SECURITY FORESIGHT

FUTURE ISSUE

THE ARCTIC

PROMISE AND PERIL IN A MELTING OCEAN

The Hague Centre for Strategic Studies

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PROMISE AND PERIL IN A MELTING OCEAN

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Contents

Figures, Boxes, Maps & Tables

IN BRIEF

HCSS reviewed over 250 documents and over 100 recent foresight studies pertaining to the future of the Arctic in the period 2025-2050. The results show a very active and recent debate clustering around four Key Issues: Arctic resource extraction, trans-Arctic shipping, Arctic governance and conflict, as well as the preservation of the Arctic environment and indigenous rights. Key insights from the foresight community are:

- A clear majority of authors believe the Arctic Ocean to emerge as a major hydrocarbon production region over the coming decades. However, there is also a marked trend to increased scepticism among newer studies.
- An increasing number of authors deem it unlikely that economically viable trans-Arctic shipping routes are established in the second quarter of the 21st century.
- Arctic shrinkage is believed to be proceeding fast, with roughly half of the more recent studies anticipating a seasonally ice-free Arctic by or before 2025.
- A growing majority of authors believes that interstate relations in the Arctic region by 2025-2050 are going to be marked by cooperation rather than by conflict.

HCSS also analysed a wide range of prominent drivers that steer the development of Arctic issues. They were used, together with a number of valuable scenario exercises found in the foresight literature, to assess potential geopolitical security implications. Four synthesis scenarios are developed and discussed. A central finding from these exercises is that, while the possibility cannot be excluded, the prospects of a serious militarisation of the Arctic appear as rather remote, at least in the short and medium term. Yet, the current trend for an ongoing securitisation of the Arctic region is likely to continue.

The New Arctic:
Promise and Peril of a Melting Ocean

Enter the 'New Arctic'

In the past, the vast, mostly frozen ocean that forms the Northern-most region of the globe elicited little, if any attention among policymakers or the general public. The Arctic, a somewhat arbitrary geographic description of the Arctic Ocean and its adjacent ice-covered shores north of the Arctic Circle (66° 33´ N), simply seemed to offer little of interest to busy global players: temperatures as low as -50° C, continuous darkness for many months of the year, and vast, uncharted landscapes of ice, water and rocks, all make the region inhospitable and hazardous for any type of human activity. Apart from a few adventurers, scientists and some nuclear submarines in the days of the Cold War, this has left the 'Old' Arctic mostly to Mother Nature and small indigenous populations, who have developed over thousands of years a lifestyle that allows for survival in this harsh environment.

However, this has changed dramatically over the past few years. The Arctic has suddenly become subject to a plethora of policy memoranda, newspaper editorials, international declarations, industry conferences, planning studies, military expeditions, and advocacy reports. Beyond any doubt, the 'new' Arctic is *en vogue*. This curious development was triggered by accumulating scientific evidence, which linked massive sea-ice reductions in the Arctic Ocean, so-called 'arctic shrinkage', to accelerating global climate change and predicted an 'accessible Arctic' a few decades, if not only a few years, further on. Not only does this imply profound and disruptive environmental change in one of the few ecosystems on our planet that have so far escaped large-scale human interference. It also creates the prospects of exploiting potentially very large Arctic deposits of fossil fuels and other valuable minerals, in addition to leading to the resurgence of a centuries-old dream of harnessing a trans-Arctic maritime short-cut between the North-Atlantic and the North-Pacific region.

This HCSS Future Issue examines the prospects and pitfalls of this 'Arctic Promise' and explores the likely security implications of the complex and precipitous developments in this region. In this chapter we identify key issues in the debate around the Arctic and present the results of an extensive survey of different views within the foresight community on the future development of these issues. This is followed in the second chapter by a deeper analysis of prominent drivers that determine the development of these issues. After this we explore the key insights from various extensive scenario-building

exercises, which have been conducted in the foresight community to better understand and anticipate the future of the Arctic. Finally we explore the security implications of each of these scenarios for businesses and governments.

The Arctic in the 21st Century: A Comprehensive Review of the Foresight Community

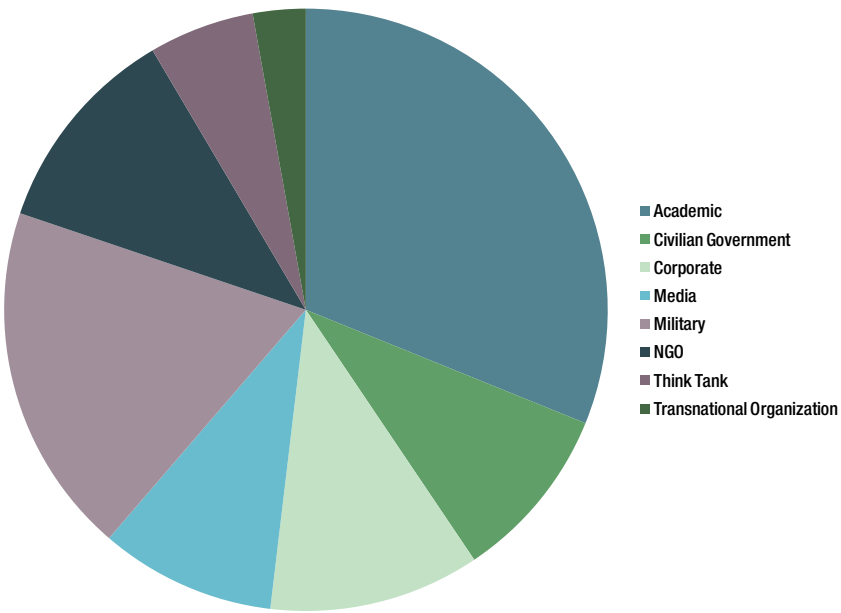
In order to identify key issues, prominent drivers, and security implications of future Arctic developments, HCSS conducted a comprehensive review of foresight documents on the topic. In a first step, the websites of over 200 known foresight organisations and journals collected in an internal HCSS database were scanned for documents related to the future of the Arctic. The results were complemented with searching the Factiva database and a series of open Google searches. This netted a total of 252 recent documents. As the result of a preliminary scan and a series of in-house expert sessions, HCSS identified 10 topics that appeared as particularly important for the future development of the Arctic. These themes are shown in Box 1.

Box 1. Arctic Issues

1. Trans-Arctic shipping
2. Arctic Resource Extraction
3. Arctic Shrinkage
4. Technology
5. Infrastructure
6. Governance
7. Conflict
8. External demand for Arctic shipping / resources
9. Access of non-Arctic actors
10. Safeguarding of Indigenous & Environmental Rights

In a second step, text-mining techniques where used to collect key predictions on these ten topics from the 252 documents, along with other relevant statistics such as the type and source of the publication, leading to a refined sample of 108 documents.[1] Figure 1 shows the type of sources in our sample and demonstrates the variety of stakeholders that are concerned with the Arctic. Figure 2 reveals another interesting fact about this debate: It is relatively new and clearly heating up. As a matter of fact, only 17% of the documents in the sample are older than three years and close to half of the documents are less than a year old. Figure 3 finally shows the number of concrete predictions that appear on each of the ten identified Arctic topics in our sample of foresight studies.

Figure 1 Types of Authors in the Sample of Foresight Studies



In a third step, HCSS clustered and analysed the text mining findings, resulting in the ultimate selection of four key issues and fifteen prominent drivers that provide the basis of this Future Issue. Finally, HCSS formulated four questions about the Arctic future associated with the identified key issues and surveyed the refined sample for answers in the foresight community. The results are shown below.

Figure 2 The Arctic Debate is Heating Up

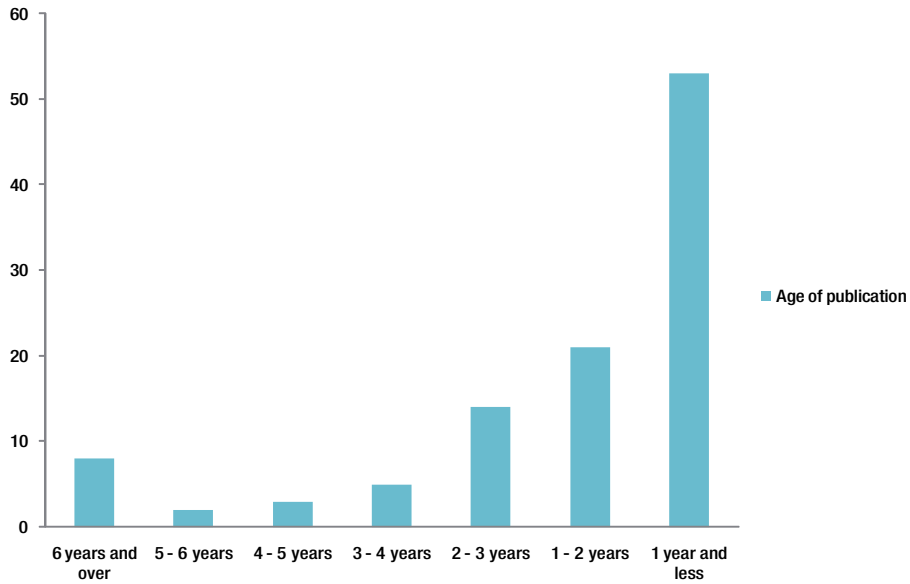
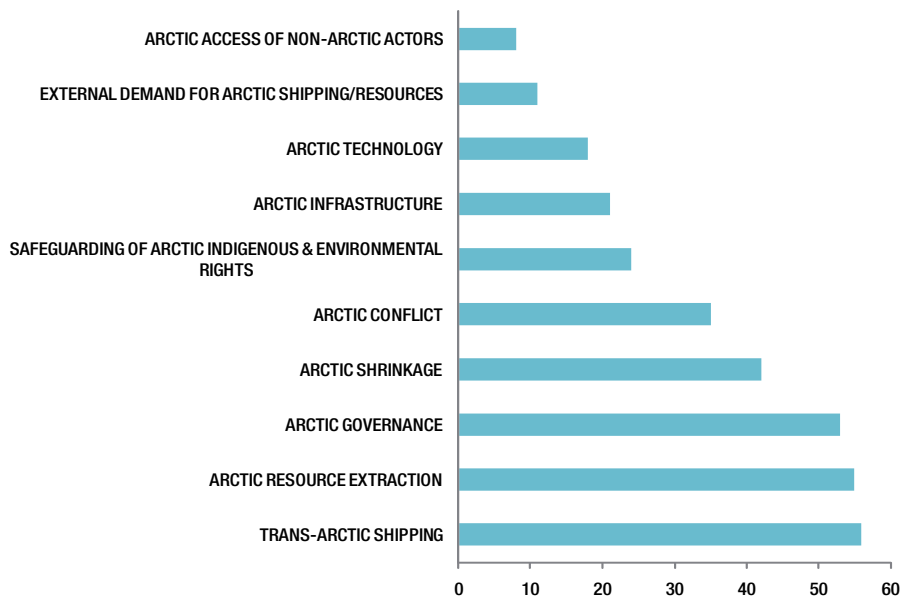


