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Maria Morgunova and Kirsten Westphal

Offshore Hydrocarbon Resources in the Arctic

From Cooperation to Confrontation in an Era of Geopolitical and Economic Turbulence?

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SWP
Stiftung Wissenschaft
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German Institute
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Ludwigkirchplatz 3–4
10719 Berlin
Germany
Phone +49 30 880 07-0
Fax +49 30 880 07-100
www.swp-berlin.org
swp@swp-berlin.org

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Table of Contents

Maria Morgunova is a PhD student at Gubkin Russian State University of Oil and Gas (Moscow) and the KTH Royal Institute of Technology (Stockholm). She worked as a visiting scholar at SWP in 2014–2015 (financed by the "Iwan Gubkin" scholarship programme of DAAD and Gubkin University).

Dr. Kirsten Westphal is a Senior Associate in SWP's Global Issues Division.

Offshore Hydrocarbon Resources in the Arctic From Cooperation to Confrontation in an Era of Geopolitical and Economic Turbulence?

The northern polar region has been an area of low tension since the end of the Cold War. During the past two years, geopolitical rivalries have begun to transform cooperative relationships into more confrontational ones. This has an impact on the oil and natural gas industry's development. The Western sanctions on Arctic offshore oil development from 2014 in reaction to military destabilisation in eastern Ukraine are the most visible sign of a rift between Russia and the West. If the spirit of cooperation is lost in the energy field, political relations will further erode.

Since 2007/2008 approaches to the Arctic have been subjected to change: In 2008, the United States Geological Survey (USGS) published a very promising forecast for Arctic hydrocarbon resources, according to which 13 per cent of the world's undiscovered oil, a third of its undiscovered natural gas and a fifth of its undiscovered natural gas liquids may be found in the Arctic. Almost three-quarters of these estimated resources are located offshore on the five Arctic states' continental shelves. In the aftermath of the survey, the Arctic gained a lot of attention, and a new surge in oil and gas exploration activities has taken place there. A first observation to be emphasised is that the run for Arctic hydrocarbons has not contributed to geopolitical rivalries as expected, but rather resulted in economic and political cooperation to ensure a stable environment. This is a precondition for Arctic projects because they have very long lead-times.

The Arctic was part of the endeavour to tap into "non-conventional" energy resources driven by then high energy prices and high demand prospects in the Asia-Pacific region. Since the oil price slump in mid-2014 and relatively low price levels since then, companies have partly lost their immediate interest in hydrocarbon development in the Arctic. This is true for oil, but even more true for natural gas, for which transport infrastructure is an indispensable requisite, significantly adding to the costs. There are increasingly divergent economic calculations, risk assessments and energy strategies between the five Arctic coastal states: The interest in Arctic hydrocarbons is steady from the Russian side and its state-dominated companies, whereas the United States and Canada have move or shied away from this area, including their corporate sectors. Denmark (through Greenland) has not been a major player in hydrocarbon development. For Norway, natural gas exploration in the Barents Sea is crucial to maintain current levels of production in the future. Oil and gas companies have to adapt to new circumstances. As our analysis of the past proves, the oil price level and price volatility are major intervening factors, bringing into question the economic viability of huge long-term investment projects in the Arctic during the downward swing of fossil fuel markets. Cyclical markets are nothing new, but there are structural changes being driven by nonconventional oil and gas supply ("shale" revolution) and shifting trade dynamics. Moreover, high levels of uncertainty about future demand prospects and about structural shifts in the energy mix (away from hydrocarbons) add to a complicated market situation.

There is also the danger of falling back to old times: During the East-West conflict, the Arctic was a highly strategic and militarised region. The mode of silent cooperation that has prevailed since the end of the Cold War is at risk. Arctic governance has developed and helped to settle questions concerning borderlines and continental shelves in the past two decades. The common sense applied back then to jointly develop the abundant resources paved the road for that. This was complemented by Arctic environmental governance.

We come to the conclusion that a "loss of a cooperative spirit" can be observed, further reinforced by the sanctions against the offshore Arctic oil development of the Russians. They are hitting Russian national interests in a sensitive area, even though they are targeting *future* oil and natural gas production. The levels of instability regarding both economic and political issues in the polar region are increasing and have mutually reinforcing effects on international politics. The dynamics challenge stable and predictable relations. Visible and stepped-up military activities will no longer be balanced, which might result in a "security dilemma". Russia has had the strongest interests in stable relations in the past as a precondition for its "Arctic oil and gas rush". This logic and momentum are vanishing. Obviously, broader economic issues complicate the picture. The national interests of the five Arctic coastal states are directed towards development of the polar region, and sovereignty issues are attached to the coastal waters and exclusive economic zones. Traffic is increasing there, as ice-free passages have raised the strategic interests of other non-Arctic – especially Asian – countries.

If the spirit of dialogue and cooperation in economic and technological areas is fading, negative consequences become more likely, not only for security matters but also for environmental ones. Modern Western technologies are being replaced by Asian technologies, which might present a higher risk to the fragile environment. Cooperation to preserve the global commons is less likely in such an environment. A common vision for a sustainable Arctic – even though it is highly desirable not only for ecological but also economic reasons – is increasingly moving out of reach. Since 2007, ecological and climate concerns have been raised with the reports of the United Nations International Panel on Climate Change. Climate change is a particularly sensitive topic, with the melting icebergs and polar bears being the major symbols for global warming, thus raising public awareness. From the perspective of a "carbon emission budget" of a world that aims at limiting global warming to two degrees Centigrade compared to pre-industrial levels, Arctic oil is "unburnable carbon". The paradox and dilemma stem from the circularity that only because of retreating ice – itself a consequence of global warming driven by fossil fuel consumption – do the Arctic hydrocarbon resources become more accessible. But if climate change is taken more and more seriously, and if the bottom-up processes agreed upon at the COP 21 with the Paris Agreement in 2015 prove to become more efficient in the future, the risk of stranded assets is particularly high in the Arctic. Through the lens of climate mitigation, natural gas is a slightly different story, as it can serve as a bridge to decarbonisation.

From a German and European Union (EU) perspective, the current situation can have far-reaching future implications because two of their major energy suppliers, Norway and Russia, have their resource bases far north. Potential long-lead effects of the sanctions – coinciding with low oil and gas prices – can seriously harm (or even kill off long-term development projects in the Arctic. This context has to be taken into account when discussing supply security in the EU. There are good reasons to explore ways towards German/EU-Norwegian-Russian trilateral cooperation, especially for natural gas and infrastructure projects.

Through the Prism of Today's World: Arctic Offshore Hydrocarbons

Changing International Dynamics in the Arctic and Offshore Hydrocarbon Development

This research paper aims to analyse the state of Arctic offshore hydrocarbon development according to its many facets, because the past illustrates that driving/intervening factors have been changing over time.[1] Arctic offshore hydrocarbon activities have to be analysed through the prism of economic, geopolitical and ecological issues. The oil price slump has had a major effect on hydrocarbon projects in the Arctic. On top of the shifts in energy economics come rising geopolitical tensions globally, which are spilling over into the Arctic. In 2014, Russia's offshore Arctic oil development was put under sanctions by the West as a response to ongoing hybrid warfare in Ukraine. Our hypothesis is that the vector of cooperation is actually losing vigour overall. The Ukraine crisis has changed the mode of international cooperation twofold: First, Russia's offshore Arctic oil exploration is sanctioned; second, the relationship between the West and Russia, as the main Arctic stakeholder, has deteriorated and many political dialogues are on hold. This presents a rupture with the cooperative pattern that has prevailed in the far north since the end of the Cold War. There is a potential for destabilisation and an increasing "security dilemma"[2] in the Arctic region, which can rebound. Turning away from cooperation in the Arctic hydrocarbon sector can have sensitive spillover effects on energy security, foreign policy and on the environment.

