoned due to falling oil prices, the end of government exploration incentives and lack of infrastructure.² Since 1991, only one offshore well has been drilled in Canada's Arctic, in 2005/2006, but it was

abandoned in March 2006.³ In 2002 and 2004, lease sale rounds were conducted by the Canadian federal government. In 2007, Imperial Oil won the bid for a large area offshore in the Beaufort Sea. BP followed in 2008 and Chevron in 2010. In the aftermath of the Deepwater Horizon incident in the Gulf of Mexico in 2010, however, Canadian authorities imposed a moratorium on all Arctic drilling. The National Energy Board (NEB) then conducted an Arctic Offshore Drilling Review, introducing new operating standards, released in December 2011. Currently, there is no drilling taking place in Canada's offshore Arctic.⁴ However, a number of companies hold exploration licenses for areas in the Beaufort Sea, and six new exploration licenses were issued in 2012.⁵ A joint project owned by BP, ExxonMobil and Imperial Oil seems to have the most developed plans for an exploratory drilling program.⁶ Still, drilling is not likely to take place before late this decade.

Looking at maritime infrastructure in the Canadian Arctic, many infrastructure proposals have been presented with the aim of connecting the coastal regions with the provinces further south.⁷ There is also the "Northern Marine Transportation Corridors Initiative," which entails a program for improving maritime infrastructure in the Canadian Arctic. These initiatives are in their early stages, though, and no formal investments, let alone plans for cost sharing, have been announced. However, there appears to be a somewhat higher expectation for the Northwest Passage's economic potential than earlier, after the successful transit of *Nordic Orion* in 2013.

Moreover, in Canada's Northern Strategy from 2009, we find a strong commitment to promote social and economic development in Canada's North, and the Canadian government encourages future exploration of oil and gas.⁸ Formally, the federal government controls the development of offshore oil and gas in the Canadian Arctic. However, there is an ongoing process of "devolution," the transfer of governance of resources to the Territories.⁹ It is completed in Yukon, is under negotiation with the Northwest Territories, and talks have started with Nunavut.¹⁰ Ceding new powers to the Territories will give the territorial governments additional responsibility for approving resource development.¹¹ This may not affect offshore exploration and production directly, but it will have indirect effects since most offshore projects require onshore infrastructure. The National Energy Board will continue to have regulatory responsibilities for oil and gas exploration and production activities offshore.¹² But there are some uncertainties regarding the future political framework.

At the regional level, interest in the offshore development of the Beaufort Sea on the part of the Northwest Territories (NWT) is not strong. Current onshore production levels are low. Thus, the region is not heavily dependent on revenues from oil and gas, and local communities tend to favor mineral extraction. Developing mineral deposits is perceived as giving more direct benefits (revenues and labor), and mining is often perceived as the future economic driver of Canada's North.¹³ Thus, the decision to open for petroleum activity, including lease sales and exploratory drilling, is more closely linked to federal interests. Furthermore, Canada is not dependent on these resources for domestic energy supply. The presence of oil sands in Alberta and petroleum production in New Brunswick and Newfoundland has made Canada a significant producer. Canada is the fifth-largest energy producer in the world.¹⁴ Arctic offshore energy development is not a high priority. Much uncertainty remains about the resource potential in offshore Arctic Canada, however, and the discovery of a large oil or gas field could change this outlook.

The boom in domestic shale gas production has made the United States self-sufficient in natural gas, and prices have dropped. This development also has consequences for the commercial attractiveness of Canadian gas projects in the Arctic. The development of the Canadian Arctic offshore is price sensitive. The size of discoveries is crucial. Only the discovery of large natural gas and oil fields will allow the development of infrastructure. But if infrastructure is established, it could also serve smaller fields.¹⁵

Furthermore, environmental concerns are high on the Canadian political agenda. This shows in the Review of Offshore Drilling in the Canadian Arctic, where an emphasis is put on environmental issues and the involvement of native communities.¹⁶ The NEB's Arctic offshore drilling review concluded that any company wishing to drill in the Arctic must have plans that are safe for the public, workers, and the environment.¹⁷ A main goal in this review was to get a better understanding of Northern residents' perspectives on offshore drilling activities. Meeting aboriginal concerns is integral to any new offshore development. Consequently, the deficiency of infrastructure, price levels, a lack of regional and local interest, and uncertainties regarding the future political framework must be taken into account when considering oil and gas exploration in the Canadian Arctic.

Alaska – Large Undiscovered Resources and Environmental Mobilization

The Alaska Outer Continental Shelf (OCS) may be one of the world's largest untapped oil and gas basins. Offshore Arctic Alaska is made up of two areas: the Beaufort OCS and the Chukchi OCS.¹⁸ In the 1970s, 1980s and early 1990s, the U.S. government encouraged exploration drilling offshore in the Beaufort Sea and the Chukchi Sea, but drilling stopped due to falling prices.¹⁹ The next lease sale took place in 2008, but indigenous groups and environmental NGOs mobilized and appealed to the U.S. District Court in Alaska, which halted drilling in 2009. In the aftermath of the Macondo incident in April 2010, the Obama Administration imposed a six-month moratorium on all new offshore drilling in U.S. waters. Only in 2012 did Shell complete top-hole drilling on two wells in the Beaufort and Chukchi Seas.²⁰ However, on December 31, 2012, one of Shell's drilling rigs (the Kulluk) was damaged because of strong weather and stranded on an uninhabited island.²¹ Moreover, in September 2012, the company announced, after a containment dome designed for a potential oil spill in Arctic waters was damaged, that it was cancelling its drilling program for 2013. In November 2013, Shell filed a new exploration plan for the Chukchi Sea,²² but by January 2014, the company announced that it had postponed drilling for another year.²³ Both ConocoPhillips and Statoil also have postponed plans for drilling in the offshore Alaskan Arctic.²⁴ Nevertheless, expectations are that drilling will start in few years and that the first oil from the Beaufort and Chukchi Seas could come on stream in the early 2020s.²⁵

Currently, there are no Arctic deep-water ports in Alaska, but a study of the possibility of constructing such a port has been launched. The United States has two icebreakers operated by the Coast Guard, both of which are ageing. Planning for new icebreakers, which could enter service in the early 2020s, has started. Costs are estimated to be up to 1 billion USD. A report from the Government Accountability Office observes that "Less than one percent of navigationally significant waters in the U.S. Arctic have been surveyed with modern technology."²⁶ Generally, "economic opportunities in the U.S. Arctic are considered to be key drivers for the development of Arctic maritime transportation infrastructure." Currently, there is limited activity and limited plans.²⁷

Existing oil production accounts for approximately 90% of Alaska's

unrestricted general fund revenues.²⁸ For this reason, the regional interest in development is strong. But the State of Alaska lacks the decision-making authority to allow offshore drilling. The federal interest has been closely related to energy security and reducing dependence on foreign oil imports. However, the unconventional gas and oil revolution has lowered the federal urgency of Arctic energy development, and may make policy more susceptible to environmental concerns. Indigenous groups and environmental NGOs have mobilized against offshore development both at the U.S. federal and state level, emphasizing the lack of environmental considerations and the nonexistence of technology to clean up oil spills under ice in the harsh Arctic environment.

On the other hand, the potential for substantial discoveries is considered to be high. While lack of infrastructure is a challenge in every Arctic region, access to existing infrastructure is, given the Trans-Alaska Pipeline, rather favorable in Alaska.²⁹ However, offshore activity is still limited. The regulatory framework is still in the making, and harsh weather conditions, a short drilling season and environmental risks must be taken into account when assessing further development.

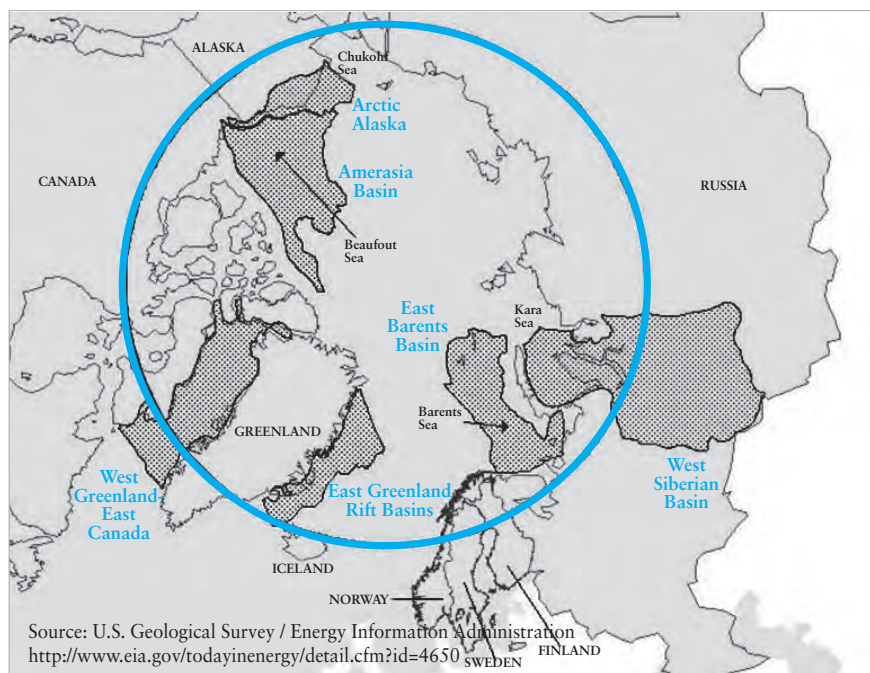


Figure I-1. Major petroleum basins in the Arctic

Greenland – Seeking Independence but Lacking Capacity

Oil and gas are expected to be found both on the east and west coasts of Greenland,³⁰ but exploration has been limited, and resource estimates vary. Test drilling started in 1976, but all wells, five in total, were considered dry.³¹ In 2000, a sixth dry well was drilled by Statoil. In 2002 and 2004, parts of the sea west of Greenland were opened for petroleum exploration, but the result was only minor bids by small companies. In 2006, however, two licensing rounds resulted in a total of seven licenses awarded to major companies, including Chevron, ExxonMobil, Cairn Energy, and Statoil. In the last years, several licensing rounds have followed, and in the summers of 2010 and 2011, Cairn Energy conducted eight exploratory drillings offshore in Greenland. No big discoveries were reported, but hydrocarbons were found in Greenland for the first time.³² In 2012 and 2013, seismic studies further north along the west coast were conducted, and major companies like Shell and Statoil are showing interest in future exploratory drilling in the area. Two successive licensing rounds for an area on the east coast of Greenland have been carried out. By the end of 2013, licenses had been awarded to bidding groups involving several leading international oil companies.³³ They have indicated that development is long-term and will be stepwise.³⁴

This is evident also when looking at Greenland's maritime infrastructure, which is limited. But a decision to expand and modernize the port in Nuuk on the southwestern coast of Greenland so that it can handle larger ships and more traffic was made in 2012. It is estimated to cost some 109 million USD, to be paid with state money and to be ready in 2016.³⁵

Greenlandic governments have been actively promoting petroleum development, in order to reduce dependence on Denmark and eventually provide an economic basis for full independence.³⁶ There is no oil or gas transportation infrastructure in the country, and the lack of administrative capacity (Greenland has only 57,000 inhabitants) is also vital to recognize when discussing the future of oil and gas development in Greenland. Moreover, the cost of accessing reserves in waters that are icebound most of the year are high,³⁷ and due to the harsh environmental conditions insurance requirements are high and strict liability provisions apply.³⁸ Greenland's location, however, provides easy access to both North American and European markets for oil. The lack of infrastructure and current market prices for LNG thus suggest that potential oil discoveries

seem most likely to be developed.³⁹

A key question is whether Greenland has the capacity (infrastructure, human resources, administrative capacity, etc.) to be both a mineral and hydrocarbon nation. In 2013, the newly elected government lifted a uranium mining ban, underscoring that this could be a big step towards both economic and political independence from Denmark.⁴⁰ The upshot is that a successful mining development could reduce the political interest in petroleum exploration. Yet the mining issue remains controversial in Greenland, as exemplified in the hard fought November 2014 election.

Norway – Dynamic and Petroleum Dependent

Norwegian oil and gas production takes place solely offshore, with activity in the North Sea, the Norwegian Sea, and the Barents Sea. The Norwegian part of the Barents Sea, the only area defined as Arctic, is ice free and thus different from many other Arctic areas.

In 2001, oil production peaked on the Norwegian continental shelf (NCS). To stimulate exploration, the government produced a scheme making it more attractive for new companies to become involved in oil and gas activity. Only around 40% of the total expected resources of the NCS have been produced. Furthermore, increasing gas production could lead to growth in total petroleum production.

In 1980, the first exploration well in the Barents Sea was spudded, and in 1984, Statoil discovered the Snøhvit (“Snow White”) gas field, with recoverable reserves of 193 billion cubic meters of natural gas, 113 million barrels (17.9 million cubic meters) of condensate, and 5.1 million tons of natural gas liquids (NGL).⁴¹ Production started in 2007. In 2000, the Goliat oil discovery was made, and it will start producing in 2015 with Eni as operator.⁴² Estimates from 2013 indicate that total investments (actual and expected) for these two projects amount to some 12 billion USD.⁴³ For comparison, ca. 28 billion USD was invested in the NCS in 2013 alone, excluding exploration.⁴⁴

In recent years, several significant discoveries have been made, notably the Johan Castberg (formerly called Skrugard) and Havis fields, with recoverable reserves estimated between 400 and 600 million barrels.⁴⁵ Moreover, a license round completed in 2013 allocated 20 new exploration and development licenses, and licensing in the Norwegian part of the previously disputed area with Russia is expected soon. However, by summer

2014 only 109 exploration wells had been drilled in the Norwegian part of the Barents Sea. The Norwegian Petroleum Directorate estimates that 8 billion barrels of oil equivalents of undiscovered resources are located in the Norwegian Barents Sea.⁴⁶

In terms of maritime infrastructure, Norway has a string of ports along its northern coast, but none of them is large. Proposals for expansion in anticipation of increased traffic on the Northern Sea Route (NSR), with an accompanying need for reloading capacity, have been put forward by some of them. The port in Kirkenes, near the border with Russia, includes an undeveloped deep-water harbor area that would have room for extensive reloading facilities or an offshore base. It is controlled by Tschudi, a Norwegian investor.⁴⁷ Whereas several ports in the northernmost county of Finnmark can be used as service ports and bases for offshore petroleum projects, the government has concluded that only Kirkenes is relevant for larger petroleum-related facilities.⁴⁸ Extension of the port in Tromsø, further south, is going on, mainly with a view to petroleum activities, but also cargo handling for the NSR.

The Norwegian state participates in petroleum development in several ways. It is the dominant shareholder in Statoil, and it is also a big direct investor through its own economic interest in licenses, administered by the state company Petoro. Because of the companies' deduction of investment costs from their revenues, the state is covering 78% of their exploration costs.

By adopting legislation the Norwegian Parliament sets the framework for petroleum activities on the NCS. Moreover, major development projects must be considered by the parliament. A major goal is to optimize project developments by coordinating the infrastructure development and the establishment of offshore bases. Sometimes, disputes between business preferences and regional expectations emerge. The broader infrastructure issue in the Barents Sea involves the construction of gas pipelines vs. LNG transport. So far, all Norwegian Barents Sea gas is liquefied, and no decision on a pipeline, which would require the coordination of several fields, has been made. Inclusion of Russian gas in a Norwegian pipeline has also been discussed.

The High North is often portrayed as Norway's principal foreign policy concern. This strategic interest is apparent not least in Norway's relations with Russia, in the management of marine resources and of the Barents Sea as an important area in terms of shipping and oil and gas reserves.

Development in the area must be considered in light of this political priority.

Norway has over 40 years of experience as an oil and gas producer. The sector is the most important industry in Norway, directly or indirectly employing 250,000 people. About 50 Norwegian and foreign companies are active on the NCS. Moreover, the petroleum sector's share of state revenues is 30%, and it accounts for 52% of total exports, respectively. Thus, Norway is heavily dependent on revenues from the oil and gas sector, and the future development of petroleum is of paramount importance to the Norwegian economy.

Nevertheless, there are currently strong voices in the parliament mobilizing against further offshore development, particularly in the northern part of the Barents Sea, arguing that Norway has to prepare for a less carbon-intensive economy and the need to develop more renewable energy. Climate change in the region and its consequences for Norway are high on the political agenda. The lack of capacity to handle major oil spills in the region is also a major issue. More recently, concern over the commercial viability of Arctic offshore development has become more pronounced. An almost saturated gas market has reduced the attractiveness of gas developments, as is the case also in other parts of the Arctic offshore. The cost increase in the petroleum industry is also casting a shadow over Arctic oil, creating uncertainty regarding the development of the large Johan Castberg field.⁴⁹ Despite all the exploration licenses that have been awarded, rapid industrial development in the Norwegian Barents Sea is not a given.

Russia's Arctic – A Resource Base for the 21st Century?

Russia has the largest continental shelf of all the Arctic states and has high ambitions for Arctic petroleum exploration and development. Russian estimates put initial resources on the continental shelf, discovered and undiscovered, at 70 billion tons of oil equivalents. Of this, 13.5 billion tons (85 billion barrels) are estimated to be oil, and 73 trillion m³ natural gas.⁵⁰ That means gas makes up 80% of the total. Most of the resources are expected to be found in the Barents and Kara Seas, altogether 53 billion tons oil equivalent. These numbers are very preliminary and include mainly undiscovered resources, but they are reference points in the Russian debate and say something about Russian expectations. As of 2012, only 10% of

Russia's total offshore resources had actually been discovered. Huge areas are unexplored.⁵¹

Only one field, Prirazlomnoe, is under development in shallow waters with severe drifting ice in the Pechora Sea (the southeastern part of the Barents Sea). It started producing in 2014, and the plan is to reach a level of 5 to 5.5 million tons by 2021.⁵² Capital expenditures for the project have been estimated at 5.7 billion USD.⁵³ The project is fully owned by Gazprom through the offshore subsidiary Gazprom Neft Shelf, which holds the license, whereas actual oil production from the field is taken care of by the larger oil subsidiary Gazprom Neft. Plans by Gazprom, Total, and Statoil for development of the giant Shtokman gas and condensate field were advanced, but the project was, for all practical purposes, abandoned in 2012, mainly because of the changed gas market situation.

Russian authorities have issued licenses for exploration drilling in the Arctic offshore since 1992, but the scale of activities has been small. This changed in 2011-2012 when Rosneft was given huge acreage in the Kara Sea and the Barents Sea and signed agreements with ExxonMobil, Eni and Statoil for exploration and development of these areas. In 2013, more acreage in the Kara Sea and in the Laptev and East Siberian Sea were added to the Rosneft-ExxonMobil cooperation, altogether covering some 760,000 square kilometers. Seismic surveys in the Kara Sea were carried out in 2012-13, and first exploratory drilling took place in August-September 2014. The project with Eni covering the southern part of the previously disputed area with Norway stipulates first drilling before 2020, similar to Statoil's project with Rosneft in the northern part of this area.

Furthermore, Rosneft has agreed to cooperate with the Chinese National Petroleum Company to study three structures in the Barents Sea.⁵⁴ In September 2014, it entered into a partnership with Petro Vietnam for the exploration and development of two smaller blocks in the Barents Sea.⁵⁵ Some exploration activity on smaller structures is also carried out by other companies in the Pechora Sea, the largest of which is Dolginskoe (Gazprom Neft), with estimated recoverable reserves of some 200 million tons of oil. A new series of exploration drillings there started in 2014.⁵⁶

Exploration of the Arctic areas further east is expected to start later. The Arctic offshore has enjoyed high priority in Russian public documents and official statements for the last 10 years due to increased knowledge about the resource potential, but also because of problems with renewal of the onshore resource base, increasingly dominated by less-developed,

complex and remotely located deposits. The Russian Arctic, which also includes the northern rim of land, has been called the country's resource base for the 21st century.

The surge in offshore licensing since 2010—particularly to Rosneft—clearly heralds more activity. However, even with the partnerships with foreign companies there will be limits as to how much the company can handle. Reorganization of the offshore activities cannot be ruled out. Until then, engagement on Russia's Arctic continental shelf will have to go through Rosneft and Gazprom and the joint ventures they establish.

The deals that have been concluded between Rosneft and the foreign companies, ExxonMobil, Eni and Statoil, call for the foreign companies to cover all of the high initial exploration costs, seismic and first exploration wells. The first well in the Kara Sea would reportedly cost between 0.5 and 1 billion USD.⁵⁷ Thus, Rosneft's exposure in the first years is modest. Only later will Rosneft be required to come up with investment funds, but they will be enormous. According to Rosneft's president, investments in the company's program for the Arctic continental shelf will amount to 400 billion USD over the next 20 years.⁵⁸

Russia's Arctic offshore development depends on participation by leading foreign companies, as witnessed in the deals signed by Rosneft. The sanctions following the crisis in Ukraine in 2014 definitely complicate the outlook. By September 2014, it became clear that ExxonMobil would be required to abandon the drilling campaign in the Kara Sea before the scheduled end of season.⁵⁹ As long as the sanctions stand, development of the larger Arctic offshore projects will remain frozen. Replacing Western companies with Chinese ones is unrealistic, since the latter do not possess the necessary experience and competence to operate in remote areas. Even when the sanctions are lifted, effects will linger. A new sort of risk has been introduced for investors. Could new crises emerge? This will add to the already high commercial risk associated with the projects.

Despite the long Arctic coastline, Russia has only a few large Arctic ports open for use by foreign ships. Murmansk, which is ice free, is the major port in the Russian Arctic, home to the nuclear icebreaker fleet and set to be the main offshore petroleum base for the western part of the Russian Arctic. It is also a significant oil export terminal for oil products brought there by rail; a reloading terminal for crude oil is situated in Kola Bay near the city. The port is already overloaded (17 million tons handled in 2013,⁶⁰ and a large share of which was oil) and plans for extension have

been underway for many years. A major complication is that segments of the port are controlled by different agencies and companies, which cannot reach agreements. The port of Arkhangelsk is, unlike Murmansk, dependent on icebreakers in the winter season. It is still a significant port, but reportedly only 1.5 million tons were handled in 2013.⁶¹ It has depth limitations, and plans for a new deep-water section have been presented, but not financed. Dudinka, at the mouth of the Yenisey River, was given the right to receive foreign ships in 2012. The port serves the mining complex in Norilsk, but is also a significant reloading point for goods up and down the river, reaching into the heart of Siberia. The port of Sabetta on the Yamal Peninsula is currently under development and will, in addition to Yamal LNG, serve other petroleum projects in the region. The Russian government has pledged substantial contributions to the financing of the port. Tiksi, at the mouth of the Lena River, has an important strategic location connecting the huge Sakha Republic to the sea. It has also been used for oil exports, but its condition is unclear. The port of Pevek on the Chukotka Peninsula was opened for foreign ships in 2012. It is an important port in the operational management of the NSR and also serves the mining industry on the peninsula.

Management of Russian ports is the responsibility of the regional administrations of the Federal Agency for Ocean and River Transport (Rosmorrechflot). Ownership of Russian ports varies, and is often divided between different owners, both state bodies and private companies. This may in itself complicate development. But the most import constraint is financing. All the ports are in serious need of upgrading, and many smaller ports are hardly functional.

The most important part of Russia's Arctic shipping infrastructure remains the icebreaker fleet.⁶² As of 2014, four nuclear icebreakers were in operation. The official plan is to construct three new 60-megawatt icebreakers, to be delivered in 2018, 2020 and 2021, at a cost of about 1.3 billion USD each. A critical period between 2017 and 2020 is approaching when the capacity of old icebreakers with extended service life can be increasingly questioned, at the same time as the new ones may not be available yet. Russia is in need of rapid renewal of its icebreaker fleet if it intends to continue the present level of icebreaker services.

By 2012, there were four diesel-electric icebreakers operating on the NSR. In addition, there were five on the White Sea and four in the Far East Basin.⁶³ Most of these ships were built in the 1970s and are in need

of replacement. A program for building new diesel-electric icebreakers has been launched, and the construction of the first in the LK-25 series started at the Baltiyskiy Zavod yard in St. Petersburg in October 2012, to be finished at the end of 2015, at a cost of some 8 billion roubles. With 25 megawatts, it will be the strongest non-nuclear icebreaker ever built. It will be operated by Rosmorport, a state enterprise set up to develop Russian sea transport infrastructure, and is a multipurpose vessel designed for escort service along the NSR as well as other functions, with a capacity to cut two meters of ice.⁶⁴ Construction of one 18 MW and three 16 MW icebreakers also seems to be underway. The diesel icebreakers currently in use for longer hauls are 15 megawatt. If the renewal of the diesel-electric icebreaker fleet is fully implemented, it will increase capacity for destination traffic and transit in the summer season. It will not contribute to an extended sailing season, however.

The Russian government has gone a long way toward making foreign investments in offshore activities attractive. The fiscal framework for individual projects prioritized by the government seems negotiable. In addition to the economic interest in offshore energy, the government also sees offshore development as a vehicle for modernization. There is some uncertainty, though, about how far and for how long the new tax conditions can be extended, since they imply low government revenue in a period when state income from traditional sources is likely to fall. Competition to a vigorous offshore effort can emerge from non-traditional oil onshore, which may promise a better payoff.

To sum up, the Arctic offshore has enjoyed a high priority in Russian public documents and official statements for the last 10 years due to increased knowledge about the resource potential, but also because of problems with the renewal of the onshore resource base, increasingly dominated by less-developed, complex and remotely located deposits. The Russian Arctic, which also includes the northern rim of land, has been called the country's resource base for the 21st century. There is little opposition to Arctic drilling for environmental reasons.

CONCLUDING REMARKS

There are big differences in the scale as well as the organization of offshore petroleum activity in various Arctic coastal states. In the United

States, Canada and Greenland, the initiative is clearly in private hands. In Norway and Russia, the state is more directly involved through ownership in dominant companies as well as state development priorities. However, each major investment project has its own character. The speed and force of Arctic offshore petroleum development seem to have abated somewhat in recent years. This is especially true for Alaska, but also in other parts of the Arctic there are concerns over costs—partly caused by stronger attention to environmental protection. Rising costs are a general problem for the petroleum industry, but particularly painful in areas that are already high cost, and perhaps marginal, like the Arctic. The gas market revolution, has made Arctic offshore gas much less commercially attractive. Furthermore, there is considerable public resistance to offshore petroleum activity in Alaska, Canada and Norway. The strongest public support for increased activity seems to be in Greenland, but there also a debate on the merits of offshore expansion is taking place. In Russia, the opposition to Arctic drilling is minimal.

In terms of maritime infrastructure, the overall conclusion is that not much is going on. There is an abundance of plans, but not much firm investment. This goes for all parts of the Arctic. But unlike Alaska, Canada and Greenland, where there is little infrastructure to begin with, Russia benefits from enormous investments in ports as well as icebreakers in the Soviet period. However, the need for new investment there is also urgent. Norway's Arctic coast is more developed than most other parts of the Arctic coastline, but ports must be extended if they are going to play a role in future Arctic development.

The development of port infrastructure seems to be a logical area for private-public partnerships since the major ports discussed will ultimately have several users, even if one particular project may be decisive for starting the development, as in the case of the port of Sabetta and Yamal LNG. The interest in controlling costs gives a strong impulse to develop dual-use facilities, and there is hardly any example of authorities claiming sole responsibility for infrastructure investment. Illustratively, in the new Russian Arctic strategy document from 2013, the idea of private-public partnership is repeatedly stressed as a solution to Arctic investment needs. But what it means in practice exactly is unclear. This can only be clarified via negotiations on a case-by-case basis.

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3. Patterns of Investment in the Russian Onshore Arctic: An Area of Stable Growth?

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INTRODUCTION

In recent years, when speaking of the Arctic, we usually refer to economic activity in the framework of new projects, new opportunities, and new development thrusts. But this approach can be applied only partially to Russia, as the country has been undertaking economic activities for a long time in this region. Moreover, Russia's economic development is largely determined by the development of the Arctic, its conditions and dynamics—it was true before, it is still true now, and it definitely will be true in the future. According to a credible estimate, products manufactured in this area provide 11% of the country's national income and 22% of the export turnover. The region contains considerable reserves of natural gas, diamonds, gold, silver, copper, and other mineral resources.¹

It is difficult to provide a comprehensive estimate of investment needs to realize resource development and improve infrastructure, but scattered data indicate that they are enormous. In particular, the Russian Federal State Statistics Service (Rosstat) is conducting a project that would update the Federal Plan of Statistical Operations and incorporate a new section for official statistical data.²

These remarks (or, rather, first-step reflections) are essential when analyzing the problems of investment activity in land areas of Russia's Arctic zone. The main principles are as follows:

1. The Arctic's economic development (which is impossible without investment activity and various social projects) is the most important component of social and economic development of Russia as a whole.
2. Economic activities in the land territories of Russia's Arctic zone have their own history that should not be ignored when analyzing investment activity. In other words, one cannot consider investment activity in the land territories of Russia's Arctic outside

the modernization or, rather, adaptation of previously created production, technological and social systems to the modern, more open economy and to a new Russian economic system currently under development.

3. It is quite difficult to present complete and comprehensive data on the current state and dynamics of investment activity in the land territories of Russia's Arctic zone. Still, it is possible to present main trends.

We should introduce the analysis of investment trends in the land territories of Russia's Arctic zone with the following consideration: the main economic goal in the Arctic has always been and still is to explore sources of mineral and natural resources with exceptional geological characteristics and mining potential. Nonetheless, the sources explored and then involved in the economy were not only unique due to their rare and valuable minerals. Those characteristics were able to provide economies of scale to the full extent. This can be applied to the apatite ore deposits on the Kola Peninsula (explored in the 1930s); copper-nickel and polymetal deposits in the Norilsk District on the Taymyr Peninsula (in the 1930s-40s); gold, zinc and lead deposits in the northeastern part of Russia (in the 1940s-50s); kimberlite pipes deposits in the Republic of Sakha (Yakutia) (in the 1950s-60s); and unique gas fields in the Nadym Pur Taz District in the north of Tyumen Oblast (in the 1970s-80s). These sources of raw materials were explored exceptionally effectively because of considerable mineral reserves (all the deposits above are among the largest in the world in their categories) and engineering solutions aimed at fast extraction of mineral resources which did not pay much regard to their consequences for the environment.

New sources of minerals are characterized less by reserves/resources potential than by more-complicated regional/geological conditions. Among their features: complex structures of minerals and hydrocarbons (solid, liquid and gaseous ones), great stratification depth (e.g., the exploration of diamond deposits in Arkhangelsk Oblast requires overburden removal), a large distance from previously constructed objects of industrial and social infrastructure, and big environmental risks. As a result, their development requires much higher per capita investments and also new technical, technologic, organizational and economic solutions.

The last important feature is the open character of all the projects,

whether previously executed or still pending. The majority of projects exceed the demands and capabilities of the Russian domestic market, by their size and by investment requirements. This is one of the reasons why a significant number of these projects are pursued as joint projects with companies from abroad (especially those that have experience, know-how, technology or investment potential).

We illustrate these arguments on project-to-project basis, starting from the west and finishing north of Russia's Arctic zone.

EUROPEAN LAND AREA OF RUSSIA'S ARCTIC ZONE

We should note that it is necessary to examine ore mining and energy projects separately. The main reason for this distinction is the different in-service dates for the objects and different schemes of delivery for extracted products. Consequently, investment projects are effective in different ways and have different aims.

The following trends are typical of the European part of Russia:

- a) Stagnation in the mining industry, and
- b) development in the oil-and-gas sector (especially resulting from creating a "window" to the north of the Komi Republic and the shelf area of the Pechora Sea).

Mining Industry

Existing apatite projects. JSC Apatit (a subsidiary of JSC PhosAgro) is a company primarily directed to support the current apatite ore and raw materials base, processing facilities and infrastructure objects, to increase production, to decrease net cost, and to provide industrial, environmental and fire safety. A major portion of investment goes to underground mines, mainly the Kirov phosphate mine.³ The combined Kirov apatite mine was founded in 1989 from two underground mines, the Kirov mine, exploring the Kukisvumchorr apatite deposit since 1929, and the Yukspor mine, exploring the same deposit since 1954.

New apatite projects. JSC Akron is a company building a mining and concentration plant named Oleniy Ruchi, which would be the first large investment green-field project in the northwestern part of the country. It is

completely financed with private funds. This project is the only one that is aimed to recover production of phosphate-bearing raw materials in Russia. The first phase was completed in the middle of 2012, and it has capacity of 1 million tons of apatite concentrate per year. Investments amounted to 430 million USD. The second phase will be completed in 2017, and it will have the same capacity.⁴

Polymetals. JSC Norilsk Nickel plays the main role in this sphere. According to the company's documents describing its development strategy for the next few years, Kola Mine & Metallurgical Company (MMC) (one of its operational divisions) is problematic for the parent company and will not be actively developed. The company intends to decide the future of the assets resulting from business activities in 2015 and reconfiguration of its manufacture. Norilsk Nickel is going to restructure its process chains. All the processes connected to the smelting of nickel will take place at the Polar Division on the Taymyr Peninsula, whereas refining will be in the Kola MMC.⁵

Diamonds. Arkhangelsk Oblast is one of the three most northern regions with diamond mines (along with Yakutia and Canada). OJSC Severalmaz, the youngest mining company in Russia, was founded in 1992 in order to explore the Lomonosov diamond deposit; 95% of its shares belong to the Alrosa Corporation. The company started producing in 2006, and since then production levels have stayed at about 500,000 carats per year. In March 2014, Severalmaz established a second processing plant in the Lomonosov MCP to process 3 million tons of ore per year, which would help significantly increase processing and, as a consequence, the output of diamonds. In 2014, JSC Lukoil (a Russian oil company) will launch another diamond deposit, the Grib diamond pipe.⁶

Nevertheless, new projects, such as Oleniy Ruchei MCP or launching diamond mines in Arkhangelsk Oblast, cannot compensate for the loss of total mining production in the region. Modernization of previously launched mining companies in the European part of Russia's Arctic zone is leading to a significant reduction in employment.

JSC PhosAgro, the parent company of JSC Apatit on the Kola Peninsula, is undergoing the same process. In 2013, the company is reported to have started mass dismissals in the Apatit area. The number of the redundant may reach up to 3,500 people, i.e., up to one third of the total staff.

Currently, the main efforts of all industrial enterprises in the region are intended to maintain production at a constant level. Except for the Komi

Republic, after 2011, all the regions in the European part of Russia's Arctic zone have demonstrated a decrease in industrial output.⁷

Energy Resources

Coal. Over the past 20 years the annual production of JSC Vorkutaugol and Intaugol has decreased by 46.6%. In 1990, total output was near 30 million tons; from 1990 to 2002 it has fallen to 12.9 million tons. The decrease is attributable mainly to unfavorable circumstances in the Russian coal market. In 2002, domestic coal markets fell, which made restructuring of the industry unavoidable. As a result, a significant number of mines in the Pechora Coal Basin were shut down, and production fell to half the level of the 1990s. In 2013, the turnover of coal in the port of Murmansk increased by 12% and reached 13 million tons. A major part of it was produced in the Komi Republic.⁸

Oil and gas. In the Kharyaga oil field, Total S.A. is currently exploring the Haryaginsk deposit, with 97 million tons of oil in the licensing area, under production sharing agreement conditions signed in 1999. The participants of the PSA are as follows: Total S.A. (40%, the executor), Norwegian Statoil ASA (30%), JSC Zarubezhneft (20%) and Nenets Oil Company (10%) belonging to the administration of Nenets Autonomous Okrug. Over 33 years of the project, it is expected to produce 45 million tons of oil. The highest production level will be 1.9-2.0 million tons of oil, and may be reached in 2017-18. As of 2011, the project expected 389 cluster pads to be constructed (about 3,000 individual boreholes) and nearly 10 billion USD to be funded in total.⁹

Varandey and a cluster of fields. Varandey is a unique transport project by Lukoil aimed to build and launch an Arctic oil export terminal. The terminal is a fixed offshore ice-resistant offloading terminal (FOIROT) with capacity of 12 million tons of oil per year. Departing from Varandey in small shuttle tankers, oil is transported to the port of Murmansk and loaded onto the estuarial barge "Belokamenka" for further exporting. The FOIROT was set in operation in 2008. All the objects of the Varandey terminal cost 78 billion rubles (2.6 billion USD).

Initially, the mineral owner was a joint venture founded by JSC Lukoil and ConocoPhillips and named LLC Naryanmarneftegaz (NMNG). In January 2014, the licenses that this company had acquired to exploit deposits in the areas of Medyn, Myadsey and Toboy fields were reissued

to a new owner, LLC Lukoil-Komi. It was estimated that the production-sharing project will extract up to 10 billion barrels of oil. According to the assumptions, the participants should have been extracting 10 million tons of oil per year by 2008. However, due to a mistake made by the geologists who worked in Yuzhnoye Khylochuyu, the main deposit, production levels began to fall drastically. Thus, in 2009-2010, less than 7 million tons of oil were extracted, and only 3.3 million tons by 2011. In 2012, ConocoPhillips sold its share (30%) in NMNG to Lukoil for about 600 million USD, so Lukoil obtained 100% of the company. Naryanmarneftegaz now has seven licenses to exploit deposits in the Nenets Autonomous Okrug: Yuzhnoye Khylochuyu, Yareyu, Varandey, Toravey, Zapadnyy Lekeyagin, Severnyy Saremboy, Varandey-Adzvin structure zones with Perevozhnoye, Mezhdurechensk and the Sedyagin deposits inside.¹⁰

Trebs and Titov oil field. A development project for the Trebs and Titov oil fields, one of the largest unexploited deposits in Russia (total reserves for ABC1 categories exceed 210 million tons), is being executed by JSC Bashneft and JSC Lukoil. This can significantly decrease costs and minimize project risks by using existing infrastructure and work experience in the region. The total project implementation cost is about 180 billion rubles (or about 5 billion USD).¹¹

Prirazlomnoye field. In December 2013, JSC GazpromNeft started oil production from a field with an offshore ice-resistant stationary platform, Prirazlomnaya. In April 2014, the first oil tanker left the station with cargo weight of 70,000 tons. In 2014, it is planned to ship more than 300,000 tons of oil. A new oil grade from the Prirazlomnoye field is called ARCO (Arctic Oil). After increasing production, part of the oil will be sold on the basis of long-term contracts. The Prirazlomnoye oil field is in the Pechora Sea 60 km off the coast. The planned production is about 6 million tons per year (which will be executed after 2020).¹²

The Prirazlomnoye field was discovered in 1989. At first, Gazprom planned to start exploring it 10 years ago, in 2004. The company estimated the exploration costs as 200 billion rubles (6-7 billion USD). This sum includes the cost of the platform Prirazlomnaya (60-65 billion rubles), infrastructure, two service ships and two ice class tankers.¹³

As exemplified by the European part of the land Arctic zone, we can see clearly that projects in the oil-and-gas sector are developing dynamically (taking account of a rather limited chance to increase the resource base), modernization processes are facing more difficulties, and the Russian

mining industry is renewing its assets. In the latter case, the growth is “destroyed” by the increasing complexity of processes and inefficiency of deposits long under development and production. One of the reasons is the notorious insider’s dilemma: major owners of metallurgical and mining companies do not want to lose their dominance when making decisions and receiving income from their assets (despite their declining profitability), as well as severe employment conditions for redundant workers in northern monotowns, whose economy is dominated by a single industry or company. Economies of scale have practically disappeared (especially in the case of long-developing fields).

NORTHWESTERN SIBERIA—THE YAMALO-NENETS AUTONOMOUS OKRUG

All the trends mentioned above are also common in this area. Although its land territories and internal waters (the estuaries of the Ob River and Taz River) have immense reserves of natural gas (the size of fields is over 1 trillion cubic meters), the trend is practically the same.

Supergiant Gas Fields Brought into Development in the 1970s-80s and 2000s

This type of deposit comprises (the licenses to develop the fields belong to Gazprom subsidiaries)¹⁴:

- Medvezhye: 4.7 tcm, brought into development in 1972 (capacity is 70 bcmpa).¹⁵
- Urengoy: 16.5 tcm, brought into development in 1978 (capacity is 280 bcmpa).¹⁶
- Yamburg: 8.2 tcm, brought into development in 1982 (capacity is 160 bcmpa);
- Zapolyaroye: 3.5 tcm, brought into development in 2001 (capacity is 105 bcmpa); since 1994, investments in its development have accounted for about 140 billion rubles (about 4.5 billion USD excluding transport infrastructure).¹⁷
- These fields have the following development process characteristics:
- the first step is to develop the so-called Cenomanian deposits (at

- a depth of 1100-1700 m, with a stratum width of 200-300 m) containing almost pure methane with a certain percent of ethane;
- gas is shipped using mostly a system of cross-country pipelines to deliver it to the European part of Russia and Europe; and
 - the economies of scale factor has a pronounced effect: due to low unit costs, they could transport gas over large distances and generate substantial gains.
 - While production levels in these giant fields are declining, costs are rising fairly fast. In 2013, the annual costs increase exceeded 10%. The average gas production cost of 2013 is reported to be 1232 rubles/mcm (38.72 USD/mcm or 1.2 USD/MMBtu) compared with 1085 rubles/mcm (34.92 USD/mcm or 1.1 USD/MMBtu) in 2012.¹⁸

Eventually, the advantages stated above will be lost, making room for rather complicated issues:

- enormous spending made to renew key assets, as well as dispose of and close certain manufacturing units (which is currently happening in the Medvezhye gas field);
- a need to maintain decreasing pressure in order to deliver gas over large distances; and
- the growing importance of exploring more complex and less homogeneous deposits (first of all, in hydrocarbon content), because of increased production of gas condensate and even oil.
- The main result of these trends is that the proportion of so-called “low-pressure gas” in these deposits is rapidly increasing. LP gas is economically unprofitable and ineffective to be extracted for further transportation.

New Project in an Old Place

The projects mentioned above depend not only on how the LP gas problem is solved but also on the exploration and development of smaller, deeper and more complex fields (in terms of hydrocarbon composition). In 1997, commercial production of oil started in the Urengoy field. Since 2008, there has been gas and gas condensate output from the Achimov layers, and the next step is to exploit Jurassic sediments. The Achimov formation has low

productive capacity, so the project includes construction of 200–300 meter-long horizontal wells and hydraulic fracturing.

More complex and deeper deposits provide a basis for collaboration with technologically advanced companies. Therefore, in July 2003, Russian JSC Gazprom and German company Wintershall Holding GmbH (BASF's wholly owned subsidiary) founded a joint venture, JSC Achimgaz, on the principle of parity (50:50) to exploit Achimov deposits at the first test site in the Urengoy gas field. In 2008, Achimgaz brought the site into pilot production and into commercial production at the end of 2011.^{19,20}

Another successful co-project between Gazprom and Wintershall Holding GmbH is the Yuzhno-Russkoye oil/gas/condensate field in Yamalo-Nenets Autonomous Okrug (YaNAO). The field was brought into production in 2007 and has capacity of 25 bcm.

Yamal mega-project. Besides extracting natural gas, gas condensate and oil from the deposits described above, Northwestern Siberia offers an opportunity to develop new large projects, although they are smaller than the previously mentioned sites. These kinds of fields are situated within the Nadym Pur Taz District, in the Yamal, Taz and Gydan Peninsulas, in the Gulf of Ob and the Taz Estuary.

The most important area is the Yamal Peninsula, where the Yamal mega-project is located. According to various estimates, the amount of investment necessary to implement the project fluctuates between 75 and 125 billion USD. In January 2002, the Gazprom Board of Directors named the Yamal Peninsula a region of strategic interest to the company. By 2030, the commercial exploitation of fields on the peninsula and the nearest offshore areas will have increased gas production to 360 billion cu m per year. A new large gas producing region is growing in Yamal that will replace traditional deposits in Nadym Pur Taz. There are 32 sites located on the Yamal Peninsula and adjacent waters, with total reserves amounting to 26.5 trillion cu m of natural gas and nearly 1.64 billion tons of oil and gas condensate. In terms of gas reserves, the Bovanenkovskoye field is the most significant one on the Yamal Peninsula, with 4.9 tcm.

Between 2007 and 2012, Gazprom's capital expenditures (including those of its subsidiaries) on projects in YaNAO and the Yamal Peninsula accounted for about 1.6 trillion rubles (about 500 billion USD). The investments were spent on the following ventures: the Bovanenkovskoye field development and the Bovanenkovo–Ukhta gas trunkline system; the Obskaya–Bovanenkovo railroad line; infrastructure development in the

Zapolyarnoye, Urengoy and Yamburg fields; expansion of the Urengoy gas transmission center, and the Zapolyarnoye–Urengoy gas pipeline.²¹

Bovanenkovskoye field. Production at the Bovanenkovskoye field is up to 140 bcmpa.

To deliver gas from the deposit, Gazprom has built a new 2451-km-long pipeline system, namely the Bovanenkovo–Ukhta and the Ukhta–Torzhok pipelines. The first start-up complex brought into production at the end of 2012 has a complex gas treatment plant with a capacity of 30 bcmpa and 60 wells.²²

Yuzhno-Tambeyskoye field. Another significant project is development of the Yuzhno-Tambeyskoye field, with reserves amounting to 1.3 tcm of natural gas. Unlike the Bovanenkovskoye field development, this project does not deliver gas to the long-distance pipeline, but relies on a liquefied natural gas (LNG) plant. It is planned to build three production lines, each with capacity of 5.5 million tons. The first line is to be officially launched in 2017. The project's total cost is estimated at 26.9 billion USD, provided that loan proceeds are about 70% (18-19 billion USD).²³

The main feature of the project is that it is not implemented by Gazprom, but by Novatek (formally an independent member of the Russian gas market, although Gazprom owns 19.9% of its shares). To produce LNG, a new company has been founded named Yamal LNG, shares of which belong to Novatek (60%), Total (20%) and China National Petroleum Corporation, or CNPC (20%).

It is worth mentioning that the cost of Yamal LNG construction has increased by 50-60% from the initial estimates and reached that of the Shtokman oil/gas/condensate field development, which Gazprom has postponed indefinitely. The project cost has risen from the original estimate of 18-20 billion USD to 27 billion USD, with 2.6 billion USD already invested. The participants in the project have received tax deductions for investments and have thereby transferred a part of the expenditures to the state. The government will pay 47 billion rubles (about 1.5 billion USD) to build a port at Sabetta to take delivery of construction supplies for the plant and then to ship LNG.²⁴

Novoportovskoye oil and gas field. Overall production from the Novoportovskoye field (developing by JSC GazpromNeft) is estimated to be 220 million tons of oil and 260 bcm of natural gas. A year-round oil export terminal near Mys Kamenny on the Gulf of Ob will be launched in 2014, and the field will be brought into production in 2015. Mys

Kamenny is approximately 400 km to the south of the Port of Sabetta, where Novatek plans to build Yamal LNG.²⁵ Between 2013 and 2015, JSC GazpromNeft expects to invest 91.7 billion rubles (nearly 2.5 billion USD) in the Novoportovskoye field development and 17 billion rubles (nearly 0.5 billion USD) on the Messoyakha gas field in YaNAO.²⁶

The port of Sabetta and its infrastructure. The oil and gas resources of the Yamal Peninsula open the door to creating a maritime infrastructure. The port of Sabetta is a good example. Construction of the port began in July 2012 within the framework of the Yamal LNG project. In terms of bottom dredging at Sabetta, it is estimated that the total amount of subsoil will amount to 70 million cubic meters. Starting from 2013, the port can take Cape size vessels, including icebreakers.²⁷

It is notable that certain players in Russia strongly support the intention to make the port universal and accessible in order to develop navigation along the Northern Sea Route (NSR) and expand foreign economic relations with the Asia-Pacific region. It was elaborated on the initiative of the three Russian regions (YaNAO, Khanty-Mansi Autonomous Okrug, and Tyumen Oblast) with the assistance of the Russian Union of Industrialists and Entrepreneurs.²⁸

EASTERN AND NORTHEASTERN SIBERIA

The projects executed in the mineral resource sector of the land areas within Russia's Arctic in Eastern Siberia and the Far East show vividly how two types of projects can combine and interact: one related to the modernization and reconstruction of previously created assets and another related to an opportunity to execute new projects. We should also emphasize that issues of modernization (as we described earlier for the mining industry in the European part of Russia's Arctic zone and for gas fields of land territories in Western Siberia) are not limited to attracting investment and obtaining access to new technologies. The fact of the matter is that the government should also change the institutional environment for implementing such costly projects.

Taymyr Peninsula

Norilsk Nickel: too late to modernize? JSC Norilsk Nickel is one of

the world's largest producers of copper, nickel and rare metals (such as platinum and palladium). Its major mining assets are mines and smelters located in the Kola and Taymyr peninsulas, which work together closely and represent a single process chain. The NSR facilitates collaboration between these territorial units, the Kola and Polar Divisions, respectively. Norilsk Nickel is currently both the main carrier and customer using the NSR to ship and receive cargo. The company possesses ice class vessels, a seaport at Dudinka, and terminals at Murmansk and Kandalaksha; it annually transports over 1 million tons of cargo, including equipment and concentrate for further processing. Apart from that, Norilsk Nickel provides the largest number of jobs in Norilsk, which is the largest city above the Arctic Circle in this region with a population of 178,000 people in 2013, and some monotowns on the Kola Peninsula.

In 2014, Norilsk Nickel announced the company's intention to reconfigure its process chains. Smelting will take place at the Polar Division, whereas refining will be in the Kola MMC. The company also wants to upgrade and expand the Talnakh facilities (Polar Division). As the new strategy states, the project requires 950 million USD in investments and will improve the quality of concentrate.²⁹ All the changes require Norilsk Nickel to attract significant funds, so the company counts on the government's assistance.

The main environmental problem of the old metallurgical plants at Norilsk Nickel's Polar Division is airborne emissions. According to a study on the most polluted places in the world conducted by Green Cross Switzerland in collaboration with the Blacksmith Institute, the annual amount of emissions into the atmosphere in Norilsk amounts to about 500 tons of copper and nickel oxides, and 2 million tons of sulfur dioxide. The whole modernization program of the Norilsk Industrial District will cost 70 billion rubles (about 2 billion USD). The nickel plant was launched in 1942 and is currently located within the city of Norilsk.

JSC Norilsk Nickel is an example of the consequences resulting from the monopoly of a company on unique mineral resources, which is true not only within the land territories of Russia's Arctic. The nickel and copper deposits of Norilsk District are exceptional in terms of ore structure, so they ensure stable high income for a long time, despite market fluctuations, due to the fact that major capital expenditures took place in Soviet times. Although nonferrous metals production is an economically efficient field, Norilsk Nickel has not paid much attention to technical upgrading and

modernization due to the company's monopoly position on the Russian market, private as opposed to public ownership of assets—the company's major shareholders are the leading Russian financial and industrial groups that also have great influence outside of the country (Interros (30.3%), United Company RUSAL (27.8%), Millhouse Capital (5.87%), Metalloinvest Management Company LLC (-4%)), and ineffective state regulation of the subsoil users' operations.

Norilsk-1—Is Russian Platinum LLC an alternative? In 2012, one of the attempts to change the monopoly situation in an important region of the land territories of the Arctic was to hold an auction/competition to find out who will have the right to exploit and produce copper-nickel ores in the southern part of the Norilsk-1 field. The winner of the auction was the mining company Russian Platinum (Russkaya Platina) due to its proposal meeting all the requirements of the competition for a deposit of federal significance. It is assumed that a new enterprise, the Chernogorskaya Mining Company LLC, founded to explore the southern part of Norilsk-1 will provide more than 3,000 jobs in Krasnoyarsk Oblast. The mine will be in operation for about 60 years. The work will be conducted in close collaboration with the Chernogorskaya Mining Company LLC, acquired by Russian Platinum and located in the same region. Capital investments will amount to 58 billion rubles (about 1.7 billion USD) in the first step and 78 billion rubles (about 2.2 billion USD) overall.

EASTERN TAYMYR (KHATANGA), NORTHWESTERN SAKHA REPUBLIC (YAKUTIA), AND THE FAR EAST

The eastern sector of the land territories at Russia's Arctic zone has not been explored in detail economically. The main mineral resources are diamonds (both traditional and found in meteorites), gold, and polymetals. So far, oil and gas resources have been found in the continental shelf of the Sea of Okhotsk; the shelf of other seas of the Arctic remains to be explored.

A distinctive feature of the mineral potential in the eastern area is its focus on and intention to satisfy the growing needs of a modern high-tech economy. Diamonds (especially meteoritic origin ones which have outstanding characteristics) can serve as raw material to produce high-strength and precision tools. As for rare earth elements, they are now in higher and higher demand in many sectors of modern industry.

The explored deposits have two main characteristics: their exceptional combination of between large scale and good quality of mineral resources, and their location in poorly developed areas, both economy- and transportation-wise.

Almazy Anabara

In the northwestern part of Yakutia, in Anabarsky and Olenyoksky Districts, the mining industry is rapidly developing. The Anabarsky mining and concentration complex ALROSA, OJSC Almazy Anabara, and OJSC Nizhne-Lenskoye are working in the alluvial diamond deposits, and Nordvik LLC is operating in the Yuzhno-Tigyanskoye oil field.

The main focus is the development of alluvial diamond deposits. Almazy Anabara (ALROSA's wholly owned subsidiary) conducts mining operations in the Mayat and Morgogor alluvial diamond deposits.

In 2102, the company produced 2,408 thousand carats of diamonds worth 161.8 million USD (the share of the company from the total diamond production of the ALROSA group in 2012 amounted to 7%). By early 2012, the company had accumulated 45.7 million tons of ore or 36.5 million carats of diamonds.³⁰

Rare Earth Metals of the Tomtor Field

One of the largest deposits of rare earth metals is the Tomtor field, which is located in the northwestern part of the Sakha Republic (Yakutia). The field is distinctive in its high concentration of minerals. There are 18 types of them, starting from conventional minerals (iron, phosphorus, titanium, vanadium) and ending with rather exotic elements (holmium, ytterbium, and lutetium). The State Register of Reserves lists 10 elements in the Tomtor field, each of which forms an industrial concentration. This deposit in Yakutia is a world leader in the number of unique compounds of niobium with rare earth elements.³¹ The Tomtor field is known for its rare elements: niobium, yttrium, scandium and lanthanide group. At current demand levels, reserves of rare elements in the deposit can satisfy the needs of Russia (and those of the world, under certain conditions) for hundreds of years.³²

On May 28, 2014, a joint venture of the state corporation Rostech (formerly known as Rostekhnlogiya) and the EAST Group won a tender to

develop the Tomtor field in Yakutia, one of the world's largest deposits of rare earth metals. Rostech and the EAST Group agreed to invest 1 billion USD in rare earth metal production in the next five years (until 2018). The Tomtor field is one of the largest ore deposits in the world, with estimated resources of 154 million tons.³³

Impact (Meteorite Origin) Diamonds of the Popigai Crater

Recent decades have seen the discovery of previously unknown types of diamond bedrock. In the early 1970s in the northern part of the Siberian platform, geologists discovered impactites occurring within the Popigai astrobleme lying in the eastern part of the Taymyr Peninsula and the northwestern part of Yakutia. Reserves of impact diamonds there greatly exceed those of the world's best-known diamondiferous deposits. In the bedrock of the Popigai crater, alluvial deposits of micropolycrystal diamonds also have been found. Impact diamonds, or lonsdaleites, belong to a new, previously unknown type of technical rough diamonds which are not well enough known for industrial development or use.

Gold and Polymetals of Northeastern Russia

The northwestern part of Russia's Arctic land territories, namely Magadan Oblast and Chukotka Autonomous Okrug, possesses significant resources of precious (primarily gold) and nonferrous metals. A distinctive feature of the region is a high degree of resource base development.

Magadan Oblast. The most successful projects in gold mining are those executed by the Kinross Gold Corporation of Canada. The company has been operating in Russia since 1995. It is the leading foreign investor in the gold mining industry, the leading Canadian investor in the Russian economy, and one of the largest taxpayers in the Russian Far East. Kinross Gold holds 100% of shares of the OJSC Chukotskaya Mining and Geological Company, which is developing the Kupol mine in Chukotka Autonomous Okrug. Since the company launched production in 2008, total production levels have reached about 3 million gold equivalent ounces. In 2010, the company acquired 100% ownership of Severnoye Zoloto LLC and Regionruda LLC, which are developing the Dvoynoye deposit and the Vodorazdelnaya property located 100 km to the north of the Kupol mine. The total investment amount exceeded 3 billion USD.³⁴

Companies in Magadan Oblast are considering cooperating with the companies of other countries, including China. In September 2013, the Administration of Magadan Oblast and China Nonferrous Metal Industry's Foreign Engineering and Construction Co., Ltd. (NFC in short) signed a co-investment agreement.

The agreement stipulates the terms and conditions of cooperation within an investment project on the Kunarev mine development in the Srednekansky District in Kolyma. Its resources are estimated to be 14,200 tons of silver, 4,200 tons of zinc, 605,000 tons of lead and 1.3 million tons of copper.³⁵

As we can see from the examples above, Russia's Arctic zone shows relatively high levels of investment activity. The companies of the region implement projects aimed to upgrade previously launched oil and gas objects and projects intended to explore new sources of raw materials and energy.

GENERAL CONSIDERATIONS

Since the late 1980s, Russia has been working on establishing a new institutional system for subsurface resources management, including the exploration of mineral resources in the Arctic. Apart from laws and regulations dealing specifically with subsurface resources, we surely need to mention legislative acts related to denationalization and privatization in resource industries, to taxation and pricing issues, and to problems of regulating certain activities (especially naturally monopolized ones).

The following characteristics are the most important features of the institutional environment in the mineral resources sector of the Russian economy (which fully applies to the Arctic case):

- a contradictory and ambiguous set of priorities regulating the formation and modification of the system;
- weak coordination and interdependence of different parts of the system (e.g., the one forming rules and standards of mineral resource use and the one defining conditions of mineral resource use) and a general trend for subsoil users to “localize” their economic activities in those regions where mineral resources are extracted;
- insufficient attention to questions related to conflict resolution,

adaptation of socially oriented solutions in the sphere of subsoil use (which would not only be designed to satisfy the specific needs of indigenous ethnic groups' economic life, but would also respect the concerns of the whole population of the Arctic);

- fiscal orientation of the main set of rules aimed to control subsoil users (to receive the most federal revenue, to the extent reasonably practical), which have led to an ongoing situation where the stress is not on socially determined production rates, but on achieving maximum development and production capacities, which is encouraged by commercial goals; and
- lack of inter-determination and correlation among different units of the institutional system (e.g., contradictions between the subsoil and forest legislations of the Russian Federation).

Before 2008, all companies (private and state) could become investors entitled to develop mineral resource deposits. In addition, the proportion of foreign capital in the assets of private companies was not restricted. In 2008, however, the government defined the status of “subsoil plots of federal significance.” These deposits were included in the reserve fund, and the right to distribute them was strictly assigned to the government of the Russian Federation. These amendments significantly slowed the development of new subsoil plots. Between 2008 and 2014, starting from the foundation of an independent legal institution on subsoil plots of federal significance, only eight licenses to develop deposits of gold, diamonds and platinum group metals have been issued. March 2014 saw amendments to the Subsoil Law that excluded alluvial deposits and occurrences of precious metals and stones from the list of strategic subsoil plots, and aimed at simplifying the procedure for granting the right of subsoil use.

Therefore, we can divide all the projects of the mineral sector executed in the land territories of Russia's Arctic into two big groups:

- a) projects implemented in “subsoil plots of federal significance” where the foreign investor's share in the assets of an applicant cannot exceed 51%, and if a licensee company sells 10% to foreign agents, it should be approved by the government; and
- b) other projects in which both Russian companies and Russian companies with predominantly foreign capital can participate.

It needs to be emphasized that the dependence of the Russian economy on the mining sector in general and the mining sector in the land territories of the Arctic in particular influences the need to enforce strict laws flexibly.

All the main infrastructure projects in the land territory of Russia's Arctic are implemented in connection with the development of certain mineral deposits. This includes the Varandey terminal, a railway within the Yamal mega-project, the port of Sabetta, and the reconstruction and modernization of social infrastructure in the city of Norilsk.

In the final analysis, a combination of the following factors will define future growth areas for investment and business in the land territories of the Arctic:

- a) the intention to open "new reserves" of traditional types and sources of minerals; a slow path is to search and implement super-efficient projects that would produce economies of scale;
- b) conditions to develop new and more complicated southern deposits, as well as the fields that were under development for a long time, requiring technological upgrades; and
- c) increasing demand for new, unique types of minerals, e.g., the rare earth elements of the Tomtor field and impact diamonds of the Popigai crater.

Business activity in the Arctic will not grow significantly due to public investment. Government assistance will be aimed to obtain the highest effects for the domestic economy by regulating subsoil use. Having experienced a boost in the technological development of the oil-and-gas industry, Norway and Canada demonstrate how necessary it is to have a consistent policy for science and technology; to strengthen the role of the government as a regulator controlling technological development and as a customer who encourages new technological solutions and innovative products; to stick to pragmatic protectionism towards local industrial, service and innovation companies; and to regulate monopolies and to make the government control the design and technological activities of the companies that execute new projects in cooperation. A key trend in assessing the feasibility of oil and gas development projects in the Arctic is to satisfy the long-term social, environmental and economic interests of Russia as a whole, as well as its eastern and Arctic regions.

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Commentary

Tatiana Mitrova

GLOBAL ROLE OF ARCTIC OIL AND GAS

The Arctic is often presented as the new frontier of global oil and gas production, the “next Gulf” with incredible resources of hydrocarbons (though our knowledge about their size is quite low). Many of the political disputes concerning the Arctic are motivated by these resource expectations, and nearly all major oil and gas companies are expressing their interest in Arctic projects.

The situation is quite different for Arctic offshore and onshore oil and gas production. Onshore projects are in a better position; they are already providing considerable volumes of hydrocarbons to global markets (Alaska, Canada, Norway, Russian Yamal-Nenets AO) and they can be regarded as conventional, though their higher costs make them less competitive in periods of oversupply and low prices. Problems faced recently by the Alaska gas pipeline and Russian gas supplies from Yamal due to the shale gas revolution clearly demonstrate that if the new, cheaper sources of oil and gas appear, expensive projects in the Arctic are immediately squeezed out from the supply curve.

Arctic offshore projects find themselves in a much worse position. In fact, as Moe and Rottem fairly mention, “despite the considerable attention given to Arctic offshore petroleum resources in recent years, actual industrial activity is still very limited.” There are just a few million tonnes of oil equivalent produced in the Arctic offshore, with enormous efforts and extremely high environmental risks.

Of course, there is huge potential in the Arctic continental shelf, but the main issue is whether there are commercially relevant Arctic investment projects related to offshore petroleum and gas production, and also whether these operations are environmentally acceptable. Numerous unsuccessful attempts and disappointments in the Alaska Outer Continental Shelf (in the Beaufort Sea and the Chukchi Sea), and in Greenland demonstrate the high vulnerability of Arctic offshore projects to the price movements. Each time oil prices increase, a strong interest in Arctic hydrocarbons rises, and when the prices drop, the activity stops. Shell’s recent announcements of

postponement of their Arctic project are probably the best demonstration of the fact that the majority of the Arctic hydrocarbon projects are marginal and extremely risky. They are on the edge of modern technologies and companies' managerial skills (and sometimes even beyond them). The need to organize complicated processes in the short two- to three-month ice-free window is still a challenge, even for the most experienced and well-managed oil companies.

THE ROLE OF ARCTIC HYDROCARBONS FOR RUSSIA

Russia is a key Arctic country, holding about 76.3 billion tonnes of oil equivalent, with recoverable reserves estimated to be 9.6 billion tonnes of oil. The gas reserves, estimated at 21.4 tcm, greatly exceed the oil reserves estimated in the region. According to Rosnedra, reserves in the Barents Basin include 2.2 billion tons of oil and 1.2 tcm of natural gas. Nonetheless, oil reserves, especially in the Kara Sea, are likely to have the priority, as they require less-expensive infrastructure to be developed and exported.

The energy sector is traditionally a crucial part of the Russian economy, providing for the bulk of export revenues, budget incomes and GDP. In 2012 oil, oil products and natural gas accounted for nearly 70% of exports, while customs duties and mineral extraction taxes on oil and gas provided more than half of federal revenues. So far, the share of revenues from the new Arctic oil and gas projects is not high (just a few of them are operational,¹ and some of them are at the moment receiving tax breaks or even direct investments from the state). Nevertheless, the Russian government (as well as state-controlled oil and gas companies, which are mainly holding these resources) is demonstrating enormous enthusiasm concerning future Arctic hydrocarbons development.

The reason is obvious: depletion of the Soviet-legacy oil and gas fields, together with all the strategic and social considerations and regional economic policies, stimulate a huge interest by the government in the reserves located in the Arctic, on the Yamal Peninsula, Arctic continental shelf, and so on. Oil and gas investments also have a huge multiplier effect, as they create an additional domestic demand for other industries' products and ensure the infrastructure development required for economic growth. Proceeds from hydrocarbon exports have an impact on the financial resources of manufacturers and service providers, and therefore on business

activity in the country, and thereby on its economic development prospects.

Not surprisingly, according to the “Energy Strategy of the Russian Federation up to 2030,”² which is the basic document setting out Russian energy policy, one of the most important strategic initiatives of the State in the energy industry is “Exploration of the Arctic continental shelf and northern regions (which should help stabilize oil and gas production after a possible downturn in the traditional oil-producing areas of Western Siberia in 2015-2030).”

Despite all declarations and intentions, however, the fate of the Russia Arctic oil and gas projects is not clear. Some of them have been postponed for an indefinite period (e.g. Shtokman), while others have taken several decades longer than expected for their implementation (e.g. Prirazlomnoe, the Yamal mega-project).

RUSSIAN ARCTIC OIL AND GAS INVESTMENT PROJECTS

The magnitude of investment in the Russian Arctic projects is impressive: 10 billion USD for the Kharyaga oil field, 5 billion USD for the Trebs and Titov oil fields, 6 billion USD for the Prirazlomnoye field, 75-130 billion USD for the Yamal mega-project, 30 billion USD for Yamal-LNG, 3 billion USD for the Novoportovskoye and Messoyakha fields development – totaling 130-185 billion USD. These are probably the most costly and largest projects in the entire Russian energy sector, with long lead times, high risks and an unclear period of investment return. Most of these investments were made with significant delays compared to the initial plans and schedules, which seems to be a common trend in this complicated and challenging area.

Several of these projects have huge infrastructure components, which is understandable: operators have to develop their production in remote frontier areas where no infrastructure exists at all, so once they decide to engage in a project, they have also to take the responsibility to build all the infrastructure necessary for its implementation. Prime examples are the Varandey terminal, a railway within the Yamal mega-project, and the Port of Sabetta.

The major investors in Russian Arctic oil and gas projects are large national state-controlled companies such as Gazprom and Rosneft,

influential private companies (like Novatek) and a few foreign majors cooperating with the state giants, such as Total, and until recently ExxonMobil, Statoil and ENI (See Table I-1).

Table I-1. Key offshore exploration projects linking Gazprom and Rosneft with foreign companies

Foreign Partner	Number of license areas	Offshore blocks	Comment/structure of the deal
Gazprom			
Total	1	Shtokman	Discovered in 1988 and located about 600 km offshore from Murmansk, the Shtokman gas and condensate field is believed to hold 3.8 tcm of gas and 53.4 Mt of gas condensate. In 2013, the project’s development was postponed to after 2020 or even later, as initial partners Gazprom, Total and Statoil didn’t make a final investment decision over challenges related to project design and costs. Statoil then left the project. According to Gazprom, field development would be divided into three phases. Phase 1 and Phase 2 would allow for respective annual production of 23.7 and 47.4 bcm of gas. The field is to reach its design capacity of 71.1 bcm /year through implementing Phase 3 at a later stage. ³
Rosneft			
ExxonMobil	11	The license blocks include Severo-Vrangelevsky-1, Severo-Vrangelevsky-2 and Yuzhno-Chukotsky blocks in Chukchi Sea, Ust’ Oleneksky, Ust’ Lensky and Anisinsko-Novosibirsky blocks in Laptev Sea and Severo-Karsky block in the Kara Sea	In return for obtaining the right to conduct exploration activities in these areas (agreements have different legal status and validity, though, at this stage and may not all be firm), ExxonMobil envisions that Neftegaz America Shelf LP (Neftegaz), an indirect independent subsidiary of Rosneft, acquires a 30% interest in 20 deep-water exploration blocks in the Gulf of Mexico held by ExxonMobil. In a separate Heads of Agreement, Rosneft (or its affiliate) have an opportunity to acquire a 25% interest in the Point Thomson Unit, which covers the project of developing a remote natural gas and condensate field on Alaska’s North Slope. It is estimated that Point Thomson contains approximately 25% of the known gas resource base in Alaska’s North Slope.
Statoil	4	The Kashevarovsky, Lisyansky and Magadan-1 licenses are in the Sea of Okhotsk north of Sakhalin Island, and the Perseevsky licence is in the Central Barents Sea.	The license requirements include drilling of six exploration wells in the period from 2016 to 2021. Statoil will carry the expenses of exploration activities required to determine the commercial value of the licenses. The three Arctic license areas cover a territory of 79,000 km ² .

Table I-1. Key offshore exploration projects linking Gazprom and Rosneft with foreign companies (continued)

Foreign Partner	Number of license areas	Offshore blocks	Comment/structure of the deal
ENI	3	The Fedynsky block (38,000 km ²) is located in the ice-free part of the Barents Sea. The Central Barents block (16,000 km ²) borders Fedynsky from the North; and the Western Chernomorsky block in the Black Sea.	Eni has reportedly started 2D seismic surveys and a first well.
Inpex	2	Offshore blocks Magadan-2 and Magadan-3 in the Russian section of the Sea of Okhotsk.	An MOU was signed in May 2013: INPEX was granted exclusive rights to negotiate toward a final agreement, expected by the end of 2013. INPEX would reimburse the development expenses for the licensed blocks incurred by Rosneft, as well as 33.3% of a one-off payment made by the Russian company during the course of license acquisition. Furthermore, the agreement provides for non-recurrent bonuses to be paid by INPEX to Rosneft for each commercial oil and gas discovery proportionally with its stake in the project. Both firms plan to set up a joint venture to explore the offshore blocks.
CNPC	3	These blocks are located in the Barents and Pechora Seas (West Prinovozemelsky, Yuzhno-Russky and Medynsko-Varandskiy) as well as onshore blocks in the Irkutsk Region, Krasnoyarsk Territory and YNAA.	Preliminary agreements were signed in March 2013. Some of these areas have never been explored before and are thus quite unknown.
Petrovietnam		Blocks would be located in the Pechora Sea.	The parties also signed an MOU over Rosneft's potential acquisition of a stake in the production sharing agreement (PSA) for Block 15-1/05 offshore Vietnam.

Source: IEA Russian Energy Policy Review 2014.

While a Russian company typically holds the license, these agreements generally involve a shareholder agreement of 33.33% for the foreign

company in the joint venture, and a commitment by the foreign company to finance exploration activities in line with license obligations and to develop joint technologies. IOCs teaming up with these two Russian state-controlled companies have to operate on a risk-service basis and cannot own any equity, i.e., the license and reserves. Indeed, under the current schemes developed for exploration works in the Arctic shelf, they are minority shareholders in foreign registered joint ventures in which Russian state companies Rosneft and Gazprom are majority shareholders. Foreign companies have insisted that foreign joint ventures be established to benefit from greater legal security and have established complex contractual frameworks to overcome gaps and uncertainties in the Russian legislation. As such, there is room to further clarify and make more precise the Russian legislation and regulatory framework to facilitate these partnerships between foreign and Russian companies.

Should gas or oil finds be made and the decision taken to move to a production phase, the Russian partner would generally reimburse its share of exploration costs. These agreements also involve a reciprocal equity agreement for some projects that these IOCs develop abroad, so far in North America, North Africa and the North Sea, allowing Rosneft to gain expertise and develop internationally, while also giving foreign partners an opportunity to gauge this cooperation. Such asset-swap type agreements are supported by the Russian government, and others could follow.

Rosneft and ExxonMobil started first exploratory drillings in August 2014 in the Kara Sea, but with the rapid deterioration of the relationship between Russia and the West and the “war of sanctions,” they had to stop the operations and suspend a well, losing significant investments made. In the current geopolitical climate, the future involvement of the international majors in the Russian Arctic is becoming increasingly questionable, as all technologies for Arctic offshore drilling and production are on the sanction lists of the United States and the European Union.

The number of smaller, independent Russian companies active in this area is negligible. Huge costs, together with the law on “strategic fields” in significantly limit the number of potential participants in the Arctic development “business of the big guys.” It is difficult to disagree with Kryukov that the institutional environment for Arctic oil and gas projects in Russia during the last two decades has been contradictory and ambiguous.

In the future, the potential growth areas for investment in the Russian Arctic are first the Yamal Peninsula, where the major infrastructure has

already been created, and the Kara Sea (with all Rosneft exploratory activities). But these investments are at the moment also significantly limited by the financial sanctions.

The situation is quite different for oil and for gas: Gazprom already produces Yamal gas (at the Bovanenkovo gas field on Yamal, though at rather small volumes due to a lack of demand), and the transportation system has been built, so there are no serious obstacles for further expansion of gas production in this area. Conversely, the new Arctic oil projects, led by Rosneft, are mainly focused on exploration. Here the uncertainty and risks are high. The uncertainty is associated with the geology, as many geologists predict that the Kara Sea might hold not oil but gas deposits, and that the lifting costs are going to be high. According to different estimates, even if the exploratory activity is successful and if large oil reserves are discovered, Russia would be able to start producing them no earlier than in one decade, reaching about 10-15 million tonnes per annum by 2025-2030 in the most optimistic case. The IEA's World Energy Outlook 2013 projection of Russian Arctic oil production is also modest – just 0.11 mb/d, or 1.1% of total production by 2035.

As Arctic projects are extremely expensive, taxation will be one of the key factors defining their success. The government has already provided a number of fiscal incentives to foster exploration activities in the offshore Arctic, including unlimited MET exemptions, export tax exemption (yet limited in time, for example on 250 bcm of gas for the Yamal LNG project and up until 2042 for Arctic resources), and property tax and amortization holidays. Yet more incentives are likely to be necessary in order to attain higher investment levels given the very high anticipated production costs.

Resource access and the number of players is the key factor in the success of Russian Arctic offshore development. So far, only companies with over 50% state ownership and more than five years of experience in marine exploration are allowed to participate in auctions for licences on the continental shelf in Russia's Arctic regions. This means that no private companies are given access to these areas, in spite of Lukoil, for example, having extensive offshore experience (in the Korchanginskoe field in the Caspian Sea for example) and conducting exploration activities in the Norwegian Barents Sea. Consequently, 80% of licences have already been given to Gazprom and Rosneft. However, even with partnerships with foreign companies there will be limits to how much they can handle.

Clear and strict environmental policy is also an essential condition for

the Russian Arctic projects' success. Developing possible Arctic resources will bring key environmental and technological challenges given the harsh environment, with offshore drilling from platforms surrounded by ice and low temperatures. Any accident could have a devastating impact on sensitive Arctic ecosystems. Any misstep by industry could postpone Arctic resource development for decades. Thus is why developing a robust security and environmental protection framework is key along with ensuring that the most advanced and relevant technologies are employed.

Another issue that is becoming critical for the future of the Russian Arctic in the current geopolitical and economic situation is the ability of the companies to attract credit finance, which implies that banks are confident that risks, especially those taken by foreign partners, are reasonable and addressed in the contractual and regulatory framework, and there are no restrictions or sanctions. Now, it seems that only companies with internal financial resources, loans from Russian financial institutions and also from Chinese banks will be the major sources of financing for the Russian Arctic projects.

Access to offshore drilling technologies and LNG equipment is also important. Without Western technologies, Russia would have to postpone the development of the projects until domestic Russian technologies are developed. The state would also need to ensure the development of a vibrant and competitive service industry in Russia capable of providing state-of-the art drilling technologies at reasonable and competitive prices.

Further exploration and research activity is needed in the Arctic in the coming decades in order to prepare for hydrocarbon production in a safe, sustainable and commercially efficient way, and it seems that the oil and gas companies still have a long way to go in ensuring that resource extraction can be viable economically and occur safely while protecting sensitive Arctic ecosystems.

Notes

1. Whether the Nadym-Pur-Taz area in Yamal-Nenets Okrug is included or not mainly depends on the definition.
2. The last edition was accepted in 2009 and currently the new, updated Energy Strategy up to 2035 is in development.
3. <http://www.gazprom.com/about/production/projects/deposits/shp/>

Commentary

Nam Yll Kim

ARCTIC RESOURCE INVESTMENT RISKS AND LNG PROJECTS

Status of Arctic Area Resources

The Arctic Ocean is currently thought to have 22% of the world’s undiscovered energy resources, estimated to be composed of 13% oil (90 BB), 30% gas (1,679 Tcf) and 20% NGL (44 BB).¹ About 60% of these resources are concentrated in Russia.

Arctic Resource Investment Risks and Cost Comparisons among Transportation Modes

There are lots of risks to confront for an Arctic energyresources investment project. The first would be the geological risk. The fact that the estimated value of resources announced by the USGS is based on an educated guess and not based on thorough, widespread exploratory drilling must be noted. The second risk comes from harsh weather conditions. Because of

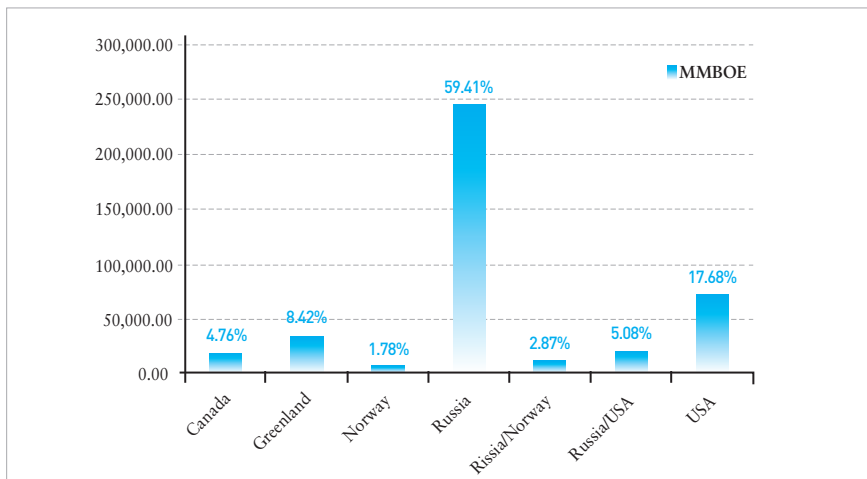


Figure I-2. Arctic resources by geography

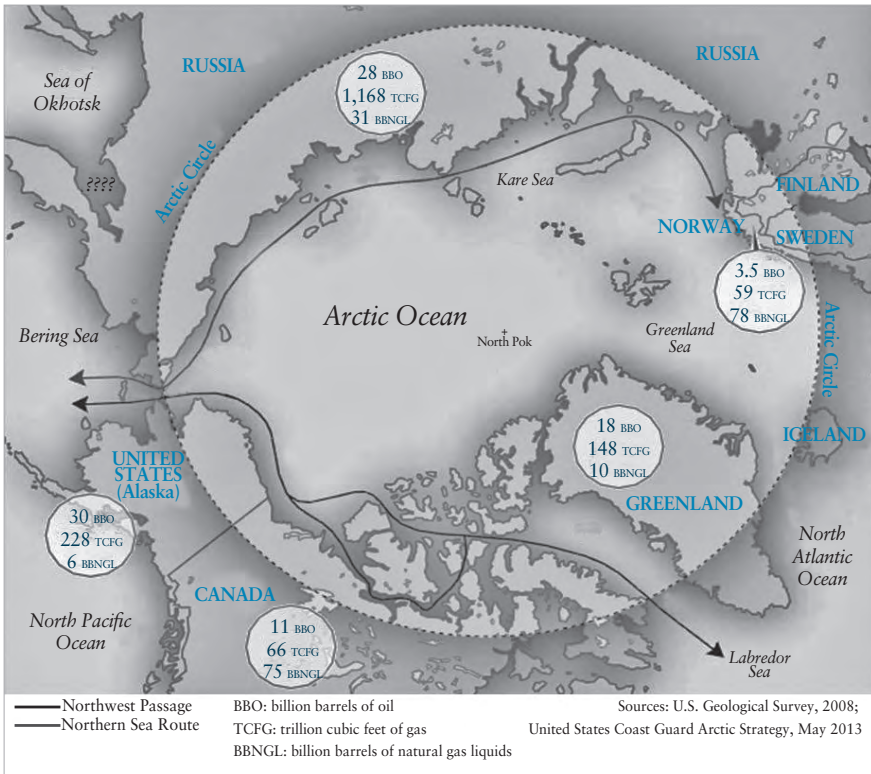


Figure I-3. Estimated undiscovered Arctic oil and gas and potential trade routes

frequent icy storms and low temperatures, the drilling window term is very short (summer time from June to October), and the drilling equipment may be polluted. The third is regulatory risk. Since the Macondo accident in the U.S. Gulf of Mexico in 2010, governments around the world have strengthened safety and environmental regulations. This has brought about increased costs of complying with the regulations, along with the inflation of insurance costs, which is a big burden for smaller resource development corporations. The fourth risk is environmental sensitivities. In order to develop resources in the Arctic, operators must adapt to ever-changing conditions of the Arctic. The fifth risk is infrastructure challenges. It is difficult in the first place to build and operate infrastructure safely in the Arctic, but transporting the resources produced in the Arctic safely to the market is another problem. And out of these risks, whether a transportation infrastructure exists or not greatly affects the investment cost for resource

development.

Although it is difficult to treat it as a risk indigenous to the Arctic, political risk exists as well. Due to the current situation in Ukraine, sanctions on the Russian energy sector have been imposed by the United States and the European Union. The banning of all exports of Arctic offshore drilling rigs for oil has been applied against Russia. Yamal LNG (Novatek 60%, Total 20%, CNPC 20%) is unlikely to be impacted by the technology sanction, and Yamal LNG is not a sanctioned entity, but its financing options will be restricted, increasing its cost of capital. In addition, Rosneft and ExxonMobil have recently expanded their strategic collaborative relationship for Arctic resource development. But western sanctions have frozen this arrangement as well.

The majority of gas development in the Arctic will take the form of LNG investment projects. The reason for this comes from the long transportation distance between the Asia-Pacific region, which is thought to possess most of the world's gas demand increase,² and the Arctic. Also, because the form of LNG is favorable for long-distance shipping, gas developed in the Arctic area will most likely be processed into LNG instead of PNG. The picture below explains this situation clearly.

As the picture shows, as distance increases, (1) the benefits of LNG transportation surpass those of gas pipelines, (2) LNG ships are more flexible when it comes to shipping out to its destination, unlike PNG with designated destinations, and (3) long-distance shipping requires passing

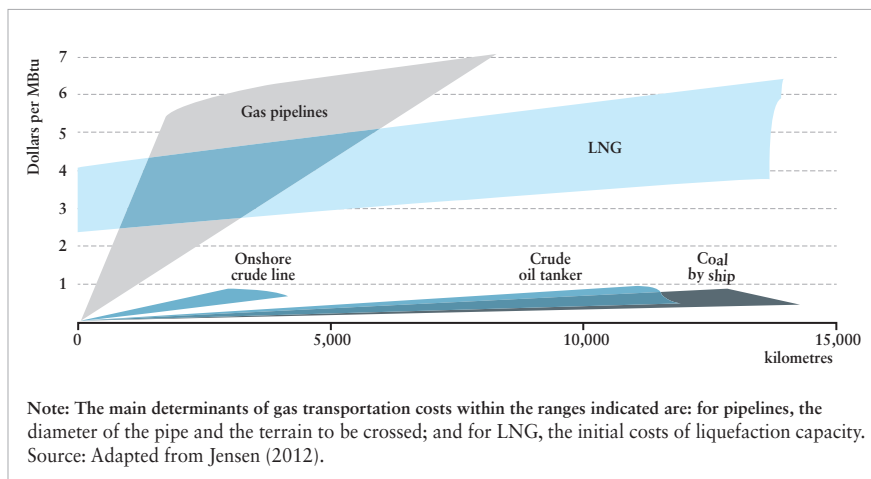


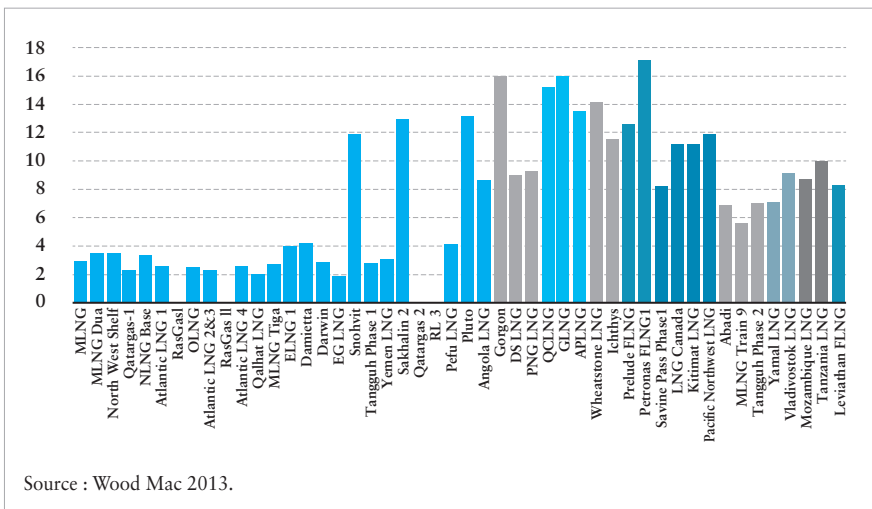
Figure I-4. Cost comparison among transportation modes

through multiple national boundaries, and LNG tankers are better suited for avoiding this trouble.