Figure 3 Number of Concrete Predictions on the Future of Arctic Issues



Key Issues in a Melting World

The debate around the future of the Arctic revolves around four key trajectories, which might significantly affect global societies beyond the confines of the Arctic Ocean and its littoral states. Consequently, this Future Issue focuses on these Key Issues, which are Arctic resource extraction, trans-Arctic shipping, Arctic conflict, and the Arctic environment.

1) Discovering the 'Arctic Emirates'?

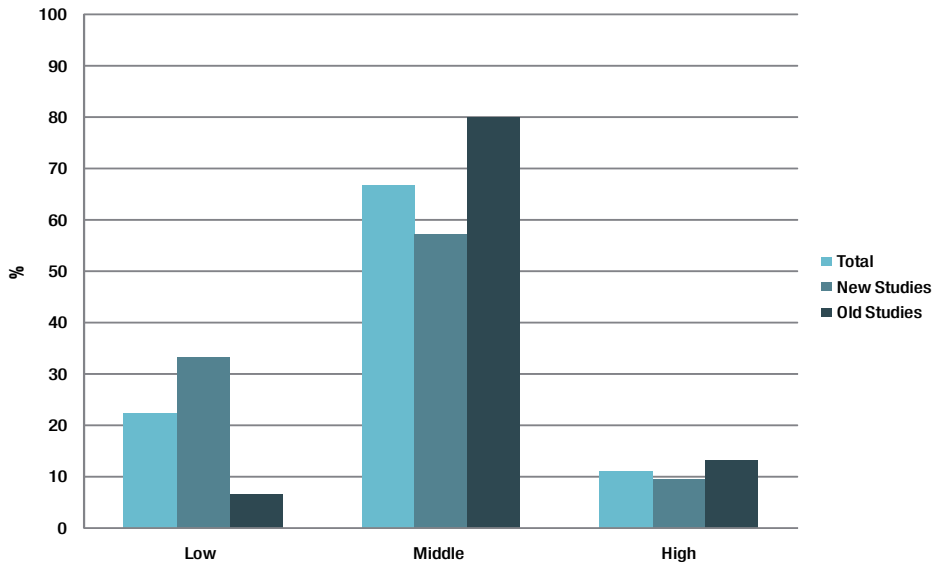
Will the Arctic Ocean be a major source of fossil fuels in 2025-2050?

It has been estimated that up to 13% of the world's unproven oil reserves and 30% of the world's unproven gas reserves are to be found in the Arctic.[2] In a world that is currently marked by ever-tightening energy markets, the prospect that a warming Arctic might give access to large untapped oil and gas reserves has caused a considerable frenzy. Most of these reserves are assumed to be found offshore in relatively shallow waters on the continental shelves with an average depth of 100 to 200m,[3] with a considerable fraction expected to be found in Russian territory (see Map 1 on page 8).

While recent years have seen fervent efforts to access these resources, development has been generally slow, with offshore activities so far having mainly focused on exploration and development. Projects have been repeatedly delayed and production volumes have generally stayed below expectations.[4] Extracting oil and gas offshore under Arctic conditions is technically an extremely challenging undertaking, and extraction costs are substantially higher in Arctic environments than in temperate climates.[5]

Figure 4 on page 7 shows, that despite these hindrances, nearly four in five surveyed documents deem it likely or highly likely that—spurred on by long-term high commodity prices— major obstacles to resource extraction will have been overcome, making extraction economical and turning the Arctic Ocean into one of the major global fossil-fuel suppliers in the second quarter of this century. It is interesting to note that among newer studies[6] this position has declined markedly and a third of studies are now sceptical about the prospects of economical Arctic offshore drilling.

Figure 4 The Likelihood that the Arctic Becomes a Major Source of Fossil Fuels by 2025-2050 is ...



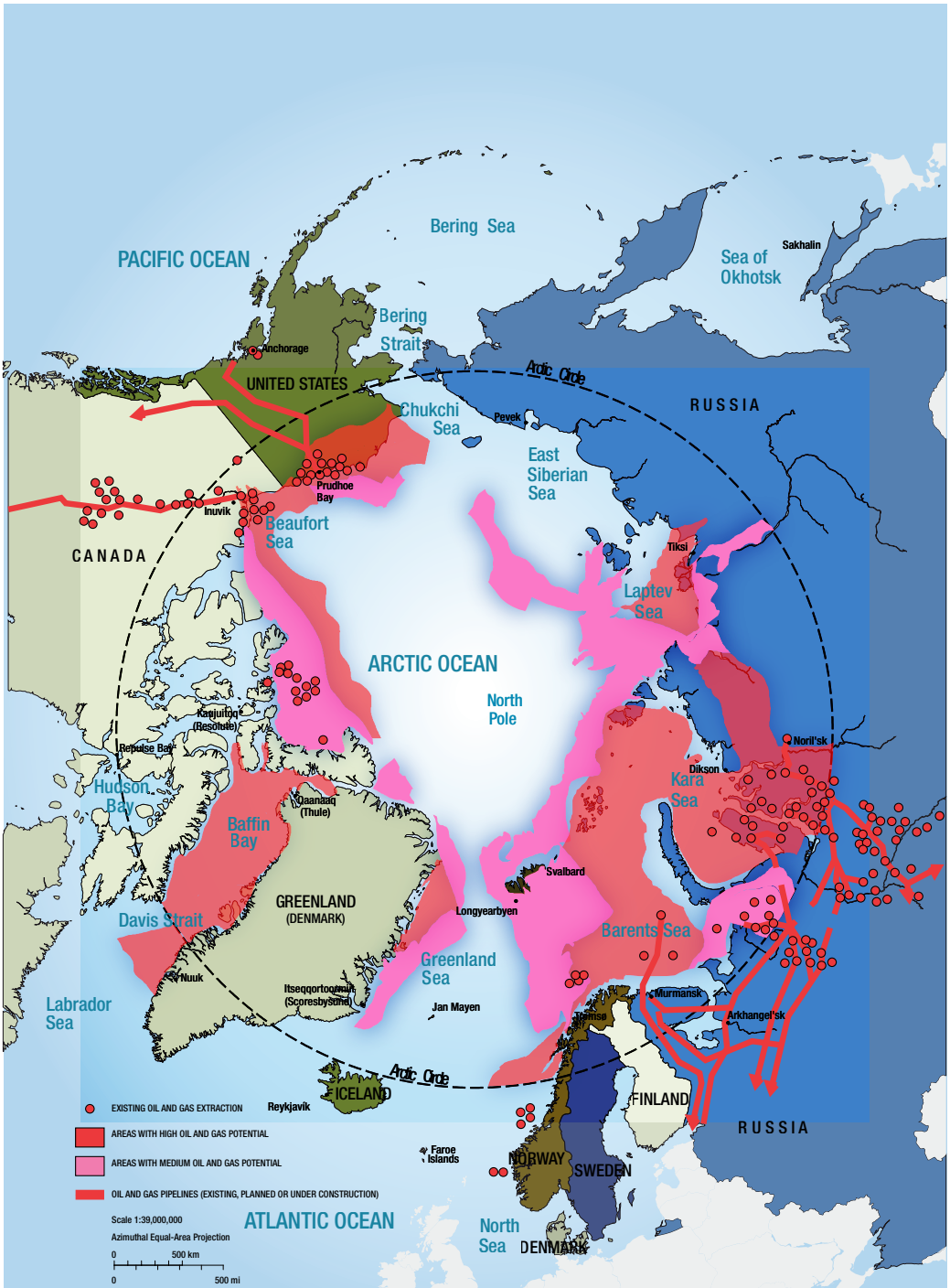
At Last, a Trans-Arctic Shortcut?

Will regular trans-Arctic shipping routes have been established in 2025-2050?

The retreat of the sea ice and recent advances in ship-building technology have re-kindled the centuries-old dream of establishing shipping routes across the Arctic, linking the North-Pacific with the North-Atlantic. Map 2 on page 10 shows that essentially three routes are under consideration: the North-West Passage (NWP) through the Canadian Archipelago, the Northern Sea Route (NSR) along the Siberian coast line, and a North Polar Route (NPR) directly over the North Pole.[7]

The key rationale behind establishing such routes would be that, relative to congested Southern-bound routes such as the Suez or the Panama route, trans-Arctic routes substantially shorten the shipping distance between Far-East Asia or the US West-Coast on the one side, and Europe or the US East-Coast on the other side. For example, vis-á-vis the Suez route, the NSR would cut 39 percent of the shipping distance between Yokohama and Rotterdam,[8] and the NPR would offer even greater savings. Establishing such alternatives could also lessen the vulnerability of states and businesses to disruptions at geopolitical choke points like the Panama and the Suez channel.