At first glance, the Arctic hydrocarbon conundrum is composed of (geo)political, economic, climate and environmental cross-cutting issues as well as push and pull factors. Assessing the role of the Arctic for current and future energy markets provides a very ambiguous picture. The driving and limiting factors of Arctic hydrocarbon development have been changing over time. The extremely promising resources appraisal forecasts – such as the USGS Circum-Arctic Resource Appraisal of 2008, when oil prices were at their highest – resulted in huge interest and increasing levels of Arctic oil and gas exploration activities offshore. Arctic hydrocarbon abundance has become an object of scrutiny from both governments and business following the rise in the global need for new sources of oil and the diversification of natural gas supplies since then. Yet, rapidly changing energy markets, shifting trade flows to the Asian region and volatile energy prices have added to uncertainties and the emergence of new risks.

Today the region is in transition,[3] and its geography is changing, relating the issues at stake literally to *geo*-politics and -economics. The issues stretch from coastal lines that are changing due to melting polar caps and rising sea levels, the control of exclusive economic zones,[4] and the definition of continental shelves to the issue of free, innocent maritime passages. Shipping routes are developing and trade is increasing. Free sea lanes are often referred to as part of the global commons, which are in contrast to sensitive sovereignty issues of coastal states that aim to protect their territorial seas. Diverse geopolitical and economic interests as well as regulatory approaches are (mis)matching in the Arctic, creating ambiguous outcomes for the overall international environment.

The Arctic is a distant region but it is also becoming part of a globalised world. Its interconnectivity is historically, geographically and economically determined and is growing. There is a high level of interconnectivity among the Arctic countries and with non-Arctic countries. Apart from strong social and economic connections in the near-border areas (Norway-Sweden, Sweden-Finland, Finland-Russia, Norway-Russia, United States-Canada and others), there is cross-border cooperation in a variety of activities concerning the

1 The authors would like to kindly thank Stefan Steinicke, Tobias Etzold and another anonymous reviewer for their valuable and useful comments on the research paper. Grateful thanks go to Benjamin Gaiser for revising the text.

2 Tobias Etzold and Stefan Steinicke, *Regional Security and Cooperation in the Arctic and Baltic Region. Destabilization Follows Ukraine Crisis*, SWP Comments 44/2015 (Berlin: SWP, 2015), 3.

3 Germany's *Arctic Policy Guidelines. Assume Responsibility, Seize Opportunities* (Berlin: Auswärtiges Amt, November 2013), 1.

4 An exclusive economic zone is a sea zone prescribed by the United Nations Convention on the Law of the Sea over which a state has special rights regarding the exploration and use of marine resources, including energy production from water and wind.

transport sector, raw materials, fishing, etc. With increasing trade and shipping activity, the coast guard and military presence is being stepped up or considered by the five Arctic coastal states (Canada, Denmark (through Greenland), Norway, Russia and the United States). Even though the Arctic region is distant from the main international playgrounds, non-Arctic states such as China and Germany that have observer status in the major international governance institution, the Arctic Council, contribute to the globalisation of the Arctic region. Trans-regional Arctic issues, such as maritime transport routes, are equally important to Arctic states and non-Arctic states. In particular, China views the Northern Sea Route – and in particular the north-east passage – as part of its maritime Silkroad Initiative.[5] Industrial activity opens possibilities and creates opportunities for cooperation and managing interdependence for mutual benefits.

With regard to offshore hydrocarbon developments in the Arctic, four dimensions are important. First, Arctic offshore hydrocarbon development is a challenging endeavour technologically, environmentally and economically. Second, energy and mineral resource prospects contribute to the Arctic's economic globalisation, as they increase industrial activities in exploration, development, production and infrastructure construction as well as transport activities. They determine economic development of the coastal areas. Third, unlocking these hydrocarbons is a highly strategic issue for some parties from national and socio-economic – but also from regional and international – points of view. Last but not least, climate change and the fragile ecological environment provide a major reference point for policies and non-governmental activities.

As emphasised above, Arctic offshore hydrocarbon development demands more rather than less international cooperation to provide long-term stability, reduce costs, hedge risks and define what the Paris Agreement on Climate of 2015 will mean for Arctic hydrocarbons and consumption patterns. Climate change is a major intervening factor. The Arctic is prospectively rich in hydrocarbon resources but ecologically very fragile. Melting icebergs and endangered polar bears – as the major symbols for global warming – make hydrocarbon development a sensitive societal and political issue beyond mere consideration of energy economics. Through the lens of decarbonisation, Arctic offshore oil is "unburnable carbon".[6] Arctic natural gas, however, might serve as a bridge into a more sustainable future. At the same time, natural gas resources generate less interest from the companies than does oil. The priorities of – and visions for – resource development vs. conservation differ widely across the globe.

What Is the Arctic?

The Arctic is in an area north from the Arctic Circle (66°32'N), which is the southern boundary of the midnight sun. Canada, Denmark (Greenland), Norway, Russia and the United States are the five Arctic states (Figure 1). Three other Arctic states have no Arctic Ocean outlets (Finland, Iceland and Sweden). However, this simple definition is not universally applicable. Arctic borders may vary depending on governance, average temperatures, vegetation, permafrost, ecological characteristics, etc.

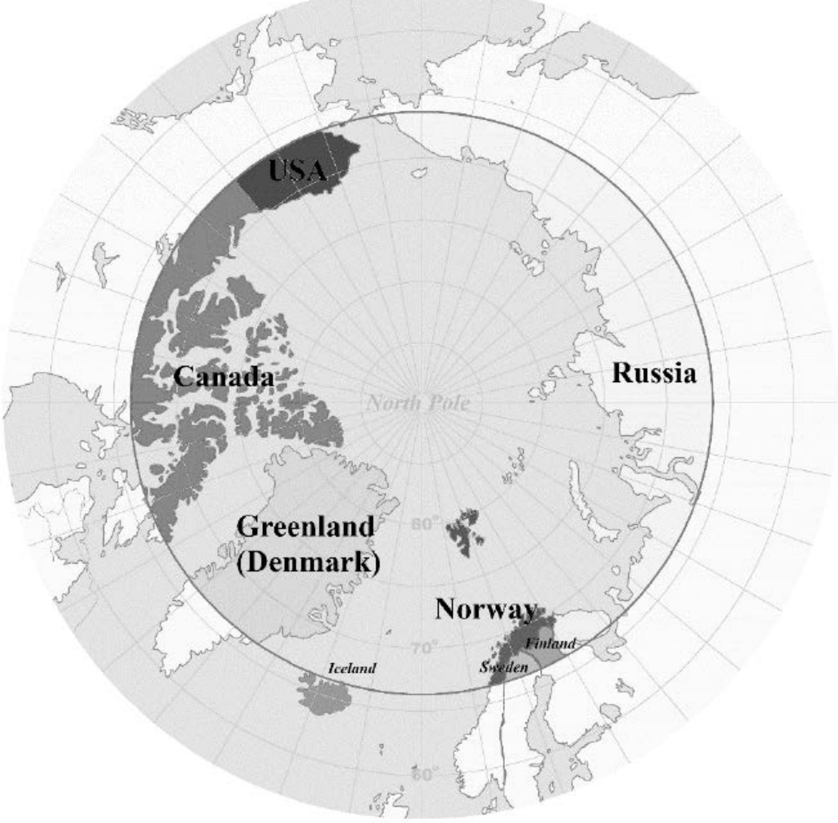
With respect to hydrocarbons, a wide range of classifications of Arctic oil and gas activities exists, implying the broad variability of geographical and physical parameters: deposits located offshore, onshore or partly onshore and located in northern or Arctic seas, seasonal ice-covered seas or ice-free water. Companies operate in the remote, hard-to-access locations and in harsh weather conditions.[7] Technological parameters also vary according to: the type of installations for resources exploration and exploitation, ice-resistance characteristics and the necessity of ice-breaker maintenance, etc. The most advanced technological approach implies subsea, automated, remote-controlled and unmanned drilling and pro-