Economics of Russian Arctic LNG Projects

Arctic resource development projects have a high cost business structure. Because of the hard development conditions (weather, frozen ground, ice flows and lack of infrastructure), the development cost is greater than that of LNG projects involving North America’s shale gas resources or those in East Africa. And the additional costs (charges for using icebreakers or specialized transport vessels, establishment of transportation facilities in frozen ground areas) regarding resource transportation are also likely to be high, no less than the development costs.

In December 2013, Novatek and Total announced a final investment decision on a three-train, 16.5 mmtpa, Yamal LNG project in the Arctic Circle. The first LNG shipment is scheduled for 2017. Novatek, Russia’s largest independent gas producer, has a 60% equity, while Total and more recently CNPC have each acquired 20% in the project. Yamal LNG will be the first LNG project in Russia since the Sakhalin-2 investment decision in 2003. The project has received heavy government backing in the form of significant tax breaks, support in gas sales negotiations, liberalizing of LNG exports and funding for the construction and dredging of Sabetta Port. So



Source : Wood Mac 2013.

Figure I-5. FOB break-even cost at 12% IRR (\$MMBtu)

far, it has announced two agreements: a 3-mmtpa contract with CNPC, and a 2.5 mmtpa with Spain's Gas Natural Fenosa (GNF). The remaining 11 mmtpa should look for other takers.

Novatek has estimated the total cost for CAPEX for Yamal LNG development to be 20 billion, and it is argued that the project possesses price competitiveness against U.S. shale gas LNG. But according to Wood Mackenzie (2013),³ taking the challenging development conditions into consideration, the facility development cost is estimated to be 37 billion USD (gas field development 6.8 billion USD, drilling 14 million USD per well, liquefaction plant installation and maintenance costs 30.8 billion USD). Also, an additional 27 billion USD (2013 base) is estimated for operations and management (upstream operation 1.80/boe, liquefaction plant maintenance 0.60/MMBtu, icebreaker 10/ton). Taking a few additional assumptions into consideration, the final FOB cost for Yamal LNG development is estimated by Wood Mackenzie (2013) to be 9.41 USD/MMBtu. The regasification cost and transportation cost (nuclear icebreaker, ARC7 LNG transportation, storage cost) are not included in the final FOB LNG export costs.

With the advancement of multiple LNG projects around the world, development costs have increased rapidly, up to 1,200 USD/tonne, due to soaring raw material costs, lack of human resources and delayed construction. And most LNG projects have 20-60% in additional costs after they begin, while also being delayed for four to 17 months. Taking this situation into consideration, it is expected that the U.S. Henry Hub price level, crude oil price and Arctic area development costs will become the key to the competitiveness between all LNG projects, including those in the Arctic.

Progress of the U.S. Alaska LNG Project

Alaska's State Assembly agreed to the state government's participation in the Alaska LNG project on April 21, 2014. The state government is planning to conclude a contract with ExxonMobil, BP, Conoco Phillips and TransCanada for the export of North Slope natural gas.

The Alaska LNG project includes connecting 800 miles (about 1,287 km) of export pipelines from the North Slope gas production sites (Prudhoe Bay, Point Thompson, etc.) to gas export terminals in the southern shore of Nikiski, along with the construction of liquefaction plants, storage facilities and export terminals. The total cost is estimated to be 45-65 billion USD.⁴

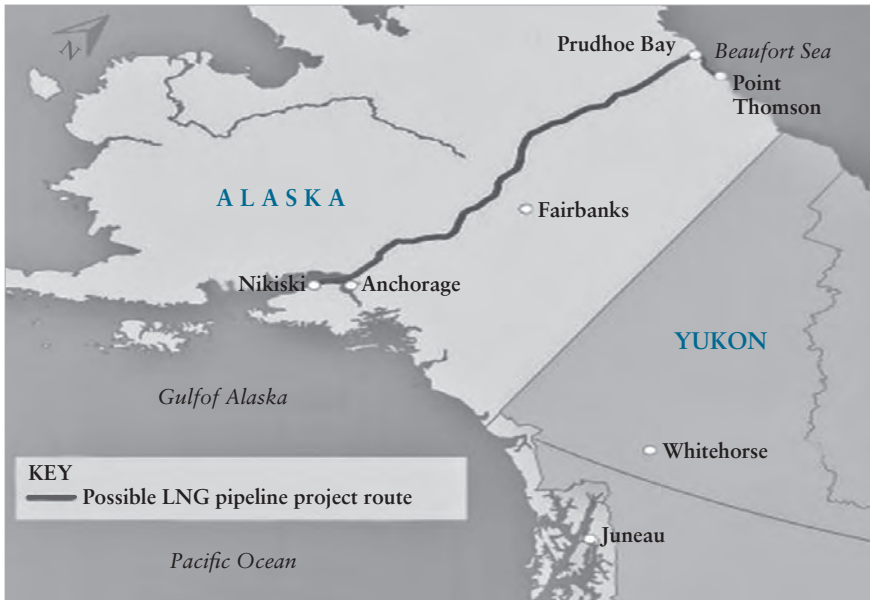


Figure I-6. The Alaska LNG project

With the approval of the state assembly, the related companies have entered the FEED phase with the state government and are expected to export natural gases from the North Slope into Asia and Europe starting from the mid-2020s.⁵

The Alaska LNG project holds promise for Asian countries, as it is a lot closer for them than Russia's Arctic, Western Canada, or the U.S. Gulf of Mexico. However, as of today, whether the long-term contract options can meet the demand of Asian consumers, as well as how large the possible amount of gas supply stock will be, is hard to know. But considering its location, it seems to be the closest Arctic LNG project for Northeast Asian consumers.

IMPLICATIONS FOR ASIAN BUYERS

Opening of Arctic Sea Route and South Korea's Gas Consumption Pattern

South Korea will likely participate in the Yamal LNG project if the nation

is willing to join any Arctic project.⁶ However, Russia is employing a strategy of simply allowing shareholding or securing offtakers from South Korean and other Asian companies.

According to South Korea's long-term supply outlook for natural gas, the supply and demand situation is not as tight either. Especially with the introduction of American Sabine Pass gas in 2017, new options are opening up. Therefore, as a gas consumer, South Korea is not experiencing urgency in securing Russia's gas exports. Also, given the recent progress regarding China-Russia gas contracts, it is noted that a South-North-Russia gas pipeline project is at a wait-and-see level.

An important fact about South Korea's gas consumption pattern is that it shows a typical high-winter and low-summer consumption rate. This sort of pattern does not fit well with the conditions of the Arctic Northern Sea Route, which opens up for about four months during the summer. Therefore, if South Korea wishes to become an offtaker of Yamal LNG, it is important to consider the contractual flexibility of swapping unnecessary gas at will along with the price conditions. South Korea, along with Japan and other consumers around Asia, is trying hard to come out of an oil-indexed scheme. And the Yamal LNG Project is focused on securing additional offtakers. Whether or not KOGAS participates in the project will depend upon the conditions of negotiation.

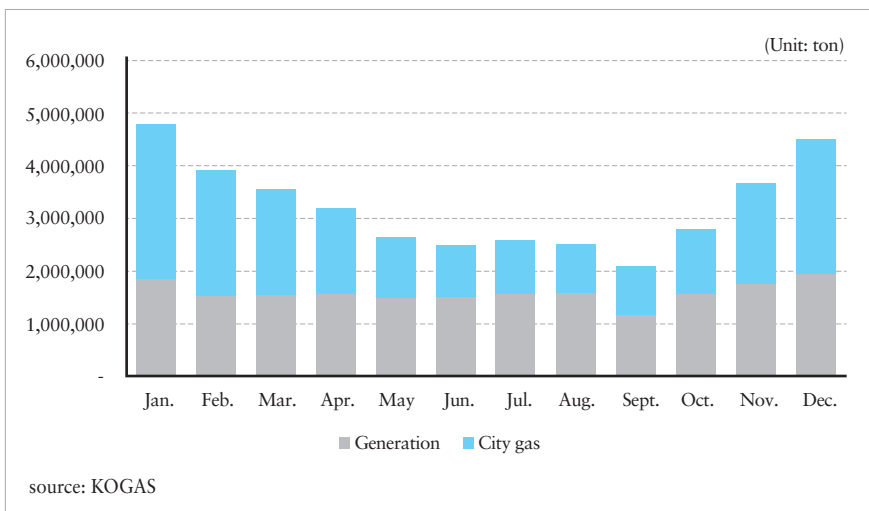


Figure I-7. Korea's gas consumption by month (2013)

Cost of LNG Based on East Asian Destinations (LNG Delivered Ex-Ship Cost)

The picture below compares the destination costs of LNG from several locations with South Korea’s Port of Incheon set as the common destination. With Incheon as the standard, it is not hard to estimate the cost for China’s and Japan’s key LNG ports as well.

The competitive levels between LNG projects around each region of the world are based on a long-term LNG price formula. As of now, regarding the recent crude oil price and Henry Hub standard, the Henry Hub-indexed price formula is likely to ensure better price competitiveness than an oil-indexed price formula.

The key points for competitiveness for North American projects depend upon the gas market price level, while the new projects in the Arctic and East Africa will be based on development costs. Asian nations will continue to make efforts to come out of an oil-indexed scheme and lower the contract price. But considering the new LNG supply costs, the portion of contracts with oil-indexation will remain high for long time.

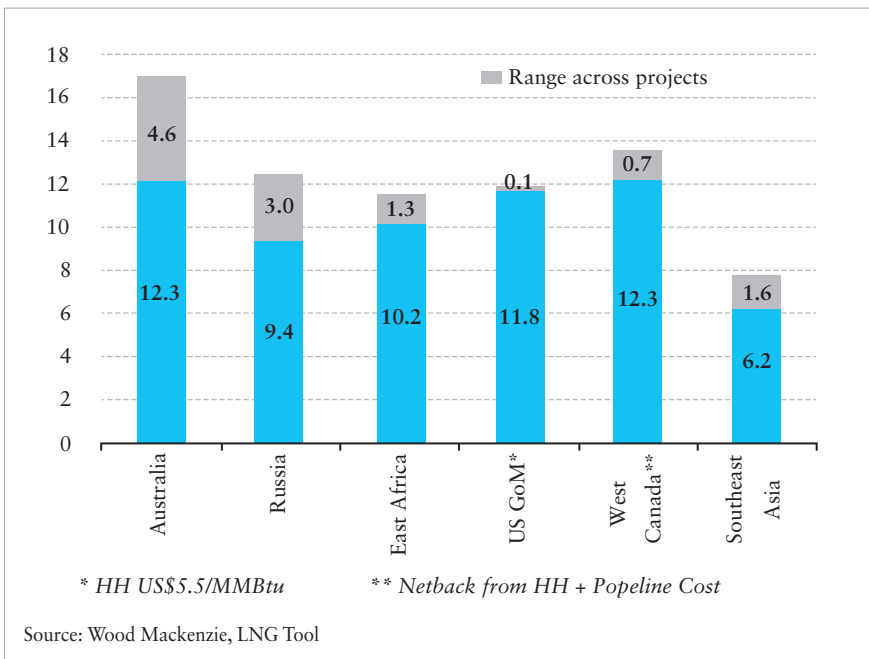


Figure I-8. LNG DES cost stacks to Incheon (\$MMBtu)

South Korea, Japan, Taiwan, and other key Asian LNG importers are working side by side to reduce the Asia gas premium, reform the destination clause and secure flexibility within contract options. LNG suppliers who are desperately willing to accept these conditions will be a key factor moving toward ensuring offtakers for the new projects.

Notes

1. USGS 2008 Data.
2. As of 2014, 70-80% of the world's LNG consumption is in the Asia-Pacific region, and this trend is likely to continue.
3. Wood Mac, LNG Supply Analysis, Russia, April 2013.
4. The Alaska LNG project transports 3-3.5 Bcm/d of natural gas to a liquefaction plant through a 42-inch pipeline, and the liquefaction plant produces 15-18 million tons (2~2.4Bcf/d) of LNG every year.
5. Alaska began exporting LNG in the 1960s, and its main gas source is located south of Anchorage at Cook Inlet.
6. South Korea's KOGAS took some stakes in Northern Canada's Umiak gas field in the Arctic in 2011.

Commentary

Heather A. Conley

When we read about the Arctic in the print media, we are greeted by sensational and typically inaccurate headlines such as “A New Cold War!,” “A Race for Arctic Riches!,” and “Arctic Bonanza!” Rare is the factual headline, much less detailed information, about the overall political, economic, and security trend lines in the Arctic region. Arctic analysts and experts must perpetually employ “myth-busting” analysis to temper wild assumptions about Arctic developments.

Thankfully, three thoughtful authors provide rich and detailed descriptions of two important Arctic investment patterns: “Arctic Offshore Petroleum and Shipping” from Arild Moe and Svein Vigeland Rottem of the Fridtjof Nansen Institute in Norway, and from Valeriy A. Kryukov, “Patterns of Investment in the Russian Onshore Arctic—An Area of Stable Growth? The level of detail related to both the scope and scale of significant Arctic development projects provides a concrete understanding of what is at stake for both the sovereign and commercial actors involved.

To understand the region with the greatest level of economic ambition and potential dynamism, one must begin in the Russian Arctic. Kryukov notes that for Russia, the Arctic is “the most important component of socioeconomic development as a whole,” a fact that the international community wholly underappreciates, as well as the “historical significance of Russian northern development.” This concept bears repeating: the international community profoundly underestimates the forces influencing Russia’s and ultimately President Putin’s future for a region that encompasses nearly the entire northern coast of Eurasia. The Arctic is home to Russia’s strategic nuclear fleet, 14% of Russia’s GDP, 25% of its exports, 50% of the total Arctic coastline, and two million Russian citizens, thus making the Arctic a key driver of Russian policy in the 21st century. Dmitry Medvedev noted in 2008 that “Our first and main task is to turn the Arctic into a resource base for Russia in the 21st century ... Using these resources will guarantee energy security for Russia as a whole.”¹ As former Murmansk Oblast Governor Dmitri Dmitriyenko further underscored, “For Murmansk Oblast, the election of Vladimir Putin as President of the Russian Federation is a very important event, which means the continuity

of the current course ... a course of huge breakthrough projects, which gradually will transform the social and economic situation in the region. Probably, Putin is the only of our politicians who knows and understands the Russian Arctic, and who underlines that it is in the Arctic that Russia has its future.” With such an emphasis on the importance of the Arctic for Russia’s future, the economic and political stakes for Russia are enormously high.

Kryukov provides an important analytical framework to examine the plethora of new Russian development projects, ranging from the excavation of mineral resources, such as phosphate, nickel, platinum, diamonds, and gold, to the extraction of energy resources such as coal, oil, and natural gas. The analytical framework consists of: (1) the need for extensive capital investment; (2) the introduction of new technology; (3) the technological difficulty of reaching these resources; and (4) the resources exceed Russian domestic demand and are produced for export. Helpfully, he geographically breaks the Russian Arctic into three strategic and quite different regions of development: European Russia, Siberia, and the Russian Far East. Kryukov contends that all Russian onshore activities—regardless of location—require two things: (1) significant technology, as well as technical skills enhancements, and (2) modernization.

After the annexation of Crimea and the destabilization of Eastern Ukraine, technology transfer from the West to Russia will be interrupted by enhanced Western sanctions. Modernization, defined by adaptation to the mechanisms of the global economy, would require domestic political and economic reforms that fuel entrepreneurship and foreign investment and legal reforms that create an independent judiciary and ensure transparency. Modernization would also require a less-centralized Russia (it is more centralized than ever) and a better investment climate, bolstered by improvements to the rule of law, management, and social and environmental concerns. These elements do not exist in Russia today, posing significant obstacles to successful Russian modernization.

Kryukov offers two contradictory Russian Arctic investment trends: general stagnation in the Russian mining sector and growth potential in the oil and gas sector, with specific attention being given to the Yamal Peninsula liquefied natural gas (LNG) terminal and the Port of Sabetta. In the mining sector, stagnation has translated into a decline in industrial production and decreases in the mining sector workforce. From a socioeconomic standpoint, this stagnation has significant implications for the northern

“monotowns” that are completely dependent on one industry. Norilsk Nickel, the world’s largest producer of refined nickel, is both an important example of static Russian investment and a shift in business practices. As a monopoly, whose “private” investor ownership consists of major Russian financial and industrial groups, and that has been slow to modernize and adapt to global economic forces, Norilsk Nickel accounts for 1.9% of Russia’s GDP and has its own Arctic fleet (seven ice-class cargo ships and one ice-class tanker). Norilsk Nickel is also one of Russia’s largest polluters, accounting for a quarter of Russia’s sulfur dioxide emissions. Norilsk Nickel, seeing the greatest growth potential in its polar division, recently reduced its mining operations in southern regions and eliminated Russian jobs. Now, contrast this with a newly formed Russian company, Russian Platinum LLC, which views environmental stewardship as a high priority and plans to construct its own infrastructure, not relying on use of the Northern Sea Route (NSR), but rather the Yenisei River to transport resources from the Norilsk-I field (Krasnyorsk Oblast).

While international attention tends to focus on the European and Siberian portions of the Russian Arctic, one must not forget the great mineral resources of the Russian Far East. Significant deposits of iron ore, rare earths, and impact diamonds in the Russian Far East’s (Yakutia) Tomtor field constitute one of the largest ore deposits in the world. As these resources are developed, the eastern portion of the NSR will likely be utilized to transport these riches to Asian and international markets, which could significantly increase shipping traffic in the Bering Strait over time.

While mineral extraction is stagnating in Russia, oil and gas projects are on the rise and are considered national “prestige projects.” Kryukov notes that these prestige projects are granted “state guarantees [to ensure that] even constant unprofitable businesses will survive.” Russian state guarantees have been ubiquitous following the 2008 definition of “subsoil plots of federal significance,” which narrowly defines a federally significant project as more than 70 million tons of discovered oil and 50 billion cubic meters of natural gas. Simply put, nearly every commercially viable mineral and natural resource discovery in Russia is deemed significant to the Kremlin. This new definition, however, has dramatically reduced new licenses. Clearly, increased Russian central control over mineral and energy resources, coupled with the requirement that Moscow must approve any sale of 10% or more to foreign entities and that foreign ownership of an investment project cannot exceed 51%, has substantially restricted the

forces of foreign investment and advanced technologies entering Russia today.

Why has the Kremlin enacted a stranglehold over new Arctic investment projects when decentralization and incentivizing international technology transfers are necessary for success? The answer is budget dependency. In 1995, oil and gas revenues accounted for 9% of the Russian budget. In 2012, oil revenues made up 52% of the Russian federal budget. Although global oil and commodity prices remain quite high (at the time of this writing, Brent oil was 104 USD per barrel), these prices are unable to sustain Russia's ailing economy.² Today, Russia finds itself in a completely new operational environment where its most important energy customer, Europe, has a rapidly decreasing appetite for Russian energy due to anemic economic growth, deteriorating demographics, the decreased price of natural gas (which has spurred contract renegotiation), anti-monopolistic rules, and increased use of renewable energy and energy efficiency. Moreover, Europe is currently racing to diversify itself away from Russian energy resources. In addition to Europe's decreased demand, Russia is also facing increased global competition from other energy suppliers such as Australia, North America, and Africa.

The Russian gas market faces the dual challenge of rising costs (a 10% increase in 2013) and declining demand. This environment has forced Russian companies—Gazprom, Rosneft, and Novatek—to compete with each other while simultaneously competing for foreign direct investment (FDI) and Kremlin approval of their projects as they attempt to increase natural gas revenues. The Yamal LNG project appears to be the most competitive Russian Arctic gas project. In 2002, the Gazprom Board of Directors named the Yamal Peninsula a region of strategic interest. Rosneft's CEO Igor Sechin, a close confidant of President Putin, has for now successfully concentrated Rosneft's power and influence in the Russian gas market and Arctic energy development, thus ensuring its geopolitical relevance.

For the Russian oil market as well, regulating controls will be as important as reform of the Russian tax system. While it may be true that the Russian government will continuously sustain unprofitable businesses, international companies will not. The long-term development of new Russian oil fields is not economically competitive under the current Russian tax regime, although tax exemptions have been granted for Arctic development. Due to the over-reliance of the Russian budget on rent income from the oil and gas sector, Russian authorities are extremely

reluctant to reform the tax code, as it would entail great political risk to Russian authorities.

After taking a deep dive into Russian Arctic development, Arild Moe and Svein Rottem take us on an Arctic offshore circumpolar journey which can best be described as “the unevenness of Arctic development.” While Arctic offshore activities are at present limited to two fields in Norway and Russia, Canada is exploring limited, private-led opportunities in the Beaufort Sea. The United States is slowly exploring its offshore potential in the Chukchi and Beaufort Seas, and Greenland, while initially exploring opportunities, has found mostly gas (and not necessarily commercially viable amounts) but seeks oil deposits. Having recently identified potential rare earth minerals in Greenland, there may be greater economic benefits from mining than from energy discoveries.

Norway and Russia demonstrate some similarities in offshore Arctic development. State companies are the principal conduit for development, and both countries rely on energy exports to support their national economies. For Norway, Arctic development has taken on some urgency as declining productivity in the North and Norwegian Seas has required exploration further north, with a particular focus on the 12 billion USD Snøhvit field. Like Russia’s federal significance determination, the Norwegian government conducts “opening processes” in which it formally assesses the risks and prospects of exploration in a particular area. Moreover, the Norwegian government is also responsible for issuing exploration licenses to oil and gas companies. Several areas of the offshore Norwegian shelf, including all of the northern Barents Sea, the eastern part of the southern Barents Sea, and the northeastern Norwegian Sea, have not been approved for petroleum activities due to limited knowledge of seismic activity in the region. However, the Norwegian government will offer 34 licensing blocks in the Barents Sea before the end of 2014, increasingly moving into areas further north and east. The Norwegian government is also grappling with its Arctic infrastructure. Should it export its Arctic energy via pipeline or LNG tanker? The choice of infrastructure is based largely on the choice of market. Does Norway seek to export its Arctic offshore resources to Asia (a 2013 LNG condensate tanker departed Hammerfest, Norway for Tokyo, Japan) or could Norwegian gas one day displace Russian gas exports to Europe? In 2012, Norwegian gas exports to Europe exceeded Russian exports, but in 2013 Russia once again became the leading exporter of gas to Europe.

Russia, enjoying the largest continental shelf in the Arctic, has only explored about 10% of its offshore potential, principally in the Barents and Kara Seas. Thus far, approximately 80% of the energy discoveries have been natural gas rather than oil. Russia's most significant offshore project is the 5.7 billion USD Prirazlomnoye field 60 kilometers offshore in the Pechora Sea. In April 2014, the Prirazlomnoye field became the first to produce and deliver to market Arctic offshore oil. The field was discovered in 1989, and the Prirazlomnaya Arctic offshore platform, operated by Gazprom Neft, was the first of its kind to work in shallow water, although it has frequently been afflicted by drifting ice.

Moe and Rottem also examine the state of Arctic infrastructure, where it can be argued that there is an abundance of ambition but a scarcity of investment. Once again, Russia has taken the most ambitious and aspirational approach to the NSR, consisting of port infrastructure (such as the Port of Sabetta on the Yamal Peninsula), 10 search and rescue centers to be completed by 2015, and roughly 35 governmental and privately owned ice breakers with three new nuclear-powered icebreakers to be completed by 2020. Because Russian infrastructure development is tied to project development, some of these "prestige projects" may fall victim to sanctions or lack of commercial viability for international companies due to shifting global energy patterns (such as the postponement of the Shtokman field). Norway has the most developed infrastructure along its western coast, including the Port of Narvik, which has the advantage of being ice free and can accommodate ships up to Cape size. The Canadian government also has an aspirational vision to export its Arctic resources, such as the Northern Marine Transportation Corridor Initiative and the Pacific Gateway Initiative. Yet these plans have developed slowly over time based on private sector demand, global economic trends, and environmental and indigenous community impacts. One issue that is not frequently addressed, however, is the impact of climate change on existing, as well as future infrastructure in the Arctic. The impact on Russian infrastructure in particular from permafrost thawing, coastal erosion, and ocean acidification will be considerable.

At the time of this commentary, the United States and the European Union had agreed to substantial economic sanctions against Russia, specifically targeting the energy and financial sectors. These sanctions will have a direct impact on Russia's future ability to attain offshore technology and financing from the West for its large-scale projects. However, this does

not prevent China from attempting to replace some of this lost Western investment, and the sanctions could potentially enhance China's overall economic investment strategy and presence in the Arctic. The imposition of Western sanctions can also alter global trade patterns as well as accelerate global energy and commodity patterns through technological innovation (such as the U.S. unconventional gas revolution).

Finally, experts tend to view the Arctic as if it is a hermetically sealed and increasingly ice-free region. However, it is neither. The Arctic is a rapidly changing region where the decisions and activities implemented by one Arctic state can have a lasting impact on all Arctic nations. Nor is the Arctic immune to global economic trends and turbulent geopolitical periods – whether they are stagnating oil prices, low natural gas prices in the United States, or the increased costs of oil and gas exploration and production. While Russia is more immune, or at least more willing to bear the costs of economically infeasible “prestige projects” in the Arctic, it is not immune to these forces if Western partners do not transfer Arctic technologies and offer long-term investment options.

In conclusion, there is an unevenness of development and state approach in the circumpolar Arctic; however, Russia will remain the epicenter of Arctic development. Its development will be state-directed and state-led, as Arctic progression is a “federally significant” part of Russia's historic narrative as a great power and is of greatest socioeconomic importance to Russia. Yet, Russian Arctic development faces serious headwinds due to its domestic policy choices as well as global economic trends, and these challenges will become greater with the imposition of sanctions. Murmansk, for instance, may be the perfect example of Russia's Arctic conundrum and the effect of domestic headwinds. Murmansk will be the hub of Russian economic development along the NSR, yet despite great aspirations, its development plan is continually altered or postponed. According to reports, Murmansk currently has a 20% budget deficit in the first half of 2014, yet it has increased spending by 18%.³ It is likely that Murmansk's budget deficit will increase due to the imposition of Western sanctions.

While the other Arctic coastal states have varying degrees of state ownership and involvement, their development models stand in stark contrast to that of Russia. Norway and Greenland will continue to develop their Arctic resource potential with the aim of future economic well-being for Norway and eventual political independence from Denmark

for Greenland. The North American Arctic, however, will develop more slowly, with the United States the furthest behind in its Arctic development. Canada's Arctic development is more instinctively inclined toward economic development, while offering tenuous footsteps toward greater northern development.

This unevenness potentially poses a considerable challenge to Arctic cooperation. When the stakes are so great for the largest Arctic state; when that state is under increasing external (and eventual internal) political and economic pressure; and when non-Arctic actors like China are introduced to the region, it is difficult to predict how Russia and the other Arctic states will respond both to future economic opportunities and to grave environmental and geopolitical challenges.

Notes

1. "Medvedev: Arctic Resources are key to Russia's Future," *The Seattle Times*, September 18, 2008, http://seattletimes.nwsourc.com/html/nationworld/2008187217_russia18.html
2. Since this was written, world market prices for oil have declined sharply.
3. Atle Staalesen, "In Murmansk, a growing budget deficit", *Barents Observer*, July 29, 2014, <http://barentsobserver.com/en/business/2014/07/murmansk-growing-budget-deficit-29-07>

Commentary

Lawson W. Brigham

The papers in this part focus on strategies and investments in offshore hydrocarbon development around the circumpolar Arctic (Arild Moe and Svein Vigeland Rottem) and in the Russian Arctic onshore (Valeriy A. Kryukov). Both are comprehensive reviews focusing on Arctic natural resource developments that are also the primary drivers for the emergence of increased Arctic marine shipping and operations. This was a key conclusion of the Arctic Council's Arctic Marine Shipping Assessment (AMSA) released in April 2009, and it remains consistent with what is observed regarding ship traffic in the Arctic today. Most trans-Arctic voyages along the Northern Sea Route (NSR) involve tankers, bulk carriers and LNG carriers transporting natural resources from northern Norway and the Russian Arctic to Asian ports in the Pacific. Offshore hydrocarbon exploration in Greenland, Norway, Russia and Alaska all involve small armadas of support ships attending to the needs of the drilling rigs and vessels. Arctic sea ice retreat is certainly a key driver in that this profound environmental change enables greater marine access and potentially longer seasons of navigation and drilling. However, it is Arctic natural resource development that is driving the requirements for expanded marine operations. In both papers, Arctic waterways (coastal and riverine) represent the critical links of the Arctic's vast resources to global markets. Protection of these waterways and the Arctic people who live in these marine areas requires large investments in navigation and safety systems that have yet to be realized.

It is important to note, as the paper by Moe and Rottem does, that one of fundamental challenges to the future of Arctic natural resource development is the volatility of prices of global commodities. These economic forces have influenced the uneven nature of offshore hydrocarbon development around the circumpolar world. The Arctic is a challenging frontier production location, both onshore and offshore, and higher levels of capital investment are likely required at the outset of major projects. Increasing environmental concerns and greater regulatory oversight may also play key roles in the uncertainty of regional Arctic development and the need for higher levels of investment in operating environments that

are considered “higher risk.” It is clear that fluctuating global commodity prices will remain a strong factor even for long-term, strategic investments in the Arctic. The global natural gas market particularly is experiencing dramatic change, and there is uncertainty as to the future role of Arctic gas in a global context (except perhaps for West Siberian gas to Europe and future Russian Arctic gas to China). Current investment in Arctic oil exploration seems to be moving ahead, as evidenced by the summer 2014 exploration in the Kara Sea by the ExxonMobil-Rosneft joint partnership. However, uncertainty now surrounds the return date of Shell to summer exploratory drilling in the Chukchi Sea off the northwest coast of Alaska. Other influential factors involve the facts that large Arctic development projects will likely require international investment and technology transfer, and involve Arctic states, non-Arctic states, and multiple companies. Such stakeholder complexity requires enhanced cooperation and partnerships and can make any investment climate challenging.

For the Arctic states, one of the greatest concerns and fundamental challenges is the lack of significant marine infrastructure in most sectors of the maritime Arctic, with the exception of the Norwegian coast, coastal northwest Russia, and Iceland. This major gap in marine infrastructure remains a key limitation in pursuing strategies of sustainable development for much of the Arctic’s coastline and marine areas. The Arctic Council’s AMSA identified key missing infrastructure including adequate hydrographic data and marine charts; complete and adequate coverage of modern communications; environmental monitoring of weather, sea ice and icebergs; search and rescue (SAR) capacity; marine environmental response capacity; aids to navigation; salvage and towing services; ice navigation training; ship monitoring and tracking; port reception facilities; icebreaker capacity; deepwater ports; places of refuge; and more. The Moe/Rottem and Kryukov papers appropriately mention the importance of ports: the roles of Murmansk, the new LNG port at Sabetta on the Yamal Peninsula, and the lack of major ports in the Canadian and U.S. Arctic sectors of the Arctic. Ports are integral to trade, links to offshore development, support to SAR and environmental response, support to law enforcement and sovereign security, access to marine services, and as gateways to future Arctic development. The lack of major, functioning ports in vast stretches of the Arctic region is a fundamental missing element in providing an adequate safety net to Arctic marine operations. The Arctic Ocean’s sparse hydrographic database and the lack of an adequate observing network of

environmental observations key to safe navigation are additional, critical limitations requiring long-term investment. This huge deficit in the range of infrastructure components as defined by AMSA also makes it difficult to evaluate the risks of current and future Arctic marine operations. The marine insurers and ship classification societies are challenged to create risk-based models when marine infrastructure is minimal or nonexistent in many Arctic regions where large development projects will be sited.

There are many challenges to the increasing marine uses of the Arctic Ocean that confront the Arctic states. But the most difficult is likely reducing this infrastructure deficit. Large investments are required, but there are many questions regarding the funding mechanisms for such infrastructure. The Arctic state governments are not likely to have the capacity to fund this frontier infrastructure in its entirety. New public-private funding mechanisms and partnerships will be required. New schemes may also be necessary for the cost recovery of select infrastructure, for example the observation and distribution of environmental data; the deployment of special aids to navigation; the conduct of unique hydrographic surveys in remote areas; the use of response services; and the use public-private icebreaker escort services. To complement expanded marine safety and environmental protection strategies and measures, public and private assets will have to be combined where remote, regional projects are under development. The Arctic state governments and the maritime industry must work more closely together to prioritize where these large infrastructure investments should be directed, and where private rather than fully public investments are needed. Examples include: co-developing integrated systems for monitoring and tracking of Arctic ships; matching advancing traffic to where new hydrographic surveys should be conducted; addressing icebreaker fleet renewal, both government and commercial icebreakers and associated services; and defining satellite requirements for expanded environmental observations and Arctic communications. Adequately addressing the critical marine infrastructure needs can only be achieved through greatly expanded government-industry cooperation and joint funding.

The World Economic Forum's Global Agenda Council on the Arctic recently outlined several key issues regarding Arctic infrastructure investment:

- Certain types of infrastructure are important preconditions for

sustainable Arctic development (e.g. icebreaking ships, oil spill response ships, ports, energy supplies and telecommunications).

- High-level cooperation is required between the Arctic state governments and stakeholders in the development of plans for new infrastructure linking population centers and states.
- Arctic infrastructure inevitably requires greater levels of monitoring, management and maintenance compared with infrastructure at lower latitudes. A greater level of investment in these critical areas is a necessity to attain higher levels of safety and environmental protection.
- The Arctic Council is an effective intergovernmental forum focusing on environmental protection and sustainable development issues and promoting common interests among its constituents.
- Arctic projects require from regulatory authorities a clear articulation of the procedures, requirements and timeliness for project approval. This environment relates directly to investment strategies and addressing infrastructure needs.
- The Arctic needs an infusion of skilled people to realize large and complex industrial projects. Expanded investments in education and infrastructure, making the region more livable, are necessary requirements.
- A new Arctic investment vehicle for sustainable development may be necessary to assist in the funding of cross-border infrastructure.

These key issues suggest that more dialogue and cooperation is necessary among the Arctic states, industry, and private investors, particularly in the newly emerging maritime Arctic.

Commentary

Hua Xu

Under the grand trend of global warming and Arctic summer sea-ice retreat, Arctic resources have become more accessible. The major explored Arctic resources include natural gas in the Barents Sea and Yamalo-Nenets Okrug, oil in north Alaska and Canada's Mackenzie valley, nonferrous metals on the Taymyr Peninsula and in Alaska, and iron ore on Baffin Island and the Kola Peninsula and in northern Scandinavia. There are also some promising but unexplored petroleum deposits in the Arctic, including oil and gas in the Siberian Shelf and waters near Greenland and the Canadian Arctic Archipelago. One of the most attractive Arctic resources is the natural gas from the Russian Arctic, due to the scale of the reserves that are nearly one-sixth of the world's total natural gas reserves.

The majority of the explored Russian Arctic gas is located in the Barents Sea and Yamalo-Nenets Autonomous Okrug. In the southern part of this okrug, some giant gas fields (e.g., Urengoykoye) have been in production for several decades as major gas sources for Europe. Because they are declining, Russia decided to develop the gas resources on the Yamal Peninsula (in the northern part of Yamalo-Nenets Okrug) and the Arctic seabed. Due to a shortage of experience in Arctic offshore drilling, Russia sought foreign companies to cooperate with domestic industries in Arctic offshore petroleum exploitation.

Gazprom, a Russian state-controlled energy company that nearly monopolizes Russia's gas production and exports, identified the Yamal Peninsula as a region of its strategic interest in 2002, and then brought forward the "Yamal Project," in which a series of gas fields and a pipeline system on the Yamal Peninsula will be developed. The total recoverable gas reserves of Yamal Project are estimated to be up to 16 tcm, and the annual output of its largest field, Bovanenkovskoye field, is expected to be 75-115 bcm. Gazprom also invested in several Arctic offshore projects with foreign partners: the Shtockman gas field with Total and Statoil and exploration and development of petroleum in the Arctic shelf with Shell. Gazprom now runs Russia's first Arctic offshore petroleum project, Prirazlomnoye field, in the Pechora Sea. The Dolginskoye offshore field nearby also belongs to Gazprom.

Rosneft, Russia's largest oil producer, has many international offshore projects in the Barents Sea and the Kara Sea with partners from different countries. Two of them are located near the maritime boundary between Norway and Russia: the Perseevsky oil field with Statoil and the Fedynsky oil field with ENI. One project is near the west coast of Novaya Zemlya: the Zapadno-Prinovozemelsky oil field with CNPC. Two are located in the Pechora Sea: the Yuzhno-Russky and Medynsko-Varandeytsky oil fields, both with CNPC. Finally, there is the "East-Prinovozemel Project" covering the exploration and development of oil and gas in three regions of the Kara Sea with ExxonMobil.

Novatek, Russia's largest independent gas producer, operates in the gas fields on the Yamal Peninsula; it cooperates with Total and CNPC on the "Yamal LNG Project." This project is based on the Yuzhno-Tambeyskoye gas field, which is one of Novatek's two largest gas fields (the other is the Yurkharovskoye field), and is expected to produce for export 16.5 million tons of LNG (or 22 bcm of gas equivalent) and 1 million tons of gas condensate annually, mainly to Europe and East Asia (3 million tons of LNG are committed to China). For this project, the port of Sabetta, a new LNG loading terminal for the gas field, will be built. This project is deeply involved with East Asian countries, and is considered an important influence on shipping via the Northern Sea Route (NSR). On the one hand, traffic on the NSR will increase rapidly when the Yamal LNG Project is in full production in 2018; on the other hand, the construction of the Sabetta LNG port will bring maritime delivery of materials, components, machines and supplies. NSR shipping will be stimulated by this project.

Due to its importance, the Yamal LNG Project has become one of the hottest topics in Arctic shipping and energy development. There are many studies dealing with the financial, regulatory, and technological aspects of the project, but one problem is rarely considered: can other gas fields compete with the natural gas from Yamal? There has been a long negotiation between China and Russia on gas pipelines in South Siberia, and Russia plans to build LNG terminals in Vladivostok and on southern Sakhalin Island, which are far closer to East Asian markets than Sabetta is. From this perspective, the focus of this commentary is not Yamal LNG itself, but gas projects from Russia to East Asia, especially China. Although these projects are situated outside the Arctic, they may influence Yamal LNG in the long run, so we cannot neglect them in an evaluation of Arctic energy shipping.

THE REASONS FOR EAST ASIA'S ATTENTION TO RUSSIAN GAS

According to BP's data, at the end of 2013, the annual natural gas consumption of China, Japan, and Korea was 161.6, 116.9, and 52.5 bcm, respectively. Consider that among the three countries, only China produces gas. China's net imports are 44.5 bcm, whereas the gas consumed by Japan and Korea is totally imported. So China, Japan, and Korea rank as the fifth, second, and third most gas deficient economies in the world, respectively (the first and fourth are the European Union and the United States). More seriously, the gas consumption of the three East Asian countries is still growing rapidly, whereas U.S. gas consumption is growing slowly and that of the EU is falling. From 2003 to 2013, gas consumption has increased 377%, 46%, and 117% in China, Japan, and Korea, respectively, whereas the growth rates in the United States and the EU are 17% and -8%.¹

Why is the demand for gas in East Asia growing faster? The reason is that the share of gas in the total prime energy consumption of East Asian countries is lower than the level of the United States or the EU. As a clean energy, natural gas emits less CO₂ and other pollutants than oil or coal does. Japan and Korea turned to gas from oil to reduce their CO₂ emission, so their gas consumption increased faster than consumption in the EU and the United States, which have a higher and more stable gas consumption share. For China, to carry out the promise made by President Hu Jintao in 2009 of a reduction in CO₂ emission intensity, the extraordinary high coal consumption share must be lowered, and gas is a better option than oil to substitute for coal. Moreover, China's total energy consumption is increasing quickly because of its fast-growing economy. So, East Asian countries are and will still be big importers of natural gas in the future.

But why Russia? The first reason is that Russia has huge gas reserves, which rank as the second largest in the world (after Iran). The second but more important reason is that Russia is much closer than other gas exporters to East Asia. For Japan, Korea, and most part of China, Russia is closer than Southeast Asia, another important gas producing area. Additionally, Russia and China are land neighbors, and Russia is separated from Japan by narrow straits. The maritime distance between the Russian Far East and Korea is also short. This is why Russian gas is so attractive for East Asia. But we should keep in mind that Russia is a vast country, and most of its gas fields are located far from its border. To deliver gas to East Asia, Russia has to build

long pipelines or develop expensive LNG supply chains. So, it is natural for East Asian countries to participate in the Russian gas sector.

THE YAMAL LNG PROJECT

Yamal LNG is a multinational project in the Russian Arctic focused on exporting natural gas, mainly from the Yuzhno-Tambeyskoye field, in the form of LNG. Its design capacity is 16.5 million tons of LNG annually when its three trains of LNG plant are fully completed in November 2018. Its first train is expected to be finished and to produce the first LNG in November 2016. The port of Sabetta, its loading terminal, is being built on barren land and is expected to be completed in 2016.

Yamal LNG was acquired by Novatek from Volga Resources, which controlled the Yuzhno-Tambeyskoye field, in May 2009. Novatek sought cooperation with Gazprom and foreign partners, and in October 2011 Novatek and Total signed an agreement to hold 80% and 20% shares of the project, respectively. In June 2013, the Chinese state-owned petroleum company, CNPC, bought a 20% share from Novatek. Now the owners of the project are Novatek (60%), Total and CNPC (20% each). We should note that this is not the first Chinese investment in the Russian Arctic. Before this, China had already invested in three oil fields with Rosneft in the Barents Sea.²

In the beginning, the overall of the Yamal LNG project was estimated to be 18-20 billion USD. By now, however, the estimated expenditure has risen as high as 27 billion USD due to unpredicted costs. The LNG will be shipped by 16 ARC7 ice-class carriers, which have been contracted to Daewoo Shipbuilding and Marine Engineering (DSME) Company. The cost of these ships is about 2.2-2.3 billion USD each. These ships can sail independently in waters covered by 1.7 m-thick level ice in summer and autumn. So, the strategy of Yamal LNG to access the Asian market is bi-directional: in the summer and autumn the ships go eastward via the NSR, while in winter and spring they go westward via the Suez Canal or still via the NSR with icebreaker escorts.

The construction of the port of Sabetta is financed primarily by the Russian state. In June 2014, the cost of the port was estimated to be 69.7 billion RUB (or 1.9 billion USD), 40% above the original project budget, and the construction has encountered a money shortage. Now, the Russian Ministry of Transport is proposing to move 4.9 billion RUB (or 135 million USD) from the project of

the Murmansk Transport Hub to Yamal LNG, because the delay of delivery will require a huge compensation to LNG buyers.³

The port construction was contracted to Murmansk Shipping Company (MSCO), and MSCO will deliver 1.5 million tons of goods to Sabetta in three years. The LNG will be shipped by Sovcomflot, Teekay, and a joint venture between MOL and China Shipping, which ordered ARC7 LNG carriers from DSME. All LNG buyers have signed long-term contracts (20 or 30 years) with Yamal LNG. They are Total (4 million tons/year), Gas Natural (2.5 million tons/year), CNPC (3 million tons/year), Novatek Gas & Power (2.86 million tons/year), and Gazprom (3 million tons/year).

It is interesting that Gazprom has purchased gas from Yamal LNG, since that company is the largest gas producer in Russia and monopolized gas exports for a long time. In 2013, Russia liberalized gas exports and permitted Novatek and Rosneft to export gas in the form of LNG, but Gazprom still kept a monopoly on Russian pipeline gas exports. Thus, Novatek can export LNG from Yamal without seeking cooperation with Gazprom. In fact, in 2012, Gazprom and Novatek had a long round of negotiations over a partnership on Yamal gas production, but the plans soon crashed.⁴ Now here is a question: will Gazprom buy gas from the Yamal fields owned by Novatek and transport it through its vast pipeline network to Asia in the future? This option may compete with Gazprom's future plans of continuing to contract to Yamal LNG, and in turn compete with the Yamal LNG Project itself, considering that Gazprom is planning a pipeline across the Ob Bay from the Yamal Peninsula to its other field in the Yamalo-Nenets area, and eventually to China.

Moreover, there are several other LNG projects conceived or under development in the Yamalo-Nenets area. Novatek is planning a second LNG project there, which is located on the Gydan Peninsula on the east coast of the Ob Bay; Rosneft is interested in establishing an LNG project on the Yamal Peninsula after it drills out gas with ExxonMobil in the Kara Sea;⁵ and Gazprom also has its own LNG project on this peninsula south of Sabetta. All these projects may compete with the Yamal LNG Project in the long run.

We should note that the monopolistic right held by Gazprom in pipeline gas exports is being challenged. Recently, Rosneft wanted to negotiate with Gazprom to use its "Power of Siberia," a pipeline system under construction in Eastern Siberia, to export gas from its gas fields in Evenkia and Irkutsk to China. But this proposal was refused by Gazprom, which is afraid of losing its monopoly in pipeline gas exports. However, Rosneft

keeps struggling and lobbying to obtain the pipeline gas export right.⁶ If Rosneft wins, it is reasonable to suppose that it will also connect its Vankor field near the border of Krasnoyarsk Krai and Yamalo-Nenets Okrug to Gazprom's gas pipeline systems in the Western Siberian Lowland to export to China or other markets. For the same reason, Novatek will struggle for the export rights as well. If its Yamal gas fields obtain a pipeline outlet, the importance of Yamal LNG may be weakened. So, the gas pipelines south from the Russian Arctic will influence the future of Yamal LNG, due to their overlapping main market – East Asia.

COMPETING GAS PROJECTS IN EASTERN SIBERIA AND THE RUSSIAN FAR EAST

Long before the investment in Yamal LNG and the offshore oil fields in the Barents Sea, China began to cooperate with Russia in developing cross-border pipeline systems to import oil and gas from the Russian Arctic.

The Russia-China oil pipeline (now called the Eastern Siberia – Pacific Ocean oil pipeline, or ESPO) was proposed in 2001 by the Russian oil company Yukos to go from Angarsk to Daqing via a route south of Lake Baikal to export its oil from Khanty-Mansi Autonomous Okrug to Northeast China. At the same time, Transneft, the Russian oil pipeline monopoly, proposed an alternative route from Tayshet to the Far East port Kozmino near Nakhodka via a route north of Lake Baikal, which could serve other Far East markets. In May 2003, the Russian government decided to combine these projects and said that Transneft would be in charge of the pipeline, while Yukos would supply the oil, and signed an agreement with CNPC for a 25-year oil contract. In December 2004, however, Yukos was acquired by Rosneft, and Transneft's route was adapted to bypass China. The construction of ESPO began in 2006, and the first stage, from Tayshet to Skovorodino in Amur Oblast, was completed in May 2009. In June 2009, Russia and China signed a deal to build a branch pipeline from Skovorodino to Daqing to export 15 million tons of oil to China each year for 20 years. This branch line covering 64 km in Russia and 992 km in China was completed in September 2010. On January 1, 2011, Russia began to export oil to China by the ESPO pipeline. The second stage of the pipeline, from Skovorodino to Kozmino, was inaugurated in 2012 and will be completed in 2014 or 2015. The total distance of the ESPO pipeline is

4857 km, and the initial transport capacity is 30 million tons per annum (it will be upgraded to 80 million tons per annum by 2025). The capacity of the branch to China is 30 million tons per annum.

At the same time, other Russia-China cross-border gas pipelines have been planned and built. These lines relate not only to Russian Arctic gas, but also to gas deposits in Eastern Siberia. As early as 1987 and 1989, two large gas fields, Kovyktinskoye (in Irkutsk Oblast) and Chayandinskoye (in the Sakha Republic), were discovered. Their recoverable gas reserves are estimated to be 1.5 tcm and 1.2 tcm, respectively. Due to their remoteness from European Russia, their main market is oriented to East Asia.

In 1994, CNPC began to negotiate a cooperative agreement with SIDANCO, the then owner of the Kovyktinskoye field, but the negotiations were delayed. In 1999, CNPC and RUSSIA Petroleum, which held the license for the field at the time, signed a cooperation agreement. In 2000, Korea's Kogas joined this project. It included a 4887 km gas pipeline from the field to Northeast China and Korea (including a subsea pipeline across the Yellow Sea); the estimated expenditure was 17 billion USD. The predicted gas exports to China and Korea were 20 and 10 bcm per annum, respectively. The project was expected to begin in 2005 and be completed in 2008, but was postponed to later. In 2003, the holding companies of TNK International, SIDANCO, RUSSIA Petroleum and some other Russian companies established a joint venture with BP known as TNK-BP. The ownership of Kovyktinskoye field was then shifted into the hands of TNP-BP. However, in June 2010, RUSSIA Petroleum went into bankruptcy, and Gazprom bought its assets and obtained the field in March 2011. So the field became a part of Gazprom's "East Gas Program." TNP-BP was acquired by Rosneft in March 2013.

The cooperation between Gazprom and CNPC plays a critical role in Siberian gas projects. They signed a strategic cooperation agreement in October 2004. In March 2006, during Putin's visit to China, the two companies signed a protocol on gas supplies from Russia to China, including a gas supply schedule, volumes, routes and pricing principles. They agreed on two routes: the western route or Altai pipeline from Urengoyeskoye field to the Xinjiang Uyghur Autonomous Region in northwest China with a connection to China's West-East Gas Pipeline (completed in 2004) via the Altai Mountains, and the eastern route from Chayandinskoye field in the Sakha Republic to northeast China. The supply volumes of the western and eastern routes are 30 bcm and 38 bcm per annum for 30 years, respectively.

The partners gave the Altai pipeline priority for construction. It runs 2800 km and was estimated to cost 4.5-5 billion USD. However, the partners could not agree on the price, and the negotiations lasted a long time. The project was shelved in 2008. In December 2010, negotiations resumed, but the estimated cost was updated to 14 billion USD and the first gas shipment could not be delivered in 2011 as anticipated in the initial plan. The estimated completion date was put off to 2015-2018. More seriously, the pressure from protests in the Altai Republic, which the pipeline would transit, made the project less appealing. To protect the Ukok Plateau, a sacred land in native culture and a part of the “Golden Mountains of Altai,” a UNESCO World Heritage Site, and to protect local endangered species such as the snow leopard and Altai argali, Altaian activists and the general public opposed the pipeline. As a compromise, Gazprom announced in May 2013 that it would temporarily stop funding of the project during 2014 and 2015. But it didn’t cancel the project.

Meanwhile, the eastern route was given more attention. In October 2012, Putin instructed Gazprom to start construction of the Yakutia-Khabarovsk-Vladivostok gas pipeline, also known as Power of Siberia, at the time of the final investment decision on the pre-development of the Chayandinskoye field. This project included a plan to link the Kovyktinskoye and Chayandinskoye fields later, so the total distance of the pipeline is about 4000 km: 3200 km from Chayandinskoye field to Vladivostok in the first stage, and 800 km from Kovyktinskoye field to Chayandinskoye field in the second stage. The annual transport capacity is designed to be 61 bcm. In May 2014, Gazprom and CNPC signed a 400 billion USD contract to supply 38 bcm of gas per annum to China for 30 years via Power of Siberia. The estimated date to initiate exports of gas from the Chayandinskoye field is 2019, and its annual production will be 25 bcm. The investment in the field’s development is about 13.7 billion USD, and in the pipeline about 24.5 billion USD, as estimated in 2012. The construction of the first stage of Power of Siberia will start in 2015. Its eastern section, between Skovorodino and Khabarovsk, will share an integrated corridor with the ESPO oil pipeline. From Blagoveshchensk, there will be a branch pipeline heading to China. At Khabarovsk, Power of Siberia will join the Sakhalin-Khabarovsk-Vladivostok gas pipeline, which is 1188 km long, linking the gas projects in the northern Sakhalin Island (opened in 2011) to Vladivostok. Its capacity will be 30 bcm per annum in 2020, of which 8 bcm will be from Sakhalin. At the end of this pipeline in

Vladivostok, an LNG terminal will be built as a joint venture of Gazprom and the Japan Far East Gas Company (a consortium led by Itochu and involving CIECO, INPEX, JAPEX, and Marubeni) that will be opened in 2018 with a total capacity of 15 million tons of LNG (or 20 bcm of gas equivalent) when three production trains are completed. The main market of the Vladivostok LNG Project is expected to be Japan and Korea. There is another LNG port in the southern Sakhalin Island, also designed to serve the Japanese and Korean market.

Japan has paid attention to the oil and gas resources on Sakhalin Island for a long time. Now there are six existing or planned offshore petroleum projects along the Sakhalin coast, from Sakhalin-I to VI, operated cooperatively by Russian and foreign companies. Among them, Sakhalin-I is operated by Exxon Neftegas Ltd., a consortium including ExxonMobil (30%), SODECO (30%, jointly funded by JAPEX, Japan National Oil, Itochu, and Marubeni), ONGC Videsh Ltd. (20%, an Indian company), and Rosneft's two subsidiaries (11.5% and 8.5% each); Sakhalin-II is operated by Sakhalin Energy, a consortium including Gazprom (51%), Shell (26.5%), Mitsui (12.5%) and Mitsubishi (10%). The former project holds 310 million tons of oil and 0.48 tcm of gas, began production in 2005 and mainly yielded oil; the latter project holds 160 million tons of oil and 0.5 tcm of gas, began to produce in 1999, and also includes the Trans-Sakhalin oil and gas pipelines and an oil terminal and an LNG plant, plus a terminal near Korsakov in the southern Sakhalin Island. In 2005, the total investment of Sakhalin-II was estimated to be \$20 billion USD. The output of the project is 19.7 million tons of oil and 19.3 bcm of gas per annum. The LNG terminal was opened in 2009, and it exports 9.6 million tons of LNG (or 13 bcm of gas equivalent) each year. The buyers of Sakhalin LNG include seven Japanese companies (three of which are electric power companies), one Korean company, and one Dutch-British company. Sakhalin-III holds 800 million tons of oil and 0.9 tcm of gas, and one of its fields, Kirinskoye gas field, is owned by Gazprom, with the first gas being extracted in October 2013. Gazprom has created two outlets for the gas produced from these Sakhalin projects: one is the Sakhalin LNG terminal near Korsakov, the other is the Sakhalin-Khabarovsk-Vladivostok gas pipeline, which connects the eastern route of Power of Siberia for exports to China.

We should note as well that Power of Siberia will connect the Chayandinskoye and Kovyktinskoye fields, and Gazprom has a plan to build a pipeline from Kovyktinskoye to Irkutsk in order to gasify this

industrial center in Eastern Siberia. In the long run, Gazprom plans to build a connection between its pipeline networks in Western and Eastern Siberia. With this connection, the gas from the Yamalo-Nenets area can be piped to Northeast China, or the gas from Eastern Siberian fields can be piped to Xinjiang once the Altai Project is completed. Given this potential scenario, the Yamal LNG Project may be challenged in the long run after the first gas deal expires, since the pipeline network developed by Gazprom in South Siberia will provide a major alternative to this Arctic project. Of course, there is no need to worry about Yamal LNG in the next 30 years.

CONCLUSION

This commentary is relevant to the future of Yamal LNG, which plays a key role in the development of NSR shipping, though it does not focus directly on Yamal LNG or other Arctic projects. It examines the petroleum projects, especially natural gas projects, in South Siberia and the Russian Far East that involve cooperation between Russia and East Asian countries, since these projects may affect Yamal LNG in the long run. The key observations are:

- (1) East Asia is close to Russia, so that pipeline and short-sea LNG shipping are competitive;
- (2) Although Gazprom still enjoys a monopolistic position in pipeline gas exports, Rosneft is struggling to obtain export rights. If Rosneft wins, it is reasonable to imagine that Novatek will follow, and its gas from the Yamal Peninsula to China can go through pipelines southward;
- (3) Gazprom has major projects, existing or planned, to export gas to the East Asian market; and
- (4) Last but not least, the capacity of gas pipelines and LNG shipment in South Siberia and Russia's Far East are much bigger than Yamal LNG, though Yamal LNG is important for traffic via the NSR. Consider that each year Power of Siberia will provide China with 38 bcm of gas, and the Altai pipeline will provide 30 bcm, whereas Yamal LNG will only provide 4 bcm.

As dramatic changes are not unusual in Russian projects, however, there are many uncertainties in the future, so these challenges to Yamal



Figure I-9. The eastern part of Gazprom's gas pipeline networks (solid for existing, dashed for planned)

LNG are potential rather than certain. At least in the next 30 years, these challenges are not likely to derail the Yamal LNG project.

Notes

1. BP Statistical Review of World Energy, June 2014.
2. Barents Observer. "China to drill in Barents Sea" - <http://barentsobserver.com/en/energy/2013/03/china-drill-barents-sea-25-03>
3. Barents Observer. "Budget crash at Sabetta puts Murmansk in squeeze" - <http://barentsobserver.com/en/energy/2014/06/budget-crash-sabetta-puts-murmansk-squeeze-10-06>
4. Barents Observer. "Gas giants with Yamal deal" - <http://barentsobserver.com/en/energy/2014/05/gas-giants-yamal-deal-27-05>
5. Barents Observer. "Sechin eyes LNG plant in Yamal" - <http://barentsobserver.com/en/energy/2014/02/sechin-eyes-lng-plant-yamal-11-02>
6. Reuters. "Russia's Rosneft says will take Gazprom to court over pipeline refusal" - <http://uk.reuters.com/article/2014/07/01/oil-russia-rosneft-courts-idUKL6N0PC37I20140701?feedType=RSS&feedName=rbsEnergyNews>

Commentary

Ryuichi Shibasaki

ESTABLISHMENT OF PUBLIC-PRIVATE PARTNERSHIP COUNCIL IN JAPAN FOR THE NORTHERN SEA ROUTE

In May 2014, the Japanese Ministry of Land, Infrastructure, Transport and Tourism (MLIT) established a “public-private partnership council for the Northern Sea Route (NSR),” in order to share information on the NSR with maritime shipping companies, cargo owners and administrations in Japan and encourage use of the NSR.¹ The Council members are not only the Maritime Bureau, Port and Harbors Bureau, Meteorological Bureau, Japan Coast Guard and Policy Bureau of MLIT, but also other governmental administrations, including the Cabinet Secretariat, the Ministry of Foreign Affairs (MOFA) and Ministry of Education, Culture, Sports, Science and Technology (MEXT), as well as major shipping companies (NYK, MOL, K-Line), major shippers, including electric power companies, gas companies, trading firms, and several related associations and foundations such as ship owner associations, marine safety associations, the OPRE, and JOGMEC.

On May 30, 2014, the first meeting of the Council was held, and related information such as the current situation and economic analysis of the NSR, international cooperation and collaboration on Arctic Seas (including the introduction of NPAC), and movement of investigation and research on the Arctic Seas were delivered from several ministries and agencies.

SHIP BUILDING CONTRACTS OF ICE-CLASS CARRIERS BY MOL FOR YAMAL LNG PROJECT

On July 9, 2014, Mitsui O.S.K. Lines, Ltd. (MOL) announced that a joint venture between MOL and China Shipping (Group) Company was concluded and shipbuilding contracts signed with Korea’s Daewoo Shipbuilding & Marine Engineering Co., Ltd. (DSME) to build three ice-class LNG carriers for the Yamal LNG project.

According to the press release issued by MOL,² the ice-class LNG

carriers for the project will have independent ice-breaking capabilities that enable them to sail in icy seas with a maximum 2.1 m ice thickness (“ARC7” type). A profile and image of the vessel are shown in Table I-2 and Figure I-10. The vessels will be capable of transporting LNG from the Yamal LNG liquefaction plant at Sabetta Port on the Yamal Peninsula to the main LNG markets in the world. During the summer period, the carriers will also be able to sail independently on NSR to transport LNG to East Asia.

Table I-2. Profile of ice class LNG carrier ordered (source: MOL)

Dimensions	Length: 299m, Breadth: 50m
Ship type	172,000 m ³ membrane type
Ice class/ Specifications	RMRS ARC7/ Special specifications for Arctic environment
Ice-break sailing capabilities	Icebreaker bow structure; aft structure: three-axis POD propeller Max. ice breaking capacity: ice thickness 2.1m (when going astern)
Shipyard	Daewoo Shipbuilding & Marine Engineering Co., Ltd.

The Japan Maritime Daily reported³ that the headquarters of the joint venture company will be in Hong Kong. MOL and China Shipping Development Co., Ltd. each have a 50% share. The price of each vessel is 310 million USD. By sharing the financial burden with partner companies and obtaining loans for financing (i.e., project financing), the total amount of self-financing per company can be limited to 100 to 140 million USD for building three vessels. The operation of these carriers will be conducted by



Source: MOL

Figure I-10. Illustration of LNG carrier for Yamal project

MOL. The first vessel is expected to be completed in March 2018.

DSME gave notice of acknowledgement of orders to build nine ARC7 ice-class LNG carriers this time. These vessels will be delivered by the end of February 2020. The six LNG carriers other than those ordered by the joint venture company of MOL and China Shipping are supposed to be ordered by Teekay LNG Partners LP (USA). In addition, one ARC7 ice-class LNG carrier was already ordered by Sovcomflot (a Russian state-owned company) in March 2014 and will be delivered by the end of June 2016. Since it is expected that 15-16 specialized LNG carriers (around five carriers per LNG train) are needed for all-year constant shipping of LNG from Sabetta Port, around two-thirds of them have been ordered from DSME.

All ARC7 LNG carriers now built or contracted for building will serve under a time-charter contract with Yamal LNG, of which the shareholders are Novatek (Russia, 60%), Total (France, 20%) and CNPC (China, 20%). The contract period of the time-charter is 25 years. Under the time-charter contract, the ARC7 ice-class LNG carriers operated by MOL will transport LNG to any destination that the customer (i.e., Yamal LNG Project) instructs. From Sabetta Port, operation to Europe will be conducted all year long, with operation to East Asia, including China, Japan and Korea via the NSR being possible only during the summer season (for example, from May to November) as shown in Figure I-11.

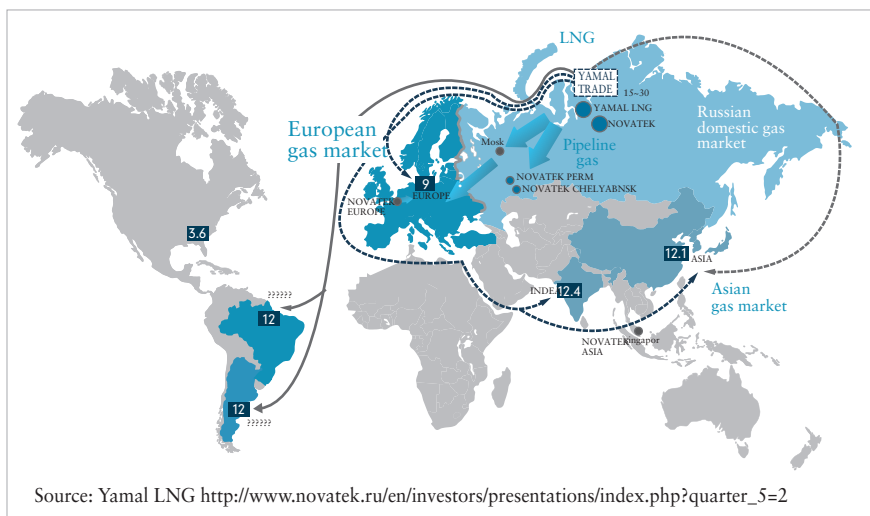


Figure I-11. Expected importers of Yamal LNG and shipping routes

TRANSSHIPMENT HUB OF LNG

According to a press release⁴ issued on May 20, 2014 by Yamal LNG, a binding contract with CNPC to provide for the supply of three million tons of LNG per annum at delivered ex-ship (DES) terms, including delivery cost by maritime shipping for a period of 20 years, has been concluded. In addition, in order to provide year-round supply to East Asia, Yamal LNG has signed an agreement outlining the parameters of cooperation on the transshipment of LNG with Fluxys, which is a Belgium-based, fully independent gas infrastructure group, according to a press release issued on April 4, 2014. The Zeebrugge LNG terminal, which is owned by Fluxys LNG, a 100% affiliate of Fluxys, will be the transshipment platform enabling LNG supply from Yamal to the Asian-Pacific countries when winter navigation is closed on the Arctic Ocean's NSR (see Figure I-12). Fluxys will carry out all technical, permitting and regulatory processes with a view to provide LNG transshipment services.

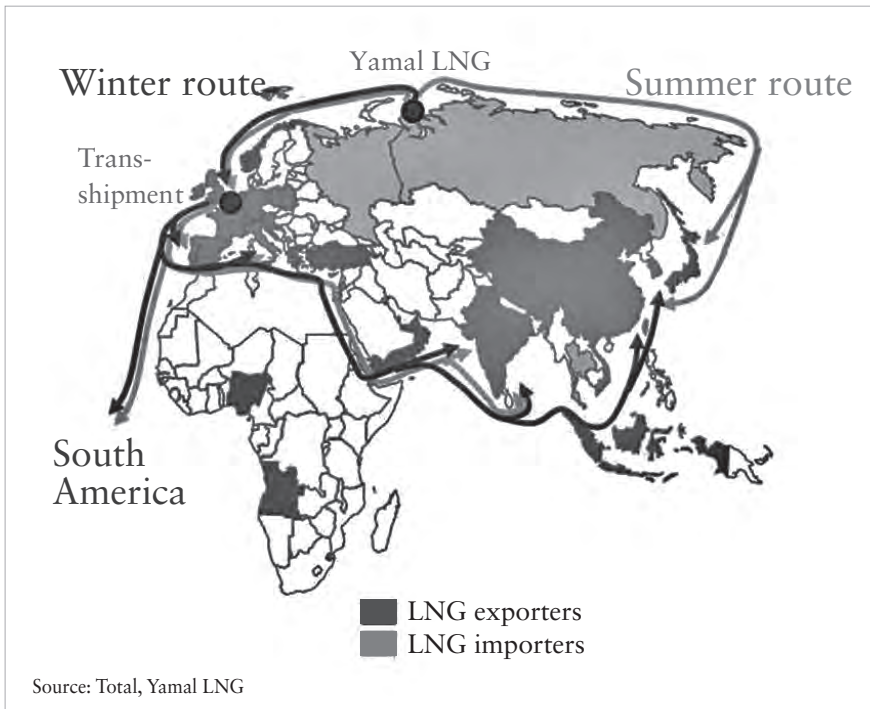


Figure I-12. Yamal LNG shipping options with transshipment in Europe to East Asia during the winter season

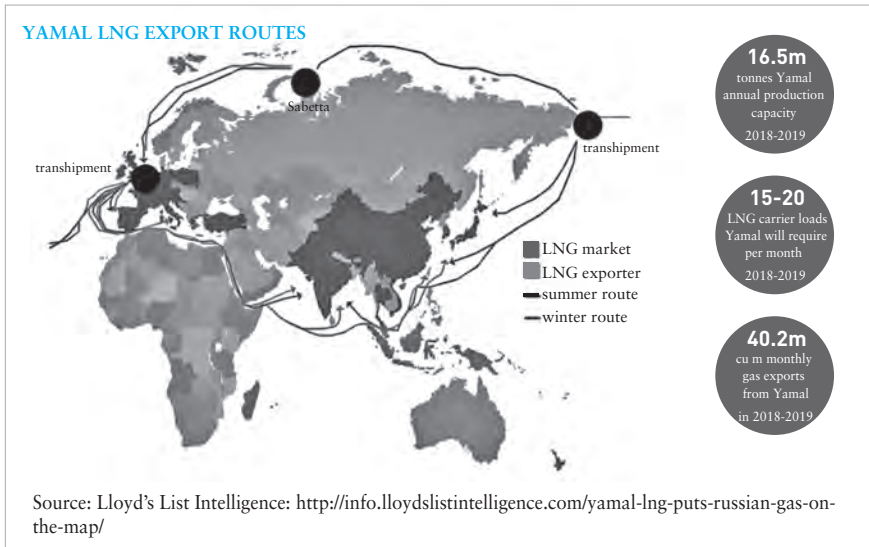


Figure I-13. *Is the transshipment hub needed for East side?*

The transshipment hub of LNG in Europe to be provided by Fluxys Belgium targets the shipping demand of LNG to East Asia during the winter season when the NSR is not available. Some figures available through Internet (one example is shown in Figure I-13) show a possibility of the hub in East Siberia or East Asia as well. Also, some seaports including Petropavlovsk-Kamchatsky, Vladivostok, Busan and some Japanese ports are said to aim at being a hub of the NSR, although they do not target only the LNG transport. Is it possible to be a hub in the east side? In order to realize that, it must be proven that the shipping system with transshipment is economically advantageous (i.e. the shipping cost with transshipment is cheaper), compared with the direct shipping to the destination.

One possibility of the transshipment hub in the east side is to emulate the original business model of Fluxys Belgium to provide the LNG to neighbor countries as secondary transport. Some transshipment hub located in an ice-free port can sell the LNG in the winter season which the price of LNG become higher, by stocking them at full capacity from Sabetta Port via the NSR during the summer season.

RISKS IN BUILDING ICE- CLASS CARRIERS

According to our interview survey to MOL, the company considers that the risk on the demand side will be undertaken by Yamal LNG because they entered a long-term, time-charter contract; therefore, MOL can keep its mind on the operational issues of vessels. MOL considers that the know-how and resources needed for ship operation on the NSR will further enhance and expand its ocean transport services, not only in LNG carriers.

Another risk for shipping companies such as MOL is whether the LNG terminal for exports will be completed as scheduled. There may be a large risk if no cargo is found to be shipped after the vessels are completed.

RESPONSE OF THE SUEZ CANAL AUTHORITY (SCA)

Finally, let me comment on some responses from the Suez Canal Authority in Egypt, since the OCDI is involved in a Japan International Cooperation Agency (JICA) project to enhance the strategy of the Suez Canal with the SCA staff. The staff of SCA is interested in the current situation and future direction of the NSR, which they consider to be a potential competitor with the Suez Canal. They would also like to attend the NPAC from next year in order to gather information as well as to develop a friendship with relevant people in Arctic shipping.

Notes

1. http://www.mlit.go.jp/sogoseisaku/ocean_policy/sosei_ocean_tk_000021.html (in Japanese)
2. <http://www.mol.co.jp/en/pr/2014/14036.html>
3. Japan Maritime Daily, July 10, 2014.
4. <http://www.novatek.ru/en/business/yamal/southtambey>

Commentary

Sung Woo Lee

HIGH INTEREST IN ARCTIC ONSHORE AND OFFSHORE RESOURCES

The Arctic is well known for its rich repositories of energy and mineral resources. Energy importing countries around the world pay considerable attention to Arctic offshore and onshore oil and gas resources. In particular, East Asian countries, including China, Japan, and South Korea, have a great interest in the Arctic offshore and onshore, mainly due to the supply potential for meeting their needs for energy and the mineral resources

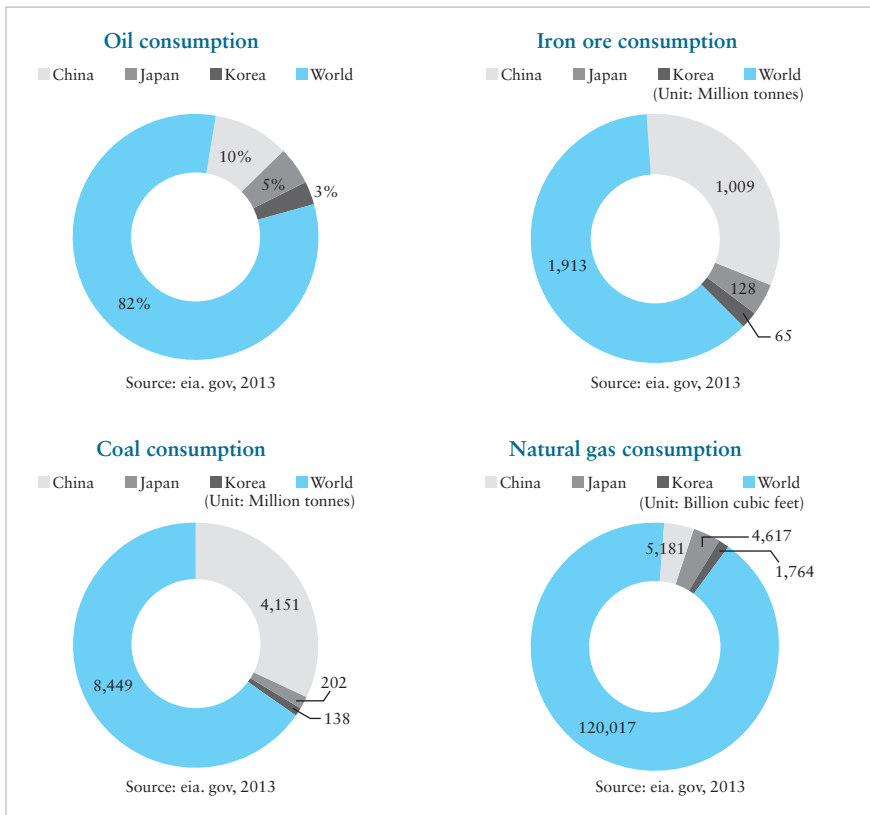


Figure I-14. Consumption of energy and mineral resources in East Asia

essential for supporting their economies. As shown in Figure I-14, the three countries in East Asia account for 18% of the world's oil consumption.

In order to comprehend South Korea's perspective on Arctic energy and resources development, we need to understand the nation's position relating to energy and mineral resources. South Korea is energy and mineral poor. Moreover, it is located a long way from available natural sources and has been heavily dependent on the high-cost Middle Eastern and Southeast Asian markets for supply.

To maintain its economic growth, South Korea has been increasing its demand for energy and mineral resources abroad. The country has been suffering from natural resource-related difficulties, such as a lack of natural resources, long-distance transportation, and vulnerability to the fluctuations of international commodity prices. In this respect, the prospect of easier access to Arctic natural resources—mainly due to the emergence of the Northern Sea Route (NSR) in the world energy market—should be increasingly valuable in South Korea's strategic considerations for energy and natural resource supply.

WHAT IS SOUTH KOREA'S INVESTMENT TARGET FOR ONSHORE AND OFFSHORE RESOURCES IN THE ARCTIC?

Despite the growing need for the Arctic's natural resources, in particular in the Russian Arctic, numerous barriers in the region discourage South Korea from entering the energy resource market. The deficiency of transportation infrastructure is the most salient. Improvement of the transportation infrastructure in the Arctic region requires an increase of seaport facilities, logistic centers and supporting cities. These projects are expensive. During the next decade, according to a recent Lloyd's report,¹ as much as 100 billion USD in investment will take place in the Arctic, mostly in offshore oil and gas. In short, the improvement of the transportation infrastructure in the Arctic offshore alone could increase the cost of using the NSR by tens to hundreds of billions dollars in the decades to come.

A similar situation exists regarding onshore petroleum and mining activities in the Russian Arctic. The development of onshore natural resources needs to connect to regional logistic networks, including railroads, river ports and roads, which support onshore activities, and



Figure I-15. Concept of accessible logistics network on and offshore in Russian Arctic

provide East Asia and Europe with useful transport routes via the Trans-Siberian Railway (TSR) as well as the NSR, as shown in Figure I-15.

Apart from physical infrastructure, commercial Arctic shipping needs to address other requirements shown in the Arctic Marine Transportation System (AMTS) by the Norwegian expert Bjørn Gunnarsson. This system consists of four sectors, as follows:

a) Physical infrastructure such as adequate ports and terminals with deep draft access, cargo handling and passenger/crew facilities and the provision of refuge for ships, b) information infrastructure such as navigational charts with updated hydrographic and shoreline mapping data, aids to navigation and real-time navigation information, marine weather and sea ice forecasts, proper communication systems and vessel traffic monitoring and reporting systems, c) response services such as services of icebreakers for vessel escorts, search and rescue and emergency response, oil spill prevention and preparedness and available response technologies to clean up oil and other hazardous wastes spilled at sea, and d) Arctic vessels, including a fleet of ice-strengthened cargo ships and specialized vessels operating in the harsh Arctic environment, possibly on a year-round basis.

This list will apply to South Korea's case if it gives serious consideration

to entering into the NSR energy resource logistics market.

WHO ARE THE INVESTORS IN ARCTIC ONSHORE AND OFFSHORE RESOURCE DEVELOPMENT?

The development of Arctic resources will require huge investments in related infrastructure development. The question is: who will invest? In general, development of infrastructure abroad is conducted by government funding, private investments, and private-public partnerships (PPP).

In some cases, especially those involving infrastructure development for less developed countries by developed countries, official development assistance (ODA) may be available. Coastal nations in the Arctic region, however, do not meet the requirements for ODA investments. As a result, the next-best option for investment will be a combination of government and private investment efforts.

But the problem is, as Valeriy Kryukov mentions, that the lack of transparency in foreign direct investment regulations and complex ownership problems in Russia make it difficult to find appropriate ways to safeguard investments. An alternative may be investments by international development banks. But the problem still remains because international development banks such as World Bank and Asian Development Bank need their monetary sources to assist LDCs. Even in the case of a monetary source being secured, they would face limitations arising from the institutions' basic roles. So for infrastructure development in the Arctic region, the Asian Infrastructure Investment Bank (AIIB), recently initiated by China, seems to have potential for funding.² Additionally, the tentatively named Arctic Development Bank, which will be able to establish joint efforts of Arctic coastal nations and Arctic user countries, can play a significant role in raising funds for Arctic infrastructure development. However, in both cases, the prospect of conflicting interests in stakeholder countries demands more consideration in order to make such an institution work well.

ARE ECONOMIC BENEFITS FROM ARCTIC RESOURCE DEVELOPMENT POSSIBLE?

Eventually, the value of Arctic natural resources depends on the question

of whether the development and extraction of such resources would be profitable. Energy resource development in the region must address a number of factors such as environmental risks, the social safety of Arctic aboriginal communities, costs entailed by infrastructure development and building and maintaining icebreakers, and price fluctuations braising from world energy markets. Such cost factors will be reflected in transit charges imposed by the Russian government. Moreover, the ups and downs of resource prices can lead to irregularity in the NSR's commercial use. In addition, a lack of preparedness in terms of institutions and administration and unclear private ownership problems may interrupt the smooth entry of foreign capital into Arctic energy development. Thus, it seems doubtful if energy resources in the Arctic—again especially in the Russian Arctic—will emerge in the world energy resource market.

HOW CAN THE PROBLEM OF COMMERCIALIZING THE ARCTIC'S NATURAL RESOURCES BE SOLVED?

In order to solve the cost problems involved in the development of natural resources in the Russian Arctic, technological progress regarding the prevention of oil spills, ship building, resource extraction, and related infrastructure development will be needed to reduce costs. Furthermore, effective ways to maintain the price of commodities produced in the Russian Arctic will be needed. One of the prime tasks in this respect will be setting up a stable price structure that is immune to seasonal fluctuations.

In this regard, the option of constructing a transshipment hub like the Zeebrugge LNG terminal in the Yamal LNG project deserves attention. The advantage of such an approach is that companies can use such a transshipment hub to store products in order to sell them at a favorable time, minimizing the limitations of using the NSR in the winter season with their inventories. Moreover, this sort of facility can support value-added activities such as the dehydration of mineral products and desulfurization and refinement of petroleum (see Figure I-16).

In this respect, the South Korean government is examining the future role of Ulsan Port, one of the largest ports in South Korea in terms of liquid cargo, as an international hub for the transshipment hub of energy resource cargos in East Asia.³ Ports in the Russian Far East and on Japan's West Coast would likely join in competition with Ulsan Port to play a leading

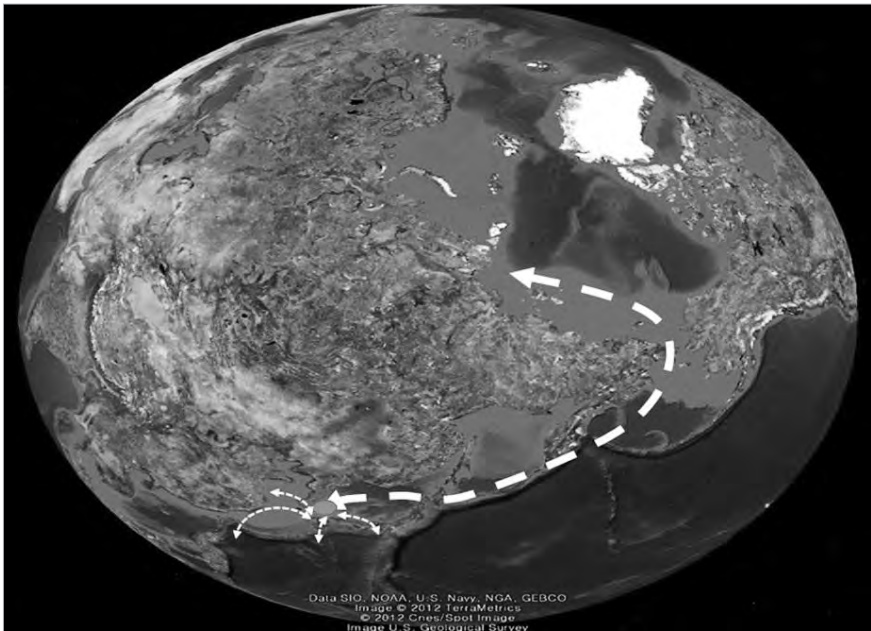


Figure I-16. Transshipment hub in East Asia

role in this realm.

To facilitate the business activities surrounding Arctic natural resource development and related commercial maritime shipping via the NSR, a concerted effort will be needed. For Russia, it is essential to improve legal systems so they are more favorable for attracting foreign direct investment, especially for private investments, and to introduce eco-friendly and aboriginal-friendly natural resource development rules. Along with the Russian efforts, cooperative international efforts will be needed for the joint development of a logistics infrastructure in the Arctic region, development of transshipment ports to improve demand and supply flows and create added value, construction of storage facilities, R&D efforts related to shipbuilding technology, and energy resource and mineral resource development. At the same time, and simultaneously, the consolidation of international governance for the sustainable development and use of resources will be essential for the commercialization of Arctic natural resources and vitalization of the NSR.

Notes

1. Lloyd's Report, "Arctic Opening: Opportunity and Risk in the High North." (2012). Available at: www.lloyds.com.
2. The AIIB is an international financial institution proposed by China in 2013. In June 2014, China showed a revised proposal, doubling the registered capital of the bank from 50 billion USD to 100 billion USD and invited India to join the bank. The South Korean government has asked China to move the headquarters of the AIIB to Seoul or Songdo (Incheon City). See "Korea asks China for the AIIB headquarters," *Joongang Daily*, July 15, 2014.
3. According to UPA statistics, liquid cargo handling, including oil and oil products, accounted for 70.5 % (134,600 ths. tons) in the total cargo handling volume in Ulsan Port in 2013. Ulsan Port consists of four ports: Main, Onsan, Mipo, and New ports. For more detailed information, see "Statistics of Ulsan Port" (in English) on the UPA's official website (www.upa.or.kr).

PART II

COMPARING NATIONAL ARCTIC POLICIES

4. Canada's Arctic Policy¹

Bernard W. Funston²

The Arctic described in a number of Arctic Council publications is a vast region that includes some areas that are generally considered to be sub-Arctic. For the purposes of this paper, the Arctic Council's expansive definition of "Arctic" is adopted. In Canada, the lands and marine territories north of the 60°N latitude are commonly referred to as "the North." Consequently, this paper treats "Canada's Arctic policy" and "Canada's northern policy" as one and the same thing.



Figure II-1. Map showing the Arctic circle and a boundary of the circumpolar Arctic region

THE EVOLVING CONTEXT OF CANADA'S ARCTIC POLICY

Canada is a federation, which means in practical terms that Canada's Arctic policy encompasses often-divergent views of several levels of government, including the Government of Canada, the governments of several provinces and territories, and indigenous peoples' institutions and governments recognized in modern treaties. Significant political, economic and social changes have occurred in Canada's Arctic or North in the past three decades. The evolving roles of the Territorial Governments (Yukon, Northwest Territories, Nunavut) and of the numerous indigenous peoples' governments and organizations are perhaps the most dramatic developments. Territorial Governments and indigenous peoples governments and organizations are integral components of the political and economic decision-making processes in Canada's North today. Fundamental amendments to the Yukon Act in 2003 and the NWT Act in 2014 to implement devolution agreements are examples of important transfers of jurisdiction and responsibility from the Government of Canada to northern governments in key sectors such as resource development. Most recently, the Government of Canada has begun a process to negotiate devolution with the Government of Nunavut.

Similarly, modern Aboriginal land claim and self-government agreements in the Yukon, NWT, Nunavut, northern Quebec, and Labrador contain important land and resource rights, as well as a variety of governance and administrative arrangements that affect decision-making in relation to Arctic lands and waters. For example, environmental protection provisions in most of these agreements create powerful boards and agencies with guaranteed representation for indigenous peoples, to encourage sound decision making in relation to resource development. Together, these complex legislative, regulatory and policy-making processes constitute the major elements of the broad scope of "Canada's Arctic policy."