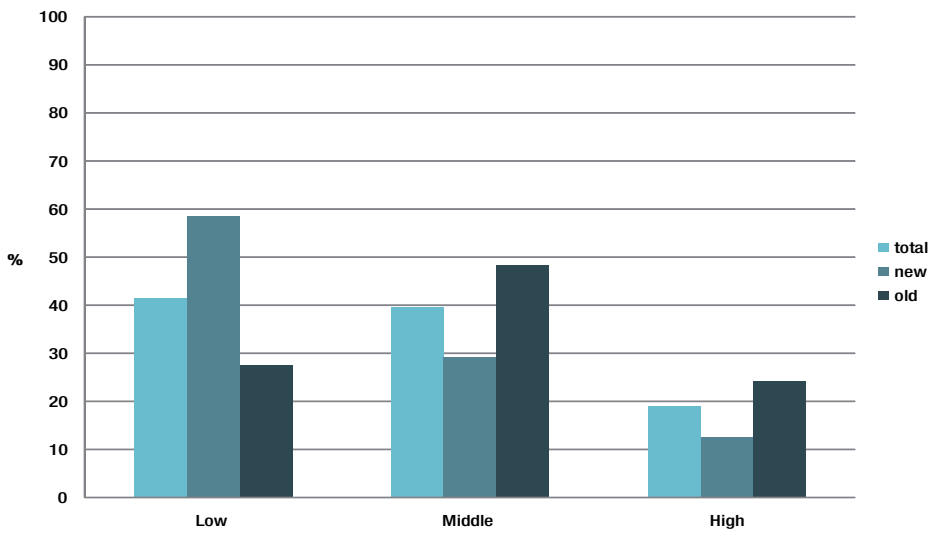
Map 1 Arctic Oil and Gas Potential



For details and sources, please see Appendix C.

Despite Arctic shrinkage, regular trans-Arctic shipping routes nonetheless face substantial obstacles. Even with accelerating climate change, trans-Arctic routes will remain ice-covered for many months each year, allowing only for seasonal usage, necessitating costly ice-breaker assistance, or demanding specially designed, ice-breaking cargo ships.[9] Further, large-scale Arctic shipping demands a costly infrastructure that is able to cope with the hostile environment.[10] Finally, there are only a limited number of goods that are suitable for trans-Arctic shipping and it remains unclear if actual demand will make the routes for these goods commercially viable.[11]

Figure 5 The Likelihood that Regular Trans-Arctic Shipping Routes will be Established in 2025-2050 is...



Although media hype has done much to promote the idea of the trans-Arctic routes as "super seaways",[12] the foresight community is markedly more sceptical. Our analysis shows that it generally has a negative outlook on the likelihood of regular trans-Arctic in the short to medium-term. Less than 20 percent of the surveyed foresight documents making concrete predictions about trans-Arctic shipping deeming it highly likely to occur on a regular basis between 2025 and 2050. Newer studies tend to be even more sceptical, with only 12.5 percent of authors holding this view and close to 60 percent judging it to be highly unlikely. Most authors comment on the severe obstacles mentioned above as major impediments to development of the routes, and noted that while trans-Arctic shipping may be a long time coming, more can be expected from destinational Arctic shipping brought on by tourism and resource extraction.

Map 2 Trans-Arctic Shipping Routes

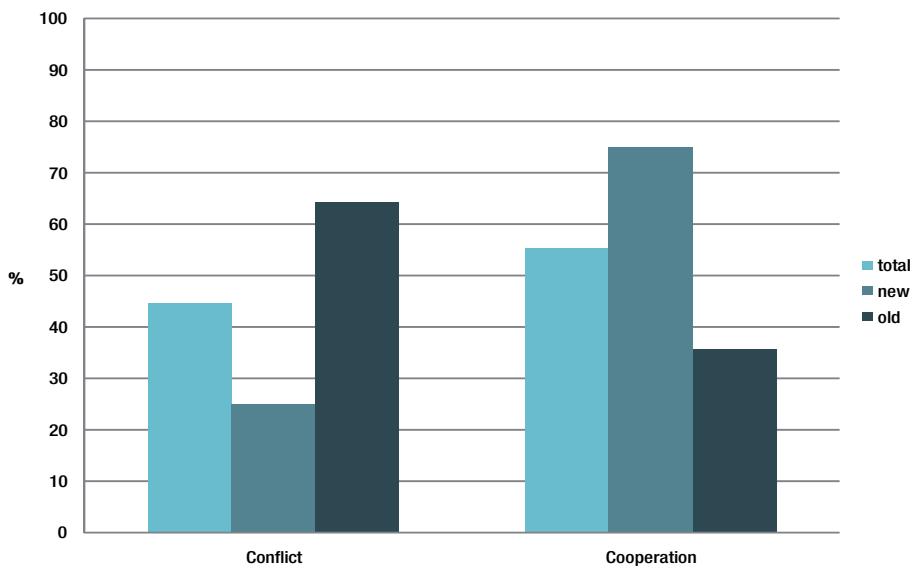
For details and sources, please see Appendix C.

3) The Start of Polar Power Play?

Will interstate relations in the Arctic in 2025-2050 be mainly characterised by cooperation or by conflict?

High stakes, deficient governance and a number of unresolved maritime border disputes have created a potentially explosive mix in the melting Arctic (see Map 3 on page 12). Arctic states have responded to this in recent years with a military build-up and increasingly forceful nationalist posturing.[13] This has created the worrisome spectre of escalating conflict over Arctic access and resources, with some observers even warning about the possibility of Arctic war in the near future.[14]

Figure 6 In 2025-2050, Interstate Relations in the Arctic are mainly going to be characterised by...



Not surprisingly, an endangered Arctic, which has the potential to become an economic powerhouse and major maritime transit region, has garnered considerable attention among national governments and corporations, particularly in the five littoral states, Norway, Russia, the US, Canada, and Denmark (via Greenland). Correspondingly, transnational organisations such as the EU and NATO have also tried to raise their 'Arctic profile' and began to define the warming Arctic as a region of strategic importance.[15]

Map 3 Territorial Claims, Border Disputes and Military Infrastructure

For details and sources, please see Appendix C.

To defuse tensions, cooperative institutions such as the Arctic Council have been created in recent years. However, the nascent governance framework in the Arctic still lacks the capacity to effectively resolve conflict and foster cooperation among Arctic stakeholders. One important obstacle is e.g. the pending ratification of the UN Convention on the Law of the Seas (UNCLOS) by the US, clearing the way for US participation in the Arctic decision-making process and strengthening the international regime.[16] Nonetheless, a majority of the foresight studies HCSS examined believe that cooperation will eventually prevail in Arctic relations. More than half of all studies, and over 70% of newer studies, expect a cooperative and relatively stable future governance regime to emerge (see Figure 6 on page 11).

4) Looting the Earth's Last Sanctuary?

Will Arctic shrinkage render the Arctic Ocean seasonally ice-free?

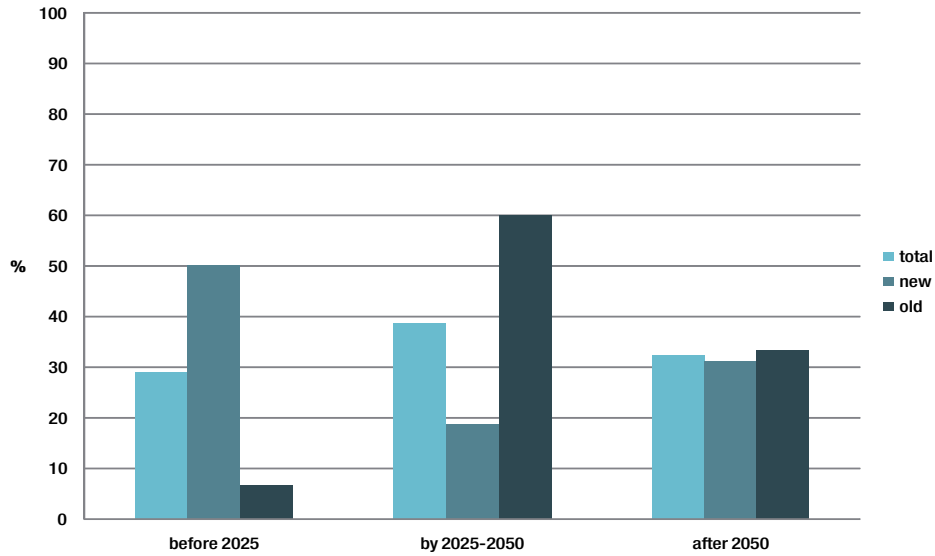
Rapid climate change has put the Arctic under enormous environmental stress. The shrinkage of the Arctic ice cover threatens the survival of a whole array of ice-dependent species, such as the polar bear. Changes in season-length, salinity, temperature and water-circulation patterns in the Arctic have comparable disruptive effects.[17] These threats to the extremely sensitive Arctic ecosystem are now compounded by the rapid growth of Arctic shipping-, drilling-, and mining activities, and the associated increase in Arctic population and industrial infrastructure.[18]

Experts warn that fast climate change and exponentially growing human exploitation of the Arctic could lead to the total collapse of the Arctic ecosystem in the not so distant future. This would not only lead to the rapid decimation or even extinction of unique Arctic species, but also effectively deny the Arctic's indigenous populations their traditional livelihoods.[19] The potential repercussions of such an Arctic collapse on the global ocean and climate system are difficult to foresee, but could also be substantial.

Map 4 Retreating Ice in the Arctic Ocean

For details and sources, please see Appendix C.

Figure 7 The Arctic Will be Seasonally Ice-Free...