5 Marc Lateigne, *One of the Three Roads: The Role of the Northern Sea Route in Evolving Sino-Russian Strategic Relations*, NUPI-Policy Brief 2/2015 (Oslo: Norwegian Institute of International Affairs, 2015).

6 See: Christophe McGlade and Paul Ekins, "The Geographical Distribution of Fossil Fuels Unused when Limiting Global Warming to 2°C", *Nature* 517 (2015): 187–99 (187).

7 Arctic weather conditions are defined as extreme cold (more than −40°C), severe storms, underwater and sub-water constructions icing, frequent and long-lasting fogs, permafrost, shallow sea water areas, strong sea currents, gusty winds (up to 36 m/sec), severe ice conditions, sea-bottom plowing, darkness and considerable sea level changes (up to 5 m). Sourced from: National Snow and Ice Data Center, *Arctic Sea Ice News & Analysis*, http://nsidc.org/arcticseaicenews/ (accessed 25 May 2014); Bellona, *Report Offshore Oil and Gas Development in Northwest Russia: Consequences and Implications*, 2007, http://bellona.org/news/uncategorized/2007-11-offshore-oil-and-gas-development-in-northwest-russia-consequences-and-implications (accessed June 2014).

Figure 1
Arctic region within the Arctic Circle, adapted by the authors



duction units[8] (an example from the industry is the Snøhvit gas condensate field in Norway[9]). Some of the oil and natural gas fields in the Arctic are located partly offshore and developed both from onshore and offshore facilities. Most discovered reservoirs can be developed with existing, known and tested technologies and are located in shallow water.[10] In addition, energy companies give their own definitions of their Arctic projects and of the Arctic itself. For example, Statoil defines three Arctic areas: the workable or "commercial" Arctic (the Norwegian Barents Sea and Canadian East Coast), the "stretch" and the extreme.[11]

However, some areas fall out of the Arctic Circle, and climate conditions there can be much softer.

Politically and administratively, the Arctic region can be extended up to the 60° parallel and includes territorial waters of the United Kingdom and half of the territory of Russia. In the case of Arctic offshore oil and natural gas resources exploration, the Arctic boundary was modified and incorporated to include the main Arctic offshore areas: the Barents, Pechora and Kara seas, Ob and Taz bays, the Beaufort Sea, waters of the Canadian Arctic island archipelagos, Prudhoe Bay, the Chukchi Sea and the northern part of the Norwegian Sea, as well as Greenland waters (Baffin Bay, waters south and east of Greenland, the Greenland Sea). Canada, Denmark (Greenland), Norway, Russia and the United States are the five Arctic states with Arctic Ocean outlets and Arctic offshore areas under their jurisdiction.

8 Dmitry Rogozin, Deputy Chairman of Russian Government, "Zagljanem v bezdnu" [Look into Abyss], *Rossijskaja Gazeta* (Russian Newspaper), 14 March 2014, http://www.rg.ru/2014/03/14/rogozin.html (accessed March 2014).
9 Statoil, *Snøhvit*, publication from 12 January 2015, http://www.statoil.com/en/ouroperations/explorationprod/ncs/snoehvit/pages/default.aspx (accessed December 2015).
10 National Petroleum Council, *Arctic Potential. Realizing the Promise of U.S. Arctic Oil and Gas Resources* (USA: NPC, 2015).
11 "Statoil – to Renew Focus on Arctic Exploration", *Reuters*, 5 March 2014, http://uk.reuters.com/video/2014/03/05/statoil-to-renew-focus-on-arctic-explora?videoId=287983054 (accessed May 2014).

Hydrocarbon Developments in the Arctic – An Economic Perspective

Assessment of Projects, Locations and Lead-times

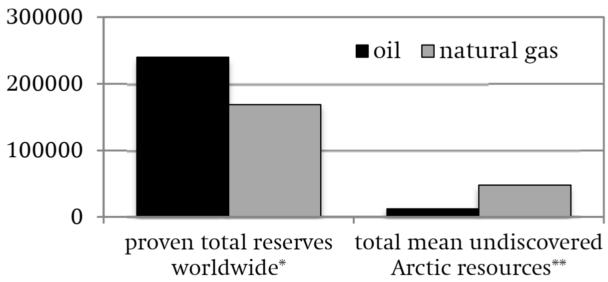
The "Arctic bonanza" had its big bang in 2008 because of the then published Circum-Arctic Resource Appraisal on undiscovered oil and natural gas by the USGS.[12] According to the survey, up to 22 per cent of the world's undiscovered oil and natural gas resources may potentially be found in the Arctic, almost 13 per cent of oil resources and 30 per cent of natural gas resources.[13] Natural gas is three times more abundant than oil.[14] A total of 84 per cent of these resources are expected to be offshore but located mostly in shallow waters on continental shelves of the five Arctic states.[15] The Russian section, and in particular the South Kara Sea, is looking most promising: It contains almost 39 per cent of the undiscovered gas in the Arctic.[16] There are nearly 550 oil and natural gas fields in the Arctic basins, and approximately 61 large ones, 43 of which were found in Russia.[17]

Despite the rush in 2008, oil and natural gas exploration activities in the Arctic region have been taking place for more than 90 years.[18] To date, each of the five Arctic coastal states has shown a profound interest in Arctic resource management and geopolitics. However, the intensity of oil and natural gas resources exploration differs widely among these states, even though each of these countries has Arctic offshore areas. Being extremely technologically demanding and risky, offshore activities require huge investments from both the corporate and government sides. The following analysis is dedicated to showing current oil and gas activities in the offshore Arctic areas.

Table 1 shows average time from discovery to production (D-to-P) for offshore oil and natural gas projects in the Arctic of Canada, Norway, Russia and the United States; the two zones with Arctic-like weather conditions, Newfoundland and Labrador (Canada); and for the Cook Inlet (United States). The average D-to-P rates illustrate differences in Arctic offshore resources management and interest towards resource exploration among the five Arctic coastal states.