The body of this paper will focus primarily on the policies of the Government of Canada (hereinafter referred to as "Canada"). A number of departments or ministries in the Government of Canada have activities in the Arctic and carry out their mandates in accordance with key statutes and policies. A lead department on domestic Arctic affairs is the Department of Aboriginal Affairs and Northern Development (AANDC). However, other departments such as Fisheries and Oceans, Natural Resources

Canada, Parks Canada, and Environment Canada also have significant responsibilities in the region. At the international level, the Department of Foreign Affairs, Trade and Development is the lead for Arctic Council matters.

CANADA'S VISION FOR THE FUTURE OF THE ARCTIC

There are several key documents in relation to the Arctic that represent the formal policy pronouncements of the current Government of Canada. These include:

- Canada's Northern Strategy: Our North, Our Heritage, Our Future (2009);
- Canada's Arctic Foreign Policy Statement: Exercising Sovereignty and Promoting Canada's Northern Strategy (2010); and
- Canada's Arctic Council Chairmanship Program 2013-2015 (2013)

While these documents share many common themes and positions with previous Liberal and Conservative federal governments, the policy approach to Arctic issues taken by the Conservative government of Prime Minister Stephen Harper has been quite different. Indeed, the policy development process itself has undergone significant change during the term (2006 to present) of the Harper government. More will be said on this point below.

Prime Minister Harper has shown sustained personal interest in the Arctic. Unlike any other prime minister in Canadian history, he has made annual trips to the region since becoming prime minister in 2006. The record of achievement in the Arctic of the current Government of Canada has been significant, but the longer-term implications of current policies are difficult to understand and predict. There is much uncertainty, for example, in relation to the direction of Canada's Arctic science and research policy, climate change and environmental protection policies, and the tenor and direction of circumpolar/international cooperation through such bodies as the Arctic Council.

In 2009 the Government of Canada released its Northern Strategy.³ The strategy is based on recognition that the Arctic is on "the cusp of change." It contains the following domestic vision statement:

“The Government of Canada has made the North a top priority, placing it higher on the agenda than it has been in many decades. This Government has a clear vision for the North as a healthy, prosperous region within a strong and sovereign Canada. By moving forward with Northern Strategy commitments and ensuring results are benefiting Northerners and all Canadians, the Government of Canada is making substantial progress across all four priority areas: exercising our Arctic sovereignty, protecting our environmental heritage, promoting social and economic development, and improving and devolving Northern governance.”⁴

In 2010, the international dimensions of Canada’s Northern Strategy were articulated in an Arctic foreign policy statement entitled *Exercising Sovereignty and Promoting Canada’s Northern Strategy*.⁵

“Canada’s vision for the Arctic is a stable, rules-based region with clearly defined boundaries, dynamic economic growth and trade, vibrant Northern communities, and healthy and productive ecosystems. The statement articulates Canada’s priorities with respect to sovereignty, economic and social development, environmental protection, and governance in the Arctic region. It details the ways Canada will show leadership and work with others to demonstrate responsible stewardship and to build a region that is responsive to Canadian interests and values.”⁶

The Harper government actually began implementing elements of these policies in 2007. Such initiatives included:

- 156 million USD to support Canadian participation in the fourth International Polar Year;
- 200 million USD over two years for the renovation and construction of new housing units in the North;
- Initiating a procurement process for six to eight new Arctic patrol ships;
- 50 million USD over five years for the creation of a northern economic development agency;
- 85 million USD over two years to maintain and upgrade Arctic research facilities;

- 90 million USD over five years for the renewal of the Strategic Investments in the Northern Economic Development program;
- Initiating a procurement process for a new Polar icebreaker, the CCGS John G. Diefenbaker;
- 37.6 million USD to support initiatives related to the proposed Mackenzie Gas Project;
- Expansion and modernization of the Canadian Rangers Program;
- 100 million USD for a five-year (2008-2013) Geo-mapping for Energy and Minerals (GEM) Program geological mapping program to support increased exploration of natural resources and inform decisions on land use;
- RADARSAT-2, a commercial radar satellite, launched in December 2007, for marine surveillance, ice monitoring, disaster management, environmental monitoring, resource management and mapping in Canada and around the world, and the planned RADARSAT Constellation Mission (2018) to provide complete coverage of Canada's vast land mass, oceans and coastal approaches at least once per day and up to four times daily in the high Arctic, under all weather conditions;
- More than 85 million USD from 2008 to 2014 to conduct research relating to the Canada's claim for an extended continental shelf in the Arctic;
- More recently, in 2012, the Conservative government announced 142.4 million USD over six years for construction and equipment for a new Canadian High Arctic Research Station (CHARS) in Cambridge Bay, Nunavut, including 46.2 million USD over six years for the CHARS Science and Technology research program. For 2018-19, an additional 26.5 million USD has been set aside for the ongoing program and operations of CHARS; and
- Also of note are commitments of 300 million USD to build a highway from Inuvik to Tuktoyaktuk to connect the Arctic Ocean coast to the rest of Canada's road network, and renewed support for the GEM Program in the amount of 100 million USD over seven years (2013-2020).

What these and other expenditures demonstrate is a strong commitment to the North/Arctic, with a particular focus on economic development. In addition the prime minister has personally encouraged and supported

initiatives that attempt to raise public interest in the Canadian North and its history. Key among these initiatives was the search effort to locate the ships of the ill-fated Franklin expedition from the mid-1800s. This enduring mystery was solved in part with the discovery of the remains of the *Erebus* in the summer of 2014.

CANADA'S ARCTIC COUNCIL CHAIRMANSHIP PROGRAM 2013-2015

In August, 2012, Prime Minister Harper announced that the Honourable Leona Aglukak, then Canada's Minister of Health, now Minister of the Environment, would serve as Canada's Arctic Council Chair. This appointment was somewhat surprising, because since the inception of Arctic Council, the Minister of Foreign Affairs had been Canada's head of delegation at Arctic Council ministerial meetings. However, Minister Aglukak, an Inuk from Nunavut with a life-long understanding of the Arctic, had served as Canada's ministerial representative at the Nuuk Ministerial Meeting in May, 2011 (Minister of Foreign Affairs Lawrence Cannon had lost his seat in parliament in a national election a few weeks before the Nuuk Ministerial Meeting and no new foreign minister had yet been appointed.).

Vowing to strengthen the Arctic Council and demonstrate strong leadership, Canada announced the broad themes for its chairmanship at the Senior Arctic Officials (SAOs) meeting in Haparanda, Sweden in November, 2012. The overarching theme is "Development for the People of the North" with a focus on creating conditions in the North for dynamic economic growth, vibrant communities, and healthy ecosystems.⁷ Three subthemes - 1. Responsible Arctic Resource Development, 2. Responsible and Safe Arctic Shipping, and 3. Sustainable Circumpolar Communities, - reinforced the overall emphasis on long-term prosperity for northerners while committing to maintain high standards of environmental protection. The subthemes were deliberately broad, to accommodate ongoing council work as well as Canadian priorities.⁸

In the period following the announcement of this theme and subthemes, Canada prepared 10 draft proposals for activities to flesh out this program. These proposals were brought forward for approval by the other Arctic states in the run-up to the 2013 Kiruna Ministerial Meeting. The titles of

these 10 proposals are as follows:

1. Oil Spill Environmental Sensitivity Mapping in the Arctic
2. Circumpolar Business Forum
3. Promoting Mental Wellness in Northern Circumpolar Communities
4. Protecting Arctic Lifestyles through Migratory Bird Conservation
5. Arctic Adaptation Exchange: Facilitating Adaptation to Climate Change
6. Development of an Instrument or Other Arrangement to Address Short-Lived Climate Pollutants
7. Guidelines for Arctic Marine-based Tourism and Cruise Ship Operation
8. Strengthening the Arctic Council
9. Supporting Traditional/Community Lifestyles and Knowledge
10. Arctic Marine Oil Pollution Prevention

Although the incoming chair generally has significant influence on the substantive elements of Arctic Council declarations, only a few of Canada's initiatives survived the Kiruna negotiations intact. In a published article examining the Canadian Arctic Council Program, one commentator concludes that Canada's agenda going into the Kiruna meeting emerged in a significantly weakened form:⁹

"...Canada proposed an expansive policy agenda for the Arctic Council in the months preceding the Kiruna meeting. In doing so Canada drew upon a February 2013 statement by environment ministers of all Arctic states which urged the Arctic Council to commit to negotiate 'an instrument or other arrangement to enhance efforts to reduce emissions of black carbon.' Notwithstanding these efforts, the most substantial components of Canada's proposed policy agenda—preventing pollution of the marine environment, reducing emissions of black carbon and concluding a polar code for shipping—have been visibly watered down. These issues will still be addressed during Canada's chairmanship, but instead of negotiation of international agreements or 'instruments'—processes which attract and focus political attention—the stage seems set for further research and technical analysis. Moving these issues from research to international public policy formation will likely have to await the chairmanship of the USA.... This prompts an obvious question: What will be achieved in line with Canada's Arctic Council theme, 'Development for the People of the North'? The

likely answer to this question is promotion of business through the proposed Circumpolar Business Network. This may be a worthwhile objective, but it surely does not require the attention of the Arctic Council. If business, particularly 'big' business believes it needs a circumpolar network it is more than capable of establishing one without the assistance of the Arctic states operating through the Council."

One Canadian priority did receive approval exactly as proposed, namely the establishment of "a task force to facilitate the creation of a circumpolar business forum." However, this "independent body of business representatives," later re-branded as the Arctic Economic Council (AEC), raises some questions that could have an important bearing on the nature of future Arctic cooperation and the mandate of the Arctic Council itself.

THE ARCTIC ECONOMIC COUNCIL AND OTHER CANADIAN-INITIATED DELIVERABLES

An analysis of political statements by key participants in formulating Canada's Arctic Council agenda and general Arctic strategy suggests that Canada's Arctic policy is firmly focused on economic development, with a particular emphasis on opportunities for Arctic communities and northern businesses. The establishment of the AEC, therefore, appears to be a key goal of Canada's Arctic Council Chairmanship.

The AEC was agreed to at an SAOs meeting in Yellowknife in June 2014. The document establishing the AEC, approved by SAOs, characterizes its overall aim as "Fostering sustainable development, including economic growth, environmental protection and social development in the Arctic region." The document also proposes that the AEC address "responsible resource development." So the AEC, an "independent body of business representatives," has a mandate very similar to the Arctic Council's own mandate set out in the 1996 Ottawa Declaration.

Is this what ministers anticipated when they called for a circumpolar business forum in the Kiruna Declaration? Will the AEC become a more relevant and accessible forum for non-Arctic state observers to the Arctic Council given their economic interests in the circumpolar world? It would be rather ironic if Canada helped during its first chairmanship (1996 -1998) to launch the increasingly relevant Arctic Council, only to then launch a

competing forum during its second chairmanship (2013-2015).

The AEC held its inaugural meeting in Iqaluit on September 2 and 3, 2014. Although all Arctic states nominated participants for this first meeting, there are some signs that not all share the Government of Canada's enthusiasm regarding this initiative. Because the AEC, once created, is now an independent body, its future course is difficult to predict, as is its ongoing relationship to the Arctic Council.

Aside from the AEC, Canada does not appear to have a robust slate of Canadian-initiated deliverables for the Ministerial Meeting in Iqaluit scheduled for April 2015. Practical outcomes, if any, of Canadian efforts to promote capacity building among Permanent Participants and social development of indigenous communities, including mental wellness and application of traditional indigenous knowledge, will become clearer in the final months of its chairmanship.

THE FUTURE OF MULTILATERAL ARCTIC COOPERATION

Ongoing tensions arising from Russia's actions in Crimea and eastern Ukraine, and the responses of Canada, the U.S. and Europe, could have longer-term implications for the Arctic Council. An optimistic conventional wisdom seems to have emerged that Pax Arctica will prevail. On one hand, it seems convenient and wise to maintain an open Arctic channel of cooperation and diplomacy. On the other, a key feature of Arctic affairs today is the realization that this region is tightly bound to global biophysical, geopolitical and socioeconomic systems. If Russia does not participate in the Arctic Council Ministerial Meeting in April 2015, for whatever reason, the outcomes of the Canadian Chairmanship could be seriously compromised. Rule 7 of the Arctic Council Rules of Procedure could provide some relief. It states that "...In the event that a ministerial or SAOs meeting is held without the attendance of all eight Arctic states, consistent with Rule 3, decisions may be taken by a consensus of all Arctic states present, subject to confirmation in writing by the absent Arctic states within 45 days after receiving notice of the decision."

Furthermore, if strained relations with Russia persist, the recently announced USA chairmanship program could also be compromised. The future of the Council, as well as the alignment of Arctic affairs generally,

could be dependent upon the next ministerial meeting and the ongoing fragile situation with Russia.

ANALYSIS

Canada's current Arctic policy has received a mixed reception in domestic and international media reports, academic commentary, and public discourse. The apparent ambivalence of the Government of Canada in relation to climate change, and the science that accompanies it, have received considerable attention and concern. Economic development priorities have been characterized in negative terms by several environmental organizations. However, on some domestic Arctic files, such as devolution, the Government of Canada has taken major steps to move control closer to the people of the North. Similarly, although often portrayed in the media and in the public service as anti-science and anti-research, the Canadian Government has committed considerable funding and political capital to refurbishing Arctic research facilities and building a world-class high Arctic research laboratory and research program in Cambridge Bay.

The figure below encompasses four dimensions of Canada's Arctic policy. While in substantive terms the formal policy documents appear

<p style="text-align: center;">Substance</p> <ul style="list-style-type: none"> • Primary pillars of Canada's Policy are generally acceptable across all national parties 	<p style="text-align: center;">Tone</p> <ul style="list-style-type: none"> • Canada First • More inward looking • Less multi-lateral and cooperative in tone
<p style="text-align: center;">Priorities</p> <ul style="list-style-type: none"> • Economic development • Greater local control • Reinforcing sovereignty 	<p style="text-align: center;">Process</p> <ul style="list-style-type: none"> • Policy options formulated more by political actors than by officials in the bureaucracy • Changing attitudes to the nature of policy "evidence"

Figure II-2. Four dimensions of Canada's Arctic policy

to reflect an agenda that would be generally acceptable across all national parties, the priorities, tone and processes adopted by the current government tend to distinguish it from past Canadian governments.

As mentioned above, it is not clear where the threads of Canada's Arctic policy will lead. How should the Government of Canada's policy positions and achievements be characterized?

- During the years of the Prime Minister Harper's leadership, the Conservative government (2006 to present) has shown a heightened domestic interest in the North, articulated early and clear commitments, and undertaken substantive initiatives, a few examples of which are noted earlier in this article.
- One practical result, which has been discussed by many commentators, appears to be a more inward-looking, domestic approach to Arctic issues, rather than an outward-looking, multilateral approach. The tone and substance of Canadian diplomacy in the Arctic seem to have become decidedly less multilateral, less cooperative and less accommodating. Some media commentators have referred to this as a "Canada-first approach to the Arctic."¹⁰
- As reported by *Global News* on 21 August 2013: "There have been numerous assertions that Harper's once-tough rhetoric on the federal government's Northern strategy has gone largely unfulfilled.... [A] number of promises made by Harper in 2007—including Arctic offshore patrol ships and a deep water facility at Nanisivik—have gone unfulfilled."
- An alternative view, provided by Professor Rob Huebert, an expert on Arctic military affairs, is that Prime Minister Harper deserves credit for an unrelenting focus on the Arctic, even if he has under-achieved on some of his pledges: "If you go down the checklist in terms of what he's promised and what he's delivered on, there's nothing that has been abandoned yet."¹¹
- Some northern interests believe the investments being made, for example in relation to patrol ships (\$8-billion CD), would be better spent to subsidize air travel and build other infrastructure that is more beneficial to northern residents, such as sealift facilities to improve the resupply of communities and airport infrastructure which is critically important in most parts of the Canadian Arctic.
- Notwithstanding significant expenditures for research facilities

and various programs, the Government of Canada's commitment to pure Arctic scientific research, climate change mitigation and environmental protection have been questioned by some commentators and by the science community itself.¹²

CONCLUSIONS

Regardless of what conclusions one draws from policy documents, actions and commentaries, it is clear that in 2006 with the election of the Conservative government of Stephen Harper, the tone, processes, and priorities, if not the content, of Canada's Arctic policy underwent considerable change.

The manner in which policy is developed has also undergone dramatic changes in Ottawa. It appears that the role of the federal government bureaucracy as primary formulator of policy options has been significantly constrained. The prime minister and his cabinet have taken firm control of policy development and its tactical and strategic elements, reducing the role of bureaucracy to policy implementation alone. In many cases it appears that bureaucratic input is neither sought nor desired. Nor does the current Government of Canada seem particularly interested in the lengthy, inclusive, and at times unproductive consultative processes that have become the norm in Canadian governance over the past few decades. The tendency of the Harper government to be decisive and unapologetic about its positions has generated criticism from many commentators about a lack of transparency and political dogmatism.

Taken together with efforts to reduce the size of government, both in terms of program spending and numbers of civil servants, the Canadian policy environment at the national level is quite different that it was 10 years ago. This is especially true in the context of the Arctic. While there has been a notable shift away from multilateral Arctic internationalism, there has also been a concerted effort to bring the Canadian North into the mainstream of national affairs. By advancing the devolution of jurisdiction to northern territorial governments, asserting Canadian interests and sovereignty in the Arctic, and initiating programs such as the Geo-mapping for Energy and Minerals (GEM) Program to support increased exploration of natural resources, the Harper government has brought a more sustained and focused national interest to Arctic affairs than at any other time in

Canadian history. The determined effort to build a high Arctic research laboratory in Cambridge Bay and the search for Franklin's lost ships also demonstrate a continuing interest in exciting the imaginations of the Canadian public in this formerly peripheral region.

In all of these initiatives, the political message seems to be "action" instead of "process." However, there will be ongoing challenges to sustain or increase Canadian activities in the Arctic because of the significant infrastructure deficits in respect to marine shipping and operations, for example. The high costs of building and maintaining ports and harbors, navigational aids, icebreakers and patrol ships, communication systems and so on could make it difficult to maintain the momentum of current policies and to meet new demands as the Arctic becomes more accessible. The Harper government's emphasis on economic development in the North suggests that in part it sees private investment, rather than government spending, as the key to addressing some of these infrastructure issues. This is perhaps one rationale for dedicating so much political capital during its Arctic Council chairmanship to the creation of the Arctic Economic Council.

Notes

1. The views expressed in this paper are those of the author and do not represent any department or agency of the Government of Canada, nor any other institution or body.
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5. Russia's Arctic Policy

Alexander N. Vylegzhanin

*“He who walks in his uprightness reveres the Lord, but who is perverse in his way despises Him”
(the Bible)*

INTRODUCTION

With new possibilities for economic and social activity in the Arctic and relevant environmental and other risks and challenges,¹ interest in the contemporary policy in the region on the part of both Arctic and non-Arctic states is increasing.² The responsibility of the Arctic states for the future of the Arctic and the necessity to govern its unique spaces wisely is obvious today. Regional (within the Arctic) and inter-regional (the Arctic and North Pacific) cooperation of states is essential. The prevailing view of experts is that the Arctic should be insulated from global geopolitical diseases. There is a déjà vu exchange of mutual accusations between Russian leaders on the one hand, and President Obama and leaders of the European Union on the other, this time after the coup d'état in Kiev in February 2014, when President Yanucovich was overthrown by Ukrainian nationalists in violation of the Constitution of Ukraine, with the presumed support of Obama and EU leaders. These accusations may hinder Arctic cooperation in the short term, but not within a long-term perspective.³ Shared interests among Arctic and Non-Arctic states will prevail in the long run.

This paper first provides a general overview of basic documents that form the legal basis of Russia's current Arctic policy. Then, sectoral policies in the Arctic are considered, such as transport policy in general and the status of the Northern Sea Route (NSR) in particular, taking into account the recent federal law on the NSR; Arctic oil and gas development policy; fisheries policy in the Arctic zone of the Russian Federation; and international relations of the country in the Arctic region, especially

regarding environmental protection. Specific attention is paid to the question of a balance between development and environmental protection in Russia's Arctic policy. And last but not least, the paper dwells upon institutional arrangements, spurring and hindering the development and implementation of Arctic policy, including in relevant international fora.

GENERAL OVERVIEW OF BASIC DOCUMENTS ON RUSSIA'S CURRENT ARCTIC POLICY AND STRATEGY

At the level of general applicable law (*lex generalis*), two sets of legal sources are most prominent: 1. the National Laws of the Russian Federation (the Constitution of Russia, Constitutional Acts, Federal Acts, Acts of the President of the RF, Decrees of the Government of the RF, Orders of Ministers and other federal organs, legal acts of entities-members of the RF—regions, oblasts, etc.), and 2. the rules of international treaties of the Russian Federation and of other sources of international law applicable to the Arctic (customary rules of international law, first of all).

The analysis of this level of legal regulation and of bulky texts of the relevant documents is available,⁴ as is that of Russia's position as to the legal regime of Spitsbergen and of adjacent marine areas, based on the Agreement between Russia and Sweden-Norway of 1871-1872 and the Treaty on Spitsbergen of 1920.⁵ Russian maritime policy in general, as reflected in the 2001 "Maritime Doctrine of the Russian Federation until 2020" (approved by the president of the RF) is also described.⁶

Specific political and legal documents, where the Arctic policy and strategy of the country is reflected concretely (on the level of *lex specialis*), are considered also in this paper.

Fundamentals of the State Policy of the Russian Federation in the Arctic for the Period until 2020 and a Further Perspective of 2008 (hereinafter "the 2008 Arctic Fundamentals")

This document, adopted by the president of the Russian Federation on September 18, 2008, is considered to be an initial political and legal source in which an overall modern Arctic policy of the country was formulated after the demise of the Soviet Union in 1991.

There are no references in the 2008 Arctic Fundamentals to the

boundaries of the “Arctic sector” of the country, contrary to the mainstream of Soviet literature on international law. Instead, Part I of the document (“general provisions”) introduces a new notion—“the Arctic zone of the Russian Federation,” which is defined as “a part of the Arctic which includes, in full or in part, the territories of the Republic of Sakha (Yakutia), Murmansk and Arkhangelsk provinces, Krasnoyarsk territory, Nenets, Yamal-Nenets and Chukchi autonomous districts,” and also “lands and islands” specified in the Decree of the Presidium of the Central Executive Committee of the USSR of April 15, 1926, “On announcement of lands and islands located in the Arctic Ocean as the territory of the USSR.” The sea components of the Arctic zone encompass “the internal maritime waters, territorial sea, exclusive economic zone and continental shelf of the Russian Federation adjoining to such territories, lands and islands.” Previously, the Decree of 1926 mentioned above established sector lines from western and eastern land boundaries of the USSR on its arctic coast up to the North Pole. Within such a sector, all the “islands” and “lands,” discovered or not, were legally designated as “the territory of the USSR.” While the Decree of 1926 is still a part of National Law of the Russian Federation, these sector lines are not specified by the 2008 “Arctic Policy” as limits of the Arctic zone of the Russian Federation. The 2008 Arctic Fundamentals provides that limits of such a zone are specified “according to legal acts of the Russian Federation and rules of international treaties to which the Russian Federation is a party.”

Such western limits are provided in the Treaty between the Kingdom of Norway and the Russian Federation concerning Maritime Delimitation and Cooperation in the Barents Sea and the Arctic Ocean, signed in 2010 and entered into force in 2011.⁷ The Treaty establishes maritime delimitation line between the coasts of Norway and Russia in the Barents Sea and the Arctic Ocean, roughly between the sector line (claimed by Russia) and pure equidistant line, claimed by Norway (rejecting sector line or Spitsbergen Treaty Box as a special circumstance). The Treaty also provides for continuation of fisheries cooperation between the Parties (Annex I to the Treaty) and for modern legal mechanisms of joint utilization of transboundary hydrocarbon deposits (Annex II).⁸ The eastern limits of the Arctic zone of the RF are specified in the agreement between the USA and the USSR on the maritime boundary of 1990. The boundaries of the continental shelf in the High North—between Canada and Russia, and between Denmark (Greenland) and Russia—are not yet delimited.

The 2008 Arctic Fundamentals notes factors that influence “the formation of the state policy in the Arctic”: “extreme natural-climatic conditions, including a permanent ice cover or drifting ices in the Arctic seas; focal character of industrial-economic development of territories and a low population density; remoteness from basic industrial centers, high resource consumption and dependence of economic activities and life-support of the population on deliveries of fuel, food and essential commodities from other regions of Russia; and low sustainability of ecological systems” in the Arctic region.

Part II of the document (“National Interests of the Russian Federation in the Arctic”) identifies “use of the Arctic zone of the Russian Federation as a strategic resource base,” “maintenance of the Arctic as a zone of peace and cooperation,” “preservation of unique ecological systems of the Arctic,” and “use of the Northern Sea Route as a national transport communication of the Russian Federation in the Arctic.” The word “national” refers to national regulations, and not to shipping: Russia is interested in developing international shipping via the NSR, without environmental accidents, as will be shown later.

Part III of the document is devoted to “basic objectives” and strategic priorities of Russia’s Arctic policy, specifically noting the objectives of sectoral policies. Part IV provides for goals within such sectoral policies. These parts will be dealt with later, while considering sectoral policies of the Russian Federation in the Arctic.

The 2008 Arctic Fundamentals also provides for three stages of its realization: 1) 2008-2010, 2) 2011-2015, and 3) 2016-2020. According to the document at the current stage (until 2015), the following should take place, in particular: “structural reorganization of the economy in the Arctic zone of the Russian Federation on the basis of development of a mineral-raw-material base and water biological resources of the region,” and “creation and development of the infrastructure and control system of communications of the Northern Sea Route for solving problems of maintenance of the Eurasian transit.” During the third stage (until 2020), “transformation of the Arctic zone of the Russian Federation into a leading strategic resource base” is to be achieved. It is noted in the document that with the realization of this policy, Russia may “maintain the role of a leading Arctic power.”

The Strategy of Development of the Arctic Zone of the Russian Federation (hereinafter “the 2013 Arctic Strategy”)

This document was signed by the president of the Russian Federation (RF) on February 8, 2013. The 2013 Arctic Strategy was developed “in accordance with” the 2008 Arctic Fundamentals, so these two documents are considered as legally and politically interlinked.

Some provisions in the two documents are similar or even identical; for example, Part II of the 2013 Arctic Strategy (“The main risks and threats and the purpose of the Strategy”) begins with a list of factors “that influence the socioeconomic development of the Arctic zone” of the RF. They are practically the same as the factors that influence “the formation of the state policy” provided in the 2008 Arctic Fundamentals and cited above.

Part III of the 2013 Arctic Strategy provides for “development priorities” such as an “integrated socioeconomic development of the Arctic zone” of the RF; development of science and technology; establishment of a modern information and telecommunications infrastructure; environmental security; international cooperation in the Arctic, and provision of military security, protection, and protection of the state borders of the Russian Federation in the Arctic. This state borders, according to the national laws of the RF, are the outer limit of its territorial sea, which is in accordance with international law.

Part IV of the 2013 Arctic Strategy is titled “Mechanisms for the implementation of the Strategy.” The document provides that the sustainable socioeconomic development of the Arctic zone of the RF is based on systems “of interaction between government, business and nonprofit organizations and civil society through public-private partnership in the implementation of key investment projects.” The state’s participation is aimed at “economic development, solving social problems,” and also at creating “economic incentives for business.” According to the document, “the main mechanisms for the implementation of the strategy are: a) State program of social and economic development of the Arctic zone” of the RF for the period up to 2020, and b) other public programs of the Russian Federation, federal and departmental target programs and sectoral strategies, regional and municipal programs, programs of large companies, with activities aimed at the comprehensive development of the territory of the Arctic zone” of the RF. Funding for the activities that implement the

Arctic Strategy come mainly from the federal budget. “Extra-budgetary financial support of the Strategy is provided by a public-private partnership, with the resources of development institutions, international financial institutions and foreign investments.”

According to Part V, the first phase of Implementation of the Strategy (2015) provides, *inter alia*, for (a) creation of conditions necessary for “strengthening national security through the integrated development of the Arctic zone” of the RF, including improvement of the legal framework and governance, coordination of all stakeholders of the state policy of the RF in the Arctic, and development and implementation of economic incentives; (b) “formation and implementation of the state’s social and economic development of the Arctic zone” of the RF; (c) “completion of hydrographic and formation on the basis of results of proposals on the need to amend or revise the list of geographical coordinates of points defining the position of baselines for measuring the breadth of the territorial waters and economic zone and the continental shelf;” “establishment and development of the Coast Guard of the Federal Security Service of the Russian Federation in the Arctic zone of the RF; establishment of “an integrated information and telecommunications infrastructure (central processing, transmission and storage of data, and mobile networks, wireless and satellite communications and data) to provide services (the network Internet, television, communication, etc.) to public authorities, individuals and legal entities;” development of “rescue preparedness, including establishment of integrated rescue centers,” and development of “the unified national system of monitoring pollution of the Arctic zone” of the RF. It is noted in legal literature that a number of such provisions are correctly formulated but not efficiently enforced, such as: “provision of basic, problem-oriented and applied research in the Arctic zone of the Russian Federation;” “implementation of measures to ensure environmental security in the Arctic zone” of the RF, and “identification of measures of state support for traditional economy of indigenous peoples in the Arctic.”

The document provides also for “development of border infrastructure in the Arctic Zone” of the RF; “creation and development of a unified system of integrated control surface situation;” “development of integrated security system for the protection of territory, population and critical facilities in the Arctic zone” of the RF from the threats “of natural and man-made disasters;” “establishment and development of the multipurpose space system ‘Arctic;’” modernization of the Loran system (“Route”);

“development of infrastructure of the Northern Sea Route,” and “implementation of measures to ensure long-term sustainable use of marine biological resources of the Arctic zone” of the RF.

It is noted in the document that at all stages of implementation of the strategy it includes measures aimed at the “rational use of resources and preservation of the natural environment of the Arctic zone” of the RF, based “on its systematic comprehensive research study.”

SECTORAL POLICIES

Arctic Policy on Shipping and Other Modes of Transport

Shipping along the Arctic coast of the Russian Federation is considered both by the 2008 Arctic Fundamentals and the 2013 Arctic Strategy as a fundamental basis for cooperation between Russia and other Arctic and non-Arctic states in the North, linked with such common interests as protection and conservation of the Arctic’s fragile marine environment, including that in ice-covered areas. According to the 2008 Arctic Fundamentals, organization and effective utilization of air routes in the Arctic and also “use of the Northern Sea Route for international navigation under the jurisdiction of the Russian Federation” is one of the “strategic priorities of the Russian state policy” in the Arctic. The document provides for such “basic objectives” of this policy as forming “a system of monitoring over the maintenance of navigation safety, management of transportation flows in the areas of intensive navigation, including through the realization of measures aimed at hydro meteorological and navigating maintenance in the Arctic zone” of the RF.

Similarly, the 2013 Arctic Strategy provides for the “modernization and infrastructure development of the Arctic transport system, modern information and telecommunication infrastructure” and, specifically, “management of the Northern Sea Route and safety transit and transpolar air routes in the Arctic.” In order to modernize and develop Arctic transport system infrastructure and to retain the NSR as an integrated transport “backbone” along the coast of the Russian Federation, the document provides for “development of an integrated transport system of the Arctic Russian Federation ..., which includes the Northern Sea Route and gravitating toward it meridional river and railway communications

and airport network;” improvement “of the transport infrastructure” in the regions of development of the “Arctic continental shelf;” restructuring and growth “of freight traffic along the Northern Sea Route”, including through construction of icebreaking ships, rescue and auxiliary vessels, as well as development of the coastal infrastructure; improvement of state regulation by the Russian Federation of navigation through the NSR, “its security, tariff regulation for icebreaking services and other types of support, and development of mechanisms of insurance;” “establishment and development of complex safety of Arctic shipping traffic control in areas of heavy traffic of ships, including navigational and hydrographic, hydrometeorological, icebreaking and other types of support, and creation of rescue centers;” modernization of Arctic ports and building new port and industrial complexes in the Arctic zone of the RF; state support of the “delivery to the North” of goods and export of products via transport schemes “river – sea”; forming a support network of roads in the Arctic zone of the RF “which are parts of international transport corridors,” and ensuring their “compliance with international standards in order to integrate them with the Eurasian transport systems”; and development of an effective system of air service in the Arctic, including “the reconstruction and modernization of the airport network along the Northern Sea Route.”

As for Russian laws on Arctic shipping,⁹ on July 28, 2012, a new Federal Act was adopted, with a long title: “On Modification of Some Acts of Legislation of the Russian Federation relating to regulation of merchant navigation in the Northern Sea Route Areas.” The most important parts are modifications in the text of the Federal Act “On Internal Waters, Territorial Sea and Contiguous Zone of the Russian Federation.” According to the amended text, its new article 14, though repeating the previous wording of legislation about the NSR as “a historically established national transport communication of the Russian Federation,” doesn’t mention the Rules of Navigation through the NSR. Provisions on such a navigation system are now in the amended text of the Code of Merchant Marine of the Russian Federation, which contains a new article 5-1 (“Navigation through the Areas of the Northern Sea Route”). This article also provides for the status of the administration of the NSR and its functions, firstly, organization of navigation. The status of the administration, however, is lower in the hierarchy of the state bodies compared to that of its counterpart during the Soviet period. The important new part is that payments by ship owners (whether Russian or foreign) depend on the volume of services rendered to

a specific vessel during specific navigation (icebreaker services, ice pilots, etc). In full accordance with these documents, the new Rules of Navigation in the Areas of the Northern Sea Route were adopted by the Ministry of Transport of the RF on January 17, 2013, as Order N7, and are available now on the site of the ministry.

Arctic Policy on Oil and Gas

Russia's energy policy in the Arctic takes into account a number of facts: that the Arctic coast of the RF is the longest; its continental shelf is the biggest; that the RF possesses considerable unexploited oil and gas resources, both on land and in marine sub-soil; that the RF is the second-most important source of oil for the market of the EU, and that the RF possesses more than one quarter of proven global gas reserves.

At the same time, there are a number of relevant challenges to be dealt with: depletion of the country's developed gas fields and a possibility of a gas supply gap,¹⁰ disputes between such mighty state-controlled companies as Rosneft and Gazprom on the one hand, and the Ministry of Natural Resources on the other, which is advocating access for private companies to the Arctic shelf; cases of corruption and money laundering in the oil and gas industry, etc.

The 2013 Arctic Strategy provides, in particular, for "effective use and development" of resources of the Arctic zone of the RF as a goal "to meet needs of Russia in the hydrocarbon resources." In order to achieve this goal, the following policy measures are provided: formation of an integrated project study of the continental shelf and coastal areas; preparation for hydrocarbon resources development on the basis "of the state program of exploration of the continental shelf and development of its mineral resources;" guarantees for energy security and sustainable development of the energy sector in the long term; "implementation of large infrastructure projects, which integrate the Arctic zone of the RF with the developed regions of Russia; development of "the Timan-Pechora and hydrocarbon deposits on the continental shelf of the Barents, Pechora and Kara seas, the Yamal Peninsula and Gydan;" development of hydrocarbon deposits on the continental shelf of the Russian Federation; science-based marine services, including marine exploration, use of fiber-optic and satellite communication systems, mobile radio communications and wireless access to information and telecommunications network; means to ensure hydrometeorological

and environmental safety, and to “ensure protection of public interests in the development of hydrocarbon deposits on the continental shelf of the Russian Federation in the Arctic.” Special attention in this context is to be paid to projects developed by Rosneft in the Barents Sea, for developing about 2 billion tons of oil and about 2 billion cm of gas, and in the Kara Sea for developing about 5 billion tons of oil and about 8 billion cm of gas.¹¹

The Russian Federation – as with any other arctic coastal state – is responsible under international law for the rational management of marine subsoil in areas under its sovereignty (that is, in its internal waters and territorial seas) and jurisdiction (the Arctic shelf of the RF). So, as correctly noted in other papers presented for this conference, Russia is interested in attracting more foreign investment in oil and gas development on the Arctic shelf, especially in order to introduce advanced technologies and relevant eco-friendly infrastructure.

Arctic Fisheries Policy

In formal terms, the Russian fisheries policy in the Arctic seas does not need much clarification. The national Arctic fishing industry is located mainly on the Russian coasts of the Barents Sea. According to the 2013 Arctic Strategy, in order to modernize the fishing industry in the Arctic zone of the RF, the following measures are provided: preservation and development of fishery resources and implementation of technical upgrading of new capacities for processing of aquatic biological resources and the development of marine biotechnology; effective use of key species of marine biological resources and involvement of nontraditional fishing sites, and preventing and combating the illicit production and trafficking of marine biological resources.

In practice, however, this component of the country’s Arctic fisheries policy is often criticized in the Russian Parliament and by society and the media, like the environmental law and policy of the country. The rare example of a consistent Russian fishery policy is related to Spitsbergen Treaty.¹² In practically all other Arctic areas, the fishery policy does not look consistent, including the policy relating to the status of the conservation regime in the Central Arctic.¹³ For example, under the auspices of the Russian Council on International Affairs, the Russian International Maritime Law Association, and the Pew Environment Group, a symposium was conducted in Moscow on September 4, 2012, where

experts from Russia, the United States, Canada, the United Kingdom, and elsewhere assembled “to consider the potential for increased access to biological resources in the Arctic Ocean due to climate change, and discuss the scientific, legal, and policy challenges to coastal states and the world community to ensure the conservation and rational management of these resources.” There was a general consensus that “current scientific information and institutional arrangements are not sufficient to ensure proper conservation and management of fisheries in the high seas area of the Central Arctic Ocean.”¹⁴ But during the U.S.-Russia Consultative Fisheries Committee meeting, Russian officials took a different position. Afterwards, however, there were official attempts to join U.S. efforts to prevent illegal, unreported and unregulated fishing in the Central Arctic Ocean.¹⁵

International Relations

The 2013 Arctic Strategy instructs the government and other state authorities to promote international cooperation and preservation of the Arctic as a zone of peace. To achieve this goal the following is to be done, with an obvious accent on regional and bilateral levels of cooperation: “providing a mutually beneficial bilateral and multilateral cooperation between the Russian Federation and other Arctic states;” “coordinated activity of the Russian Federation with other Arctic states in order to protect Russia’s national interests and to implement rights of the coastal states in the Arctic region as provided under international acts, including issues relating to exploration and exploitation of resources of the continental shelf and delimiting its external limits;” “combining the efforts of the Arctic states to create a single regional system for search and rescue, and to prevent man-made disasters and elimination of their consequences, including the coordination of rescue forces;” “enhancing good neighborly relations between the Russian Federation and the Arctic states, on bilateral basis and within regional organizations, intensification of economic, scientific, technical and cultural cooperation as well as cross-border cooperation, including effective management of natural resources, preservation of the environment in the Arctic;” “regular exchange of information on the environment, as well as data on the Arctic climate and its dynamics, development of international cooperation in improving systems for meteorological observations in the Arctic climate, including

from space;” “organization of international research expeditions to study the environment (ice, pollution of marine waters) and influence of observed and projected climate change;” “development of the dialogue between the regions and the municipalities of northern countries to exchange experiences in the field of climate and energy policy,” and “development of international tourism, including recreational, scientific, cultural, educational, and environmental” activities.

The special vulnerability of the Arctic environment is recognized both by Arctic and non-Arctic states. Because of such vulnerability, the RF takes special measures relating to Arctic nature protection, especially in areas of the NSR. In fact, the initial forms of cooperation of the RF with other Arctic states in the protection of Arctic nature were of a bilateral character.¹⁶ This level remains effective until now and deserves to be analyzed further.

Russia and the USA. In 1972, the Soviet Union and the United States of America signed an agreement on cooperation in the field of environmental protection.¹⁷ The importance of this agreement consists in the fact that the USSR and USA, as the largest world powers at that time, recognized the necessity of cooperation in the sphere of environmental protection. At that moment, the agreement of 1972 represented the most comprehensive, in terms of its content, bilateral international treaty, concerning environmental protection. Being “a sample of successful international cooperation on a bilateral level,” this treaty was subsequently taken as a basis for other, similar bilateral agreements between states.¹⁸ Following the disintegration of the Soviet Union, the parties wishing to continue joint work, and also “taking into account mutual interests and experience obtained from implementation of the Agreement of 1972”¹⁹, prepared an updated variant of this treaty titled “Agreement between the Government of the Russian Federation and the Government of the United States of America on cooperation in the field of protection of the environment and natural resources,” which was signed in 1994. The new agreement not only expanded the sphere of interaction between the U.S. and the RF in this area, but also reflected the results of the development of international law on environmental protection during the preceding 20 years. In 1989, an agreement between the USSR and the USA concerning cooperation in combating pollution in the Bering and Chukchi Seas in emergency situations was signed. The parties to the agreement undertook to render assistance to each other in combating such pollution incidents, which may affect the “areas of responsibility” of the parties.²⁰ This area includes the

water within the Bering and Chukchi Seas, which are the respective party's internal waters or its territorial sea, and "the sea area beyond the territorial sea, in which that Party exercises its sovereign rights and jurisdiction in accordance with international law" (art. 2).

One of the key directions of environmental protection is preservation of Arctic wild nature. Traditionally, polar bears have a great importance for the well-being of the indigenous peoples of the region. In 1956, it was completely prohibited to take these animals across all territory of the Soviet Union, and subsequently of Russia. The outcome of the eight-year U.S.-RF negotiations was an agreement on the conservation and management of the Alaska-Chukotka polar bear population signed in 2000. That agreement was developed not only by experts on the state level, but also with the active participation of the indigenous population of Chukotka and Alaska, with a view to maintaining their right to the traditional use of the wildlife. The U.S.-Russia bilateral agreement of 2000 is a logical bilateral extension of the content of the regional agreement on the conservation of polar bears of 1973,²¹ and it takes into account all its provisions.

Between the USA and the RF there is also the Shared Beringian Heritage Program, founded in 1991.²² In 2011, the presidents of the RF and the USA in a joint statement recognized the value of the shared natural and cultural heritage of Chukotka and Alaska. The presidents declared "an intention to deepen cooperation between the United States of America and the Russian Federation in the cross-boundary Bering Strait region, including the expansion of interaction between the national agencies that are responsible for specially protected natural territories/areas of both countries in the State of Alaska and the Chukotka Autonomous District, including their commitment to developing a dialogue with native peoples to help determine the specific goals and methods for such cooperation."²³

Russia and Canada. The long-term interaction between Canada and Russia is shaped by several factors. Both countries have adjacent sub-water and sub-ice shelf areas extending up to the North Pole. Both states are within the Polar Circle as opposite states, and both are fundamentally interested in the preservation of the ecosystems of these areas and the Arctic as a whole. So, their cooperation on a bilateral basis in this region is in great demand. The initial forms of Arctic cooperation between the USSR and Canada were of a scientific and technical character, beginning in 1971, when representatives of Canada visited the Soviet North. In 1972, the parties concluded two memorandums of mutual understanding.

Subsequently, it so happened that relations between the two countries as a whole became politically tense (for reasons not connected with the Arctic) and provisions of these memorandums have not been effectively realized.²⁴ Negotiations about cooperation in the Arctic began again in 1982-83. A positive result of these negotiations was a protocol on working out a program of scientific and technical cooperation in the Arctic and North, which was signed in 1984 between the National Scientific Research Council of Canada and the USSR State Committee for Science and Technology. In 1989, the USSR and Canada signed a memorandum of mutual understanding and cooperation on preventing and controlling pollution in the Arctic marine environment. The memorandum addresses the cases of pollution of the marine environment from vessels in ice-covered areas as they are defined in Article 234 of the UN Convention on the Law of the Sea of 1982 (UNCLOS). In 1993, Canada and the Russian Federation concluded the Cooperation Agreement between the Government of Canada and of the Russian Federation on the Environment (framework agreement). While confirming the principles of sustainable development, the parties consolidated the areas of cooperation directed at environment protection, including protection of the marine environment and fresh waters, and preservation of ecosystems. In 1992, the parties signed the Declaration of Friendship and Cooperation, in which they undertook to develop further their cooperation in this sphere, and also indicated the basis for developing their relations. In particular, they recognized the global importance of environmental protection and of their cooperation under the Cooperation Agreement on the environment. The parties to the declaration affirmed their support for the creation of an International Arctic Council and identified the economic development of the Arctic areas as a priority of the cooperation. The same idea is reflected in the joint statement by Canada and Russia on cooperation in the Arctic and the North, 2000. The projects "Arctic Bridge" and "Northern Air Bridge" provide for the creation of cross-polar sea and air routes, respectively. The Air Bridge between the countries may considerably reduce the flying time from Europe and Asia to America. In 2011, the Arctic and North working group of the Russian-Canadian Economic Commission officially approved this project.

Russia and Norway. The Agreement on Measures to Regulate Sealing and to Protect Seal Stocks in the Northeastern Part of the Atlantic Ocean of 1957 was the first environmental bilateral treaty between the USSR and

Norway. The sphere of application of the agreement includes the waters of the Northeast Atlantic to the east from the Farvel Cape where citizens of both countries engage in sealing, namely the Greenland and Norwegian Seas together with the Dutch Strait and the Jan-Mayen area and the Barents Sea. The purpose of the agreement is to ensure the maximum allowable productivity of the seal population and maintain a sustainable level of harvesting these species. The regulations establish special protected areas and periods of permitted sealing. The use of poisonous substances is prohibited. This prohibition was later formalized in the multilateral Agreement on Conservation of Polar Bears, 1973.

In 1992, Russia and Norway concluded an Agreement on Cooperation in the Field of Environmental Protection. This agreement provides a broad spectrum of interactions by the two countries on environmental issues, including protection of the air basin from pollution; protection and preservation of the marine environment; protection of water; protection of ecosystems; preservation of marine living resources; sharing the results of scientific research, and perfection of legislation in the field of environment protection.

Being countries bordering the Barents Sea, Russia and Norway pay special attention to protecting the environment of this sea, since pollution in this area would inevitably lead to adverse ecological consequences for both countries. The first joint maneuvers of the two countries in the Barents Sea with a view to oil pollution prevention and response took place in 1991. Following the maneuvers, a joint emergency pollution response plan was elaborated. Consequently, such work led to the conclusion of the Agreement between Russia and Norway on Co-operation in Combating Oil Pollution in the Barents Sea, 1994.

Cooperation in emergency search and rescue operations is also a subject of bilateral relations of Russia and Norway. In 1995, the parties signed an Agreement on Cooperation in the Search for Missing Persons and Rescue of People in Distress in the Barents Sea. Later, in 2000, the two countries signed the Memorandum of Understanding between the Government of the Russian Federation and the Government of the Kingdom of Norway about Cooperation in Search and Rescue and Prevention of Serious Incidents, in which the parties reaffirmed their commitment to notify each other immediately in the case of any incident on water or land in areas of the Barents, Norwegian and Northern Seas.

A joint statement made in 2010 by the president of the Russian

Federation and prime minister of the Kingdom of Norway once again provides for the special responsibility of Arctic states for the preservation of the Arctic. Referring to the Ilulissat Declaration of 2008,²⁵ the two leaders agreed that existing international legal instruments represent a sufficient basis for solving issues that can arise in the Arctic and form a solid basis for the development of interaction between states located in this region and beyond its limits.²⁶

Russia and Denmark. Cooperation between Russia and Denmark in the area of Arctic environment protection is mainly realized at the regional level in the framework of the Arctic Council. At the bilateral level, the countries are parties to the Agreement in the Field of Environment Protection of 1993. The agreement notes the adherence of the parties to the Arctic environmental protection declaration and the Arctic Environmental Protection Strategy. The agreement consolidates a broad spectrum of interaction between the two countries, including, inter alia, protection of air from pollution; nature protection issues linked to energy production; marine environment protection; monitoring, and environment impact assessment.

In sum, the bilateral practice of the Russian Federation and its participation in the environmental activities of the Arctic Council show that regional environmental *lex specialis* pertaining to the Arctic is extensive.²⁷

BALANCE BETWEEN DEVELOPMENT AND ENVIRONMENTAL PROTECTION

Theoretically, the accepted response to the question of settling conflicts between commercial and environmental interests in Russia is the concept of sustainable development. However, in practice, the concept is not properly developed in Russian national laws.²⁸ In 1990, a decree by the president of the USSR was adopted in which a list of measures was indicated that could lead to establishing legal instruments of sustainable development. In 1990-91, some steps were taken to adapt the foreign experience of environmental impact assessment procedure to Russia, as well as an environmental management system, liability for past environmental damage, etc. In particular, ecological expertise as an instrument of harmonizing commercial and environmental interests was discussed in detail. In the long run, the relevant Russian legal model was construed as a mixture of

these two procedures. The law provided for public inputs, provided by nongovernmental organizations, scientists, representing communities, and so forth. That procedure was able to prevent the realization of projects that would be harmful for the environment. In the Russian variant, the ecological expertise initially covered a wide spectrum of commercial activity, and also included plans and programs of regional development, and in this aspect it came rather close to a strategic environmental assessment. In the late 1990s, however, a new strategy was adopted in Russia aimed at intensifying economic development. A new management strategy was launched. As the economic interests of Russia's mighty companies got priority, environmental limitations were almost subordinated to their economic activity, including the environmental impact procedure. The list of activities that should be covered by this procedure was cut down. In the energy sector, for example, only drilling and gas activity on the continental shelf of the Russian Federation remained covered by this procedure.

In recent years, environmental organizations have insisted constantly on returning to the original version of the list of activities subject to ecological expertise, referring to international experience, especially in the Arctic. Later, several initiatives were launched to draft Russian Arctic environmental laws in order to harmonize them with development projects. A working group of legal experts was created by the Russian Ministry of Economic Development that worked for more than a year with a task to formulate a draft law on protection of the Arctic environment. The mandate of this group was rather wide: national legislation in force, international law applicable to the Arctic area, foreign legislation and comparative legal analysis. On this basis, an attempt was made to draft a law, which, however, was not adopted.

In sum, the current state of Russian environmental legislation is criticized by Russian specialists. They note, for example, that in the RF there is no special legislative act establishing the specificities of a legal regime for the protection of Arctic ecosystems.²⁹ In the legal system of Russia, relationships in the sphere of Arctic environmental protection are regulated mainly by general rules of national environmental legislation. In other words, the Arctic environment is an object of regulation by a number of national laws applicable both to the Arctic and to the Black Sea, such as the Water Code, Forest Code, and Land Code of the Russian Federation, and the federal laws "On environment protection," "On production and consumption of wastes," "On specially protected natural territories," "On

protection of the atmospheric air,” “On fauna,” “On ecological expertise,” “On Internal sea waters, Territorial sea and Contiguous zone of the Russian Federation,” “On Continental shelf of the Russian Federation,” “On Exclusive economic zone of the Russian Federation,” “On Subsoil.”

At the level of presidential documents, such acts are often cited as Decrees of the President of the Russian Federation, such as “On state strategy of the Russian Federation on protection of the environment and maintenance of sustainable development,” “On climatic doctrine of the Russian Federation,” and “Fundamentals of the state policy in the sphere of environmental development of the Russian Federation for the period till 2030.” At the level of documents of the government of the RF, such orders are cited as “On Environmental doctrine of the Russian Federation,” and “On adoption of Water strategy of the Russian Federation for the period till 2020,” having sometimes a declaratory wording.³⁰ In contrast, the federal law “On specially protected natural territories” consolidates some specific rules on the organization of specially protected natural territories in the Russian Federation, and also establishes a regime for their protection and use.³¹ But the final conclusion of specialists is not optimistic: for the 10- year period of the realization of the Environmental Doctrine of the Russian Federation (starting in 2002) the instrument of strategic environment assessment “was not duly consolidated in the legislation” and, therefore, “it has not been at all incorporated in the national nature protection practice.”³²

INSTITUTIONAL ARRANGEMENTS

There exist a number of institutions that contribute to developing the Arctic policy of the Russian Federation. Within the Russian government, the Ministry of Economic Development and the Ministry of Transport play leading roles in this respect. The issues of current Arctic policy are also considered within the Analytical Center of the Government of the Russian Federation. There is also the Expert Council on Arctic and Antarctic of the Council of Federation—the Upper Chamber of the Russian Parliament (Federal Gathering of the Russian Federation), where ministerial officials are supposed to report on draft Arctic policy acts. As to international cooperation in the Arctic, it is the Ministry of Foreign Affairs of the Russian Federation that is the leading authority. According to the Constitution of the Russian Federation, however, it is the president of the Russian

Federation who is determining the foreign policy of the country. It was recently suggested to create a new inter-ministerial body on coordination of activity in the Arctic zone of the RF.

SPURRING AND HINDERING THE DEVELOPMENT OF ARCTIC POLICY

Environmental and economic changes in the Arctic certainly gave impetus to the development of the 2008 Arctic Fundamentals as an initial source of such policy. While northern regions and companies interested in economic development of the Arctic are the primary driving forces of new initiatives in the national Arctic policy, the national institutions mentioned above play a major role in formulating drafts of relevant specific documents.

As mentioned above, the insufficient quality of some acts of environmental legislation of the country applicable to the Arctic, combined with their growing quantity, hinder the proper governance and development of the Arctic policy of the Russian Federation. Other hindering factors are cases of corruption, bad management and bureaucratic approaches, especially at ministerial and municipal levels. Reprimands specifying that some Russian officials from Federal ministries trying to involve multilateral technical mechanisms do not represent the “national interests” of the RF have also been published.³³

STATUS OF NATIONAL POLICY IMPLEMENTATION

As shown above, the 2008 Arctic Fundamentals (in which the Arctic policy of the Russian Federation was initially formulated) are nowadays being implemented. One result was the development and adoption the 2013 Arctic Strategy. The government of the Russian Federation is leading this implementation process. It presents annual implementation reports to the president of the Russian Federation. The Council of Federation of the Federal Gathering of the Russian Federation publishes regular reports on the status and problems of realization of the Arctic strategy of the Russian Federation (in Russian).³⁴

THE ROLE OF ARCTIC ISSUES IN NATIONAL POSITIONS AND APPROACHES IN INTERNATIONAL FORA

According to the Russian legislation applicable to activities of the Ministry of Foreign Affairs, national positions and approaches in international fora are suggested by the ministry. However, it is the president of the Russian Federation who determines legally the national foreign policy of the Russian Federation, including its Arctic policy. Since both the 2008 Arctic Fundamentals and the 2013 Arctic Strategy were adopted by the president, a Russian delegation represented at any international meeting is to tackle Arctic issues in accordance with these documents and other legal acts signed by the president. In practice, however, inconsistent steps are sometimes taken. The president of the RF has made the Arctic a top priority, as expressed in a number of documents, cited above. There also exists a foreign policy department within the administration of the president to oversee consistency in national positions and approaches in international fora.

Notes

1. Oran R. Young. "Navigating the Arctic/non Arctic Interface: Avenues of Engagement." An essay prepared for discussion at the 2014 North Pacific Arctic Conference, Honolulu, Hawaii, August 20–22, 2014.
2. The term "Arctic coastal states" usually means the group of five states bordering the Arctic Ocean, each of them having internal waters, territorial seas, an exclusive economic zone and a continental shelf in this ocean, i. e., Canada, Denmark (because of Greenland), Norway, Russia and the USA (because of Alaska). The term "Arctic states" usually means the group of eight states, the territories of which are crossed by the North Polar Circle; that is, in addition to the five states mentioned above, Finland, Iceland and Sweden. These eight states are also members of the Arctic Council.
3. Such mutual accusations, considered in legal literature as "upright" or "perverse," are not new. After U.S. President Truman ordered two atomic bombs to be dropped on Japanese cities in 1945, the Soviet leadership accused the United States of this not being a military necessity and a violation of international humanitarian law. When the United States took military action against Vietnam

in 1964, another accusation followed. When the Soviet Union intervened in Czechoslovakia in 1968, defending “socialism” against “creeping capitalism” (with its growing difference between “rich” and “poor”), the United States accused the USSR of a violation of territorial sovereignty of an independent state. But later the United States was accused of a similar breach of international law when it tried “to overthrow the Sandinista Government of Nicaragua” and the government of Castro in Cuba (but didn’t succeed), and when it took military action against such the independent state of Iraq and succeeded in overthrowing Hussein’s government (without a relevant resolution of the Security Council). This list of mutual accusations is certainly not complete. What is remarkable is that even during the Cold War the Arctic was insulated from these “geopolitical diseases.”

4. Arctic Region. Problems of International Cooperation. Vol. III. General Editor I. Ivanov. Introduction by A. Vylegzhanin. Moscow. 2013. p. 661 (in Russian).
5. A.N. Vylegzhanin, V.K. Zilanov. Spitsbergen. Legal regime of Adjacent Marine Areas. Ed. and translated by W.E. Butler. Eleven International publishing. 2007. p. 167.
6. D. Vasilevskay, A. Nikolaev, G. Tsoy. The Environmental Component of the National Maritime Policy of the Russian Federation on the Arctic Ocean. Environmental Security in the Arctic Ocean. Ed. by P. Berkman and A. Vylegzhanin. Springer. 2013. p. 93-101.
7. Both Heads of the Delegations – 1) Russian (Kolodkin R. The Treaty with Norway-Delimitation for Cooperation/International Life. 2011.N 1. P. 14-31 – in Russian) and 2) Norwegian (Report Number 9-6, prepared by R.E.Fifer. Treaty between the Kingdom of Norway and the Russian Federation concerning Maritime Delimitation and Cooperation in the Barents Sea and the Arctic Ocean. – International Maritime Boundaries, 1-37. 2012. The American Society of International Law. Printed in the Netherlands) assessed the Treaty as a positive and equitable document. However there are a number of Russian publications reflecting sharp criticism of “unilateral concessions” made by the Russian delegation (Zilanov V. Fishery Provisions of the Russian-Norwegian Delimitation Treaty. / Fisheries. 2011. N 2. P. 36-40; Melkov G. Legal assessments of the 2010 Treaty between Russia and Norway. / Fisheries. 2010. Resolution of the Parliament of the Murmansk Region. N 2205. 21 October 2010. – all papers in Russian). The main legal argument of the critics is that the Treaty of Spitsbergen of 1920 doesn’t provide for the territorial sea of Norway adjacent to islands of Spitsbergen (the 1920 Treaty provides only for territorial waters of Spitsbergen with special status, different from the status of the territorial sea of Norway); therefore there is no continental shelf of Norway extending from islands of Spitsbergen; the Russian delegation, however, has agreed to delimit shelf between Spitsbergen and coasts of Russian islands “as if the Spitsbergen special status

- doesn't exist" – "to the benefit of Norway".
8. Developing International Legal Basis of Cooperation of Russia in the Arctic. Russian Council for International Affairs. Moscow. 2013. Ed. Ivanov I. S. P. 16-17 (in Russian). A. Vylegzhanin. Legal Regime of the Arctic as reflected in the documents. – Introduction to Vol. III. / Arctic Region. Issues of International Cooperation. Volumes I-III. Ed. Ivanov I.S. Vol. III. Moscow. 2013. P. 11-44. (in Russian).
 9. Cf.: The Arctic in World Affairs. Ed. by R.W. Corell, J.S.-C. Kang, and Y.H. Kim. The Korea Transport Institute. East-West Center. KMI. 2013. p. 298-299.
 10. The recent discovery of a new oil deposit, "Pobeda" (Victory) in the Kara Sea in such a context is good for foreign and Russian investors in Arctic shelf development.
 11. Presentation of Rosneft in MGIMO University, December 2013.
 12. Vylegzhanin A., Zilanov V. Spitsbergen. Legal Regime of Adjacent Marine Areas. Ed. and translated by W. Butler. Eleven International Publishing. 2007. p. 168.
 13. International Cooperation in the Field of Environment Protection, Preservation and Rational Management of Biological Resources in the Arctic Ocean / Materials of the International scientific symposium. Ed. I. Ivanov. Moscow, September 4, 2012, RIAC. p. 48-68.
 14. A. Vylegzhanin, Y. Maleev, et. al. Materials of the International Scientific Symposium. Moscow, September 4, 2012. International Cooperation in Environmental Protection, Preservation, and Rational Management of Biological Resources in the Arctic Ocean. Ed. I. Ivanov. Moscow, 2013. p. 79.
 15. Roundtable discussion at Analytical Center of the Government of the Russian Federation. September 10, 2014. Available at the site of the center.
 16. For more, cf.: International Cooperation in Environmental Protection, Preservation and Rational Management of Biological Resources in the Arctic Ocean / Materials of the International Scientific Symposium. A. Vylegzhanin (Lead. Author), M. Filippenkova, et. al. Ed. I. Ivanov. Moscow, September 4, 2012, RIAC. p. 69-76.
 17. Robinson N.A. The U.S. – U.S.S.R. Agreement to Protect the Environment: 15 Years of Cooperation. *Pace Law Faculty Publications*. Paper 384. 1988. p. 408-410.
 18. *Ibid.*, p. 408. As an example, Robinson N. cites the agreement between the USA and Poland on cooperation in the field of environment protection of 1987 for which the agreement of 1972 served as a precedent, and therefore provisions of these two agreements should be identical.
 19. The preamble of the Agreement between the Government of the Russian

- Federation and the Government of the United States of America on cooperation in the field of protection of the environment and natural resources of 1994.
20. According to the agreement, a “pollution incident” means a discharge or an imminent threat of discharge of oil or other hazardous substances from any source, which character demands an immediate response action for the prevention of such discharge or restriction of its distribution, gathering or removal of this substance to eliminate a threat or to reduce to a minimum the harmful impact on living resources, marine flora and fauna, health and well-being of the population.
 21. Signed by all five Arctic coastal states: Russia, the USA, Canada, Denmark and Norway.
 22. Beringia is defined as the land and maritime area bounded on the west by the Lena River in Russia; on the east by the Mackenzie River in Canada; on the north by 72 degrees north latitude in the Chukchi Sea; and on the south by the tip of the Kamchatka Peninsula. Available at: <http://www.nps.gov/akso/beringia/ru-index.cfm>. According to the scientists, a millennium ago, in the area of the Bering Strait, there was an overland bridge connecting Asia with North America that allowed nomad tribes of that time to move freely from one part of the world to another.
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6. United States' Arctic Policy

Raymond V. Arnaudo

The United States became an Arctic country when it purchased Alaska from Russia in 1867, allowing it to acquire the land as well as potential ocean access to the Far North. But it would be another century before the U.S. federal government would begin to develop a broad set of goals to provide an approach to, and goals for, oversight and development of this region.

The Arctic policy of the United States has remained broadly constant over the years since the early 1970s, when initial efforts to craft a unified U.S. government inter-agency approach to the Arctic were initiated. This policy has been based on several key principles, which include the protection of our national security interests and the preservation of the principle of freedom of the seas and superjacent airspace as well as the development and implementation of programs and activities to facilitate international cooperation in the areas of exploration, scientific research, resource development, exchange of scientific and technical data and the engagement of indigenous and local communities. The past two decades have witnessed an evolutionary trend and growth in the perspective of the United States to welcome greater structured international and multilateral cooperation, which has resulted in more cohesion and better communication among Arctic countries.

Pan-Arctic cooperation is a relatively recent innovation among the countries bordering the Arctic Ocean. One of the earliest agreements in the northern regions was the Spitsbergen Treaty of 1920, which recognizes the sovereignty of Norway over the Svalbard Archipelago, but mandates the demilitarization of the islands while providing access to the signatories to commercial activities, such as mining. Prior to the collapse of the Soviet Union, international cooperation was limited to scientific efforts or logistical support for exploration or business projects, such as explorations of the ice, or to natural resources management and conservation, such as the North Pacific Fur Seal Convention (1911) or the Polar Bear Agreement (1973). While there have always been these types of cooperative arrangements, there were overriding reasons for a lack of initiatives to broaden cooperation (primarily the Cold War), and the territories of

the north were clearly under the jurisdictions of the five Arctic countries: Canada, Denmark (Greenland) Norway, the United States, and the Soviet Union.

The political tensions between East and West continued to hinder most substantive dialogues about multilateral cooperation in the Arctic. With the Soviet Union on one side of the equation, and the United States, Canada and Nordic countries on the other, many efforts to reach across this divide were stunted, although some government agencies did work together on specific problems, mostly on a bilateral basis. Adding to this tension was the presence of the military factor. The United States, working with its allies, had constructed an early warning radar system, the DEW (Distant Early Warning) line, as a tripwire against potential Soviet intrusions, and a military presence in the Arctic regions could only reinforce this barrier to multilateral discussions to address common problems.

The Arctic also has limited political clout. In the specific case of the United States, the country's focus on the North has generally been limited. Although Alaska is America's largest state by far, with 1.7 million km², this represents less than 20% of the country's total landmass. More importantly, its population of under 750,000 is less than one percent of the entire U.S. population. Although the United States is an Arctic power because of its northernmost state, Alaska has a distinctly limited share of the total voting influence on the decision-making authority in government. Federal decisions about international cooperation originate in Washington. This means that only two of the 100 U.S. senators, and only one representative among 435 in the House of Representatives, specifically represent Arctic interests. While several large, under-populated states have this similar "minimal" representation, Alaska, isolated regionally and by its far north location, speaks alone for Arctic interests. In this regard, it is important to remember that the United States does not have a parliamentary form of government: major federal programs or decisions affecting the Arctic must be approved by Congress, often not an easy process with such a small congressional representation.

The interests of Alaskan indigenous groups are similarly underrepresented nationally. The agency designed to protect the rights of Native Americans, the Bureau of Indian Affairs, has long focused its attention on the tribes of the Lower 48 states. And the legislation designed to protect the rights and interests of Alaska Natives, the Alaska Native Claims Settlement Act (ANCSA), is poorly understood among non-

Alaskans.

With no significant federal focus on the Arctic, and congressional membership restricted to three, pressure for international outreach in the Arctic has always been limited. On the Alaskan side, there was also limited pressure on the federal government to seek greater international cooperation among the bordering countries. Alaska has always sought cooperation with its regional partners in the former Soviet Union and/or Canada, but has never been particularly enamored with seeking federal assistance to gain cooperation, which it understood to be the state's own prerogative.

The federal government does have two interagency organizing structures which coordinate Arctic policy and Arctic scientific efforts: the Arctic Policy Group, under the National Security Council structure, chaired by the State Department, and the Interagency Arctic Research Policy Committee, authorized by the Arctic Research and Policy Act of 1984, chaired by the National Science Foundation. But funding for initiatives and programs is broadly ad hoc, as no single federal department or agency has control of or a dedicated budget for Arctic funding. The Arctic Research Commission has theoretical authority over all federal Arctic research, but it does not control the budgets of different departments and agencies that fund projects and activities in Alaska. Nor has there ever been a "Department of the Arctic" in the federal government that could serve as an overseer of management of and funding for activities in the Arctic.

The specific problems of the indigenous peoples living on the land have presented another set of limits. As noted above, the relevant U.S. federal agency, the Bureau of Indian Affairs, has tended to focus on indigenous peoples in the Lower 48, and not those in Alaska. And internationally, prior to the formation of the Inuit Circumpolar Conference (now Council) in 1977, there was little structured coordination among native populations. The problems of Cold War tensions and lack of appropriately proportionate political influence by those living in the northern regions thus limited discussions of formalizing political cooperation in the Arctic. Add to this the simple fact that the populations affected are relatively small in all Arctic countries, and it is clear that the barriers to political cooperation in the North were large.

But in the late 1970s and early 1980s, several forcing events took place to heighten awareness of the need for greater cooperation, which would improve the atmosphere for Arctic cooperation. First and foremost was the

growth in the public's consciousness of the importance of environmental protection and global responses to problems. The State Department was called upon to address increased global interest and heightened public concerns over the effects of transboundary air pollution and environmental protection. The United States and Canada held a series of discussions beginning in the 1970s over the issue of Arctic haze, the north-spreading air pollution from the United States into Canadian airspace. Globally, the world's countries organized to adopt the Convention on Long-range Transboundary Air Pollution (1979) under the United Nations Economic Commission for Europe. The pace of multilateral negotiations that would address the growing concerns over the environment accelerated in the 1980s, leading to agreements on polar protection, wildlife conservation regimes, environmental cooperation, and climate change, and a global emphasis on the need for more actions to protect the environment. These efforts culminated in the Rio Earth Summit of 1992, raising awareness regarding the importance of a regional focus on ecosystems, such as the Arctic. There nevertheless continued to be concerns over the specific effects of transboundary air pollution in the Arctic.

A second forcing event was the scientific community's interest in improving cooperation among Arctic researchers. Taking a page from cooperation in the Southern Ocean and Antarctica, which led to the Scientific Committee for Antarctic Research (SCAR) and then to the Antarctic Treaty of 1959, scientists began to press for improving pan-Arctic cooperation to improve research interactions. They began discussions by drawing Arctic and non-Arctic countries together, leading to the formation of the International Arctic Science Committee (IASC) in 1990. IASC was the first pan-Arctic scientific body to be established, whose goal was to initiate, develop, and coordinate scientific activity in the Arctic region, and on the role of the Arctic in the Earth system. There were efforts by some countries to restrict membership solely to Arctic countries, but this was resisted, in keeping with the normal arrangements of scientific bodies, and IASC became a global scientific body with an Arctic focus. Its creation jump-started the push for international governance in the North. If scientists could form an organization to assist in international cooperation, why could not regional Arctic powers do so as well?

Third, the Soviet Union began to signal its interest in Arctic cooperation. Nordic states began to encourage the idea of an Arctic political forum, mainly to engage the Soviets, whose transboundary

pollution into the northern regions was of growing concern. But there was a limited or negative response from the Soviet Union to these ideas, until 1987, when Soviet Party Secretary Gorbachev, in a speech at the Ceremonial Meeting on the Occasion of the Presentation of the Order of Lenin and the Gold Star to the City of Murmansk, called for greater cooperation and peaceful activities in the Arctic, especially in the areas of resource development, scientific research, environmental protection, and the rights of native groups. This remarkable statement, albeit buried in a long speech, confirmed for many of those engaged in the process of strengthening Arctic cooperation that the Soviets were finally recognizing the need for reaching out to the West.

Lastly, the influence of nongovernmental groups should be noted. Native groups in the North would occasionally meet to discuss transboundary cooperation, but in 1977, a broadly representative group of Arctic indigenous peoples met in Barrow, Alaska, and created the Inuit Circumpolar Conference, thus organizing a voice for the natives of the North. Additionally, a group of academics started an informal consultative group in the late 1980s, the Working Group on Arctic International Relations, which brought together several of those government officials, including some from the Soviet Union, who would eventually work on the formation of the Arctic Council in an informal setting, where options and solutions could be explored without attribution or government endorsement. These discussions would lead the Russians to explore ideas that were formally acknowledged in Gorbachev's now-famous Murmansk speech, which indicated to the other Arctic countries that the Soviet Union was interested in greater cooperation.

Shortly thereafter, the government of Finland broached the need for greater Arctic cooperation, an initiative that later into the cooperative arrangements leading to the Arctic Council. There was no consensus in support of a binding convention or an overly centralized organization. But the mood for a regional agreement had coalesced, and the result was the first step, the Arctic Environmental Protection Strategy (1991), adopted in Rovaniemi, which five years later would be broadened to become the Arctic Council (Ottawa Declaration 1996).

America's geopolitical interests have remained broadly constant over the years, and one the major strengths of U.S. Arctic policy is that it, too, has remained relatively constant. The 1971 National Security Decision Memorandum states that it will be the Arctic policy of the United States

to “insure that Arctic development is orderly and consistent with U.S. policy on consideration and protection of the environment; to maintain a posture sufficient to protect our national security interests and preserve the principle of freedom of the seas and superjacent airspace; to develop and implement programs and activities, within a framework of international cooperation wherever appropriate and feasible...” U.S. policy should also include “mutually beneficial cooperation with Arctic and other countries in exploration, scientific research, resource development and exchange of scientific and technical data.” The decision memorandum also called for the creation of an interagency Arctic policy group to review and coordinate U.S. policy in the Arctic to be chaired by the Department of State.

Ten years later, the U.S. government, under a Republican administration, reaffirmed the basic tenets of these policies with another National Security Decision Directive (1983), which stated: “the United States has unique and critical interests in the Arctic region related directly to national defense, resource and energy development, scientific inquiry, and environmental protection...” and specifically recommitted the United States to promoting “beneficial international cooperation.” In 1984, a major new effort to move the ball forward was introduced with the enactment of the Arctic Research and Policy Act of 1984. This Act established the new, independent national Arctic Research Commission to oversee and coordinate U.S. scientific efforts in the Arctic. It also created the Interagency Arctic Research Policy Committee, to be chaired by the National Science Foundation and to oversee U.S. federal agencies’ Arctic research.

The international efforts in the late 1980s—the Murmansk speech by Soviet leader Mikhail Gorbachev, described above, and the global push for greater Arctic cooperation—led the United States to once again review its Arctic policy, a process initiated by a public forum and conference sponsored by the U.S. Department of State in Alaska in 1993 and resulting in a new Presidential Decision Directive involving the Arctic the following year. As with previous directives, the broad thrust of policy principles remained the same, although, for the first time, U.S. policy emphasized the importance of indigenous communities in decision making and policy development along with the need to protect the environment.

While the broad Arctic policy goals have provided a foundation for U.S. policy for decades, toward the end of the second term of the Bush administration it was concluded that it was an appropriate time to review U.S. policy. Fourteen years had passed since the last federal Arctic policy

review, and there had been several notable changes worthy of consideration. The growing concern about the need to understand the causes and effects of climate change on the planet, especially in the Arctic, had caused all northern countries to reassess their activities in the region. The United States, for its part, had taken the lead in the late 1990s, initiating the Arctic Climate Impact Assessment (ACIA 2004) under the auspices of the Arctic Council (in cooperation with IASC). In addition, many of the initiatives to develop greater multilateral cooperation in the North, leading to the formation of the Arctic Council, had happened after the last policy review and needed to be taken into account. Rapid change in the extent and thickness of the Arctic ice shelf and sea ice was leading to increased maritime activity, which in turn raised new questions about the possible expansion of fisheries, increased pollution, commercial shipping, new forms of energy exploration and development, and, collectively, potential new questions about the entire scope of sustainable and economic development in the region.

For these reasons, the administration sought comments and suggestions from relevant stakeholders and from the most recent interagency review, which included input from a wide variety of U.S. players and stakeholders, such as the state of Alaska, indigenous groups, environmental leaders, and industry representatives as well as members of the academic and research community. After extensive discussions and meetings of government officials with various stakeholders, the administration released an updated policy in January 2009. The revised National Security Presidential Directive (2009), which retained the six central tenets of previous Arctic policies, was a nonpolitical document and represented goals that might appropriately be called bipartisan. In a demonstration of this, early in the new term, the Obama administration reaffirmed that the 2009 presidential directive from the Bush administration would continue to accurately describe U.S. Arctic policy, thereby retaining the same six broad policy goals first expressed in the 1994 Arctic policy of the Clinton administration:

- 1) Meet national security and homeland security needs relevant to the Arctic region;
- 2) Ensure that natural resource management and economic development in the region are environmentally sustainable;
- 3) Strengthen institutions for cooperation among the eight Arctic nations (Canada, Denmark, Finland, Iceland, Norway, Russia,

- Sweden and the United States);
- 4) Enhance scientific monitoring and research into local, regional, and global environmental issues;
 - 5) Involve the Arctic's indigenous communities in decisions that affect them; and
 - 6) Protect the Arctic environment and conserve its biological resources.

It is important to remember that the Bush administration worked for eight years under the Arctic directive that had been developed by the Clinton administration, which reflects the constancy of U.S. fundamental interests and objectives in the North, regardless of which political party is in power. While these basic U.S. interests and objectives in the Arctic endure and have not changed much from the prior directives, there have been new developments in policy that reflect the changes that have been taking place in the Arctic. U.S. domestic policies on homeland security and defense have changed significantly since September 11, 2001. The United States has fundamental homeland security interests in preventing terrorist attacks and criminal or hostile acts in or via the Arctic domain. There had also been time to reflect on the progress made under the Arctic Council. Finally, there was a need to consider the potential increases in commercial shipping and economic activity as well as how best to prepare for possible rapid changes in the environment.

As a result, the various national security components of the U.S. government, as well as the state of Alaska, have in the past few years outlined their goals and plans for operations in the Arctic. The National Security Council, the White House, the Department of Defense, the Navy, the Coast Guard, and the state of Alaska have all issued new guidance and directions in various strategies and plans:

- Arctic Region Policy, NSPD 66 National Security Council, 2009
- National Strategy for the Arctic Region, 2013
- Managing for the Future in a Rapidly Changing Arctic: Report to the President, 2013
- Arctic Strategy, Department of Defense, 2013
- Inter-Agency Arctic Research Policy Committee, Five-year Arctic Research Plan FY2013-17, February 2013
- The U.S. Coast Guard's Vision for Operating in the Arctic Region, 2014

- Arctic Roadmap, 2014-2030, U.S. Navy, 2014
- Implementation Plan for the National Strategy for the Arctic Region, White House, 2014
- Alaska Policy Commission, Preliminary Report to the State Legislature, 2014
- Arctic Action Plan, National Oceanic and Atmospheric Administration, April 2014
- Arctic Issues: Better Direction and Management of Voluntary Recommendations Could Enhance U.S. Arctic Council Participation, Government Accountability Office (GAO) # 14-435, May 2014.

The collapse of the Soviet Union and the end of the Cold War clearly lowered the prominence of traditional security issues in the Arctic, but the potential increase in transportation and other human activities due to the melting of polar ice certainly raises new concerns and calls for a renewed focus on potential new conditions. As a result, the current U.S. policy directive calls for “greater capabilities and capacity, as necessary, to protect United States air, land, and sea borders in the Arctic region.” The recent Department of Defense Arctic Strategy (2013) best summarizes this approach:

“Security in the Arctic encompasses a broad spectrum of activities, ranging from resource extraction and trade to activities supporting safe commercial and scientific operations to national defense. Security cooperation activities and other military-to-military forms of engagement establish, shape, and maintain international relations and the partnerships necessary to meet security challenges and reduce the potential for friction.

The Department will continue to build cooperative strategic partnerships that promote innovative, affordable security solutions, and burden-sharing in the Arctic, and seek to increase opportunities with Arctic partners to enhance regional expertise and cold-weather operational experience. The Department will continue to train and operate routinely in the region as it monitors the changing environment, revisiting assessments and taking appropriate action as conditions change.”

This strategy identifies the Defense Department’s desired end-state for the Arctic: a secure and stable region where U.S. national interests are safeguarded, the U.S. homeland is protected, and nations

work cooperatively to address challenges. It also articulates two main supporting objectives: ensure security, support safety, promote defense cooperation, and prepare to respond to a wide range of challenges and contingencies operating in conjunction with other nations when possible, and independently if necessary, in order to maintain stability in the region. Finally, it identifies the ways and means the department intends to use to achieve these objectives as it implements the National Strategy for the Arctic Region.

While such recent reviews of Arctic operations and planning by the military have prompted reactions about increased militarization of the North, these measures do not reflect any heightened tensions in the area, but rather are simply a prudent response to new conditions, driven largely by potential new evolving economic interests. All eight members of the Arctic Council have recently reviewed their Arctic policies and made similar statements about the need to examine their capabilities to respond to changes taking place in the Arctic. In addition, the state of Alaska, the reason the United States is an Arctic nation, has formed a state-level Alaska Policy Commission, which completed a preliminary study in January 2014 that reports on the major Arctic policy issues facing the state. Its final report to the state legislature is due in 2015.

Although it is not yet party to the United Nations Convention on the Law of the Sea (UNCLOS 1982), the United States has long considered that, with respect to traditional uses of the ocean, the convention generally reflects customary international law and these provisions are thus binding on the United States. UNCLOS is the fundamental legal instrument governing activities on, over, and under the world's oceans, and has the complete support of the Obama administration. The increased interest in, and greater access to, the Arctic only heightens the importance of this convention, which provides a roadmap for maritime cooperation.

With respect to accession to the convention, it remains an important goal of the Obama administration to secure Senate approval of UNCLOS. Every administration—whether Democratic or Republican—since the treaty was first submitted to the Senate in 1994 has supported U.S. accession to the convention and ratification of the associated 1994 Agreement. The Obama administration is working closely with Senate leadership for the Senate to take up this important treaty at the earliest opportunity. The other four Arctic coastal states (Canada, Denmark, Norway, and Russia) are parties to the convention. United States accession UNCLOS would

further our national security, environmental, economic, and diplomatic interests, and would reaffirm U.S. leadership in this arena.

The importance of the law of the sea and its role in the Arctic is reflected in the Ilulissat Declaration (2008) adopted by the five Arctic coastal states. The declaration explicitly recognizes that “an extensive international legal framework applies to the Arctic Ocean. Notably, the law of the sea provides for important rights and obligations concerning delineation of the outer limits of the continental shelf, the protection of the marine environment including ice-covered areas, freedom of navigation, marine scientific research, and other uses of the sea.”

Another important reason to become a party to the UNCLOS arises from the interests of non-Arctic states in the Arctic. The convention divides ocean areas—both the water column and the seafloor—into different zones, with states enjoying varying rights in each zone. The five coastal states of the Arctic thus do not “control” or “own” the entire Arctic Ocean, although they do exert jurisdiction at various levels over their respective territorial seas, extended economic zones and continental shelves. All states may exercise freedoms of navigation and overflight in areas beyond the territorial sea. Thus, while non-Arctic states may have legitimate interests in the Arctic Ocean, these are carefully defined by the UNCLOS.

Lastly, as a result of the U.S. failure to accede to the convention, it has not been able to nominate an expert for election to the Commission on the Limits of the Continental Shelf (CLCS), which reviews countries' submissions for delimiting their continental shelves. Thus, until the United States becomes a party to the convention, it cannot participate fully in the review process, nor even nominate American commissioners to review the detailed data submitted by other countries on the limits of their continental shelves beyond 200 nautical miles.

The United States is also eager to delineate the outer limits of its continental shelf beyond 200 nautical miles, which would be reviewed under the provisions of the UNCLOS. A coastal state exercises certain sovereign rights over its continental shelf, including exploration, exploitation, conservation, and management of non-living resources, such as oil, gas, minerals, and living, “sedentary” species, such as clams, crabs, and sponges. The United States has vast areas of continental shelf—at least twice the size of California and, in the Arctic, at least as far as 600 miles from the coastline. Parties to the convention have access to the CLCS, whose technical recommendations assist a coastal state in establishing

the outer limits of its continental shelf. In spite of this, the United States is in the process of completing a multi-year study of its continental shelf, including cooperation with its neighboring Arctic state, Canada.

The United States, like all eight Arctic states, is a member of the International Maritime Organization (IMO), a United Nations specialized agency that oversees issues related to maritime safety and shipping security, and the prevention of marine pollution by ships, among other topics. In accordance with UNCLOS, the IMO provides a global structure for ships operating in polar waters. After years of research and efforts, the IMO expects to complete the Polar Code, setting forth mandatory regulations pertaining to ships operating on polar waters by the end of 2014 or early in 2015.

The United States believes that the primary focus of the Arctic Council should remain its excellent work in the areas of environmental protection and sustainable development, but also recognizes that changing conditions in the Arctic present an opportunity to expand and broaden cooperation in the region. Multilateral cooperation in the Arctic has improved steadily since the adoption of the Arctic Environment Protection Strategy and later the Arctic Council, and the organizational elements have been adjusting to new challenges. The United States is actively engaged in efforts to improve the effectiveness and efficiency of this forum, in accordance with its general mandate.

In this regard, at its ministerial meeting in Nuuk, Greenland in 2011, the Council agreed to establish a new secretariat in Norway to provide better continuity and transition between the two-year country chairmanships. Evolving challenges frequently require creative solutions, and in this regard, Arctic Council has begun to craft binding commitments to strengthen protections in the North. Specifically, in 2011, members concluded an agreement for search and rescue cooperation (Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic, 2011), the first time all eight Arctic countries have adopted a legally binding agreement under the Council's auspices. Two years later, they concluded a second binding agreement on oil spill response (Agreement on Cooperation on Marine Oil Pollution Preparedness and Response, 2013).

The members of the Council have also begun to explore possible measures that can be taken to address the climate impacts of black carbon and other short-lived climate pollutants. Other potential areas, which may need further attention, include shipping, energy and other resource

development and oil spill response. Finally, there is a growing interest by non-Arctic countries in the region, with increased demands for a larger role in the Arctic Council, and the Council will need to address the growing demand for an increased voice and participation by observer countries in Council activities.

There are also regional jurisdictional questions that need the attention of the U.S. and Canadian governments, since they disagree over the location of their maritime boundary in the Beaufort Sea. Canada claims that the land boundary dividing Alaska from the Yukon Territory, the 141st line of longitude, should also be the maritime boundary heading due north. The United States claims that the maritime boundary should be an equidistant line out to 200 nautical miles, i.e., a series of points that are equidistant to the nearest points of land in each country. As a result of this difference of views, both states claim a roughly triangular area in the Beaufort Sea covering approximately 6,100 square nautical miles. The infusion of continental shelf claims offers another layer of dispute. Both states have offered oil and gas leasing blocks in the disputed area, but neither side has moved forward with drilling. There are not thought to be any significant fishery resources in this area at this time, although both countries acknowledge the need for more research, as melting ice provides new fishing areas. The United States takes the position that until there is adequate knowledge of the fishery stocks in arctic waters, there should be a moratorium on any commercial fishing activities.

The United States has periodically suggested to Canada that the two sides attempt to reach an agreement on all four disputed maritime boundaries (the others are in the Dixon Entrance, outside the Strait of Juan de Fuca and in the Gulf of Maine), and Canada has recently suggested that there is political willingness in Canada to discuss a resolution of the Beaufort Sea maritime boundary.