At any rate, few in the foresight community dare to make concrete predictions about the future state of the ecosystem in a rapidly changing Arctic. However, most agree that the speed of Arctic shrinkage is going to be a crucial determinant of stress on the Arctic environment: not only is faster climate change more disruptive, but it will also encourage greater industrial and shipping activity. The HCSS analysis shows that there is considerable disagreement about the exact speed of Arctic shrinkage, but that more recent assessments tend to expect more rapid change: around half of the newer foresight studies expect the Arctic Ocean to be seasonally ice-free before 2025 (i.e., there will be no coherent ice-cover in any part of the Ocean for at least a very short period each year), while among older documents, only 7% percent did make the same prediction. It should be noted that contrary to the melting of the continental ice-covers in Antarctica and Greenland, the melting of the Arctic Ocean will not contribute to global sea level rises as the ice is already floating in the ocean.

Uncertainty in Arctic Affairs

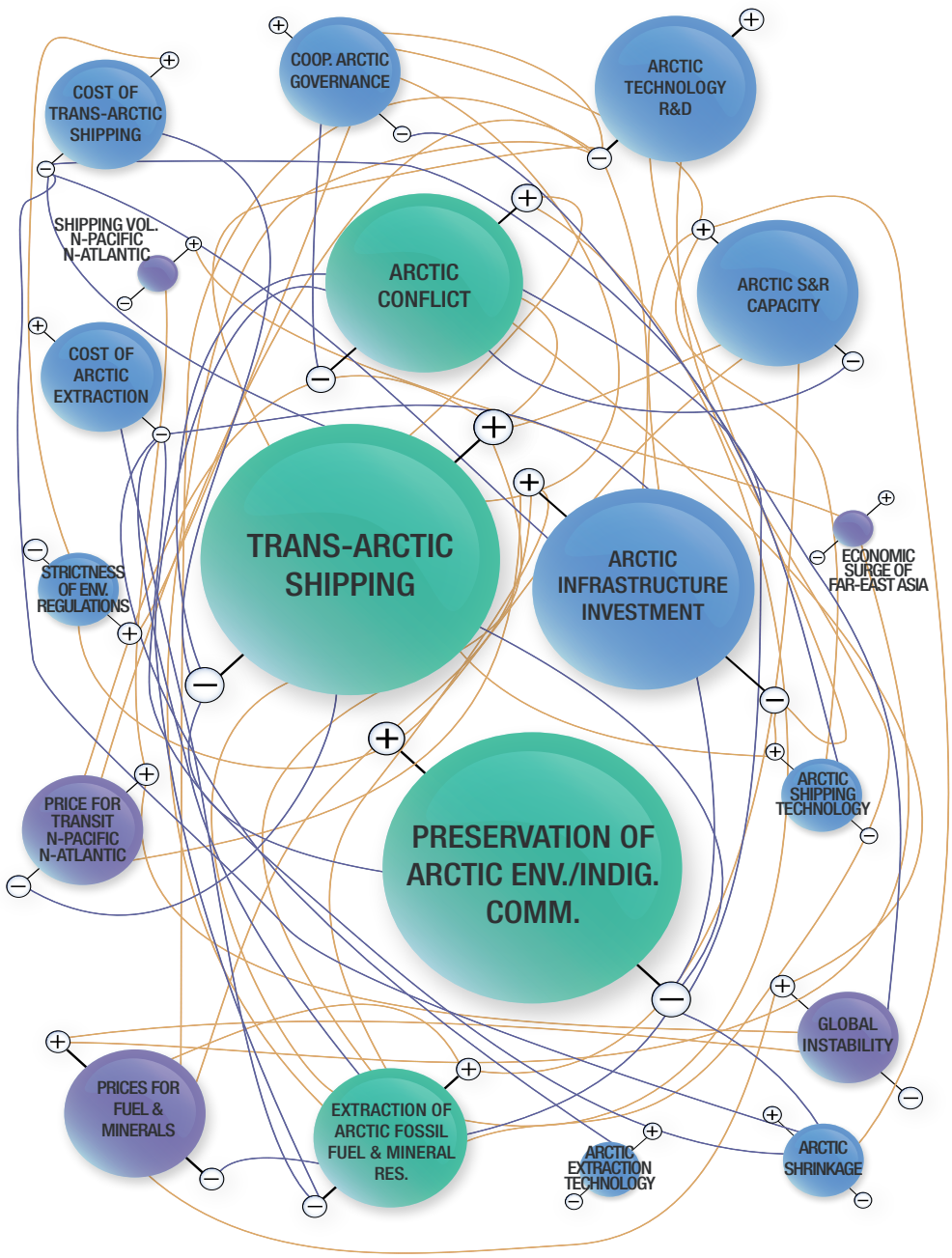
There are some facts about the Arctic present one should keep in mind when trying to read the region's future: it is vast, remote, and remains only sketchily explored and poorly understood in many of its aspects. A point in case is that available maps of Mars' surface are better than those of the Arctic seafloor. The lack of precise knowledge about the Arctic—together with the complex interdependencies of the multiple issues and actors involved—creates high levels of uncertainty about the future direction and speed of developments in the region. This point is often missed by those who make full-throated predictions about the Arctic as the future 'shipping highway', 'the next Saudi-Arabia', or the 'battlefield of the 21st century'.

To gain a better understanding of what forces will affect the future of the Arctic key issues presented above, the foresight studies were scanned for the underlying causal forces that are used to explain developments in a changing Arctic. HCSS identified a total of 15 of such prominent drivers and analysed their relationship to the key issues, as well as to each other. The results of the analysis show 62 direct causal relationships among the key issues and prominent drivers in Arctic affairs. Table 1 in Appendix A presents an overview of these forces and relations.

In a next step, HCSS used these data as basis for Figure 8 on the next page. This Figure demonstrates the high degree of complexity caused by multiple interlinkages interlinkages, feedback loops, and spillover effects, which together affect the development of the Key Issues in the Arctic. It also demonstrates, that sketching the future of the Arctic demands simultaneous attention to a whole array of factors, which are intertwined in a very complex fashion that militates against straight-forward predictions.

A detailed discussion of all complexities shown in Figure 8 lies outside the scope of this Future Issue. Instead, the following two sections provide in-depth explorations of two key themes with critical importance for the future course of the Arctic. The first concerns the cost-benefit balance in Arctic offshore drilling and trans-Arctic shipping; the second deals with ownership and governance issues in the Arctic context.

Figure 8 Complexities in Arctic Affairs



Maybe Huge Benefits–Certainly Substantial Costs

Superficial discussions around Arctic resource extraction and transit shipping often stress its enormous potential with numbers like “40% shorter shipping routes” or “a quarter of the world’s unproven fossil fuel reserves”. Such statements however frequently overlook considerable uncertainties concerning the question of how much of this potential is actually going to materialise in the future. They also often fail to appreciate the substantial costs associated with working in an environment as challenging as the Arctic— its warming notwithstanding.

Stuttering Offshore Development

An important example of these uncertainties concerns oil and gas in the Arctic. The numbers that are routinely cited, be it in million barrels or as percentage of the world’s unproven reserves, stem nearly exclusively from a single source, the US Geological Survey.[21] They are based on statistical estimates that compare the geological composition of the Arctic to similar formations elsewhere and then make interferences about the existence of oil and gas in the Arctic based on these analogous formations. However, as the authors of the survey freely admit, “these first estimates are, in many cases, based on very scant geological information … [and] do not include technological or economic risks, so a substantial fraction of the estimated undiscovered resources might never be produced”.[22]

These technological or economic risks are indeed substantial. Most of the deposits are expected to be found on the continental shelves offshore, and Arctic offshore oil extraction is a technologically and logistically extremely challenging and expensive enterprise. The research department of Statistics Norway has estimated that offshore extraction under Arctic conditions is, on average, three to five times more expensive than in more temperate environments. It demands the establishment of specialised and costly infrastructure, such as floating oil rigs, ice-breakers, polar-class transportation and supply ships, search-and-rescue resources, Arctic deep-water ports, or trans-Arctic pipelines, all to be operated and maintained by highly-trained personnel.[23] Finally, Arctic exploration and offshore drilling is also a very time-consuming process, with lead-times between discovery and production of Arctic oil currently being at least ten years.[24] Taken together, this results in very substantial, high-risk investment requirements with long capital-recovery periods, which poses a very serious obstacle to the large-scale commercial exploitation of Arctic oil and gas reserves.

This might explain why, until today, exploitation of Arctic offshore resources has been very hesitant. While several governments and large corporations have committed themselves to Arctic exploration and development, the results so far have been not very encouraging. In the Barents Sea, where Arctic offshore development have advanced the furthest, Norwegian and Russian projects (such as the Snøhvit and the Shtokman fields) have been dodged by time and cost-overruns and have so far failed to live up to their investors' high expectations. For example, the current production levels in the Russian Barents Sea are at 20% of the quantities that had been forecasted for 2009 by industry experts, and there is little to indicate that this will change substantially over the next years.[25] This is not to say that the emergence of the Arctic as a major oil-producing region is necessarily a pipe-dream. However, if it is to materialise, this will demand high long-term energy prices, risky long-term investments by private companies and governments in Arctic infrastructure and R&D in the order of many billions, further discoveries of relatively accessible very large oil and gas fields, and stable investment environments.