When interest in exploration began growing in the 1980s, the United States was at the forefront, during which time the average D-to-P rate was only 8.5 years (Cook Inlet fields started to produce 11 years after their discovery, on average). Most likely, this speedy development was driven by the two oil crises in the 1970s and rising oil prices. There was a surge in new

Figure 2
Proven oil and natural gas reserves worldwide and Arctic resource potential, million tons of oil equivalent (mtoe), compiled by the authors



* By the end of 2014; source: "BP Statistical Review of World Energy 2015", BP, June 2015, http://www.bp.com/statisticalreview (accessed October 2015).
** Sum estimates of undiscovered hydrocarbon resources in oil- and natural-gas-bearing provinces north of the Arctic Circle by 2008 (including natural gas liquids); source: USGS, *Fact Sheet 2008–3049: Circum-Arctic Resource Appraisal: Estimates of Undiscovered Oil and Gas North of the Arctic Circle*, Vol. 2000 (USA: USGS, 2008), 4.

12 Donald L. Gautier et al., "Assessment of Undiscovered Oil and Gas in the Arctic", *Science* 324, no. 5931 (2009): 1175–79 (1178); USGS, *Final Report: Oil and Gas Resource Assessment of the Russian Arctic*, 2008 (Denver, 2015); USGS, *Fact Sheet 2008–3049: Circum-Arctic Resource Appraisal: Estimates of Undiscovered Oil and Gas North of the Arctic Circle* (Vol. 2000), 4.
13 Gautier et al., "Assessment of Undiscovered Oil and Gas in the Arctic" (see note 12): 1178.
14 Ibid.
15 Kathrin Keil, "Economic Potential", in *Arctic Security Matters*, ed. Juha Jokela, EUISS Report No. 24 (Paris: European Union Institute for Security Studies, 17 June 2015), 22.
16 Gautier et al., "Assessment of Undiscovered Oil and Gas in the Arctic" (see note 12): 1175.
17 Phillip Budzik, *Arctic Oil and Natural Gas Potential* (Washington, D.C.: U.S. Energy Information Administration [EIA], Office of Integrated Analysis and Forecasting, Oil and Gas Division, 2009), 18.
18 Arctic Monitoring and Assessment Programme, *Arctic Oil and Gas* (Oslo, 2007), 40.

Table 1
Average D-to-P rates in the Arctic by country

	Canada	*Canada (Newfoundland)*	*Norway*	*Russia*	*United States*	*United States (Cook Inlet)*
number of producing fields	0	3	2	2	6	5
average D-to-P	–	17.7	13.5	28.5	8.5	11.4
number of fields planned to be developed*	0	1	3	7	2	–
average planned D-to-P	–	–	14.3	29.5	37.0	–
average D-to-P	–	22.3	14.0	29.3	15.6	–

* Norway: Goliat, Aasta Hansteen, Johan Castberg; United States: Point Thompson, Liberty; Russia: Kharasaveyskoye, North-Kamennomysskoye, Kamennomysskoye-Sea, Dolginskoye, Rusanovskoye, Leningradskoye, Kruzenshternskoye; Canada (Newfoundland): Hebron.

exploration and development by countries in the Organisation for Economic Co-operation and Development (OECD) to reduce their import dependencies on the Middle East.

The next generation of discoveries made in the mid- and late 1980s in Russia, Norway and the United States appeared to be more time-consuming. By then, however, oil prices had plummeted. Norway had an average D-to-P rate of about 14 years, whereas the Russian offshore Arctic average was about 30 years (see Table 1).

This trend has changed only slightly over time. This means that actual exploration for Arctic resources is far from being intensive, even under the pressure of the geopolitical "rush" and the undiscovered resource potential. This supports the overall historical trend for the non-intensive exploration of Arctic resources. Even though technological progress and record-high oil prices of the 2000s triggered the trend for Arctic development, the on- and offshore share of oil in Arctic production has reached 10 per cent of global production, and natural gas has reached around 21 per cent.[19] Since then, most likely, the relative shares have declined a bit, given the shale oil and gas revolution in the United States.

As Table 2 (p. 12) shows, there are two producing offshore oil and natural gas fields in Norway (Snøhvit and Skuld), two in Russia (Prirazlomnoe and Yurkharovskoye), and six in the United States (Northstar, Endicott, Pt. McIntyre, Nikaitchuq, Oooguruk and Badami) in total. There are no producing fields in the Canadian Arctic, but three in the Newfoundland area (Hibernia, Terra Nova, White Rose). These fields are graphically weighted by amount of reserves in Figure 3 (p. 13). There are also some US projects being conducted in Arctic-like conditions: Cook Inlet (e.g. Granite Point, Trading Bay, Middle Ground Shoal, North Cook Inlet, Cosmopolitan).

To summarise, Figure 3 shows "brown" (long-producing fields) and "green" or "blue" (recent production start of oil or natural gas fields, respectively) fields in the offshore Arctic areas. The fields are weighted by the amount of reserves (cumulative oil and natural gas reserves in mtoe). Two gas fields – Yurkharovskoye and Snøhvit – together contribute more than two-thirds of overall Arctic offshore production. This only comprises around 1 per cent of total world oil and natural gas production.[20]

The International Energy Agency estimates in its World Energy Outlook of 2015 that oil production from the Arctic shelf will only play a marginal role with 0.2 million barrels a day in output in 2040 (less than 1 per cent of global oil consumption at that date).[21] Even though Arctic oil production is low, the undiscovered potential of offshore hydrocarbon resources in the Arctic can significantly contribute to the total proven reserves worldwide (see Figure 2). Thus, national interests are still present in the Arctic.

19 Solveig Glomsrød and Lars Lindholt, *Future Production of Petroleum in the Arctic under Alternative Oil Prices*, Chapter 5: "The Economy of the North" (Norway: SSB, 2008), 69–73.

20 Maria Morgunova, *Arctic Offshore Hydrocarbon Resource Development: Past, Present and Vision of the Future*, Universitetsservice US-AB, ISBN 978-91-7595-5025 (Sweden: Kungliga Tekniska högskolan [KTH], 2015), 123.

21 International Energy Agency (IEA), *World Energy Outlook 2015* (Paris, 2015), 134.

Table 2
Producing oil and natural gas fields in the Arctic and Newfoundland offshore

Country, area	*Field*	*Resource type*	*Recoverable (proven) reserves, million tons of oil equivalent (mtoe)*	*Start of production*	*Operator*
Canada, Newfoundland	Hibernia	oil	96	1997	ExxonMobil
Canada, Newfoundland	Terra Nova	oil	55	2002	Petro-Canada
Canada, Newfoundland	White Rose	oil gas	30 (satellites approx. 30)	2005	HuskyEnergy
Norway, Barents Sea	Snøhvit	gas condensate	194	2007 (satellites 2014–2015)	Statoil
Norway, Norwegian Sea	Skuld	oil gas	12	2013	Statoil
Russia, Pechora Sea	Prirazlomnoe	oil	72	2013	Gazprom Neft Shelf
Russia, Yamal (partly offshore)	Yurkharovskoye	gas condensate	424	2003	Novatek
US, Beaufort Sea	Northstar	oil	24	2001	BP/Hilcorp*
US, Beaufort Sea	Endicott	oil	Approx. 65	1986	BP/Hilcorp*
US, North Slope	Pt. McIntyre	oil	46	1993	BP Exploration (Alaska)
US, North Slope	Nikaitchuq	oil	30	2011	Eni
US, North Slope	Oooguruk	oil	9.5	2008	Pioneer Natural Resources
US, North Slope (partly offshore)	Badami	oil	16.4	1998	BP

* Hilcorp also acquired 100 per cent of the Northstar and Endicott fields from BP; source: Tim Bradner, "Hilcorp Files Plan for Liberty Field Development", *Alaska Journal of Commerce*, no. 2 (2015), online July 2015, http://www.alaskajournal.com/Alaska-Journal-of-Commerce/January-Issue-2-2015/Hilcorp-files-plan-for-Liberty-field-development/ (accessed December 2015).