Although Canada regards the Northwest Passage, which connects Baffin Bay/Davis Strait in the Atlantic with the Beaufort Sea in the Arctic Ocean, as "internal waters" through which there are no passage rights, the United States, and most other maritime powers, regard the Northwest Passage as a waterway used for international navigation with the same status as the Strait of Gibraltar, for example, through which vessels enjoy the right of transit passage.

The United States recognizes Canadian sovereignty over its Arctic islands as well as its sovereignty over territorial seas adjacent to those islands. The

United States, however, has long disputed Canada's "straight baselines" that attempt to enclose much of Canada's arctic waters as "internal waters." Those straight baselines are not drawn in a manner consistent with the provisions of the Law of the Sea Convention. The United States also has concerns about Canada's mandatory requirements for foreign-flagged ships transiting Canadian-claimed Arctic waters, commonly referred to as NORDREG, and has recommended that they be submitted to the IMO for review. Lastly, there is also a bilateral agreement between the two countries on the navigation and transit of ice-covered areas by research vessels (Agreement Between the Government of the United States of America and the Government of Canada on Arctic Cooperation 1988), which affects this strait.

In the area of science, and considering the role of the International Arctic Science Committee as a catalyst to greater scientific and political cooperation, the United States remains deeply committed to the need for sound scientific and socioeconomic information. Arctic countries should continue to work to promote unfettered scientific research on a host of Arctic issues, including climate change and its effects. The United States has already made significant investments in the infrastructure needed to collect environmental data in the Arctic, and welcomes the investments others are making to advance research in the Arctic. The United States will seek the involvement of all Arctic and non-Arctic nations in order to advance scientific understanding that could provide the basis for assessing future impacts of climate change and proposed response strategies. In this regard, the United States also has supported strongly the need for the traditional knowledge of indigenous people in support of science-based knowledge. The role of indigenous people and their understanding of the environment and use of natural resources are well acknowledged under the Arctic Council's mandate. The Arctic Council recognized this with the establishment of a unique role of native representatives as "Permanent Participants," as distinct from the "Observers" and "Nongovernmental Organizations."

The United States will assume the chairmanship of the Council in 2015, its first return to the leadership role since 1998-2000. It is working to develop its goals and major themes under its leadership, following on from the current Canadian chairmanship. These goals are likely to include initiatives in the areas addressing climate change, protection and management of natural resources, strengthening the roles of indigenous people, and protection of the environment. They may also expand efforts to examine the structure of the working groups and the task forces of the

Council, as well as examining and improving the role of Observer States.

The last 40 years have seen a remarkable evolution in the policies of countries in the Arctic region toward greater engagement and mutually beneficial efforts. Growing from mostly bilateral and limited regional cooperation and starting from the era of tensions and confrontation of the Cold War, Arctic countries have created new mechanisms to foster greater regional cooperation. While the broad trends of greater global interconnectedness have helped this cooperation, the increased awareness of policy makers in the United States regarding the benefits of pursuing regional approaches to share information and approaches to solutions has led to a recognition that many of its problems in the Arctic are better solved through regional approaches. U.S. Arctic policy has always recognized this fact, but the benefits of this growing cooperation are more apparent than ever.

Table II-1. U.S. Arctic policy timeline

1971	Arctic Policy Group established by United States
1973	Polar Bear Treaty (Canada, Denmark, Norway, USSR, USA)
1977	Inuit Circumpolar Conference (now Council) established
1984	Arctic Research and Policy Act: created the Arctic Policy Group, under the National Security Council structure, chaired by the State Department, and the Interagency Arctic Research Policy Committee, chaired by the National Science Foundation.
1987	Murmansk speech. Soviet Party Secretary Gorbachev looks west
1988	Working Group on Arctic Relations, informal consultative group, chaired by academics
1989	Rovaniemi Process (Beginning of discussions for the AEPS)
1990	International Arctic Science Committee, the first pan-Arctic scientific body to be established
1991	Arctic Environmental Protection Strategy (AEPS) signed
1992	Rio Earth Summit (Global focus on ecosystems, such as the Arctic)
1993	Nuuk Ministerial (First AEPS ministerial meeting)
1994	National Security Decision Memorandum (Review of U.S. Arctic policy)
1996	Ottawa Declaration (Founding of Arctic Council)
1998	U.S. Chairmanship of Arctic Council
2000	Arctic Climate Impact Assessment (ACIA) begun
2009	First joint meeting of the Arctic Council and the Antarctic Treaty
2011	Arctic Search and Rescue Agreement (First pan-Arctic agreement)
2013	Oil Pollution Preparedness and Response Agreement
2013	Arctic Council Secretariat established
2015	United States will assume Chairmanship of Arctic Council

U.S. Arctic Policy reviews: 1971, 1983, 1994, 2008.

Table II-2. Arctic Council chairs

1996-1998	Canada
1998-2000	USA
2000-2002	Finland
2002-2004	Iceland
2004-2006	Russia
2006-2009	Norway
2009-2011	Denmark
2011-2013	Sweden
2013-2015	Canada
2015-2017	USA

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7. China's Arctic Policy

Jian Yang

With the acceleration of ice melting in the Arctic, the importance of the Arctic in terms of navigation, resource exploitation and scientific research, has increased in recent years. The cold Arctic is consistently warming with the increase of human activities. Softened ice needs hard norms and rules. The evolution of Arctic governance and the expanding functions of the Arctic Council are under way. While the situation is undergoing complex and profound changes, all parties concerned with Arctic affairs are working together to face the common challenges and to compete for more benefits from changing situations. The natural environment in the Arctic region is changing at a greater pace than people anticipated. Human society, including the nations outside the Arctic Circle, must make necessary adjustments to their practices, ways of production, and way of life and build up new social governance mechanisms to adapt to the new natural surroundings.

FIVE QUESTIONS ABOUT CHINA'S POSITION AND POLICY ON THE ARCTIC

In May 2013, the Arctic Council officially granted observer status to six non-Arctic states, opening the door for China to be involved in Arctic governance affairs at the regional level. On September 10, 2013, the M.V. Yong Sheng from COSCO Shipping Co. successfully completed her maiden voyage through the Northeast Passage and arrived at the Port of Rotterdam.¹ Before the Yong Sheng, China had only made one actual voyage in Arctic waters with its Arctic research vessel the Xue Long in August 2012.

In recent years, China has carried out bilateral dialogues with all the Arctic nations and some non-Arctic nations to enhance understanding and mutual trust and promote pragmatic cooperation in Arctic affairs. In April 2012, China and Iceland signed an agreement on Arctic cooperation. This is the first time for China to sign such an agreement with an Arctic nation, laying a solid legal basis for pragmatic bilateral cooperation. In addition,

agreements on marine cooperation between China and the USA, Canada, Russia, Iceland, Germany, France, and Korea have been signed, and Arctic cooperation is an important part of the agreements. Many academic seminars on Arctic governance sponsored by institutes from China and the Arctic nations have been held. In December 2013, the Chinese Nordic Arctic Research Center, consisting of many academic institutes from China and the Nordic countries, was established.²

As a non-Arctic state and globally important economy, will China be a positive contributor or a burden to Arctic governance? In recent years, the world has paid great attention to China's involvement in Arctic affairs. The questions focusing on the Chinese position and policy regarding Arctic issues can be sorted into five categories: Firstly, what forces are driving China to participate in Arctic affairs? Secondly, how does China view the current international order in the Arctic, and how does it view the existing Arctic governance mechanism? Thirdly, how does China realize its rights and interests in the Arctic? Fourthly, how does China value international cooperation in terms of environmental protection and economic cooperation? Lastly, how does China deal with the relationship between Arctic states and non-arctic states.

What Forces are Driving China to Participate in Arctic Affairs?

In the next decade, China will be one of the most important trading nations. Its economic growth is heavily dependent on trade and shipping. With labor costs rising in China, transportation costs will be a factor for multinational corporations that wish to choose China as a production base. The opening of the Arctic commercial sea routes will change the world trade pattern. The exploiting of sea routes and oil and gas resources will facilitate the formation of an Arctic Circle economy including the northern parts of Russia, North America, and the Nordic nations, thereupon affecting the entire world economic and geopolitical pattern. Therefore, many countries are stepping up to formulate Arctic strategies, making preparations for the chance. China, as one of the world's major economies, should follow the trend of globalization and seize an opportunity to further its economic development.

In order to guarantee employment and individual welfare, China must maintain a certain level of economic growth. It is necessary for the nation to find various channels to secure energy supplies. In 2012, China's

dependence on imported oil exceeded 58%. According to the World Situation Report 2011 composed by the Development Research Center affiliated with China's State Council, for the next two decades and along with urbanization, China's energy consumption will grow at the same time for both production and living. By 2030, 70% of China's oil and 40% of its natural gas will need to be imported.³ No matter how the structure of China's economy is optimized with policies, its status as one of the world's major energy-consuming economies will not change in the short run. In this sense, positive involvement in the development and utilization of the Arctic sea routes and importing resources through bilateral economic cooperation is a sensible choice for China to explore new channels to facilitate economic security and decrease economic uncertainties.

We are currently in the incubation period of a new technology revolution. Environmental limitations to exploiting resources constitute an important factor restricting the further development of the economy. A possible breakthrough to a new technological revolution could be at the junction where energy and environmental limitations are solved. The Arctic is a resource-abundant region and environmentally fragile area; green technology and resources are most likely to achieve a breakthrough there. The Arctic can become an important testing ground for China to become a pioneer in specific fields of science and technology.

In short, China's positive participation in Arctic affairs should be treated as part of its strategy for further development and integration into the world. The economic security and uncertainty raised by Arctic ice melting is one of the main driving forces for China's participation. To gain soft power by achieving a scientific edge in polar studies and providing a public good to protect the environment and biodiversity is also one of China's aspirations. Participating in Arctic affairs and engaging in Arctic governance is a new type of diplomatic practice for China that needs overall planning and coordination between its domestic and international situations.

At present, China's involvement in exploiting Arctic resources is far below the level that international media have mentioned. In practice, many Arctic countries welcome China's enterprise to invest in the Arctic and participate in sustainable development there. Chinese enterprises are cautious about engaging in economic activities in the cold Arctic because of the harsh climatic conditions, safety and health issues, environmental concerns, and lack of necessary infrastructure.⁴ At present, there are only

few Chinese enterprises carrying out some pilot projects by cooperating with foreign companies, or just beginning to probe the possibility of establishing cooperative projects. In 2009, the China Zhongrun Resources Investment Corporation signed an agreement with a British mineral company to exploit a copper mine in Greenland.⁵ This is one of the few projects that Chinese enterprises are carrying out in the Arctic.

How Does China View the Current International Order in the Arctic, Including the Existing form of Arctic Governance?

The Arctic is a polar region located at the northernmost part of the Earth. The Arctic consists of the Arctic Ocean and parts of Canada, Russia, the United States (Alaska), Denmark (Greenland), Norway, Sweden, Finland, and Iceland. The United Nations Convention on the Law of the Sea (UNCLOS) is relevant as a governance tool for the order of the Arctic Ocean. As for the parts of land of the eight nations mentioned above, most of the sovereignty issues have been settled properly. Respecting the sovereignty of Arctic states and respecting the existing Arctic governance mechanisms is the primary legal basis for China to deal in Arctic affairs. The ownership of the land territories and most of the marine rights in the Arctic have been clearly established, which means the governance of the Arctic is essentially different from the governance of Antarctica, which can be called a global commons. This is of positive significance in establishing an international order and regional peace in the Arctic. Only peace in the Arctic can bring environmental and economic benefits to China, so respecting the sovereignty of Arctic states is the legal basis for China to view the current international order, as is encouraging Arctic states to resolve territorial disputes and marine rights through consultation on the basis of the UNCLOS. That is why China has supported the efforts of Norway and Russia to solve their dispute regarding jurisdiction in the Barents Sea through negotiation.

Because Arctic governance is a system that is mixed with multiple levels (global, regional and local), issue areas (climate change, biodiversity, fishery, energy etc.), and actors (states, NGOs, indigenous peoples, companies, etc.), an international organization that can play the role of platform and of harmonizing and integrating all sorts of governance mechanisms is most important. The Arctic Council is the most important regional intergovernmental forum to discuss the issues of sustainable development

and environmental protection in the Arctic. With the expansion of its functions and representatives, the importance of the Council has been upgraded. China appreciates the positive role the Council plays in Arctic affairs. China will make its own contribution to Arctic governance by participating in relevant working groups and projects.

How Does China Define its Interests and Rights in the Arctic?

China is a signatory to important international treaties like the Spitsbergen Treaty and UNCLOS. Like other signatories, China assumes its due obligations as well as enjoying rights in many aspects of the Arctic region. According to the Spitsbergen Treaty, Chinese ships and nationals shall enjoy equal rights of mining, fishing and hunting in the territories of the Svalbard Archipelago specified in the treaty. According to UNCLOS, Chinese ships and aircraft enjoy freedom of navigation and overflight in the exclusive economic zones of the Arctic countries, freedom of navigation in the high seas of the Central Arctic Ocean, and the rights of a flag state specified in the treaty.

Some Chinese scholars say that in the Arctic, China's interests mainly comprise environmental interest, navigation interest, resource interest, maritime scientific exploration interest, etc.⁶ To my understanding, all the interests mentioned above are indirect ones. China is a product-processing place on a global scale. It is also an important market for Arctic products. Most of the interests can be realized by international law and by bilateral economic cooperation and trade. Statements like "China has sovereign rights in the Arctic," or "the entire Arctic is a heritage belonging to all humankind"⁷ are totally wrong and will never be supported by the Chinese government.

How Does China Value International Cooperation Relating to Scientific Research, Environmental Protection, and Sustainable Development?

The Arctic is a unique region that is vulnerable to global climate change and to increasing human activities, so it needs cooperative protection by international society. Climate change is making the Arctic a greener, warmer, and increasingly accessible place for economic activities. However, climate impacts such as sea ice loss and rising ocean acidification are

straining coastal community resilience and sound resource stewardship. There is a big knowledge gap for good governance in the Arctic. The impact goes far beyond the Arctic to the rest of the world, and requires scientists from all over the world to cooperate with each other to better understand the region's influence on global weather and climate patterns, to find ways to protect the environment and biodiversity, and to promote sustainable development. As reiterated by Chinese diplomats, the eco-environment of the Arctic region is unique and fragile, and highly susceptible to global environmental problems such as climate change and persistent organic pollutants. The protection of the eco-environment of the Arctic requires joint efforts of Arctic states and the whole international community. China has ratified or acceded to the major international environmental agreements, including the Stockholm Convention on Persistent Organic Pollutants and the United Nations Framework Convention on Climate Change and the Kyoto Protocol. China is fulfilling its treaty obligations in good faith, and has made solid achievements in controlling greenhouse gas emissions and reducing persistent organic pollutants. China will keep working to contribute to the protection of the global and Arctic environment.⁸ Chinese institutes attach great importance to cooperation with the Arctic states. The people living in the Arctic region have a tradition of respecting and protecting their natural heritage. China also has a tradition of living harmoniously with nature. The ancient Chinese philosopher Laozi, the founding father of Taoism, once said, "tiandi shang bu neng jiu, er kuang yu ren hu?," which means, if nature cannot be sustained, how can man? Also, Taoism encourages people to lead simple lives. A quotation from "The Book of Tao and Teh" says that a life of luxury will make a man lose the ability to observe and to think: "Colors make man blind, music makes man deaf, too much food makes man lose his sense of taste." The theme of Taoism is that rules and laws are set by nature, and human beings should respect and learn from nature. We can find many similarities between Chinese traditional thoughts and the traditional knowledge of the indigenous people in Arctic. Similar traditions lay a sound foundation for further cooperation between China and the Arctic states. These states have the experience and best practices in scientific research, environmental protection, and technology innovation. China cherishes and respects the knowledge and experience that the Arctic nations have acquired and accumulated.

How Does China Treat Relations between Arctic and Non-Arctic Nations?

Cooperation between Arctic and non-Arctic states has always been part and parcel of Arctic cooperation, either bilaterally or within the frameworks of regional fora and international organizations, on scientific research, environmental protection, and sustainable development. A good partnership between Arctic and non-Arctic states should include four essential elements:

First, recognizing and respecting each other's rights constitutes the legal basis for cooperation between Arctic and non-Arctic states. Arctic states hold sovereignty and related sovereign rights and jurisdiction in the Arctic region, while non-Arctic states also enjoy relevant rights of navigation and scientific research. Second, to enhance cooperation, Arctic and non-Arctic states should strengthen communication, increase mutual understanding and trust, and act on common interests. Third, addressing transregional issues through joint research endeavors represents a major field of cooperation between Arctic and non-Arctic states. Arctic and non-Arctic states are partners, not competitors. Fourth, upholding and promoting peace, stability and sustainable development in the Arctic region is vital.

To enhance cooperation, Arctic and non-Arctic states should, on the basis of respecting each other's rights, strengthen communication, increase mutual understanding and trust, support and assist each other, and seek areas of converging interests. This model of cooperation has already yielded sound results in addressing such issues as climate change and Arctic shipping. We should continue to enhance our mutually beneficial and win-win cooperation.

WHAT KIND OF MESSAGES DO NON-ARCTIC STATES GET FROM ARCTIC STATES?

The Arctic is the homeland of peoples in the eight Arctic states. It is natural for these states to have a greater stake in the governance of the Arctic. In this sense, the policies of non-Arctic states will contain elements reacting to the Arctic states' policies toward the non-Arctic states. The policy of the Arctic states toward important non-Arctic states is to inform and to engage them. For the non-Arctic states, the policy in this regard is to get well-informed about and be positively engaged in Arctic affairs.

Exclusiveness or Inclusiveness

Like forms of regional governance out there in the world, Arctic governance faces the issue of exclusiveness and inclusiveness. Any regional organization will take considerations on the issue as follows: (1) Efficiency of governance policy. The more member states there are, the more difficult it is to reach regional agreements and the longer it will take to negotiate platforms for taking action. (2) Allocation of interests. Regional interests should be allocated within the region as more as possible, which can prevent external competitors. (3) The capability of extra-regional actors to provide public goods. (4) The extent to which the external actors will become a cost of governance. If a governance regime cannot effectively incorporate important factors, internal and external alike, the cost cannot be effectively controlled and efficiency will be low.

The allocating process of Arctic resources has the nature of a market, while Arctic environmental governance involves the bearing of obligations that have the nature of a non-market. These differences give Arctic states exclusive and inclusive proclivities, respectively. Resource allocation in the Arctic is market-oriented. In other words, under market conditions, the volume of the interests to be allocated is limited. Thus, limited resources will compel the regional members to bar newcomers or competitors. In a case when newcomers are undeniable, a good alternative for this purpose is to raise the threshold of entrance or to introduce discriminative arrangements. The Arctic nations still have vigilance about and suspicion of non-Arctic nations' involvement in Arctic affairs. Before 2013, the Arctic Council repeatedly postponed accepting new observers. The European Union has been rejected as a formal observer, partially because it advocates multilateral governance in the Arctic with a high profile.⁹ The Arctic Economic Council is a new example. In the 2013 Kiruna Declaration, ministers from the eight Arctic Council states decided to establish a task force to facilitate the creation of a circumpolar business forum. In December 2013, the Task Force to Facilitate the Circumpolar Business Forum (TFCBF) proposed a new name for the circumpolar business forum, the Arctic Economic Council, and it was approved by Senior Arctic Officials in January 2014. The Arctic Economic Council will foster business development in the Arctic, engage in deeper circumpolar cooperation, and provide a business perspective to the work of the Arctic Council.¹⁰ But the fact is that the non-Arctic economies were excluded from the first Arctic

Economic Council meeting even though some of them have been granted formal observer status.

Arctic governance, on the other hand, is non-market-oriented in terms of environmental protection and climate change. In other words, enlarging the group will not necessarily bring about competition, but rather bring more members to share interests as well as costs, lowering costs for the original members. Exactly for these reasons, seeking fewer sharers of interests and more investors in public goods, Arctic states are prone to taking an open and inclusive attitude on issues of climate change, the environment and ecology by seeking common interests and common responsibility with extra-regional actors, while taking exclusive policies on issues of resources. As Olav Schram Stokke put it, when it comes to resource allocation, the fewer members the better; when it comes to sharing of cost, the more members the better.¹¹

Out of their own interest, the Arctic states are fully justified in incorporating or denying extra-regional participants. In this case, it is an option to not accept categorically non-Arctic states in the Arctic governance mechanism. Any candidate member should prove itself to be associated with the club to a very large extent, and its contribution should be greater than its share of interests. Moreover, extra-regional participants should not exert overdue influence on the policy decisions of the regional club, lest Arctic states lose their predominance over regional affairs.

Tactics and Diplomatic Practices of the Arctic States

The Arctic states vary in their thinking regarding whether they should incorporate non-Arctic states, which countries or national organizations should be accepted, and in what way they should be accepted. Relatively speaking, Russia and Canada, the two big powers in the region, attach more importance to sovereignty and demarcation lines in Arctic affairs, while Nordic countries and the United States are more in favor of international cooperation. Former Secretary of State Hilary Clinton used to express discontent with the exclusive meetings arranged by Canada, saying that the tasks of Arctic affairs are so heavy and time is so urgent that broad participation is needed.¹² The Nuuk Ministerial Meeting and the Kiruna Ministerial Meeting have basically formed the tactics of the Arctic Council on how to cope with its relations with important non-Arctic states.

First, on the issues of allocating resource interests, which are also

related to the interests of external actors, the Arctic states have effectively divided the Arctic issues into two levels, national and regional, by treating environmental and climate change issues as international cooperation issues while leaving the ownership of resources at the disposal of national governments, thus successfully preventing non-Arctic states from affecting the allocation of Arctic resources through participating in regional platforms. The Arctic Council thus applies either the form of a formal organization or a form of informal consultation to handle intra-regional relations and interregional relations separately, which can ensure that public goods are provided by extra-regional actors and restrain extra-regional actors from sharing interests.

Second, the Arctic Council raised the threshold and separated the rights of Arctic states from the rights of non-Arctic states to ensure policy exclusiveness, and in the meantime prevented non-Arctic states from organizing alternative mechanisms in the case of being denied. The alternative mechanism outside of the Arctic would have confronted the intra-Arctic regional mechanism. "Except for other reasons, the non-Arctic states will manage to establish an alternative forum if the East Asian countries are denied formal observatory status," said Alexander Sergunin, a Russian scholar, when talking about Russia's change of position in the last minute agreeing to accept East Asian countries as formal observer states.¹³ Thus, the Arctic states finally decided to handle the issue of non-Arctic states' participation in Arctic affairs by granting limited access and discriminatory rights.

The Ministerial Meeting of the Arctic Council in 2013 passed the Kiruna Declaration, which welcomed the non-Arctic states of China, South Korea, and so on to become formal observer states, and emphasized the responsibility of the observer states to contribute through their provision of scientific and expertise knowledge, information and financial support.¹⁴ The Observer Manual released at the meeting made it clear, "Decisions at all levels in the Arctic Council are the exclusive right and responsibility of the eight Arctic states with the involvement of the Permanent Participants. All decisions are taken by consensus of the Arctic states. The primary role of observers is to observe the work of the Arctic Council. Furthermore, observers are encouraged to continue to make relevant contributions through their engagement, primarily at the level of working groups."¹⁵ This dichotomy is apparently aimed at restricting non-Arctic states' participation in the decision-making process of regional governance, and at the same

time encouraging external contributions to the areas mentioned above.

These documents and the Observers' Manual have clarified the relationship between the Arctic and non-Arctic states, and specified the standards, methods and paths of introducing external influence.¹⁶ Before becoming observer states, non-Arctic states have to recognize the sovereignty and jurisdiction of Arctic countries, and they must not put forward governance proposals that transcend the policy goals of the Arctic states and Permanent Participants. They must not challenge the legal framework that is already established and recognized by the Arctic Council, and they must respect the culture, interests and values of the Arctic region. Obstacles to the observer states are designated at the operational level as well. Firstly, the participation is indirect, i.e., the bill of an observer state must be submitted indirectly through the Arctic countries. Secondly, the influence is ceilinged, i.e., contributions of project funding must not be larger than those of the Arctic countries. Thirdly, their identity is passive in that the participation status is non-permanent or needs to be reappraised periodically, which can be used to weaken the influence of the non-Arctic states in the Arctic and their legitimacy of participating in governance.¹⁷ By admitting non-Arctic states' participation in this way, the Arctic Council has reached its dual goals of restriction and exploitation, and effectively enhanced the importance of the Arctic in global politics.

THE RESPONSIBILITY OF NON-ARCTIC STATES WHILE PARTICIPATING IN ARCTIC AFFAIRS

As non-Arctic states gain connectivity with the Arctic, they should assume the global responsibility of maintaining environmentally friendly and sustainable development and keeping the peace in the Arctic region.

Non-Arctic States' Participation: Do Favors for the Goals of Governance

Incorporating non-Arctic states into the Arctic Council is determined by the needs of Arctic governance and the trends of world development. Taking China as an example, at the global level, it is a global economic power, a permanent member of the UN Security Council, a signatory to UNCLOS, and an important constructor of many international regimes of

environmental protection. This status means that China can play a leading and coordinating role in peacekeeping, rationally handling contradictions between national sovereignty and the common heritage of humankind, balancing between interests of the Arctic states and those of the non-Arctic nations, and protecting the fragile Arctic environment and common home of humankind.

Moreover, important non-Arctic states can help to provide the public goods necessary for Arctic governance, which can play a direct role in fulfilling the tasks of governance. China is highly valued by some Arctic states for its capital, market and capabilities in infrastructure construction. The international scientific community regards Chinese polar scientists as an important contingent in addressing polar scientific conundrums. Since Arctic governance needs a system involving land-based, marine, aerial and space technologies to monitor and prevent outbreaks of incidents, China is exactly one of the few countries equipped with those technological systems needed to provide public goods for Arctic R&D and economic activities. The president of Iceland, Olafur R. Grimsson, said in the 2nd China-Nordic Arctic Cooperation Symposium that how wide the table of the Arctic Council is depends on the observer's knowledge and understanding about the Arctic, and it also depends on the scientific contributions from the observer states.

How Do Non-Arctic States Substantiate Their Self-Interest and Bear Their Responsibility?

Although non-Arctic states do not have jurisdiction over territories and territorial seas in the Arctic region, they can enjoy rights ruled by international laws. Oran R. Young, the internationally famous theorist of governance, has claimed that non-Arctic states have rights to a variety of uses of the Central Arctic Ocean (e.g., rights to navigation, high seas fishing, laying submarine cables, and overflights).¹⁸

As an emerging power that accounts for one-sixth or more of the global population, China is also an important market for Arctic economies. As a big trade power in the northern hemisphere, the legal system of maritime navigation bears directly on China's navigation interest. Any change in the nature of the Arctic region will have an impact on the sea waters and the climate of China's periphery. Therefore, Arctic scientific exploration and research will exert far-reaching impacts on China's economy and

development of science and technology. More and more Arctic countries recognize China as “an Arctic stakeholder”. They are looking forward to more contributions to Arctic affairs from China.¹⁹

Although non-Arctic states enjoy some legitimate rights in the Arctic, the Arctic states are alert to any non-Arctic states’ claims regarding their interests in the Arctic, and in particular, they are suspicious of the rapid economic rise of China. In this circumstance, non-Arctic states should not pursue their interests in the Arctic region only by resorting to their own interests and abilities, but rather by resorting to the reconciliation between international mechanisms and domestic policies. As for its role in Arctic affairs, China should seek an adjustment among three variables: the Arctic countries’ expectations and definition of China, the non-Arctic countries’ expectations and definition of China, and China’s definition of itself, seeking commonality in the contradictions. Seeking common interests, reducing conflicts of interest and creating new shared interests require cautious and correct assessment of the change of the natural environment and the change of the politico-economic order in the Arctic region and full exploitation of the existing international mechanisms to acquire and protect legitimate interests.

In participating in Arctic affairs and realizing its interests in the Arctic, China should observe the principles of the three “follows”: follow the cardinal principles of international law; follow the trends of economic globalization; and follow the necessity of bilateral links between China and relevant countries. While China is enjoying the rights of participating in Arctic affairs and acquiring relevant rights according to existing international laws, it should also assume the global responsibility of keeping the peace and maintaining environmentally friendly, sustainable development in the Arctic region.

The major non-Arctic states’ responsibility in the Arctic should be carried out on multiple levels. First, they should assume big country responsibility at the global level, such as responsibility in global organizations like the United Nations to make their own contribution to Arctic environmental governance, climate change and ecological protection, and insist on the importance of environment protection and oppose any exploitation at the cost of the environment. Second, they should play a positive role in regional Arctic organizations, strengthen ties and communication with governance organizations such as the Arctic Council, and highlight the necessity of the non-Arctic states’

participation. They should also increase the vigor of their participation in domains and functional issues of navigation, environmental protection, tourism and resource exploration, in order to allow future mechanisms and arrangements to take into account global interests, non-Arctic states' interests, and the interests of the big traders from other parts of world. Third, as cooperators in the Arctic, they should pay great attention to social responsibility while conducting economic and science and technology cooperation with the Arctic countries. Besides realizing win-win bilateral interests, they should demonstrate humanitarian and environmental concerns in the host countries in connection with investment and cooperation, especially the concerns shared by the indigenous people.

LOOKING FORWARD TO THE PUBLICATION OF CHINA'S ARCTIC POLICY

It takes a long time, even for Arctic nations, to form a strategy such as a Northern Strategy, the High North Strategy, or the Arctic Strategy. So it is also a time-consuming process for China to formulate its Arctic policy. This explains why China has launched many policy research projects and many bilateral dialogues with the Arctic nations. There is some preparatory work that should be done domestically and internationally. China's Arctic work relates to foreign policy, marine governance, transportation, science and technology, weather, energy and other aspects that require all departments to form a cohesive program. In 2011, the Chinese government established a coordination mechanism to deal with Arctic issues. The main task of this coordination mechanism is to exchange information and to analyze the evolution of the Arctic situation. Since it was established, this mechanism has played a positive role in promoting information sharing, in integrating various practices, and laying a sound foundation for forming China's Arctic policy in the future. As Jia Guide and Shi Wuhong observe, after comprehensive research and all-round dialogues with the Arctic nations and related organizations, China should introduce its policy on Arctic issues in the form of a timely white paper.²⁰ The timely introduction of China's Arctic policy can provide correct guidance for related work in domestic coordination. It can facilitate the transparency of China's strategy and policy and help the international community to understand China's activities and enhance mutual trust. "China's voice on the Arctic" will

emphasize its contribution to the fields of Arctic research and environmental protection to guide the international community to understand its Arctic policy as moving from “benefit oriented” to “contribution oriented” and to create a favorable environment in international public opinion.

Notes

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8. Japan's Arctic Policy

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INTRODUCTION

Compared to those of China and South Korea, Japan's Arctic policy is harder to recognize. Nevertheless, Japan has been involved in the Arctic region for many years (Tonami and Watters 2012). The question whether Japan has an Arctic policy or not depends on the meaning of the term "policy." If policy means the publication of a formal Arctic strategy, Japan does not have one. But if we understand the term as the pursuit of goals and actions to achieve the goals based on national resources, Japan's Arctic policy exists.

Although Japan had not a number of footprints in the Arctic in the past, the big ice-melt in the Arctic Ocean prompted several government ministries to begin making their agendas relevant to changing Arctic developments. By sketching this process of defining Arctic interests for Japan at ministerial levels, Ohnishi argued that Japan's approach to the Arctic region transformed from involvement, or less active and sporadic actions, to engagement or more focused actions (Ohnishi, 2014). However, this picture of Japan's Arctic policy changed when the government adopted the Basic Plan of Ocean Policy (which was the second version under the Basic Act of Ocean Policy) in April 2013, in which Arctic-related measures were stipulated.

This second Basic Plan was significant because it was the first document at the cabinet level to recognize the Arctic Ocean as an ocean where the government needed to take action. In addition, the Basic Plan designated goals and measures to be taken in relation to activities in the Arctic Ocean. On the other hand, most of the measures were not new. Instead, the plan demonstrated linkages among existing measures. No studies have analyzed the impact of the 2013 Basic Plan on Japan's Arctic policy, so providing an evaluation in this sense is one of the motives of this article.

Taking into account the discussion above, this article's main goal is to

examine the strategy embedded in the Arctic policy of Japan. In doing so, it employs an analytical framework consisting of three pillars: diplomacy, science, and business. The three pillars are important because they have constituted the driving forces behind Japan's Arctic policy. This article analyzes each pillar's consistency and inconsistency in Japan's past and current Arctic policy. In addition, it considers the prospects of each pillar based on the current trends.

In the next section, the article argues that the three pillars emerged in the period prior to the millennium. In the third section, it deals with the Basic Plan on Ocean Policy. Within this section, the article first explains the process of the formulation of the Basic Plan. It then examines both perceptions regarding Arctic affairs in the Plan and measures related to Arctic affairs by making a clarification based on the three pillars. In addition, this section argues that there are emerging linkages among the three pillars. These linkages reveal the strategy of Japan's Arctic policy in the plan. The fourth section examines the prospects of Japan's Arctic policy in the pillars of business and diplomacy, where recent trends are identified. In the conclusion, based on the above discussions, the article demonstrates a clear view on the strategy in Japan's Arctic policy by describing each pillar's features judged from the following points: 1) main actors, 2) traditional or not, 3) driving forces, 4) the degree of emphasis in the second Basic Plan, 5) linkages, and 6) prospects. The main finding of the article is that the observable strategy or longstanding plan in Japan's Arctic policy that emerged in the 2013 Basic Plan is pursuing business opportunities in the Arctic through improving scientific knowledge and enhancing Arctic diplomacy, or, in other words, promoting the pillar of business by enhancing the pillars of science and diplomacy.

THE FORMATION OF THE THREE PILLARS

The focus of this article is limited to the involvement of governmental entities of Japan before the millennium. Thus, activities other than government actions are excluded from examination. In addition, the reason to make a demarcation before and after the millennium is that there is an obvious difference in the attitudes of actors toward the Arctic. As detailed in this section, ministerial entities in the Japanese government came to deal with an Arctic agenda more actively after the millennium, shifting their

attitudes from involvement to engagement. Furthermore, these activities were not coordinated with each other before the millennium.

The first pillar. The first pillar of the Arctic policy was formed in the sphere of diplomacy when the government signed the Spitzbergen Treaty in 1920 as one of the 14 high contracting parties. The treaty entitled Japan to certain legal rights and obligations, including rights of fishing and hunting in the territories and waters of the archipelago (article 2), liberty of access and entry (article 3), the establishment of an international meteorological station (article 5), and the same treatment (of nationals of the signatory countries) as the nationals of Norway, “with regard to methods of acquisition, enjoyment and exercise of the right of ownership of property, including mineral rights, in the territories” (article 7).

During the Cold War period, the Japanese Ministry of Foreign Affairs (MoFA) had not formulated a position regarding the treaty, and thus these rights were not exercised by Japan at all. However, this practice changed when the Ministry of Education, Culture, Sports, Science and Technology (MEXT) began to engage in research in Svalbard.

Since the end of the Cold War, the MoFA has gradually started to engage in international/multilateral coordination in the Arctic. In January 1993, Japan was granted observer status with the Barents Euro-Arctic Council. When the Arctic Council was established in Ottawa in 1996, Japan sent a delegation to attend the meeting as an ad-hoc observer.

The second pillar. The second pillar of Japan’s Arctic policy involves the field of science. Although Japan had engaged in polar science in the Antarctic for more than half a century, its scientific engagement with the Arctic needed to wait until the establishment of the International Arctic Science Committee (IASC), an active nongovernmental organization promoting Arctic research, in which the National Institute of Polar Research (NIPR) joined as a member from 1991. Slightly preceding this event, the NIPR established the Arctic Environment Research Center (AERC) in 1990.

The AERC opened a research station at Ny-Ålesund in Svalbard in 1991. Joining the IASC from 1991, the NIPR began to engage in a variety of national and international research activities in the Arctic. While the NIPR focused on terrestrial fields of research, the Agency for Marine-Earth Science and Technology (JAMSTEC) began marine research in collaboration with the United States. JAMSTEC conducted its first research cruise with the oceanographic research vessel *Mirai* or *future*, in 1998.

Since then, invaluable observational studies have resulted from more than 10 Arctic expeditions organized by JAMSTEC.

The third pillar. The third pillar encompasses the sphere of business. Japan participated in the Kalaallit Nunaat Marine Seismic (KANUMAS) Project from 1990 to 1996. The KANUMAS Project was a seismic reconnaissance survey off the eastern and western coasts of northern Greenland. The Japan National Oil Corporation (now called Japan Oil, Gas and Metal National Corporation, or JOGMEC) joined the project as a member of the major oil companies (BP, ExxonMobil, Shell, Statoil and Texaco) in addition to Nunaoil as a partner and operator. These oil companies hold a preferential exploration position in the areas covered by the seismic surveys (GUES 2005).

A common feature in the formation of all three pillars is that each formed sporadically and involved self-sustained activities. The first pillar dated back to the 1920s, but there was almost no continuation of this pillar by the MoFA until the 1990s. When the Cold War ended, although MoFA sent delegations to the meetings of Arctic regional arrangements such as the BEAC and Arctic Council, these moves were temporary because delegating personnel to the issues was occasional rather than durable. Therefore, the pillar of diplomacy could be seen as traditional and less active.

By contrast, the other two pillars (science and business) have roots in the period of collapse of the Cold War system when international cooperation began to spread in the Arctic region. In this sense, these two pillars were less traditional and more active than the first pillar since observational activities and a seismic reconnaissance survey continued for a certain duration.

THE BASIC PLAN ON OCEAN POLICY AND THE THREE PILLARS

The Basic Plan on Ocean Policy is an action plan under the Basic Act on Ocean Policy, which was enacted in April 2007 and entered into force in July 2007. This act is an outgrowth of the ratification of the United Nations Convention on the Law of the Sea (UNCLOS) in June 1996. The ratification of UNCLOS tasked Japan to adapt itself to the needs of a new type of ocean governance, which is a general tendency in the “post-UNCLOS phase.” In this phase there is a considerable decline in the importance of

national regulations governing ocean affairs. Instead, there is an increasing need for a more flexible and complex governance system, under which a variety of norms and policies are produced one after another and where multiple actors play important roles (Vivero, 169).

To meet the needs of the post-UNCLOS phase, the government was urged to enact a new law bringing in a new type of ocean governance. Under this circumstance, the Ocean Policy Research Foundation, a private think tank promoting the shipbuilding industry and related manufacturing industries, took a leading role, prompting the Diet to adopt new legislation on ocean governance by hosting an informal, nonpartisan meeting of parliamentarians called “Kaiyo kihonho kenkyu kai,” or a meeting for the study of the Basic Ocean Act, in April 2006.

Under these circumstances, it was no coincidence that the foremost role envisaged in the act was to “clarify the responsibilities of the state, the local governments, business operators and the citizens” (Art. 1). In realizing this role, the act also stipulated the need to “formulate the basic plan with regard to the oceans and other basic matters with regard to the measures on the oceans” (Art. 1). The basic plan is an action plan to realize six general principles through implementation of the 12 basic measures stipulated in the act. The six general principles are: 1) “harmonization of the development and use of the oceans with the conservation of the marine environment” (Art.2), 2) “securing safety and security on the oceans” (Art.3), 3) “improvement of scientific knowledge of the oceans” (Art.4), 4) “sound development of ‘Ocean Industries’”¹(Art.5), 5) “comprehensive governance of the oceans” (Art.6), and 6) “international partnership with regard to the oceans” (Art. 7). The 12 basic measures are: 1) “promotion of the development and use of ocean resources” (Art.17), 2) “conservation of the marine environment, etc.” (Art.18), 3) “promotion of the development of the exclusive economic zone, etc.” (Art.19), 4) “securing maritime transport” (Art.20), 5) “securing the safety and security of the oceans” (Art.21), 6) “promotion of ocean surveys” (Art.22), 7) “promotion of research and development of ocean science and technology, etc.” (Art.23), 8) “promotion of ocean industries and strengthening international competitiveness” (Art.24), 9) “integrated management of the coastal zone” (Art.25), 10) “conservation of the remote islands, etc.” (Art.26), 11) “securing international coordination and promotion of international cooperation” (Art.27), and 12) “enhancement of citizen’s understanding of the oceans, etc.” (Art.28).

In addition, “(I)n order to promote measures with regard to the oceans intensively and comprehensively,” the Headquarters for Ocean Policy (hereafter the Headquarters) was established in the cabinet (Art. 29). The items that the Headquarters will take charge of are: 1) “matters with regard to drafting and to the promotion of execution of the Basic Plan on Ocean Policy,” 2) “matters with regard to synthesis coordination of measures of implementation by relevant administrative bodies based on the Basic Plan on Ocean Policy,” and 3) “matters with regard to planning and drafting of important measures with regard to the oceans as well as synthesis coordination” (Art. 30). The Headquarters consists of “the Director-General of the Headquarters for Ocean Policy, the Vice Director-Generals of the Headquarters for Ocean Policy, and Members of the Headquarters for Ocean Policy” (Art. 31). The post of director-general of the Headquarters for Ocean Policy is served by the prime minister (Art. 32), and the vice director-generals by the chief cabinet secretary and the minister for ocean policy (Art. 33). The other members of the Headquarters for Ocean Policy are all ministers (Art. 34).

THE ADOPTION OF THE NEW BASIC PLAN ON OCEAN POLICY

In March 2008, the first Basic Plan for five years was adopted. The first plan stipulated the 12 basic measures in accordance with the Basic Act on Ocean Policy. What is important to note here is that there was no reference to Arctic issues in the first plan. However, the profile of the first plan was changed when it was replaced by the second one. After the five-year tenure of the first plan ended, a meeting of the Headquarters decided on the second Basic Plan on Ocean Policy in April 2013. The reason that the Arctic was included in this plan was a change in the perception of social circumstances surrounding the sea, which also became a main foundation for the adoption of the second plan. While this plan evaluated that ocean measures had been “implemented at a nearly steady rate in accordance with the Basic Plan on Ocean Policy,” it also stipulated that “the measures to be promoted intensively under the plan will (would) be clarified in consideration of the changes in social circumstances surrounding the sea” (The government of Japan, 5). The new governmental perception of the changes in social circumstances includes a “review of energy strategy and disaster-prevention

countermeasures after the Great East Japan Earthquake, mounting expectations for development and use of the sea, changes in international circumstances surrounding conservation of marine interests and other changes in social circumstances, etc.” (ibid., 5-6). Under these social circumstances, the plan showed a new vision of Japan as an oceanic state. This vision of an oceanic state consisted of four elements: 1) international cooperation and contributions to the international community, 2) wealth and prosperity through ocean development and utilization of the sea, 3) from a country protected by the sea to a country that protects the sea, and 4) venturing into the unexplored frontier (ibid., 1-2). Toward the realization of these visions, the second plan demonstrated both 1) the six measures to be intensively promoted in the coming roughly five years, and 2) the seven basic policies of the measures to be implemented in the coming years, with medium- and long-term perspectives occasionally taken (ibid., Chap.1). Then, specific ocean measures that need to be comprehensively and systematically promoted in the coming five years, including measures to be taken in a focused manner and to be taken with close cooperation among related agencies, were stipulated for each of the 12 basic measures set forth in the Basic Act on Ocean Policy (ibid., Chap.2). Finally, matters necessary for comprehensively and systematically promoting ocean measures, such as a review of the Headquarters for Ocean Policy, were also stipulated (ibid., Chap.3).

PERCEPTIONS REGARDING ARCTIC AFFAIRS IN THE BASIC PLAN

With regard to the Arctic, what was decisive was the inclusion of Arctic affairs in the perception of the changes in social circumstances surrounding the oceans. The second plan mentioned the Arctic region under “other changes in social circumstances.” Specifically, the plan stated that:

“Given changes in the Arctic Ocean caused by climate change, including the decline of sea ice extent, global concern has been mounting over the impact of such changes on the global climate system and potential for use of Arctic Sea Route. In Japan, there have been expectations for promotion of research and survey activities with regard to the Arctic and reform in maritime transport by a reduction of transportation costs. Other trends are

observed as well, such as changes in the ocean environment attributed in part to global warming and ocean acidification, a rapid shift of Japanese consumers from fish amid growing demand for fishery products in the rest of the world, and increase and changes in the distribution of goods via the oceans associated with the remarkable economic development of East Asian countries” (ibid., 6).

As is apparent in the quote above, the mode of recognition of the Arctic Ocean was categorized as “other” changes, implying something that was a remnant, and less important than those changes relating to the “Great East Japan Earthquake,” “development and use of the sea,” and “changes in international circumstances surrounding the conservation of marine interests.” This weak tone in the perception of Arctic affairs was consistent through the entire plan. However, it is important to note that this was the first time that Arctic affairs were, even noted explicitly in an official document at the cabinet level.

Based on this perception, the Arctic Ocean is considered among others to deserve measures to be “intensively” promoted under the plan. However, there were also differences in terms of priorities among the measures. The measures related to the Arctic Ocean again were categorized as “other important measures to be promoted intensively,” following the other five measures.² The category of “other important measures to be promoted intensively” consists of two parts: disaster control and environmental measures after the Great East Japan Earthquake, and measures responding to changes in the Arctic Ocean caused by climate change. The latter part in the plan reads as follows:

“Given the changes in the Arctic Ocean caused by climate change, Japan has been facing diverse issues to study and address, such as securing maritime transport, securing navigation safety, promotion of research and survey activities, conservation of the environment, and promotion of international coordination and cooperation. Comprehensive and strategic measures should therefore be promoted to tackle these issues” (ibid., 8).

Although the emphasis on the Arctic was not as strong as on other measures, this quote was significant because it showed that the plan

recognized the need to tackle issues comprehensively and strategically, such as securing maritime transport, securing safety of navigation, promotion of research and survey activities, conservation of the environment, and promotion of international coordination and cooperation in the Arctic Ocean. In this sense, this part constituted a sure footing for the Arctic policy of Japan at the cabinet level.

When it comes to the basic policies or directions of the measures to be implemented with medium- and long-term perspectives, the measures related to the Arctic were referred to in the categories of both “improvement of scientific knowledge of the oceans” and “sound development of marine industries.” In the former part, the plan says that “observations, surveys and research on the Arctic, Antarctic and other areas are important for assessing the impact of climate change and future projections on the global scale and in Japan and areas around it” and that “(A)bove all, observations, surveys and research on the Arctic will lead to an assessment of the potential for future use of the Arctic Sea Route, so the government should continue such activities” (*ibid.*, 11). In the part about sound development of marine industries, the plan stipulated that “measures aimed at future use of the Arctic Sea Route should also be accelerated” (*ibid.*, 11).

THE PILLAR OF SCIENCE

In chapter 2 of the act, a careful reading reveals that there are a number of measures intended to improve scientific knowledge of the Arctic region. As a measure for research and development related to forecasts and adaptation to global warming and climate change, the plan suggested to “promote observations, surveys, research and other activities in regions considered to have a great impact on Japan’s climate, such as the Arctic region, Kuroshio region, and the Antarctic region, including the Southern Ocean” (*ibid.*, 35). In conjunction with forecasts and adaptation to global warming and climate change, the plan especially recommended to “implement observations, surveys, research and other activities in the Arctic region by taking into account the fact that global interest in use of the Arctic Sea Route has recently been growing due to melting of Arctic sea ice as a result of warming” (*ibid.*). The plan more obviously proposed to “conduct experimental tests to create sea ice flash charts for safe navigation along the Arctic Sea Route by using sea ice observation data collected by satellites

such as the Water Circulation Change Observations Satellite (GCOM-W) and Advanced Land Observing Satellite-2 (ALOS-2)”(ibid., 34, 39). Along with the creation of sea ice flash charts, the plan also emphasized coordination among related ministries to “implement demonstration experiments to understand the situation of ship navigation in marine zones, including outer sea marine zones, by using a satellite equipped with automatic identification system (AIS) receivers”(ibid., 39).

Regardless of the areas of its applications, in order to secure marine safety, comprehensive marine management and other activities, the plan stressed to “take into account the progress of the development of satellite infrastructure both in Japan and overseas” (ibid.). These suggestions made by the plan were in line with what the Ministry of Education, Culture, Sports, Science and Technology (MEXT) had been conducting since 2005. In February 2005, MEXT established the Earth Observation Facilitation Committee, under which, in order to make its arrangements more organizational and effective for Arctic research and observation, the Working Group of Arctic Research Examination was established. The working group submitted an interim report in August 2010. The report suggested the establishment of a consortium for Arctic environmental research and the facilitation of research and observation on impacts of climate change in the Arctic. As to the first suggestion, the Japan Consortium for Arctic Environmental Research was founded as a platform for coordinating the Arctic research activities of Japan in May 2011. In the next month, responding to the second suggestion, MEXT also initiated the Green Network of Excellence (GRENE), under which the five-year Arctic Climate Change Research Project was funded. The GRENE Arctic Climate Change Research has been directed by a subcommittee on Arctic Strategic Research, which was set up in February 2011 as the succeeding body of the Working Group of Arctic Research Examination. The GRENE Arctic Climate Change Research has seven projects: 1) improvement of coupled general circulation models based on validation of Arctic climate reproducibility and on mechanism analyses of Arctic climate change and variability, 2) change in the terrestrial ecosystems of the pan-Arctic and effects on climate, 3) atmospheric studies on Arctic change and its global impacts, 4) the role of the Arctic cryosphere in global change, 5) studies on greenhouse gas cycles in the Arctic and their responses to climate change, 6) ecosystem studies on the Arctic Ocean’s declining sea ice, and 7) projection of sea ice distribution and Arctic sea routes. These projects are ongoing

now and are expected to produce meaningful results. In this regard, the measures stipulated in the plan were a sort of governmental confirmation of the measures currently directed by MEXT rather than a sort of proposal to initiate new measures, although its emphasis on further utilization of the progress of development of satellite technology seemed to be a suggestive message to be put into practice.

Judging from the weight accorded to the field of science in the plan, it is fair to conclude that the driving force behind the plan to include Arctic-related measures was first of all to foster Arctic-related science. The reason emphasis was placed on science was the fact that scientific knowledge would serve the interests of Japan, ranging from its concerns about the impact of climate change and global warming to those of potential business opportunities. Therefore, science itself could be seen as a main driving force letting the plan expand its considerations to include the Arctic region, and thus constituted a pillar in the Arctic measures under the plan. Science as a pillar fit with the plan's emphasis on the improvement of scientific knowledge.

THE PILLAR OF BUSINESS

In the second plan there was a tendency to place a lesser emphasis on other issues than science. The fourth section, "Securing Maritime Transport" in chapter 2 of the plan encouraged efforts to "promote talks with relevant countries on the possibility of use of the Arctic Sea Route, which has recently been attracting interest, and under coordination with shipping operators, shippers and other parties, examine the possibility of the opening of shipping routes, technological issues, economic issues and other challenges" (*ibid.*, 26).

This statement matched the practice recently initiated by the Ministry of Land, Infrastructure and Transport (MLIT). MLIT set up a board in August 2012 with the purpose of examining the feasibility of the Northern Sea Route (NSR) and logistics for Japanese shipping companies, including ports in the northern part of Japan. MLIT conducted an on-site inspection in Russia in 2013 in order to gather basic information on the NSR.³ This move was a kick-off activity, which was followed by the establishment of a Public-Private Partnership Council for the Northern Sea Route in May 2014, consisting of both the public sector, such as governmental ministries,

and the private sector, including shipping companies, trading companies, electric power companies, etc. The purpose of the Council was to inform Japanese ship operators and shippers of information on the NSR, and thus to facilitate the entry of Japanese companies into Arctic businesses.⁴

Although efforts made by MLIT were a rather new phenomenon compared to those by MEXT, which entail a decade-long effort, promotion of use of the Arctic Sea Route was also a distinct idea that clearly differed from ideas in the pillar of science. The driving force behind the promotion of use of the Arctic Sea Route could be seen as a governmental initiative in pursuit of economic opportunity, which had been newly brought about as a result of the seasonal retreat of the sea ice in the Arctic Ocean. Therefore, although the plan's idea of seeking economic advantages is limited only to maritime industries or the shipping industry, this element could be seen as part of the pursuit of economic opportunity, namely a pillar of business.

What was surprising in the plan regarding the pillar of business was its exclusion of references to exploration for oil and gas in the Arctic Ocean. After completing the KANUMAS Project in 1996, the Greenland Petroleum Exploitation Co. Ltd. (GreenPeX), co-established by several Japanese leading companies in May 2011 under the initiative of JOGMEC, won exploration licenses at the Unimmak and Nerleq oil fields from the government of Greenland in December 2013. The main reason for this exclusion was that the plan intentionally limited the range of development of marine energy resources to the surrounding marine zones of Japan, where the government saw a higher possibility of abundance of petroleum and natural gas (*ibid.*, 23–16).

THE PILLAR OF DIPLOMACY

When it comes to the pillar of diplomacy, the plan included two stipulations. The first one was about the Arctic Council. The plan simply states that “the government should make concerted efforts to gain observer status at the Arctic Council” (*ibid.*, 53). The second stipulation demanded that “Japan should actively promote international cooperation for marine observations conducted in coordination with related agencies of Japan and other countries, including bilateral cooperation based on agreements on cooperation in science and technology, etc. in order to promote marine observational research with a view to assessing the impacts of atmospheric

fluctuations in the Arctic, Pacific and Indian oceans on the environment, which have been drawing increasing attention globally” (ibid.).

In terms of the first stipulation, this had been the main agenda for MoFA since Seiko Hashimoto, the senior vice minister of MoFA, formally mentioned Japan’s application for observer status with the Arctic Council at the ministerial meeting of the Antarctic Treaty-Arctic Council Joint Meeting in Washington, D.C. This statement was followed by MoFA with an official application for observer status with the Arctic Council in July 2009. Before and after this application, MoFA started to arrange inter-sectional responses within the ministry.⁵ After some consideration, MoFA established an Arctic Task Force, which is an inter-sectional gathering within the ministry, in September 2010. As a part of its efforts to gain observer status at the Arctic Council, the senior vice minister of MoFA attended a meeting between the Arctic Council’s Swedish chair and the Council’s observers and ad hoc observers in Stockholm, Sweden in November 2012. To facilitate Arctic diplomacy, MoFA in March 2013 appointed an ambassador of cultural exchange to be concurrently appointed in charge of Arctic affairs. As a result of these efforts, Japan was admitted to observer status with the Arctic Council at the eighth Ministerial Meeting of the Arctic Council in Kiruna, Sweden in May 2013, which was a month after the adoption of the second Basic Plan. Therefore, the first stipulation became a reality.

LINKAGES AMONG THE THREE PILLARS

As observed above, most of the measures related to the Arctic stipulated in the plan had their foundation in the existing measures taken by ministries before the adoption of the second plan. Rather than stipulating new measures, the plan gave the existing measures a more authoritative status. Meanwhile, the significant contribution of the plan was to give order to Japan’s previously sporadic and fragmented Arctic policy in order to regulate the relationship among the three pillars. In other words, the plan for the first time introduced linkages among the three pillars.

There were two obvious linkages in the plan. The first was a linkage between the pillars of science and business. In the sphere of science, observations, surveys, and research were first of all considered for the sake of forecasts and adaptation to global warming and climate change (ibid. 39). But at the same time, the plan recommended that these scientific

activities be connected to future use of the NSR, including experimental tests to create sea ice flash charts for safe navigation, and demonstration experiments for the AIS system (*ibid.*, 39). In short, the pillar of science encompasses both the improvement of scientific knowledge itself and increasing business opportunities.

The second linkage comes between the pillar of diplomacy and science. In the pillar of diplomacy, there were two stipulations. The first was to gain observer status, and the second was to promote international cooperation. As the first mission has already been achieved, only the second remains. In terms of the second stipulation, the plan clearly noted that “Japan should actively promote international cooperation for marine observations... including bilateral cooperation based on agreements on cooperation in science and technology...in order to promote marine observational research with a view to assessing the impacts of atmospheric fluctuations in the Arctic, Pacific, and Indian Oceans on the environment, which have been drawing increasing attention globally” (*ibid.*, 53). The remaining mission in the field of diplomacy was supportive in nature for the sake of the pillar of science.

Summing up these linkages, there was an emerging strategy or long-term emphasis in the plan. The first element in this strategy was to poise each pillar as self-sustained. The second element was to use the pillar of science for the pillar of business. The third element was to make efficient use of the pillar of diplomacy for the pillar of science. The considerations on the strategy will be summarized in the conclusion.

PROSPECTS FOR THE PILLAR OF BUSINESS

With regard to the pillar of business, features in the plan were both its emphasis on the use of the NSR and the exclusion of Arctic-related exploration of petroleum and natural gas. However, when it comes to business opportunities more generally, there is a vast potential in the Arctic. The past practices conducted in the pillar of business had been limited to exploration for petroleum and natural gas, as in the case of the KANUMAS Project, and maritime transport as in the plan.

There is a prospect to expand the pillar of business into the terrestrial dimension. In October 2013, the Ministry of Economy, Trade and Industry (METI) set up the Public-Private Coordination Meeting for Promoting the

Japan-Russia Relationship in order to facilitate bilateral cooperation, which a focus on the Far East and East Siberia. This was one of the results from a joint statement on the Development of the Japanese-Russian Partnership, which was reached at the Japan-Russia summit meeting on April 29, 2013.

In addition, following the Japan-Russia summit, the minister of METI visited the Russian Federation. During his visit, the minister had meetings with his Russian counterparts, the Minister of Economic Development, Minister for the Development of the Russian Far East, and the Minister of Energy, respectively. The main object of his visit was to further advance the projects and other initiatives that were discussed at the summit meeting in April 2013 (METI). Furthermore, METI and the Public-Private Coordination Meeting for Promoting the Japan-Russia Relationship organized the Japan-Russia Investment Forum in Tokyo in March 2014, with 450 Russian business leaders and the same number of Japanese leaders. Topics included cooperation in the field of 1) the urban environment, 2) the automotive industry, including its supporting industries, 3) local municipal economic exchanges, 4) agricultural business, 5) medical services, 6) small and medium enterprises and 7) economic zones and industry (the Russian-Japanese Organization for Trade and Investment Promotion). These developments give plausibility to the strengthening of the current measures taken by METI in the Arctic region. When this happens, the pillar of business will be more comprehensive and advantageous.

PROSPECTS FOR THE PILLAR OF DIPLOMACY

In the pillar of diplomacy, there are also new trends. MoFA now seems to be developing an Arctic channel by a bilateral approach rather than through multilateral ones with the Nordic and Baltic eight countries (NB8). When Japan and the NB8 had a meeting at the foreign minister level on the occasion of the ASEM conference in New Delhi, India in November 2013, Arctic affairs were discussed among other topics (MoFA). In addition, the Embassy of Japan in Finland organized an on-site inspection of Arctic areas in June 2014, with members from governmental agencies, international corporations, and researchers.⁶ The significance of this move should not be exaggerated because these are merely signals which may or may not continue in the future. What is plausible is that there is a possibility of MoFA taking a supportive role in developing the pillar of business,

especially the dimension of terrestrial business in the Arctic region.

CONCLUSION

This article has provided a holistic view of Japan's past and current Arctic policy, which has developed through the formation of three pillars. The features of these pillars can be summarized based on the following points: 1) main actors, 2) traditional or not, 3) driving forces, 4) the degree of emphasis in the second Basic Plan, 5) linkages, and 6) prospects. (See Table II-3)

Table II-3. Evaluation of the three pillars

	The pillar of diplomacy	The pillar of science	The pillar of business
Main actors	MoFA	MEXT, NIPR, JAMSTEC	MLIT, JOGMEC
Traditional	More	Less	Less
Driving forces	Acquisition of AC's observer status	Improvement of scientific knowledge	Pursuit of business opportunity
Emphasis in the second basic plan	Weak	Strong	Medium
Linkages	Supportive to the pillar of science	Both Self-sustained and supportive to the pillar of business	Self-sustained
Prospects	Possibility to expand	Status quo	Possibility to expand

The pillar of diplomacy has been developed by MoFA. It is traditional in the sense that the 1920 Spitzbergen Treaty was the oldest root in the involvement of the government of Japan in the Arctic. However, it had lacked a policy following the treaty until the 1990s. Since then, the driving force in this pillar had mainly been the acquisition of observer status with the Arctic Council, which was achieved in May 2013, just one month later after the decision of the second Basic Plan was made. In the second plan, the main role of this pillar was emphasized mainly in support of the other pillars. The pillar was considered actively to promote international cooperation for marine observations in the pillar of science. However, there are prospects for expanding to build bilateral approaches through the multilateral dialogue with the NB8. This may reinforce the pillar of

business.

The pillar of science is less traditional compared to the pillar of diplomacy since most of its activities began in the 1990s. Its main actors have been MEXT, NIPR and JAMSTEC. These three take a leading role in the current GRENE Arctic Climate Change Research. The driving force within the pillar has been the improvement of scientific knowledge, which was centered on Arctic-related measures in the Basic Plan. In this sense, the pillar of science has been the core of the Japan's Arctic policy. In terms of linkages, the second plan clearly stipulated, rather than promoting itself, to promote the pillar of business, namely future use of the Arctic Sea Route, by conducting experimental tests for sea ice flash charts and the AIS system. The prospects of this pillar are in maintaining the current status quo rather than initiating new activities.

The pillar of business, beginning with the KANUMAS Project in the 1990s, is less traditional than the pillar of diplomacy. The main actors are the Japan Oil Corporation or JOGMEC and MLIT. This pillar is becoming thick after MLIT constituted its own Arctic agenda in 2012. The increasing importance of this pillar can be observed in the fact that the pillar of science was called on to promote this pillar in the plan. As to its prospects, there is an increasing possibility that METI will become an important actor within the government in terms of the pillar of business.

So far, how do we perceive the strategy of Japan's Arctic policy as a whole? Based on the fact that there has been no independent formulation of an Arctic strategy or Arctic policy, hints are in the relationship of the three pillars. As this article shows the formation of three pillars resulted from sporadic and self-sustained projects taken by several ministries and semi-governmental entities. Therefore, in the period before the second plan was adopted, it was hard to see a common and consistent strategy throughout the three pillars. However, these three have been important driving forces developing Japan's Arctic policy.

The decisive step in terms of a strategy was taken with the inception of the second Basic Plan on Ocean Policy, although the impact of the Basic Plan should not be exaggerated, since the portions on Arctic-related measures were categorized as "remnants" compared to the agenda for other than Arctic affairs. Taking note of this weak foundation in the plan, this article examined the three pillars in the plan and revealed the linkages among the three pillars. With these linkages, it is possible to contend that the plan produced a strategy for Japan's Arctic policy. The main features of

the strategy are:

- to maintain each pillar as self-sustained,
- to utilize the pillar of science for the pillar of business, and
- to make efficient use of the pillar of diplomacy for the pillar of science.

These three elements are in essence the way in which Arctic policy has been conducted until now and also constitute the main vision for the future. However, since this strategy was defined mainly in the context of ocean policy, it has limited its focus to ocean-related activities. This tendency may change to take into consideration terrestrial dimensions. The promising categories are in the pillar of business and diplomacy. Therefore, it is fair to conclude that with the development of the terrestrial dimension the strategy will be complete, and then the Arctic policy of Japan will have a more sound foundation. The coming years will for nourish the current Arctic Policy toward becoming more balanced and comprehensive.

Notes

1. "Ocean Industries" means those industries bearing on the development, use and conservation of the oceans (Art. 6 of the Basic Act on Ocean Policy).
2. Other measures are: promotion and creation of marine industries; securing safety and security on the oceans; promotion of marine surveys and integration and disclosure of marine-related information; developing human resources and improving technological ability; and comprehensive management of sea areas and formulation of plans.
3. Personal interview with MLIT official, March 28, 2014.
4. Ibid.
5. Personal interview with MoFA official, February 7, 2014.
6. The author participated.

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9. Korea's Arctic Policy

Jong Deog Kim

INTRODUCTION¹

After Korea implemented the “National Development Plans” for modernization in the 1960s, the Korean economy flourished from foreign trade that mainly relied on shipping logistics. Some of the main factors were a lack of natural resources, insufficient domestic demand, and limitation of land transportation with other countries. This economic structure can be found even to this day.

In the 1970s and 1980s, development policies were focused on the heavy chemical industry, leading to growing shipbuilding, steel, construction, and oil refining businesses, and allowing the Korean manufacturing industry to gain the upper hand in international competition. As trade proliferated in the 1990s, social overhead capital such as harbors, airports and telecommunications networks evolved. Busan Port and Incheon Airport grew to become the key bases for goods and transportation in Northeast Asia, and the nation's communication technology (ICT) including the Internet became one of the best in the world. Steady growth continued from the year 2000 in high value-added industries such as semiconductors, telecommunication devices, automobiles, special shipbuilding, etc. Market share in these sectors grew even in new regions such as China, Southeast Asia and South America.

Unfortunately, several key issues remain unresolved, such as the lack of natural resources, an unbalanced energy supply system, and a weakened logistics competitiveness system. Overcoming these problems will strengthen Korean industrial competitiveness and enable a long-term sustainable economy. Therefore, considering Korea's current economic structure, opportunities in the Arctic are significant. It is predictable that Arctic affairs will become a more important national interest for Korea in the future.

Since 2005, some scientific studies have shown that unstable climate conditions and ecosystem changes in Korea and its neighboring seas are closely connected to changes in the Arctic region, which has led to increased

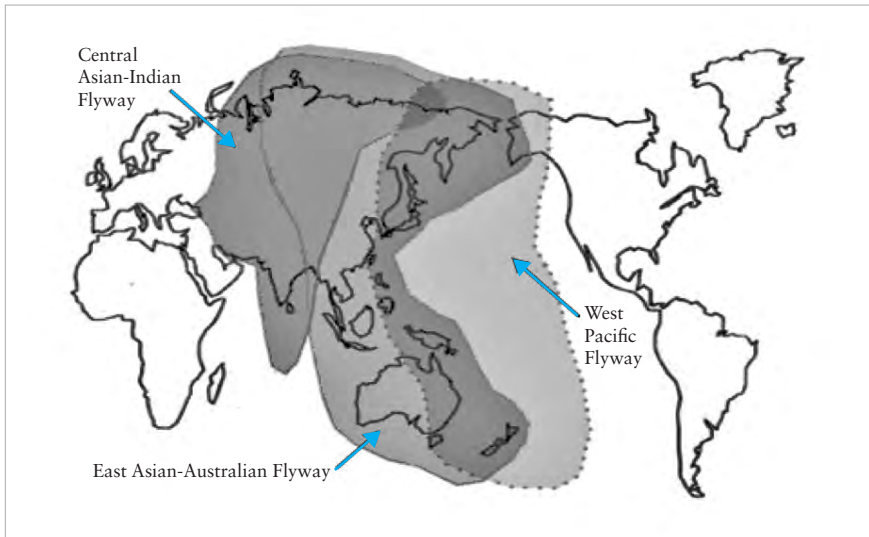


Figure II-3. Asia migratory bird flyways²

concerns about the effects of being geographically located near the Arctic. In particular, abnormal weather during the winter and spring season is affecting agriculture, fisheries, and large ecosystems, posing a long-term threat to natural security.

The climatic, environmental, economic and social changes surrounding the Arctic since the 1990s became a new global challenge in the 21st century. The Arctic Council was founded in 1996 by eight Arctic states and various indigenous groups, and aims to promote environmental protection and sustainable development in the Arctic. Specific action plans have been established since then by the six Working Groups and Task Forces to meet the goals of the Arctic Council.

The drastic shrinking of Arctic sea ice in 2007 and a report from the US Geological Survey in 2008 on resources in the Arctic region initially triggered an immense amount of attention from the world. Ironically, such changes and resources caught the attention not only of the eight Arctic nations, but also Asian countries such as China, Japan, and Korea, which are directly (and indirectly) involved in Arctic issues—climate change, environmental pollution, scientific research, shipping, and economic development—and are also the key global players in meeting technological challenges such as shipbuilding and offshore plant facilities in the Arctic.

In addition, the aforementioned nations play a significant role as

both suppliers and consumers in the areas of resources, construction, telecommunications and the tourism market that are strongly related to sustainable development in the Arctic. The High Seas of the Central Arctic Ocean constitute a zone of free navigation under the UN Convention on the Law of the Sea (UNCLOS), meaning that non-Arctic nations can claim rights as interested parties in some parts of the Arctic Ocean.

Korea pursued a globalization policy due to political democratization during the 1990s. With an underlying policy of national development through an increase in economic activities and sustainable development through green growth, Korea tries to perform its duties as a member of the G20 and of the global community in the 2000s. With the establishment of the Ministry of Oceans and Fisheries (MOF) in 1996, efforts are underway to achieve an integrated ocean policy, including enhancing R&D to create stronger marine science and technology competitiveness and to develop Korea as a hub area of the shipping service industry in Northeast Asia.

The Arctic region poses new challenges—bringing collective benefits through cooperation, sharing responsibility in Arctic environmental protection and sustainable development, and reducing threats using state-of-art technology.

KOREA'S ARCTIC POLICY IN THE PAST

Korea's involvement with the Arctic affairs began with fisheries in the 1960s. According to the records, trawl fishing in the Bering Sea in 1966 was officially the first Arctic-related activity. But under 1994 by the Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea (CBSPC), whose signatories are Korea, the United States, Russia, Poland, China, and Japan signed the treaty, the pollock fishery is suspended unless and until the stocks recover.

In the 1990s, Korea took up the challenge of exploring the North Pole. The AURORA exploration team sought to reach the North Pole, but failed in their first trial in 1990. In the following year, however, the AURORA team reached the North Pole after departing from the Ward Hunt Island in Canada. This was the 11th nation and 18th team to reach the North Pole, and the expedition was aired live on TV through satellite. Reaching the North Pole by the AURORA team created a deep impression on the Korean people regarding the future potential of the Arctic.

Scientific efforts began in the late 1980s. In 1987, the Polar Research Laboratory (PRL) was founded within the Korea Ocean Research and Development Institute (KORDI), and in 1993, Korea participated in an Arctic research project with the Polar Research Institute of China (PRIC). In 1999, Korea joined the Okhotsk marine research effort with the Geological Survey of Japan's National Institute of Advanced Industrial Science and Technology (AIST). In the same year, Korea also joined the Chinese research icebreaker, *Xue Long*, for an Arctic expedition. Solo research by Korea officially took off with the establishment in 2002 of the DASAN Arctic Research Station in Ny-Ålesund on Svalbard where scientists conduct research on climate change and biodiversity and observe the changes in the Arctic. In 2000, as part of the Korean MOF's research program, a joint marine investigation was conducted in the Barents Sea and Kara Sea with Russia's Arctic and Antarctic Research Institute (AARI). In 2002, Korea joined the International Arctic Science Committee (IASC).

The most significant change in Arctic research was brought about by the establishment of the Korea Polar Research Institute (KOPRI) in 2004 and construction of a research icebreaker, the *Araon*, in 2009. KOPRI operates three polar research stations and the *Araon*. Sized at 7,487GRT, the *Araon* can sail at 3 knots in 1 meter of ice and is used in global maritime research in the Arctic and Antarctica. Capable of carrying a 6.1 meter container and 7 meter working boat, the vessel exemplifies Korean polar research.

Responses in the policy field took reached a new level in 2008 when Korea applied for observer status with the Arctic Council. The drastic change in the Arctic sea ice in 2007 raised socioeconomic concerns in Korea. Since then, several research studies have been conducted relating to the Northern Sea Route (NSR) and resource development cooperation. In 2012, Korea acceded to the Treaty of Spitsbergen, and the president of Korea visited Greenland and Norway for the first time to officially announce to the international community Korea's interest in cooperation in the Arctic. In 2013, the new administration also designated Arctic cooperation as one of the key national agenda items. When Korea became an observer in the Arctic Council at the Ministerial Meeting held at Kiruna, Sweden in 2013, it triggered the country to take on a pan-governmental approach to Arctic policy. Previously, only sectoral projects were pursued by each government agency and research institute. The Master Plan (discussed later in this article) is the first integrated policy coordinated

Table II-4. Transits NSR to/vialfrom Korea 2011-2013

No	Vessel	Flag	Cargo	Port Loading	Port Destination
1	Stena Poseidon	Finland	Gas Con.	Vitino, RUS	Incheon
2	Perseverance	Singapore	Naphtha	<i>Yeosu</i>	Le Havre, FRA
3	Mariann	Norway	Gas Con.	Vitino, RUS	Incheon
4	Marilee	Norway	Gas Con.	Murmansk, RUS	Incheon
5	Stena Poseidon	Finland	Jet fuel	<i>Yeosu</i>	Porvoo, FIN
6	Palva	Finland	Gas Con.	Murmansk, RUS	Daesan
7	Marika	Norway	Jet fuel	<i>Yeosu</i>	Porvoo, FIN
8	Marinor	Norway	Gas Con.	Murmansk, RUS	Daesan
9	Stena Poseidon	Finland	Gas Con.	Murmansk, RUS	Daesan
10	Palva	Finland	Jet fuel	<i>Yeosu</i>	Porvoo, FIN
11	Two Million Ways	Cyprus	Gas Con.	Murmansk, RUS	Incheon
12	Marika	Norway	Gas Con.	Murmansk, RUS	Yeosu(?)
13	Ob River	Marshall Is.	Ballast	<i>Yeosu</i>	Montoir, FRA
14	Maribel	Norway	Gas Con.	Murmansk, RUS	Daesan
15	Marinor	Norway	Gas Con.	Murmansk, RUS	Daesan
16	Yong Sheng	Hong Kong	General cargo	<i>Busan</i>	Rotterdam, NDL
17	Vengery	Russia	Reposition	<i>Busan</i>	Murmansk, RUS
18	Propontis	Greece	Gas oil	<i>Ulsan</i>	Skagen, DEN
19	Stena Polaris	Bermuda	Naphtha	Ust-Luga, RUS	Yeosu
20	Zaliv Amurskiy	Cyprus	Gas oil	<i>Onsan(Ulsan)</i>	Rotterdam, NDL
21	Viktor Bakaev	Liberia	Jet fuel	<i>Yeosu</i>	Rotterdam, NDL
22	Zaliv Baikal	Liberia	Naphtha	Ust-Luga	Yeosu

by various governmental agencies rather than a single unified national strategy. The Ministry of Oceans and Fisheries became a leading agency in implementing this Master Plan.

Meanwhile, Korea's observer status with the Arctic Council received much attention by the domestic media. Many of the articles noted, with enthusiasm, that Korea will have the opportunity to participate actively and cooperate with the global society's response to the Arctic and gain economic benefits through access to Arctic resources and the NSR. On the other hand, concerns have also been raised with regard to potential negative effects of Arctic changes on the Korean environment and economy. As risks and challenges in Arctic development were perceived, the role of technological capacity-building in overcoming them became more

prominent.

In the Arctic shipping business, Korea plays a significant role already. Considering the 158 NSR transits from 2011 to 2013, Korea was either the departing or arrival port for 22 of these transits, second only to 25 in the case of China. Korea was already in the fast lane for the first commercial test voyage of the NSR between Ulsan and Rotterdam in 2009 by the Beluga Shipping Company of Germany, which did not stop in Russia. Oil products such as jet fuel, have been transported to the European market through the NSR several times.

In October 2013, Hyundai Glovis, a Korean logistics company, for the first time ever, completed a commercial test voyage in the NSR. The Stena Polaris of Sweden began its voyage from Ust-Luga in Russia and transported 44,000 tons of naphtha to the Yeosu-Gwangyang Port in Korea. It is expected that more Korean companies will use the NSR for commercial purposes under international guidelines and regulations similar



Figure II-4. Hyundai Glovis test voyage on NSR in 2013³

to other countries. The experiences of the test voyages will contribute much to the development of feasible shipping via the NSR. Additional test voyages by multiple Korean companies are expected in 2014. And the recent contract between DSME and Yamal LNG to build icebreaking LNG carriers will benefit Korea symbolically in the realm of Arctic development.

Figure II-5 illustrates the results of searching Internet for the word “Arctic.” There were a total of 11 million web hits, with “Korea + Arctic” ranking 16th among the 20 Arctic and non-Arctic states associated with the Arctic Council, whereas news hits ranked 11th, indicating that there is more interest from the media. The increase is especially notable since obtaining observer status with the Arctic Council; there has been a significant increase of interest by local media, along with competition among domestic ports to utilize the NSR by local governments.

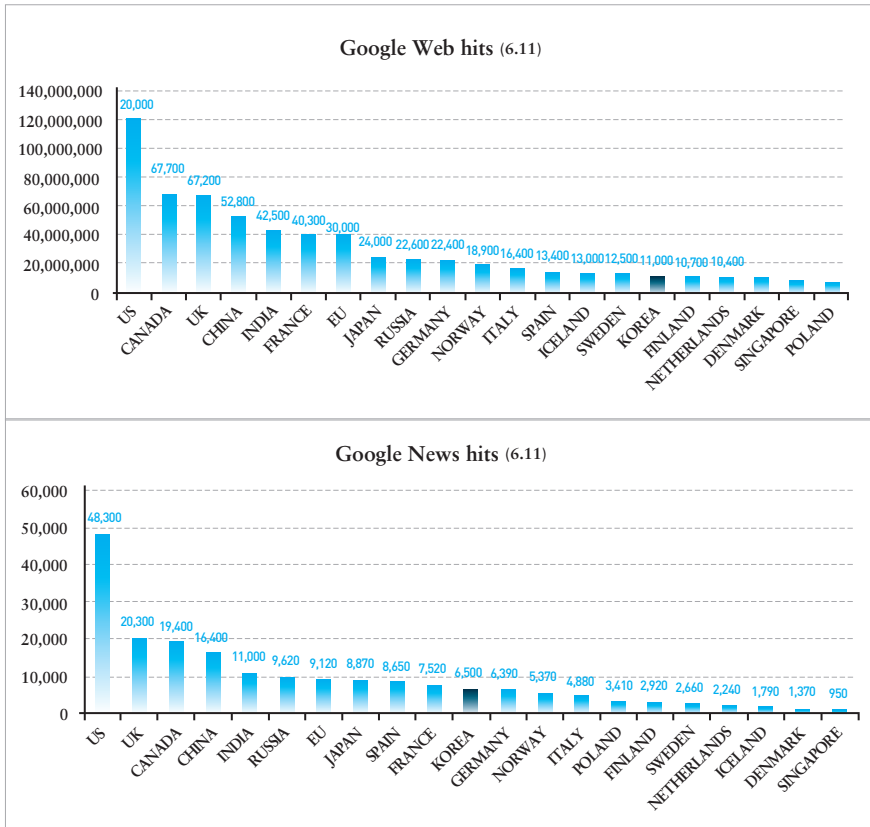


Figure II-5. Google hit number analysis as of June 11, 2014

PAN-GOVERNMENT ARCTIC POLICY MASTER PLAN⁴

Obtaining observer status with the Arctic Council has provided Korea with opportunities to develop domestic policy-making processes aimed at promoting common interests and cooperation in the Arctic. In addition, this new status opened provided an opportunity to establish diverse relations with the Arctic Council and its subsidiary bodies as well as to promote bilateral and multilateral cooperation with various stakeholders in the Arctic. This makes it natural for Korea to establish a policy framework to promote effective cooperation activities and to enhance capacity related to the research and business in the Arctic region. Through seven months of consultation with seven ministries (i.e., MOF,⁵ MOFA,⁶ MSIP,⁷ MOE,⁸ MOTIE,⁹ MOLIT,¹⁰ and KMA¹¹) and a number of research institutes (i.e., KMI,¹² KOPRI,¹³ KRISO,¹⁴ KIGAM,¹⁵ etc.), Korean officials developed an integrated plan for Arctic cooperation. This plan was approved as the 1st Pan-Government Arctic Policy Master Plan by the Cabinet Council in December 2013.

Vision and Purpose

The vision of the Master Plan is to promote a sustainable future for the Arctic region through global, regional and local cooperation. Some principles, such as “peace and stability by international regime,” “technological innovation for smart development,” “protection of the environment,” and “welfare of and sustainable development for the Arctic people” were considered.

By implementing the Master Plan, Korea aims to fulfill three policy goals: (1) establishing an Arctic partnership, (2) strengthening scientific research capacity, and (3) seeking new business opportunities. The Master Plan will maintain a consistent policy framework by forming an institutional mechanism to support the policy goals and to insure that they are put into action and reviewed.

From 2013 to 2017, 31 key projects will be implemented under four major programs, elaborated in the following sections:

1. Strengthening international cooperation with the Arctic region;
2. Encouraging scientific and technological research capacity;
3. Pursuing Arctic business opportunities; and

4. Securing a domestic institutional foundation.

Strengthening International Cooperation

To strengthen international cooperation, Korea will try to expand its engagement with the Arctic Council and its subsidiary bodies by forming a domestic consultative body and developing cooperative projects with Arctic stakeholders that contribute to the realization of Korea's vision for the Arctic. In particular, the Master Plan presents a rationale for the importance of participating in the Arctic Council Working Groups and establishing a plan for Korean experts to participate in research projects with or related to the Working Group activities. Along with the Arctic Council, Korea will cooperate with Permanent Participants through international forums, scientific research, and support of their efforts to preserve their history, culture, way of life and traditional knowledge with their available capacities. In addition, Korea will focus on scientific research by planning and proposing international joint research projects through the use of Korean equipment, which includes a research icebreaker.

Encouraging Scientific and Technological Research

One of the main emphases in this program is to expand the function of the DASAN Arctic Research Station. The Master Plan will pursue expansion of laboratories at the station for geological research, climate observation, atmospheric science research, etc. There is also consideration the possibility of building a new independent station and the possibility of expanding research areas. Moreover, Korea plans to expand its research at the DASAN Arctic Research Station by broadening participation in the Svalbard Integrated Arctic Earth Observing System (SIOS) and participating in international joint research projects in the Svalbard region. This Master Plan will encourage use of the Korean icebreaker, the Araon, for research activities in the Arctic Sea.

Pursuing Sustainable Arctic Businesses

To pursue sustainable Arctic businesses, the Master Plan aims to promote the NSR as an important future transportation corridor. Korea will accumulate navigation experiences in ice-covered areas through

joint activities with leading Arctic maritime nations, establish both consultation services and market research support for Korean maritime logistics companies, and implement follow-up measures for test voyages via the NSR. In conjunction with the NSR, the Master Plan focuses on the development of Arctic navigation capacity through training courses; the pursuit of joint research to lay the foundation for sustainable Arctic resource cooperation; development of technology for shipbuilding and safe navigation for polar-class vessels, and development of offshore plant technology for deep water resource development.

Securing a Domestic Institutional Foundation

The Master Plan aims to secure an institutional foundation with two key tasks. The first task is to establish an institutional arrangement for a national polar policy. The Master Plan explains that Korea will pursue the enactment of legal grounds for cooperation in the Arctic region in order to gain support for the projects outlined in the Master Plan. The second task is to build a polar information service system that will collect, analyze, and provide comprehensive information on the Arctic to various domestic stakeholders.

FUTURE DIRECTIONS¹⁶

Although it is difficult to say that all Korean experts have sufficient understanding of the Arctic region and conducting surveys is not enough, this section offers some insights as to how Korea perceives Arctic affairs at this time.

In June 2014, a group of 55 Korean experts were asked to take a survey on the future of Korea's participation in and contribution to matters related to Arctic affairs. The first question asked was to what degree can Korea contribute to cooperation in the Arctic region in the future through observer status with the Arctic Council. The experts had to answer on a scale of one to seven, one being the lowest with no contribution and seven being the highest with an extremely significant contribution.

The results, represented in Figure II-6, show that the contribution level is fairly high. Out of 55 Korean experts, 29.6% believe that the benefit of observer status with the Arctic Council is extremely significant; 22.2% thought it was fairly significant, while 27.8% thought the contribution level

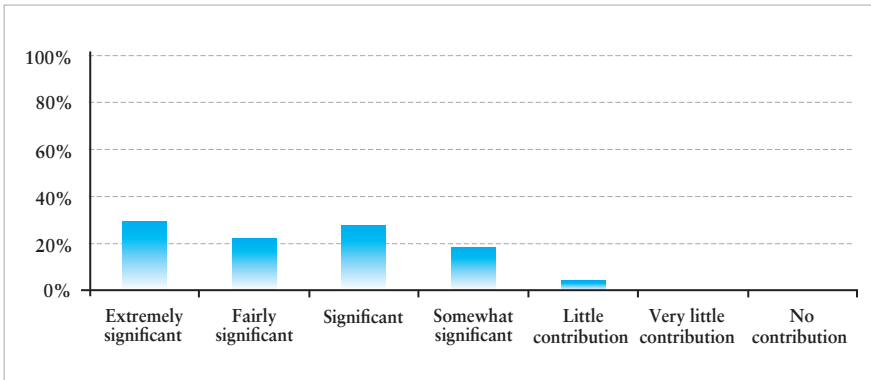


Figure II-6. Contribution level of observer status with the Arctic Council for Korea's cooperation with the Arctic region

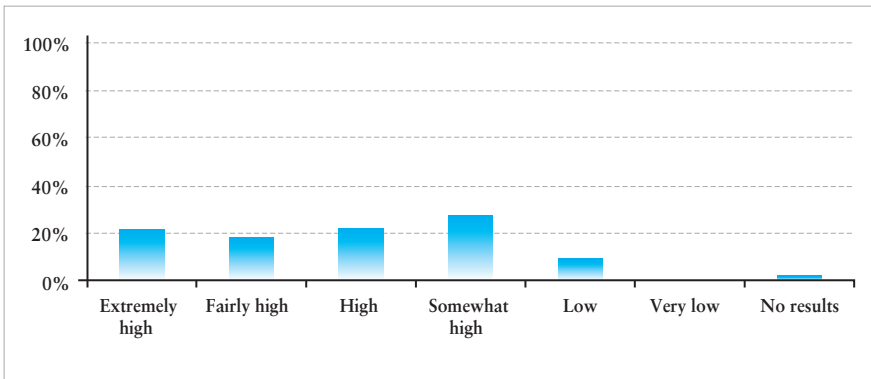


Figure II-7. Korea's performance level after implementing Arctic policies

was significant. Finally, 18.5% of the participants expected the contribution level to be somewhat significant, and only 1.3% expected Korea to make little contribution to Arctic cooperation and participation.