Challenges in Trans-Arctic Shipping

As in the case of Arctic oil and gas, trans-Arctic shipping (and often Arctic shipping more generally), is fraught with many issues that are not adequately captured in statements about the enormous shortening of shipping distances. Rapid warming notwithstanding, ice remains a central problem in Arctic shipping and will remain so at least for several decades onwards. Shipping in the Arctic Ocean is seasonal, and while Arctic shrinkage expands the length of this season, the prospects of a year-round ice-free Arctic seem very remote, even towards the end of the twenty first century.[26] Further, it has been pointed out that the term "ice-free" is a euphemism; it would indeed be more appropriate to speak of "a navigable Arctic with ice infested waters".[27] Finally, there is considerable variability in weather patterns and an overall warming trend does not imply that there will not be Arctic winters as cold as those we are currently used to.[28]

This has profound implications for the prospects of establishing regular trans-Arctic shipping routes. First, unless routinely relying on costly ice-breaker assistance or specialised ice-breaking carriers, trans-Arctic shipping will remain a seasonal phenomenon.[29] Second, ships using the route will need to be polar class and equipped with a crew that is trained to navigate in ice-infested waters.[30] Third, shipping companies must be prepared to encounter maximum ice-conditions in 2030 that are not necessarily different from those today, even if there will be normally considerably less ice than presently.[31]

Taken together, this means that vessels for trans-Arctic shipping in the coming decades will need to be polar-class with ice-experienced crews, and either be put to other uses outside of the Arctic shipping season, or be escorted by ice-breakers. Either way, this implies significant additional costs as compared to existing shipping routes. Also, ice makes trans-Arctic shipping subject to possible delays, thus severely limiting the ability to adhere to the strict delivery schedules that characterise the global shipping industry today.[32] Finally, ships can't safely maintain the same speed in ice-infested waters as elsewhere.[33] As in the case of Arctic offshore drilling, trans-Arctic shipping also would have to struggle with high overhead costs in terms of creating and maintaining the necessary Arctic infrastructure—onshore and offshore. All these adverse factors weigh against the commercial viability of trans-Arctic shipping and must be offset by the savings that accrue from the shorter distances, if it is indeed to become a reality.

Experts have not only examined the costs associated with trans-Arctic shipping but also questioned how much demand there is for such shipping routes in the first place. The cold and the inability to guarantee tight schedules put limits on the type of cargo that might be considered for trans-Arctic delivery.[34] Judging the attractiveness of trans-Arctic routes thus depends on the actual flows of these types of cargo between the ports trans-Arctic routes could connect. There are only very few studies that try to take all these issues simultaneously into account, but they invariably conclude that the potential for large-scale trans-Arctic shipping to become profitable in the coming decades is remote, even with continued rapid climate change.[35] It is a point in case that the NSR, which stands open to ice-breaker assisted trans-Arctic shipping since the early 1990s, is hardly ever used for purposes other than destinational shipping.[36] Once thawed, the economics of the NWP, and especially the NPR, might be more amenable to sustained trans-Arctic shipping, but this will be the case only in a decade or two, even under the most optimistic scenarios.[37]

Ownership, Stewardship, and Governance in the Arctic

Fuelled by surprisingly rapid climate change, policymakers' perspective on the Arctic has profoundly shifted. What used to be thought of as an ice-covered no-man's land suddenly transformed into a fragile, endangered eco-system, which is crossed by strategic trade routes and abundant in prised natural resources. This has led to an array of competing demands from various stakeholders to territorial and shipping rights, control over natural resources, and authority over environmental protection regimes. These claims confront embryonic Arctic governance mechanisms that are characterised by fragmen-

tation and grey-zones such as the Arctic Council.[38] The combination of high stakes and murky governance has created a number of complex conflicts between various Arctic actors. Much of the future of Arctic key issues will depend on how these conflicts play out and on how the Arctic governance framework further develops. In recent debates, calls for an "Arctic Treaty", modelled after the Antarctic Treaty, have grown louder. While the following section looks at UNCLOS as most important existing governance tool in the Arctic, Appendix B looks at the prospects of such a treaty.

UNCLOS and Sovereign Control over Routes and Resources

A central theme in Arctic governance is the question of who holds the territorial rights to the Arctic Ocean. In principle, the answer to this question is determined by the United Nations Convention on the Law of the Sea (UNCLOS). UNCLOS stipulates that a country's Exclusive Economic Zone (EEZ) extends 200 nautical miles (nm) beyond its shoreline, and may be extended to up to 350 nm, if the littoral country is able to proof that the seabed in this area is a "natural extension" of the country's continental shelf.[39] While a country cannot regulate shipping in its EEZ, it does give it exclusive ownership over all resources, such as fishing rights and mineral resources in the seabed.

In the Arctic Ocean, UNCLOS has led to two types of maritime border disputes: first, disputes arising from overlapping EEZs within the 200 nm range; and second conflicting claims about the exact extension of the continental shelf and consequently the extension of the EEZs beyond the 200 nm limit. This second type of conflict is particularly important, because the Arctic continental shelves stretch far into the Ocean, are poorly mapped, and are thought to hold considerable oil and gas resources.[40] Therefore, the littoral states—which, except for the US, have all ratified UNCLOS—are making strong efforts to map the seabed to build their case for controlling large swathes of the Arctic Ocean.[41]

However, different from what is often suggested and what one might infer from the sable rattling that accompanies these claims, it presents a complex but more or less orderly judicial process, rather than a series of imperialistic 'land grabs'. While several littoral states (above all Russia and Canada) have underscored their 'sovereign rights' with flag-plantings and military exercises, it should be noted that their assertions are made with clear reference to UNCLOS; even if e.g. the Russians claim that the Lomonosov Ridge that runs under the North Pole is an extension of the Eurasian continental shelf is still disputed.[42]

As the theoretical maximum claims of the littoral states in Map 3 on page 12 shows, UNCLOS is likely to eventually allocate large parts of the Arctic Ocean as EEZs to individual littoral states, particularly those areas thought to contain most of the Arctic gas and oil deposits.[43] Once the UNCLOS process has run its course—which might very well take a decade or two—an overwhelming part of Arctic fossil fuel deposits will thus be unambiguously assigned to the sovereign control of one of the five Arctic littoral states. More serious disputes might arise in a few cases where EEZs overlap in areas with big resource potential (such as the Barents Sea between Norway and Russia).

With regards to trans-Arctic shipping routes, international jurisdiction is somewhat less clear. Parts of the NWP run through Canadian internal waters, and according to UNCLOS thus fall in principle clearly under Canadian sovereign control. However, Canadian control of the NWP has been challenged by the US on the grounds that the NWP should be treated as an 'international strait', thus giving all ships the right to unhindered passage.[44] In contrast to this, the NSR traverses the Russian EEZ but not its internal waters, theoretically denying Russian control of the shipping route. As travelling the NSR currently still requires Russian icebreaker assistance, the Russian state nonetheless exercises *de facto* sovereign control over the route.[45] Once sea ice has retreated and Russian icebreaker assistance is no longer necessary—or if other icebreakers are being used—international law does not give Russia a right to interfere with the usage of the NSR. However, it is difficult to imagine that Russia would be willing to simply relinquish control of the NSR, which in Russia is widely regarded as a symbol of the country's achievements in Arctic shipping.[46] One argument that has been used in favour of the NPR is indeed that, next to being the shortest of all three suggested routes, it is not fraught with such sovereignty issues.

In sum, UNCLOS provides a relatively robust framework to eventually adjudicate conflicts about the control of natural resources and shipping routes in the Arctic Ocean. In the Illulisat Declaration in May 2008, the five littoral states have indeed reaffirmed their commitment to UNCLOS as framework to resolve their territorial disputes.[47] It is true that littoral states have recently sought to expand their Arctic military capacities, but actual investments and deployments have so far been a fraction of politicians' boastful pledges.[48] Even if substantially upgraded, the military capabilities of Arctic states are at best sufficient for basic surveillance and search and rescue missions. Under these circumstances, a full-blown Arctic military standoff over territorial rights or resources appears as increasingly unlikely.

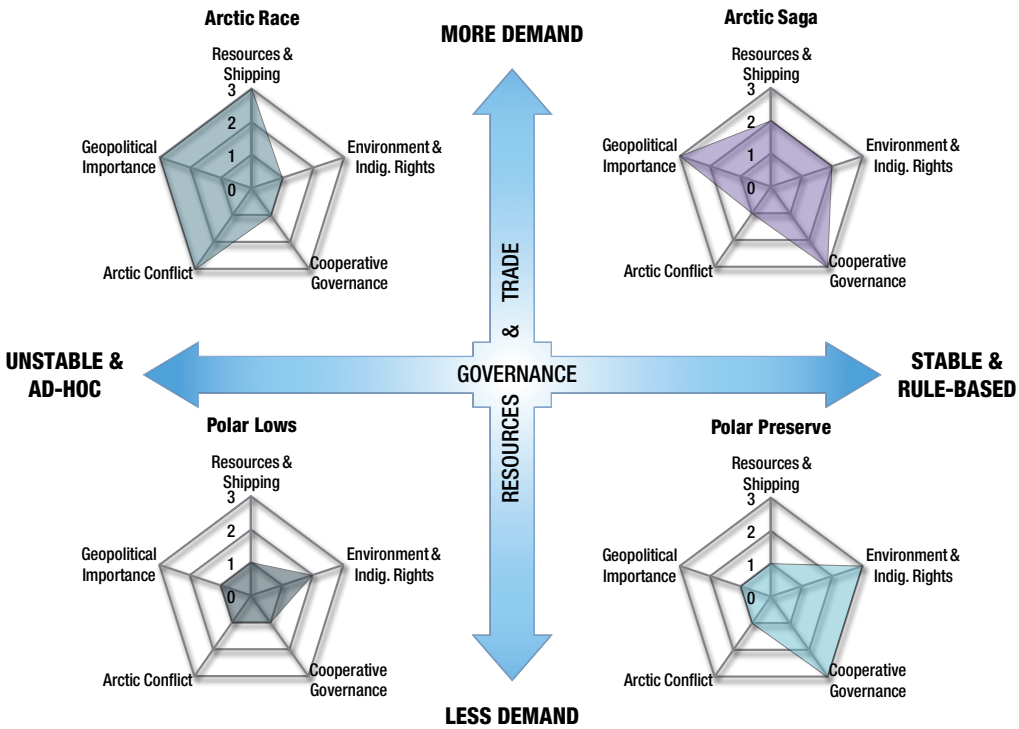
Using Scenarios to Uncover Arctic Futures

A Meta-Analysis

The previous chapter has demonstrated that a wide variety of factors interact in a very complex manner to shape the future of the Arctic. This introduces high levels of uncertainty and makes it difficult to anticipate aggregate developments. A useful tool to think through various possible trajectories of Arctic developments is scenario analysis, a method that is used by several foresight studies in our sample to sketch alternative Arctic futures.[49] Instead of building alternative scenarios from scratch, HCSS combined the most insightful approaches offered in the literature as basis of the scenarios presented below.