Arctic "Bonanza" vs. Oil Price Slump – The Impact of Market Dynamics

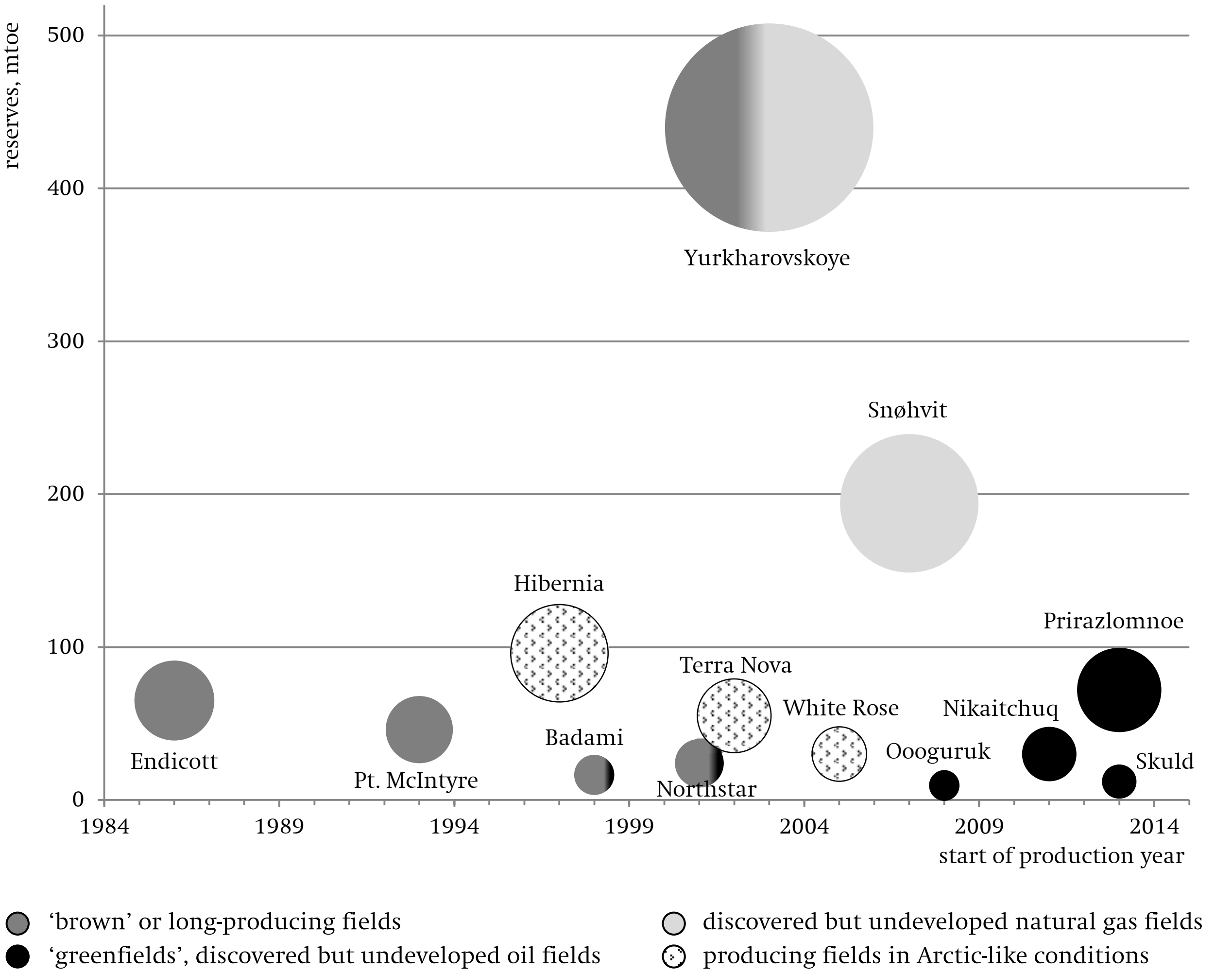
The Arctic has been part of the envisaged "nonconventional revolution". The World Energy Outlook in 2008[22] paid great attention to nonconventional hydrocarbon resources, including Arctic ones. In general, oil and natural gas exploration has qualitatively entered a new stage since the first decade of the 21st century due to technological progress. It has been moving into new frontiers and new hard-to-reach locations, forcing businesses and governments to gather.[23] The difference between conventional and nonconventional resources is mainly based on technology and economics.[24] In the Arctic, the key issue is the discovery of those Arctic oil and gas deposits where exploitation is economically

22 IEA, *World Energy Outlook 2008 – Oil and Gas Production Prospects* (Paris, 2008).

23 Shell, *New Lens Scenarios, A Shift in Perspective for a World in Transition* (2013), 11, http://www.shell.com/global/future-energy/scenarios/new-lens-scenarios.html (accessed December 2015).

24 David L. Greene, Janet L. Hopson and Jia Li, "Have We Run Out of Oil Yet? Oil Peaking Analysis from an Optimist's Perspective", *Energy Policy* 34 (March 2006): 515–31 (516).

Figure 3
Comparison of proven recoverable reserves of producing oil and natural gas fields offshore from the Arctic and Newfoundland (mtoe), compiled by the authors



viable and technologically feasible. Still, offshore hydrocarbon resources in the Arctic are very speculative. For natural gas, the discoveries have to be large enough to justify the construction of the necessary export infrastructure (pipelines and/or liquefaction plants).

Energy demand across the world has increased dramatically since 2000, with the largest-ever levels of growth in energy consumption, in volume terms, occurring between 2002 and 2012.[25] Most projections, for example by the IEA,[26] Shell[27] or by Statoil,[28] foresee a growth in energy demand of up to 41 per cent by 2035 compared to 2012.[29] It is expected that neither technology breakthroughs nor price developments or market conditions will dramatically change the consumption patterns and will not result in a quick turning away from global fossil fuel consumption.[30] If glo-

25 British Petroleum (BP), *Energy Outlook 2015*, January 2014, 9, http://www.bp.com/energyoutlook.
26 IEA, *World Energy Outlook 2013* (Paris, 12 November 2013), http://www.worldenergyoutlook.org/publications/weo-2013/.
27 *Shell Energy Scenarios to 2050* (2008), 52, http://www.shell.com/global/future-energy/scenarios/2050.html; Shell, *New Lens Scenarios, A Shift in Perspective for a World in Transition*, 2013, http://www.shell.com/global/future-energy/scenarios/new-lens-scenarios.html.
28 Statoil, *Energy Perspectives, Long-term Macro and Market Outlook*, June 2013, 44, http://www.statoil.com/en/NewsAndMedia/News/2013/Pages/14Jun_EnergyPerspectives.aspx.
29 BP, *Energy Outlook 2015* (see note 25), 9.
30 H.-H. Rogner, “An Assessment of World Hydrocarbon Resources”, *Annual Review of Energy and the Environment* 22, no. 1 (1997): 217–62.

bal demand patterns do not really change fundamentally, fossil fuels will dominate the global energy balance for the next two decades.