The second question was on Korea's performance level since 2013. Similar to the previous question, experts had to use a scale of one to seven to determine this. As Figure II-7. shows, 27.3% of the experts consider Korea's performance level to be somewhat high. A similar proportion of experts (21.8%) reported high and extremely high performance levels, while the proportion reporting Korea's performance level at fairly high was 18.2%. Finally, no experts thought Korea's performance level was very low, but 1.8% of the participants believed there were no results regarding Korea's performance when the Arctic policies were implemented.

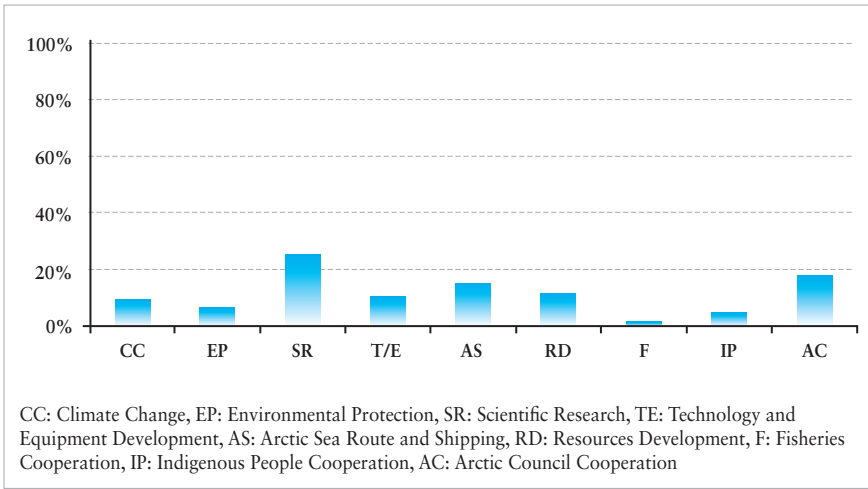


Figure II-8. Main priority for Korea related to the Arctic policies and promoting cooperation

As for question three, experts were asked what the main priority should be for Korea in the area of promoting cooperation with the Arctic policies. As shown in Figure II-8, scientific research should be the main priority for Korea, at 25%. The Arctic Council came in second at 17.6%, whereas Arctic shipping was 14.8%. Resource development, technology and equipment, and climate change were fairly close at 11.1%, 10.2%, and 9.3%, respectively.

Lastly, experts were asked which Arctic state Korea should cooperate with the most as it advances and promotes Arctic cooperation at this time.

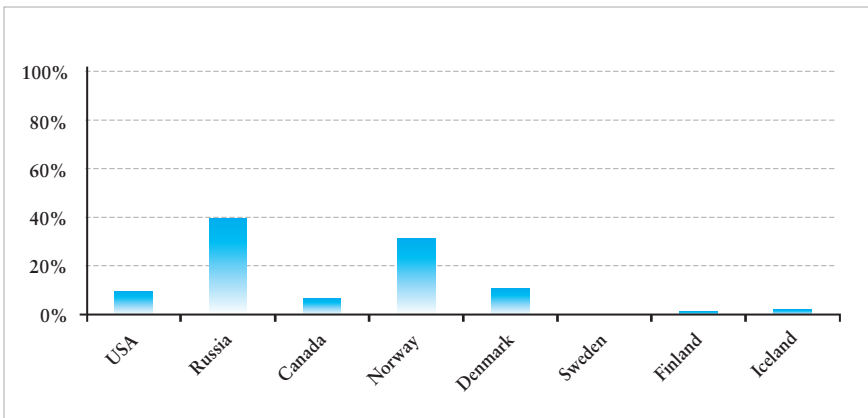


Figure II-9. Which Arctic state should Korea give cooperation priority to?

Unlike question three, the experts, as seen in Figure II-9, had fairly similar answers. Many believed that Russia should be the Arctic state Korea needs to work closely with, at 40%. Norway also ranked high at 31.1%; 9.4% answered the United States, and 6.6% said Canada. Denmark, which includes Greenland and Iceland, stands at only 10.4% and 1.9%, respectively. This result may be due to the current cooperation activities such as NSR transit and scientific cooperation in Svalbard.

SECTOR RESPONSES

Overall Arctic Strategy or Policy

Korea currently does not have a unified national strategy on Arctic affairs. The Pan-Government Arctic Policy Master Plan tries to combine the different projects in various government agencies and frame a more effective cooperation policy. The plan was endorsed by the Cabinet Council where it is expected to lead to a five-year rolling plan in the future. The Master Plan will become the basis for various projects in each governmental agency with continuous amendments and follow-ups on individual actions. It will also contribute to running effectively operational measures such as budget and organization.

Sectoral Policies

The Master Plan embraces the majority of the plans set forth by each agency, and detailed programs are expected to follow within the basic framework. With regard to the NSR, enhanced cooperation is expected with the main stakeholders such as nations utilizing the route and commercial shipping companies that own ice-class vessels. Support systems for vessels using the NSR will take place along with domestic regulations that correspond to transport and shipping regulations set forth by the IMO. Mid- and long-term infrastructure plans such as port redevelopment will be initiated to prepare for the use of the NSR in the future.

Balance between Development and Environmental Protection

The Master Plan proposes not only a business sector policy but also

involvement in the Arctic Council's environmental protection activities, monitoring environmental changes by using the Araon and the DASAN Arctic Research Station, expanding science research centers in the Arctic, developing technology to overcome sea pollution, and abiding by international environmental regulations. It also emphasizes communication and cooperation with indigenous peoples in the Arctic region in order to enhance understanding and ultimately to achieve sustainable development. Moreover, increased cooperation with Arctic states to develop science research labs and cooperation systems to support search and rescue activities is expected in the coming years.

Leading Departments

The major ministries addressing the Arctic agenda are the Ministry of Oceans and Fisheries (MOF), the Ministry of Foreign Affairs (MFA), the Ministry of Science, ICT and Future Planning (MSIP), the Ministry of Trade, Industry and Energy (MOTIE), the Ministry of Land, Infrastructure and Transport (MOLIT), the Ministry of Environment (MOE), and the Korea Meteorological Administration (KMA). For Arctic research services, Korea has the Korea Polar Research Institute (KOPRI), the Korea Maritime Institute (KMI), and the Korea Research Institute of Ships and Ocean Engineering (KRISO). The MOF is leading the Master Plan, and a legal basis for Arctic activity support and a separate division in charge of the Arctic is currently under revision. KMI is currently focused on Arctic policy research that includes the NSR, socioeconomic affairs of the Arctic, and cooperation with the Arctic Council. KOPRI deals with the Arctic science station operation, research icebreaker activity, and research on natural resources and the environment. Lastly, KRISO concentrates on engineering research that is related to Arctic shipping and offshore plant facilities.

Factors Affecting Korea's Arctic Policy

The Arctic policy of Korea is expected to receive support from various sources, as it has been selected as a national agenda by the Blue House. There are movements to create a domestic consortium for Arctic research with an increased research budget including environmental, natural scientific, engineering and socioeconomic research. The organization and functions among research institutes are becoming stronger with an agenda

including extending the Arctic science facility and building a second research icebreaker vessel. Limiting factors are weak policy experience, a shortage of research capacity, and a shortage of investment, and legislative support for Arctic affairs over the long run.

Status of Policy Implementation

With the implementation of the Master Plan, test voyages via the NSR, establishment of an Arctic research consortium, broad bilateral cooperation with other Arctic states, development of an Arctic information system, cooperation with the Arctic Council and its subsidiary bodies, and academic exchanges in economic development fields are under way. In addition, each key player is strengthening its capacity, such as expanding the activities of the Arctic Research Station, capacity building of research vessels, scientific research cooperation with the Arctic states, and exchanging information among academic experts. In addition, research institutes are also enhancing their international cooperation. For example, KMI joined the University of the Arctic as a non-Arctic member and initiated the North Pacific Arctic Research Community with participation from 13 organizations in China, Japan and Korea.

CONCLUSION

Korea's interest in the Arctic is not merely limited to the economic area such as the NSR or resource development, but encompasses science, technology, climate, and the environment as well. A balanced approach to these various sectors will be a key challenge for Korea in the future. In this regard, recent progress, such as obtaining observer status with the Arctic Council, developing the Pan-Government Arctic Policy Master Plan, and appointing Arctic affairs as a national priority will contribute to sustainable Arctic development.

Moreover, although the numbers may not be high, successful transits of the NSR and consistent interest and investment by Arctic states, neighboring nations, and the international community will certainly attract the Korean government and Korean corporations. The economic structure of Korea supports the Arctic as a vital partner, since Korea imports natural resources such as energy and minerals and exports goods and services

through shipping.

Yet, Korea still has a long road ahead in this realm. Korea must accumulate knowledge and experience in the Arctic, better understand Arctic cultures and their traditional way of life, and safeguard complicated security issues through cooperation with relevant stakeholders in the Arctic region. In addition, bilateral and multilateral cooperation must take place to enhance capacity from within, and collaborative efforts should be geared toward climate change and environmental protection of the Arctic nature. Ultimately, Korea should become a reliable partner to seek a future of togetherness by contributing to the sustainable development of the Arctic region.

Notes

1. The views expressed in this article are the sole responsibility of the author and do not reflect the views of KMI or the Korean government.
2. http://en.wikipedia.org/wiki/Central_Asian_Flyway
3. Ministry of Oceans and Fisheries of the Republic of Korea
4. This section has been adapted from the draft document of the Master Plan, and does not explicitly reflect the original text.
5. Ministry of Ocean and Fisheries
6. Ministry of Foreign Affairs
7. Ministry of Science, ICT and Future Planning
8. Ministry of Education
9. Ministry of Trade, Industry and Energy
10. Ministry of Land, Infrastructure and Transport
11. Korea meteorological Administration
12. Korea Maritime Institute
13. Korea Polar Research Institute
14. Korea research Institute of Ships and Ocean Engineering
15. Korea Institute of Geoscience and Mineral Resources
16. Please note that this analysis is based on an informal questionnaire survey of Arctic experts in the academic, business and NGO fields of Korea by the author. Officials from government agencies have been excluded.

PART III

ARCTIC STATE/NON-ARCTIC STATE ENGAGEMENT

10. Navigating the Interface

Oran R. Young

Changes occurring in recent years have transformed the Arctic in ways that have far-reaching implications for governance.¹ The impacts of climate change are being felt sooner and more dramatically in the Arctic than anywhere else on the planet.² Not only is this significant in its own right; it is also opening the Arctic to development on the part of those interested in commercial shipping, natural resource extraction, and newly emerging opportunities for adventure tourism. As a result, the connections between the Arctic, once treated as a more or less distinct region, and the global system are becoming stronger. There is no reason to expect that these developments will turn the Arctic into a zone of conflict.³ Nonetheless, it is easy to understand the growth of interest in Arctic developments on the part of important non-Arctic actors, including the European Union and the major Asian states, as well as among the Arctic states themselves.

In this article, I focus on options for enhancing the engagement of non-Arctic states (and other non-Arctic actors) in the affairs of the region, while at the same time protecting the interests both of the Arctic states and of the region's permanent residents. I start with a brief account of the linkages between the Arctic and the global system, stressing the responsibility of outside actors for what happens in the region as well as the interests of these actors in benefitting from opportunities for various forms of development in the region. I then turn to an examination of existing and potential avenues of engagement that can provide mechanisms for non-Arctic actors to participate in decision making regarding the region's future. I start with options involving the Arctic Council, the central element of the existing Arctic governance mosaic and the principal focus of debate regarding the role of non-Arctic states. Then, I proceed to consider options involving broader intergovernmental mechanisms (e.g., the International Maritime Organization), nongovernmental arrangements (e.g. the International Arctic Science Committee), public-private partnerships (e.g., the International Maritime Organization and classification societies), and a variety of more informal off-the-record venues (e.g., the Arctic Frontiers Conferences, the Arctic Circle, and the World Economic Forum). The take-

home message is straightforward. None of the existing or potential avenues of engagement constitutes the Holy Grail in the sense that it provides the essential channel for communication at the Arctic/non-Arctic interface. But a number of these avenues can provide opportunities for engagement that are beneficial to both Arctic and non-Arctic states if handled with care. The good news is that the individual avenues are by no means mutually exclusive; it is often sensible to make use of several avenues in addressing complex issues.

THE GLOBALIZATION OF THE ARCTIC

During the 1990s, a series of events, including the waning of the cold war, the collapse of the Soviet Union, and the softening of the global energy market, moved the Arctic to the periphery with regard to the mainstream of world affairs. Nuclear-powered submarines continued to roam the Arctic. But the remaining ships in Russia's Northern Fleet spent most of their time in port, and many northern military bases were downsized or abandoned. No one paid much attention to the Arctic in thinking about global security issues. Hydrocarbons continued to flow from the Arctic. At the peak, some two million barrels of crude oil flowed through the Trans-Alaska Pipeline each day. Yet the world market price of oil slumped during these years, dropping below 20 USD a barrel (in 2011 dollars) for some time. Taken together, these developments undoubtedly simplified the efforts to craft arrangements like the Arctic Council, set up under the terms of the Ottawa Declaration in 1996. But they also produced a situation in which leading thinkers concerned with international politics paid little attention to the Arctic.

Today, this situation has changed dramatically.⁴ Everyone is now keenly interested in the Arctic; many are ready to express opinions about the role of the region in world affairs, whether or not they have a deep understanding of the forces at work in the Arctic. Symbolically, the collapse of sea ice in the Arctic basin during 2007 serves as a marker of this transition. But it is worth taking a moment to reflect on the fact that there are multiple, interactive forces at work here that connect the Arctic to global processes via biophysical, geo-economic, and geopolitical mechanisms.

The impacts of climate change in the Arctic are not developments expected to occur at some future time; they are occurring today. The

most dramatic case centers on the shrinking of sea ice in the Arctic Basin. But other impacts are striking, especially from the perspective of Arctic residents. These include coastal erosion due to stronger storm surges, increased melting of the surface layer of the permafrost, the rapid retreat of Arctic glaciers, the steady acidification of Arctic waters, and the destruction of forests in the Subarctic borderlands. All these processes appear to be accelerating; the record low for ice in the Arctic Basin was recorded in 2012. But climate change is not the only environmental force linking the Arctic to the global system. Environmental contaminants, including persistent organic pollutants and heavy metals (e.g., mercury), originating outside the region, make their way to the Arctic via airborne and waterborne vectors. Activities occurring in the southern regions of the larger Arctic states (e.g., Canada, Russia, the United States) are implicated in some of these linkages. But countries having no direct connection to the Arctic (e.g., China, Japan, Korea, and the non-Arctic members of the European Union) are major drivers of climate change and sources of contaminants that end up in the Arctic.⁵

There is a similar story to be told about geo-economic linkages.⁶ The Arctic is a major source of hydrocarbons and valuable minerals, including gold, diamonds, lead, zinc, nickel, copper, iron ore, and rare earths. Widely cited projections from the U.S. Geological Survey suggest that the region may hold 13% of the world's undiscovered oil reserves and up to 30% of the undiscovered gas reserves.⁷ But Arctic natural resources are expensive to extract and transport to southern markets. Decisions about whether or not to produce them are sensitive to world market prices for oil, gas, and various minerals. A few years back, many observers were forecasting the onset of a highly competitive scramble for Arctic resources.⁸ Today, the picture has changed considerably due to factors like the onset of the shale gas revolution and rising interest in alternative fuels. Plans to develop Russia's Shtockman gas field, one of the world's largest proven gas deposits, have been put on hold; Shell is reconsidering its plans to explore for oil in the Beaufort and Chukchi Seas. Of course, this does not mean that large-scale development of the Arctic's natural resources will not occur in the course of time. But it does demonstrate the strength of the geo-economic linkages between the Arctic and the global system.⁹

Parallel observations about the role of geopolitics are also in order. The Arctic itself is a zone of peace; most responsible analysts expect it to remain so during the foreseeable future. Even the recent expansion of

Russia's military presence in the region is motivated mainly by a desire to be accepted again as a great power in world affairs rather than by a concern about the prospect of serious conflicts arising in the Arctic itself.¹⁰ Yet the Arctic is not immune to geopolitical changes in the world at large. There is no direct connection between the Arctic and the Ukraine, but the conflict between Russia and the West over the fate of the Ukraine is already having adverse impacts on the course of international cooperation in the Arctic.¹¹ Everyone recognizes that the emergence of China as a regional superpower and, increasingly, as a counterweight to the United States on a global scale, is affecting the course of world affairs. This does not mean that the Arctic is about to be swept into the vortex of global political relationships. Yet geopolitical shifts do make a difference. When China expresses increasing interest in what happens in the Arctic and takes concrete steps to demonstrate the seriousness of this interest, for instance, it is no longer possible to dismiss the expression of Chinese views on Arctic issues as empty gestures.¹²

An important feature of all these regional/global links is the extent to which the fate of the Arctic is affected by the actions of outsiders who often pay little attention to the consequences of their actions for the well-being of the Arctic's human residents or the integrity of the Arctic's biophysical systems. It is perfectly reasonable to acknowledge the legitimacy of the interests outsiders have in Arctic resources, including potential shipping routes and opportunities for adventure tourism as well as valuable natural resources. But it is equally important for outsiders to acknowledge their responsibility for the fate of the Arctic's biophysical and socioeconomic systems as they are affected by the disruptive impacts of climate change, the destructive effects of contaminants, and the instabilities associated with global economic forces. Any constructive consideration of avenues of engagement between Arctic and non-Arctic states (and various non-state actors) must therefore start from the proposition that we need to think of this as a two-way street. It is legitimate to ask about opportunities for non-Arctic states to have their voices heard in the activities of important governance arrangements like the Arctic Council. But it is equally legitimate to ask about ways for non-Arctic states to play constructive roles in addressing Arctic problems, such as the need to adapt to the impacts of climate change and the social problems associated with the occurrence of boom-bust cycles or patterns of economic development that lead to dysfunctional segmentation between a modernized sector focused

on extractive industries and a traditional sector heavily dependent on subsistence activities. A balanced approach stressing responsibilities as well as interests may well be the key to progress in navigating the Arctic/non-Arctic interface.

NON-ARCTIC STATE ENGAGEMENT IN THE ARCTIC COUNCIL

The Arctic Council, formed in 1996 under the terms of a non-legally binding ministerial declaration, has emerged as the central element of the Arctic governance mosaic.¹³ Despite its obvious limitations (e.g., a prohibition on addressing issues relating to military security), the Council has become an influential player in considering a broad range of issues pertaining to environmental protection and sustainable development.¹⁴ Membership in the Council is limited to the eight Arctic states; six indigenous peoples' organizations have the innovative status of Permanent Participants and are accorded a prominent place in the work of the Council. Non-Arctic states (and non-state actors) can apply to be accorded the status of observers in the Council.¹⁵ Although the issue has generated considerable controversy, the Arctic Council has granted this status to 12 non-Arctic states (seven from Europe and five from Asia). The European Union has received provisional acceptance, subject to the resolution of some poorly defined but serious concerns regarding EU actions having significant consequences for the Arctic.¹⁶

Observer states have found their status in the Arctic Council a source of frustration.¹⁷ For starters, the rules of procedure require these states to "[r]ecognize Arctic states' sovereignty, sovereign rights and jurisdiction in the Arctic," in effect acknowledging the primacy of the Arctic states regarding issues that come up for consideration in the Council.¹⁸ The rules also specify that observers must submit to a process of reassessment and recertification on a periodic basis.¹⁹ Quite apart from these procedural concerns, observers frequently feel that they are treated as marginal participants in Council activities. Although they can submit papers, they do not have the right to speak in meetings of the Senior Arctic Officials (SAOs), much less meetings of the deputy ministers or Arctic Council Ministerial Meetings. When they are allowed to speak, it is typically at the tail end of meetings when those remaining in the room are focused on closing the

proceedings and heading to the airport. Conditions are less uniform at lower levels. There is considerable variation, for example, in the practices of the Council's working groups regarding observers. While the results are satisfactory from the perspective of the observers in some cases, there remains a good deal of frustration on the part of observers, even at the level of the working groups.

Nonetheless, the reality is more complex than these general comments suggest. To begin with, it is important to differentiate three distinct levels in considering opportunities for observer participation in Arctic Council activities: the working groups, the task forces, and the SAOs and above. The working groups do not make decisions on matters that are policy relevant. But they have achieved considerable influence by carrying out projects and preparing reports that draw attention to emerging issues, frame these issues for consideration on the part of policymakers, and serve to advance the issues on policy agendas. Prominent examples include the State of the Arctic Environment Report (1997), the Arctic Climate Impact Assessment (2004), the Arctic Human Development Report (2004), the Arctic Marine Shipping Assessment (2009), the report on Changes in Arctic Snow, Water, Ice, and Permafrost (2012), and the Arctic Biodiversity Assessment (2013).²⁰ Projects of this sort currently underway include the second Arctic Human Development Report, the Arctic Resilience Report, and the assessment of Adaptation Actions for a Changing Arctic. As others have pointed out, observer states can play active roles in the conduct of these projects and the preparation of their reports by supplying experts who are able to contribute to the success of specific projects. While the receptivity to contributions from non-Arctic states varies somewhat from case to case, it is fair to say that the leaders of most projects have been happy to receive inputs from all sources, so long as the quality of the inputs is good. Although the products of these working group activities are typically somewhat technical, this does not mean that they lack policy relevance.

Going a step further, the Arctic Council has developed a practice in recent years of establishing task forces to address more or less focused issues of current interest. At present, for example, there are task forces looking into the role of business in the Arctic Council, science cooperation, oil pollution prevention, and the effects of black carbon and methane. Not only do the task forces have more focused agendas than the working groups, there is also an expectation that their efforts will lead to more concrete results (e.g., specific recommendations on measures to improve

science cooperation or on measures to prevent oil spills in the maritime Arctic). A notable feature of these efforts is that they typically deal with topics that require the involvement of non-Arctic states and non-state actors in one form or another. There is no way to address issues relating to black carbon in the Arctic, for instance, without taking into account the role of non-Arctic states that are sources of a sizable fraction of the black carbon reaching the Arctic. Any effort to improve science cooperation will need to include a consideration of ways to engage the International Arctic Science Committee (IASC), a nongovernmental body that has numerous non-Arctic members. A mechanism designed to encourage dialogue with the business community must find ways to facilitate communication between the Arctic states and major non-state actors. The task forces constitute a fairly recent innovation in institutional terms; they are not envisioned in the constitutive provisions of the Arctic Council (e.g., the 1996 Ottawa Declaration). It is hard to forecast what role the task forces will play in the future practices of the Council; there are some indications of friction between the working groups and the task forces regarding a suitable division of labor.²¹ But the task forces do offer a different playing field from the more familiar terrain of the working groups that may provide distinct opportunities for engagement on the part of non-Arctic states.

Perhaps the most frustrating domain for observer state engagement has been at the level of the SAOs and above. Observers have limited opportunities to engage with the SAOs, who can and do meet with each other in private sessions, and virtually no opportunity to participate effectively in the biennial Ministerial Meetings. As a result, those representing observer states are limited to informal interactions occurring on the margins of such meetings or diplomatic interactions taking place outside the confines of Arctic Council meetings. This situation has come to seem increasingly difficult to accept as the Arctic Council has become a site for substantive policymaking processes (e.g., those that produced the 2011 search and rescue agreement and the 2013 agreement on oil spill preparedness and response) and global interest in Arctic affairs has mounted.²² On the other hand, it is worth noting that policy initiatives unfolding within the Arctic Council have been and will continue to be confined largely to issues that are essentially regional in the sense that they involve matters in which the interests of the Arctic states are paramount and in which these states will be called upon to provide the lion's share of the effort required to handle implementation. In this regard, it makes sense that the search and rescue

agreement was negotiated under the auspices of the Council and adopted by the eight members of the Council on the occasion of an Arctic Council Ministerial Meeting. On the other hand, it is clear that the Arctic Council is not the appropriate venue for efforts to negotiate the terms of the Polar Code dealing with commercial shipping in the Arctic. To be effective, the Polar Code will require buy-in on the part of all the key players in maritime commerce. Similarly, there are good reasons why the interested states have avoided the Arctic Council in seeking to address issues relating to the potential for commercial fishing in the Central Arctic Ocean.²³

It is worth noting as well that there are rising pressures to reexamine the role of the Arctic Council in handling the affairs of what many have come to think of as the “new” Arctic.²⁴ What may have been perfectly acceptable when the Arctic was treated as a peripheral region with limited connections to the global system seems increasingly problematic as the links grow stronger. Whether we look at linkages involving impacts of climate change, the control of contaminants, the effects of volatility in world commodity markets, or the geopolitical consequences of the rise of China, the Arctic now and during the years to come will be quite different from the Arctic at the time of the crafting of the terms of the Ottawa Declaration. The technical activities of working groups, such as the Arctic Monitoring and Assessment Programme, the Arctic Contaminants Action Programme, or the Working Group on the Protection of the Arctic Marine Environment, will continue to be important as conditions change; they may even become more important. But issues relating to broader matters, like the legal status of the Council, the criteria for membership, and the scope of its mandate, are all likely to become matters of lively discussion that may eventuate in significant adjustments. There is no way to forecast what the Arctic Council will look like in 2020, much less in 2030 or 2040. But it is virtually certain that some key non-Arctic states and some important non-state actors will play a role in developing proposals for institutional innovations in this context and in shaping the negotiations that lead to agreements regarding prospective adjustments.

BROADER INTERGOVERNMENTAL MECHANISMS

As the connections between the Arctic and the global system become

stronger, there is a growing need to think about distinguishing between those issues that can be dealt with effectively in Arctic venues (e.g., the Arctic Council) and those that require action within broader international or global venues in which interested non-Arctic states are able to participate on an equal basis. From the beginning, the Arctic Council has taken an interest in issues that have important consequences for the Arctic but that are not subject to resolution through the actions of a regional body like the Council. In such cases, it is necessary to turn to broader intergovernmental mechanisms in search of solutions. Consider the problem of controlling persistent organic pollutants (POPs), a matter of intense interest to the residents of the Arctic, as a case in point. Because most persistent organic pollutants originate outside the Arctic and make their way to the region via airborne or waterborne vectors, the Arctic Council is not in a position to solve this problem on its own. The Council may be able to draw international attention to the importance of issues of this sort and take steps to exert influence on the broader international processes involved in addressing these issues. In the case of POPs, for instance, there is considerable evidence to suggest that concerns about the effects of such contaminants in the Arctic played a role of some importance in the effort that produced the 2001 Stockholm Convention on Persistent Organic Pollutants.²⁵ Nevertheless, the convention itself is a multilateral environmental agreement negotiated by a large number of states and currently includes 179 parties.²⁶

Some issues for which broader intergovernmental mechanisms are needed center on activities occurring outside the Arctic that nevertheless have far-reaching consequences for the region. Perhaps the most dramatic case in point is climate change, in which the emissions of greenhouse gases occur largely beyond the confines of the Arctic region, while the impacts of climate change are affecting the Arctic more rapidly and more dramatically than any other part of the planet. But climate change is not the only issue of this sort. Others include the seasonal ozone hole over the Arctic resulting from the production and consumption of ozone-depleting substances in the mid-latitudes,²⁷ the health and ecological consequences of persistent organic pollutants that make their way via airborne and waterborne processes from the mid-latitudes to the Arctic, and the health effects of heavy metals (e.g., mercury) that originate for the most part outside the Arctic. A common feature of these issues is that the Arctic is in a very real sense a victim of the activities of non-Arctic actors. There is a need, therefore, for non-Arctic

states to acknowledge responsibility for these external/unintended effects of their actions (or the actions of their citizens) and to act accordingly in efforts to address these environmental concerns.

The way forward in dealing with these issues is an effort to adopt substantial multilateral agreements and to find ways to implement them effectively. The record regarding such efforts is mixed. The 1987 Montreal Protocol on the problem of ozone depletion is a success story.²⁸ Seasonal depletions of stratospheric ozone still occur, but the international community is on track toward solving this problem. The record regarding the 2001 Stockholm Convention on persistent organic pollutants and the 2013 Minamata Convention on Mercury is more mixed. The Stockholm Convention covers only a subset of the relevant contaminants; the Minamata Convention has not yet entered into force. At this juncture, the most problematic case is climate change. Despite continuous efforts to build on the 1992 UN Framework Convention on Climate Change, greenhouse gas emissions continue to rise, and the end is not in sight.²⁹ With regard to the roles of non-Arctic states, however, all these cases are similar. They allow these states to play prominent roles in addressing issues of great importance to the future of the Arctic.

Another category of issues that produce roles for broader mechanisms includes those involving activities that take place in the Arctic but that the Arctic states cannot deal with on their own because they lack the necessary jurisdiction to address the issue effectively, because non-Arctic actors are in a position to make relevant decisions, or because the engagement of non-Arctic states is needed to ensure compliance. In all these cases, non-Arctic states can engage actively either directly as parties to issue-specific negotiations or indirectly as members of the relevant intergovernmental or nongovernmental organizations. For the most part, the way forward regarding such issues is to devise arrangements that create a basis for cooperation between the Arctic states and interested non-Arctic states.

The most prominent example of this class of issues today centers on the effort to develop a mandatory Polar Code covering the design, construction, and operation of ships operating in polar waters under the auspices of the International Maritime Organization (IMO).³⁰ While the provisions of the Polar Code relating to safety at sea are relatively uncontroversial, the section on environmental protection involves significant differences between the Arctic states (and environmental organizations) concerned about the environmental dangers of commercial shipping in the Arctic and

key states sympathetic to the interests of the shipping industry and desirous of minimizing the cost of operating ships in the Arctic. The text that has emerged from several years of negotiations and that is now expected to enter into force at the beginning of 2017 is relatively weak with regard to environmental concerns. It does not ban heavy fuel oils in the Arctic; it is silent on the issue of black carbon generated by commercial ships; it has no provisions addressing the issue of invasive species. Yet it is entirely possible that experience over time will lead to effective efforts to tighten the environmental provisions of the Polar Code. In the meantime, this case offers a clear illustration of how Arctic and non-Arctic states can engage with one another within the framework of an intergovernmental organization.

Closely related to this case in substantive terms is the work of the International Hydrographic Organization (IHO). The IHO is a consultative and technical intergovernmental organization "... established in 1921 to support safety of navigation and protection of the environment."³¹ The organization currently has 82 members, including most of the world's major coastal states. As the volume of commercial shipping in the Arctic increases, the need for adequate hydrographic mapping of the region will become increasingly critical. Current estimates suggest that hydrographic maps that are up to prevailing international standards cover less than 10% of the maritime Arctic.³² Of course, individual coastal states must take the lead in collecting and assembling hydrographic data for areas that are under their own jurisdiction. But hydrographic mapping is an expensive proposition. Moreover, international cooperation is important both to ensure that the data supplied by individual states are commensurable and to assemble the data to produce hydrographic maps that cover areas in which two or more states have jurisdiction or areas that lie beyond the bounds of national jurisdiction. To the extent that commercial shipping in the Arctic grows, the pragmatic contributions of the IHO are sure to become increasingly important for all parties concerned.

Other examples of this class of issues are less straightforward. The five Arctic coastal states, for example, are currently working on an initiative intended to impose a moratorium on commercial fishing in the Central Arctic Ocean until such time as enough is known about the potential for sustainable fisheries in the region to justify opening the area to commercial fishing. There is an analogy between this case and the case of polar bears in which the five Arctic coastal states, claiming authority as the range states,

entered into an international agreement in 1973 calling for cooperation in the management of polar bear stocks throughout the Arctic.³³ In the case of fishing, however, the coastal states recognize that a sizable area of the Central Arctic Ocean will remain part of the high seas under the terms of the UN Convention on the Law of the Sea (UNCLOS) regardless of the resolution of outstanding claims relating to jurisdiction over the seabed beyond the limits of Exclusive Economic Zones (EEZs).³⁴ The coastal states have acknowledged that they will need to find a way to draw interested non-Arctic states into the discussion regarding fishing in the Arctic, and sooner rather than later. The fact that most knowledgeable scientists believe that commercially valuable stocks of fish are unlikely to occur in this region any time soon may make it relatively easy to avoid severe conflicts of interest regarding this matter.³⁵ There are, moreover, relevant precedents to draw on, ranging from the six-nation regional fisheries management organization for the pollock stocks of the central Bering Sea to the more comprehensive North East Atlantic Fisheries Commission whose coverage extends to a sizable swath of the North Atlantic.³⁶ But here, too, it is worth emphasizing that the solution to this issue will require cooperation between the Arctic coastal states and some set of interested non-Arctic states.

A different example involves the idea of establishing marine protected areas (MPAs) through the designation of Ecologically and Biologically Sensitive Areas (EBSAs) authorized under the provisions of the Convention on Biological Diversity (CBD) or Special Areas or Particularly Sensitive Sea Areas established under the terms of the Convention for the Prevention of Pollution from Ships (MARPOL). In such cases, non-Arctic states could engage with the Arctic states as members of the CBD or of MARPOL, even when all or parts of the prospective protected areas would be located within the EEZs of one or more of the Arctic states. Suggestions regarding the desirability of creating EBSAs within the Bering Strait region exemplify this possibility.³⁷ To the extent that potential protected areas are located wholly or even partially in areas beyond national jurisdiction, moreover, non-Arctic states would clearly have a role to play. The recent action of the European Parliament in calling for the establishment of some sort of protected area encompassing the high seas around the North Pole illustrates this prospect.³⁸ This suggestion raises a host of complex questions, and the unilateral character of the proposal suggests that it may be motivated at least in part by the desire of the EU to get into the act regarding matters of Arctic governance. Nevertheless, it does help to make more concrete the

possibility of engagement between the Arctic states and interested non-Arctic states regarding issues of mutual interest that are not suitable for treatment within the confines of the Arctic Council.

NONGOVERNMENTAL ORGANIZATIONS

By definition, nongovernmental organizations (NGOs) are not authorized to produce international agreements that are mandatory or legally binding. But that does not mean that they cannot function as useful avenues of engagement between Arctic and non-Arctic states (and other non-Arctic actors). In this context, it is useful to start by drawing a distinction between NGOs that are essentially advocacy organizations (e.g., Greenpeace) and NGOs that endeavor to facilitate mutually beneficial cooperation (e.g., the International Council of Science or ICSU) or to perform some task that advances a common interest (e.g., the International Association of Antarctic Tour Operators). In this article, the focus of attention is on this second category of NGOs. The universe of NGOs is growing rapidly; a sizable number of them engage in activities that are relevant or potentially relevant to the Arctic. In this discussion, I single out four that seem particularly interesting with regard to the issue of navigating the Arctic/non-Arctic interface: the International Arctic Science Committee (IASC), the International Organization of Standards (ISO), the Association of Arctic Expedition Cruise Operators (AECO), and the World Ocean Council (WOC).

IASC is a nongovernmental organization whose members are national academies of science or research councils. Founded in 1990 during the transition to the post-cold war era, the organization now has 22 members, the eight Arctic states and 14 others, including France, Germany, the UK, China, Japan, and Korea. The initial impetus for the establishment of IASC was a desire to encourage collaboration between western scientists working on Arctic issues and their Russian counterparts. Since then, the work of IASC has expanded in a number of directions. IASC is an Arctic Council observer, an International Scientific Associate of ICSU, and a close collaborator with the Scientific Committee on Antarctic Research (SCAR), its sister organization dealing with scientific research in the south polar region.³⁹ IASC is at the center of a network that includes a number of other organizations that come together annually in what is known as

Arctic Science Summit Week. The organization has also taken the lead in arranging the International Conference on Arctic Research Planning, now in its third cycle. There is a lively discussion today concerning the proper relationship between IASC, which represents the community of scientists engaged in original research, and the working groups of the Arctic Council, which engage officials from public agencies who have scientific training but who are interested primarily in scientific assessments. But there is no doubt that the resultant interactions offer a significant channel of communication across the Arctic/non-Arctic divide.

The International Organization for Standardization (ISO) is a nongovernmental organization that has established itself as a mechanism for setting standards that not only help to harmonize practices on an international basis but also put pressure on actors in a variety of sectors to improve their practices. Prominent examples encompass standards dealing with environmental management, social responsibility, food safety, and information security. Many of these standards are generic; they apply to the Arctic as well as to other regions of the world. But ISO has also taken a more focused interest in activities occurring in the Arctic. In 2010, for example, ISO developed standards pertaining to Arctic offshore structures used in the petroleum and natural gas industries.⁴⁰ Similar standards may be developed to address other industrial activities that become more important in the wake of the opening up of the Arctic resulting from the impacts of climate change. Although ISO is nongovernmental in nature, it does offer a forum for discussing issues of mutual interest to those associated with both Arctic and non-Arctic states.

Another case involves the Association of Arctic Expedition Cruise Operators (AECO). Founded in 2003, AECO "... is dedicated to managing responsible, environmentally friendly and safe tourism in the Arctic."⁴¹ Somewhat less advanced than IAATO, its counterpart in the Antarctic, AECO is developing rapidly as a forum for interaction among those interested in the governance of ship-based tourism in the Arctic, which has become a growth industry following the increasing accessibility of remote areas. The organization sponsors a series of conferences that bring together "... AECO's members, other associations, governmental officials from different Arctic countries, service providers, NGO's and others with connection to or interest for Arctic cruise tourism." Issues of management, regulation, and governance more generally are prominent items on the agenda of these conferences. Because many of the operators and other

interested parties are not based in Arctic states, this mechanism provides yet another channel for communication on topics of mutual interest that cross the Arctic/non-Arctic divide.

An example of another sort is the World Ocean Council (WOC), which describes itself as an “international, cross-sectoral industry leadership alliance on ‘Corporate Ocean Responsibility’.”⁴² WOC seeks to promote the activities of companies and associations that share the organization’s “vision of a healthy and productive ocean and its sustainable use and stewardship by responsible businesses.” Although WOC is interested in the sustainable use of all the world’s oceans, it has taken a focused interest in helping to introduce the concerns of the business community into the deliberations of the Arctic Council. It has worked together with the Council’s Sustainable Development Working Group (SDWG) to facilitate communication between members of the business community and representatives of government agencies engaged in the work of the SDWG. WOC has played an active role in the planning efforts behind the Canadian initiative aimed at establishing an Arctic Economic Council. WOC does not cover the full range of businesses with Arctic operations or interests, but it does offer another avenue of engagement that allows individuals from Arctic and non-Arctic states to communicate informally about matters of common interest.

PUBLIC-PRIVATE PARTNERSHIPS IN THE ARCTIC

The idea that public-private partnerships may prove helpful in addressing a range of international or transnational issues has become a prominent focus of attention in recent years, especially in the aftermath of the high-profile emphasis on the idea in the course of the 2002 World Summit on Sustainable Development (the Johannesburg Conference).⁴³ The significance of this development remains an open question. Many specific initiatives launched under the banner of public-private partnerships have failed to live up to initial expectations; some have simply fallen by the wayside. In the context of this article, however, a more focused question is pertinent. Do public-private partnerships of relevance to the Arctic offer another avenue of engagement for Arctic and non-Arctic states seeking to address issues of Arctic governance? One factor that makes this question particularly interesting is that some of the major corporate players in the Arctic are either state-owned enterprises (e.g., the Chinese Ocean Shipping

Company or COSCO, China's leading shipping company), nominally private enterprises that are partially owned or controlled by a government (e.g., Gazprom, the world's leading producer of natural gas, in which the Russian government holds a large stake), or private companies that operate in settings characterized by close corporate-state relations (e.g., Hyundai or Daewoo in Korea).

In thinking about public-private partnerships as avenues of engagement, it is helpful to begin with a distinction among three possible roles that such arrangements may play: advisory, regulatory, and operational. Some such partnerships are intended to be advisory in nature. There is growing interest in Arctic circles, for example, in developing the means to facilitate communication between the policy community and the business community regarding issues of mutual interest. A prominent example is the effort of Canada, acting in its capacity as chair of the Arctic Council during 2013-2015, to launch an Arctic Economic Council. Although the details are not yet clear, the expectation is that this Council would be an informal body including representatives of major corporations operating in the Arctic (or intending to do so in the future), loosely affiliated with the Arctic Council, and able to serve as a channel providing input from the business community into Arctic Council deliberations. The non-Arctic states would not themselves be members of the Arctic Economic Council. Nevertheless, Council members could include (representatives of) corporations based in non-Arctic states (e.g., the China National Petroleum Corporation or CNPC, Royal Dutch Shell, Total, and Hyundai), an arrangement that would provide a channel for non-Arctic states to convey their views regarding economic matters to the Arctic policy community.

Another role for public-private partnerships is regulatory in nature. A concrete example involves the International Association of Classification Societies (IACS), a nongovernmental organization that brings together a group of classification societies (e.g., Lloyd's Register, Det Norske Veritas, China Classification Society, and Korean Register of Shipping) and that has gained considerable influence in the world of shipping. To take a specific illustration, a new oil tanker must receive certification from IACS regarding its compliance with current equipment standards before it can qualify to obtain insurance. There is no demand for the services of uninsured tankers, a fact that allows IACS to wield substantial influence in the world of maritime commerce.⁴⁴ Regarding the operation of commercial vessels in the Arctic, IACS maintains a system of classifying vessels with respect to

their capacity to operate safely in varying ice conditions. This system of ice classification has no formal connection to the requirements dealing with the design, construction, and operation of ships intended to navigate in polar waters now under development under the auspices of the IMO. But it seems clear that there is ample opportunity for coordination between the IACS system of ice classification and the rules likely to be included in the mandatory Polar Code. Among other things, coordination between the two systems may well have important implications when it comes to issues relating to marine insurance for vessels operating in polar waters.⁴⁵

Partnerships that are more operational in character may also become increasingly significant in the Arctic. Interesting examples relate to the operation of cruise ships in Arctic waters. Some operators have begun to equip their vessels with hydrographic instruments and to offer to submit hydrographic data to a central public repository, a matter of considerable interest given the fact that hydrographic information that meets current international standards is lacking for most of the Arctic.⁴⁶ The operators may also have a role to play in the realm of search and rescue. One step that could help to offset the limited capacity of governments to implement the 2011 search and rescue agreement would be the introduction of a requirement that cruise ships operate in tandem, so that a rescue vessel would be close at hand in the event that an accident crippled a vessel or even led to a sinking. In all likelihood, the Arctic Council lacks the authority to make an effective decision about a matter of this sort. But there is little doubt that those states possessing jurisdiction over the waters used by cruise ships operating in the Arctic could band together to make and enforce a policy of this sort. The fact that many of the ships involved are either registered in non-Arctic states or owned by nationals of non-Arctic states suggests that this may provide yet another opportunity for navigating the Arctic/non-Arctic interface.

Because these partnerships focus, in the first instance, on interactions between governments and private actors, their relevance as avenues of engagement between Arctic and non-Arctic states is limited. But this fact does not make them irrelevant in these terms. Some of the key players are actually state-owned enterprises, such as COSCO or CNPC, or corporations operating in systems featuring extremely close relations between corporations and the state (e.g., Korean or Japanese corporations). Although the usefulness of this avenue may be limited to a relatively narrow range of issues, it would be a mistake to overlook the role of

public-private partnerships as an avenue of engagement between Arctic and non-Arctic states.

INFORMAL VENUES

Finally, it is worth thinking about arrangements that provide informal opportunities for engagement between or among individuals from Arctic and non-Arctic states. Of course, individuals can meet at times and places of their own choosing and exchange thoughts on any topics that are of mutual interest. But it is often useful to develop forums that provide recurrent opportunities to engage in informal and off-the-record interactions on the part of individuals who can count on running into their counterparts repeatedly without having to make formal arrangements to do so. There is a long history of arrangements of this sort dealing with a wide range of international issues. The concept of the Chatham House Rule, under which individuals can engage in open discussions of innovative ideas without fear of attribution, applies generally to such encounters.⁴⁷ With regard to the Arctic, three forums of this sort are worth considering explicitly: the annual Arctic Frontiers Conferences, the North Pacific Arctic Conferences, and the World Economic Forum gatherings.

Arctic Frontiers, now in its ninth year, is "... an international arena addressing development in the Arctic" and intended to share ideas about "... how upcoming opportunities and challenges may be handled to ensure viable economic growth and societal and environmental sustainability."⁴⁸ Organized as a project of the Norwegian company Akvaplan Niva, this annual event takes place on the campus of the University of Tromsø (now known as the Arctic University of Norway) and attracts more than 1,000 participants. Each year, the conference adopts a broad theme that is discussed over a two-day period by those engaged in the policy community and then considered for three additional days by members of the research community. The theme for 2015 is "Climate and Energy." As with many successful ventures of this sort, Arctic Frontiers has become a magnet for a variety of side events that offer particularly attractive venues for informal and off-the-record dialogue on a variety of topics. In the context of this discussion, Arctic Frontiers is notable both because it is open to participants from a variety of non-Arctic states and because it attracts a sizable group of Russian participants who are able to address a range of Arctic matters.

The North Pacific Arctic Conferences (NPAC), now entering their fifth year, provide a different approach to the goal of creating opportunities for off-the-record engagement among individuals from Arctic states and non-Arctic states. Supported by the Korea Maritime Institute (KMI) and held at the East-West Center in Hawaii, the annual NPAC gathering takes the form of a structured conference in which a relatively small number of participants make presentations and engage in informal but focused discussion of a series of well-defined topics. A central objective of this series of conferences is to bring together individuals from leading Asian states (e.g., China, Japan, and Korea) who are interested in Arctic affairs and individuals from the North Pacific Arctic states (Canada, Russia, and the United States) in a setting in which informal communication can supplement the more formal exchanges occurring among presenters, commentators and panelists. The proceedings of the NPAC conferences are published, but the general discussion occurring at the conferences takes place under the Chatham House Rule. The decision of the Arctic Council in 2013 to grant observer status to five Asian states has heightened the significance of NPAC as an informal avenue of engagement.

The World Economic Forum (WEF) is a well-known group that holds an informal but high-level meeting each winter in Davos, Switzerland, in which leading business people, policymakers, scientists, and public intellectuals come together to compare notes on a variety of topics and to engage in more private consultations on matters of current interest. Formally a not-for-profit foundation, the forum strives "... to demonstrate entrepreneurship in the global public interest while upholding the highest standards of governance."⁴⁹ Long concerned with macro-scale economic and political events, the WEF has taken note of the growing importance of the Arctic on a global scale and created a group called the Global Agenda Council on the Arctic, which has recently produced a booklet entitled "Demystifying the Arctic."⁵⁰ The significance of this document is that it lays out a well-informed and balanced account of current developments in the Arctic and that it has provided a road map regarding these developments for members of an influential elite. Whether or not the WEF continues to attach priority to Arctic issues, this group offers another useful avenue of engagement for prominent individuals from both Arctic and non-Arctic states.

An informal mechanism that is somewhat different in character is the Arctic Circle, an open forum for all those interested in the Arctic launched

in 2013 and intended to become an annual event. This initiative was greeted at first with some concern by members of the Arctic Council community, who feared that the Arctic Circle could become a competitor for the role of high-level forum for the treatment of Arctic issues. But this concern has dissipated with the decision of the Council to accept additional non-Arctic states as observers and the development of the circle into a kind of annual festival attracting all those interested in the Arctic from around the world and from a range of perspectives. The inaugural assembly of the Arctic Circle drew more than 1,200 participants from 40 nations to an event characterized as "... a nexus where art intersects with science, architecture, education, and activism."⁵¹ It is too early to tell how this organization will develop, but the outpouring of interest from around the world stimulated by the 2013 assembly makes it clear that enthusiasm regarding Arctic issues is widespread. In terms of navigating the Arctic/non-Arctic interface, it may make sense to think of the Arctic Circle's annual assembly as a kind of all-hands gathering or "fair" in which a program of activities provides a setting in which interested parties can engage in networking of various sorts and enter into agreements regarding a wide range of issues in a festive atmosphere.

CONCLUSION

In thinking about the usefulness of the various avenues of engagement discussed in this article it is essential to bear in mind that the Arctic is a dynamic region. Biophysical forces (e.g., the melting of sea ice) are causing transformative change in the high latitudes. These changes have triggered the emergence of new socioeconomic opportunities (e.g., the prospect of commercial navigation using Arctic sea routes). And these opportunities, in turn, are leading to new developments in the realm of governance. In 1996, at the time the Arctic Council was established, commercial shipping using the Northern Sea Route was in decline following the collapse of the Soviet Union. No one at the time foresaw the sharp rise in interest in Arctic shipping that has occurred in recent years. The Arctic Council has been a significant player in this realm, carrying out projects (e.g., the Arctic Marine Shipping Assessment) that have identified emerging issues and framed them for purposes of consideration in policy forums. Now, the focus of attention has shifted to the development of a mandatory Polar Code under

the auspices of the IMO, a body that is fully accessible to non-Arctic states with an interest in shipping. In effect, an issue that the Arctic Council was among the first to identify and take seriously has evolved into an issue addressed in a broader international forum in which interested non-Arctic states are able to engage freely and effectively.

Fortunately, the avenues of engagement I have identified are by no means mutually exclusive. What is needed is a strategy of mixing and matching that allows those interested in a specific issue at a particular stage in its evolution to work together to make progress toward the creation and implementation of mutually agreeable governance arrangements. Take the case of commercial shipping again as an illustration. IASC is coordinating the production of knowledge pertaining to the behavior of sea ice needed to support safe navigation in the Arctic. The Arctic Council's 2009 Arctic Marine Shipping Assessment framed the key issues regarding Arctic shipping, provided an authoritative assessment of the state of play regarding these issues, and advanced a series of concrete recommendations. The Polar Code is now emerging under the auspices of the IMO. IACS is likely to play an important role in certifying that new ships meet standards pertaining to vessels operating in ice-infested waters and, in the process, making them eligible to obtain marine insurance. The North Pacific Arctic Conferences have provided a forum for discussion among those concerned with the economics of Arctic shipping, including the costs of establishing and managing the infrastructure that would be needed to support commercial shipping in areas like the Northern Sea Route. Nor is there anything unique or even unusual about Arctic shipping in these terms. It follows that it is more important to think creatively about the use of multiple avenues of engagement than to fixate on details regarding arrangements pertaining to any one of the avenues.

Notes

1. For a range of perspectives on these developments, see the essays collected in James Kraska ed., *Arctic Security in an Age of Climate Change*. Cambridge: Cambridge University Press, 2011; Paul A. Berkman and Alexander Vylegzhanin eds., *Environmental Security in the Arctic Ocean*. Dordrecht: Springer, 2012 ; Oran R. Young, Jong Deog Kim, and Yoon Hyung Kim, *The Arctic in*

- World Affairs: A North Pacific Dialogue on the Future of the Arctic*. Seoul and Honolulu: KMI and EWC, 2013; Elizabeth Tedsen, Sandra Cavalieri, and R. Andreas Kraemer eds., *Arctic Marine Governance: Opportunities for Transatlantic Cooperation*. Berlin: Springer, 2014, and Kristine Offerdal and Rolf Tammes eds., *Geopolitics and security in the Arctic*. London: Routledge, 2014. A compact but well-informed overview is presented in Christian Le Miere and Jeffrey Mazo, *Arctic Opening: Insecurity and Opportunity*. New York: Routledge, 2013.
2. United Nations Environment Programme, *UNEP Yearbook 2013: Emerging Issues in Our Global Environment*. Nairobi: UNEP 2014 – see the chapter entitled “The View from the Top.” See also Robert W. Corell, “Consequences of the Changes across the Arctic on World Order, the North Pacific Nations, and Regional and Global Governance,” pp. 17-57 in Robert W. Corell, James Seong-Cheol, and Yoon Hyung Kim eds., *The Arctic in World Affairs: A North Pacific Dialogue on Arctic Transformation*. Seoul and Honolulu: KOTI and EWC, 2013 and James Astill, “The melting north,” *The Economist*, 16 June 2012.
 3. The idea that the Arctic is becoming a zone of conflict is a popular theme in journalistic accounts, but has little basis in fact. See, for example, Siemon T. Wezeman, “Military Capabilities in the Arctic,” *SIPRI Background Paper*, March 2012.
 4. For a popular but well-informed account, see James Astill et al., “The vanishing north: What the melting of the Arctic means for trade, energy and the environment,” a 14-page special report, *The Economist*, 16-22 June 2012.
 5. Sandra Cavalieri et al., “EU Arctic Footprint and Policy Assessment,” Ecologic Institute, Berlin, 21 December 2010.
 6. Heather Conley et al., “Arctic Economics in the 21st Century: The Benefits and Costs of Cold,” A Report of the CSIS Europe Program, Washington, DC, July 2013.
 7. Donald Gautier, et al., “Assessment of Undiscovered Oil and Gas in the Arctic,” *Science*, 234 (2009): 1175-1179.
 8. Roger Howard, *The Arctic Gold Rush: The New Race for Tomorrow’s Natural Resources*. New York: Continuum, 2009; Richard Sale and Eugene Potapov, *The Scramble for the Arctic: Ownership, Exploitation and Conflict in the Far North*. London: Frances Lincoln, 2010.
 9. Harri Mikkola and Juha Kämpylä, “Arctic Economic Potential: The Need for a Comprehensive and Risk-Aware Understanding of Arctic Dynamics,” Finnish Institute of International Affairs, *FIIA Briefing Paper 127*, April 2013.
 10. Marlene Laruelle, *Russia’s Arctic Strategies and the Future of the Far North*. Armonk, NY: M.E. Sharpe, 2014.

11. For example, Canada, the current chair of the Arctic Council, boycotted Council meetings in Moscow at the end of April 2014 as one means of expressing displeasure with Russia's annexation of the Crimea.
12. Inevitably, some western commentators react suspiciously to such developments. Consider Elizabeth Economy's recent comment that "China has begun the process of engaging in the Arctic through research, investment, and diplomacy. For now, it has only dipped its toe in the Arctic waters, but it is ready to plunge in. The rest of the world needs to be prepared"- <http://blogs.cfr.org/asia/2014/04/04/beijings-arctic-play-just-the-tip-of-the-iceberg/>. For a balanced account, see Linda K. Jacobson and Jingchao Peng, "China's Arctic Aspirations," *SIPRI Policy Paper 34*, November 2012.
13. There are clear similarities between the idea of an institutional mosaic and the concept of a regime complex that has become a focus of attention in recent literature on international governance. The difference is that a mosaic involves distinct arrangements that all deal with a spatially defined region, whereas a complex includes separate arrangements dealing with a common issue domain (e.g., climate change). See Amandine Orsini, Jean-Frederic Morin, and Oran R. Young, "Regime Complexes: A Buzz, a Boom, or a Boost for Global Governance," *Global Governance*, 19 (2013), 27-39.
14. Olav Schram Stokke and Geir Hønneland eds., *International Cooperation and Arctic Governance: Regime Effectiveness and Northern Region Building*. London: Routledge, 2007.
15. An earlier distinction between permanent and ad hoc observers is no longer in use.
16. The most prominent sticking point is Canada's displeasure regarding the EU's ban on the importation of certain seal products. See also the latest expressions of EU thinking about the Arctic - Council of the EU, "Council conclusions on developing a European Union Policy towards the Arctic Region," 12 May 2014 (<http://www.consilium.europa.eu/Newsroom>).
17. For a general account of the role of observers in the Arctic Council, see Piotr Graczyk and Timo Koivurova, "A new era in the Arctic Council's external relations? Broader consequences of the Nuuk observer rules for Arctic Governance," *Polar Record*, doi:10.1017/S003247412000824.
18. The operative rules are articulated in the report of the Senior Arctic Officials to the Ministerial Meeting in Nuuk, Greenland in May 2011. See *SAOs Report to the Ministers, May 2011* – text available at <http://www.arctic-council.org/>.
19. The significance of this requirement will not become clear until 2017 when observers accepted in 2013 or before come due for recertification.
20. Texts of all these documents are available on the Arctic Council's website –

<http://www.arctic-council.org/>.

21. At NPAC 2014, a participant who has played a prominent role in the Arctic Council since its inception spoke of the “task force mess.”
22. Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic, signed 11 May 2011 and Agreement on Cooperation on Marine Oil Pollution, Preparedness and Response in the Arctic, signed 15 May 2013. Texts available at: <http://www.arctic-council.org/>.
23. The five Arctic coastal states have taken the lead in pushing for an agreement regarding potential fisheries in the Arctic Ocean, but have now acknowledged that it will be essential to draw in other states in order to produce an effective agreement. See Chairman’s Statement from the Meeting on Arctic Fisheries, 24-26 February 2014.
24. Alun Anderson, *After the Ice: Life, Death, and Geopolitics in the New Arctic*. New York: Smithsonian Books, 2009; Paula Kankaanpää and Oran R. Young, “The Effectiveness of the Arctic Council,” *Polar Research*, 31 (2012), 17176; Thomas Axworthy, Timo Koivurova, and Waliul Hasanat eds., *The Arctic Council: Its Place in the Future of Arctic Governance*. Toronto: Munk School of Global Affairs, 2012.
25. Although it is difficult to prove conclusively, the available evidence suggests that a concern regarding impacts in the Arctic did play a role in the negotiations leading to the 2001 Stockholm Convention. See David L. Downie and Terry Fenge eds., *Northern Lights against POPs: Combatting Toxic Threats in the Arctic*. Montreal and Kingston: McGill-Queen’s University Press, 2003.
26. Henrik Selin, *Global Governance of Hazardous Chemicals: Challenges of Multilevel Management*. Cambridge: MIT Press, 2010.
27. Although the Antarctic ozone hole is larger and more widely known, seasonal depletions of stratospheric ozone are also prominent occurrences in the high latitudes of the northern hemisphere. The ozone regime has brought about dramatic reductions in the production and consumption of ozone-depleting substances. But the seasonal ozone holes in the high latitudes have not yet disappeared.
28. Edward A. Parson, *Protecting the Ozone Layer: Science and Strategy*. Oxford: Oxford University Press, 2003.
29. The Global Carbon Project publishes an annual authoritative report on trends in carbon emissions – <http://www.globalcarbonproject.org/>.
30. The Polar Code will apply to commercial navigation in both Arctic and Antarctic waters. But current interest in the issue is driven by the expectation of substantial increases in the operation of ships in the Arctic. See David L. VanderZwaag, “The IMO and Arctic Marine Environmental Protection,” pp.

- 99-128 in Oran R. Young, Jong Deog Kim, and Yoon Hyung Kim eds., *The Arctic in World Affairs: A North Pacific Dialogue on Arctic Marine Issues*. Seoul and Honolulu: KMI and EWC, 2012.
31. The quote is from the IHO website – <http://www.iho.int/>.
32. Bjørn Gunnarsson, “The Future of Arctic Marine Operations and Shipping Logistics,” pp. 37-61 in Oran R. Young, Jong Deog Kim, and Yoon Hyung Kim eds., *The Arctic in World Affairs: A North Pacific Dialogue on the Future of the Arctic*. Seoul and Honolulu: KMI and EWC, 2013.
33. Anne Fikkan, Gail Osherenko, and Alexander Arikainen, “Polar Bears: The Importance of Simplicity,” pp. 96-151 in Oran R. Young and Gail Osherenko eds., *Polar Politics: Creating International Environmental Regimes*. Ithaca: Cornell University Press, 1993; Pål Prestrud and Ian Stirling, “The International Polar Bear Agreement and the Current Status of Polar Bear Conservation,” *Aquatic Mammals*, 20 (1994): 113-124.
34. Because the Arctic coastal states have made a point of arguing that UNCLOS is the basis for addressing issues of governance in the maritime Arctic, they can hardly claim that it does not apply to the case of fishing. The area beyond national jurisdiction in the Central Arctic Ocean encompasses more than two million square kilometers.
35. A.B. Hollowed, B. Planque, and H. Loeng, “Potential Movement of Fish and Shellfish Stocks from the Sub-Arctic to the Arctic Ocean,” *Fisheries Oceanography*, 22 (2013): 355-370.
36. Syma Ebbin, Alf H. Hoel, and Are Sydnes eds., *A Sea Change: The Exclusive Economic Zone and Governance Institutions for Living Marine Resources*. Dordrecht: Kluwer, 2005.
37. Lisa Speer and Thomas L. Laughlin, “Workshop Report,” IUCN/NRDC Workshop to Identify Areas of Ecological and Biological Significance or Vulnerability in the Arctic Marine Environment, 7 April 2011.
38. On 12 March 2014, the European Parliament adopted a resolution on the EU strategy for the Arctic. Although the media have reported that the resolution calls for the creation of an Arctic sanctuary, the actual text of the resolution calls for “... the protection of the international area around the North Pole outside the economic zones of the coastal states.”
39. While SCAR is an ICSU committee, IASC is only an ICSU international scientific associate. The reason for this distinction has to do with the establishment of an IASC Regional Board, representing the concerns of the eight Arctic states. For a range of perspectives on SCAR, see David W.H. Walton ed., *Antarctica: Global Science from a Frozen Continent*. Cambridge: Cambridge University Press, 2013.

40. These standards are set forth in ISO 19906:2010.
41. Quotes in this paragraph are from the AECO website – <http://www.aeco.no/>.
42. Quotes in this paragraph are from the WOC website – <http://www.oceancouncil.org/site/>.
43. Philipp Pattberg et al. eds., *Public-Private Partnerships for Sustainable Development: Emergence, Influence and Legitimacy*. Cheltenham: Edward Elgar, 2012.
44. Ronald B. Mitchell, *Intentional Oil Pollution at Sea: Environmental Policy and Treaty Compliance*. Cambridge: MIT Press, 1994.
45. Charles Emmerson with Glada Lahn, “Arctic Opening: Opportunities and Risk in the High North,” London: Lloyd’s, 2012.
46. Lawson Brigham, “International Cooperation in Arctic Marine Transportation: Safety and Environmental Protection,” pp. 115-136 in Oran R. Young, Jong Deog Kim, and Yoon Hyung Kim eds., *The Arctic in World Affairs: A North Pacific Dialogue on the Future of the Arctic*. Seoul and Honolulu: KMI and EWC, 2013.
47. The term Chatham House Rule refers to a practice originating with the Royal Institute of International Affairs in the UK, whose home in London is known as Chatham House. The rule specifies that participants in a meeting held under the Chatham House Rule “... are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed.”
48. The quote is from the Arctic Frontiers website – <http://www.arcticfrontiers.com/>.
49. The quote is from the WEF website – <http://www.weforum.org/>.
50. World Economic Forum Global Agenda Council on the Arctic, “Demystifying the Arctic,” WEF, 2014.
51. The quote is from the Arctic Circle website – <http://www.arcticcircle.org/>.

Commentary

Lars-Otto Reiersen

Twenty-five years ago, the Arctic was a zone of conflicts; nowhere else in the world were there more nuclear installations, storage of fuels, waste and weapons than in the North. Nuclear submarines were patrolling under the sea ice, and intelligence services tried to watch every movement with military implications in the area. These Arctic military operations involved several non-Arctic states, including the UK, France, the Netherlands, etc. At the same time, the local and indigenous Arctic peoples lived as they had done for thousands of years, harvesting from nature what they needed to survive. Regarding science, few scientists were interested in the Arctic. Among those interested, however, some came from non-Arctic states.

In 1987, Gorbachev gave a special speech in Murmansk that triggered a tremendous change opening the way for new cooperation between the East and West. In 1990, the International Arctic Science Committee (IASC) was established to promote scientific cooperation. In 1991, the Arctic Environmental Protection Strategy (AEPS) was established, and in 1996 this arrangement was transformed into the Arctic Council. After 1991, numerous circum-Arctic and regional Arctic organizations were established focusing on the environment, business, culture, education, health, and so forth. There were a lot of overlapping initiatives and projects, and most of these had the same intention: to assist in a democratic transition from the Soviet Union to Russia. The involvement of non-Arctic states and organizations varied a lot among these initiatives. Investments were needed and promised, but not always provided, leading to a huge variation in the real investment and involvement among Arctic and non-Arctic states.

Twenty-five years ago the Arctic was seen as a huge, pristine area (some people do still believe that this is the case). It came as a big surprise when the Arctic Monitoring and Assessment Programme (AMAP) in 1997 presented the first comprehensive Arctic environmental assessment documenting that the Arctic peoples—especially the indigenous peoples - animals (the food for the people) and part of the water and soil in some areas were polluted with products not only originating from the Soviet Union, as many expected, but from emissions and discharges in states all over the Northern Hemisphere—Arctic as well as non-Arctic states. The main sources within the Arctic were military activities (due to nuclear tests,

etc.) and some mines and metallurgic industries. Some of the contaminants had levels that affected the lives of humans and animals. These results were provided to international fora by AMAP, some Arctic states and Arctic indigenous leaders like Sheila Watt-Cloutier. They were used in documentation to get in place international agreements and actions that could reduce the pollution not only of the Arctic, but in the world as a whole. The 2001 Stockholm Convention on Persistent Organic Pollutants (POPs) and the 2013 Minamata Convention on Mercury are two examples of such agreements where results produced by AMAP/Arctic Council played a significant role. In addition, the cleanup of radioactive fuels, waste and submarines in Northwest Russia was to a great extent based on the AMAP report on nuclear contamination presented in 1996.

The scientific assessment report that triggered the largest effect and increased interest in the Arctic and the Arctic Council was the Arctic Climate Impact Assessment (ACIA) presented in November 2004. ACIA was produced jointly by AMAP and CAFF under the Arctic Council and the IASC. Bob Corell chaired the steering committee. The IPCC had until then produced global climate assessments and written about the effects of future climate change, but ACIA documented that the impacts of climate change were occurring now!

In all these scientific assessments, scientists from Arctic states and from some non-Arctic states participated. Since the beginning in 1991, some Arctic states have not had Arctic research and monitoring as a priority area; more southern national areas had the priority. Interestingly, some non-Arctic states have placed the Arctic high on their research agendas, and contributed significantly to the work of AMAP.

As mentioned before, significant parts of some contaminants/pollutants ending up in the Arctic originate in non-Arctic states (e.g., from Europe and Southeast Asia). The same pollutants not only affect the Arctic, but also the source countries (Arctic as well as non-Arctic) and their peoples. But due to a more complex situation with more stress factors in addition to the contaminants, the cause-effect relation will not be so easy to document as in the Arctic.

The Arctic is rich in resources—fish and seafood, minerals, oil and gas, forest products—all wanted by the world. As a consequence of the effects of climate change, some of these resources will be more accessible than before, and states and industries have started to position themselves for exploration and exploitation. For this type of work, some of the Arctic

states may need expertise and investment from non-Arctic states. A migration to the North might be triggered in some areas as climate change goes on and the possibilities for jobs increase. This migration may lead to local conflicts between those living in the Arctic today and newcomers. Based on previous experiences with oil and gas development and the big fisheries off the Arctic coasts, there is already a discussion related to how much of the profits created by such activities in the North will stay in the North and be of benefit for the local and indigenous peoples now and in the future. So, who will be the winners and who the losers?

The Arctic Council came out of the “Valley of the Shadow” and into the political spotlight when the ACIA report became public. The Arctic Council has two main interesting features: 1) the active involvement of Arctic indigenous peoples in setting work priorities, and 2) the short distance from science to policy actions (e.g., pollution, climate and health issues). With climate change affecting the Arctic, more states have a focus on the Arctic, and thereby also on the Arctic Council.

The eight Arctic states have not assigned the same high priority to work under the Arctic Council. This has been easily observed in several ways, including who has been nominated as the national SAOs—a strong person with an “Arctic heart,” or one waiting for retirement—and then how much financial and human resources have been allocated to perform the work to be done by the working groups and Arctic scientific work. During the IPY, there was an increase in the scientific budget in some states, but that has not continued. Due to the economic crises, budget cuts for environmental and Arctic work have been announced and implemented in some countries. The involvement of private businesses in the work of the Arctic Council has been discussed, and the establishment of an Arctic Economic Forum as a way to stimulate investments in the North. But will this lead to more money for scientific research and monitoring and environmental protection and better access to environmental data stored by the businesses?

All Arctic Council working groups started out as task forces under the AEPS (1991-1997). Over the last four years, several new task forces have been initiated, but unfortunately most of the tasks have to a large degree involved duplication of work that some of the working groups already have a mandate to do (e.g., oil spill prevention and black carbon). This situation and the increasing split between the SAOs (arranging more separate meetings for SAOs only) and the working groups have produced a rather special situation at some meetings and for work to be done. The working

groups were established as the tools for the Arctic Council to prepare background documentation and recommendations for actions on the part of the SAOs and the ministers, with the understanding that they would make decisions on the final actions. With the new task forces, this strategy has been changed—and maybe not to the better.

Two initiatives to reorganize the Arctic Council have failed more or less due to the national protection of “babies.” The organization today has more or less the same structure as when it was designed in June 1991 in Rovaniemi to handle the situation as seen then. Some of the problems identified then do still exist, but there are new problems to be handled today and in the near future. It is time to look at the Council’s structure and also to revisit the list of observers—several of the observing organizations listed have never attended any working group meetings or contributed to their work. On the other side, there are international organizations that should be of great interest for the Arctic Council and the work to be done. AMAP has since the beginning in 1991 involved experts from international organizations like WMO, IAEA, ICES, etc. because these organizations have expertise and instruments that are of great value for the scientific work to be done.

For the work to be done by several of the working groups, an active involvement of non-Arctic states and international organizations is highly recommended because they may bring in expertise and knowledge needed by the working groups in their work. This is especially true for AMAP, which bases its work on world-class science and transparency, in addition to avoiding duplication of work. Some non-Arctic states and organizations do have financial resources that are available for Arctic work/science, and it makes sense to use these opportunities to improve the quality of the products produced and thereby also the policy that will be decided upon.

Over the last few years, the eight Arctic states under the Arctic Council’s umbrella have made an interesting innovation. There have been two agreements negotiated that have been signed by the eight Arctic countries: the Search and Rescue Agreement and the Oil Pollution Preparedness and Response Agreement. Possible action related to black carbon and science is under discussion. Can this new strategy developed by Arctic Council member states be followed up in a way that also provides an opportunity for the non-Arctic observing states to agree on actions beyond scientific cooperation in the working groups?

An interesting situation exists—the eight Arctic states and 12 non-Arctic

observing states are today the main sources for many of the contaminants affecting the Arctic, the 20 states and significant parts of the globe. As for emissions of greenhouse gasses, two-thirds of CO₂ emissions originate from these 20 states. If these states could talk together on possible actions and solutions regarding how global pollution and climate change could be handled and maybe solved, it may open the way for real actions. It will not be an easy task, but 20 states should be easier to handle than almost 200. This work will not only be of benefit for the Arctic and its people, but for the whole world.

Commentary

Jiayu Bai

The Arctic has been experiencing transformative change for more than 20 years. This transformation, triggered by climate change, has generated a need for Arctic cooperation.¹ The acceleration of sea ice melting in the Arctic results in a rise in sea level and extreme summer weather in the northern mid-latitudes.² Meanwhile, the accessibility of the Arctic provides an opportunity for navigation, resource exploitation, tourism and other human activities in this region. An effective Arctic governance system could steer socio-ecological systems toward pathways that are collectively desirable and away from pathways that are undesirable.³ Non-Arctic states are significant stakeholders in Arctic affairs, not only because of the realization of their legal rights and interests in the Arctic, but also due to their contribution to the provision of public goods. In this article, I start with a clarification of the roles of non-Arctic states in the Arctic governance system, defining the non-Arctic states as public goods providers and cooperators. Then I expound on non-Arctic states' contributions to the existing Arctic governance mosaic in various domains, taking China's engagement as a concrete case.

NON-ARCTIC STATES' ROLES IN THE ARCTIC GOVERNANCE MOSAIC

The Arctic governance system is one involving multiple actors dealing with issues in multiple fields through multilevel mechanisms. A balanced Arctic governance system requires non-Arctic states to play positive roles. In what fields are non-Arctic states welcomed for engagement? How can non-Arctic states contribute to enhance the existing regulatory regimes and create new ones via a wide range of administrative bodies? The answers to these questions may help clarify the roles of non-Arctic states in the Arctic governance system.

From biophysical, geo-economical and geopolitical perspectives, Arctic states are located at the frontiers facing the transformation of the Arctic. Other actors' involvement in Arctic governance should be based on the acknowledgement of Arctic states' sovereignty and indigenous

peoples' rights. However, along with climate change and the globalization of the Arctic, Arctic states are unable to address all the issues without the participation of non-Arctic states. Especially in some nontraditional security fields, Arctic and non-Arctic states enjoy the same interests and the burdens of common responsibilities.⁴ Non-Arctic states could play constructive roles through their engagement in the multilevel mechanisms. At the global level, non-Arctic states participate in global framework arrangements to provide public goods and prevent public ills. At the regional level, non-Arctic states engage in some regional or Arctic-specific bodies and comply with the regional arrangements. At the local level, non-Arctic states cooperate with Arctic states and among themselves to realize win-win results.

As a non-Arctic state, China respects the sovereignty, sovereign rights and jurisdiction of Arctic states.⁵ China is a member state of various treaties aiming at climate change response and marine environment protection. Under UN agencies and programs, China will participate in the formation of new rules applicable to the Arctic. The Arctic Council is the most influential regional institution for addressing a range of issues relevant to environment protection. After being granted observer status by the Arctic Council, China has accepted its responsibility for environment protection in the Arctic. Although observers have no rights to express ideas to Senior Arctic Officials, China would like to play an active role in the working groups and tasks forces. Generally speaking, China's attitude toward its role in the Arctic is on the foundation of keyword-cooperation. On April 20, 2012, the former Prime Minister of China, Wen Jiabao, visited Iceland and extended willingness to cooperate to Arctic states.

NON-ARCTIC STATES' CONTRIBUTION TO CLIMATE CHANGE GOVERNANCE IN THE ARCTIC

Climate change manifests itself more dramatically in the Arctic than anywhere else on the planet. The Arctic is considered the reactor of climate change. In the middle of September 2012, the Arctic Ocean recorded the lowest summer sea ice cover ever. The extent of Arctic sea ice extent has declined at a rate of about 8% per decade during September since the 1980s.⁶ Sea level rise, the acidification of seawater and extreme summer weather in northern mid-latitudes that result from sea ice loss are severely threatening non-Arctic states, particularly the coastal states and small

island states in the northern hemisphere.

Climate change governance falls under the typical global governance category, including separate arrangements dealing with the common concerns of humankind. Climate change governance is also a key topic in the Arctic governance system in that the Arctic is the early warning device of climate change. To some extent, the specific governance mechanisms in the Arctic dealing with climate change are part of the climate change governance mechanisms globally. The existing mechanisms relating to climate change enrich the Arctic governance mosaic as well. The conference of parties of the UNFCCC provides the platform for non-Arctic states to contribute to the reduction of greenhouse gas emissions, which should be implemented according to the principle of common but differentiated responsibilities. The Arctic Council regards climate change governance as a key priority together with environment protection. The working groups Arctic Monitoring and Assessment Program (AMAP) and the Conservation of Arctic Flora and Fauna (CAFF) along with the International Arctic Science Committee (IASC) produced the Arctic Climate Impact Assessment in 2004. The task force for enhancing scientific cooperation focuses on the impacts of climate change.⁷ Observers could designate scientists to participate in the relevant working groups and task forces to address climate change.

China is a coastal state with 18,000 kilometers of coastline. The area north of the Yangtze River in China is located in the northern mid-latitudes, accounting for 63.5% of the land area of China. China may suffer extreme weather and severe acidification of seawater because of sea ice melting in the Arctic. Sea level rise may cause the disappearance of some of China's coastal cities, and even the coastal provinces in China, such as Shanghai City and Jiangsu Province. Therefore, it is extremely urgent for China to learn about the status of the Arctic marine environment and take precautionary measures in case the situation is likely to become worse. The Chinese government has organized Arctic scientific research six times. One of the most important purposes of Arctic scientific research is to accumulate knowledge about climate change and share the relevant data with other states. In the regime complex of climate change governance, China endeavors to contribute through various mechanisms. China is a member state of the UNFCCC and Kyoto Protocol. By means of the Clean Development Mechanism under the Kyoto Protocol, China has reduced hundreds of millions of metric tons of carbon equivalents. Energy

conservation and emission reductions have become fundamental national policies of China.

NON-ARCTIC STATES' CONTRIBUTION TO ENVIRONMENT PROTECTION GOVERNANCE IN THE ARCTIC

The fragile environment in the Arctic and the movement of currents in the Arctic Ocean make environmental protection in the Arctic important. Prevention of pollution from various sources requires governance by multiple actors through multiple mechanisms. The global agreements and institutions include UNCLOS, MARPOL 1973/1978, the London convention 1972/1996, and the 1979 Convention on Long-range Transboundary Air Pollution as hard laws, and the Global Program for Action for the Protection of the Marine Environment from Land-based Activities as soft law. The Minamata Convention on Mercury, aimed at protecting human health and the environment from the adverse effects of mercury, was adopted on January 19, 2013. Other regional and sub-regional regimes include the Arctic Council, Barents Euro-Arctic Region, Norwegian/Russian Commission on Environment Protection, Convention on the Protection of the Marine Environment of the North-East Atlantic, etc. The theme of environmental protection has been a central concern from the Arctic Environmental Protection Strategy to the Arctic Council.

Most non-Arctic states are member states of the global agreements mentioned above. It is stipulated in UNCLOS that States have the obligation to protect and preserve the marine environment.⁸ States shall take, individually or jointly as appropriate, all measures consistent with the convention that are necessary to prevent, reduce and control pollution of the marine environment from any source, using for this purpose the best practical means at their disposal and in accordance with their capabilities, and shall endeavor to harmonize their policies in this connection.⁹ Thus, it is the obligation of non-Arctic states to prevent pollution and protect the environment of the Arctic. In this circumstance, non-Arctic states should actively implement the relevant ratified agreements and enact domestic laws to strengthen compliance with the agreements. The international legal regimes dealing with environmental protection constitute a fragmented system. Non-Arctic states need to update and improve their domestic laws

in order to meet the pollution prevention goals of different agreements. Under regional and sub-regional arrangements, non-Arctic states could contribute through observer status with the Arctic Council to work jointly with Arctic states to prevent pollution.

China is a member state of most international environmental protection agreements. Considering the long coastline of China, the best way to encourage foreign states to comply with the environmental protection rules relevant to China is to respect other coastal states' environmental protection legislation, including Arctic states' legal arrangements within their EEZs. Non-Arctic state status allows China to contribute through the designation of experts and financial support for environmental protection activities in the Arctic. China is also eager to protect the marine environment of the Arctic high seas by flag state control and restriction of any illegal, unregulated and unreported fishing in this area.

NON-ARCTIC STATES' CONTRIBUTION TO GOVERNANCE OF SHIPPING IN THE ARCTIC

Since the melting of Arctic sea ice and the opening of the Northern Sea Route (NSR) and the Northwest Passage (NWP), non-arctic states have shown an interest in transportation through Arctic passages. In 2009, two German heavy-lift vessels travelled through the NSR, shaving 3,000 miles and 10 days off a journey from Europe to South Korea compared to the Suez Canal route. By using the NSR, 600,000 USD per trip can be saved. In 2010, a transit by a Chinese (Hong Kong) flagged vessel with iron ore concentrate bound for China halved the time of the Suez Canal route and saved around 300,000 USD.¹⁰

Non-Arctic states could contribute to Arctic shipping governance through IMO at a global level, through the Arctic Council at a regional level, and through bilateral or multilateral cooperation at a national level. For example, China is a member state in the Memorandum of Understanding on Port State Control in the Asia-Pacific Region, the Tokyo MOU; Canada and Russia are also member states of the memorandum. China could coordinate with Canada and Russia to check whether states passing through the NSR or NWP comply with relevant IMO rules. Governance involving several levels of institutions can be mutually supportive.

In a multilevel Arctic shipping governance platform, non-Arctic states could participate in the formation of various Arctic shipping regulations. Regarding the compulsory Polar Code, China agrees with the goal and has provided valuable suggestions from a non-Arctic state perspective about vessel construction and crew training. To meet the new polar rules, other IMO treaties, like MARPOL and SOLAS, also await amendment by general consensus and wisdom from IMO membership, including those non-Arctic member states. In a word, Arctic governance cannot refuse the participation of non-Arctic states. There is a need for non-Arctic states to enhance interactions and exchange common concerns to stimulate learning about the Arctic.

China owns the largest commercial fleet in the world. As of December 31, 2012, the dead weight tonnage of China's fleet ranked in the top three worldwide, which accounts for more than 10% of the total dead weight tonnage around the world. The Chinese flag fleet accounted for 37.1% of the total of China's fleet, a percentage that is higher than for Greece or Japan.¹¹ In addition to the large fleet, the value of trade between China and parts of the Arctic region has been increasing in the last 14 years. In 2011, the export value from China to Arctic states was 342 million USD, and the import value from Arctic states to China was 1.552 billion USD.¹² Obviously, the trade market in the Arctic welcomes China's contribution by shipping. The involvement of the Polar Code and participation in IMO initiatives by China is of great significance for the stable, sustainable development of world shipping.

NON-ARCTIC STATES' CONTRIBUTION TO FISHING GOVERNANCE IN THE ARCTIC

When we analyze the meaning of the principle of freedom of the high seas, the right to fish is a common example. Hugo Grotius proposed the notion of the free sea in the 17th century. He said that the fishery resources were as rich as the stars in the sky and were inexhaustible. Nowadays, the freedom to fish has changed. For sustainable fishing, no country has the absolute freedom of fishing on the high seas. Where the stocks occur within the EEZ and in an area beyond and adjacent to it, or the stocks are highly migratory species, coastal states should cooperate directly or through the FAO with other states whose nationals harvest these species to ensure

their conservation. Although commercially valuable stocks of fish may not occur in the Arctic high seas for some time, only regional arrangements encompassing both Arctic coastal states and interested non-Arctic states, like China, can ensure conservation. For example, the 1994 Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea includes both the coastal states (Russia and the United States) and fishing states (China, Japan, Korea and Poland). Other sub-regional arrangements between Arctic coastal states and fishing states may also be helpful to deal with the prospect of IUU fishing.

NON-ARCTIC STATES' CONTRIBUTION TO SCIENTIFIC RESEARCH AND DATA SHARING

Good governance of the Arctic relies on full knowledge about the natural conditions of the Arctic and learning about its dynamic transformation. All states, irrespective of their geographical location, have the right to conduct marine scientific research subject to the rights and duties of other states.¹³ Those non-Arctic states which suffer the adverse effects of sea ice melting and climate change need regular and consistent scientific research about the Arctic. Until now, China has carried out comprehensive scientific research about the sea ice, ocean and atmospheric changes in the Arctic six times, exploring the causal linkage between the Arctic and climate change. In August 2012, the scientific research vessel Xuelong even transited the Northwest Passage to engage in scientific research activities in the Arctic Ocean. As a member state of the International Arctic Science Committee (IASC) and Arctic Ocean Sciences Board (AOSB), China shares scientific research data with other Arctic and non-Arctic states. However, domestic legislation about polar scientific research in China is insufficient. With the development of Arctic and Antarctic scientific research by China, the need for new legislation has emerged on the agenda.

Notes

1. In October 1987, Mikhail Gorbachev gave a speech in Murmansk to ask for broader and deeper cooperation in the Arctic and make it an international “zone

of peace.”

2. QiuHong Tang, Xuejun Zhang and Jennifer A. Francis, “Extreme Summer Weather in Northern Mid-Latitudes Linked to a Vanishing Cryosphere.” *Nature Climate Change*, 2013. doi: 10.1038/nclimate2065.
3. Young, O.R., L.A. King, and H.Schroeder (eds.).2008. *Institutions and Environmental Change: Principal Findings, Applications, and Research Frontiers*. Cambridge: MIT Press.
4. The nontraditional security fields mentioned here include climate change response, marine environment protection, shipping safety, sustainable resources exploitation and scientific research.
5. On May 15, 2013, China was granted observer status with the Arctic Council on the premise of the recognition of Arctic states’ sovereignty, sovereign rights and jurisdiction.
6. Data information from the website of the National Snow and Ice Data Center: nsidc.org. Comiso, J.C. “Large Decade decline of the Arctic Multiyear Ice Cover,” *J.Clim.* 25, (2012)1176-1193.
7. The Kiruna Declaration signed in May 2013 by Arctic states’ ministers established a task force to achieve improved scientific cooperation among the Arctic states.
8. United Nations Convention on the Law of the Sea, Article 192.
9. Ibid, Article 194(1).
10. Olav Schram Stokke, “Regime Interplay in Arctic Shipping Governance: Explaining Regional Niche Selection,” *International Environmental Agreements, Politics, Law and Economics*, vol.13 Issue 13, 65-85.
11. Ministry of Transport of the People’s Republic of China: The 2012 Report on China’s Shipping Development, China Communications Press (2013).
12. Zhang Xia, et al. “A Study on Scale and Scope of Maritime Cargoes through the Arctic Passages,” *Chinese Journal of Polar Research* 25, (2013) 167-175.
13. United Nations Convention on the Law of the Sea, Article 238.