One of the most recent and largest in-depth scenario exercises on the future of the Arctic region was realised by the Arctic Council with the help of the Global Business Network (GBN) in the context of the Arctic Marine Shipping Assessment (AMSA).[50] Through a series of consultations and workshops two key axes of uncertainties in the Arctic future, governance and resources and trade, were identified and used as the basis for four scenarios. HCSS combined these very insightful and extensive scenarios with the framework of Arctic key issues developed in Chapter 1, producing Figure 9 on the next page. The dimension governance is plotted on the horizontal axis and ranges from unstable – ad hoc (left) to stable and rule-based (right). The dimension resources and trade is plotted on the vertical axis and ranges from less demand (bottom) to more demand (top). This produces four basic scenarios called Arctic Race, Arctic Saga, Polar Lows and Polar Preserve. The radar charts for each scenario describe them in terms of the key issues that where discussed in Chapter 1. However, in order to clarify differences between the various scenarios, we combine Arctic shipping and resource extraction into a single dimension and separate Arctic conflict and governance into two different dimensions. Finally, we added an indicator for the overall geopolitical importance of the Arctic in each scenario. A short description of each scenario follows below.

Figure 9 Four Arctic Futures



Source: Arctic Council (2009); HCSS.

Arctic Race

There is an increased demand for resources and trade and the governance structures in place are weak. Competing states are rushing in to claim Arctic territories and resources. Brinkmanship and fierce political tensions between the Arctic rim states are key issues, which may lead to large scale military confrontations. Also the rise of Asian states that are increasingly getting involved in safeguarding their energy interests is an important development in this scenario. Environmental concern is low as well as the interest for the indigenous Arctic people.

Arctic Saga

Governance regimes and cooperative international structures are stable. The demand for natural resources and Arctic marine traffic is growing, but at a healthy rate in order to make necessary investments in navigational infrastructure and environmental protection of the Arctic. At the same time attention is paid to the local cultures of people living in the area. Joint efforts and compromises between states and the industrial sector lead to a relatively peaceful development of the Arctic arena.

Polar Preserve

There is a stable and rule-based governance structure in place, pressing for more harmonisation and restrictions in exploration of Arctic resources, with strong concerns for the environment and indigenous people. Demand for trans-Arctic shipping is low and offshore extraction turns out to be costly, resulting in a slowdown of developments for resource extraction and destinational shipping. Economic and geopolitical interests elsewhere are of higher importance than in the Arctic region.

Polar Lows

Arctic offshore extraction and trans-Arctic shipping turn out to be costly and impractical and global demand for them remains relatively low. Besides, governance structures are unstable and ad-hoc, leading to unclear regulations and different standards. Domestic troubles take precedence over a more outward looking focus. Regional disputes over territorial claims may occur, but will not lead to serious clashes between the main Arctic actors. Underinvestment in infrastructure and R&D lead to a standstill in the development of the Arctic region.

Box 2 Strategic Focus on the Arctic

Canada Jul. 10th 2007, Prime Minister Harper's "use-it-or-loose-it" speech reasserts Canadian sovereignty claims and declares the region as central to Canadian identity, announces the expansion of Arctic surveillance, the building of up to 8 naval vessels and an Arctic deep water port as base until 2013.

Russia Sept. 2008, Fundamentals of state policy in the Arctic in the period up to 2020, calls for establishment of the Arctic as Russia's top strategic base for resources by 2020 and preserving Russia as leading Arctic power. It targets the establishment of continental shelf boundaries by 2015 and the further development of the NSR; advises the creation of military units with Arctic capabilities; emphasises the need to maintain the Arctic as zone of peace and underlines the importance of extending bi- and multilateral cooperation.

EU Oct. 20th 2008, Commission Communication 763, declares EU as "inextricably linked" to the Arctic and the region as priority in its Northern dimension policy; promotes preservation of the Arctic and sustainable usage of resources; calls for defence of freedom of navigation and reaffirms UNCLOS.

USA Jan. 9th 2009, National Security Presidential Directive no. 66 declares the US as Arctic Nation with "broad and fundamental security interests in the Arctic" and designates the NWP and the NSR as international straits; rejects an Arctic Treaty, urges ratification of UNCLOS and calls for enhanced US presence and greater international cooperation.

NATO Jan. 29th 2009, secretary general speech on security prospects in the high North defines the high North as region of strategic interest to NATO; proposes its involvement in S&R and ecological disaster operations, identifies NATO's role in maintaining energy security as "particularly relevant" to the high North, and claims the Alliance as "forum" to "discuss and share" concerns on territorial disputes; calls for NATO-Russia Arctic cooperation and building of mutual trust in the region.

Nordic Countries Feb. 9th 2009, Stoltenberg report on foreign and security policy coordination calls amongst others for joint maritime and satellite monitoring systems, cooperation on Icelandic air surveillance, a maritime and disaster response force with Arctic S&R expertise and icebreaker capabilities, as well as a joint Arctic amphibious unit.

HCSS research demonstrates that issues pertaining to the Arctic region are increasingly prominent on domestic policy agendas of Arctic coastal states and have also gained the attention of transnational organisations such as the EU and NATO (see Box 2). The analysis of high-level policy documents and debates further shows that the precipitous change in the region creates a growing awareness for the possible strategic and security implications at the geopolitical level. However, our results also indicate that it remains unclear when, and if at all, the Arctic will become a serious global security priority. This section will address the most salient strategic issues emerging from our analysis and discuss the increasing securitisation and potential militarisation of the Arctic region.

The Arctic Race: Dangerous but Unlikely

The analysis above showed that in three of four key scenarios, the Arctic region is unlikely to become a focal point of geopolitical conflict: Either disappointing progress with offshore drilling and trans-Arctic shipping will shift global attention away from the Northern Polar region (in the scenarios Polar Lows and Polar Preserve), or a robust Arctic governance regime will emerge that has the capacity to effectively defuse conflicts over valuable resource and shipping rights (in the scenario Arctic Saga). Only in the Arctic Race scenario, a failure to agree on viable cooperative governance mechanisms and a rapidly rising importance of Arctic fossil fuels and trade routes transform the Arctic into a prised geostrategic asset, for which coastal states compete ruthlessly in a tense security environment. Arctic littoral states would react to such a development almost certainly with an aggressive expansion of Arctic military capabilities and the region would become a major source of global instability. From a security perspective, this scenario is certainly the most troubling and it is therefore not surprising that it has received disproportionate attention among defence analysts, policymakers and in the media.

However, our meta-analysis of the foresight community (in Chapter 1), as well as our exploration of the driving forces in a rapidly changing Arctic (in Chapter 2), shows that there is currently very little indication that the region is indeed moving towards the Arctic Race scenario: recent experiences with polar offshore drilling and exploration have considerably lowered expectations towards the actual production potential of the region, at least in the short and medium term; and trans-Arctic routes as profitable, major global shipping routes equally seem, at best, still decades away. Taken together, these trends push the Arctic future towards the lower half of the scenario matrix, away from the Arctic Race scenario.

Box 3 Business in a Changing Arctic

A melting Arctic indeed contains considerable potential in offshore resources and Arctic shipping. Around these businesses, there exist sizable auxiliary industries specialised in supplying everything from Arctic ship-design, various types of Arctic infrastructure and communications technology, challenging logistical services, specialised insurances, and much more. However, harnessing Arctic opportunities is fraught with complex technological and economic challenges in an extremely harsh environment characterised by high degrees of uncertainty. Making business in the Arctic profitable in these sectors requires investments in the order of billions with investment horizons ranging in decades. Evolving environmental and safety legislation and disputed ownership rights further add to risks for businesses. Taken together, these challenges make the Arctic business environment into a world of relatively few, large and committed players, with distinct Arctic expertise and usually close ties to the littoral states they operate in (e.g. Fednav (Canada), Sovcomflot, Gazprom (Russia), Statoil, DNV (Norway) or Aker Arctic Technologies (Finland)).

An explosive militarisation of Arctic affairs also appears as less likely in light of the fact that international Arctic institutions has made some progress in the past years. While UNCLOS alone might be insufficient to deal with all important governance issues that confront the Arctic, it will in all likelihood serve as viable basis for resolving the most explosive territorial and resource disputes confronting the region. The Illulisat Declaration, in which all littoral states reaffirmed their commitment to UNCLOS and to the peaceful resolution of Arctic disagreements is an important signal in this regard. Also the fervent debates around Arctic security seem to have made policymakers acutely aware of the grave risks and substantial costs that would be associated with the escalation of conflicts in the Arctic. Public sable rattling about the Arctic still continues, but it appears to be mainly targeted at domestic audiences. Simultaneously, there are ongoing efforts to strengthen bi- and multilateral negotiations and cooperation in the Arctic. These tendencies move the Arctic future to the right in the scenario matrix, again away from the Arctic Race.