Economic feasibility of distant or newly explored oil and natural gas resources in places other than traditional oil-producing regions is very dependent on oil pricing, due to high exploration costs and technological complexity. Since the turn of the century, the oil world experienced a steep increase in prices between 2003 and 2008, an oil price slump during the financial and economic crises in 2008/2009, followed by an unprecedented period of stable high oil prices between mid-2009 and mid-2014. In the past decade, the depletion of conventional oil and gas reserves and the ongoing relevance of an oil production plateau (or oil peak[31]) were of great concern. As the new reservoirs and nonconventional sources proved to be more expensive to recover, these new resources have been associated with the end of the era of cheap oil[32] or easy oil (and natural gas to a lesser extent).

In 2008, before the economic crises unfolded and at the beginning of the "Arctic rush", the cost of Arctic oil resources was estimated to range between US$40 and $100 per barrel, depending on transport costs and other overheads, whereas the oil price was around US$80–$90.[33] Arctic offshore oil and gas is expected to require an even higher price. The expectations for Arctic offshore oil production were very modest – less than 200,000 barrels per day (10 mtoe per year) by 2035.[34] Actual production volumes are higher but are expected to increase only a little till 2040.[35] During the period of very stable and high oil prices between 2009 and June 2014, a number of companies turned their attention to the Arctic: Shell in the Chukchi and Beaufort seas, Russian majors Rosneft and Gazprom in the Barents and Kara seas, Cairn to offshore Greenland, ExxonMobil to the offshore Russian Arctic and Alaska, and Eni to offshore Norway. In the last 15 years, a number of international joint ventures have been created[36] to commonly explore and develop the oil and gas reservoirs in this highly challenging environment. The most prominent examples are: Shtokman Development AG 2008 by Gazprom, Total and Statoil; Rosneft and ExxonMobil in Kara Sea in 2011; Rosneft and Eni in Barents as well as Rosneft and Statoil in the Barents and Okhotsk seas in 2012; Gazprom and Shell in 2013; Novatek, Total and CNPC to construct the Yamal liquefied natural gas plant in 2014; BP, ExxonMobil and Imperial Oil in the Beaufort Sea in 2010. An industry project of 33 oil and gas companies has also acquired seismic data in the Barents Sea.[37]

In general, huge investments were made across the globe in new oil and gas projects. The major outcome was the technological breakthrough of combining hydraulic fracturing and horizontal drilling, resulting in the "shale revolution" in the United States. These new types of nonconventional energy resources, and so-called new frontiers, have successively changed the world energy balance away from tight markets to an oversupply since the second half of 2014. The oil price slump, which saw new recent lows in price on 20 January 2016 (Brent, US$27.6 per barrel), seriously hit many high-cost exploration and development plans. The Shtokman Field in the Barents Sea was the first victim of the "shale revolution". The promising joint venture of Gazprom, Statoil and Total collapsed in 2012. After Statoil's withdrawal, Total followed in June 2015, passing over its 25 per cent share to Gazprom.[38]

31 Ian Chapman, "The End of Peak Oil? Why This Topic Is Still Relevant Despite Recent Denials", *Energy Policy* 64 (2014): 93–101.

32 Robert L. Hirsch, "The Inevitable Peaking of World Oil Production", *The Atlantic Council of the United States Bulletin* 16, no. 3 (2005): 1–10; Nick A. Owen, Oliver R. Inderwildi and David A. King, "The Status of Conventional World Oil Reserves – Hype or Cause for Concern?", *Energy Policy* 38, no. 8 (2010): 4743–49; Fredrik Robelius, *Giant Oil Fields – the Highway to Oil* (Uppsala: Uppsala Universitet, 2007).

33 BP, "Energy Charting Tool", 2015, http://www.bp.com/en/global/corporate/about-bp/energy-economics/statistical-review-of-world-energy/energy-charting-tool.html (accessed 20 February 2015).

34 IEA, *World Energy Outlook 2008 – Oil and Gas Production* (see note 22).

35 IEA, *World Energy Outlook 2015* (see note 21), 134.

36 Examples: Shtokman Development AG 2008 by Gazprom, Total and Statoil; Rosneft and ExxonMobil in Kara Sea in 2011; Rosneft and Eni in Barents and Rosneft and Statoil in Barents and Okhotsk seas in 2012; Gazprom and Shell in 2013; Novatek, Total and CNPC to construct Yamal liquefied natural gas plant in 2014; BP, ExxonMobil and Imperial Oil in the Beaufort Sea in 2010; joint industry project of 33 oil and gas companies to acquire seismic data in the Barents Sea in 2013–2014, and others.

37 "Barents Seismic Program Adds New Participants", *Offshore-Mag*, 25 February 2014, http://www.offshore-mag.com/articles/2014/02/barents-seismic-program-adds-new-participants.html. Seismic cooperation gave first results in October 2014. For more information: "Seismic Cooperation in the Barents Sea Gives New Perspectives", *Statoil*, 2 October 2014, http://www.statoil.com/en/NewsAndMedia/News/2014/Pages/02Oct_Barents_seismic.aspx.

38 "Total Withdraw from Shtokman Development AG Shareholders Board", *Stokman*, 5 August 2015, http://www.shtokman.ru/en/press/news/2015/274/ (accessed 21 September 2015).

At the time of writing at the beginning of 2016, there was still an oil oversupply of approximately 1.5 million barrel per day to up to 2 million barrel per day on world markets. Moreover, after the nuclear deal with Iran, a major oil and gas producer is coming back to world markets, and thus competition over oil market shares is expected to increase. Furthermore, the United States has lifted its crude oil export ban. Conventional low-cost producers such as Saudi Arabia are aiming at pushing competitors out of the market. Last but not least, the Chinese economy is displaying more and more signs of flattening growth. Thus, oil prices most likely will remain at a relatively low level for the coming months. The now prevailing perception is "low for long" prices. The demand-supply balance of oil and gas markets typically displays cyclical swings.[39] The stable and high price period between 2010 and 2014 is more an exception to the rule. Thus, we are observing a "new normal" with the relatively low price level but with high short-term volatility.