Commentary

Eiji Sakai

A PITHY REMARK

The Arctic Ocean is only one element of the earth system, but one that is extremely important and sensitive to the climate of the globe, as the land and sea ice govern the energy exchange between the sun and the earth. The Ocean Policy Research Foundation (OPRF) endorses the trustworthiness of the Arctic Council (AC), hoping its deep consideration of the relationship between rights and responsibilities will be incorporated into the existing human rights framework. OPRF supports the Ilulissat Declaration adopted by the five Arctic coastal states in 2008, and places a high value on the reports of the AC's working groups.

As to international human rights instruments, the International Covenant on Civil and Political Rights (ICCPR) and the International Covenant on Economic, Social and Cultural Rights (ICESCR), which both entered into force in 1976, adopted the statement of principle on individual duties set forth in the Universal Declaration of Human Rights (UDHR) in 1948 in their preambles. The UDHR includes the following language:

“Whereas recognition of the inherent dignity and of the equal and inalienable rights of all members of the human family is the foundation of freedom, justice and peace in the world, Whereas disregard and contempt for human rights have resulted in barbarous acts which have outraged the conscience of mankind, and the advent of a world in which human beings shall enjoy freedom of speech and benefit and freedom from fear and want has been proclaimed as the highest aspiration of the common people, Whereas it is essential, if man is not to be compelled to have recourse, as a resort, to rebellion against tyranny and oppression, that human rights should be protected by the rule of law....”

The OPRF believes the AC will act with the principles of the Declaration and the Covenants in mind.

In addition, international society has already enforced a number of

treaties, protocols, and laws governing our globe. UNCLOS, SOLAS, MARPOL1973/1978, STCW are all relevant to the Arctic. In the days of the Internet, any opinions and proposals to the AC would be able to be expressed on the Web. Even non-Arctic states without AC observer status would be able to express their views, or address any proposal by organizing communities when needed, for instance the Global Ocean Commission, World Economic Forum, and so forth. The major benefit to the AC observers will lie in the fact that they can listen to formal discussions at AC meetings and gauge the atmosphere of the meetings. They can enjoy the AC reports freely. In July 2014, the AC established a Facebook and Twitter presence. An announcement stated: "In taking steps towards enhancing the Arctic Council's communications capacity, the Council has established profiles on Twitter and Facebook. The Arctic Council looks forward to using these channels to provide quick and up-to-date information about its work and to introduce new audiences to the Council." The Council will be able to accumulate and analyze non-Arctic states opinions and proposals prior to AC meetings.

Non-Arctic states already have various opportunities to address their own Arctic policies and proposals in reports and international conferences organized by international institutions, such as the World Economic Forum, and other well-known organizations, such as the Club of Rome, Global Ocean Commission Partners, etc.

It is obvious that the Arctic issues involving climatology, the environment, including biodiversity, and social, economic and legal matters are not matters that the Arctic states are able to deal with alone. If the AC's decision making and measures taken are of a self-righteous attitude expressing intolerance toward other members of international society, non-Arctic states will step forward even to establish a non-Arctic Council to protect the Arctic and our globe. Remembering that solar radiation has been strengthening since the birth of the earth and that the theoretical effective radiation temperature and the average surface temperature of the earth are -18°C and 15°C , respectively, the AC and "competitive society" should be much more seriously concerned about global warming and the fossil energy-dependent life-system, decreasing energy exploration and development in the Arctic. No protocol has yet worked well in effectively reducing greenhouse gas emissions. It would be only too likely to entail serious consequences to our globe. The safety of navigation in the Arctic seas is to be fully assured by the IMO Polar Code as the basic law and

the IACS Unified Requirements for ice-class vessels as the basic practical rules, although effective prevention measures are shockingly poor due to the physical, biological and human environments of the Arctic. In addition, existing indemnity systems seem to be unable to cover serious accidents in the ice-infested waters. e-Navigation/ECDIS requirements might cause stress on seafarers in Arctic sailing. The AC should also provide information on the latest industry R&D, review what is being done to prevent oil spills in ice-infested waters and outline possible methods for containment and clean up.

Japan and the UK's Scott Polar Research Institute (SPRI) have been building a close relationship as partners in polar science since Japan signed the Antarctic Treaty in 1959, and a much closer relationship since the National Institute of Polar Research (NIPR) was established in 1973. Since then, the UK's policy and attitudes toward the Arctic have drawn the interest of the academy in Japan.

In 2012, The UK's House of Commons presented a summary of the comprehensive study and discussion on protecting the Arctic. This summary noted that:

“the Arctic is seen as a politically stable region and an orderly process to settle claims of who owns the resources of the continental shelves is ongoing. The Arctic Council is a key means of cooperation between the eight Arctic states and other observer states, including the UK. The UK could increase its influence on Arctic matters in a number of ways, including offering to broker the relationship between Arctic Council members and others, and using UK Arctic science and research as a basis for enhanced cooperation on environmental protection. All Arctic states have developed their own Arctic strategies, and the UK Government should also do so to bring together the UK's diverse interests in the Arctic and engage all stakeholders. Such a strategy should set out how the government plans to implement the recommendations we make in this report, including securing a moratorium on oil and gas drilling in the Arctic until the preconditions we list above have been implemented.”

The following year, in 2013, the UK government published a document called “Adapting to Change: UK policy towards the Arctic.” The forward to this document states that:

“There is no doubt that the Arctic is on the frontier of global climate change impacts ... In turn, the region is seeing more commercial activity ... It [the UK government] recognizes that what happens in the Arctic has a global impact and can be a legitimate concern of people far beyond the Arctic Circle. It commits the United Kingdom to working with international partners to balance the needs of human development with environmental protections. The scale of the challenges facing the Arctic is immense and compounded by the speed of the changes. That is why the whole of government has signed up to the comprehensive set of measures outlined in this Policy Framework. It is a practical example of how we will work together with all the Arctic states and the wider international community to ensure a sustainable future for the Arctic.”

The OPRF would like to express its approval of the UK's practical example, particularly in order to ensure a better future for our globe.

There has been a flood of papers and reports dealing with Arctic issues, including governance, starting with the interpretation of UNCLOS Article 234. However, for the natural scientists of Japan, formal involvement in the AC has been a trivial concern. They have already been enjoying academic participation directly in the AC through its working group activities and indirectly via various international organizations, such as the IPCC, IASC, Arctic Ocean Science Board (AOSB), Pacific Arctic Group (PAG), International Permafrost Association (IPA), International Arctic Social Science Association (IASSA), International Council for Aeronautical Science (ICAS), and a number of international conferences. Satellite-based remote sensing groups have been working together under the 1998 International Agreements on Cooperation in Remote Sensing and Earth Observation (published by C.S. Wagner and agreed in 1997). Scientists can easily set up bilateral and multilateral agreements and work in cooperation.

Through investments, bilateral or multilateral science and technology consultation agreements, and imports/exports of goods and technologies, the substantial interface between the Arctic and the non-Arctic states has already been working, where basically no division exists between them. In this sense, science and industry have been running ahead of the community of international law.

The OPRF would simply like to wish that the AC set guidelines for every industrial activity carried out in the Arctic under the deepest principle

of human nature with a logical mind and for the well-being of the future generations of living things, carefully watching the AC's strategies and actions on Arctic issues.

The OPRF (formerly the Ship & Ocean Foundation) determined its Arctic policy at the time when the OPRF/Nippon Foundation decided to be one of the core institutions in the International Northern Sea Route Program (INSROP) in 1992. The policy is quite simple: "Preservation of the nature and well-being of living things in the Arctic, on the understanding that the Arctic shall be considered as an element of the earth's system, but an essential one to our globe," with deep respect for the Leibniz's theory of monads.

ARCTIC POLICY OF JAPAN

Japan is a typical country surrounded by seas and slightly isolated from adjacent countries. Quite recently (July 20, 2007), the "Basic Act on Ocean Policy" entered into force. Such a delay in the drafting and enforcement of the law was mainly caused by the fact that Japan has no broad continental shelf around the country together with the existence of a powerful law, the "Port and Harbor Law," enforced in 1950. To promote the policy of the law, the cabinet decided on the "Basic Plan on Ocean Policy" on March 18, 2008, which will be amended every five years. No mention of the Arctic was found in the 2008 Basic Plan on Ocean Policy. In 2014, the Basic Plan on Ocean Policy was revised, and two articles relating to the Arctic were added, recognizing the importance of the Arctic for the climate and seaborne trade of Japan in the decades to come. The OPRF made a considerable contribution to the Basic Law and the Basic Plan.

Meanwhile, the Ministry of Foreign Affairs of Japan launched an "Arctic Task Force" (ATF) on September 2, 2010. The press release on it said the following:

- 1) The Ministry of Foreign Affairs has established the "Arctic Task Force" (ATF) in order to make a cross-sectoral approach towards foreign policy on the Arctic, including the aspect of international law, and held the first meeting of the ATF on September 2, 2010.
- 2) In light of the impact of global warming, there has been emerging and ongoing changes in the Arctic Ocean, including the tendency of

reduction of ice-covered areas, which cannot be overseen only by the Arctic states, but also by non-Arctic states like Japan. Japan is becoming more and more involved in Arctic issues, and therefore has applied for observer status to the Arctic Council. As a maritime state, Japan is highly interested in Arctic issues, because the Arctic Ocean is reported to be full of potential such as opening new shipping routes and new development of natural resources.

- 3) The ministry will hold the ATF meetings on an occasional basis, when needed, and fully utilize them for shaping the appropriate Arctic policies of Japan.

The OPRF was deeply involved in the ATF meetings.

THE OPRF'S INTEREST IN ARCTIC ISSUES

R&D Regarding Icebreaking Commercial Vessels

With the financial support of the OPRF (SOF at that time), a research project on Arctic marine transportation was conducted in 1986 at the National Maritime Research Institute (Ship Research Institute, or SRI at that time), in response to industrial demands. The project was coordinated with an ad hoc research panel organized by the Shipbuilding Research Association of Japan (SRAJ) from 1980 to 1984. Extensive and systematic model tests on Arctic tankers and LNG carriers were carried out in an ice model basin and 400m towing tank in the Ship Research Institute, with particular interest in the effects of parallel body, length-breadth ratio, frame line, mid-ship section, side flare, and block coefficient as well as bow shape, on performance in ice. In this project, particular attention was given to the conceptual design of a 200,000 DWT icebreaking tanker expected to transport crude oil from the Beaufort Sea to Japan. A final hull form was determined after the systematic model tests. Various model tests were also conducted on the ship with the final hull form to ascertain the performance in ice, such as backing resistance in level ice, resistance through model ridges and refrozen channels, propeller-ice interactions, and turning ability in level ice. Self-propulsion tests in waves were also carried out in the SRI's 400m towing tank to confirm the sea-keeping performance, particularly in the North Pacific Ocean. The ice load responses of ship structures and

their membranes had been minutely investigated by major shipbuilding companies, based on their accumulated experiences for the wave load responses of ship structures.

Through this project, the instrumentation and experimentation in ice model basins were fully developed, and comprehensive data were compiled, which are potentially useful for the design of large icebreaking commercial vessels in the future.

In the 1980s, the OPRF organized a committee to carry out a comparative study of ice-class rules among major classification societies and a committee to survey technology for removing spilled oil in ice-infested waters in the world.

INSROP/JANSROP

The industry and research institutes of Japan have accumulated knowledge and experience in ice engineering through the Canadian Beaufort Project, although Japan could not obtain a drop of oil from the Canadian seas. In the 1980s, a researcher at the National Maritime Research Institute became aware of the possibility that in future, probably after 2050, the sea ice in the Arctic Ocean would greatly diminish in the summer. The prediction was based on two observations: one of atmospheric CO₂ increase at the Mauna Loa Observatory in the United States, and observations of a rapid decrease of 14C in trees since the industrial revolution, called the “Suess Effect.” At that time, although satellite-based remote-sensing technology was in its infancy, hard and soft technologies were expected to be swiftly developed, so that much earlier than 2050 we would be able to enjoy high-resolution images of sea ice in the Arctic taken by satellites.

In 1987, then General Secretary Mikhail Gorbachev declared the NSR open as an international shipping route. This did not signify the opening of the seas to all comers, but it represented an end to the old, cold war mechanisms previously in place in the Russian Arctic. A comprehensive feasibility study on the NSR was then launched in 1993 after a two-year pilot study by Russia and Norway. The three principal cooperative partners, the Fridtjof Nansen Institute (FNI) in Norway, the Central Marine Research and Design Institute (CNIIMF) in Russia, and the Ship & Ocean Foundation (currently the OPRF)/Nippon Foundation in Japan, formed the International Northern Sea Route Program (INSROP), an international

joint research project to dispel the prevalent myths about the NSR and replace them with scientific knowledge over a six-year period beginning in 1993. Phase I of INSROP was carried out from 1993 to 1995, and Phase II was carried out from 1997 to 1998 (Østreng, 1999; Ragner, 2000; Kitagawa, 2001).

Four sub-programs were implemented in Phase I:

- I. Natural Conditions and Ice Navigation,
- II. Environmental Factors and Challenges,
- III. Trade and Commercial Shipping Aspects of the NSR, and
- IV. Political, Legal, Cultural and Strategic Factors.

In Phase II, the outcomes of the studies in Phase I were integrated together with supplemental work suggested by an international evaluation group. The INSROP GIS was formulated in Phase II on the basis of extensive data accumulated in both phases.

INSROP provided 167 peer-reviewed working papers by 468 researchers from 100 different institutions in 14 countries and a large number of articles and books governing almost every foreseeable problem and relevant aspect of shipping on the NSR for the opening of the route to international shipping. The project provided a large amount of new knowledge and much deeper understanding, as well as collecting, analyzing and transmitting vital material already available in Russia and publishing this for the first time outside Russia.

The SOF (OPRF) organized two projects at the same time in the frame of the INSROP (a research project called JANSROP I and an experimental voyage with an ice-strengthened Russian cargo vessel, the *Kandalaksha* (14,700 DWT), via the NSR). JANSROP I, the Japanese version of the INSROP, was carried out to make up for some of the slightly weak points in the INSROP, stressing the technological requirements of NSR cargo vessels. The *Kandalaksha* sailed successfully from Yokohama to Kirkenes in Norway, with observations and measurements of various items being made by an expert team composed of members from Japan, Russia and Canada. The voyage afforded us a good chance to deepen our understanding of the NSR navigation system (Yamaguchi, 1995).

For the simulation, the sea ice data provided for the INSROP by the Arctic and Antarctic Research Institute of Russia (AARI) were organized into average monthly values for the 38-year period from 1953 to 1990,

divided into square segments of 20nm in length and encompassing 18 parameters: cold sum, average concentrations of first- and multi-year ice, minimum and maximum concentration, thickness of level ice, average, minimum and maximum ice thickness, wind direction, current direction, floe size, average ridge sail height, minimum and maximum possible ridge size, and average, minimum and maximum ridge density. The simulation concluded the following: capital costs have the most significant impact on NSR operations; the operational costs and adequacy of NSR shipping eventually depend on ice conditions, and therefore the month of operation; the current compulsory escort tariff might be a disincentive to improve the icebreaking performance of cargo ships; the larger bulkers could enjoy a size advantage under a lower escort fee system and be sufficiently competitive with conventional handy-size bulkers through the Suez Canal route, if appropriate commodities are provided. PDF versions of INSROP's 167 Working Papers is available from the OPRF as a Blu-ray disc.

Soon after INSROP and JANSROP I, the OPRF, with the warm support of the Nippon Foundation, carried out a study on the NSR called JANSROP II (2002-2006), which laid particular stress on the Far East Asia and Russia. Since 2007, in every fiscal year, the OPRF has carried out updated surveys of the scientific and business activities in the Arctic and

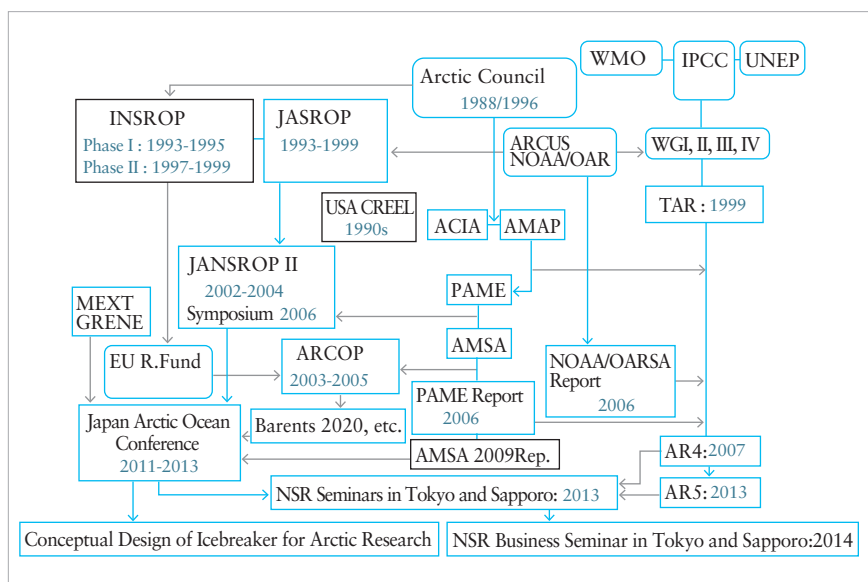


Figure III-1. OPRF's activities in Arctic issues

compiled it into INSROP/JANSROP Follow-up Reports. The OPRF's Arctic research activities are summarized in the Figure III-1.

Japan Arctic Ocean Conference

The symptoms and facts of global warming have been seen in many places. The Arctic Ocean is particularly sensitive to climate change. According to the fourth report of the Intergovernmental Panel on Climate Change (IPCC), it is "very likely" that the temperature increase in the Arctic is far higher than the average temperature rise globally. The extent of sea ice in the summer has recently been greatly reduced from a mean value of 700 million km² in the latter half of the last century. This reduction is too large to be attributed to inter-annual fluctuation. The IPCC fifth report warned about global warming with greater confidence.

These changes in the environment and ecosystem, as well as expectations of natural resource exploitation, have led to a growing interest in the Arctic Ocean. Although Japan is not an Arctic state, it is closely tied to the Arctic for various reasons. For instance, climate change in the Arctic has various impacts on the climate of Japan and those of monsoon Asian countries; Japan has already taken part in natural resource development in the Arctic, and should be more involved in the future; the increased sailing via the NSR would have a large influence on Japan as a major seaborne state in the Asian market; and there are many unsolved issues related to the security, sustainability and governance of the Arctic.

It is a matter for deep regret that at the national level there has only been sporadic research on the Arctic, because the significance of the region has not been sufficiently recognized by the Japanese government. Although data and information on Arctic issues have flooded the Web, until a year ago, the government had yet to take any initiative to establish a policy for Arctic issues. As a consequence, industry in particular has been bewildered in making decisions on its business strategy in the Arctic.

In view of this situation, the OPRF initiated the Arctic Conference in Japan in 2010 with experts in international law, security, climatology, oceanography, polar science and technology, marine technology, navigation, and classification society regulations. Over the past two years, the conference members have met to establish a unified view of multifaceted Arctic issues and to address Japan's Arctic policy and strategy

to meet the interests of Japan and the world. The conference report summarized the findings and the discussion through the meetings, and issued recommendations for the Arctic policy of Japan to the government and industry. The multidisciplinary proposals covered wide areas such as scientific research, natural resources, shipping routes, and security and management of the Arctic Ocean.

The conference hoped ardently that its efforts would soon be used by the government to define policy for the Arctic by analyzing the conference's proposals and referring to the outcome of the GRENE project organized by the Ministry of Education, Science, Technology and Sports. With such a policy, industry would be likely to develop new strategies and develop business in the Arctic.

The conference turned out eight recommendations for Japan's Arctic policy. For the sustainable use of the Arctic Ocean, the conference urged the government to:

1. establish the nation's Arctic policy and a body of joint chiefs of staff,
2. bolster every research activity in the Arctic,
3. actively take part in protection and preservation of the environment,
4. participate much more directly in Arctic natural resources development,
5. promptly respond to logistical changes in the seaborne trade by the opening of Arctic seaways,
6. design a new national security program via the Arctic seaways and shipping,
7. contribute largely to the establishment of an order of the Arctic Ocean, and
8. make haste to strengthen Japan-Arctic states dialogue, in particular the Japan-Russia dialogue.

HOW MUCH IS ENOUGH?

Limits to Growth: The 30-Year Update by Donella Meadows, Jørgen Randers and Dennis Meadows, published in 2004, will be one of the best sellers in the world. The first text appeared in 1972. They planned to update the book again in 2012, which has yet to be done. The authors state their intention for this updating as follows:

- to stress that humanity is now in overshoot and that the resulting damage and suffering can be greatly reduced through wise policy;
- offer data and analysis that contradict prevailing political pronouncements that humanity is on the correct path for the 21st century;
- inspire the world's citizens to think about the long-term consequences of their actions and choices—and muster their political support for actions that would reduce the damage from overshoot;
- bring the World3 computer model to the attention of a new generation of readers, students, and researchers; and
- show what progress has been made since 1972 in understanding the long-term causes and consequences of growth.

The OPRF does not agree with every comment and proposal described in the book. However, the greening policies are undoubtedly a vital step toward recognizing that the natural resources we are dependent upon are considerably endangered and might be irreversibly damaged. A natural right to survival for all human beings will be grounded in a deontological ethical outlook. Given a scientific and technologically progressive world, it is unlikely that our globe will completely run out food and all kinds of energy. The OPRF worries about the limit of the capacity of all the polluting wastes produced by human society, rather than the limit to growth.

“Any preoccupation with ideas of what is right or wrong in conduct shows an arrested intellectual development”—Oscar Wilde (1894).

Disclaimer

The views expressed are those of the author and are not necessarily shared by the Ocean Policy Research Foundation or the Nippon Foundation.

Commentary

Sung Jin Kim

INTRODUCTION

Due to climate change and its effects on the world, the Arctic ice is melting faster than experts have expected since the onset of melting in the 1970s. Especially since 2007, the situation has continued to get worse. Observations have been made that Arctic ice has had the third-largest decrease in size since the beginning of May. Thus, a new ecological cycle is forming through climate change, global warming, a decrease in Arctic ice, a change in the circulation speed of seawater, and a change in the natural and reproductive environment. This transformation has become a main issue of discussion regarding ecological and physical changes, social and economic changes, and changes in governance and decision-making structures in the Arctic. Therefore, the situation in the Arctic is significantly different from what it was in 1996 when the Arctic Council was established. How the Council responds to these changes is now among our major challenges.

The Arctic is one of the main origins of climate change and has been affected significantly by climate change. For many complex reasons, such as the faster-than-expected pace of climate change, various natural resources in the Arctic, sustainable development, enhancing the indigenous peoples' quality of life, and the increased need for a scientific approach, a great deal of focus is on the Arctic. The Arctic has been gaining a lot of attention and is one of the most rapidly changing and dynamic areas. Mankind should quickly respond to climate change, but at the same time establish a mission to adapt to these changes and develop this dynamic area in a harmonious manner. While the international community should cooperatively pursue economic, social, and cultural benefits, it should also minimize the negative impacts on the indigenous peoples. In other words, it is about time to require joint efforts to encourage sustainable development in the Arctic and respect the indigenous peoples' traditions and cultures. To take the most prominent example, China, Japan, South Korea and non-Arctic European Union countries, considered major drivers of climate change, are closely intertwined with each other in respect to climate change as well as political and economic issues. Also, in the case of the Polar Code, which has been developed under the auspices of the IMO, there appear to be several Arctic

issues that cannot be determined by the Arctic Council. Particularly in Arctic development, the prosperity of humankind cannot be achieved by relying solely on the Arctic Council. Therefore, non-Arctic states are taking responsibility and duties in the Arctic. Oran R. Young introduces four interesting factors in his paper that are intriguing and worth discussing. First is the increase in the number of the nongovernmental organizations. He explains that a significant number of NGO activities are related to the main issues in the Arctic. Second are private-public partnerships (PPPs) that can contribute to widening the communication channels between Arctic and non-Arctic states. Third is an informal venue. Young gives his opinions on the roles and meaning of the Arctic Frontiers Conference, the North Pacific Arctic Conferences, and the World Economic Forum. Fourth is the representative case of search and rescue operations in the Arctic involving cooperation between Arctic and non-Arctic states. He then presents implications for future issues.

In his conclusion, Young clarifies the lack of simplicity in providing good governance benefitting all participating parties and facilitating communication and dialogue between Arctic and non-Arctic states. However, there are various (imperfect) channels that are currently available. He has provided us with a meaningful direction by emphasizing that our focus should be on whether we can utilize the right channel at the right time. Arctic issues have evolved and have become global issues. From this moment on, the Arctic is no longer an issue for Arctic coastal states, including the Arctic Council, alone but is now an issue for various countries, including non-Arctic states, that have concerns and understand the Arctic area. These countries have to draw on their wisdom in order to solve these challenges wisely and jointly.

The Arctic Council is at the heart of the decision-making process in the Arctic. However, as the Arctic becomes a more global issue, non-Arctic states now have the opportunity to build a platform to deliver their opinions more freely and effectively. Many experts are in agreement on the value of a platform or forum to exchange knowledge between individuals from government, business, academia and nonprofit organizations. In this respect, Young's paper is significant, and it is important to point out that dialogue between Arctic and non-Arctic states must be effective. In this article, following a brief commentary on Young's paper, I would like to present several opinions regarding how to enhance communication measures between Arctic and non-Arctic states.

OVERVIEW OF ORAN YOUNG'S PRESENTATION

Over the last three years, Young has published several articles about Arctic governance. This analysis, however, examines the avenues of engagement between Arctic and non-Arctic states and goes one step further than his previous works. He navigates the boundary between Arctic and non-Arctic states nicely by dissecting the involvement of non-Arctic states in the Arctic Council and in wider intergovernmental mechanisms, nongovernmental organizations, PPPs and informal channels. Moreover, he collects comprehensive materials and data in his paper, and he is quite logical when analyzing the Arctic. The opinions he presented are concise and clear.

His discussion on deciding on a location to meet and communicate between the Arctic and non-Arctic states contains the current status of institutions encompassing various types of consultative bodies and agreements. In addition, the article properly analyzes the limitations of the existing formal/informal channels. In particular, there is a clear and concise analysis of the scope and limits of each level of participation by observer states in the Arctic Council, dividing them into three levels: working groups, task forces, and SAOs meetings. The article also points out the significant parts of major cases where the Arctic Council lacks authority. Thus, he notes the role of bilateral dialogue and the need for cooperation.

In regard to meaningful change around the Arctic, Young points out that it is inevitable that there will be a distinctive change in the Arctic Council's role in the coming years. This is a bold and correct comment that only he can make, and I concur with the idea that the roles of non-Arctic states are increasingly important.

OPINIONS AND QUESTIONS ON THE PRESENTATION

Young introduces the following factors in his paper that are quite intriguing and worth discussing. First, non-Arctic states have caused pollution and climate change; therefore, non-Arctic states should now take responsibility for their actions. He justifies his point by explaining that for the sake of environmental protection, non-Arctic states are actively participating in multilateral channels. Second is the increase in the number of NGOs. He explains that a significant number of NGO activities are related to the main issues in the Arctic. In particular, there is a difference between NGOs, such

as Greenpeace, that operate as advocacy organizations and consultative bodies, such as the International Arctic Science Committee, in relation to mutually beneficial cooperation.

Third, all the cases considered as avenues of engagement between the Arctic and non-Arctic states are divided into five categories, and the fact that these categories include the PPPs and informal venues is quite interesting and original. Moreover, it is intriguing that Young has classified PPPs into advisory, regulatory, and operational ones in discussing how PPPs can contribute to widening the communication channels between Arctic and non-Arctic states. As for informal venues, Young discusses the roles and meaning of the Arctic Frontiers Conference, NPAC, WEF. I am in agreement with Young that the NPAC has already been an important player and plays a prominent role as one of the avenues of engagement and will most likely develop in the future.

In this section, I would like to ask some questions to Young with my additional comments. First, he pointed out that it would be difficult for the Arctic Council to ignore China's opinion when China proposes to expand its influence in the international community and take concrete actions. I agree with his point and wonder what measures China will take in the Arctic. In addition, I would like his opinion on what kind of changes this measure could bring in the existing Arctic governance system where the focal point is the Arctic Council.

Second, Young indicated that climate change, environmental pollution management, and volatility effects in the global goods market may bring a significant change in the legal status of the Arctic Council. He also noted that non-Arctic states will play a stronger role institutional innovation regarding Arctic governance in the future. If this is possible, what kind of changes in the exclusive Arctic Council oriented governance can we expect in the next 5 to 10 years? I wonder whether it is possible to transform the Council into an open governance system similar to the Antarctic system and not restrict the role of observers in the SAOs meeting.

Third, Young separates issues related to the Arctic from issues regarding the global situation. The former, such as the SAR agreement, should be resolved within the Arctic Council while not soliciting participation by non-Arctic states, and the latter, such as the Polar Code, should be dealt with by multilateral frameworks similar to the IMO. I agree with this dichotomy in principle. However, there is a fine line between local and global issues, as Young pointed out in his conclusion. Although the Arctic Council created

the Search and Rescue Agreement (SAR), search and rescue operations in the Arctic can include non-Arctic governments and public and private vessels. A good example can be found in the search and rescue activities in the Antarctic. In the dichotomous approach, although some issues are considered global ones, only the Arctic Council can deal with them and non-Arctic states do not have any opportunity to participate due to its exclusive decision-making process, which may become a source of conflicts. If possible, I would like to hear his additional explanation on these issues.

Lastly, Young suggests five avenues of engagement as an interface between Arctic and non-Arctic states. Each avenue has, of course, its own advantages and limits. I would appreciate an additional explanation if he could categorize the main priorities, starting with the most important avenue. In my humble opinion, for the issues of individual countries, bilateral cooperation is crucial, and for common interests such as climate change and the Polar Code, multilateral consultative bodies such as the IMO are of great importance.

NEW CHALLENGES FOR OBSERVER STATES IN THE ARCTIC COUNCIL

Before I propose various methods to strengthen the engagement between Arctic and non-Arctic states, I would like to briefly mention new challenges faced by observer states, particularly South Korea, in the Arctic Council. In the 2013 at the Kiruna Ministerial Meeting, Asian countries such as South Korea, China, and Japan joined the Arctic Council as observer states and made an effort to expand their participation through subsidiary bodies in the Arctic Council, such as the working groups. In addition, aside from the activities of the Council, Young explains that there has been significant progress in pushing forward a detailed discussion of ways to use scientific technology cooperation, economic consultations, and consultative bodies such as the FTA and the IMO. However, it cannot be said that discussions in the Arctic Council have been fruitful.

Although there are several reasons for these circumstances, I would like to hear Young briefly discuss the lack of capacity for observer states and the uncertain system regarding how to accept an observer states' opinions. Despite their scientific and technological capabilities, observer states face challenges when reaching an agreement in the Arctic Council's working

groups, since many consider the observer states' capability limited. Without improving their capabilities, it is relatively difficult to participate in various activities, and thus observer states should be preparing to commit human and financial resources.

On the other hand, even in areas with a certain level of competence, there are specific difficulties that many encounter when participating in the working groups. As a result, there should be clear guidelines on observer states' involvement in the working groups' decision-making processes. Another challenge for observer states is to build a platform of cooperation with Indigenous groups. It is not an easy task as an observer to find ways to cooperate with Indigenous groups residing in the Arctic and Indigenous groups that are Permanent Participants in the Arctic Council. The following NPAC meeting may contribute to the Arctic Circle by discussing cooperation on economic, cultural and social issues between Indigenous groups and Asian observer states.

SUGGESTIONS

For NPAC to fulfill its role as an avenue of engagement for cooperation between Arctic and non-Arctic states, the following efforts are recommended. First, over the last three years in the North Pacific region, NPAC has been building a bridge between experts from Arctic and non-Arctic states and has made its results and performances widely known to the public. For instance, NPAC has posted its proceedings annually on the websites of both KMI and EWC and informed members of the Arctic Council and major experts via pamphlets and booklets. In addition, NPAC plans to present its successful and effective results to experts from not only the Arctic Frontiers and Arctic Circle, but also to the secretariat of the Arctic Council and the working groups. Other than the SAOs and Ministerial Meetings in the Arctic, I am quite optimistic that a more systematic way of communication to review a more detailed method in the NPAC Organizing Committee may be considered.

Second, by taking full advantage of the observer states' capabilities, while maintaining the current decision making system, I propose to establish a study group that will aid in developing a more sustainable Arctic society. Therefore, an effective method and action plan must be established to address the issues in NPAC Organizing Committee. Moreover, I hope

that NPAC continues to excel with its cutting-edge performance in the field of science and technology and presents a feasible alternative that may be integrated into the economic and social fields. Third, we should establish a joint research community among Arctic-related research institutes and universities in Korea, China, and Japan through the promotion of the North Pacific Arctic Research Community (NPARC) in order to expand the range of cooperation and find common interests between related agencies in the United States, Russia, and Canada.

Lastly, as Young has mentioned in his paper, I look forward to seeing NPAC become an avenue of engagement with NGOs, informal venues, and other institutes that are involved and can serve as important bridges between Arctic and non-Arctic states. For this to be effective, NGOs and other informal venues must first actively participate with members of NPAC and discuss the main issues in order to properly monitor the Organizing Committee. In addition, it is necessary for NPAC to meet regularly to discuss its agenda and expand its cooperation, similar to the Arctic Frontiers, Arctic Circle, and other consultative bodies. The World Ocean Forum (WOF) launched the Global Agenda Council on the Arctic this year. Given its influence in the international community, the WOF is expected to support the Arctic as a global issue and serve as a useful venue for dialogue with non-Arctic states. Therefore, we must consider the possibility of cooperation with the WOF and other influential entities. Finally, nongovernmental organizations and other advocacy organizations, such as Greenpeace, have made great contributions to protecting the environment in the Arctic, as Young discussed, and for this reason, we must invite a representative from Greenpeace to the NPAC conferences.

CONCLUSION

Over the last three years, NPAC has discussed issues regarding the Arctic and covered the governance issues relating to Arctic policies. Young's article arranged various existing avenues of engagement and analyzed the pros and cons of each avenue concisely and clearly. As a consequence regarding how to resolve Arctic issues, in my opinion, specific and individual issues must be dealt with through bilateral cooperation between the parties, while global issues that involve both the Arctic Council and non-Arctic states, should be handled within the framework of international organizations or

existing multilateral councils.

As Young pointed out, there have been significant changes in the circumstances surrounding the Arctic since the inception of the Arctic Council. The Council should take a more open and positive approach and listen to the opinions of the non-Arctic states that are currently important stakeholders in Arctic-related issues. I hope that in the long term, the Arctic Council will recognize the fact that it needs to evolve into a more open decision-making structure and make appropriate changes. In anticipation of this development, I confidently believe that NPAC will be a pioneer in promoting a cooperative dialogue regarding Arctic issues, which are now worldwide and common issues for humankind. The issue of how to stimulate communication between Arctic and non-Arctic states could be discussed more in depth during Session VI.

PART IV

INNOVATIONS APPLICABLE TO THE ARCTIC

11. A Fibre Optic System for Canada's Western Arctic

Michael Aumond

This article describes the rationale, design, and implementation strategy for a high-speed fibre optic system connecting Canada's Western Arctic to the Southern Canada fibre optic telecommunication grid. The article describes the Mackenzie Valley Fibre Link (MVFL) project and addresses:

1. The project objectives, focusing on the Government of the Northwest Territories (GNWT) public good objectives of providing high-speed delivery of social services programming, health care, education and outreach services and of providing a high-speed fibre-optic telecommunications "enabling" infrastructure to support economic diversification for the region by connecting relatively small rural and remote communities to the national and international marketplace.
2. The economic and technological challenges of providing fibre-optic communications in Canada's North, and the decision by the GNWT to strategically invest in a long haul backbone system, providing telecommunications transport facilities from northern communities to an existing southern location on Canada's existing fibre grid.
3. The private public partnership (PPP) chosen for the execution and long-term operation of the system, and the risk profile assumed both by the private sector partner and by the government.
4. The requirement for a robust business model for the government's investment in the MVFL, and the benefit of an existing satellite receiving station in supporting both the long term revenue base of the MVFL and the government's economic diversification objectives in the region.

PROJECT LOCATION AND OBJECTIVES

Canada's Northwest Territories (NWT) extends from the northern boundary of Alberta to Canada's high Western Arctic. The NWT is approximately 500,000 sq miles, and has a population of 43,000 located in

33 communities. The largest community is Yellowknife, with a population of approximately 20,000. The southern Canada fibre optic grid extends to Yellowknife and communities in southern NWT. Northern communities are served either by satellite or by terrestrial microwave communications systems. Both of these technologies result in higher prices, limited capacity, and in some cases, slower connection speeds.



Figure IV-1. Canada's Northwest Territories

The difference in telecommunications technologies used to provide telecommunications service to our northern communities translates into a disparity in services that can be delivered to our communities. Modern government services, including health care, education, social outreach programs, and government administrative services rely on the ability to deliver these services in an efficient and cost-effective manner. They often use high-speed Internet services as a key transport element of the services delivery component. Without access to high-speed and affordable Internet services, communities may not have access to needed, modern government services. Additionally, in an increasing competitive global economy, the ability to attract high-quality investments in the north, leading to jobs and

value-added services, is often contingent on access to modern, high-speed, reliable communications systems.

The GNWT has, as two key priorities in this area:

- a) Improved delivery of GNWT public services to northern communities
- b) Creating an environment to attract economic activity in the NWT and regional economic diversification.

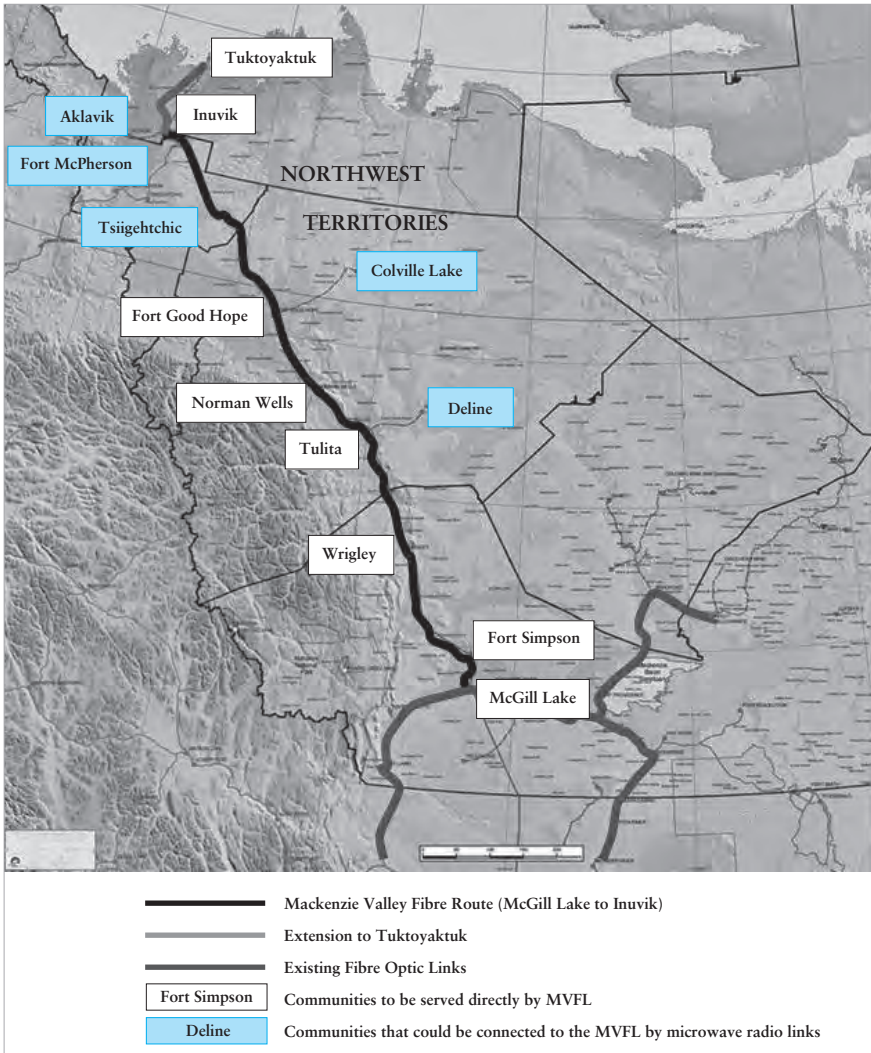


Figure IV-2. MVFL route

The purpose of the Mackenzie Valley Fibre Link Project is to realize both of these priorities in the Mackenzie Valley region of NWT and to improve overall connectivity. The system extends from the southern Canada fibre grid at McGill Lake in southern NWT to Tuktoyaktuk on the shores of the Beaufort Sea. Six communities will be served directly on the fibre route, and an additional four communities could be served in the future by short microwave connecting systems from communities located close to the MVFL, but not directly on the fibre route. Inuvik is the largest community, with a population of 3,500, and the region has a total population of 10,100. The distance from McGill Lake to Tuktoyaktuk is approximately 1,200 km.

ECONOMICS OF NORTHERN TELECOMMUNICATIONS SYSTEMS

Telecommunications systems can be classified broadly into three major components, as shown in the diagram below:

In the north, distances between communities are typically much larger

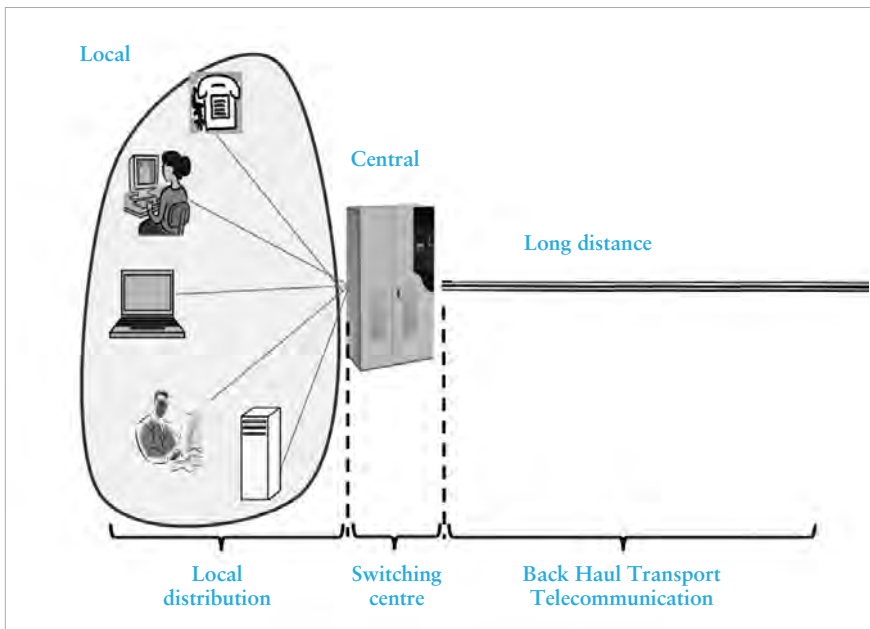


Figure IV-3. Three major components of telecommunications systems

than in southern Canada, and the communities themselves are much smaller. Conversely, the communities in the north tend to be more compact than in rural areas in the south or in peri-urban areas. These differences have a profound effect on the economics of providing modern, high-speed telecommunications services to northern communities at an affordable cost.

In typical southern Canadian networks, the cost of providing local loop services in rural areas is the dominant cost. In general, the cost of the backhaul system is a relatively minor component on a per-customer basis.

In northern networks, the situation is reversed. The cost of the backhaul networks is almost always the single most significant cost component. The provision of local service to northern customers in the relatively compact communities is not, by comparison, a large cost component. Technology is providing alternative ways of providing relatively inexpensive local loop alternatives (for example, wide bandwidth cellular distribution systems). Additionally, the cost of switching systems, including ancillary elements such as building space and power consumption, has fallen significantly.

In economic terms, the high cost of backhaul systems in the north means that telecommunication service providers have little choice but to charge significantly higher prices to serve these communities. This has the effect of generating a systemic disadvantage to northern communities both in terms of the effective and efficient provision of public good services to local residents and in attracting firms to provide jobs and economic opportunities for northern communities.

Government of Northwest Territories (GNWT) Investment Strategy for the Mackenzie Valley Fibre Link

The GNWT developed an investment strategy specifically to address the high-cost backhaul segment of northern telecommunications systems. The government has no interest in operating a broader telecommunications service, or in becoming a telecommunications service provider, other than the facilitation of important government services to residents and businesses. For those areas where the telecommunications market functions well, the government has no interest in intervening.

The GNWT strategy has two basic components:

- a) Limiting investment to the backhaul portion of the network from Tuktoyaktuk to McGill Lake, which is the closest point in the

southern Northwest Territories that has an existing high-speed fibre system.

- b) Establishing a PPP business arrangement to design, build, finance, operate and maintain the MVFL system. The term of the contract is for a period of 20 years from the service commencement date.

Technology Challenges of the Mackenzie Valley Fibre Link (MVFL)

The route of the MVFL, extending from McGill Lake in the south to Tuktoyaktuk in the north, is characterised by a rapid change in environmental conditions. From the sporadic permafrost in the subarctic region in the south, to continuous permafrost in the polar north, the MVFL has been designed to meet the challenges of operating in a hostile, and changing, northern and Arctic environment. Specific challenges unique to the MVFL environment are:

Climatic and Environmental Conditions and Route Geography

The southern end of the MVFL at McGill Lake is located in a subarctic climatic region, and the route extends to a polar climatic region at Tuktoyaktuk in the north. The route is divided into four sections:

- 1) An all-weather gravel road section from McGill Lake for approximately 320 km to Wrigley.
- 2) A winter road section from Wrigley for approximately 475 km to Fort Good Hope, close to the Arctic Circle,
- 3) A section from Fort Good Hope to Inuvik (a distance of approximately 360 km), along the proposed route of an extension of the NWT's Mackenzie Valley Highway. This is the most challenging section of the route and requires the use of mobile crew camps.
- 4) The final section from Inuvik to Tuktoyaktuk, following the all-weather Dempster Highway that is currently under construction.



This section can be installed during the summer/fall seasons using a traditional cable plough.

Permafrost

Permafrost along the MVFL route ranges from sporadic, to discontinuous, to extensive discontinuous. Permafrost consists of three layers: an active layer, which is subject to a freeze-thaw cycle every year, a permanently frozen layer, and a transition layer, which resides between the active layer and the permanently frozen layer, and can contain “bubbles” of water and/or ice and an area called an ice lens when frozen. When this layer melts, the ground above sometimes gives way in a process called “slumping.”

Permafrost is a problem because, in summer, the active layer of the permafrost becomes similar to a wet land swamp and is unable to support the weight of installation equipment. Winter is the only season when installation can occur, and contractors have to wait until the ground is frozen to the point that transport and installation equipment can be safely moved.

Permafrost has three important impacts on the MVFL installation and operation.

Permafrost:

- a) Limits the installation for the northern two-thirds of the MVFL to the winter season, lasting typically from early January to early April.
- b) Affects the installation techniques to be employed and the fibre optic cable. The MVFL uses a marine-type cable for the northern two-thirds of the route because of its superior tensile and crush-resistant strength characteristics
- C) Limits the options for cable replacement in the event of a cable break. For parts of the year when the route is inaccessible, repairs will be completed using a temporary cable which will be laid directly on the ground. As soon as conditions permit, a permanent repair cable will be installed underground.



For these sections of the route, the cable is installed directly in a trench, in the active layer of the permafrost

As the route progresses northwards, the depth of the active layer decreases. The route design takes this into consideration and the depth of the trench changes accordingly.

Forest Fires

Forest fires in the Northwest Territories are typically left to burn unless property or people are affected. For the MVFL project, this means that aerial construction outside of community locations represents a long-term risk to the cable.

Tundra Fires

Tundra fires can occur at locations along the entire MVFL route. These fires can travel horizontally underground and can last for years. Typically, tundra fires do not penetrate at depths lower than approximately 1-1.5 ft below cleared ground level. As a result, the depth of the fibre cable trench is typically below 1.5 ft to mitigate the risks of the effects of tundra fires, but still within the permafrost active layer.

Major River Crossings

There are four major river crossings along the MVFL route. The largest of these is the crossing of the Mackenzie River north of Fort Simpson, with a crossing length of over a mile. All these rivers have experienced significant spring flow rates with accompanying large sections of ice propelled down the river, which renders any cable on the river bed vulnerable to ice scouring. As a result, the fibre cable installation will use horizontal directional drilling (HDD) techniques for each major crossing.

Crossing Minor Rivers and Creeks

Environmental regulations along the MVFL route permit trenching of the fibre cable across minor rivers and creeks provided that the river/creek is fully frozen to the river or creek bed. In those instances where flowing water remains, horizontal drilling techniques will be employed.

Bridge Crossings

Where bridges exist, the fibre cable will be installed in ducts attached to the bridge structure. This poses additional temperature constraints on the cable, as outside temperatures in winter can drop below -40 degrees C, and summer temperatures can reach above + 30 degrees C.

MVFL SYSTEM ARCHITECTURE

The MVFL system is equipped with terminal equipment at either end, and intermediate sites equipped with reconfigurable add-drop multiplexers (ROADM) which are configured as MVFL, publically accessible points of presence (PoP) locations. Local service providers can access the MVFL at any intermediate point, and their traffic is delivered to the southern Canadian grid carrier of their choice. The system is configured to provide equal access to any local telecommunications provider in the MVFL communities, and at the southern end of the system, equal access to any of three southern grid carriers. The MVFL provides power, equipment rack space, and a controlled equipment environment for local service provider's equipment necessary to connect their customer's traffic to the MVFL at every PoP along the route.

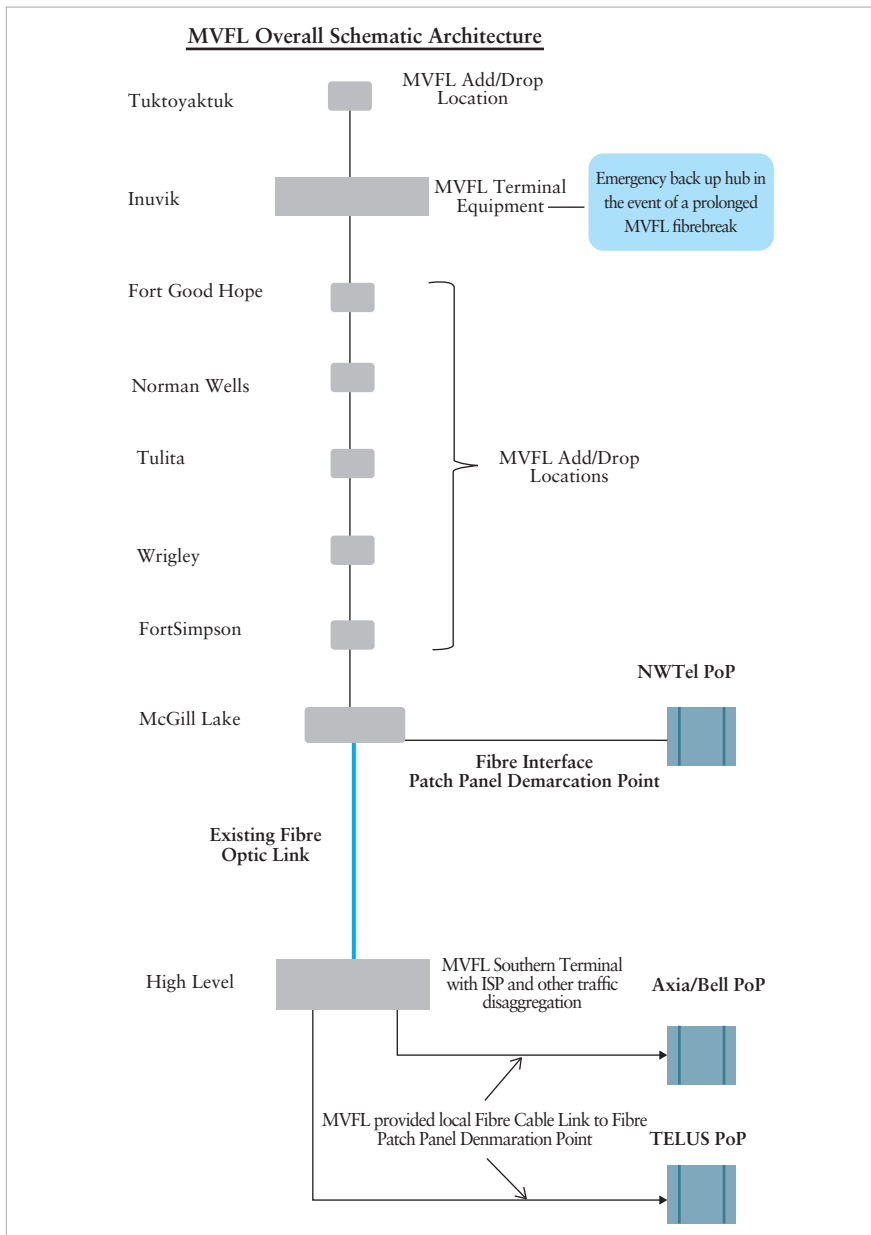
The system has a design life of 30 years. Although the demand for capacity is increasing at an exponential rate, the fibre cable capacity of 48 high-capacity fibres has been sized to meet the 30-year demand.

One significant aspect of the system architecture is the configuration of the terminal equipment and the emergency backup facility. The MVFL is a linear system and is vulnerable to a cable break. The system equipment is fully duplicated using separate operating and standby fibres. This architecture protects customers from equipment failures (the standby system is always in fully operational mode, commonly called hot standby mode) and from single fibre or splice failures. However, the system remains vulnerable to a complete cable break, which may take days to repair.

The MVFL solution to this problem is to provide an emergency backup system at the northern terminal in Inuvik that provides service to hospitals/nurses stations, police and emergency services, and government administration in the event of a cable failure. For this to work, each intermediate site has been designed to work with just one terminal. In the event of a cable failure in the middle of the system, all the intermediate sites to the north of the break will operate through the emergency backup service in Inuvik, while all the stations to the south of the break will continue operating with the southern terminal.

The MVFL system performance specifications are:

- a. Equipment-only availability - 99.99% (4.5 minutes per month - this can only be achieved with full equipment redundancy).



- The MVFL system utilizes an existing fibre system from McGill Lake NWT to High Level, Alberta to facilities access to two of the three major southern grid carriers. The third carrier is accessed directly at McGill Lake.
- The system is configured with both Express Channels from Inuvik and Norman Wells respectively to McGill Lake and local “festoon” channels that can be accessed at any intermediate or terminal location.
- The fibre cable consists of 48 fibres, with each fibre capable of supporting 88 independent Dense Wavelength Division Multiplexing (DWDM) channels, each supporting a maximum transmission rate of 100 Gbits/s.

- b. Overall system availability - 98% (includes all failures, including cable cuts).

Private-Public Partnership Project Implementation Business Model

The GNWT decided to implement the MVFL using a PPP business model for two strategic reasons:

- 1) To obtain access to private sector capital.

- 2) To share the project risk with a private sector partner that has experience both in subarctic and Arctic infrastructure construction, and the long-term operations of telecommunication services. In the MVFL project, the private sector partners assumes the design, build, maintenance and long-term operations risk, and the GNWT assumes the project revenue risk. This PPP business model provides the prime contractor with a significant incentive to design the system for reliability and to minimize long-term operation costs, and to ensure that the design meets the operational specifications. The PPP agreement provides for a reduction in payments in the event that the performance specifications are not met, and provided the reason for the poor performance is within the responsibility scope of the project agreement signed with the contractor.

The incentive for the contractor is that monthly system availability payments are guaranteed by the GNWT, subject to the contractor meeting the agreed system performance criteria. The benefit for the GNWT is that risk associated with the design, build and long-term operations of the system is assumed by the contractor.

The GNWT initially contracted a feasibility study to assess both the technical and business viability of the MVFL system. This confirmed the viability and feasibility of the system. The next step undertaken by the GNWT was the generation of a request for expressions of interest. For the MVFL project, five firms responded, and the GNWT selected three firms, each of which demonstrated both the technical capacity and financial strength to undertake a project of this risk and magnitude.

A series of collaborative meetings were held independently with each of the selected contractors. These meetings ensured that the contractors fully understood the requirements of the project. Additionally, a number of positive technical and business suggestions were made by the prospective contractors based on their own individual experience with infrastructure

projects in the north, and these proved to be valuable to the GNWT in structuring both the technical and business aspects of the project.

Following the collaborative meeting, a request for proposal was sent to the three contractors. These have been evaluated recently by the GNWT and the highest-rated proponent has been notified of its selection as the preferred proponent. The final step prior to contract execution is the financial close with the selected proponent.

MVFL PROJECT BUSINESS CASE

The GNWT undertook a rigorous business review that modelled the system costs and potential revenue for the duration of the project. The review also evaluated the value of a PPP procurement process compared to the more traditional tender process, which would have then involved the GNWT contracting out the operations and long-term maintenance.

There were five important aspects of the business modelling process:

- 1) The political support from the GNWT to proceed with a project focussing on improving connectivity in northern communities.
- 2) The result that a PPP procurement model offered the best value for the money compared to other procurement methods.
- 3) The existence of a potentially major large-volume customer of the MVFL in Inuvik. In 2010, the government of Canada, in partnership with the GNWT, the local township and local aboriginal governments, established the Inuvik Satellite Station Facility. This satellite receiving station is located in an ideal geographic position to receive data from an increasing number of remote sensing satellites.

The GNWT realised that the MVFL system would benefit from the data traffic generated by a global satellite station in Inuvik, in a similar way that the satellite station would benefit from a high-speed fibre connection to the southern Canadian telecommunications fibre grid.

The long-term vision for the Inuvik Satellite Station and the MVFL is the creation of data processing, scientific research and data storage facilities in Inuvik.

- 4) The public good value of providing improved delivery of health care, education and government services to northern residents services.
- 5) The “enabling” value of modern telecommunications infrastructure

to support existing local businesses and encourage new firms to locate in the Mackenzie Valley region.

Environmental Considerations

The Mackenzie Valley is a pristine subarctic and Arctic environment. The GNWT has been careful to require contractors to conform to both the letter and spirit of environmental legislation and regulations. In particular, special attention was given to the size of equipment proposed by contractors in the construction phase of the project, with an emphasis during the proposal evaluation on light, load-bearing construction equipment and installation techniques with minimal environmental impact.

Local Consultations

Local consultations are an integral part of any infrastructure project undertaken by the GNWT. For the MVFL project, the routing traverses aboriginal land for a significant portion of the distance between Fort God Hope and Tuktoyaktuk. Additionally, the GNWT consulted with, and continues to have a dialogue with, all aboriginal governments along the MVFL route.

MVFL Project Timetable

The planned in-service date for the Inuvik to McGill Lake portion of the MVFL project is summer 2016. This service date requires that construction start on the first winter section in 2014/15, with the summer construction season in 2015 being focused on the southern all-weather road section. The final winter construction season of winter 2015/16 will complete the installation of the project, with system commissioning starting in spring 2016 for a summer in-service date.

The final section from Inuvik to Tuktoyaktuk will start upon completion of the all-weather Dempster Highway extension to Tuktoyaktuk, and is planned to be complete in 2017/18.

12. Research Activities of the KRISO Ice Tank

Kuk Jin Kang

In this article, we introduce the Korea Research Institute of Ships and Ocean Engineering (KRISO, formerly MOERI) Ice Tank facility and research activities for Arctic engineering and then describe ships' performance in various ice conditions. We also present a hull strength assessment based on ship-ice interaction and a shipboard winterization technique. In addition, we discuss how to predict the ice resistance of the ship and the impact of ice loads on the ship as well as how to evaluate a ship's performance in ice model tests. We conclude with an introduction to a full-scale ice trial procedure.

KRISO ICE TANK FACILITY

New hull forms and operational concepts are being developed to meet the challenges facing shipping industries as a result of the increasing demand for ice-strengthened vessels and Arctic offshore structures able to meet regulatory requirements and to deal with extreme environmental conditions. These challenges have led to increased demand for model testing in ice to assist in the design process and to improve the performance of ice-going vessels and ice-operating capabilities of offshore structures. With the support of the Korean government, the research community, and ship building industries, KRISO has completed the construction of an ice tank in Daejeon. The facility, which commenced operation in 2010, employs state-of-the-art technology. The size and shape of the tank are designed to enhance the model test capabilities of offshore structures operating in the Arctic and the maneuvering performance of ice-going vessels in ice. With increasing access to the polar region, the importance of Arctic engineering and infrastructure is growing. The new ice tank is suitable for research on ships operating in this region. KRISO's Ice Tank facility can expand research capabilities and ocean technology worldwide. It can also aid the research community and industries' R&D on ice-going vessels, novel structures, and transportation systems in ice-covered water.

The square-type KRISO Ice Tank is particularly suitable for studies of ice loads on fixed offshore installations, where the interaction between the structure and ice has to be modeled. The tank also permits a model ship to complete a full turning circle test. In a typical ship resistance and/or propulsion test, the 32 m of available ice width allows more than five or six parallel test channels within one ice sheet. The dimensions of the ice tank are as follows: 42 m (long) \times 32 m (wide) \times 2.5 m (deep).

- Trimming tank size: 10 m (long) \times 32 m (wide)
- Usable ice sheet size: 32 m (long) \times 32 m (wide)
- Model ice type: ethylene glycol (EG)/aliphatic detergent (AD)/controlled density (CD) (crystal structure: columnar type)
- Microbubble generation system to control the density of model ice

The KRISO Ice Tank is equipped with a main X-Y towing carriage system consisting of an X-carriage and a Y-carriage. The X-carriage can tow models through the ice sheet or the ice sheet against the model, which is fixed or moored to the bottom of the tank. The Y-carriage is suspended beneath the main X-towing carriage and can move throughout its length. A separate service carriage is installed for modeling ice production and treatment of ice in the model test. After the model test in ice, six movable blades installed at the front of the service carriage push the broken ice sheets into an ice-melting pit. The properties of the towing carriage system



Figure IV-4. Layout of KRISO Ice Tank



Figure IV-5. X-Y carriage and service carriage

are as follows:

- X-carriage speed: max: 3.0 m/s and min: 0.005 m/s
- Y-carriage speed: max: 1.5 m/s
- Towing force capability: X-direction, 50 kN; Y-direction, 3 kN
- Service carriage speed: 1.5 m/s

The KRISO Ice Tank is equipped with an air cooling system and uses natural convection to generate the model ice sheet. This is a very effective method to produce an ice sheet with uniform thickness and strength for model tests.

- Air temperature control range: from -30°C to 15°C
- Minimum temperature changing rate: $5^{\circ}\text{C}/\text{h}$
- Ice growth rate: 2.5 mm/h at -20°C
- Maximum ice thickness: 100 mm

The KRISO Ice Tank uses EG/AD-CD model ice. The ice is a dilute aqueous solution of EG and AD in an approximate ratio of 0.39/0.036%. By fine-tuning ice model techniques, model ice up to 100 mm thick can be produced, with an allowance of about 5 mm. The ice production and modeling procedures are similar to those used by National Research Council-Ocean, Coastal, and River Engineering (NRC-OCRE, formerly NRC-IOT). The following procedures will form the starting point for future refinements. The preparation of the model ice sheet will begin with a wet-seeding procedure. The model ice will be grown at a temperature of $-20 \pm 0.5^{\circ}\text{C}$. The growth rate during this period is expected to be approximately 2.5mm/h. During the latter part of ice growth, the air temperature will be

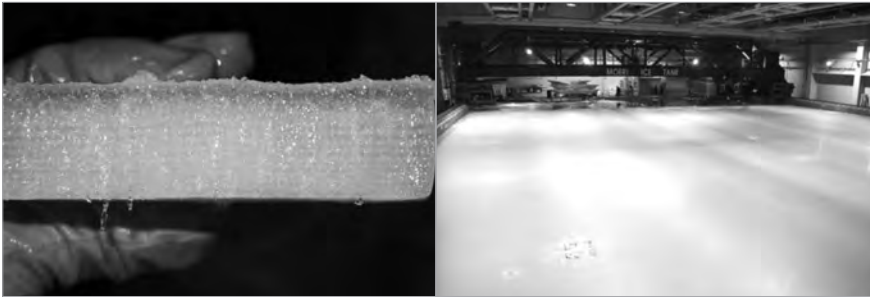


Figure IV-6. EG/AD-CD model ice

raised to $+2^{\circ}\text{C}$ to control the strength of the ice. The target ice strength will be achieved via tempering processing. The properties of the model ice will be routinely measured for each ice sheet, and a database of ice properties will be maintained for quality control and prediction. Microbubbles will be uniformly discharged from the bottom of the ice tank over the full ice-grown area during the entire freezing process to adjust the model ice density to simulate that of the natural range.

In the model test, ice conditions include level ice, brash ice, pack ice, and ridged ice. Resistance tests, propulsion tests, and maneuvering tests can be performed in the KRISO Ice Tank. The model tests in ice in KRISO's Ice Tank can be used to determine the correlation between model-scale results and full-scale results. Ice model tests can be performed with either a fixed model or a free-running model. During the fixed-model tests, the model ship is towed by the main X-towing carriage at a controlled constant speed. In the free-running model tests, the model ship is equipped with its own propulsion system. The model test procedures will follow the recommendations of the International Towing Tank Conference (ITTC). If the procedure recommended by the ITTC cannot be followed, KRISO's

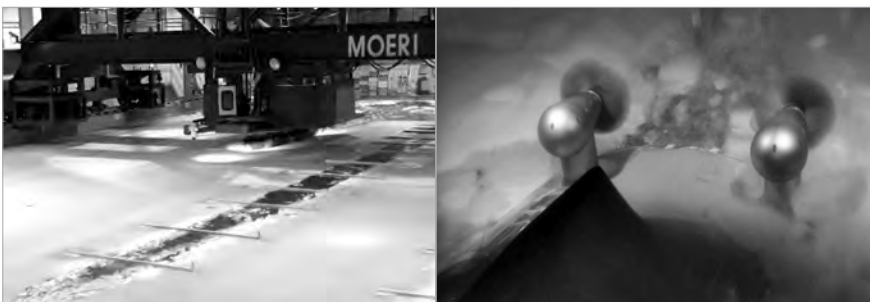


Figure IV-7. Self-propulsion test and underwater image

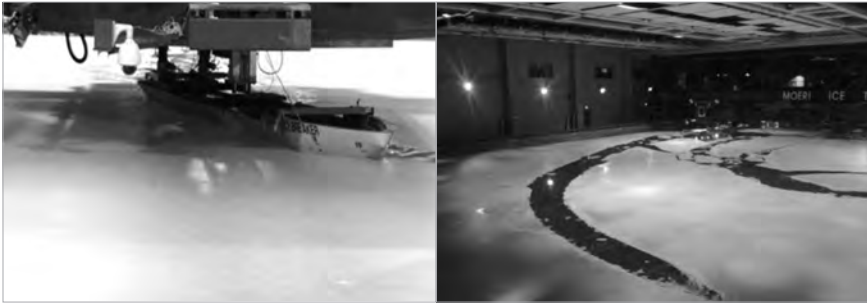


Figure IV-8. Free-running ice propulsion test and turning circle test using auto-tracking system

standard procedures will be adopted. Features of the model tests are described below:

- Study the mechanical properties of model ice,
- Resistance, propulsion, and maneuvering tests for icebreaking vessels,
- Prediction of ice load acting on fixed or floating structures,
- Ship/structure and ice interaction analyses.

Recently, an auto-tracking system that can measure the model ship's location, speed, and heading angle in real-time was developed for the free-running ice maneuvering test. The system consists of a vision camera and real-time data processing software. The system can define an accurate turning circle diameter and the breaking-out length in a full turning circle test and breaking-out test. In addition, in ice propulsion tests, the model ship's auto-tracking system can accurately measure the model ship's speed at a constant propeller revolution, thereby improving the accuracy of the

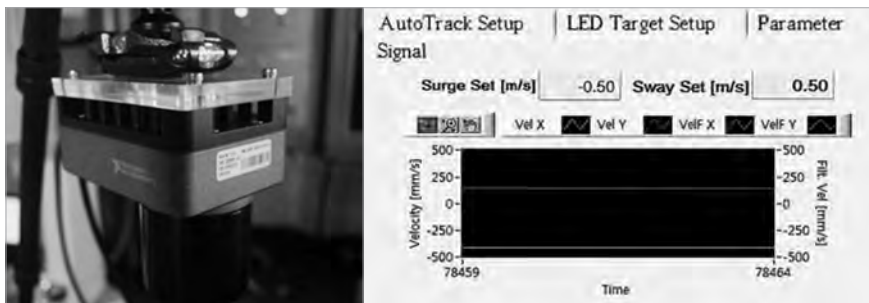


Figure IV-9. Auto-tracking system and measurement software

ice propulsion test.

RESEARCH ACTIVITIES OF KRISO ICE TANK

When a ship navigates ice-covered waters, it encounters various problems, such as ice resistance and ice load. These can affect the performance of the ship and offshore structures in ice. These problems are significant factors in Arctic shipping, in ice-related research areas in Arctic regions, and in Arctic engineering. Since 2010, model tests for ice-going vessels, including ice resistance tests, ice propulsion, and ice maneuvering tests, have been conducted in the KRISO Ice Tank. The results of such tests are important for determining ship performance in ice conditions. Recently, an ice model test for icebreaking vessels, large shuttle tankers, and large LNG carriers operating in ice-covered water was conducted in the KRISO Ice Tank. In the model test, the ice conditions consisted of level ice, brash ice, pack ice, and ridged ice. The model test in the tank can be used to determine the correlation between model-scale results and full-scale results.

In addition to ice model tests in the tank, full-scale ice performance tests of vessels are important. Such tests are needed to derive the correlation between model-scale and full-scale results and to improve the accuracy of model tests. The aim of an ice trial is to evaluate the ship's power and performance in various thicknesses and strengths of ice, but field tests are needed along with extensive experience and expertise. In the last two years, ice field tests of the Korean icebreaking research vessel Araon were conducted in the Arctic in July-August 2010 and 2011. These Arctic ice trials, six in total, were performed from 73°N to 78°N. During this period, sea ice floes consisted of thicker first-year ice, multiyear ice, and ridge ice. Ice trials were also conducted in the Amundsen Sea in February and March of 2012. During an Antarctic cruise, two ice trials were carried out to evaluate the performance of the research vessel Araon on big floes. In the ice trials, in addition to ice

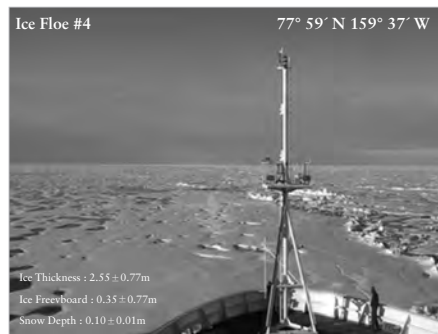


Figure IV-10. Full-scale ice trial of Korean icebreaker Araon

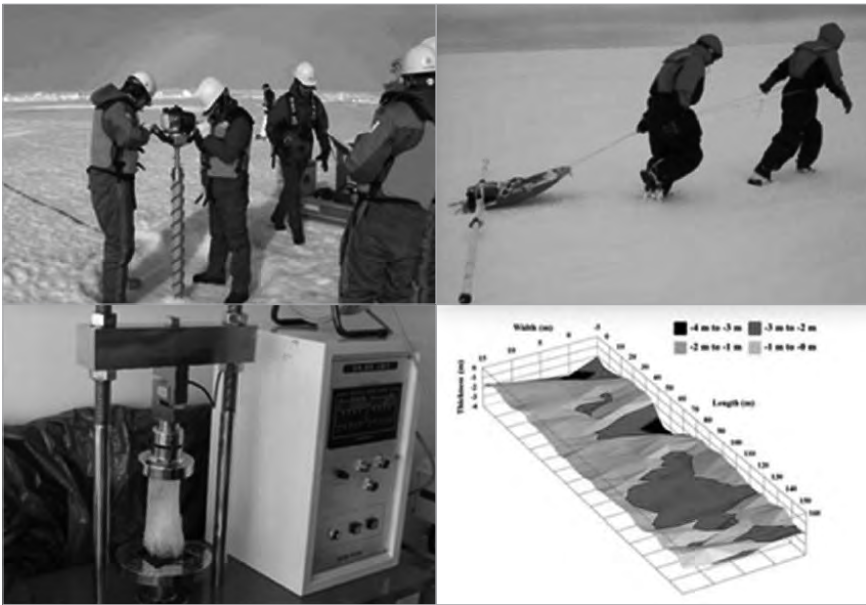


Figure IV-11. Ice thickness and strength measurement on old ice floe

properties, the time, location, engine power, revolutions per minute during the trial, and trajectory of the ship were recorded.

In ice trials, sea ice information is divided into concentration, thickness, and strength, and this information is used to evaluate the icebreaking performance of the ship. In the ice trials of an ice navigator from the Arctic and Antarctic Research Institute, the sea ice concentration at the ship's bridge and in the ice floe field was measured. Ice detection radar and a helicopter were used to define the size and condition of the sea ice. The thickness of the sea ice was measured by ice drilling. The ship's speed and main engine power were also recorded during this period. Using these data, we evaluated the ship's icebreaking performance.

As mentioned earlier, the sea ice thickness was measured by ice drilling in the field. Ice freeboard and snow depth were measured with an ice thickness gauge at intervals of 10m or 20m in selected test ice floes and a measuring stick. Figure IV-11 shows an intended ship track on a selected ice floe and ice drilling and coring with an ice auger and ice-coring device. During field measurements, sea ice thickness, temperature, weight, density, salinity, and crystal structures were measured by ice drilling. The compressive strength of the ice was measured with a universal test machine,

and the flexural strength of ice was calculated using salinity, temperature, and density results. The ship speed and power of the main engine plant were also measured in onboard tests on the ship. The performance of the ship in ice can be determined based on the measured engine power and ship speed for time history.

Until recently, the KRISO Ice Tank conducted only national research projects for Arctic research. This project focused on the development of safe operation methodology for ice-class vessels operating in Arctic sea routes and cryogenic evaluation techniques for determining a ship's ice performance. The project was carried out with the participation of universities, ship registers, shipbuilders, and marine research institutes. The strategic objectives addressed during the project were as follows, shown in order of priority:

1. Develop safety assessment techniques for the hull structure of icebreaking vessels to assess the design loads on a ship's hull,
2. Develop ice model test methodology to evaluate the ship's performance in ice and improve model test results,
3. Develop anti/de-icing techniques for ship machinery to secure its operating performance in low-temperature conditions to get the required ice class.

The aim of the project was to perform fundamental research for ice-going vessels based on ice-class rules. The main purposes were to develop a model test technique and analysis method, to determine the ice resistance of and ice loads on a ship's hull, to define the correlation between model-scale and full-scale results, to assess the hull's strength during ship-ice interactions, and to develop a numerical simulation technique for ship-ice collision. The outline and research extent is summarized below:

Project title: Development of Safe Operation Methodology for an Ice-Class Vessel Operating in Arctic Sea Routes and Cryogenic Evaluation Techniques for Determining its Performance in Ice

Total project period: 2009.06–2014.05

Total project funding: 2 million USD/year, Ministry of Knowledge and Economy, Korea

- Part 1. Safety Assessment Techniques for Hull Structure of Icebreaking

Vessels (Organization: Korea Maritime and Ocean University),

- Part 2. Development of Ice Test and Ice Performance Optimization Methodologies (Organization: Korea Research Institute of Ships and Ocean Engineering),
- Part 3. Arctic Design Technology and Winterization Performance Evaluation (Organization: Korea Research Institute of Ships and Ocean Engineering).

This research project resulted in the development of various new technologies and applications, as described below:

1. Development of accurate ice model test methodology and optimization of the performance of ice-going vessels in ice conditions.
2. Evaluation of the winterization performance of marine equipment of ice-going vessels.

Part 1. Safety Assessment Techniques for Hull Structure of Icebreaking Vessels

Project outline

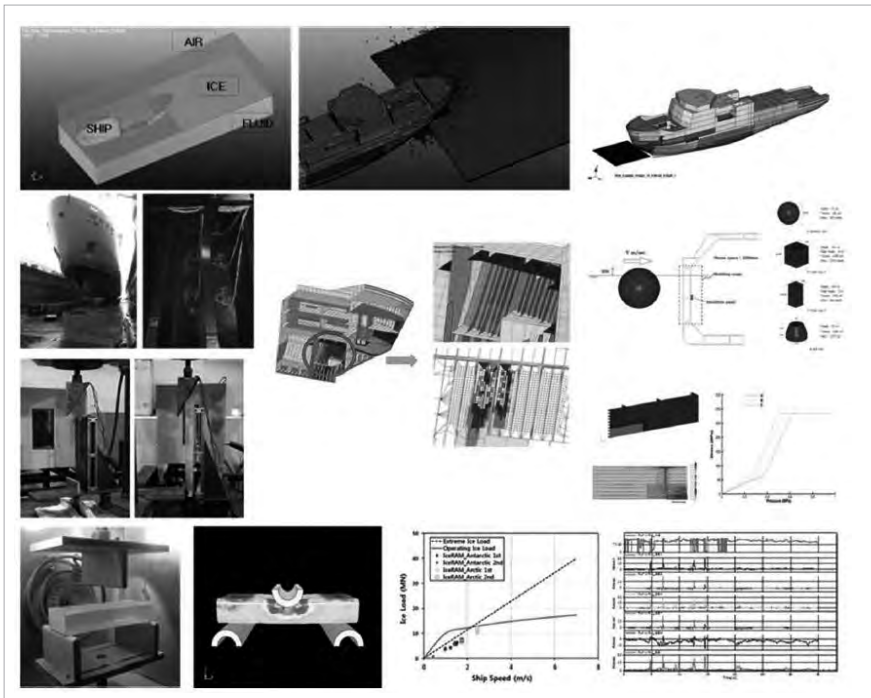
1. Research objective: Development of safety assessment techniques and analysis procedure of icebreaking vessels,
2. Participating institutions: universities, ship registers, shipbuilders, and research institutes.

Research results

- Estimation and analysis of full-scale ice load acting on a ship's hull
 - a. Ice modeling technique for theoretical ice load estimation
 - b. Numerical modeling method for ship and ice interaction
 - c. Full-scale ice load measurement procedure and analysis method,
- Impact response of ice collision and safety assessment of ship hull
 - a. Ship and ice collision analysis using LS-DYNA
 - b. Ice load estimation based on various ship and ice collision scenarios
 - c. Safety assessment of Mark III membrane CCS.

Applications

- Estimation of ice load on large icebreaking vessels,



- Safety assessment of icebreaking vessels and ice-load prediction design.

Part 2. Development of Ice Test and Ice Performance Methodology

Project outline

1. Research objective: Development of model test and ice performance analysis methods,
2. Participating institutions: Research institute and universities.

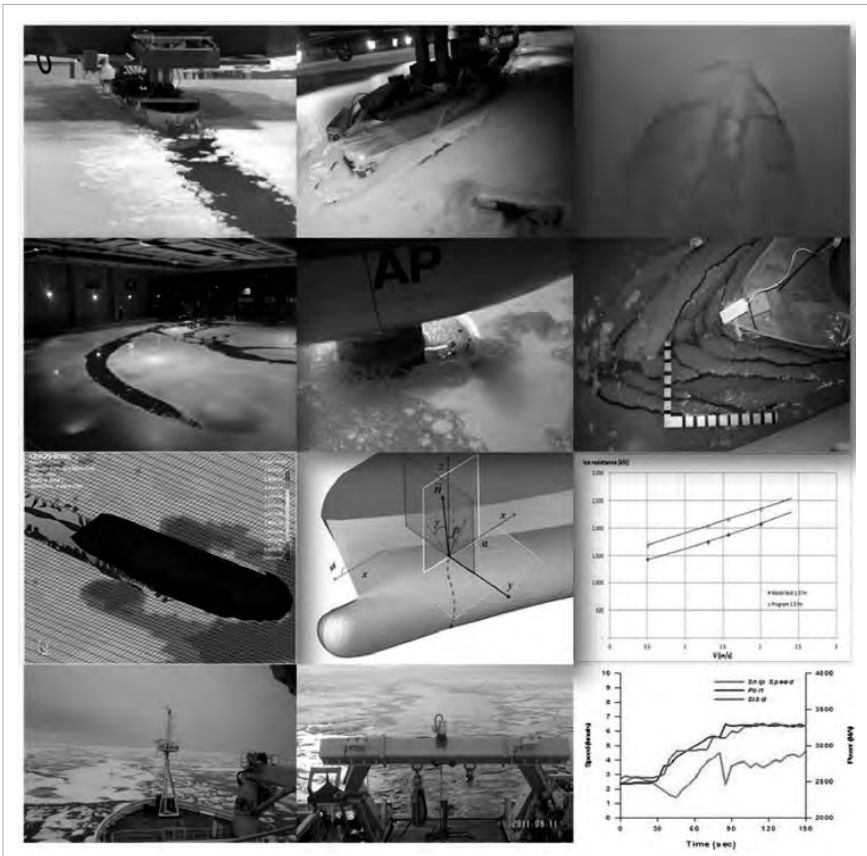
Research results

- Model test and analysis of icebreaking vessels:
 - a. Uniform model ice-generation methodology
 - b. Ice model test in various ice conditions (level ice, brash ice, ridged ice, etc.) with standard ice model test procedure
 - c. Numerical simulation of ship and ice interaction
 - d. Propeller and ice interaction analysis
 - e. Ice resistance and delivered power prediction of icebreaking vessels

f. Full-scale ice trial test procedure.

Applications

- Delivered power and resistance prediction of large icebreaking vessels,
- Numerical simulation and analysis methods using commercial code,
- Technical services to shipbuilding company to improve the ice performance of icebreaking vessels.



Part 3. Arctic Design Technology and Winterization Performance Evaluation

Project outline

1. Research objective: Development of shipboard winterization techniques,

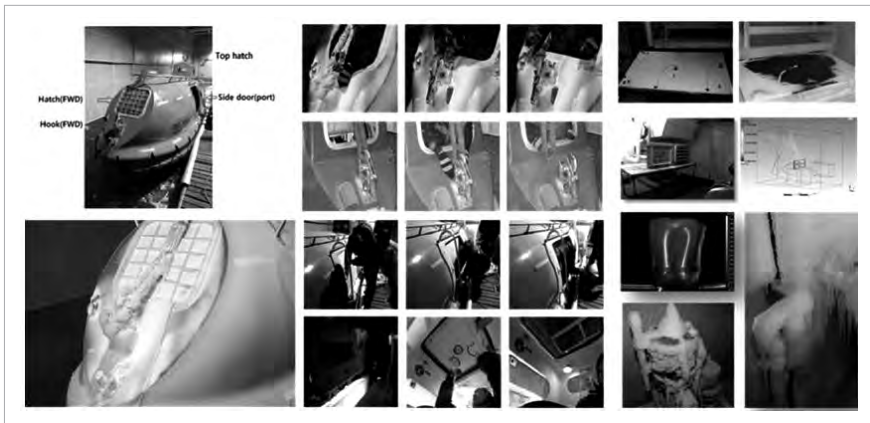
2. Participating institutions: Research institutes, universities, ship registers, shipbuilders.

Research results

- Winterization techniques for Arctic vessels based on ice-class rules:
 - a. Standard winterization performance test procedure in cold room
 - b. Anti/de-icing techniques for ship machinery (P/V valves, walkways, handrails, and louvers, etc.)
 - c. Heat transfer analysis of ship equipment.

Applications

- Winterization performance evaluation of ship equipment at low temperature,
- Shipboard winterization techniques for ice-class vessels.



FUTURE PLANS FOR KRISO ICE TANK

The KRISO Ice Tank will provide the research community and industries with reliable access to an ice-modeling facility and expertise for their R&D activities on ice-going vessels and novel structures, advanced transportation systems and technology, and operational concepts for services in ice-covered water. Initial research activities will be devoted to adapting and fine-tuning various ice-testing techniques by performing a variety of tests on icebreaking ships and on fixed and floating structures under various ice conditions.

Future work:

- Ice model test for a second Korean icebreaker and ice-performance evaluation,
- Development of safe operation technology in Arctic sea routes,
- Ice-structure interaction analysis and development of model test methodology for various offshore structures operating in Arctic regions,
- Development of cooperative relationship and partnership between members of the KRISO Ice Tank facility and others.

DISCUSSION: WHAT NEW TECHNOLOGIES IN THE AREAS OF FUTURE ARCTIC MARINE SHIPPING AND ASSOCIATED R&D ARE ON THE HORIZON THAT WILL IMPACT THE FUTURE OF THE ARCTIC?