The Arctic in Geopolitical Context

The Arctic Race might be the most threatening, even if unlikely scenario, but this does not imply that the other three scenarios do not carry important global security implications. The Arctic Saga scenario would lead to quite a different picture. While littoral states are able to contain their conflicts with the help of an effective Arctic governance regime, as offshore drilling and trans-Arctic shipping become successful and lucrative businesses. Everybody gains, but some do more than others: with a considerable fraction of Arctic off-shore oil and gas found in Russian territory, and at least the port fees etc. of ships using the NSR also accruing to Russia, its position as major economic powerhouse is virtually assured for decades to come (see Box 3 on business in the Arctic). With the help of fossil fuels found in the US and Canadian Arctic, the US is also able to lower its dependence on Middle Eastern oil substantially. Greenland might become independent from Denmark with the help of petro-dollars and trans-Arctic trade might make Iceland a major global shipping hub. A securitisation of the Arctic under these circumstances is likely; however extensive cooperative arrangements would prevent an escalating militarisation.[51]

In the remaining two scenarios, Polar Lows and Polar Preserve, the "Arctic treasure chest" essentially turns out to be empty. Less fossil fuels than expected are found in the Arctic Ocean. These are too costly and difficult to obtain to merit large-scale production. Trans-Arctic shipping requires high and risky investments and hardly can compete economically with established trade routes. Serious Arctic conflicts in these scenarios are unlikely: there is simply little that would be worth to fight about. Under these conditions, the Arctic future is probably going to be little eventful from a security perspective, neither a securitisation nor militarisation will occur.

Nonetheless, this would have important, albeit indirect, geopolitical ramifications. Norwegian and Russian production in the North Sea and on the Russian Arctic mainland is rapidly depleting proven reserves.[52] Both have set their hopes to sustain and expand their position as major global fossil fuel producers on off-shore Arctic oil and gas. Should the results from off-shore production in the Arctic turn out to be disappointing, this will significantly contribute to the further tightening of energy markets and increase pressures for a shift away from fossil fuels. Over the medium and long-term, Russia would be particularly adversely affected as its geopolitical clout would be considerably diminished and declining revenues from oil and gas might create internal instability.

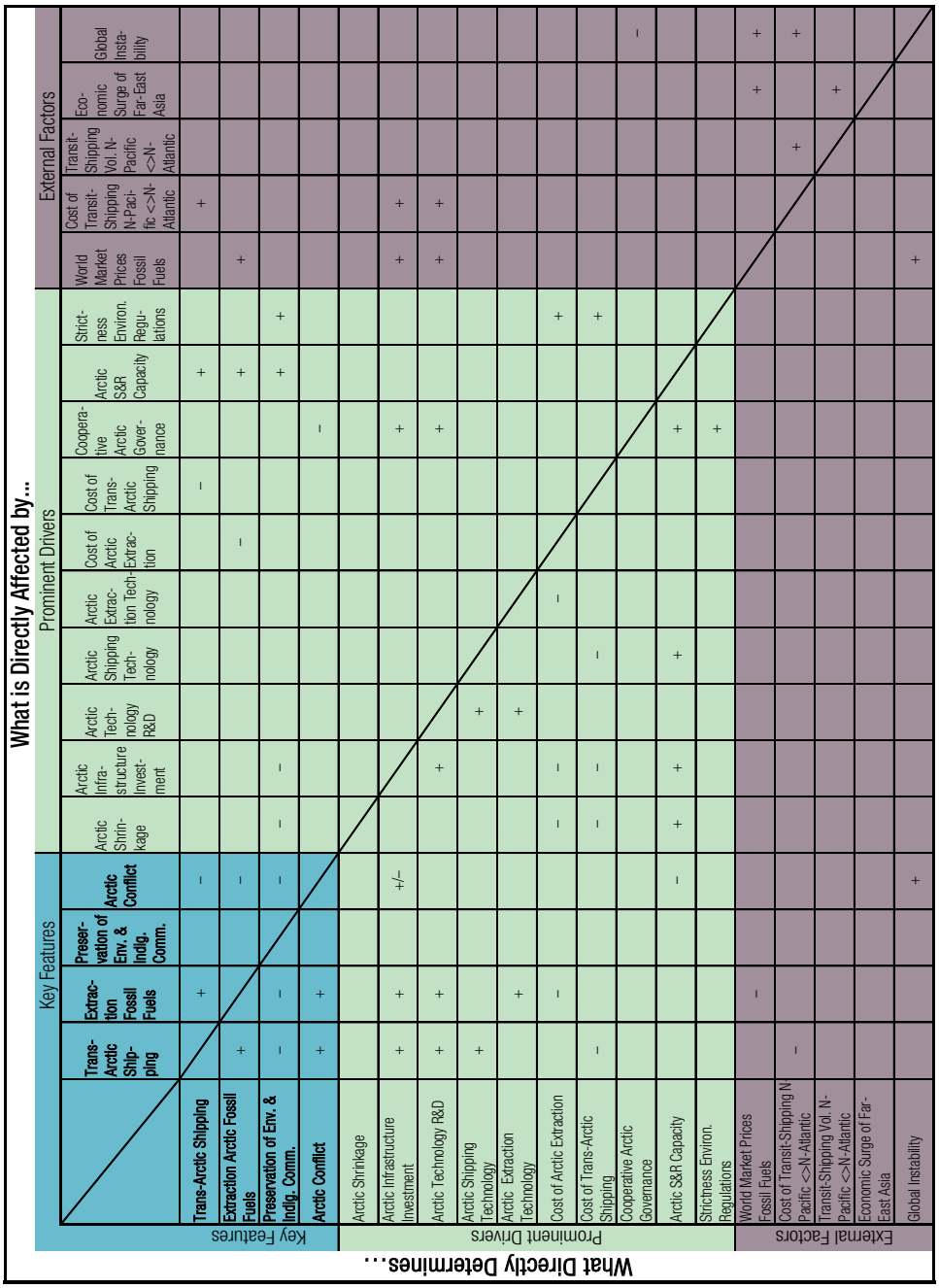
CONCLUSION

The melting Arctic is a region marked by rapid, complex, and far-reaching change, which creates a highly uncertain future for the region, which appears rich in opportunities and threats. Through a thorough survey of the foresight community, this Future Issue has identified diverging views on four key issues in a melting Arctic, (Arctic resource extraction, trans-Arctic shipping, Arctic governance and conflict, the Arctic environment), and has sought to analyse the complex underlying drivers that determine their future. The findings show a rapidly evolving debate that judges rapid Arctic shrinkage ever more likely, but simultaneously grows more sceptic about the prospects of trans-arctic shipping and large scale exploitation of Arctic offshore hydrocarbon deposits, at least in the short and medium term. Serious Arctic conflicts between littoral states are also deemed increasingly unlikely among experts.

Using the literature, HCSS further explored four useful scenarios of the Arctic future and assessed their contrasting security implications. Only one of these scenarios, deemed the most unlikely to emerge, would lead to an aggressive militarisation, while another would result in a lasting securitisation, albeit against the backdrop of cooperative regional governance. In the two remaining scenarios, the 'Arctic Promise' would essentially turn out empty, leading to a rapid decline of geopolitical attention to the remote region. However, as long as deep uncertainty surrounds the future trajectory of the Arctic region, prudent policy-makers are going to closely monitor a region of potentially great geostrategic value.

Appendix A
Causal Forces in the Arctic

Table 1 Causal Forces in the Arctic



The matrix in Table 1 lists the prominent drivers in Arctic affairs HCSS identified and plots them against the key features as well as against each other. Plus and minus signs in the matrix indicate either positive or negative direct causal relationships. Empty fields indicate no direct relationship. We identified a total of 62 such direct causal relationships in the literature. While determining the direction of the relationship was rather straightforward in most cases, it was virtually impossible to determine the sizes of the effects, as there is hardly any data available that would allow making such interferences. We further were able to distinguish between prominent drivers that were specific to the Arctic and contingent upon Arctic developments (such as Arctic infrastructure investment or Arctic search and rescue capacity); and salient external factors that are influencing Arctic developments, but themselves are at most negligibly affected by Arctic developments (e.g., the degree of global instability or world market prices for fossil fuels).

Appendix B

Despite UNCLOS, Do We Need an Arctic Treaty?

While UNCLOS provides a slowly but surely emerging framework to resolve conflicts over territorial rights and ownership of Arctic resources between littoral states, it has been questioned if suffices as only tool to satisfyingly govern the Arctic. In particular, the adequacy of UNCLOS in ensuring the preservation of the Arctic marine environment has been questioned, as it leaves these issues to national authorities and limits their ability to impose rules on foreign ships.[53] Many experts, environmental groups and indigenous peoples doubt the efficacy of such national approaches. Instead, they have called for a unified transnational framework with an effective enforcement regime, which provides clear, mandatory limits and regulations for Arctic resource extraction, shipping and waste discharge. It has been suggested that such kind of a treaty could also limit military activity, safeguard indigenous people's rights and guarantee freedom of scientific exploration in the Arctic and access to Arctic transit routes by non-littoral states.[54]

Proponents draw parallels to the Antarctic Treaty that has for decades effectively protected the South Pole as international commons and fostered joint stewardship and cooperative scientific exploration.[55] The Arctic Council, which consists of Finland, Sweden, Iceland and the five Arctic coastal states, as well as numerous non-arctic countries and NGOs as observers, has been suggested as good starting point for such a treaty. However, in the Illulisat Declaration the five littoral states have rejected demands for an Arctic Treaty,□ apparently being determined to keep Arctic governance an exclusive affair. This makes the emergence of a broad Arctic Treaty seem increasingly unlikely.

Appendix C

Sources Used to Contruct the Maps

Map 1 Arctic Oil and Gas Potential

Data are taken from the 2009 Circum-Arctic Resource Appraisal (CARA) of the US Geological Survey (USGS).[56] The CARA assesses oil and gas potential separately, using a fourfold scale to describe the degree of potential for each of them. In the present map the information was combined into two categories: medium oil and gas potential, and high oil and gas potential. Medium oil and gas potential refers to areas that have, in CARA terms:

- 100 million to 1 billion barrels of oil (BBO) potential and 1 to 6 trillion cubic feet (TCF) of gas potential, or
- *either* 1 to 10 BB of oil potential (but no more than 6 TCF of gas potential)
- *or* 6 to 100 TCF of gas potential (but no more than 1 BB of oil potential) ‘
- High oil and gas potential refers to areas that have, in CARA terms:
- 1 to 10 BB of oil potential and 6 to 100 TCF of gas potential
- Any area that has more than 10 BB of oil potential or 100 TCF of gas potential.