A question is whether, and to what extent, smaller-scale shale and tight oil and gas projects (compared to conventional fields) may have a cushioning effect on the cyclical amplitudes. Thus, it has to be highlighted that energy markets are still characterised by "unprecedented uncertainty",[40] and the rapidly changing energy markets are resulting in an "energy world under stress".[41]

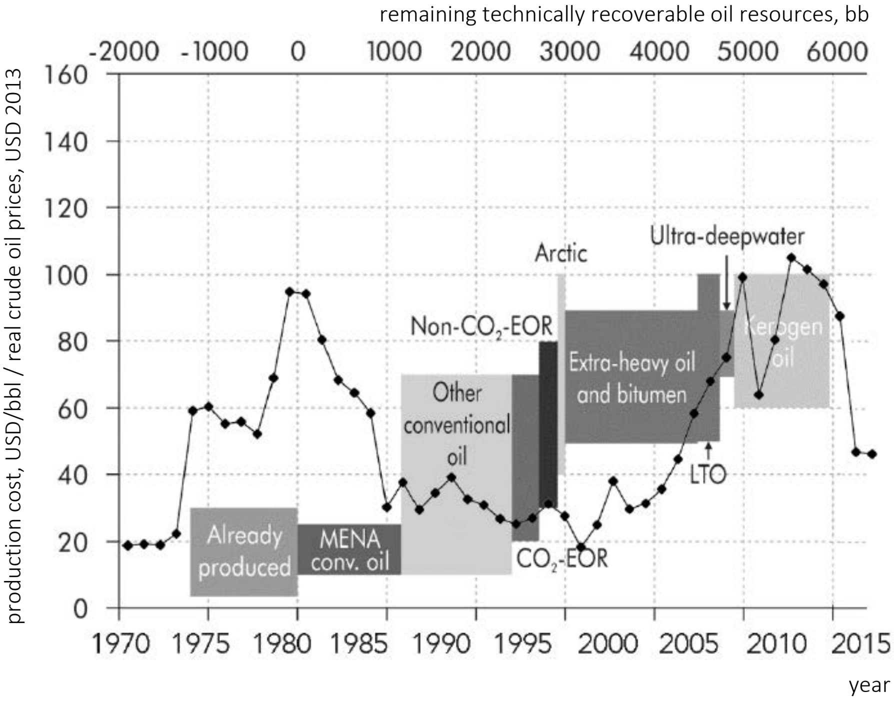
Arctic offshore resource development is the "first victim" of the downward swing in the oil (and natural gas) market. Oil prices do have a robust, long-term influence on exploration activities on the Norwegian Continental Shelf.[42] There is clear evidence that the volatility of oil prices and the USD/NOK exchange rate constitute the highest risks for the Norwegian petroleum industry.[43] The same is valid for other Arctic offshore areas. Supposedly, priority high-cost projects such as offshore deepwater and Arctic projects are under revision now due to changing risks and profitability assessments. Investments in large complex fields are increasingly being revised. Some institutions have refused to finance Arctic operations for quite a while due to extreme risks, high costs and unpredictability, as with German bank "West LB".[44] The same conclusions about uncontrolled and hard-to-manage risks were made by Lloyds[45] and some Asian investors, specifically the Japanese.

The viability of Arctic on- and offshore oil in competition with other resources is displayed in Figure 4 (p. 16).

Today, Western companies mostly keep silent or show restrained, pragmatic interest. There are some drivers that helped to maintain Arctic offshore activities (until recently). First is the fact that the reserve base for international oil and gas companies is essential for shareholder value. The pressure on the big multinational oil and gas companies to maintain a significant reserve base is high. Shell's activities in Alaska in 2015 were a case in point. Shell also made this step on the assumption that it could cut costs, even though economic and environmental risks were substantial.[46] The fear of an oil spill and reputational losses forced Shell shareholders to "support a resolution for the company to henceforth report on the climate risks of its business".[47] Investment funds are increasingly critical of climate and ecologically damaging activities, such as the Dutch Pension fund that has asked Shell to halt its activities in the Arctic.[48] The positive dynamics on stocks of having Arctic hydrocarbon resources on balance can easily be negated by an oil spill. The business faces high risks plus regulatory and political uncertainty. Shell abandoned its Arctic activities when the Burger J exploration well brought disappointing results in autumn 2015. As Shell has been a frontrunner of Arctic projects, its withdrawal might prevent other companies from starting new Arctic activities soon.

39 These issues have been highlighted by several speakers during the SWP-Weltenergierat Expert Talks on September 2 and 3, 2015 taking place under Chatham House rule.
40 IEA, *World Economic Outlook 2010* (Paris: OECD/IEA, 2010).
41 IEA, *World Economic Outlook 2014* (Paris: OECD/IEA, 2014).
42 Klaus Mohn and Petter Osmundsen, "Exploration Economics in a Regulated Petroleum Province: The Case of the Norwegian Continental Shelf", *Energy Economics* 30 (2008): 303–20.
43 Øyvind Bøhren and Steinar Ekern, *Usikkerhet I oljeprosjekter. Relevante og irrelevante risikohensyn* [Uncertainty in Oil Projects. Relevant and Irrelevant Risk], Beta 1 (1987): 23–30.
44 Mathew Carr, "WestLB, Oil Platform Lender, Won't Do Arctic, Antarctic Business", *Bloomberg Business*, 27 April 2012, http://www.bloomberg.com/news/articles/2012-04-27/westlb-oil-platform-lender-won-t-do-arctic-antarctic-business (accesses December 2015).
45 Lloyds, *Arctic Opening: Opportunity and Risk in the High North*, Report (2012), 60.
46 "Shell Resumes Arctic Drilling but Cuts $15bn from Global Investment", *British Broadcasting Corporation (BBC)*, 29 January 2015, http://www.bbc.com/news/business-31034870 (accessed December 2015).
47 Karel Beckman, "Why Shell Can't Quit the Arctic", *Energypost.eu*, 22 May 2015, http://www.energypost.eu/shell-wants-go-arctic/ (accessed September 2015).
48 Ibid.

Figure 4
Oil production costs for various categories and real imported crude oil price, 2013 USD per barrel (bl), compiled by authors



Sources: Dider Houssin, "Resources to Reserves 2013", Launch Presentation, International Energy Agency, http://www.iea.org/etp/resourcestoreserves/ (accessed February 2015); EIA, *Short-term Energy Outlook*, 10 February 2015, http://www.eia.gov/forecasts/steo/realprices/ (accessed 23 February 2015).

In view of "unprecedented uncertainty" in energy markets, a wait-and-see attitude can be observed for many big, risky projects. Compared to other countries, Arctic offshore exploration in Norway is going ahead. However, changes are occurring there: Operators have renewed focus and have become more selective about the projects to develop because of increasing operating costs and projected crude oil price stagnation.[49] Rising upstream costs (70 per cent of costs increased in the period 2000–2007[50]) and falling drilling productivity[51] have prompted companies to cut their costs, increase efficiency and/or postpone Arctic offshore projects (e.g. Statoil). Recent job cuts all over the petroleum and services sectors with no geographical borders are the result of both oil price volatility and geopolitical destabilisation.[52]

49 Mikael Holter, "Norway Oil, Gas Producers Maintain Record 2014 Spending Forecast", *Bloomberg Business Week*, 6 March 2014, http://www.businessweek.com/news/2014-03-06/norway-oil-gas-producers-maintain-record-2014-spending-forecast.
50 IEA, *World Energy Outlook 2008 – Oil and Gas Production* (see note 22).
51 Petter Osmundsen, Kristin Helen Roll and Ragnar Tveterås, "Exploration Drilling Productivity at the Norwegian Shelf", *Journal of Petroleum Science and Engineering* 73 (2010): 122–28.