Floating structures, such as large-size semi-submergible, drill-ship and LNG-Floating Production Storage and Offloading (FPSO), are believed to be feasible for marine operation in ice-covered waters. Many types of ice features, including level ice, ice ridge, pack ice and rubble ice, will pose potential challenges with respect to concept design and operations. The discussion takes into account what critical technology for floating structures operating in Arctic regions will be needed. The aim of this discussion is to contribute knowledge about ice actions on floating structures, how they can be estimated, as well as the dynamic response from model tests in ice. The specifications of the critical technology of floating structures are given for operations in ice-covered waters. This effort focuses on the requirements that should be met when the floating structures go to operate in the Arctic. The intention of this discussion will be to contribute increased knowledge about the interaction between floating structures and ice by conducting model tests in ice and by developing methodology for numerical studies. First, the fundamental studies of ice-structure interaction and ice failure mode will be discussed. Ice model tests to estimate the resistance in ice, mooring force and ice load will be conducted in the ice tank facility. Then, design concepts based on ice class rules will be provided. The intended research areas of this discussion are summarized as follows:

Table IV-1. New Arctic technology research

Technology group	Research theme	Critical technology elements
Fundamental research	Ice-structure interaction analysis	Ice-Structure Interaction Scenarios and Failure Mode of Ice
		Probability Distribution and Extreme Value Analysis of Local Ice Pressures
		Prediction of Design Ice Load of Floating Structure
		Estimation of Ice Impact Force Acting on Floating Structures Based on Impact Mechanics
Advanced research	Model test for ice-structure interaction	Modeling Techniques of Arctic Sea Ice Conditions in Ice Tank (Rubble ice, Ridged ice, etc.)
		Development of Model Test Methodology for Structural Shape (GBS, Floating, etc.)
		Development of Model Test Methodology for Various Floating Structures
		Comparison of Model Test Results Between Other Ice Tank Facilities
	Analytical and numerical analysis	Ice-Structure Interaction Analysis Based on Analytical Method (Empirical method, Energy consideration, etc.)
		Ice-Structure Interaction Analysis Based on Numerical Method (Ice fracture simulation, Structural analysis, etc.)

APPENDIX: FULL-SCALE ICE TRIAL PROCEDURE

An analysis of ship performance in ice is important at the ship design stage. Such analysis is normally executed using a computer program based on accumulated experimental data and a ship model test in an ice tank. After construction, sea trial tests are usually used to evaluate the power performance of ships. The results of sea trial tests provide valuable technical data to investigate the correlation between predicted results and trial test results. The technical data accumulated in the tests can be used to predict the power performance of another ship and to develop new hull forms for ships. It is difficult and expensive to conduct field trials of icebreaking vessels because it is not easy to navigate the sea ice field. The correction method of sea ice field test results is requested to develop. The speed of icebreaking vessels is related not only to the propulsion power

of the ship but also to sea ice properties, such as the thickness, strength, and crystal structure. These exert individual and combined effects on the propulsion characteristics of icebreaking vessels. Therefore, the results of many field trials are needed. The results of field tests of a number of icebreaking vessels in sea ice were combined in the present project.

Further ice-performance tests will be conducted to evaluate the icebreaking performance of ice-going vessels. The results of these tests will be used to develop full-scale tests, test procedures in ice trials, and test equipment. The results will be compared with predicted data in the design stage. They will also be used to predict the power performance of icebreaking vessels and to develop optimum hull forms. The trial tests will be carried out in ice floes with various thicknesses and ice properties. After landing on the ice floe for the ice trial test, a running track will be marked, and ice properties along the track will be measured. The thickness distribution of the ice floe will be surveyed using electromagnetic induction instruments. The density and salinity of the sea ice will also be measured from cored sea ice samples. The crystal structure of sea ice will be analyzed in the laboratory after completion of the icebreaking tests. After finishing the survey work on the ice floe, the icebreaking test will be started. As the ship runs along the marked track, the ship's speed and engine power will be measured. The acceleration and rotational rate of the ship will also be measured with an accelerometer located nearly at the gravitational center of the ship. The ship's motion during the icebreaking will be analyzed from the results obtained. In addition, the sea ice condition and floe size will be evaluated using radar and satellite data. All these data will make it possible to fully evaluate the ship's icebreaking performance.

Commentary

Robert W. Corell

CONTEXT FOR R&D INNOVATIONS APPLICABLE TO THE ARCTIC

The Arctic region is changing, and the changes are accelerating at rates and levels that have not been experienced by modern humankind or humankind's ancestors for at least 800,000 years, and quite possibly for millions of years. Further, the Arctic is increasingly impacted by globalization processes and socioeconomic changes that have their genesis outside the region and hence are shaped by, but in turn are shaping, the course of world affairs. The climate and other environmental changes within the Arctic and around the planet are emerging with greater clarity and are inexorably linked. These changes and the new development opportunities they have created have turned the Arctic into an increasingly important region in political and socioeconomic terms. The consequences of developments and the feedbacks between regions of the Northern Hemisphere and the Arctic regarding climate change, ecosystems, human health, and socioeconomic and resource development have the potential to affect substantively and directly the interests of the eight Arctic countries, the Asian Pacific countries of Korea, China and Japan as well as much of Europe and the rest of the planet. The Arctic is no longer a remote, isolated, inaccessible region, but one that generates intense interest on the part of Arctic and non-Arctic countries alike that face the challenges of balancing their socioeconomic and development interests with the environmental and geopolitical governance challenges of a region rich in natural resources and socioeconomic potential.¹

It is increasingly clear that these changes raise important research and development issues. This session seeks to identify the range of R&D challenges in a context of the innovations that are likely to be necessary and applicable to the Arctic, its peoples, its socioeconomic conditions, and the geopolitical realities of the opportunities and challenges that a "twenty-first century Arctic" presents.

FRAMING THE DIALOGUE FOR THE SESSION

This session's papers prepared by Mike Aumond, deputy minister of finance, Government of the Northwest Territories in Canada and Kuk Jin Kang, principal research scientist, Advanced Ship Research Division, Korea Research Institute of Ships & Ocean Engineering, focus on specific R&D developments that are likely to foster and support new innovations for the Arctic region and the world at large. Both have outlined in detail important technological developments, i.e., the Korea Research Institute of Ships and Ocean Engineering (KRISO) ice tank facility and research capabilities (by Kuk Jin Kang) and a fiber-optic system for Canada's Western Arctic (by Mike Aumond). These are excellent contributions to NPAC 2014 and for the book to come. In addition to the discussions that will follow their presentation, I would like to posit a few ideas to frame other dimensions for the dialogue following these presentations.

What do we mean when we title this session R&D: Innovations Applicable to the Arctic?

- R&D: R&D² is defined as “creative work undertaken on a systematic basis in order to increase the foundations of knowledge, including knowledge of man, culture and society, and the use of this knowledge to devise new applications.”
- A New Framing for Research: A new framing for R&D indicates that a broader perspective has been posited by the U.S. National Academies (Science, Engineering and Medicine), particularly suggesting that “use-inspired” research³ be implemented in ways that seek to connect all three of the above research activities.
- Innovation: Innovations involve the implementation of new or significantly improved products (goods or services), processes, new marketing methods, or new organizational methods in business practices, workplace organization or external relations. Innovative activities are those scientific, technological, organizational, financial and commercial steps that actually, or are intended to, lead to an implementation. Innovative activities by necessity include the R&D efforts that are directly related to the development of a specific innovation, but also may not be directly related to the development of an innovation.

The reason for suggesting these framing concepts for R&D and innovation is that it is posited that it will be essential to develop concrete programs to field the needed research, development and innovation that is applicable to the Arctic. The gaps in knowledge and understanding are real, and addressing them will require a substantial coordinated international effort. Virtually all the issues addressed to date by the NPAC Conference series can provide a roadmap for the development of such a plan. The consequences of inadequate knowledge and understanding likely will adversely affect the socioeconomic development of the region and can raise geopolitical realities that challenge the opportunities raised by the opening of seaways and other consequences of climate change and globalization facing a “twenty-first century Arctic.” Here are some thoughts for discussion during Session IV.

USE-INSPIRED RESEARCH PLANNING

ICARP III: The Third International Conference on Arctic Research Planning (ICARP III)⁴ will be held in Toyama, Japan during 27-30 April 2015. ICARP III provides a framework to address a number of issues being raised during NPAC 2014, and more particularly in Session IV. ICARP III also seeks to:

- Identify Arctic science priorities for the next decade,
- Coordinate various Arctic research agendas,
- Inform policy makers, people who live in or near the Arctic and the global community, and
- Build constructive relationships between producers and users of knowledge.

The ICARP III Symposium in Japan will mark the closure and culmination of ICARP III processes. The symposium will present and discuss the outcome of the planning process, including a consensus statement identifying the most important Arctic research needs for the next decade and a roadmap for research priorities and partnerships. The ICARP III planning process is well underway, and it is posited that it will provide a serious opportunity for the NPAC community to contribute their perspectives to the planning processes and the establishment of

internationally endorsed research priorities of importance to the NPAC community. It is recommended that the NPAC process take advantage of this opportunity to foster its interests.

National Arctic Research Planning: The eight nations of the Arctic Council all have developed their Arctic strategies,⁵ as have many of the 12 official observer nations to the Arctic Council. Further, many of these 20 nations have drafted research plans in support of their Arctic strategies. In some cases these national-level plans are produced by individual government agencies,⁶ whereas in other cases the plan is national in organization and implementation.⁷ This commentary, in this context, is not designed to be comprehensive, but to identify issues for discussion. A recent comprehensive national research plan was published by the U.S. President's Office of Science and Technology Policy which in summary states that the Arctic's central role in environmental change makes this region a critical target for research as scientists and other experts work to understand better the feedback mechanisms influencing the global climate, and support policymakers and businesses as they consider opportunities while minimizing human and environmental costs. To address these challenges and opportunities, the U.S. Interagency Arctic Research Policy Committee (IARPC) has crafted a 2013-2017 Arctic Research Plan.⁸ The plan provides a blueprint for U.S. federal coordination of Arctic research for the next half-decade. It states that it is now national policy for Arctic research to consist of seven overlapping research areas:

- Sea ice and marine ecosystems
- Terrestrial ice and ecosystems
- Atmospheric studies of surface heat, energy, and mass balances
- Observing systems
- Regional climate models
- Adaptation tools for sustaining communities
- Human health

A Recommendation: Given the rich array of formal national Arctic policy strategies and the emergence of national R&D plans and planning mechanisms that have the potential to address gaps in knowledge and opportunities of socioeconomic and sustainable development for the Arctic that have been raised during the four NPAC Conferences, it is recommended that a comprehensive effort be undertaken through the

NPAC process to codify the full range of national Arctic policies and research/ development plans for the decades ahead, possibly in the form of an Arctic Policy, Development and Research Compendium,⁹ which would assemble the national Arctic strategies (for the 20 Arctic interested nations of the Arctic Council and the others that participate in IASC) and the emerging research, development and innovation strategies of these nations. It should be extended to encompass the interests of NGOs with research, development, conservation and sustainability interests. Most importantly, it must include the six indigenous peoples' organizations of the Arctic Council and other appropriate indigenous peoples' organizations of the Arctic region.¹⁰

Coordinated Arctic Research Funding: The NPAC 2014 Conference is considering a wide range of international cooperation issues driven by a rapidly changing Arctic, with Session IV focusing on the requirements for research, development and innovation in the Arctic. This is nested in the reality of the different Arctic than we have known for centuries, a region which herein is called a "twenty-first century Arctic." The fact is that all nations will be addressing R&D issues in which national budgets for R&D are increasingly stressed and where national agencies that fund Arctic research are being seriously impacted by policy, political and budgetary stresses. Most of the 20 national funding agencies associated with the Arctic Council support Arctic research and in a number of cases development, but with the increased interest in the Arctic region the demands to do so are growing. These agencies vary in size; some focus on different areas of research and some fund both research by others or conduct research by national institutions.

It is suggested that these national R&D funding agencies also share important goals: to enable scientists, engineers and other experts to understand better system processes in the Arctic and how they are changing and to understand better interactions between these changing processes and our societies and economies. They also want the R&D they sponsor to be able to take advantage of newly available technologies and newly available databases. As we all know, achieving these objectives requires substantial financial and infrastructural resources.

Many gathered here at 2014 NPAC have worked in the Arctic and have learned long ago that international cooperation in Arctic research brings tremendous benefits. Teams of researchers from different countries, often using shared facilities, have achieved increases in knowledge—knowledge

that is now increasingly widely available.

It is recommended that the time has come now for the national agencies that fund Arctic research and development to work together internationally. It is suggested here that we in the NPAC community consider encouraging these agencies to get together to cooperate and coordinate their efforts, e.g., to consider how the financial resources to support such research and development might best be obtained; how allocation of such funds might best be coordinated to assure their most effective use, and how funding for shared use of research facilities in the Arctic might be better facilitated.

Funding agencies in the area of global change research came together more than 20 years ago and established the International Group of Funding Agencies for Global Change Research (IGFA). IGFA was—and is—a relatively informal group that brings together national funding agencies from a wide range of countries, both large and small, with objectives similar to those outlined above. It might well provide a model for an international mechanism for coordinating research and development across the Arctic. The interactions that IGFA has fostered among funding agencies is well reflected in the scientific success of the international global change research programs where IGFA has developed and maintained strong links with the World Climate Research Program (WCRP), the International Geosphere-Biosphere Program (IGBP), DIVERSITAS, the International Human Dimensions Programme on Global Environmental Change Program (IHDP), the Earth System Science Program (ESSP), and now the emerging Future Earth research program.¹¹ It is suggested for discussion purposes that an informal group of national agencies from nations with interests in funding Arctic research could similarly link with bodies, such as IASC and the International Arctic Social Sciences Association (IASSA),¹² that focus on Arctic research and often in cooperation with international global research programs such as the WCRP and the new initiative—Future Earth—that have an interest in the Arctic as well.

A CONCLUDING THOUGHT

These ideas are not designed to be comprehensive or complete, but to open doors for conversations during the NPAC 2014 session on R&D: Innovations Applicable to the Arctic.

Notes

1. These opening observations are adapted from the *2011 North Pacific Arctic Conference proceedings: The Arctic in World Affairs: A North Pacific Dialogue on Arctic Transformation*, edited by Robert R. Corell, James Seong-Cheol Kang, and Yoon Hyung Kim.
2. These definitions are taken from the *Oslo Manual*, which is the recognized international source of guidelines for the collection and use of data on innovation activities in industry.
3. The term “use-inspired research” was developed and published by the U.S. National Academy of Science to indicate “that research should include and integrate disciplinary and interdisciplinary research across the physical, social, biological, health, and engineering sciences; focus on fundamental, use-inspired research that contributes to both improved understanding and more effective decision making; and be flexible in identifying and pursuing emerging research challenges. (http://www.nap.edu/download.php?record_id=12782)
4. The ICARP planning effort is held every 10 years and provides a unique opportunity to develop plans for Arctic research for the coming decades. It is sponsored by the International Arctic Science Committee (IASC). See: <http://icarp.iasc.info>
5. See: <http://www.arctic-council.org/index.php/en/document-archive/category/12-arctic-strategies>
6. Such as KMI in Korea: <http://www.kmi.re.kr/kmi/en/publication/> and the Polar Research Institute in China seek programs to promote sustainable development of the Arctic (<http://barentsobserver.com/en/arctic/2013/12/china-nordic-arctic-research-center-opens-shanghai-12-12>)
7. Norway (http://www.forskningsradet.no/bibliotek/publikasjoner/strat_arktis_engelsk/arct_kap4.html)
8. http://www.whitehouse.gov/sites/default/files/microsites/ostp/2013_arctic_research_plan.pdf
9. An example of a compendium is “The Arctic Governance Compendium” which has assembled and evaluated a wide range of governance proposals through an electronic Arctic Governance Compendium. See the compendium at: <http://arcticgovernance.custompublish.com/compendium.137742.en.html>
10. There are over 40 different ethnic groups living in the Arctic.
11. See Future Earth Program at: <http://www.icsu.org/future-earth>. The Future Earth is designed to be a global platform, including considerations about the Arctic to deliver:

- Solution-orientated research for sustainability, linking environmental change and development challenges to satisfy human needs for food, water, energy, and health;
- Effective interdisciplinary collaboration across natural and social sciences, humanities, economics, and technology development, to find the best scientific solutions to multifaceted problems;
- Timely information for policymakers by generating the knowledge that will support existing and new global and regional integrated assessments;
- Participation of policymakers, funders, academics, business and industry, and other sectors of civil society in co-designing and co-producing research agendas and knowledge; and
- Increased capacity building in science, technology and innovation, especially in developing countries and engagement of a new generation of scientists.

12. <http://www.iassa.org>

Commentary

Mikko Niini

FINLAND'S PERSPECTIVE: TECHNOLOGIES AND R&D IMPACTING THE FUTURE OF THE ARCTIC

The industrialization of the world some hundred years ago took place in the northern areas of the globe, where many freezing areas required regular sea transport over the whole year. Thus, the first icebreakers and icebreaking technologies emerged in the Great Lakes, Baltic and White Sea areas. More of a focus on the natural resources hidden in the Arctic was not seen before the 1970s, when the first efforts involving Arctic hydrocarbon exploration and transports started to take place. The U.S.S.R. decided to open the western part of the Northern Sea Route (NSR) for strategic mining efforts. Some innovative solutions for icebreaking had already emerged in the 1890s, but basically the industries adapted naval technologies into ice-going vessels until the 1940s. Since the 1960s, Arctic needs facilitated the technology push that today's Arctic developments rely on. Finland has for more than a hundred years been a key developer and user of marine icebreaking technologies, with up to 10,000 annual port calls during winter months assisted by a national fleet of icebreakers.

Finland initiated the Rovaniemi process leading first to the establishment of the Arctic Environmental Protection Strategy and then to the Arctic Council. Finland is a member of the Council. In August 2013, the government of Finland decided on a national Arctic strategy in which Arctic technologies, related R&D, and business developments have a central role. As a reflection, this year Finland's Tekes national technology fund launched a 100 million euro support program called "Arctic Seas" for enterprises and universities.

SPECIFICS OF ICE NAVIGATION

Ice-operating vessels require some special features in order to make passage in ice safe and efficient. These include specific reinforced materials, hull form, adequate hull and propulsion strength as well as specific

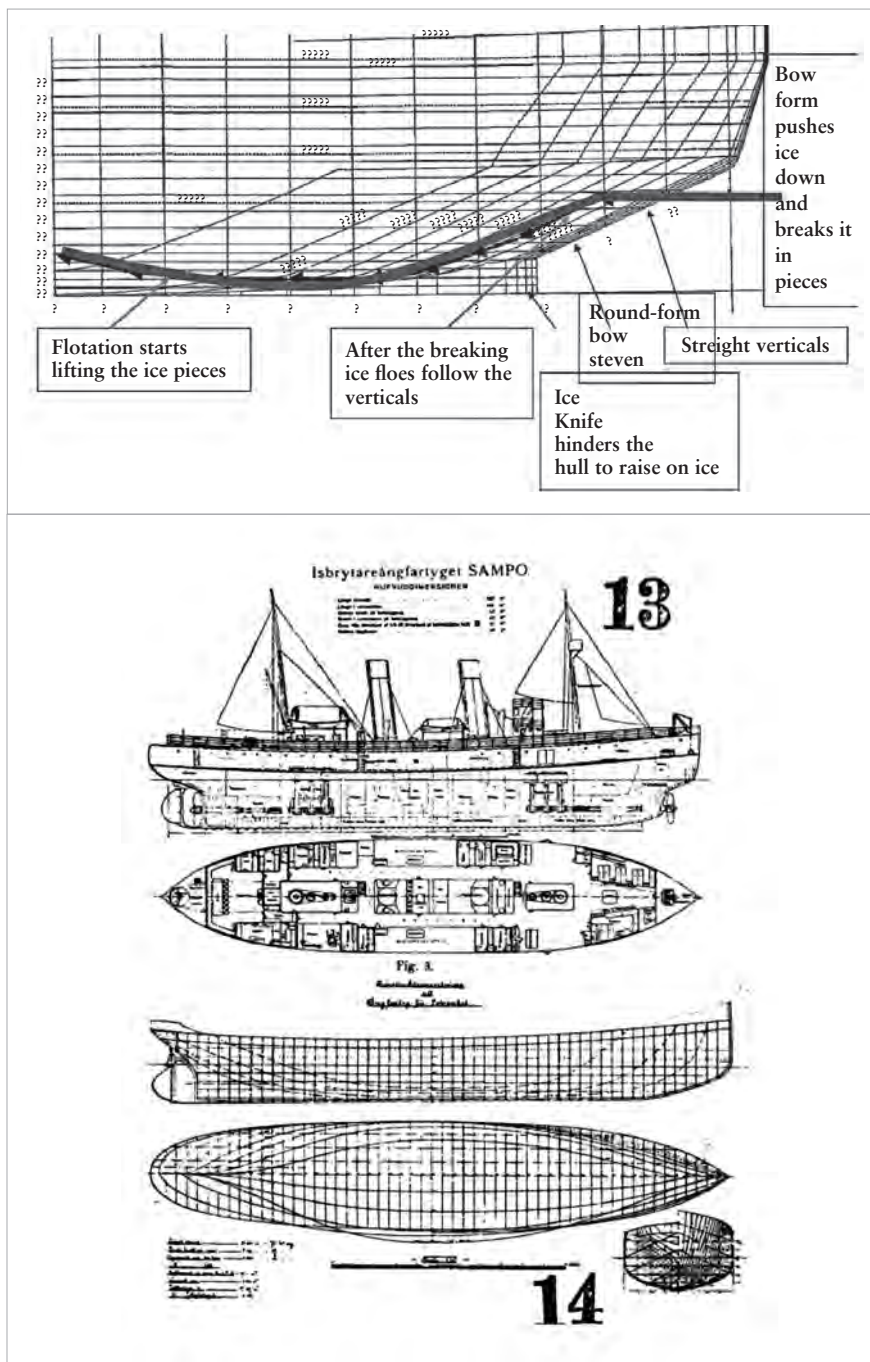


Figure IV-12. Icebreaking process and typical special features in an ice-operating vessel (top). Icebreaker Sampo from 1892 (bottom).



Figure IV-13. Manhattan in thick ice

winterization and cold environment operations features.

The general development of ship machinery brought diesel-electric installations into icebreakers in the 1930s. Overall material development since the 1970s has allowed the use of direct diesel drives and geared propulsion installations, mainly with controllable pitch propellers, although fixed propellers in shaft lines remained the standard solution in lower ice classes. Russia started focusing on the application of nuclear power for icebreakers, especially for their remote Arctic destinations for which frequent refueling was not possible. The largest *Yermak* class diesel-electric icebreakers built in the early 1970s in Finland for Russia had close to 10,000-ton capacity for fuel, and yet suffered from limited endurance.



Figure IV-14. Examples of typical additional features for friction reduction for ice-going ships

The “Manhattan” project, a pioneering, full-scale trial initiated by Humble Oil (today ExxonMobil) in 1969 to bring North Slope (Prudhoe Bay) oil to the U.S. East Coast, was a leading effort for the related industries. With the side effect of creating the WIMB ice model test basin (today Aker Arctic) in Finland, the project opened up totally new tools for the related R&D efforts. The first new ships created on the basis of the ice model testing option, the sister icebreakers *Urho* and *Atle*, in 1974 for Finland and Sweden, thus adapted totally new hull forms and more efficient operability in ice. The physical fundamentals of icebreaking were learned simultaneously, and many additional features were innovated, such as air bubbling and solvent-free epoxy coatings as well as stainless steel ice belts, all for reduction of friction.

In this period, Canada opened up the Mackenzie Delta area for hydrocarbon exploration. The specifics of the Beaufort Sea conditions, especially the presence of multi-year ice, divided the ice technology world into two schools. The Canadian designers and operators emphasized—and still emphasize—the role of a strong bow detailed for ice ramming combined with the maximum bollard pull in protected (nozzled) large propellers. Friction reduction was achieved by waterfall outlets in the bow and along the side hull. Simplicity in hull form and shaft line arrangements were also emphasized and direct engine drives preferred, with flywheels providing some of the required ice features for propulsion.

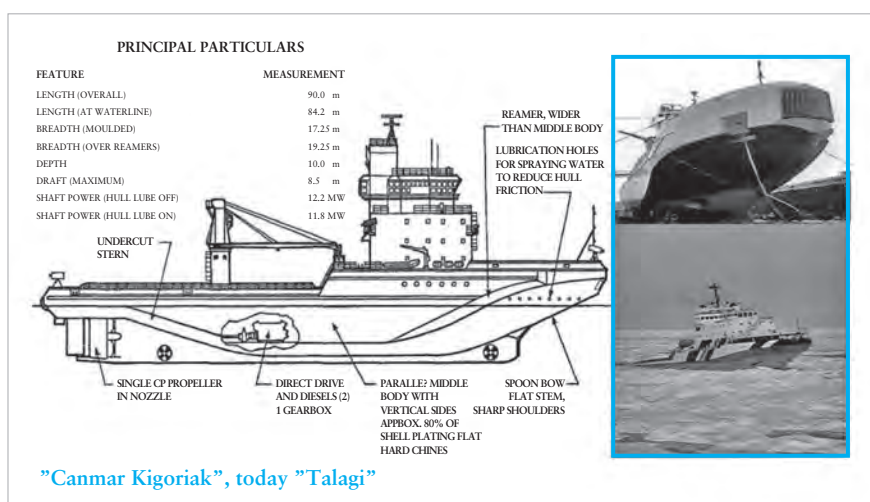


Figure IV-15. Typical Canadian icebreaker design from the 1980s

The European school, mainly Finland and Germany, started focusing more on economics, fuel efficiency, and better operability and maneuverability. This thinking created ultimate hull forms like the Wärtsilä spoon bow and Thyssen Waas bow. The Ministry for Merchant Marine of the U.S.S.R., which already had operational experience from regular Arctic transports, was a keen client for each of these novelties, including the AC-AC drives made possible through technological innovations on frequency converters. A demonstration of these new features appeared (e.g., in the Baltic icebreaker *Otso* and the shallow-draught nuclear icebreaker *Taymyr* commissioned in 1991). The same technologies were adapted later in the 1990s in the USCG IB Healy built by the Avondale Shipyard with technology and model testing support from Aker Arctic of Finland. These developments were combined with the simultaneous introduction of ice-capable electric pod drives, like the Azipod, and mechanical thrusters, like the Aquamaster.

The Canadian school built several offshore support icebreakers for Beaufort Sea oil companies (Dome Petroleum, Canmar, Beaudrill, Gulf Resources, etc.) with the ultimate example being the Swedish state icebreaker *Oden*, a frequent visitor to the North Pole and Antarctica.

LATEST DEVELOPMENTS

The introduction of the azimuthing thrusters for ice operation opened up also the possibility for a new mode of ship operation. Kvaerner Masa-Yard's full-scale trials of the tanker *Uikku* in 1993-95 showed that ice resistance was reduced up to 50% and the ridge penetration capability significantly improved, although the original target for the R&D work was to achieve better maneuverability for icebreakers. This new energy-saving "double acting" feature was soon adapted by several operators, both for icebreakers (e.g., the USCG IB *Mackinaw*, Norwegian *Svalbard*, and Finnish *Botnica*) as well as in independently operating cargo vessels (Norilsk Nickel's *Norilsk Nickel* type six-vessel series, the 105,000 tdw tankers *Tempera* and *Mastera*, Sovcomflot's *Mikhail Ulyanov* and five *Vasily Dinkov*-type bow-loading 70,000 tdw shuttle tankers built in Korea). The last-mentioned tankers are operating the world's first Arctic oil export shuttle service and have already transported more than 30 million tons of crude oil from Varandei to world markets.



Note: New technology has enabled new logistic systems, allowing for new industrial production investments in the Arctic regions. On the left is the Aker Yards-built DAS™ vessel Norilsk Nickel in independent stern-first ice operation in 1.5m-thick ice in the Kara Sea (photo: Aker Arctic), and the Samsung-built 70,000 tdw Arctic shuttle DAS™ tanker Vasily Dinkov approaching the loading tower in Varandei (photo: Sovcomflot).

Figure IV-16. Aker Yards-built DAS™ vessel Norilsk Nickel (left) and Samsung-built 70,000 tdw Arctic shuttle DAS™ tanker Vasily Dinkov (right)

ABB, having taken over the Azipod business, soon got orders for new offshore support icebreaker installations, especially for the Caspian Sea and waters off Sakhalin. The “double-acting” ice operating mode was soon adapted also for mechanical Aquamaster, Steerprop, Schottel and Wärtsilä thrusters, so that today one can say that the azimuthing thruster is a standard solution in modern icebreaking vessels. The recent launch of the gas-fueled Canadian ferry *F.A. Gauthier* for STQ now brings to the market Steerprop’s IASuper ice class further developed contra-rotating (CRP) azimuthing thrusters.

The diesel-electric type of propulsion is well-suited for reduced emissions in ice, and most recently the latest stern-first operating new ships have additionally been fitted for the use of LNG fuel. This is the case for the latest state icebreaker for Finland and the 10 Arctic 172,000 m³ Arc 7 ice class LNG carriers contracted so far for the Yamal LNG project, which simultaneously establishes the first regular transit traffic on the NSR from the Kara Sea to the Pacific Ocean. Three of the carriers are jointly contracted by Mitsui O.S.K. Lines with the China Shipping (Group) Company, and six by Teekay LNG Partners L.P. through a new 50/50 joint venture with China LNG Shipping (Holdings) Limited, with completion from 2018 to 2020. The expected unit cost is 314 million USD, compared to some 200 million USD for similar standard carriers. The planned fleet, totalling 16 vessels, is being built by DSME of Korea.

Compatriot SHI has simultaneously signed contracts for smaller Arctic 40,000 tdw twin Arc 8 ice class Azipod DAS™-type crude oil shuttle tankers that will enter service in 2016.



Note: The JMU-built Arctic bulk carrier MS *Nunavik* (photo: JMU) and an impression of the Yamal LNG Arctic LNG DAS™ carriers now under construction by DSME (photo: DSME).

Figure IV-17. The latest Arctic cargo vessels

Earlier this year Fednav in Canada took delivery from JMU, Japan of the 25,000 tdw Arctic bulk carrier *Nunavik* for year-round operation for Glencore Xtrata's nickel mine from the Hudson Strait Deception Bay to Quebec. She is an improved sister to Fednav's *Umiak I* that operates from Labrador's Voisey's Bay. These vessels represent the Canadian design philosophy of strong bows combined with direct shaft line propulsion in protected nozzles. Waterfalls are provided for auxiliary service in the bow part. The MAN-B&W 21,770 kW slow-speed single diesel is adapted for 1.5m-thick ice operation through newly developed electronic control. The *Nunavik* is now preparing for a commercial voyage through the North West Passage from Northern Canada to China.

The above examples are clear evidence of better solutions introduced to industrial investors to provide improved economies by independent vessel operation in ice. New technology thus clearly enables new industrial investments in the North through improved logistics.

PROSPECTS AND CHALLENGES FOR THE FUTURE

World shipping is conservative, and it always takes a lot of time for technology improvements to be adopted by the shipping community. It has been encouraging, however, to learn that Russia's shipping industry is keen on new developments and solutions, especially for ice operations, in which the nation and crews have long experience. Still, the lead times for implementing new technology introductions have typically been more than 10 years (e.g., the Sakhalin OSV's and the Arctic DAS™ shuttle tankers), which is half the relevant patents' validity time. Only in 2013, some 20

years after the prototype, the first Azipod installation was accepted into a Canadian project in the CCG IB *John G. Diefenbaker* to be completed in 2020.

In world shipping, two major factors affect future solutions: there is a general drive toward improved energy efficiency and lower emissions. The IMO has already issued the EEDI system to enhance the shipping industry's involvement in the Kyoto process and countermeasures against increases of CO₂ emissions. An exemption for ice-going ships, which typically require more power and burn more fuel, has been issued for vessels that are able to penetrate ice thicker than 1.0m. In certain "ECA" areas, additional emission limitations have been introduced on NO_x and SO_x. The Arctic Council has established a task force to consider regulations on black carbon, especially for the Arctic trades. One solution has been to use alternative fuels like LNG. But in general, Arctic industries need to seek further, innovative technologies to reach the general industry goals. Today, underwater radiated noise is also considered a kind of emission likely to affect marine mammals.

Environmental movements have recently generated additional challenges, especially for oil drilling-related activities. This has been experienced especially by Shell Alaska, whose drilling campaign in the Chukchi Sea has already been delayed for more than seven years from the original plans. Great emphasis has been put on oil spill combat preparedness, and full mobilization of the necessary support fleet and readiness for drilling a relief well in the same season appear to have become standard requirements that are also reflected in the ExxonMobil/Rosneft drilling campaign of August 2014 in the Kara Sea.

Further challenges to development are arising from the general concern about the safety of Arctic shipping and operations, which have been addressed in the Arctic Council's Arctic Marine Shipping Report for example. This concern for sufficient risk mitigation has now been responded to by IMO, which is in an advanced stage of launching the Polar Code. This code will set common safety standards for all Arctic and Antarctic operations from 2017 onward and additionally provide each vessel with a Polar Operations Manual that will describe the vessel's real ice capability for the intended tasks in specific areas. The code is expected to change many practices adopted by various flag states so far, and with the new environmental regulations will indirectly affect vessel designs.

Commentary

Toshiyuki Kano and Takahiro Majima

First of all, thanks to Mike Aumond and Kuk Jin Kang for their papers on “A Fiber Optic System for Canada’s Western Arctic” and “Introduction to the KRISO Ice Tank.” They discuss issues of innovations applicable to the Arctic from two distinct points of view.

Last year, we focused on greenhouse gas emissions on the Northern Sea Route (NSR), the energy efficiency of ice class ships, and monitoring navigation systems and introduced a comparison of the Suez Canal Route (SCR) and the NSR in terms of environmental impact. This time, we’d like to introduce results focused on each route from an economic perspective, and make some comments on the two presentations.

Specifically, we would like to comment on the following points:

- Shipping cost estimations for the NSR considering ship performance in ice,
- Expectations for the KRISO ice tank,
- Expectations for the information infrastructure of the Arctic

To begin, we will introduce a simulation study of cost estimates for the NSR considering ship performance in ice. Then, we will comment on the presentations related to our study.

SHIPPING COST ESTIMATES

Objectives

The NSR has distance and time advantages compared to the traditional SCR with regard to shipments between Northeast Asia and Northwest Europe. Considering greenhouse gas emissions on a global level, a significant GHG reduction could be expected by using the NSR. However, larger engine output is required, and GHG emissions increase when navigating in ice. The comparative advantages of the NSR and SCR should be evaluated not only from the perspective of distance and time savings, but

also from an environmental conservation perspective (Kano et al., 2013). It is necessary to meet technical innovation challenges for ice-class vessels. Ice-class vessel energy efficiency should be improved (Kano et al., (2013). Here, we introduce a simulation study of cost evaluation of shipping via the NSR and the SCR.

Background

Many related studies have been conducted for a comparative analysis of the estimated shipping cost through the NSR and the SCR. Since the assumptions regarding cost estimates vary among the studies, however, there remain some difficulties in comparing the estimated shipping costs in the studies. Furuichi et al. (2012) tried to establish a common platform for a wide range of cost assumptions by clarifying and analyzing cost components, referring to the literature as well as the most recent interviews with NSR shipping professionals. They accomplished an empirical analysis and produced cost estimates for container transport between East Asia and Europe.

Furuichi et al. (2012) had calculated and analyzed specific shipping costs such as container ship price, annual shipping frequency, annual container throughput, depreciation costs, NSR fees, Suez Canal fees, crew costs, maintenance costs, insurance costs, fuel costs and annual port dues, assuming that the totals correspond to the annual shipping cost of container transport between Yokohama and Hamburg. The methodology for cost estimation was clear. However, the analysis did not take into account ship performance in ice, which has a high impact on shipping costs.

Shipping Cost Estimation on the NSR Considering Ship Performance in Ice

Therefore, our study has made an economic evaluation in accordance with Furuichi et al. (2013) considering ship performance in ice. Here we have considered ice thickness and rate of ice that covers the sea and assumed the same ship performance as Kano et al., 2013 and reviewed the calculation method again to analyze the transportation cost.

Furthermore, describing a simple case study of containerized transportation between East Asia (Yokohama, Japan) and Europe (Hamburg, Germany), in this case, using the NSR is 6,975 NM, and the

SCR is 11,465 NM. The distance of the NSR is 40% shorter. The NSR has a draft restriction of 13 m at the Sannikov Strait, and the maximum ship size is approximately 50,000 DWT. Therefore, we set both an ice class container ship and conventional ship at 4,000 TEU (Figure IV-18). We will provide an example of the shipping cost that is calculation-based and analyzed. Moreover, we consider the effects in cases of improving the ship's performance in icy waters.

Results

Here we simulated the shipping cost per TEU in two scenarios intended for a 4,000 TEU ice class container ship.

Scenario 1: An ice class container ship would use the NSR when available to navigate and the SCR when the NSR is unavailable.

Scenario 2: A conventional ship would navigate the SCR at all times of the year.

We simulated and calculated the shipping cost per TEU of a container

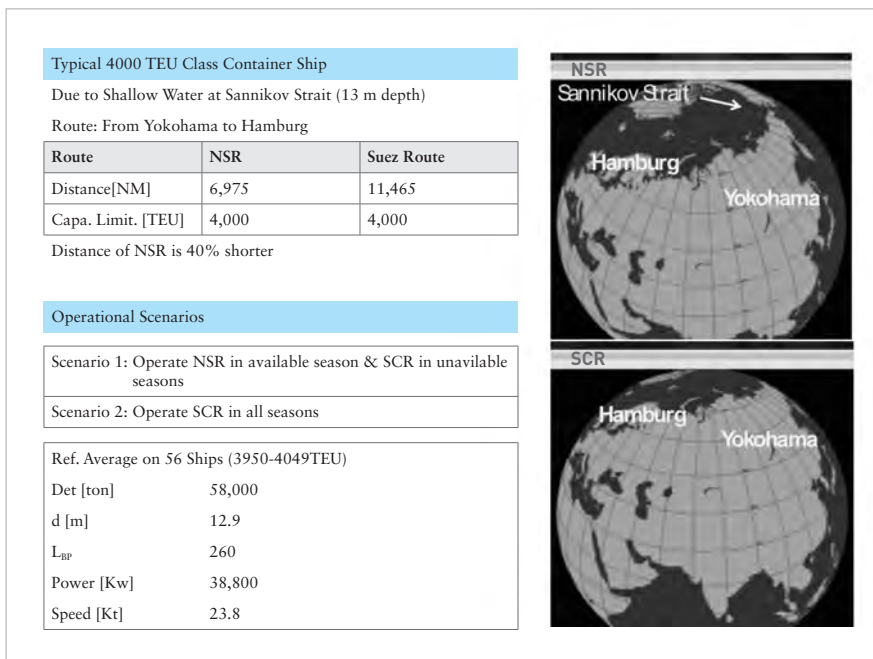


Figure IV-18. Simulation study on NSR vs. SCR

ship in the two scenarios. The table in Figure IV-19 shows the shipping cost ratio per TEU of Scenario 1 to 2 corresponding to each condition of ice coverage and ice thickness. The operation using the NSR is cost effective if the ratio is lower than 1. These results show that lower ice thickness and smaller ice coverage and longer NSR available time lead to a considerable cost advantage in using the NSR.

Considering recent ice coverage and ice thickness conditions under the assumption of navigating the NSR for 105 days, Scenario 1 has an advantage in navigating when ice thickness is lower than 0.5m and ice coverage is less than 50%, or lower than 0.7m and less than 20%.

Sea ice is decreasing due to global warming, and ice thickness and ice coverage is declining as well. Therefore, in the future it is expected that the frequency of NSR voyages will increase with enhanced navigational advantage. But the advantages of the NSR vary widely according to ice coverage and thickness. It should be realized that the NSR advantage is enhanced if the ship's performance in ice improves. The simulation can provide useful information for selecting a route when it is possible to

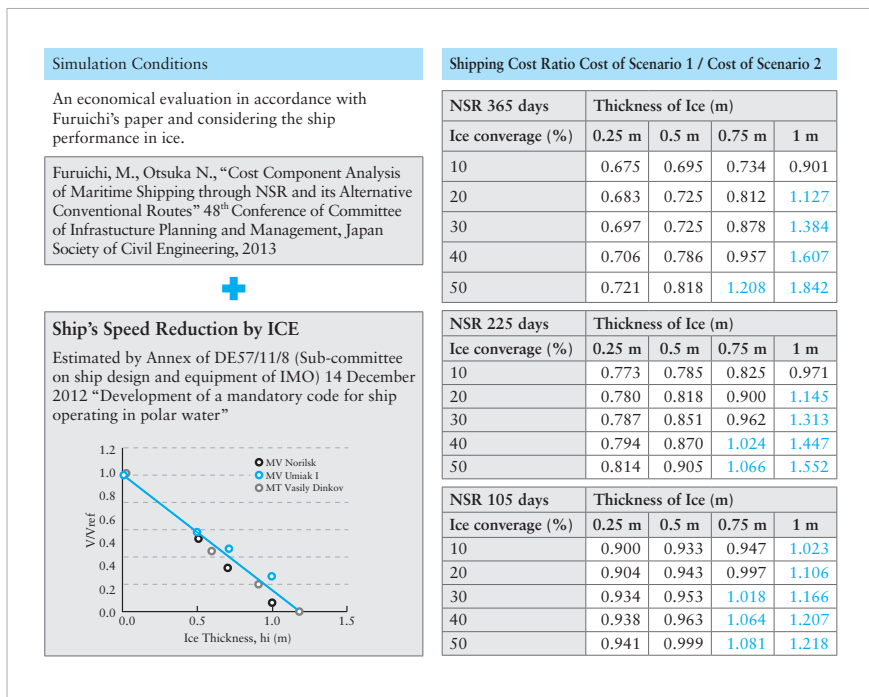


Figure IV-19. Comparative simulation analysis of shipping cost on NSR and SCR

obtain the situation of ice thickness and coverage in advance.

Considering these results, we have high expectations after the ice tank presentation by Kuk Jin Kang and the presentation on the construction of an information infrastructure using fiber optic cable by Mike Aumond. Obtaining information on the conditions of ice coverage and ice thickness in advance would help in the decision to choose the NSR or the SCR. We expect the information infrastructure using fiber optic cable will collect and organize information on ice coverage, thickness, etc. in the NSR and can be used as an information system.

EXPECTATIONS FOR THE KRISO ICE TANK

A new Korean ice tank was introduced by Kuk Jin Kang of KRISO. The square ice tank allows a model ship to complete a full turning circle test, which is expected to solve one of the problems for icebreakers and ice-resistant ships in actual icy seas. Also, technical expertise, including the measurement of the performance of a ship in ice, is obtained and safe operation could be expected.

The model test conducted in the tank follows the recommendations of the International Towing Tank Conference (ITTC). KRISO is addressing technical problems by determining the correlation between model-scale and full-scale results. The full-scale results are provided from the research vessel Araon.

As indicated in Oran R. Young's article on "Navigating the Arctic State/non-Arctic State Interface," safety standards for vessels are under discussion in the International Maritime Organization (IMO) for inclusion in the Polar Code covering the design, construction, and operation of ships. Actually, confirmation, verification, and inspection are conducted by members of the International Association of Classification Societies (IACS) and play a significant role in insurance. The development of environmental measures for vessels and their application to existing rules are under preparation by the IMO.

The technical expertise obtained from the ice tank may contribute to the discussion and development of such international safety standards. Particular attention should be given to the effects on the environment of the NSR. This means that a vessel with high propulsion efficiency is eagerly anticipated. It is expected to use the technologies acquired from the ice tank

and improved systems of vessel propulsion to develop high-performance vessels and reduce GHG emissions in the future.

EXPECTATIONS FOR ARCTIC INFORMATION INFRASTRUCTURE

Mike Aumond shows one way to improve the information infrastructure in Canada's Western Arctic. This infrastructure will allow the government, hospitals and schools to provide for residents and enrich social and medical services to improve human well-being. Additionally, it will become much easier to summarize information in the region and send it to people who need it. We suggest using the infrastructure to collect weather information that could help in understanding the change of the environment in Arctic areas.

One possibility is a navigation monitoring system. If we could obtain accurate ice information and have access to tools for precisely predicting future ice conditions, we could select the optimum route. A captain could choose the best route, using either the NSR or the SCR, a procedure called "ice routing," analogous to "weather routing." Technology in the area of fiber optic cables and Arctic communication is applicable to the development of such a navigation monitoring system.

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Commentary

Hyung Chul Shin

INTRODUCTION

With climate change occurring in the Arctic at an unprecedented rate, environmental concerns as well as economic potential acquire importance and receive attention in an way that nobody imagined before. Accordingly, Arctic research and development (R&D) has been experiencing substantial changes over the past several years. More and more countries around the world have taken an interest in this terra incognita, and begun to stake claims and make investments. Indeed, Arctic R&D ought to respond to new needs in rapidly changing environments, and is required in a variety of disciplines and areas. Recent Arctic changes are new to everybody; these challenges are faced by forerunners and newcomers and Arctic states and non-Arctic states alike.

The current Arctic R&D can be described as having three characteristics. First, it seems that knowledge about the Arctic is almost in its infancy stage. Despite the global attention and recently developed interest from nearby countries, there seems to be a lack of profound research compared to that for the Antarctic, for example. Moreover, Arctic R&D is also a little too diverse, or somewhat scattered, to say the least. In other words, each country is taking various steps to provide more knowledge and experience in the Arctic, but this is not necessarily well-balanced. It could be an institutional issue; it could very well be a governance issue. Lastly, along with the basic and scattered knowledge, the R&D needs to be better organized in terms of both research coordination and funding.

Perhaps there is no perfect model or sample case of Arctic R&D so far because there really is not much done at this stage of time. Today's diverse presentations and commentaries ranging from fiber optics and shipbuilding to an overall framework for research is in a way an illustration of this early stage of development and immaturity.

PREMISES FOR ARCTIC R&D AND QUESTIONS POSED

There are three fundamental premises for Arctic R&D in the new era. One is that Arctic changes must be understood and accounted for; another is that new developments must be safe and sustainable for the environment; and the third is that the human dimension must be cared for as much as in the rest of the world.

These premises require us to ask the following questions at the same time. First, do we understand the nature and causes of Arctic changes? There are scientific findings from the IPCC and various organizations within the international community dedicated to understanding the changing environment, but a majority of them are not specifically Arctic focused. Without such a focus, it is questionable whether we can properly grasp what to expect in the future. Second, are we (getting) prepared for the developments we are looking for? The word “getting” is in parenthesis because, as aforementioned, since knowledge about the Arctic is too diverse, it would be rather difficult to state if we are actually prepared or if we are still preparing. Third, are our expectations based on proper research or are aspirations for developmental opportunities mostly setting the agenda? As most stakeholders in the region may agree, Arctic development does not involve just scientific issues. Environmental, social, economic and national security issues are all intertwined based on the interests of the various stakeholders. Such knowledge may be driven by local, regional, or global communities seeking opportunities for themselves. Last, are the different R&D pursuits linked or coordinated? As stated in the introduction, Arctic R&D is in need of coordination and cohesiveness. Without deliberate planning efforts, it is unlikely that such pursuits will aid each other and generate synergies.

KOREAN DEVELOPMENT AND PERSPECTIVES ON THE ARCTIC

With these questions in mind, I would like to elaborate some experiences and perspectives from Korea. Geographically, Korea is a near-Arctic state. Using the East Sea as the first waypoint, Korea can access both the Northern Sea Route (NSR) and the Northwest Passage, a distinct feature found only in East Asia. Korea has always been under pressure from a

scarcity of natural resources, resulting in an unbalanced energy supply system. Moreover, the opportunities posed for shipping and logistics using the NSR are becoming a large attraction. Lastly, the recent unstable climatic conditions threatening the natural security of the Korean Peninsula have led Korea to proceed with significant scientific investments and develop economic interests in the Arctic.

Korean R&D in Arctic science dates back to the 1990s. As the 11th national and 18th team overall to explore the Arctic successfully with the AURORA exploration team in 1990, Korea has engaged in joint research projects with China, Japan and Russia. By setting up the Dasan research station in 2002, Korea kicked off full-fledged scientific research in the Arctic. For more than two decades, Korea has been able to gain strength in environmental research and in shipping and ocean plant technology, as well as energy and mineral science. However, the majority of this research is again scattered, and research coordination and prioritization are much needed.

Over the past few years, there has been an upsurge of interest from both the public and private sectors. Unfortunately, there is as yet only a modest increase in financing. As seen in Figure IV-20, the number of Arctic-related research projects is clearly on the rise, whereas the budget increase is not in proportion. Moreover, not all of these projects are wholly dedicated to the Arctic.

As Korean Arctic R&D has surged in recent years, there have been many diverse players on the scene. For example, the Korea Polar Research Institute is the operator of the national Arctic program, with a mostly scientific focus. There are government-sponsored research institutions ranging from engineering and policies bodies to primary industries, as well

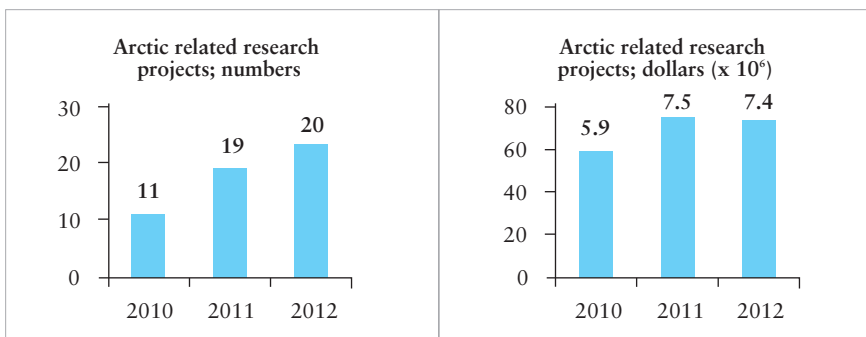


Figure IV-20. Arctic-related research projects and finance

as government-invested energy- and mineral-related public corporations. Individual universities and related academia are taking more of an interest in Arctic R&D, and private sector organizations from engineering and maritime shipping firms are performing their own research to gain practical knowledge of the Arctic. Lastly, government ministries such as the Ministry of Oceans & Fisheries and the Ministry of Trade & Industry, Science & Future Planning are paying close attention to Arctic affairs and providing support.

Despite the increased interest and various players in the field, there are many issues that need more thought. Are we doing what we need to do? Because there is so little knowledge about the Arctic, perhaps the focus may not be in tune with what is required. Is the funding adequate? As seen in Figure IV-20, despite the upsurge in interest and projects, adequate funding is still lacking. Last but not least, what is the linkage between types of research, for example, between “basic science” and “application-oriented research”? Depending on the stakeholder and interested parties, there seem to be gaps among different research efforts that need to be filled.

It is easy and tempting to finance “user-defined” research. What we now need is rather “need-inspired” research. Korean Arctic R&D has just begun and is on a steep learning curve; this is most probably the situation faced by many other countries as well. Perhaps it is high time for a new move where a nationwide research consortium is designed and prepared.

LESSONS FOR KOREA AND FOOD FOR THOUGHT FOR ALL OF US

The growing interest, inadequate financing, and multiple stakeholders are not just an issue for Korea. Both forerunners and newcomers in the Arctic will need to deal with similar challenges. Perhaps what we need is a proactive research strategy to address future needs, which should be long term. In the process, securing sufficient funding is also a must. Basic research to determine the baseline and to be able to make predictions and provide guidelines for ensuing research efforts is also crucial. We must remind ourselves that innovative technologies are badly needed for our Arctic endeavors in order to observe with minimal impacts but with greater efficiencies and coverage and in order to manage the risks. In this way, we can protect Arctic environments and communities, while extracting and using resources safely and sustainably in the future.

PART V

INDIGENOUS RESPONSE TO ARCTIC DEVELOPMENT

13. A Rights-Based Approach

Sheila Watt-Cloutier

The Arctic and its people have experienced the greatest environmental impacts of globalization. From persistent organic pollutants (POPs) making their way through weather patterns to our food chain to the weakening of the ozone layer, and more recently the huge changes in our land and ice resulting from climate change, we have borne the brunt of development occurring far from our home. The world has become increasingly aware of these impacts, and the Arctic remains in the forefront of public consciousness as both an area of great environmental concern and now as a place with both great economic and geopolitical interest and tension and a need for renewed political cooperation.

All this has confirmed the Arctic as an area of utmost importance in the minds of global policy makers, economic decision makers, and researchers. But this interest needs to be better informed by an awareness of what is happening to the largely Indigenous and subsistence-oriented communities that provide the human face of the Arctic.

I was born in Kuujjuaq, Nunavik (Northern Quebec). All my life, I have been concerned with the health and welfare of people living in these Arctic communities. Even when I became active at the international level, as a leader in the fight against persistent organic pollutants (POPs) that led to the 2001 Stockholm Convention and then as chair of the Inuit Circumpolar Council, I continued to think about Arctic issues from a community perspective.

These communities are small. They do not have great political power or economic influence at the national and international levels. But they are the heart and soul of the Arctic. That is why I believe we must reframe the current debate, adopting a rights-based approach to Arctic development. Let me tell you how I came to this conclusion and what it means for those interested in exploiting the natural resources of an increasingly accessible Arctic.

At home, in the Arctic, we are now facing an incredible growth of interest in developing the geological and ecological riches we have inherited. While we reach out to connect with the rest of the world to ask that they

change their behavior so we do not suffer the consequences in the Arctic, we should also be thinking of recognizing the many interconnections that exist today and will soon exist around the use of our own Arctic regions, including the ocean as well as the land.

As Inuit, we place great value on the ice and snow. It is, after all, the stable platform that has allowed our people to hunt, train our children, and live our lives for untold millennia. There is no price you could pay many of us for the loss of our ice. The whole world will soon learn to place a great value on Arctic cold as well. We are learning more and more just how expensive it is to be losing the “cooling system,” the “air conditioner,” if you will, of the planet.

For us Inuit, these issues are not only environmental, but first and foremost matters of health. The health of individuals, families, communities, our environment and our wildlife are all important to the cultural survival of an entire people.

Realizing there are many people around the world who have yet to hear about the challenges of the peoples of the Arctic, I feel it is important in this short article to outline some of the key challenges and opportunities we face in the Arctic, to put them into the right context at the community level, and to show how they relate to the larger context of resource development.

We Inuit and other Indigenous peoples of the Arctic were once highly independent. We had our own education, justice, health, and social systems based upon Indigenous knowledge, wisdom, and long-established social practices. We prepared our young people for the challenges and opportunities of life in an holistic way.

Then, changes happened quickly, and these changes are in large part at the root of the challenges and dependencies on substances, institutions, and processes facing Arctic peoples today. The tumultuous change in my own lifetime, along with historical traumas occurring over many decades, have eroded our sense of identity and self-esteem and reduced our ability to think and act for ourselves. These in turn have translated into the monumental health and social challenges facing Arctic Indigenous peoples today, which all too often are misunderstood as an inability to adapt to the modern world. We should realize that the substance abuse, health problems, and, most distressing, loss of so many of our people (especially our youth) to suicide are not the natural condition of our peoples. Through all these tumultuous changes, we have had our land, our predictable environment and climate, and the wisdom our hunters and elders have gained over

millennia to help us adapt.

However, things are not so predictable today. Dramatic climate change caused by greenhouse gases has left no feature of our landscape or our way of life untouched. Climate change now threatens our very culture, our ability to live off the land and eat our country foods, including the animals we hunt. Nowhere else in the world is ice and snow essential to transportation and mobility. When we can no longer count on mobility, it immediately becomes an issue of safety and security on several levels.

In all four countries where we Inuit live (Canada, Alaska in the USA, Greenland, and Chukotka in Russia), virtually every community is now struggling to cope with extreme coastal erosion, melting permafrost, and rapid runoff. Some communities face the prospect of being forced to relocate to unfamiliar settings.

Despite cold winters here and there, our sea ice is in rapid decline. Glaciers long relied on for drinking water are now unpredictable. Invasive species are moving much further north than ever before. While the size and type of each change varies across the North, the trends are consistent.

The health impacts of these changes on Inuit communities are profound. Most Inuit continue to rely on our traditional subsistence foods. Already though, climate change has affected the migration routes and quality of our animals, making them harder to hunt and less safe to eat.

Hunting and gathering itself has been similarly affected by shortened periods of safe frozen ice and snow that limit travelling in some areas. These unsafe conditions, together with less-predictable weather, cause more devastating accidents and losses among our hunters. More and more hunters have second thoughts about heading out at all. Many hunters have to be rescued when ice breaks off, taking with it hunters who were hunting close to the floe edge. With less traditional food arriving, many families are stressed by the high cost of imported southern foods. All this leads to an ever-quickenening shift away from our traditional foods and to more southern diets, which are far less healthy for us. In Canada, our communities already have rapidly rising rates of diabetes and other food-related illnesses, trends that will continue as we shift from a country food diet.

Reliance on expensive southern imports only deepens the dependence of our communities on the government. This runs counter to building thriving local economies that build on major elements of our traditional culture.

Our children will enjoy a healthier way of life if they are able to remain

connected to the principles, values, and wisdom of our hunting culture.

We are a uniquely adaptable people. We have weathered the storm of modernization remarkably well, going from dog teams and igloos to snowmobiles, jumbo jets, permanent homes, and even supermarkets within a few decades. But these enormous changes to our communities have not been without consequences.

We have suffered a loss of control over our lives and destinies. Multiple historical traumas in a short period of time, including forced relocations, children uprooted from their families and culture to be deprogrammed and reprogrammed, dog slaughters, sexual abuse by those in positions of authority, the collapse of the seal skin market, and monumental changes in our environment and climate, have all come together to create deep wounds and “collective pain” in our communities.

Through all this, we have had our land, our predictable environment and climate, and the wisdom that our hunters and elders have gained from our way of life to help us adapt. This predictability is now in question due to the climatic change and the loss of food security it brings. All these issues of climate change, food security, and the well-being of our communities cannot be considered separately. Together, they constitute a systemic challenge from the South.

We remain a hunting people intimately connected to the land, ice, and snow. The loss of food security is not the only loss we suffer when there are fewer hunters on the land. Learning to hunt teaches our young people to be patient, courageous, bold under pressure, reflective, and focused. They learn to become natural conservationists, to control their impulses, to withstand stress, to have sound judgment, and ultimately to acquire wisdom. This is why climate change is not only an issue of our land and environment, but also an issue of our health, our rights, and our very ability to exist as an Indigenous people. It is precisely these human rights that are being challenged and eroded by the unpredictability of our climate. As travelling and hunting on the land becomes more dangerous, fewer continue to lead a traditional, subsistence way of life. As a result, far less of our culture is passed down to our young people.

We have been working hard to cope with the stressors arising from the first wave of tumultuous change. We now understand how these stressors translate into what we witness today regarding social and health challenges in our communities. But the more unexpected stressors that come with these climatic changes, together with the acceleration of development

following the melting of ice, will only add to the vulnerability of our communities.

My work both on POPs and on the connections between human rights and climate change has focused on seeing the issue holistically and on ensuring that the human face of this issue is in the minds of researchers, policy makers, and industry leaders when we consider how to address the issue.

We must reframe the terms of the debate regarding the implications of environmental degradation and resource development in the Arctic. This debate must move beyond relying on the language of economics and technology. What is needed is a debate emphasizing human and cultural rights. Focusing only on economics and technology separates the issues from one another, as opposed to recognizing the close connections among rights, environmental change, health, economic development, and society. Ultimately, addressing climate change in the language of human rights and building the protection of human rights into our global climate agreements is not just a matter of strategy. It is a moral and ethical imperative that requires the world to take a principled and courageous path to solve this great challenge.

The situation we face across the Arctic is now quite different from the one just a few years ago as the extractive industries move to exploit the riches that are now becoming more accessible beneath the melting permafrost and sea ice. The hunger for jobs in our communities makes this approach of digging up the land that we have long held sacred a strangely appealing prospect. Just a few years ago in my own Arctic world, we Inuit stood solidly together on high moral ground to defend a way of life. But with the lure of quick fixes as a means to alleviate poverty in our Arctic communities, this high ground, where we collectively stood so strongly not so long ago, is fracturing as quickly as the ice is melting. As more leaders lose sight of the larger picture, staying on the principled path will become increasingly difficult for many. This, I believe, is the test of our time.

A few years ago, I delivered a lecture in Iqaluit, Nunavut in an attempt to signal to our communities and to Canada as a whole the imperative to stay focused on a sustainable path.

I said: "As wise stewards of our land, I would urge my own people to refuse the dangerous compromises between our principles and development that might diminish our own moral standing and claim to high ground as Indigenous peoples. As we call on the world to change its ecologically

degrading practices, we must not accept those practices at home no matter how desperate our needs are for economic development.

Economic gain must not override the existence and well-being of a whole people whose way of life is already being severely taxed. We must not let the prospect of development in the Arctic diminish our ability and our region's ability to teach the 'life-centered sustainability' that Arctic peoples have practiced for millennia.

The people whose lives depend on the ice and snow for cultural survival must be a central component of all our plans. We must not permit the discussion of northern development to be conducted only in terms of sovereignty, resources and economies. The focus must be on the human dimension, human communities and protection of human and cultural rights. We cannot separate political and economic development in our communities from the education, health and well-being of individuals and families."

There is a real worry here. If we put all our eggs into the basket of resource extraction and/or oil and gas development, while the rest of the world seeks to wean itself off this unsustainable way of life, we will be left in the dust, and in this case, "in the mess." When the rest of the world is well on its way to a new way of life in 20-30 years, we will be starting once again the perpetual cleanup which we are still left with from past development and military activities.

We must resist the urge to compromise our values and lose our high moral ground by adopting quick fixes to our economic and social problems. Our influence springs from our moral authority. Once we've lost our moral high ground and our sense of responsibility for a sustainable Arctic, it will be hard to regain our balance and sense of purpose.

Many of the institutions that have replaced the control and wisdom of our culture, including our newly formed governance structures (e.g., the government of Nunavut), have had trouble addressing the escalating challenges that our communities face. What most Inuit regard as highly intrusive companies (e.g., mining and oil and gas companies) will need to become more serious and committed to reinventing themselves if they want to play a role in empowering strong, healthy, resilient, and sustainable communities in the Arctic. They must demonstrate a great deal of respect for and understanding of our situation at a human level. What Arctic communities need to pay attention to is reversing trends toward "dependency-producing" institutions and supporting "dependency-

liberating” institutions that inspire our youth to embrace a life-sustaining connection to jobs and careers of choice that are meaningful and have a connection to their culture as well as to global society and our role as citizens of the world. If resource extraction is the only carrot dangling in front of our people, they will lose out on other creative and innovative options that are more compatible with our culture in the sense that they align with the principles and values of a hunting culture founded on sustainable practices.

We are now part of the modern world. But we still remain a hunting people connected to the land, ice and snow. Changes that affect our environment, including many forms of resource extraction, affect the food we bring to our families’ tables.

We are cautious, and we want to learn from experiences around the world regarding the impacts of these highly intrusive extractive industries. In Arctic communities, we must ask ourselves why it would be any different for us. We are being asked to believe it would be different for us in the absence of convincing evidence.

It is ironic that the governments of both Nunavut and Greenland are now moving strongly in the direction of development, including oil and gas extraction, when the impacts of such development were the very issues that led to the creation almost 40 years ago of the Inuit Circumpolar Council, the international body that represents Inuit globally. Our people have made headway in many areas. But it remains evident that after all this time we are still facing poverty and social and health problems because we have all but given up our own Indigenous wisdom about sustainability and because our governments have not found ways to empower our communities and to join forces to form regions that are prosperous and sustainable.

There is a great irony in trying to solve our social and health problems by granting to extractive industries that bear so much responsibility for social and environmental problems throughout the world access to our already struggling Arctic communities. In my opinion, this is not, and cannot be, the be-all and end-all solution.

The policies and programs of governments and businesses are driven mainly by global markets and the bottom line. They are not made for what is right or good for our Arctic communities. In any case, it is what is happening at the community level that will count in telling if there is actual success at the grassroots. Despite the poverty levels of many of our Arctic communities, is it possible that we can leave these resources

underground as a signal to the world that we who suffer from the negative impacts of globalization on so many levels have decided to reject the attractions of resource development? Is there hope that the existing leaders or, alternatively, the younger generation of leaders can turn around this already fast-moving development and call for a more inclusive process that will engage all voices, especially those at the grassroots?

This challenge is great. A case in point concerns a new report prepared for the Nunavut Planning Commission that calls on Nunavut's communities to build their own capacity to deal with potential oil spills. The Oil Spill Detection and Modeling Report was commissioned to respond to concerns in Nunavut about seismic testing and potential offshore oil and gas development along the coast of Baffin Bay. Issues of food security have come up time and time again as we Inuit want to know what would happen to the sea mammals we depend on for food if an oil spill were to occur.

This report found that little is known about how oil behaves in marine environments where ice and snow are factors. It found that research done over the last few decades elsewhere in the world does not consider sea ice in oil spill models. The main recommendations include training local people to respond to oil spills, enhancing awareness along with shoreline protection, gathering more data, and improving remote sensing. In this specific case, one of the stronger recommendations states that "In order to facilitate effective shoreline cleanup in the event of a spill, the Hudson and Davis Straits should be mapped to identify environmentally sensitive shoreline areas, as defined by Environment Canada criteria, traditional knowledge and community importance."

According to an article in Nunatsiaq News on July 10, 2014, "The Nunavut Marine Council, in which the Nunavut Planning Commission is a member, advised the National Energy Board and Minister of Aboriginal Affairs and Northern Development Canada of the public concern and limitations in industry knowledge of how to react to oil spills when sea ice is present."

This report was released just as the National Energy Board of Canada approved a five-year seismic testing program in Baffin Bay and Davis Strait, which many Baffin residents had opposed. It led the Nunavut Planning Commission to state that the National Energy Board is not paying much attention to the residents' concerns.

As a result of this chain of events, Mayor Jerry Natanine and Niore Iqalukjuak of Clyde River, one of the communities that clearly has potential

to be impacted by this seismic testing, have reached out to Ecojustice to help determine whether their rights are being violated. An important precedent in this regard is the recent Supreme Court ruling which not only recognized the land rights of the First Nation Tsilhqot'in of British Columbia but also found that the province had breached its duty to consult with the land owners before approving a logging license on their lands. This historic court ruling has inspired the mayor of Clyde River to explore similar rights as he reaches out to Ecojustice for advice about stopping a bid by a consortium of companies that intend to conduct seismic testing off the east coast of Baffin Island, the results of which could well lead to oil and gas development in the area. These community leaders argue that the National Energy Board did not apply due diligence when consulting with the local communities about the project.

In addition to reaching out to Ecojustice, Inuit leaders may pursue their case as a matter of Aboriginal rights at the United Nations, since Canada is a signatory to the United Nations Declaration on the Rights of Indigenous Peoples. Article 32 of the Declaration states that "States must cooperate in good faith with Indigenous peoples" and "obtain their free and informed consent prior to the approval of any project affecting their land or territories and other resources, particularly in connection with the development, utilization or exploitation of mineral, water or other resources." Niore Iqalukjuak, who is spearheading this movement together with the mayor, suggests that Inuit have been neither informed nor asked for their consent regarding this project.

I use this example to expose the challenge we Inuit face when it comes to exercising our rights in the face of resource development driven by outside (private and public) players. There will be many more challenges similar to this one in Nunavut and other regions of our Inuit homelands where the voices and concerns of affected communities are dismissed by their own governments, who see the Arctic as the next super energy "feeder" for the world and dismiss the small number of Inuit feeding their families as unimportant matters as they exploit the land and sea of the surrounding communities. Many local people feel abandoned by their own government. I regret to say that I feel this is a sign of what is yet to come as bigger challenges confront our own national governments and the Arctic Council, which I can say from personal experience has its own shortcomings in reaching a consensus regarding issues affecting Arctic communities and their peoples. As someone who led the pioneering work on connecting

climate change to human rights, I am convinced that the escalating pressures we now face regarding resource development will deepen the need for all parties to adopt a rights-based approach in the search for solutions to these problems. I believe the approach the community of Clyde River is taking exemplifies what I have spoken of as a “reframing” of the issue in terms of fundamental human rights and the connection between environmental change, cultural rights, and the development of the Inuit homelands.

Commentary

Ellen Inga Turi

While climate change is generally perceived as a threat in southern latitudes, in the North it is often viewed simultaneously as an opportunity. Climate change is making Arctic areas increasingly accessible for human activities such as resource extraction, tourism and shipping. For the Indigenous peoples of the Arctic, however, these developments represent a dual challenge. On the one hand, Indigenous peoples are witnessing the direct effects of climate change, and the impacts of these effects on their traditional livelihoods and subsistence activities. Simultaneously, increased human and economic activity in the Arctic represents a concurrent change that Indigenous people must adapt to.

The Arctic is a region of political and socioeconomic diversity. While Arctic areas are geographically, physically and climatically linked, there is no coherent Arctic political region. Rather, the Arctic is composed of territories located within the boundaries of eight nation states, where only Iceland lies fully within the area defined as the Arctic by, for instance, the Arctic Council (Keskitalo et al., 2013). Apart from Iceland, the Arctic comprises the remote peripheries of seven nation states, where policy matters have traditionally involved interactions with policy centers located in the south (Young, 2005). Consequently, governance structures around the Arctic are not uniform. The Arctic is rather a collection of states with great variations in local governing structures, formal or informal. There is considerable difference between governance structures even in neighboring countries such as those in Scandinavia, as well as in the local effects of governance structures. Similarly, Arctic Indigenous peoples are not uniform. There is great diversity in the cultures, languages, livelihoods and histories of Indigenous populations in the North. This diversity represents the starting point for any discussion of Arctic change from the Indigenous perspective.

As part of the North Pacific Arctic Conference on international cooperation in a changing Arctic, Sheila Watt-Cloutier has presented a view of Arctic development from the perspective of Indigenous peoples, calling for a rights-based approach to Arctic development. Watt-Cloutier emphasizes the connection between climate change and human rights, and

calls for a focus on the human face of this issue, i.e., the communities on the ground. She eloquently concludes: “We must not permit the discussion of northern development to be conducted only in terms of sovereignty, resources and economy. The focus must be on the human dimension, human communities and protection of human and cultural rights. We cannot separate political and economic development in our communities from the education, health and well-being of individuals and families” (Watt-Cloutier 2014, 16). This article presents a short commentary on Watt-Cloutier’s keynote presentation. I fully concur with her main argument that the discussion of Arctic development needs to incorporate the human dimension, i.e., the lived experience of the populations of the North. Such an approach needs to be rooted in human rights, the lived experience and human needs of the populations of the North. To complement Watt-Cloutier’s discussion, I draw attention to the knowledge dimension. In particular, I want to highlight the value of the traditional knowledge of Arctic Indigenous peoples in relation to understanding the effects of and planning for development in the Arctic. I argue that a rights-based approach needs to incorporate and emphasize Indigenous traditional knowledge as a basis for decision making and as a basis for understanding the needs of Indigenous populations in the North. Such an approach will not only benefit Indigenous populations but also improve our collective human understanding of environmental change in the Arctic.

To elaborate my argument, I draw from a specific Arctic Indigenous livelihood, nomadic reindeer pastoralism, to illustrate the opportunities and challenges of incorporating traditional knowledge into broader governance practices. Reindeer pastoralism is the most extensive form of animal husbandry in the Arctic and subarctic (McCarthy et al., 2005). It is primarily an Indigenous livelihood involving more than 20 different Indigenous peoples in an area stretching from the North Sea to the Pacific Ocean and covering around 5 million km² (i.e., 10-15% of the entire land area of the world). This livelihood involves approximately 100,000 people and 2.5 million reindeer. Reindeer pastoralism is thus, on the one hand, a spatially-extensive livelihood, while on the other hand it is demographically and economically marginal. In my home country, Norway, around 40% of the land area is used as reindeer pasture involving around 200,000 reindeer and 3,000 Indigenous Sámi reindeer herders.

This extensive land use is primarily a result of the nomadic strategy. As a nomadic livelihood, reindeer pastoralism is characterized by the

strategy of securing forage for animals primarily through the use of natural pastures. Sámi reindeer herders in northern Scandinavia, for instance, migrate up to 350 km, following the reindeer from summer pastures in coastal grassland areas to winter pastures in lichen-covered inland areas. This extensive and nature-based character of reindeer pastoralism implies that reindeer herding is sensitive to changes in climate, land-use, and related socioeconomic transformations.

In terms of land-use change, the following quote from a study conducted by the United Nations Environment Program (UNEP) elaborates the challenge:

“Northern Scandinavia and parts of Russia are examples of areas where the current growth of infrastructure related to transportation, oil, gas and mineral extraction is increasingly incompatible with land requirements for reindeer husbandry. In these areas infrastructure growth is associated with the loss of traditional lands, and conditions forcing indigenous people to abandon nomadic herding patterns for more sedentary lifestyles. Infrastructure development is often concurrent with changes in regional economic activity inviting southern-based resource extraction companies interested in short-term economic gains. Such socio-economic changes not only affect cultural practices directly related to traditional reindeer husbandry, but also conflict with the use of traditional homelands for hunting, fishing and gathering.” (Nellemann et al., 2001, 16–17)

This study showed that 25% of reindeer pastures in Northern Norway are “strongly disturbed” by development, including 35% of the coastal summer pastures and calving grounds (which are of particular importance for nomadic reindeer herding) (Vistnes et al., 2009). Scenarios for 2050 estimate that the figure will increase to as much as 78% unless changes are made in national and regional plans (ibid).

In addition to loss of pastures, climate change is now evident in the Arctic. Climatic projections for inland winter grazing areas in my home area, Guovdageaidnu in Finnmark, anticipate winter temperature increases of 7°-8°C over the next 100 years, accompanied by increased precipitation (Benestad, 2008). Yet, considering the enormous pressure on land use, it is perhaps not surprising that reindeer herders express greater concern for industrial development than climate change (Kumpula et al., 2012; Degteva et al., 2009; Eira et al., 2009). Reindeer herders in the European Arctic

have expressed the need for more autonomy over herding decisions, e.g., herd structure, castration, and migration, in order to preserve options to meet climate change (Degteva et al., 2009; Eira et al., 2009). It has also been suggested that undermining such autonomy erodes the very resilience of the reindeer herding socio-ecological system (O'Brien et al., 2009). Herders' perceptions are supported by studies indicating that compared to socioeconomic change, the vulnerability of reindeer herding to climate change is comparably small (Rees et al., 2008). In other words, it is not the direct ecological and weather effects of climate change that indigenous reindeer herders find most alarming, but rather the combination of increased human activity and climate change. Yet, indirect effects of climate change such as increasing human activity following increased accessibility of the Arctic from developments like the opening of the Northern Sea Route or offshore oil and gas exploration in the High North will likely accelerate the rate of fragmentation of pastures. As such, the issue of climate change is a central one for reindeer herding peoples but is inevitably linked—even inseparable—from socioeconomic changes in the North.

The most pressing challenge associated with increased human activity in the North from the perspective of reindeer herding is the reduction of spatial flexibility. In relation to climate change, spatial flexibility, or simply mobility, is a core tool used by reindeer herders to adapt to climatic variations. One direct effect of climate change in reindeer herding areas is the increased occurrence of “goavvi,” a northern Sámi term describing locked pastures resulting from rain-on-snow (Eira, 2012). Goavvi happens when rain during the winter produces an impenetrable layer of ice on top of the snow, making it difficult for the animals to reach the fodder underneath. A well-known and frequently-applied strategy for handling such conditions has been either to move the herds to different areas or, in extreme cases, to completely release control over the herds, and allow animals to search for the marginal scatterings of penetrable and available grazing areas. This type of response strategy, however, is being challenged increasingly by the fragmentation of pastures.

Reindeer herders have developed management strategies for the protection of pastures and monitoring of changes, owing to their long-term accumulated experience and skills, transferred from generation to generation. From my research on governance processes in Northern Norway, I was surprised to discover that the reindeer herding “siida” (the basic unit of social organization in Sámi reindeer herding) is currently

the only institution in Norway, monitoring and analyzing all the different types of changes spanning its customary pasture areas, as such changes may directly affect the practice of their livelihood, no matter whether it is a single tourist cabin, a major power line, or exploring prospects for mining (Turi and Keskitalo, in press). The accumulated collective knowledge of the *siida* includes detailed and long-term observation of land-use changes spanning several centuries over areas covering several administrative divisions. Formal governance structures, on the other hand, tend to be characterized by spatial and sectoral fragmentation in planning and decision making, meaning that land-use changes of different character such as tourism, resource extraction or infrastructure building are divided among different sectoral authorities and administrative divisions (municipal, regional or national authorities), while multiple stressors such as climatic change and socioeconomic change are treated only in passing or completely left out of the picture. Such administrative fragmentation complicates the task of decision making based on an holistic consideration of cumulative effects.

An opportunity, albeit a challenging one, thus lies in including and incorporating the *siida*'s and other indigenous groups' knowledge and understanding of land-use change for better governance of these areas. Conventional tools for planning, e.g., environmental impact assessments, even in the rare cases where authors pay due diligence to include reindeer herders' knowledge into the assessment (see, for example, Nellemann and Vistnes, 2011), are not sufficient to ensure that long-term and cumulative effects of land-use change for reindeer herding are duly assessed in decision-making processes. Typical flaws of conventional planning tools include the tendency of assessing only single projects and short-term effects and a lack of ongoing assessments throughout the project period (Fjellheim, 2006).

While this is primarily a governance issue, the solutions are not located only with the government. Industrial interests and other land uses also need to focus on the local level, i.e., the community level, in order to avoid the trap of "one size fits all" leading to solutions that have so often created additional challenges for local adaptation by indigenous communities. A community-level focus is central, as even neighboring communities often have different dynamics, needs and challenges. The impacts of opening a mine, building windmills, or building a new shipping port will have different impacts depending on where, when and how installations are placed. In order to understand such impacts, there is a need for

mutually respectful communication between the local-level land users and potential developers aimed at developing real understanding and mutually satisfactory solutions (rather than just achieving permission to start the development).

A major challenge of Arctic transformation is thus finding effective governance solutions that utilize the best knowledge available for land-use planning. For Indigenous reindeer herding populations, the main challenge remains finding governance solutions that do not undermine the adaptive capacity arising from traditional knowledge and intimate familiarity of the land and climate. One way of doing this is through a focus on human and Indigenous peoples' rights. A rights-based approach emphasizes the human dimensions of Arctic development, as duly noted by Watt-Cloutier. Further, a rights-based approach diverts attention from a focus exclusively on economic gain and directs attention toward the realities of human societies in the North. The rights-based approach needs, however, to be complemented and nuanced with a focus on the knowledge and practices of people on the land.

While my home country, Norway, is often noted as being one of the more advanced countries regarding the issue of Indigenous rights, reindeer herders in Norway and Scandinavia more generally are constantly struggling to meet the challenge of Arctic change. While there is potential for development in relation to Indigenous rights in governance, a rights-based approach also needs to be developed to incorporate a more nuanced view of the complexity of Indigenous land uses. Reindeer herding, fishing, hunting, farming and other natural resource harvesting systems often coexist in the same area, yet experience different impacts from socioeconomic developments. The reality for most of the Indigenous population in the North is a complex web of land use where no single group has exclusive rights to land use, raising the question "whose rights?" While a rights-based approach is important for highlighting local land uses, such an approach needs to be complemented by a traditional knowledge-based approach in order to incorporate an understanding of the potential impacts of Arctic development on local Indigenous communities.

In conclusion, I applaud Watt-Cloutier's presentation for directing attention to the human impacts of Arctic development, and specifically for directing attention to the Indigenous people in the Arctic. I do want to emphasize, however, that Indigenous peoples must not only be seen as rights holders, but also knowledge holders. Indigenous and local peoples

possess unique, valid and tested knowledge about the diverse ecosystems and environments in the North.

As a final note, I want to emphasize that it is important to avoid the trap of thinking of Indigenous populations as ancient (or outdated) people. Reindeer herders, for instance, are constantly searching for economic opportunities to develop their livelihood. Fostering economic security through exploring wider markets for reindeer products, for example, could be one way to foster resilient Indigenous reindeer herding communities. Economic interest in the Arctic thus also represents an opportunity for Indigenous communities and could potentially contribute to fostering economic independence and self-sustaining communities in the North. This opportunity can only be realized, however, if the planning of Arctic development incorporates both the rights and the knowledge of Arctic's Indigenous people.

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Commentary

Denise L. Michels

One of the questions posed to Alaska's leaders is, how will large-scale development in the Arctic affect nearby communities? The answer is that any new development in the Arctic will impact nearby Alaskan rural communities by straining infrastructure and local resources. Most coastal communities in rural Alaska, except for hub and sub-hub communities, have a population of less than 1,000 and have only basic infrastructure in place to sustain the existing population (e.g., five of our villages in the Bering Strait region do not have piped water and sewers). In the spring, some villages have to manage water usage so they will not run out of water, possibly creating health and sanitation concerns. At times, communities have run out of heating fuel before the first barge arrives in June, and need to have fuel flown in, costing more than the community can afford. Many of our villages do not have a port or barge landing and use the beach to land and launch landing crafts and skiffs.

Alaska is already experiencing impacts from the increase in Arctic shipping on the Outer Continent Shelf (OCS) with exploration activities that involve more vessels traveling through the Bering Straits to access leased tracts. With the opening of the Arctic Ocean, the shipping industry is now using the Northern Sea Route. While there were more than 82 vessels operating on August 10, 2014, in 2009 there were none. The Northern Sea Route Administration has approved 519 applications to date. There is an increase in vessels traversing the Northwest Passage, and at least 10 vessels have stopped at the Port of Nome over the last four years. The City of Nome is still experiencing a gold rush and gold exploration in state waters, and the change is that there are larger barge-type vessels operating in this area. This year to date there have been a total of 87 dredge vessels with 21 support craft, while in 1990 there was an average of four to five dredging vessels. All this traffic happens in a short timeframe when marine mammals and birds are migrating through the Bering Strait from June to November.

Climate change is impacting ice formation (thinner ice, ocean freezing later in the winter, and frequent fall storms causing coastal erosion due to having no shore-fast ice to protect the coast) and the migration patterns of marine mammals that depend on the ice.¹ Two villages in the Bering Strait

region have experienced a decline in hunting opportunities - ice has blocked hunters' ability to launch boats and bad weather did not allow access to the ice, causing the State of Alaska to declare an economic disaster on St. Lawrence Island.² The village of Diomedede located in the Bering Strait has experienced a decline in opportunities for walrus hunting due to the change in weather and ice conditions.³ The walrus rest on Big Diomedede in Russian territory, where the Alaska Native hunters are not allowed to harvest them.

There are benefits of resource development, and there are opportunities for communities that have the Arctic infrastructure in place, such as ports and harbors. The Red Dog Mine hires NANA shareholders, creating jobs, and NANA receives mineral royalties for shareholder dividends. The Ports of Unalaska and Nome have seen an increase in dockings with the opening of the OCS for oil & gas development leading to staging vessels at both ports. In Nome, ocean mining has created seasonal jobs.

One major opportunity for resource development is the construction of an Arctic deep draft port in Western Alaska, as identified by the U.S. Army Corps of Engineers and the State of Alaska.⁴ Extending Nome's causeway and onshore infrastructure at Port Clarence will meet the increased demands for ocean-going commerce, scientific research and economic and resource development activities. Most importantly, it will provide a strategic location to position assets to strengthen homeland security and national defense and increase a presence for enforcement as well as Arctic stewardship and environmental response. Investment in Nome's port will allow industry to see savings immediately and improve logistics. The City of Nome is a strategic transportation hub due to its location on the Bering Strait and Norton Sound. The city provides transportation, health and governmental services to residents of the region, where the population is over 9,000. Nome is also a mining community with resource and economic development activities happening since 1899, when the original gold rush started. Rural residents, especially Indigenous Alaskans, are dependent on the wildlife around then and have developed a mixed culture.

Many of Alaska Natives bear the most risk, with no benefits arising from the opening of the Arctic for shipping and resource development. Unfortunately, communities in the Bering Strait such as Gambell, Savoonga, Wales, and Diomedede will not see much economic benefit due to a lack of infrastructure in place for ocean vessels to use them for protection from bad weather and a lack of lay-down areas to place assets for search and rescue and environmental protection (spill containers). Unlike states along

the Gulf of Mexico, which receive OCS revenue sharing, the communities impacted by OCS activities in Alaska do not receive any revenue sharing from the U.S. Federal Government. Many communities are not adapted to address the social ills that accompany economic and resource development, including the introduction of drugs in local communities where Alaska Natives have a high rate of suicide and substance abuse.⁵

At times, our community members and villages feel helpless due to fear of the unknown and the impacts on marine mammals and migratory birds with the increase in Arctic shipping and resource development. They encourage the gathering of baseline data using traditional knowledge as well as western science to aid in policy creation for the Arctic.⁶ The most unknown event is a Spill of National Significance (SONS) in the Arctic sea ice and rough waters, putting our marine mammals and sea birds at risk, along with Alaska Natives who depend on the wildlife for cultural as well as nutritional needs. A SONS event would strain the community's water and fuel supply and landfills; the stock of local stores would be bought out. Our outlying communities are not prepared for a huge influx of people with no hotels and are in dire need of housing. The disruption of normal, everyday business also would be hampered if all rental space was taken, leaving no room for service providers such as doctors, dentists, social service and law enforcement personnel. Communications would be more difficult. In Nome during the month of Iditarod (March), for example, more than 800 visitors are in town and cell service almost comes to a halt.