Data on pipelines and existing oil and gas extraction was taken from Rekacewicz.[57]

Map 2 Trans Arctic Shipping Routes

Data on shipping routes has been taken from Rekacewicz, data on observed ice extents comes from the Arctic Climate Impact Assessment (ACIA) of the Arctic Monitoring and Assessment Programme (AMAP).

Map 3 Arctic Territorial Claims, Border Disputes, and Military Infrastructure

Data on boundaries and territorial claims of littoral states taken from the International Boundaries Research Unit (IBRU) at Durham University.[58] Data on military bases and border disputes is from Rekacewicz.

Map 4 Retreating Ice in the Arctic Ocean

Data on observed and projected ice extents is taken from the Arctic Climate Impact Assessment (ACIA) of the Arctic Monitoring and Assessment Programme (AMAP).[59]

ENDNOTES

1. A significant number of documents were discarded from our initial sample because they contained no analysis or no concrete predictions about the future of the Arctic (e.g. short news articles, fact sheets, policy statements etc.

2. Gautier et al. 2009, Assessment of Undiscovered Oil and Gas in the Arctic. Science, 329 (May 29).

3. Arctic Council 2009, Arctic Marine Shipping Assessment 2009 Report, p.18.

4. Svenning, Bjorn Sverre 2009, The Outlook for Arctic Trade and Transportation. Presentation at the 5th Annual Arctic Shipping Summit, Helsinki, April 27-30.

5. Statistics Norway, 2006, The Economy of the North, p. 29.

6. In order to assess trends in the Arctic debate, we divided the sample of foresight studies into two sub-samples of 'older' and 'newer' documents, with the median age of 21 months in the entire sample as cut-off point. This is obviously a somewhat arbitrary decision, but is quite useful n sketching changing opinions within foresight community over time.

7. International Institute for Strategic Studies 2008, Towards a Wider Higher North? Strategic Issues in a Changing Arctic. In Strategic Survey 2008. p. 60.

8. Calculations based on data supplied by Svenning, Bjorn Sverre 2009, The Outlook for Arctic Trade and Transportation. Presentation at the 5th Annual Arctic Shipping Summit, Helsinki, April 27-30.

9. Arctic Council 2009, Arctic Marine Shipping Assessment 2009 Report.

10. Ibid.

11. Brubaker & Ragner 1999, International Northern Sea Route Program (INSROP) 1993-1999. Fridthof Nansen Institute, Norway; Svenning, Bjorn Sverre 2009, The Outlook for Arctic Trade and Transportation. Presentation at the 5th Annual Arctic Shipping Summit, Helsinki, April 27-30.

12. Lassere, Frederic 2009, High North Shipping: Myths and Realities, p. 199, in S. Holtsmark & B. Smith-Windsor (eds.), Security Prospects in the High North: geostrategic thaw or freeze? NDC paper no. 7.

13. Yalowitz et al. 2009, Arctic Climate Change and Security Policy Conference: final report and findings. Carnegie Endowment for Peace.

14. Harrington, Caitlin, 2008, Eying up the new Arctic: competition in the Arctic Circle. Jane's Defense Weekly, Jan. 13th 2009.

15. Hoop Scheffer, Jaap de 2009, Speech by NATO Secretary General on Security Prospects in the High North. Jan. 29th, Reykjavik; European Commission of the European Communities 2008, Communication from the Commission to the European Parliament and the Council: The European Union and the Arctic, November 28th, Brussels.

16. Baev, Pavel 2007, Russia's Race for the Arctic and the New Geopolitics of the North Pole. The Jamestown Foundation Occasional Paper; International Institute for Strategic Studies 2008, Towards a Wider Higher North? Strategic Issues in a Changing Arctic. In Strategic Survey 2008.

17. Arctic Council 2009, Arctic Marine Shipping Assessment 2009 Report.

18. Ibid.

19. UNESCO 2009, Climate Change and Arctic Sustainable Development: scientific, social, cultural, and educational challenges. International Expert Meeting Report and Recommendations.

20. Gautier et al. 2009, Assessment of Undiscovered Oil and Gas in the Arctic. Science, 329 (May 29).

21. Ibid. p. 1178)

22. Arctic Monitoring and Assessment Project (AMAP) 2007, Arctic Oil and Gas 2007, p.33.

23. Ibid.

24. Svenning, Bjorn Sverre 2009, The Outlook for Arctic Trade and Transportation. Presentation at the 5th Annual Arctic Shipping Summit, Helsinki, April 27-30.

25. Arctic Council 2009, Arctic Marine Shipping Assessment 2009 Report.

26. Office of Naval Research et al. 2001, Naval Operations in an ice-free Arctic Symposium. Final Report p. 3. April 17-18th.

27. Rottem S. & A. Moe 2007, Climate Change in the North and the Oil Industry. FNI Report 9/2007. Fridthof Nansen Institute.

28. Arctic Monitoring and Assessment Project (AMAP) 2007, Arctic Oil and Gas 2007, p.33.

29. DNV Maritime 2006, Ship Operation in Cold Climate. De Norske Veritas.

30. Rottem S. & A. Moe 2007, Climate Change in the North and the Oil Industry. FNI Report 9/2007. Fridthof Nansen Institute.

31. Svenning, Bjorn Sverre 2009, The Outlook for Arctic Trade and Transportation. Presentation at the 5th Annual Arctic Shipping Summit, Helsinki, April 27-30.

32. DNV Maritime 2006, Ship Operation in Cold Climate. De Norske Veritas.

33. Brubaker & Ragner 1999, International Northern Sea Route Program (INSROP) 1993-1999. Fridthof Nansen Institute, Norway

34. Ibid; Svenning, Bjorn Sverre 2009, The Outlook for Arctic Trade and Transportation. Presentation at the 5th Annual Arctic Shipping Summit, Helsinki, April 27-30; Arctic Council 2009, Arctic Marine Shipping Assessment 2009 Report.

35. Brubaker & Ragner 1999, International Northern Sea Route Program (INSROP) 1993-1999. Fridthof Nansen Institute, Norway

36. Arctic Council 2009, Arctic Marine Shipping Assessment 2009 Report.

37. World Wildlife Fund 2009, Cooperation or Conflict: The way forward for Arctic governance. The Circle 1.

38. Ibid.

39. in S. Holtsmark & B. Smith-Windsor (eds.), Security Prospects in the High North: geostrategic thaw or freeze? NDC paper no. 7.

40. International Boundary Research Unit (IBRU) 2008, Maritime Jurisdiction and Boundaries in the Arctic Region.

41. Baev, Pavel 2007, Russia's Race for the Arctic and the New Geopolitics of the North Pole. The Jamestown Foundation Occasional Paper.

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43. Huebert, R. 2007, Canadian Arctic Maritime Security: The Return to Canada's Third Ocean. Canadian Military Journal (Summer).

44. Stepanov et al. 2005, Legal Implications for the Russian Northern Sea Route and Westward into the Barents Sea. Fridthof Nansen Institute.

45. Ragner, C. 2008, 'Den norra sjövägen' (The Northern Sea Route). In Hallberg, Torsten (ed), Barents – ett gränsland I Norden. Stockholm, Arena Norden, pp. 114-127.

46. Arctic Ocean Conference Ilulissat, Greenland 2008, The Ilulissat Declaration.

47. Yalowitz et al. 2009, Arctic Climate Change and Security Policy Conference: final report and findings. Carnegie Endowment for Peace.

48. Good examples are: Arctic Council 2009, Arctic Marine Shipping Assessment 2009 Report or Brigham, L. 2007, Thinking about the Arctic's Future: Scenario's for 2040. The Futurist, (Sept. – Oct.)

49. Global Business Network 2008, The Future of Arctic Marine Navigation in Mid-Century: Scenario Narratives.

50. It is not easy to determine if the Arctic would end up in a 'race' or in a 'saga', in case Arctic offshore drilling and shipping indeed turn into very profitable businesses, a prospect that seems quite unlikely at the present. Much of it is going to depend on the broader relations between Russia and the West. As explained above, the con-

stellation in the Arctic is probably more tilted towards cooperation, as there is little to gain and much to loose from adverse relations in this harsh environment. Should the broader geopolitical environment however move towards a confrontation of Russia with Western powers, then a valuable Arctic is likely to be one of the battle fields where this confrontation is played out.

51. Statistics Norway, 2006, The Economy of the North.

52. World Wildlife Fund 2009, Cooperation or Conflict: The way forward for Arctic governance. The Circle 1. Such national legislation is limited coastal states' territorial waters, although article 234 of UNCLOS, the so-called 'Canadian clause', allows them to extend non-discriminatory regulations for environmental protection also to parts of the EEZ that are covered by ice for "most of the year".

53. World Wildlife Fund 2009, Cooperation or Conflict: The way forward for Arctic governance. The Circle 1.

54. Ibid.

55. Arctic Ocean Conference Ilulissat, Greenland 2008, The Ilulissat Declaration.

56 Gautier et al. 2009, Assessment of Undiscovered Oil and Gas in the Arctic. Science, 329 (May 29).

57. Rekacewicz, Philippe 2007 The Arctic, a sea surrounded by land. Available online at: http://mondediplo.com/2007/09/07arcticmap.

58. International Boundary Research Unit (IBRU) 2008, Maritime Jurisdiction and Boundaries in the Arctic Region.

59. Arctic Monitoring and Assessment Programme (AMAP), 2005. Arctic Climate Impact Assessment. Cambridge University Press; and Arctic Monitoring and Assessment Programme (AMAP) 2009, Update on Selected Climate Issues of Concern, Oslo, Norway.

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