Alaska's Inuit are Permanent Participants in the Arctic Council through their participation in the Inuit Circumpolar Council (ICC). ICC-Alaska continues to advocate for the protection of the Arctic environment within the Arctic Council. The 2014 Kitigaaryuit Declaration was adopted in July at the ICC General Assembly in Inuvik, Canada. The United States is poised to take the chairmanship of the Arctic Council in 2015, and the region has made recommendations to the State Department requesting that all Arctic Council meetings be held in Alaska.⁷ Admiral Robert J. Papp was named the U.S. Arctic Representative, and former Alaska Lt. Gov. Fran Ulmer was named Special Advisor on Arctic issues. We look forward to working with both of them, as they are familiar with Alaska and the Arctic. Kawerak has made a recommendation to the State Department that an Alaska Native who lives in the Arctic be added to this team for the development of Arctic policies. For Alaska Natives, this would give us access to policy advisors to provide recommendations and allow the U.S.

administration to reach out to Alaska Natives in meaningful consultation and engagement. The Governmental Accountability Office (GAO) made the following recommendations for the United States: “In collaboration with other relevant agencies, develop a joint strategy for U.S. participation that outlines a clear direction for agencies and identifies resources needed to sustain collaborative efforts and consistent participation in the Council. Develop a process to review and track U.S. progress in implementing existing and future recommendations. Work with other Arctic states to develop guidelines for producing clear recommendations with measurable actions and prioritizing recommendations.”⁸

Indigenous engagement should be a principle for any government in the creation of policies, rules and regulations being considered for the Arctic. Businesses working in the Arctic should have ethical corporate values and make it a priority to engage with communities that will be impacted directly by resource development in the Arctic.

The following policies and strategies of the United States and the State of Alaska are in place: The President’s National Strategy for the Arctic; Implementation Plan for the National Strategy for the Arctic Region; the Department of Defense’s Arctic Strategy; the USCG Arctic Strategy; NOAA’s Arctic Action Plan; the Navy’s Arctic Strategy; the Committee on Marine Transportation’s U.S. Arctic Vision and Strategy; the Alaska Arctic Policy Commission’s draft report, and the Arctic Marine Assessment Report’s 2009 Recommendation for Arctic infrastructure to comply with tribal consultation with Alaska Natives and American Indians per Executive Order 13175. The next step is for congress and the president to implement and fund these priorities.

Watt-Cloutier’s discussion of a rights-based approach to Arctic development should gain momentum, and this approach should be discussed with policy makers. The United States has been a leader through our Declaration of Independence and voicing concern for human rights at the international and national levels on issues such as religious freedom, labor rights, democracy, and freedom of expression. Many Lower 48 citizens do not believe that climate change is happening and are not aware of any Arctic issues that are important to Alaska Natives. In fact, many people think Alaska is a sovereign nation and that the State of Alaska is located below Hawaii, based on maps.

Conservation groups and federal agencies react to changes in the Arctic by seeking tighter regulations on the ability of Alaska Natives to subsist

and by interrupting a process toward a rights-based approach that regions have used for sustainable resource development.⁹

Title VII of the State of Alaska's Constitution establishes the basic principles for wildlife management in Alaska and grants broad powers to the Alaska legislature to provide for the "utilization, development, and conservation" of Alaska's natural resources "for the maximum benefit of its people."¹⁰ Under Title VIII of the Alaska National Interest Lands Conversation Act (ANILCA), subsistence is a priority for rural residents and is allowed when resources are scarce. The State of Alaska chose not to comply with the federal law, citing our state constitution, which says all resources belong to all Alaskans and does not give priority to rural residents for subsistence activities. An Alaska Native Federation (AFN) report emphasized the fact that Title VIII, with its priority on subsistence, is federal law that must be administered under federal standards without improper deference to state law and state management issues and objectives. AFN joined the Native American Rights Fund to support Katie John's litigation. The U.S. Supreme Court "rejected the State of Alaska's petition for certiorari review of the decision of the Ninth Circuit Court of Appeals upholding the 1999 Final Rules promulgated by the Secretary of the Interior and the Secretary of Agriculture to implement part of ANILCA concerning subsistence fishing and hunting rights in federal waters."¹¹ The state continues to limit federal jurisdiction over fishing while it aggressively prosecutes native subsistence users in waters currently under state control.¹² Regulatory action can lead to food shortages and create fear and insecurity in our communities, and for the last couple of years Alaska Natives were arrested for taking fish from closed state rivers for subsistence, while commercial fishing was allowed in federal waters.

There are opportunities to work with the State of Alaska through other forums such as fish and game boards for a rights-based approach to policy creation to solve conflicts among users. One example is through the permit process of the Department of Natural Resources for suction dredge mining. The permits state that dredgers must maintain a certain distance from subsistence fishing nets in the ocean.

The Marine Mammal Protection Act, which grants only Alaska Natives the right to hunt marine mammals calls for an ecosystem approach to management and conservation, should be considered as a rights-based approach. Alaska Natives are using other processes for a rights-based approach within the federal and state co-management agreements. One

successful example is the Alaska Eskimo Whaling Commission. The major exploration companies such as ExxonMobil, PB Exploration and Shell created a programmatic conflict avoidance agreement in 2012 for those who operate barges or transit vessels in the Beaufort and Chukchi Seas engaged in oil and gas operations, including avoidance guidelines and mitigation measures in the area of active subsistence hunts for bowhead whales.

An opportunity to use a rights-based approach is the creation of a harbor safety committee. The coalition of the Alaska Eskimo Whaling, Walrus, Beluga, Nanuq and Ice Seal Committee came together to start on the creation of the Arctic Water Safety Committee with the increase in Arctic shipping during marine mammal migratory season and the impacts on our way of life and subsistence activities. With regional observers from the North Slope Borough (NSB) and Northwest Arctic Borough (NWAB) and Kawerak and the Alaska ICC, this effort was successful in adding areas of subsistence use to the 2013 Coast Pilot. The Arctic Waters Safety Committee will provide a forum to meet with shippers and operators to work out voluntary measures for sharing the waterway. Last month, NSB Mayor Charlotte Brower sent a letter to NWAB Mayor Reggie Joule and myself asking that we meet to form the same type of committee. We have since reached out to the U.S. Coast Guard District 17 (USCG) to host a meeting to explain the process of creating and implementing its goals and mission. The meeting was held in Anchorage on August 28 with all stakeholders at the table.

The Bering Strait, a natural choke point, is an international strait with rights of innocent passage, and many of our coastal communities' subsistence hunters and commercial fisherman are worried about the lack of a vessel traffic scheme and the prospects of conflicts with large vessels colliding with subsistence boats and smaller sailboats, along with possible ship strikes on migrating whales. The region provided recommendations to the USCG D17 Bering Strait Port Access Study, based on traditional knowledge, and identified areas to be avoided to protect marine mammals and sea birds. Alaska Natives will continue to advocate for volunteer measures to be put in place until the IMO Polar Code is completed and entered into force. There is support from NGOs such as the Pew Foundation for such voluntary measures to be in place.

Many communities partner with companies that have strong records of corporate social responsibility (e.g., Norway's Statoil along with Norway's

government) and an open and transparent process for development and have identified areas where no new resource development will occur to protect fishery interests, etc. The Arctic Slope Regional Corporation and several village corporations now have an opportunity to purchase offshore drilling operations in the Chukchi Sea under an agreement with Shell Oil for a sustainable economy.

The industry needs to be patient, realizing that the work timeline will be longer to respect our subsistence rights, which may cost more in R&D and exploration. The most successful collaboration is when industry, communities, and regulatory agencies work together to keep dialog and communication open by holding community meetings and follow up via teleconferences. Many of the resource developers are global industries working with various sovereign nations and are excellent in community engagement.

I applaud Watt-Cloutier's presentation for continuing to advocate a human rights-based approach to development in the Arctic. In closing, I want to remind the audience that we will continue to live in the Arctic, as we have for thousands of years, whereas nonrenewable resources will be depleted and those businesses will leave the Arctic. Our mission is to ensure that those resources we depend on for our nutrition and culture are there for our future, while nonrenewable resources are developed sustainably. The question to ask yourself is: What does the vision of the Arctic look like to you? My vision is of one where the environment is pristine, marine mammals are bountiful, fish and migrating birds coincide with sustainable resource development, and there are healthy people and healthy communities.

Notes

1. "Seal and Walrus Harvest and Habitat Areas for Nine Bering Strait Region Communities," Ice Seal and Walrus Project, November 2013, Kawerak, Inc., Social Service Program, Natural Resource Division.
2. August 29, 2013 Letter from Gov. Parnell to Alaska Legislature Declaring Economic Disaster.
3. "Data Source U.S. Fish & Wildlife, Marine Mammals Management, Marking, Tagging, and Reporting Program," Department of the Army, U.S. Army Engineer

- District, JBER, Alaska, "Navigation Improvements Little Diomedes, Alaska," Alternative Formulation Briefing Meeting Report, April 2013.
4. U.S. Army Corps of Engineers, Alaska District and the State of Alaska Department of Transportation, "Arctic Deep Draft Port System Study," March 2013.
 5. State of Alaska Statewide Suicide Prevention Council, Suicide Statistics. Substance Abuse Prevention Program.
 6. "Meaningful Collaboration and Environmental Governance with Alaska Natives: the case of increase maritime traffic in the Bering Strait Region, Fieldwork Report 2014," George Stetson, PHD Center for Maritime Policy and Strategy, United States Coast Guard Academy.
 7. City Answers to GAOHQ-#6373414 Study on Maritime Infrastructure, 2013.
 8. GAO-14-435 Report to Congress, "Arctic Issues, Better Direction and Management of Voluntary Recommendations Could Enhance U.S. Arctic Council Participation." May 2014.
 9. "CD-5 Project in NPR-A Lawsuit Ignores Hard-Won Compromise" by Edward Itta, Resource Development Council Newsletter, September 2013.
-Canadian Inuit Leaders Reject Environmentalist Campaign Pitting Indigenous People Against Arctic Resource Development, Press Release, May 14, 2013.
 10. *Alaska Natives and American Indian Laws*, 2nd Edition, David S. Case, David A. Voluck, University of Alaska Press 2002.
 11. Native American Rights Fund, March 31, 2014. <http://narfnews.blogspot.com/2014/03/united-states-supreme-court-rejects.html>
 12. AFN 2010 Conference Subsistence Report.

Commentary

Nancy G. Maynard

INTRODUCTION

This commentary on the presentation by Sheila Watt-Cloutier highlights the fact that, more than at any other time in history, the concerns of the Indigenous peoples of the Arctic have been validated in detail by the scientific findings of two recent prestigious national and international climate assessments, underscoring the importance of ensuring that Indigenous peoples are regarded as a part of the Arctic and have a strong voice in determining its future. The discussion in this commentary provides examples of the scientific findings of the 2014 Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) and the U.S. National Climate Assessment (NCA) that support many of the points put forth in the Watt-Cloutier's presentation on, "A Rights-based Approach to Arctic Development." Her presentation provides an insightful and detailed summary of the current and future challenges to Arctic Indigenous peoples from the increasing industrial development of the North resulting from climate changes and the opening of the Northern Sea Route. Watt-Cloutier's presentation is a direct, firsthand account of these impacts on Arctic Inuit communities to date as well as a statement of serious concerns about future challenges facing them in the rapid transformation of the Arctic and the race to exploit the region's natural resources. She provides a strong voice for the Indigenous peoples of the North, as she sets forth her concerns about whether or not it will be possible to ensure that Indigenous peoples will be part of and have a strong voice in the future of the Arctic.

This commentary describes scientific evidence from the IPCC and the NCA released in 2014 that strongly supports her descriptions of the impacts on Indigenous peoples, as well as her concerns for the future—all findings fully documented by both the scientific literature and Indigenous written and oral reports. It is hoped that this increasing body of supportive scientific evidence will serve as a tangible reminder to governments, industry and other Arctic players of the validity and importance of listening to the voices of Indigenous peoples in the upcoming discussions among Arctic and non-Arctic players regarding this rapid transformation of the Arctic.

BACKGROUND

In 2011, during the first in the series of the North Pacific Arctic Conferences, I presented a commentary on issues facing the Indigenous peoples of the region (Maynard, 2013), which outlined the growing concern by many that Indigenous peoples would be pushed aside or even eliminated in the rush by Arctic and non-Arctic states and industries to exploit the region's resources. In fact, the Conference Note for the 2011 NPAC conference provided an especially insightful summary of the challenges for Indigenous peoples:

"...The shrinking of the Arctic's ice cap increases environmental fragility and threatens the traditional way of life for Indigenous Peoples. Climate change in the circumpolar region is already affecting Indigenous Peoples who consider the region to be their homeland. Arctic Indigenous Peoples are trying to protect their traditional ways of life from colonizers who seek to take advantage of new opportunities to exploit the region for oil, mineral, and forestry resources with adverse effects on their communities..."

That initial commentary provided background information to help increase understanding of the issue, a few key questions, examples of impacts on indigenous communities occurring today, and some proposed solutions (see Maynard, 2013). The piece presented detailed information on questions such as "Who are the Indigenous peoples?" and "What are the primary stresses on Arctic Indigenous peoples?" A detailed summary was provided on the impacts on Indigenous peoples in the Arctic of changes in ecosystems (the strong connection to the environment for culture, well-being and nutrition), food and food security, extreme weather, and water. In fact, the entire paper was intended as a background brief to help enrich discussions for conference attendees with limited or no experience or knowledge of Arctic Indigenous peoples and their challenges resulting from climate and development.

Since that first 2011 NPAC conference—only three years later—a startling amount of scientific information has been published and compiled about the issues facing Indigenous peoples in the Arctic in several key climate change assessments, all of which support the major points in Watt-Cloutier's presentation. This 2014 commentary will provide a summary

of the key messages regarding Indigenous peoples from the IPCC and the NCA, and show how these climate assessments corroborate the statements made in Watt-Cloutier's presentation.

THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC)¹

The IPCC was established in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) to assess the scientific, technical and socioeconomic information relevant for understanding the risk of human-induced climate change. Its purpose is “to provide policymakers with regular assessments of the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation.” There are three working groups, each of which prepares a report: (1) Working Group 1 (WG1): The Physical Science Basis, (2) Working Group 2 (WG2): Impacts, Adaptation, & Vulnerability, and (3) Working Group 3 (WG3): Mitigation of Climate Change. The IPCC assessments provide a scientific basis for governments at all levels to develop climate-related policies, and they underlie negotiations under the auspices of the UNFCCC. The IPCC assessments, which are prepared on a volunteer basis by hundreds of leading scientists and reviewed by teams of hundreds of others, are policy-relevant but not policy-prescriptive. The IPCC is committed to the highest standards of scientific excellence, balance and clarity, and seeks to cover full scientific, technical and socioeconomic assessments of climate change. The emphasis of the assessment process is on evaluation of all cited literature and its sources, including scientific, technological, and socioeconomic literature as well as material not necessarily widely available (e.g., conference proceedings, reports, local reports), but which is made available to reviewers upon request. What is different from past years is that the 2014 assessment—in particular, the “Polar Regions” chapter—devotes a significantly increased amount of attention to the impacts of climate and development on Indigenous peoples.

IPCC SUPPORT: HOW DO THE SCIENTIFIC FINDINGS FROM THE 2014 IPCC REPORT SUPPORT THE INDIGENOUS RESPONSES TO ARCTIC DEVELOPMENT?²

To begin with, the 2014 IPCC “Polar Regions” chapter is different from previous assessments for Indigenous peoples in several different ways. In the first place, the “Polar Regions” chapter has—more than in any prior assessments—increased the amount of scientific detail documenting the serious consequences of climate change and development presently impacting the health and well-being of Arctic residents, especially Indigenous peoples. While the chapter itself is roughly twice as long as it was in 2007, the number of articles by or about Indigenous peoples tripled and the associated discussions in the chapter greatly expanded. This is reflective of the fact that there is now a significantly larger body of literature by and about the Indigenous peoples of the North. This increase in Indigenous literature, in turn, may be a result of the International Polar Year (IPY) activities that actively encouraged collaborative science-Indigenous studies during 2007-2009. In addition, at least seven of the chapter authors were familiar with Indigenous issues, and the chapter includes one Indigenous lead author.

Secondly, to help show the degree to which Indigenous peoples’ issues have been enhanced in this assessment, this commentary summarizes in the following section some of the major points of the chapter that support Indigenous concerns by having more in-depth analyses and specific examples of impacts from climate and development issues (such as the executive summary and sections on health and well-being, informal, subsistence-based economy, economic sectors, human adaptation, research and data gaps and special sections on Indigenous peoples and traditional knowledge).

IPCC SUPPORT: “POLAR REGIONS” CHAPTER EXECUTIVE SUMMARY AND INDIGENOUS COMMUNITIES³

In the executive summary, where the chapter authors summarize the points considered most important, almost all of the new scientific findings that

have emerged since the last IPCC assessment in 2007 address impacts affect Indigenous peoples—either directly or indirectly—and mirror many of the same concerns raised by Watt-Cloutier.

For example, the executive summary states that “the physical, biological and socio-economic impacts of climate change in the Arctic have to be seen in the context of often interconnected factors ... For example, food security for many indigenous and rural residents in the Arctic is being impacted by climate change, and in combination with globalization and resource development is projected to increase significantly in the future.”

In another example, the executive summary notes that “the rapid rate at which climate is changing in the Polar Regions will impact natural and social systems and may exceed the rate at which some of their components can successfully adapt.... Already, accelerated rates of change in permafrost thaw, loss of coastal sea ice, sea level rise and increased weather intensity are forcing relocation of some indigenous communities in Alaska” (Larsen et al., 2014).

One of the strongest statements in the executive summary pertaining to Indigenous issues was that the “impacts on the health and well-being of Arctic residents from climate change are significant and projected to increase—especially for many indigenous people” (Larsen et al., 2014).

It also states that “these are expected to vary among the diverse settlements that range from small, remote, predominantly indigenous communities to large cities and industrial settlements, especially those located in highly vulnerable locations along ocean and river shorelines.”

These statements all directly support a number of the major concerns raised in the presentation by Watt-Cloutier.

IPCC SUPPORT: “POLAR REGIONS” CHAPTER AND INDIGENOUS COMMUNITIES⁴

One of the key sections of the IPCC “Polar Regions” chapter, “Health and Well-being of Arctic Residents,” was written with a strong emphasis on Indigenous communities, and many of the issues discussed in that section correlate closely with the individual impacts summarized by Watt-Cloutier.

The health and well-being section, (and the reason for the emphasis on the Indigenous communities), in the words of the authors, “...focuses more on health impacts of climate change on indigenous, isolated, and rural

populations because they are especially vulnerable to climate change due to a strong dependence on the environment for food, culture and way of life; their political and economic marginalization; existing social, health, poverty disparities; as well as their frequent close proximity to exposed locations along ocean, lake, or river shorelines” (Larsen et al., 2014).

Some examples of health issues that the “Polar Regions” chapter discusses in detail that parallel those addressed by Watt-Cloutier are as follows:

- Injuries and risks from extreme weather events and temperatures, rapid onset of storms, accidents, unsafe conditions for hunting, travel and subsistence gathering, and loss of services to isolated villages
- Changes in ice and snow state, with resulting changes in animal and plant populations, loss of forage, food, sites for habitats for subsistence species, migration routes, and grazing
- Damage to the built environment impacting already limited housing, breakage of sanitation infrastructure, water supply systems for clean water, sickness from contaminants (local and long-range), and infectious disease
- Food insecurity brought on by changes in climate and development in the region, decreased opportunities for successful hunting, fishing, some subsistence species displaced, and forced reliance on (less healthy) store-bought foods
- Impacts to cultures, families, and community residents due to necessity for relocation of villages damaged by permafrost thaw and erosion, which (along with other changes) are causing stress within Indigenous and isolated communities leading to increased numbers of suicides especially among young people.

U.S. NATIONAL CLIMATE ASSESSMENT (NCA)⁵

Of particular interest for this commentary is one of the 12 key findings of the entire NCA: “Climate change poses particular threats to Indigenous Peoples’ health, well-being, and ways of life” (<http://ncadac.globalchange.gov/>). The evidence and literature supporting this statement are presented in one of the chapters in particular, “Indigenous Peoples, Lands and Resources” (see Bennett et al., 2014). This is the first time a chapter in a U.S.

NCA has been devoted specifically to indigenous peoples, and is a strong signal that this country is seriously addressing the issues related to climate and environmental change relative to Indigenous peoples.

As in the IPCC assessment, many of the points laid out by Watt-Cloutier are similar in nature to those outlined in this Indigenous chapter, and the literature sources underpinning this assessment fully support her statements. Of course, this assessment addresses American Indian and Alaska Native concerns across the board, so not every part of this chapter is necessarily applicable to the Arctic. But three of the five key messages apply directly to the Alaskan Arctic, and many of the impacts within the other two messages also apply to Alaska.

The five key messages from the “Indigenous Peoples, Lands and Resources” chapter of the NCA are:

1. “Observed and future impacts from climate change threaten Native Peoples’ access to traditional foods such as fish, game, and wild and cultivated crops, which have provided sustenance as well as cultural, economic, medicinal, and community health for generations.”
2. “A significant decrease in water quality and quantity due to a variety of factors, including climate change, is affecting drinking water, food and cultures. Native communities’ vulnerabilities and limited capacity to adapt to water-related challenges are exacerbated by historical and contemporary government policies and poor socioeconomic conditions.”
3. “Declining sea ice in Alaska is causing significant impacts to Native communities, including increasingly risky travel and hunting conditions, damage and loss to settlements, food insecurity, and socioeconomic and health impacts from loss of cultures, traditional knowledge, and homelands.”
4. “Alaska Native communities are increasingly exposed to health and livelihood hazards from increasing temperatures and thawing permafrost, which are damaging critical infrastructure, adding to other stressors on traditional lifestyles.”
5. “Climate change-related impacts are forcing relocation of tribal and indigenous communities, especially in coastal locations. These relocations, and the lack of governance mechanisms or funding to support them, are causing loss of community and culture, health impacts, and economic decline, further exacerbating tribal

impoverishment” (from Bennett et al., 2014).

In summary, more than at any other time in history, the concerns of Indigenous peoples of the Arctic regarding climate, environment and development, as described by Watt-Cloutier in her keynote presentation are shown to be supported and validated by a significant amount of scientific evidence. In fact, the evidence was presented in the extensive literature evaluated in the two highly regarded national and international climate assessments published in 2014 (IPCC and the U.S. NCA), and underscores the importance of ensuring that Indigenous peoples must be a part of and have a strong voice in the future of the Arctic.

Notes

1. The sources of information in this section can be found at: www.ipcc-wg2.gov/ and www.ipcc-wg2.gov/AR5/
2. Information in this section is based on Larsen et al. 2014.
3. Sources of information in this section are in Larsen et al. 2014.
4. Sources of information for this section are in Larsen et al. 2014.
5. Source for information in this section: <http://ncadac.globalchange.gov/>

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PART VI

OPPORTUNITIES FOR INTERNATIONAL COOPERATION IN A CHANGING ARCTIC

Perspective

Valeriy A. Kryukov

Mineral development in the Arctic has several distinctive features: increased costs, high technological and environmental risks, and a seasonal nature due to the fact that most production is carried out during short summers.

Implementation requires the use of modern technology and methods of project organization. Not all companies in the countries around the Arctic Basin have the requisite experience and technological capacity. Moreover, they do not always have adequate financial capacity to run complex and expensive projects. Equally important is the fact that mineral resources development projects are generally characterized by a “predisposition” to increase in cost from the very beginning of their implementation. Thus, in the course of two years, expenditures on LNG plant construction in the port of Sabetta on the Yamal Peninsula increased by almost 80% (from 18 to 27 billion USD). The same thing happened to the Trans-Alaska Pipeline System and the new LNG plant. Estimates of the project costs vary from 25 to 65 billion USD.

It is worth mentioning that projects in the Arctic, due to their high cost, are sensitive to market price fluctuations. This factor is relevant both to the Mackenzie Valley Gas Project and the Trans-Alaska Gas Pipeline construction project at a preliminary stage.

Taken together, these factors—geological, technical, environmental, and economic—are responsible for the substantial risks these projects carry. As a result, one of the most important tasks when implementing projects in the Arctic becomes risk management. In addition to specific forms of risk management (such as the development of special procedures for timely warning of emerging deviations in a particular geological, technological or environmental area), a critical challenge is the development of approaches to joint participation in implementing projects in order to distribute the risks among several participants.

The countries in the Arctic region and the companies involved in specific projects, tend to form inter-enterprise project teams or alliances. At the same time, the country that owns a field or a source of natural resources (at the intergovernmental level or at the level of individual national companies) is typically committed to the creation of such alliances,

which would help with:

- a) Funding (not because of a lack of its own funds or the ability to attract them, but because of the significant risks related to the implementation of projects in the Arctic);
- b) Gaining access to advanced technologies and methods of project implementation (including personnel training, especially the transfer of certain skills and abilities). This approach is exemplified by an agreement between Rosneft and Exxon/Mobil signed in 2012 but now derailed due to Western sanctions). The agreement included both the participation of the American company in the study of the Arctic shelf area as part of a cooperative project with the Russian company, and the participation of the Russian company in the projects of the American company in Alaska and the Gulf of Mexico; and
- c) Getting access to markets in the framework of a specific project (for example, the LNG plant project on the Yamal Peninsula involving sales in France and China. Earlier projects of this sort, e.g., on Sakhalin, were aimed at the Japanese market from the outset).

The success of such collaborations depends largely on whether more experienced, technologically advanced, and skillful partners are involved in a project. In the case of Russia, these are mostly foreign partners. In the case of other countries (e.g., Norway, the United States, Canada), these are both foreign partners and domestic companies. China is especially active. In 2014, China agreed to enter into a number of Arctic oil and gas projects in Russia (e.g., Yamal LNG led by Novatek and the Vankor oil and gas field¹ led after Rosneft. Together with the Norwegian companies Statoil and Petoro, China started exploration in the eastern part of the Norwegian sector of the Barents Sea² and in the Icelandic shelf area.

The most preferred form is a joint venture. In this case, all participants not only have similar rights but can also include reserves of minerals when maintaining accounting for their assets (and, as a result, attract additional financial resources).

However, in the case of Russia, this approach is only one possibility. In the last 20-25 years, Russia has used and executed various schemes and approaches to the creation of international inter-enterprise alliances. The main methods are as follows:

- a) Foreign companies with unique engineering know-how and financial capacity to implement projects in the mineral resource sector have direct access (e.g., the Canadian Kinross Gold company owns gold deposits in Chukotka Autonomous Okrug, including 100% of the Kupol mine as well as 100% ownership of the Dvoynoye deposit and the Vodorazdelnaya property located 100 km to the north of the Kupol mine);
- b) Foreign companies may have a share in the authorized capital of the companies established to carry out projects in the mineral sector. For example, shares of Yamal LNG, besides Novatek belong to Total and CNPC. In recent years in Russia, there has emerged a trend to form project alliances in order to create internal competition between the Russian companies and improve the economic performance of projects. Examples of this tendency include the Trebs and Titov oil fields in the Nenets Autonomous Okrug³ as well as Russian platinum LLC entering the Norilsk Industrial District where JSC Norilsk Nickel enjoys a monopoly;
- c) Special tax regimes and conditions for project implementation, primarily production sharing agreements (one of the most common forms of concessions in the world). Unfortunately, this type of concession is no longer used in Russia, which is the main reason for a significant increase in costs and a significant reduction in the state's profit share. As shown by the projects carried out in the Kharyaga oil field in the Nenets Autonomous Okrug (participants are French Total S.A., both participant and executor, Norwegian Statoil, JSC Zarubezhneft, and Nenets Oil Company), as well as gas projects (including Sakhalin-1 with EksonNeftegaz as executor and Sakhalin-2 with Sakhalin Energy as executor and Shell playing a key role in operational management and solving technical issues), this regime is highly efficient as individual projects were accomplished on a tight schedule; and
- d) Alliances between Russia's key state-owned companies (e.g., Gazprom and Rosneft) and world leaders to search, explore and develop oil and gas fields. Essentially, these alliances are modified risk contracts where foreign participants are mostly responsible for the costs of the project at the initial stage and, if successful, receive a share of resources produced. Such a scheme was proposed for the project in the Shtokman gas condensate field in the Russian sector of

the Barents Sea, but it was delayed due to the uncertain position of natural gas demand on foreign markets.

Rosneft signed a series of agreements on strategic cooperation in the Arctic shelf with BP (UK) and ExxonMobil (U.S.) in 2011, and with Statoil (Norway) in 2012⁴. Under the collaboration with ExxonMobil, drilling of a well at the Universitetskaya-1 site in the Kara Sea started in August 2014.⁵ The result confirmed predictions about the presence of oil and gas in the eastern part of the Kara Sea.

Among the internal forms of joint participation are project consortia and project implementation in the form of public-private partnerships. In the latter case, the state acts as a co-investor in the project's infrastructure (for example, the Port of Sabetta).

A problematic issue for Russia arises from the fact that in 2008 a huge number of minerals received the status of strategic deposits. This designation, which meant that fields could only be developed by state-owned companies, significantly reduced the possibility for both private domestic and foreign companies to participate in future projects. The list of strategic mineral deposits was finalized and approved in March 2009. This restricts direct access for foreign companies to large fields.

Since 2012, access for private companies to the sites in the Arctic shelf has been restricted. For a company to receive a license for a site in the shelf areas, it must meet two main criteria:

- a) It should have at least five years of experience in shelf exploration, and
- b) The state's share in its capital should account for more than 50%.

Unfortunately, only two companies in Russia meet these requirements, Rosneft and Gazprom. Although JSC Lukoil does not meet the second requirement, it retained a few sites in the Caspian Sea that belonged to it before.

When working in the Arctic—and much less than working on the shelf—what is important is the experience of those who perform work on the site. A customer (JSC Gazprom and JSC Rosneft in the case of Russia) only organizes projects and partially finances them. For instance, in the Sakhalin offshore projects currently being implemented, the real executors are their foreign partners.

Such demands, including both the strategic status of deposits and the exceptional role of state-owned companies, are redundant in many ways. State ownership of the subsoil provides many opportunities for state control. The redundant requirements are associated with the desire of the state to avoid expending unallocated subsoil reserve funds on the exploration of shelf sites.

Further events showed that the exceptional status of strategic deposits, both oil and gold, appeared to be an obstacle to attracting investment and using the experience and skills of the most successful foreign companies. Therefore, amendments and addenda were adopted to allow the formation of strategic alliances between Russian state-owned companies and foreign companies. All the projects of the mineral sector executed in Russia's Arctic zone can be divided into two major groups:

- a) Projects implemented in "subsoil plots of federal significance." In this case, the foreign investor's share in the assets of an applicant cannot exceed 51%, and if a licensee company sells 10% to foreign agents, it should be approved by the government; and
- b) Other projects in which both private Russian companies and Russian companies with predominantly foreign capital can participate.

In conclusion, we should note that a vast variety of forms of and approaches to joint participation may be used in the Arctic: from the creation of joint ventures with equity participation in projects by the partners to risk contracts where foreign companies conduct exploration at their peril but get a share of the project at a later stage.

Despite the circumstances described above, the common trend is to move toward the conditions of participation in projects that are more pragmatic and more attractive for real investors. New projects in the Arctic, such as drilling of a well at the Universitetskaya-1 site in the Kara Sea during summer–fall of 2014 by the Rosneft–ExxonMobil alliance, have extra high capital intensity. The Universitetskaya-1 well is worth an amazing and unbelievable total of 700 million USD.

It should also be noted that the international sanctions imposed on Russia in the second half of 2014 will have a significant impact not only on how rapidly projects for the study of hydrocarbons in the Russian Arctic will be executed. They also will influence the implementation of projects in the shelf area at lower latitudes and the development of oil–shale deposits

on land in Western Siberia and the European part of Russia.

Notes

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2. Norway welcomes China as partner in Arctic energy development. November 17, 2014. URL: <http://www.arcticgas.gov/2014/norway-welcomes-china-partner-arctic-energy-development>
3. Alas, this project is postponed due to state claims on one of the participating companies, JSC Bashneft.
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Perspective¹

David L. VanderZwaag

INTRODUCTION

Two images help capture likely directions in international cooperation related to the Arctic. First is the descriptor of “clear currents.” To address the environmental protection and sustainable development needs of the Arctic, many avenues for international cooperation already exist, and they seem bound to continue at multiple levels—global, interregional, Arctic-wide, Arctic 5, sub-regional and bilateral. A second image is “hazy horizons.” While general directions for international cooperation are quite clear, a host of challenges loom on the horizon at all levels of governance with corresponding opportunities but also uncertainties as to exactly how cooperative efforts will proceed. A brief survey of the two cooperative realities follows.

CLEAR CURRENTS

Global Currents

Global avenues of cooperation relevant to the Arctic have been driven by the need to address multiple sources of world-wide pollution that carry regional threats and impacts. The climate change regime, founded on the UN Framework Convention on Climate Change (UNFCCC) (1992) and the Kyoto Protocol (1997), is still the main cooperative process for seeking to control greenhouse gas emissions. The Montreal Protocol on Substances that Deplete the Ozone Layer (1987), although originally driven by the need to address ozone depletion over the Antarctic, continues the process of phasing out the production and use of ozone-depleting substances, such as hydrochlorofluorocarbons and methyl bromide. The 2001 Stockholm Convention on Persistent Organic Pollutants (POPs), specifically negotiated to address the long-range transport of toxic pollutants into the Arctic, has facilitated the listing of 23 chemicals for elimination or restriction. More listings will be required in the future.

The Minamata Convention on Mercury, concluded in October 2013,

offers a further global venue to address transboundary pollution in the Arctic. About 100 tonnes of mercury are estimated to enter the Arctic Ocean from the air each year, while another 100 tonnes is thought to flow into the Arctic from the Atlantic and Pacific Oceans, rivers and coastal erosion.² Total anthropogenic emissions of mercury into the atmosphere in 2010 are estimated at 1,960 tonnes, with Asia considered the main source region, contributing nearly 50% of the global total.³ The convention contains numerous cooperative promises for reducing mercury emissions around the globe, such as requiring the phase-out of mercury mining and of many products containing mercury.

The global nature of the shipping industry and the need to ensure appropriate ship safety and marine pollution standards for the Arctic, especially for areas of the high seas where special coastal state shipping standards would not apply, spurred negotiations for a Polar Shipping Code under the auspices of the International Maritime Organization. The code, now in the final stage of negotiation, promises to usher in a new era of global cooperation relating to Arctic shipping, with numerous opportunities for collaboration. Examples would be in the training of northern seafarers and sharing national implementation approaches and challenges.

Interregional Currents

Interregional cooperative tracks have also been set. Heavy metal and persistent organic pollutant protocols have been adopted under the auspices of the UN Economic Commission for Europe (UNECE). A further protocol, the Gothenburg Protocol to Abate Acidification, Eutrophication and Ground Level Ozone, was amended in 2012 to include national emission reduction commitments for black carbon, a short-lived climate pollutant of special concern in the Arctic. Interregional efforts to protect migratory bird species also stand out. The African-Eurasian Migratory Waterbirds Agreement (1995) covers a vast area from Africa up to Greenland and the Canadian Archipelago. The Partnership for the East Asian-Australasian Flyway seeks to enhance the protection of over 50 million waterbirds, many of which breed in Northern Russia and Alaska.

Regional Currents

The central forum for region-wide cooperation in the Arctic continues

to be the Arctic Council. The Council has through the use of task forces facilitated the adoption of two regional agreements on search and rescue and marine oil pollution preparedness and response. Three additional regional priorities, oil pollution prevention, black carbon and methane emission reductions, and scientific research cooperation, are in the process of being considered by task forces.

Arctic 5 Currents

Cooperation among the five Arctic Ocean coastal states (Arctic 5) has addressed two issues of special concern: the extension of jurisdiction over continental shelves beyond 200 nautical miles in the Arctic and the potential for future commercial fisheries in the central Arctic Ocean (CAO) in areas beyond national jurisdiction. The Ilulissat Declaration, issued at the meeting of representatives from the Arctic 5 in May 2008, emphasized that the law of the sea provides a solid foundation for managing human uses of the Arctic Ocean and for determining the rights to extended continental shelves in the region. Two meetings of officials from the five Arctic coastal states occurred to discuss possible future fisheries in the CAO, from April 29 to May 1, 2013 in Washington, DC and February 24-26, 2014 in Nuuk, Greenland. An agreement in principle has been reached for the Arctic 5 to lead an initiative to develop interim measures to prevent unregulated fishing and to further enhance scientific research on CAO ecosystems.

Bilateral Currents

Bilateral cooperation in the Arctic remains a somewhat neglected topic. The Arctic Council's Arctic Ocean Review (AOR) Report, issued in May 2013, aimed at providing options and recommendations for strengthening international cooperation in protecting the Arctic marine environment, excluded a review of bilateral agreements in the region and focused on the status of regional and global agreements and arrangements. Bilateral agreements that have been forged between various Arctic states have largely served to address: ocean boundary issues; scientific cooperation; transboundary resource management challenges, such as shared fish stocks and hydrocarbon pools straddling boundaries; cooperation in search and rescue, and joint contingency planning for marine oil spills.

HAZY HORIZONS

Global Challenges

- **Reaching international agreement on effective measures to mitigate CO₂ and other greenhouse gas emissions pursuant to the UNFCCC**

Parties to the UNFCCC have agreed to adopt a new legal agreement/instrument in 2015, with entry into force by 2020. Such a commitment offers substantial opportunities for both Arctic and non-Arctic states to take seriously the threats of climate change and ocean acidification to Arctic waters and communities. However, hurdles include sorting out financial and technical assistance provisions, application of the common but differentiated responsibility principle and an appropriate compliance regime.

- **Phasing out the production and use of hydrofluorocarbons (HFCs)**

HFCs, once considered “wonder substances” for replacing ozone-depleting substances, such as hydrochlorofluorocarbons, are now known to be potent greenhouse gases. An ongoing challenge is to phase out the use of HFCs, which are currently listed as greenhouse gases under the Kyoto Protocol and are not seen to have ozone-depleting potential. Canada and the United States have been trying to reach an agreement under the Montreal Protocol on Ozone Depleting Substances for an amendment to control HFCs under the protocol, but consensus has not been possible.⁴ Thus, the opportunity exists for increased international cooperation to support addressing HFCs promptly in light of climate change threats to the Arctic.

- **Strengthening the international regulation of POPs**

Listing of new chemicals for elimination or restriction under the Stockholm Convention continues to be a major challenge. While about 4,300 organic chemicals are thought to have Arctic accumulation properties,⁵ only 23 POPs have been listed to date. The listing procedure is cumbersome, requiring a detailed scientific risk analysis before listing can be considered, and listing has been slowed by the practice of requiring consensus by the Persistent Organic Pollutants Review Committee. Academic calls for more proactive approaches to controlling toxic chemicals have not been heeded.⁶ For example, a more comprehensive chemical convention might invoke a “reverse listing” approach where only chemicals listed on a global “safe list” would be allowed to be produced and marketed.

- **Ensuring timely and effective implementation of the Minamata Convention**

Numerous implementation challenges surround the new mercury convention. Entry into force will require 50 ratifications/acceptances. However, as of August 7, 2014, while there were 101 signatories, only one country, the United States, had formally accepted the convention. The extent to which parties will actually reduce mercury air emissions remains to be seen, since parties are only obligated to control and not reduce emissions. Guidance on the use of best available technologies and best environmental practices, key measures to control emissions, is left to be decided at the first meeting of the Conference of the Parties (COP). Ensuring adequate financing for capacity building and technology transfers has yet to be worked out, with financial details to be decided by the COP.

- **Working through the IMO to further address shipping issues**

A long list of vessel-source emission and discharge challenges will remain even after adoption of the Polar Code. These challenges include: getting sufficient ratifications for entry into force of the Ballast Water Convention and ensuring timely implementation of required ballast water management systems; reaching agreement on appropriate control measures for black carbon; taking further measures to reduce greenhouse gas emissions from ships; considering the regulation of gray water discharge from cruise ships, which on average may generate 3.8 million liters of wastewater per week from such sources as sinks, showers and laundries,⁷ and deciding whether to designate one or more areas of the Arctic as special emission control areas (ECAs) where the maximum sulphur content of fuel would be set lower than the general standard.

While a decision was reached during Polar Code negotiations not to ban the use of heavy fuel oil (HFO) in the Arctic as in the Antarctic, the door remains open for the issue to be reconsidered in the future. Areas around Svalbard have already been subject to a ban on the use of heavy fuel oil. Further environmentally sensitive areas in the Arctic could be proposed for HFO prohibitions.

Interregional Challenges

- **Strengthening international research and protective efforts for Arctic migratory birds**

The need to further develop international agreements and arrangements to better understand and protect marine-related species shared between and among regions was one of the key recommendations of the Arctic Biodiversity Assessment, published by the Conservation of Arctic Flora and Fauna (CAFF) Working Group in 2013. A first priority was suggested for the East Asian-Australasian Flyway. In April 2013, CAFF signed a resolution of cooperation with the Convention on the Conservation of Migratory Species to better integrate efforts to protect Arctic migratory species. In June 2013, CAFF signed a further resolution on waterbird conservation with the Partnership for the East Asian-Australasian Flyway. Substantial windows of opportunity for greater interregional cooperation have thus been opened. CAFF is further promoting cooperation in improving the conservation status of priority species through a project initiated in December 2013, the Arctic Migratory Birds Initiative (AMBI).

- **Considering future directions for the North Pacific Arctic Conferences**

The North Pacific Arctic Conference initiative, which might be categorized as a further interregional cooperative effort, also raises challenges and possible opportunities for international cooperation if the process continues. Key issues are whether the initiative might be linked in some fashion to the Arctic Council and whether the conferencing approach might be expanded to include a supportive network of Asia-Arctic researchers and possibly research institutions.

Regional Challenges

- **Finalizing and implementing an updated Arctic Marine Strategic Plan**

The PAME Working Group is in the process of developing an Arctic Council Arctic Marine Strategic Plan (AMSP) 2015-2025. The most recent workshop to review drafting progress was held on September 15, 2014. The new AMSP promises to be a major facilitator of further international strategic actions. Among other actions, the AMSP will likely encourage the strengthening of scientific cooperation among Arctic states and other countries involved in Arctic research and promote further cooperation among Arctic and non-Arctic states to address threats to migratory marine species. Conducting a 2nd Arctic Marine Shipping Assessment also has been raised as a possible strategic action, but agreement has yet to be reached on that point.

- **Following through on recommendations from the Arctic Ocean Review Report**

The AOR report's 24 recommendations tend to be general and follow-up plans are uncertain, but the report does offer some key directions for future international cooperation. For example, the report urges Arctic states to: explore the possible development of port state control guidelines or arrangements to encourage implementation of the Polar Code (Recommendation 5); increase international cooperation in addressing the threats of ocean noise and ship strikes on cetaceans (Recommendation 11); further engage the oil and gas industry and regulators by utilizing existing industry forums or by convening an Arctic-specific oil and gas dialogue (Recommendation 17); increase their leadership role in the study of ocean acidification (Recommendation 19), and through the Arctic Council, promote the periodic convening of meetings to share knowledge and experiences in ecosystem-based management (Recommendation 21).

- **Addressing key limitations of the Arctic Council**

Three limitations in the Arctic Council system continue to stand out as major challenges. First, ensuring adequate funding for Arctic Council projects and Permanent Participant involvement remains an ongoing struggle. Second, providing for accountability regarding follow through with regional commitments might be described as nascent. The Arctic Marine Shipping Assessment is the only example where detailed and sustained monitoring and reporting has been imposed to ensure the 17 key recommendations agreed to are being implemented. A third limitation is the restricted opportunities for engagement with observers, including non-Arctic states.

Various ways to firm up Arctic Council cooperation might be envisaged. For example, with the addition of six new observer states in 2013, perhaps the time has come to consider the establishment of a special fund or funds to support project activities and Indigenous capacity development and participation. A broad reporting obligation might be instituted covering not just AMSA implementation but all key council-related commitments, including the Regional Programme of Action for the Protection of the Arctic Marine Environment from Land-based Activities. Various avenues for enhancing engagements with observers might be considered, such as an Arctic Council observer forum or the periodic convening of an Arctic Ocean assembly or conference.

Arctic 5 Challenges

- **Sorting out engagements with indigenous organizations/communities and non-Arctic states**

At the Nuuk meeting in February 2014, officials from the Arctic 5 agreed to move forward with adopting interim measures to deter future unregulated fishing in the high seas of the Central Arctic Ocean. However, they left considerable uncertainty about how Arctic residents and other states might be involved. Officials agreed to develop a ministerial declaration for signature or adoption by the Arctic 5, preferably in June 2014, but the process has reportedly been slowed by the Russia-Ukraine conflict. The Meeting Statement simply noted the interests of Arctic residents, particularly the Arctic indigenous peoples, and expressed an interest to engage with them as appropriate. The meeting also reaffirmed the interest of other states in the topic of interim measures and looked forward to a broader process involving additional states beginning before the end of 2014. A final outcome of a binding international agreement was suggested as a possibility.

- **Addressing scientific cooperation on ecosystems of the CAO**

The Meeting Statement from Nuuk committed states participating in the interim measures to establish a joint program of scientific research with the aim of improving understanding of ecosystems in the CAO. A looming challenge is not only to work out the practical details of a joint scientific research program but also to determine how such a program would relate to the existing avenues of scientific cooperation.

Bilateral Challenges

- **Resolving existing and potential ocean boundary disputes**

Ocean boundary challenges, along with future cooperative possibilities, stand out in the Arctic. Canada and the United States have yet to enter into formal negotiations over their disputed boundary in the Beaufort Sea. Transboundary cooperative arrangements might be described as minimal, with a bilateral agreement on marine spill contingency response planning and an informal moratorium on allowing oil and gas activities in the disputed zone.

Once extended continental shelf claims are finalized, the potential exists

for further boundary disputes in areas beyond 200 nautical mile Exclusive Economic Zones and for further policy issues. To what extent should a commercialization versus a conservation future be encouraged on extended continental shelf areas, assuming mineral resources are located there? What are the interests of indigenous organizations and communities and how might those interests be accommodated?

- **Putting the ecosystem approach into transboundary practice**

A further challenge is to put the ecosystem approach into bilateral practice. Three main routes for moving from concept to practice would be through the establishment of bilateral networks of marine protected areas, encouraging integrated ecosystem-based management on a transboundary basis, and applying the ecosystem approach to fish stocks exploited jointly.

Cross-Cutting Challenges

With so many forums available to address Arctic-related issues, a growing challenge will be to track and possibly coordinate the fragmented array of cooperative initiatives which may span all levels of governance. A good example is the present quest to reduce emissions of short-lived climate pollutants, which include black carbon, methane, tropospheric ozone and some HFCs. Methane is a greenhouse gas already controlled under the Kyoto Protocol. The Climate and Clean Air Coalition, a voluntary international coalition launched in February 2012 to address short-lived climate pollutants, now has over 90 partners, including 40 country partners and over 50 non-state entities. Black carbon is being addressed already under the auspices of the UNECE. Future actions to reduce black carbon and methane emissions are presently being considered by an Arctic Council task force. The United States and China also have been tackling climate change and air pollution, including black carbon emissions and HFC production and consumption, pursuant to their U.S.–China Strategic and Economic Dialogue process.⁸ A U.S.–China Climate Change Working Group is overseeing numerous private sector partnerships, for example, to advance carbon capture and storage and to reduce HFCs in refrigeration and air conditioning units.

Notes

1. Due to page restrictions, only a few selected references are provided.
2. Arctic Monitoring and Assessment Programme (AMAP), *Arctic Pollution 2011* (Oslo, Norway: AMAP, 2011) at iv.
3. UNEP, *Global Mercury Assessment 2013: Sources, Emissions, Releases and Environmental Transport* (Geneva: UNEP Chemicals Branch, 2013) at 9 and 11.
4. For a summary of the debates, see the International Institute for Sustainable Development, “Summary of the Thirty-fourth Meeting of the Open-ended Working Group for Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer, 14-18 July 2014” (2014) 19 (101) *Earth Negotiations Bulletin* 1-17.
5. AMAP, *Arctic Pollution 2009* (Oslo: AMAP 2009) at 22.
6. Arctic Council, *Arctic Marine Shipping Assessment Report* (2009) at 137.
7. See, e.g., David L. VanderZwaag, “The Precautionary Approach and the International Control of Toxic Chemicals: Beacon of Hope, Sea of Confusion and Dilution” (2011), 33 *Houston Journal of International Law*, 605-630.
8. U.S. Department of State, “Key Achievements of U.S. – China Climate Change Cooperation under the Strategic and Economic Dialogue” (July 9, 2014), <http://www.state.gov/r/pa/prs/ps/2014/07/228917.htm>

Perspective

Sung Jin Kim

INTRODUCTION

Toward the end of the 40-year Cold War era, in 1991, the creation of the Arctic Environmental Protection Strategy by the Arctic states signaled a gradual transformation from opposition to cooperation or from conflict to collaboration in the Arctic. The Arctic Council, founded by the 1996 Ottawa Declaration, has become a nonbinding, intergovernmental forum dealing with various issues – except for military security affairs – related to the Arctic for the past 20 years. It has tried to create a mechanism where the eight member states of the Arctic and six Permanent Participants can respond to the changing environment, life, and socioeconomic conditions of the region. Since 2011, the Arctic Council has demonstrated success in bringing about agreement among Arctic states through task forces, providing a more effective response system to newly challenging issues. The Council is expected to become the most important arena to discuss Arctic issues and to forge consensus between governments and Indigenous peoples.

At the same time, the melting of ice in the Arctic Ocean, technological advancements to overcome problems posed in the Arctic, and the instability of resources and the global economy are driving Arctic development. The biophysical and socioeconomic environments surrounding the Arctic are changing rapidly, and all eyes are currently focused on the region. Arctic issues have become global concerns to be treated and solved through various approaches.

Many of the challenges faced by the Arctic cannot be dealt with or resolved exclusively within the Arctic region. Participation by related international organizations, non-Arctic states, and nongovernmental organizations with professional competence in a more globalized Arctic agenda is unavoidable. Moreover, non-diplomatic cooperation in various sectors such as science, technology, academics, culture, and the private economy will be enlarged to interstate and regional levels. Cooperation in the Arctic will lead not only to quantitative, but also qualitative change.

Based on these understandings, the North Pacific Arctic Conference

(NPAC) series was launched in 2011 to provide for the first time a non-formal dialogue platform in the North Pacific region. Experts from the Arctic states of the United States, Canada and Russia, non-Arctic states of Korea, China, and Japan, and a number of representatives from the European Union, Norway, and Indigenous people gathered to discuss the Northern Sea Route and other Arctic-related issues.

For the past four years, NPAC has explored various issues such as Arctic shipping, resource development, biodiversity, environment protection, Indigenous people's lives, and governance. Moreover, it has successfully contributed to providing avenues of communication and creating networks between the Arctic Council and international organizations. There has been a profound consideration of various ways to promote cooperation and communication between the Council and non-Arctic states to solve Arctic issues and provide opportunities to brainstorm about the way forward for NPAC. Thus, the conference has proposed the operation of an informal forum that can contribute to the policy and decision-making process in the Arctic. This year, cooperation has deepened, as can be seen from the founding of the North Pacific Arctic Research Community, a new research community composed of research institutes from Korea, China and Japan.

Based on NPAC's achievements so far, this presentation explores some of the future challenges to prepare for upcoming qualitative changes in the Arctic and makes suggestions about ways to approach these issues through international cooperation.

FUTURE CHALLENGES

Proactive Conformance with Existing International Norms

An action frame to assess global issues such as climate change mitigation, marine environment protection, conservation of biodiversity, and management of marine resources and the high seas is vital. Duties and responsibilities regulated by the United Nations Convention on the Law of the Sea and the United Nations Declaration on the Rights of Indigenous People also should be observed and applied.

If necessary, an agreed regulation reflecting the unique situation of the Arctic could be examined by the Arctic Council or a relevant international organization that diverse stakeholders could accept. However, careful

attention must be given to the details of such an international norm where balanced participation by the stakeholders can take place and where appropriate duties and responsibilities are bestowed by a governance system.

The five Arctic coastal states are currently in the process of imposing a temporary ban on commercial fishing in the high seas of the Arctic. Considering the ecosystem vulnerability, as many scientists and experts have made clear, this seems like a logical procedure. On the other hand, a more cautious approach may be necessary as well. A comprehensive response mechanism such as respecting legal rights bequeathed by international law, a thorough and clear investigation into the process of making the final decision, and establishing a regional fisheries management organization could take place through the participation of various stakeholders.

From the perspective of a non-Arctic state, it is important to pursue multilateral cooperation that follows existing international regulations and obtains information and knowledge through scientific research needed to ensure that binding processes stay within the boundaries of international norms.

Implementing Response Systems to Address Security and Safety Issues

The Arctic Council has already agreed not to deal with military security issues. However, security in the 21st century is both directly and indirectly related to human lives, security, the environment, resources, and economic benefits. These issues involve imminent threats to the Arctic. In addition, a majority of the strategies of Arctic states deal with security as an important issue. With increasing activities in the Arctic region, these concerns and responses are expected to grow. Implementing intergovernmental and regional agreements relating to potential security threats such as terrorism and accidents can contribute to strengthening cooperation in the Arctic region.

Increased activities in the Arctic region also require new perspectives on safety issues for the people involved. Discourses on safety measures not only for Indigenous people but also for outside users are necessary. For example, a research icebreaker of a non-Arctic state operating in the Arctic region could be used in a rescue operation. At other times, it could just as well be the subject to be rescued. The current Arctic Search and Rescue Agreement fails to address these issues clearly. A joint rescue

operation by Russia, China, and the United States in Antarctica last January and the cooperation between the Korean research icebreaker Araon and a Russian ship in Antarctic could serve as models.

It is expected that there will be 39 ice-class vessels enlisted by the Korean government. These vessels have the potential to transit Arctic waters, and will need to observe the Search and Rescue Agreement of the Arctic. Training and education for the crews of these vessels is another assignment that requires cooperation with Arctic states.

Securing Preventive and Responsive Measures Relating to Increased Economic Activity

Economic activity in the Arctic region will involve not only massive-scale industries, such as energy resource development, but also local businesses. These will, hopefully, contribute to sustainable development in the Arctic. For instance, Arctic products may appeal to many global consumers for their “pristine” quality. The unique environmental features of the Arctic, covered with snow and ice, will be attractive to those in other regions. These activities can have large impacts of the region and the Indigenous peoples.

The Polar Code of the International Maritime Organization reflects the influence of new economic activities. Participation by private firms is essential to ensure a fair and thoughtful discussion of such issues. The Arctic Economic Council needs to take into consideration how to implement such arrangements.

It is notable that the businesses included in the Arctic Economic Council are limited to small and medium-sized Arctic enterprises. But those enterprises that can invest, despite the uncertainties, are multinational corporations. There is discord among the subjects of businesses, and it seems rather difficult to set standards by the size of businesses in today’s corporate culture. Moreover, if businesses of non-Arctic states are either excluded from or limited in their ability to participate in the Council, there is only so much local development that can take place. Therefore, the Council will need to consider the public and private companies of non-Arctic states that are already preparing to operate in the region.

Information on small and medium-sized businesses in the Arctic is severely limited at the moment, and this could pose a limitation in verifying whether they are appropriate for international cooperation.

Developing Mechanisms to Increase Investment in Infrastructure

Transporting resources and cargos through the Arctic, connecting the Arctic land to the sea, and improving the lives of Indigenous peoples may require large-scale infrastructure investments. This involves not just supporting emerging businesses, but also strengthening safety and transit arrangements. High maintenance costs are expected as well given the extreme climatic conditions. Therefore, the attraction and management of investment appear to be important factors for sustainable development of the Arctic region.

Investment in the Arctic region will include regional businesses, such as on-site development. It also has the potential to be associated with global businesses, such as in information, communication and technology (ICT). In particular, education and medicine using ICT will directly improve the livelihoods of Indigenous peoples in remote areas.

This building of infrastructure has the potential to rely on public-private partnerships. A joint investment by the public and private sectors to establish infrastructure and operations, and management by the private sector has already occurred around the globe, and can be applicable to the Arctic region. It is also noteworthy that local governments within the Arctic states are taking initiatives to set up industrial complexes and infrastructure. In the shipping sector, more consideration should take place regarding the construction of ice-class vessels, facilities for search and rescue, and arrangements for pollution prevention and mitigation. Public-private partnerships can take the forms of direct investment, indirect bonds, or stock options. If standards compatible with international norms to protect investors are introduced, more investments will flow into the region. It is hereby suggested that NPAC should deal with such issues.

Developing a Management System to Share Knowledge, Information and Experience

Knowledge of the Arctic region is not just limited to modern academic knowledge such as biophysical, economic, and social issues, but goes beyond to include local and traditional knowledge. As research into the Arctic progresses, so too does the knowledge, information and experience of stakeholders from non-Arctic regions. These will contribute to making important decisions for a sustainable Arctic society. The current efforts by the Arctic Council to reveal and manage traditional knowledge are indeed

laudable.

However, development of such knowledge and information systems faces many challenges due to technological, cultural and regional gaps; collateral efforts by global actors are needed. Cooperation to manage the knowledge effectively is an assignment for all. Thus, a thorough investigation into Arctic information services by experts participating in NPAC is suggested. Conferences dealing with the Arctic are increasingly common around the world. But the synergy created by the interaction among them is far from sufficient.

Since 2011, NPAC has been engaged in meaningful efforts to spread knowledge and understanding among North Pacific nations along with various stakeholders, including the Arctic Council. It is now necessary for bodies like the NPAC Organizing Committee to set up a website, operate a tele-study group for communication between alumni, and search for ways to increase solidarity and interaction among different regions.

Sharing Arctic visions, expanding business participation, enhancing cooperative efforts on convergence with science, and finding new research areas are just some of the benefits that can be expected to arise from these efforts.

CONCLUSION

The Arctic region is entering into a transitional period in terms of climate, environment, politics, economy, and society. This will produce quantitative changes, such as increases in the number of stakeholders, and qualitative changes, such as a broader range of issues.

However, there yet remains much to accomplish with regard to the qualitative changes. Whether there is an effective governance system that can utilize and respond to the scientific, technological and resource problems arising from these changes also needs to be examined.

Sustainable development in the Arctic requires “securing the well-being of the indigenous people and carrying out common interests within the carrying capacity of the best available capability.”

To realize this goal, it is imperative to create mechanisms to provide platforms for discourse, develop strategies to constructively accept and control increasing economic interests, and establish a comprehensive response system to widen common ground for both the stakeholders and

Indigenous people who are the rights holders.

As discussed above, many opportunities and challenges surrounding the Arctic are complex and intertwined. Every piece of knowledge and wisdom from humankind needs to be gathered in order to use the new opportunities efficiently. The emerging challenges should be overcome, while the accompanying side effects are minimized. At the hub of these activities, NPAC should find ways to achieve a bright and better future. It is emphasized here that the NPAC Organizing Committee should hold a central place in the mid-term development plan and review the need to create a road map.

Lastly, we should remind ourselves that when dealing with Arctic issues, “we shall not be in haste, but take small steps slowly and surely for the right direction.”

Perspective

Michael Aumond

INTRODUCTION

The Arctic comprises a vast geographic area, many parts of which are virtually inaccessible for a significant portion of the year. At the same time, the climate and environment of the Arctic are changing rapidly. This presents challenges to local communities, scientists, private sector companies and governments alike with respect to climate change adaptation, sustainable economic development, and growth that respects the aspirations and traditions of local communities as well as broader sovereignty issues.

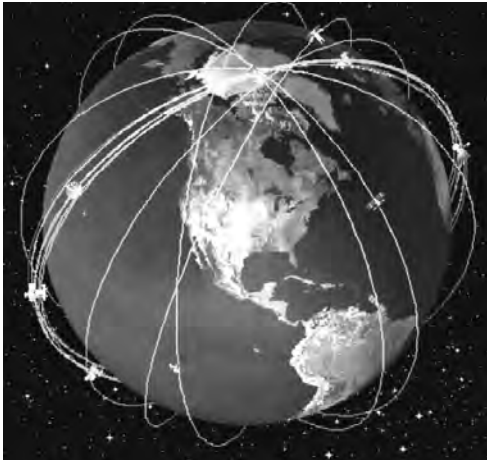
A key requirement in the management of these issues is access to real-time, accurate information. One of the important sources of information about this region comes from an increasing number of national and international remote sensing satellites that are placed in low-Earth polar orbits. These satellites provide a wide variety of high-resolution images that can be downloaded and processed at northern satellite receiving stations, and provide virtually real-time information to the scientific community, local communities, companies operating in the Arctic and both regional and national governments.

This presentation describes the current activities and applications of data received at the Inuvik Satellite Station Facility in Canada's Northwest Territories, and discusses the potential for international cooperation, using both private and public resources, in this sector.

TECHNICAL BACKGROUND

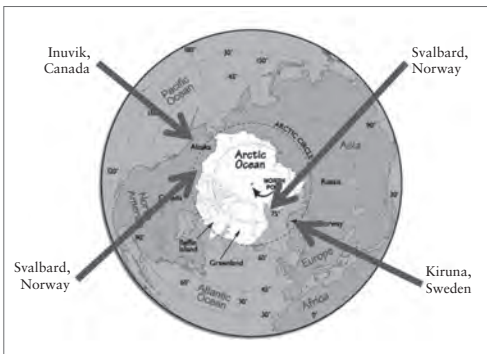
Earth observation satellites have been used for several decades to provide valuable information about changes in the Arctic. Most of the early satellite observations were driven mainly by science projects. More recently, however, a new generation of remote sensing satellites have been designed specifically to meet the needs of both public and private sector applications.

Typically, Earth observation satellites are in low-Earth, near-polar orbits.



- Each satellite goes around the earth approximately 14 times a day, and is at an altitude of between 600 km and 800 km.
- There are approximately 500 earth observation satellites currently in low earth orbits, ranging from all weather radar satellites (particularly good for ice, ship, and environmental observations), to high resolution optical satellites

The best places for downloading data from these satellites are typically at the poles. In the Northern Hemisphere, the principal international satellite receiving stations are located as shown below:



- The four principal satellite ground receiving stations in the Northern Hemisphere offer both competitive image download and processing pricing, and also enhanced reliability by providing backup in the event of a station failure.
- For example, Inuvik can receive 11 of the 14 daily orbits. Together with Kiruna (Sweden), all 14 daily orbits can be downloaded.

There are many emerging applications for Arctic remote sensing, but they can be broadly categorized into four areas:

- Environment, including climate change tracking
- Resources and land/marine management
- Science and technology innovation
- Security, including disaster mitigation and emergency relief

This presentation focuses on two potential areas for international cooperation: understanding and monitoring the effects of climate change, and sustainable resource development.

CLIMATE CHANGE APPLICATIONS

Climate change is having a major impact in the Arctic. These impacts are having a significant effect on public institutions, government and private sector firms.

Monitoring Forest Fires

This topic is currently of interest for the Government of the Northwest Territories (GNWT), having experienced this year the worst wildfire season and drought in the Northwest Territories in over 30 years.

Permafrost Changes

Changes in the characteristics of the active and transition layers of permafrost and the permanently frozen layer have major implications for northern and





Arctic infrastructure, including roads, pipelines, and buildings. Relatively small temperature changes, and changes in the characteristics of Arctic microclimates, can have a profound and lasting effect on the mechanical stability of permafrost. This applies both to areas characterized by discontinuous permafrost and to areas of extensive permafrost. In both situations, localized and often unpredictable ground collapse (“slumping”) can occur.



Biodiversity Changes

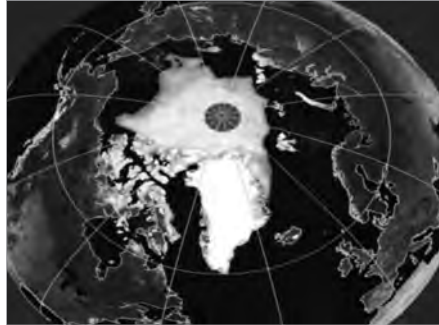
Biodiversity in the Arctic is particularly sensitive to the effects of climate change. In addition to the well-publicized reduction of the extent of sea ice, Arctic land biodiversity also is affected from the changes in migratory routes of land mammals and birds attributable to changing flora and fauna.

SUSTAINABLE DEVELOPMENT APPLICATIONS

Changes to the climate of the Arctic represent both opportunities and challenges for sustainable economic development.

Transport

One of the more significant changes in the Arctic relates to transportation. This can be both positive (less ice cover in the Arctic, with potentially new commercial sea routes using the northern passages that have previously been ice bound), and negative (shorter seasons for ice and winter roads, and more variability in Arctic climate patterns).



Satellite images over the last decade have documented the changes in Arctic sea ice together with the variability in sea ice coverage from year to year.

Recent advances in data processing and satellite image download technologies are assisting mariners and operators of Arctic infrastructure through the provision of near real time (NRT) reporting of ice conditions.

Sustainable Resource Development

For resource companies, the Arctic represents enormous potential coupled with one of the most challenging operating environments in the world.

The availability of real-time satellite data to companies operating in the North is one of the key ingredients to successful and sustainable northern development. For infrastructure located in the Arctic Ocean, accurate sea ice data is imperative to safe operations. For resource development on land, availability of accurate data regarding winter road networks (both ice roads and winter roads constructed on permafrost and frozen ground) is as important as the availability of barge transportation options along northern and Arctic rivers.

Environmental Monitoring

A critical element of any northern resource development is compliance with environmental regulations. Typically, this has principal components:

- a) Obtaining permission to implement a project, including identification of key risk areas, and the acceptance by environmental regulators of risk mitigation plans and ongoing monitoring.
- b) Ongoing monitoring to ensure compliance with the environmental regulations and, in the worst case, execution of risk mitigation plans in the event of an unforeseen accident or spill.

In Southern Canada, similar to other southern administrative areas, repeat satellite observations are being used successfully for both compliance and risk mitigation operations. This technology could be applied relatively easily to northern and Arctic projects.



- Information from satellites flying over affected areas can be relayed to fire authorities in as little as 15 minutes from data reception.
- A combination of optical, infrared and radar images provides significant information about the extent, likely direction and temperature characteristics of wildfires.
- Modern radar, all-weather, based satellite observations can measure surface variations in the order of millimeters to provide an accurate long term history of changes in the permafrost.
- These measurements are particularly important in the monitoring of roads and pipelines.

FUTURE POSSIBILITIES FOR INTERNATIONAL COOPERATION

Satellite remote sensing and data processing have evolved from an area of principally scientific interest to one with applications to a wide variety of public and private sector interests.

The satellite industry is by its nature international, with many nation states and private companies participating in this growing sector.

The two key requirements for the successful use of satellite assets are:

- Satellites with the right observation instruments on board, and with a reliable “re-visit” time for consistent and comparable observations.
- Over the next decade, the number of earth observation satellites is predicted to increase by a factor of three.
- Real-time access to processed data (15 minutes or less) that can be interpreted real-easily by “non-satellite” experts.
- This means connecting satellite ground stations with high-speed fibre optic systems, and real-time access to data processing facilities.

The GNWT has experience working in partnership with both international public and private sector enterprises to benefit the residents and communities of Canada’s Northwest Territories.

The GNWT looks forward to discussions with interested parties in the Earth observation sector, using resources and facilities in the NWT, and exploring other sustainable development projects in the NWT.

Perspective

Sheila Watt-Cloutier

Given the lightning speed at which resource development is bulldozing its way north, the members of the Arctic Council appear to be caught in a contradiction regarding the future of the Arctic. Can the Arctic Council or any similar body be truly effective in promoting sustainable development and environmental protection, so long as it is dominated by government officials who have been “educated” more than most regarding the challenges faced by northern communities but who still remain intent on making the Arctic the next global energy superpower?

The Arctic Council was established in 1996 with eight member states (Canada, USA, Russia, Iceland, Finland, Sweden, Norway, and Denmark/Greenland) as a “high level forum” to promote cooperation in the circumpolar world regarding sustainable development and environmental protection. In the Council, the Indigenous peoples of the Arctic have the status of Permanent Participants and are represented by the Inuit Circumpolar Council, the Aleut International Association, the Gwich’in Council International, the Saami Council, RAIPON, and the Arctic Athabaskan Council. Although they are not voting members, the Permanent Participants sit at the same table as the governmental members of the Arctic Council and are consulted regarding all actions of the Council.

My observations about the Council are based on my own experiences as President of ICC Canada from 1995-2002 and as Chair of ICC International from 2002-2006. My assessment of both the achievements and the shortcomings of the Arctic Council reflects activities occurring during a period in which the environmental challenges involving toxins in our food chain (POPs) and the onset of climate change leading to the collapse of Arctic sea ice and resulting in environmental, cultural and social changes for the people of the Arctic were on the table as issues requiring urgent action. Unlike most places in the world, the problems of POPs and climate change have affected the Arctic simultaneously. They both impact the health and cultural well-being of Inuit living off the land and sea.

As the newly elected president of ICC Canada, I entered the political arena in 1996, just as the Arctic Council, the successor to the Arctic Environmental Protection Strategy, was officially established and the

global negotiations on POPs were about to begin. During the initial meetings of the Arctic Council, we had to walk the Senior Arctic Officials through some very fundamental yet vital information about the social, health, and economic conditions that our communities were facing. Many representatives of the member states had not ventured north to experience life in the Arctic as we live it. What is more, although the Inuit and other indigenous peoples had participated in UN processes for many years, we could not assume that participants in the Arctic Council and in broader international arenas fully understood the perspective of Inuit on these issues.

We wanted to avoid wasting the potential of the Arctic Council. Many people in our communities were understandably worried that the Council would become yet another body intent on ‘fixing’ things as outsiders saw them with no real connection to our lives. Showing the Council what was happening on the ground on a day-to-day basis would be the best way to convince representatives of member countries that we needed an holistic approach to dealing with Arctic problems.

It took years of repetitive presentations, interventions, and oppositional stances in many venues to work out differences between nation states and Permanent Participants and to reconcile differences among research institutions with their own research standards, which often led to disagreements about how to interpret the data on the urgent issue of toxins in our food chain. Resolving these differences among scientists, industry representatives, politicians, consultants, and lawyers, all of whom had their own agendas, was essential as it otherwise would have been difficult for the Arctic Council to operate as a “block,” taking a strong stance as we began the global negotiations on POPs.

The equally urgent issue of climate change proved to be even more challenging on the scientific as well as the political level. Through our work on the Arctic Climate Impact Assessment (ACIA), the ice-dependent Inuit once again were caught in the middle as the scientific community became mired in technical debates over the validity of climate science. This resulted in a global debate on climate science that sidelined the urgent situation arising from climate change in the Arctic. We worked furiously to prevent our concerns from being derailed as a side effect of the debate about western science. Politics became more pronounced within the Arctic Council during the production of the ACIA, which included traditional knowledge of the Indigenous peoples of the Arctic as well as western

science. It took enormous efforts to get the Arctic Council back on track to produce an assessment that would help to protect our Arctic homelands from the ravages of climate change.

My point in sharing these stories is to observe that even with the stellar work of the Arctic Council's Working Groups, it is still hard to find ways to translate the results into tangible solutions at the community level. Have governments and industry understood these findings and made significant changes in their environmental and economic policies to reflect the dire conditions of poverty, suicide, unemployment and environmental degradation to the Arctic region that Inuit and other Indigenous peoples call home?

We have had some success in translating the scientific assessments into international policy. The POPs treaty, which makes our country food safer on several levels, is a good example. But the issue of climate change is not being addressed as urgently as needed to avoid the wholesale destruction of the sea ice that is essential to Inuit in hunting for food.

If we want to explore new forms of cooperation in the Arctic, it will be essential to learn from the shortcomings of the Arctic Council in which a lack of financial and human resources has hindered the ability of the Permanent Participants to engage fully and to exert a strong influence on the important debates affecting their communities.

New institutions must achieve a balance between the development of the Arctic's resources and stewardship informed by the knowledge of the peoples of the Arctic and providing opportunities for their voices to be heard.

Perspective

Peiqing Guo

Due to globalization and the “rapidly changing” circumstances in the Arctic region, the fragile environment and challenges of sustainable development in the region pose numerous governance requirements for the international community. Arctic change is triggering unprecedented opportunities and challenges for Arctic nations, as well as for countries that do not have Arctic territories but are eager to engage with and invest in the region. Vast energy and mineral reserves, local and transpolar shipping, fishing and tourism are the main opportunities provided by the melting ice in the Arctic Ocean. As far as relations between preservation and development are concerned, people see more comprehensive cooperation emerging within Arctic states, as well as between Arctic and non-Arctic states. More and more actors are seeking to play an active role in Arctic cooperation.

WHAT DECIDES THE MODE AND SCALE OF ARCTIC DEVELOPMENT COOPERATION?

To achieve the goals of preservation and sustainable development, international cooperation has been recognized as the most effective, even the only, way to deal with new challenges. Of all the kinds of Arctic cooperation, development cooperation is being highlighted recently. What and how many kinds of cooperation does Arctic development need? Is there a need for Arctic states to cooperate with actors from non-Arctic states? Or is it possible for them to do all the work by themselves?

Most of the Arctic issues are global problems of the cross-border and cross-regional kind such as black carbon, ice shipping, Arctic oscillation, fisheries management of the Central Arctic Ocean, and so on. One cause is the constant exchange of products/raw materials, capital, staff, and information between the Arctic region and the “southern regions,” mainly referring to non-Arctic states, which is growing more active and difficult to cut off. It is apparent that these problems cannot be resolved without interested stakeholder collaboration. One outstanding example is Arctic fisheries management. With global warming and rapidly melting sea ice,

Arctic fisheries have attracted a lot of attention from all over the world. However, the Central Arctic Ocean is an area beyond national jurisdiction.¹ These international waters are not at present governed by any specific international fisheries agreements or regulations. The management of Arctic fisheries is being discussed in many forums. Now is the time for the international community to create a precautionary management system for these resources. It is imperative since this region is no more remote from major fishing ports and fishing fleets than many areas of the world to which pelagic fleets already have access due to the ice melting significantly in the past three decades.² Article 88 of UNCLOS stipulates that states concerned shall cooperate to establish regional fisheries management organizations that include important stakeholders in this field. Without cooperation on the part of non-Arctic states, the authority and legitimacy of proposed Central Arctic Ocean fisheries management will be suspect, and even challenged when put into effect.

Through international cooperation involving interested stakeholders, cross-regional issues can be resolved. Some cross-border issues, however, like the delimitation of the Barents Sea boundary between Russia and Norway, should be addressed by the interested parties without outside intervention. Therefore, the mode and scale of Arctic cooperation is largely decided by the attributes of specific issues.

In the divisions of world industries, the Arctic cannot be expected to become a manufacturing base, whether in the past, at the moment or in the future. Due to the abundant resources and limited consumption capacity of the region, the Arctic is integrated into the world economy as an energy and resource base for the rest of world, as well as for tertiary industries, especially transportation and tourism.

A key point to focus on is Arctic development cooperation. With the warming Arctic climate, Arctic development is being discussed comprehensively among Arctic states, and has been elevated to the level of national strategy in some states like Russia and Canada. Most of the Arctic states share a strong resistance to so-called “internationalization” of the Arctic allegedly proposed by non-Arctic states, and hope to address most of the issues by themselves or through cooperation with other Arctic states. None of the documents issued by the Arctic Economic Council (AEC) has mentioned the role of non-Arctic states. The Agreement on the Arctic Economic Council: Facilitating the Creation of the Arctic Economic Council, reached by the Arctic Council states clearly that the main objective

is to “strengthen the Arctic Council by enhancing regional economic cooperation.” All policies implemented by the AEC must conform to this principle.³ Leona Aglukkaq, the Canadian Minister of the Environment, Minister of the Canadian Northern Economic Development Agency and Minister for the Arctic Council, called for Arctic-to-Arctic dialogue and communication twice in the inaugural meeting of the Arctic Economic Council. She insisted that participation will be limited to entities from Arctic states.⁴ In speeches to the media, the first chair of the AEC, Tom Paddon, also stressed “establishing strong market connections between the Arctic states.”⁵ In short, we have not found any documents stipulating the AEC’s relationship with non-Arctic states. Is it possible to accomplish their development objectives with a large number of Arctic stakeholders remaining excluded from participating in Arctic development?⁶

Any economic activity, including regional development, must cover three elements: capital, technology and markets. There is no exception for the Arctic. Of course, environmental protection and Indigenous culture must be taken into account in the Arctic. Let us engage in an in-depth analysis of these aspects. As the biggest Arctic state, Russia can be chosen as the sample for study.

The technology for Arctic development, especially oil and gas exploitation, is attracting more attention. The European Union and the United States possess superior drilling technology for deep water and Arctic Ocean operations. Sanctions on Russia, including the West’s suspension of exports of energy technology, are thought to be a blow to Russia’s energy industry, which is critical to the country’s economy. However, China is concentrating many resources on improving deep sea drilling techniques and equipments, and has made great progress. The 981 oil rigs in the South China Sea constitute a milestone. The disputes and competition in the East and South China Seas provide a strong impetus for China to develop deep seabed technologies. Before the sanction policy agreed on by the EU and the United States, some of the capital for the development of Russian Arctic oil and gas originated in the EU and the United States. Russia raised almost half of its €15.8 billion (26.4 billion USD) in capital in EU markets last year.⁷ But with Chinese energy companies like the China National Petroleum Corporation (CNPC) stepping into the Yamal Oil and Gas Project, some Chinese public capital is moving northward. The landmark 400 billion USD deal signed in May between Russia and China means that 400 billion USD will flow into Russia,⁸ and even more investment is being

considered in the future.

As a potential energy/resources base, most of the exploitation in the Arctic will be consumed by “southern” countries, primarily in Northeast Asia and Southern Asia, where most of the emerging economies are thirsty for energy. In short, it is impossible to cut off the relationship between the Arctic and the non-Arctic region.

In particular, cross-border cooperation usually occurs in certain circumstances. The scenario of Arctic development cooperation depends heavily on the level of engagement of key participants, so Arctic domestic politics and international politics play important roles. Russia is a typical example.

Russia takes the lead in international cooperation for Arctic development. Energy extraction and export play major roles in the Russian economy. With oil accounting for more than half of Russia’s export income, representing up to 30% of the country’s GDP and half of its GDP growth since 2000, hydrocarbons provided at least half of the state’s revenues in 2012. In short, oil and gas are paramount politically as guarantors of the security and stability of the Russian state.⁹ Russia must keep energy production rising. With declining oil production in the West Siberia basin - the biggest oil field currently accounting for 70% of all raw oil¹⁰ - Russia has to seek new oil fields to ensure its hydrocarbon production reaches a higher level. The Russian Arctic Strategy document, “The fundamentals of state policy of the Russian Federation in the Arctic in the period up to 2020 and beyond,” published in September 2008, pledged to transform the Arctic into Russia’s top strategic base for natural resources by 2020, and preserve the country’s role as a leading Arctic power.¹¹ With the sanctions by the EU and United States, foreign capital and the stable market of Northeast Asia, including Chinese capital, are regarded as an important guarantee for Russia’s economy and domestic stability.

The United States and the EU have carried out strict sanctions targeting Russia’s state-owned banks, weapons makers, and oil companies. The traditional energy cooperation between the EU/U.S. and Russia is facing serious challenges. Before the Ukraine crisis, Russia had taken some active steps regarding cooperation for Arctic development and the introduction of foreign capital. As recently as June 2012, Russia’s Rosneft signed an agreement with ExxonMobil on Arctic oil and gas exploration. Then, a record energy agreement, the 400 billion USD, 30-year China-Russia gas deal, was signed in Shanghai on May 21, 2014, succeeding a triangular agreement involving Russia’s Novatek, France’s Total and CNPC. Recently,

the international community has witnessed the rapid pace at which Northeast Asian nations, the biggest potential buyers of Russian oil and gas, are moving in terms of Arctic development cooperation. Daewoo Shipbuilding & Marine Engineering Co. of Korea received a large order for nine LNG carriers to serve the Yamal project from a joint venture between two major Asian companies, Mitsui OSK of Japan and the China Shipping Development Company. The three Northeast Asian states are contributing greatly to Russian Arctic development. The reform of energy arrangements provides an important impetus for the three states to play an active role in Arctic oil and gas development cooperation.¹² Russian determination to forge ahead with oil exploration projects solidifies the base of this cooperation.¹³

Besides Russia, Nordic countries are also showing a strong interest in attracting domestic and particularly foreign investment in their Arctic development. Of the five Nordic states, Iceland is pushing ahead at a rapid pace. To play the Arctic card is an important part of the Icelandic national strategy in the long term. As Eyjólfur Á. Rafnsson, the chair of the Icelandic-Arctic Chamber of Commerce described it, “if we play our cards right, there is every possibility that the country could become a commercial center for the region.”¹⁴

A free trade agreement (FTA) between Iceland and China that came into effect on July 1 provides a strong impetus for foreign investment. Lots of foreign companies are preparing to launch a series of grand investment schemes. Germany’s Bremen Ports is already developing a harbor in Finafjörður in the northeastern part of Iceland. Another four companies, United Silicon Carbide, Silicor Materials, Thorsil and PCC Silicon Metal Production Plant, are planning to build silicon plants in Iceland. Iceland is expected to become one of the major silicon bases of the world. The FTA with China is one of the reasons these companies decided to invest in Iceland.¹⁵

Compared to Russia and the Nordic states, Canada and the United States are less active in their Arctic development. As the current chair of the Arctic Council, Canada’s attention to Arctic economic development is currently limited to within Canada and a few international cooperation agreements. One of the reasons for this is that Canada’s critical industries are the manufacture of high technology, the mining industry, and the construction industry. Less than 10% of Canada’s gross domestic product is pulled from the Arctic.¹⁶ Arctic development cooperation has not been

prioritized in its national strategy. Accordingly, Ottawa made clear that economic development, through an “Arctic-to-Arctic” dialogue, would be one of its primary focuses.¹⁷ Canada prefers to call on representatives from the Arctic Council states and Permanent Participant organizations only to determine the ground rules for the Arctic Economic Council; there is no mention of non-Arctic states.¹⁸

For the United States, the value of the Arctic lies mainly in its strategic and energy potential. With the collapse of the Soviet Union, however, the Arctic’s strategic value declined significantly, even though Russia is a target of U.S. sanctions. Additionally, Alaskan oil production has experienced a steep decline since the late 1980s, when production peaked at over two million barrels per day.¹⁹ Production will continue to decline as shale gas is developed in the U.S. mainland in coming years.

These facts prove that the motivation for Arctic development is decided by multiple aspects combining Arctic states’ domestic politics, international politics, and market forces, rather than one dominant factor. As a result, the form, pattern and scale of Arctic development cooperation vary with different circumstances, independent of human consciousness, including the Arctic Council’s will. With gradual change, development in the Arctic will be open to the capital of non-Arctic states, as this region is an integral part of economic globalization, and it is also of extreme importance in the world economy. Taking Russia as an example, no matter what result comes out of the international investigation into the crash of Malaysian Airlines flight MH17 in eastern Ukraine, Russia is under great pressure due to the potential negative repercussions this event may cause. With the EU deciding to shift its position, standing together with the United States and expanding sanctions against Russia to include energy exploration, Northeast Asia-Russia Arctic development cooperation will be strengthened and solidified. Russia has recently demonstrated its determination to forge ahead with its oil exploration projects, fighting off the threat of the West imposing sanctions on the energy sector over the Ukrainian crisis.²⁰ No doubt, the confrontation between the West and Russia will have a negative impact on Northeast Asia-Russia cooperation in the long term.

THE ROLE OF PUBLIC AND PRIVATE CAPITAL

Of all the non-Arctic states, China has been a focus of “special” attention

on the part of the Arctic states. In the past years, promoting the idea of a rising Chinese Arctic threat has been a fashion in some research reports. The role Chinese state-owned enterprises will play is a big concern among Arctic states, and some analysts regard these enterprises as tools to implement China's global strategy. However, one fact is ignored, and that is the profound change happening silently to Chinese state enterprises. At present, China is conducting reforms of state-owned enterprises, and trying to dismantle the monopolies they have created. One of the effective ways to accomplish this is to change the stock shares of current state-owned enterprises. This implies that a large amount of Chinese private capital can be invested in stocks of state-owned companies, which will change the original nature of these companies. In a few years, it will probably be hard to identify whether these former state-owned enterprises are state-owned or privately owned. More precisely, these companies will have "mixed ownership." When China finalizes this great reform, Arctic states will face a challenge to set special criteria for Chinese companies' investment in Arctic development. In brief, it is one-sided to discriminate between state-owned capital/public capital and private capital, and it is neither possible nor practical to do so. By then, the former so-called state-owned capital from non-Arctic states may be used to better serve the interests of Arctic states in line with local laws, including environmental laws, as well as market regulations. People will realize that the attributes of capital, public/state-owned or private, mean nothing to Arctic development. Capital of a profit-driven nature will be the driving force. An investment wave is arriving. According to the London-based think tank Lloyd's/Chatham House, an estimated investment of 100 billion USD will be spent in the Arctic over the next decade.²¹

As the Arctic is an integral part of the global ocean currents and atmospheric circulation, the region is greatly affected and has been a victim of global warming. In turn, the Arctic is becoming a driver of global warming that is imperiling the low and mid-latitude regions. Whether Arctic and non-Arctic states share the common responsibility and obligation of Arctic environmental preservation and sustainable development is an ongoing question. To find a balance between protection and development is their common goal. Non-Arctic states' capital should be recognized or used as a constructive force, and their participation in Arctic development may support the goal of Arctic preservation.

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ISBN 978-89-7998-968-7