52 Starting from 2014, Shell has announced numerous jobs cuts (250 in Aberdeen alone; sourced from: "Shell Resumes Arctic Drilling but Cuts $15bn from Global Investment", *BBC*, 29 January 2015, http://www.bbc.com/news/business-31034870). Norwegian companies of different scale cut their expenses on workforce, which in 2014 has affected 7,000 and could affect as many as 40,000 jobs nationwide (sourced from: "Oil Sector Cuts 7,000 Jobs – and More to Go", *The Local*, 6 November 2014, http://www.thelocal.no/jobs/article/oil-sector-cuts-7000-jobs-and-more-to-go; Mikael Holter, "Norway Oil Sector Braces for 40,000 Job Cuts amid Downturn", *Financial Post*, 10 February 2015, http://business.financialpost.com/news/norway-oil-sector-braces-for-40000-job-cuts-amid-downturn). Statoil is going to fire 7 per cent of its workforce and a third of its consultants by the end of 2016 (sourced from: "Norway's Statoil to Cut up to 1,500 Jobs by End of 2016", *Reuters Business News*, 16 June 2015, http://uk.reuters.com/article/2015/06/16/uk-statoil-employment-idUKKBN0OW0G020150616). The US economy lost more than 9,300 jobs by February 2015 (Jen-

Since the slump in oil prices, companies have put projects on hold in Arctic seas. This is the case with almost every oil and gas company that has operated there: Eni, Royal Dutch Shell, ConocoPhillips, Exxon Mobil, Cairn Energy and BP. The last ones to postpone Arctic development were Statoil and Gazprom. Risk aversion is noticeable among the big multinational oil corporations, which have shied away from major investments in big fields, even in recent years. Here, the investment cycles are long, and significant capital is required. Such equivocation also favours the "smaller" shale gas and tight oil projects (close to existing markets and infrastructure), which have shorter investment cycles and are often more quickly realised, cheaper and less complex.

Arctic natural gas is a slightly different story, as there are just a few projects (Snøhvit, Yamal LNG, Yamal mega project and some others). Gas prices have also seen a downward turn because of increasing supplies, more gas-to-gas competition and indirect effects for oil-linked prices. What adds to the complex picture for natural gas exploration and exploitation is the fact that natural gas faces competition from other fuels in nearly all of its applications (power and heat generation, industry and transport). Thus, EU climate and energy policies for 2020 and 2030 as well as Germany's Energiewende are of decisive importance for gas projects in the Arctic. In the case of (much) higher carbon dioxide prices or greenhouse gas emission-reduction targets, coal would lose out to natural gas; yet, energy-efficiency measures and the expansion of renewable energies would reduce natural gas consumption. Natural gas is a relatively clean fossil fuel. Russian Arctic natural gas projects have not been subjected to EU sanctions (which are discussed in the chapter "The Impact of the Crisis over Ukraine and Sanctions on Russia").

Arctic gas can by a narrow margin compete on the market with American shales (and Arctic onshore Russian fields with existing infrastructure, where gas is delivered to Europe, are the lowest-cost gas source for Western European gas markets).

Diverging National Interests in Hydrocarbon Development in the five Arctic States

Economic calculations still function as the major reference point, even more so for private multinational oil and gas companies. The abovementioned development patterns still provide important path dependencies for potential Arctic hydrocarbon development. However, a glance to the past shows that also strategic considerations have played a role in Arctic hydrocarbon development – geopolitical turmoil in major regions producing conventional resources, such as the oil crises in the Middle East in the 1970s, incentivised new exploration activities in other geographic areas to have a more diversified energy supply. Simultaneously, they made the Arctic, which is a distant and hard-to-explore location, an attractive place for many Western oil and gas majors. In the 2000s one driver pushing producers to the Arctic has been the re-nationalisation of oil and gas reserves in many traditional regions. Multinational oil and gas companies have looked for access to new, promising reservoirs. Against the backdrop of more complicated economic (and geopolitical) circumstances, national interests have started to increasingly diverge.

Norway. Norway has kept the same pace of relatively fast production startup of newly discovered fields (see Table 1). Still, most of Norway's oil and gas is exploited outside Arctic waters, but future prospects and recent findings indicate that, in the future, the Barents Sea has the potential to become a major producing region in the Arctic. Norway is considered to be the global leader in Arctic exploration and takes second place for total offshore oil and natural gas volumes. However, the volumes are modest.

Between 1975 and 2011, Norway had a moratorium for Arctic oil exploration and production because of a border dispute with the Soviet Union/Russia. In 2010 the two countries solved the issue and the respective treaty was ratified in 2011 by both sides. The part of the Norwegian Arctic that holds the most prospect for exploration is the Norwegian part of the Barents Sea, where the only field developed so far is Snøhvit (production started in 2007).[53] It has been the most rapidly developing Arctic offshore area until now. The first oil

nifer A. Dlouhy, "U.S. Oil-industry Job Losses Continued to Grow in February", *Alaska Dispatch News*, 6 March 2015, http://www.adn.com/article/20150306/us-oil-industry-job-losses-continued-grow-february).

53 Norwegian Petroleum Directorate, "Facts 2013", Chapter 10: "Fields in Production", 26 April 2013, http://www.npd.no/en/Publications/Facts/Facts-2013/Chapter-10/ (accessed November 2015).

field in the Barents Sea – the Goliat (discovered in 2009 and developed by ENI and Statoil) is expected to begin producing in early 2016.[54] The Johan Castberg project (Skrugard and Havis twin discoveries of 2011 and 2012, respectively) are expected to receive an investment decision by 2017.[55] Skuld (Fossekall, 2009; Dompap, 2010) in the northern part of the Norwegian Sea is one of the fast-track developments launched in March 2013.[56] The 23rd licensing round started in April 2015, during which 11 blocks have been granted in the Barents Sea.[57]

The Norwegian state energy company Statoil actively participates in offshore oil and natural gas projects of different scale, also outside the Arctic (more than 130 projects in the North Sea and 30 elsewhere as of January 2015[58]). However, this has been slowing down due to recent cost reductions in Norway (investments in the oil and gas sector are predicted to drop by almost 40 per cent from 2014 to 2017)[59] and elsewhere in the petroleum industry.

As Norway's state budget heavily relies on hydrocarbon exports, the country can be expected to open new frontiers in offshore Arctic areas[60] in a more stable economic environment. The Barents Sea is of strategic importance for the country's wealth. Given the strong resource base in the Barents Sea, an expansion of the export infrastructure is key. As investment decisions for development, production and infrastructure construction depend on commercial decisions of companies, the discovery of huge prospective fields as well as security (or at least predictability) of demand are two necessary preconditions. This, in turn, has important implications for the EU, as Norway is a key country for the EU's efforts to diversify its oil and gas supplies. Thus, the energy future of Norway as well as the EU is dependent on maintaining stability in the Arctic.

Russia. In Russia, there has been almost no acceleration of Arctic hydrocarbon development. Yet, Russia has vast resources and ambitious plans to develop Arctic offshore fields (seven are queuing). The exploitation of Arctic reserves is a strategic issue for Russia, both in terms of modernising its oil and gas industry and for replacing the depleting oil fields onshore. Most of Russia's hydrocarbons are located in the north, in particular in western Siberia. Most importantly, Russia's major gas producer, Gazprom, faces a surplus capacity of natural gas in western Siberia,[61] limiting its appetite to develop new large deposits. For a few other Russian oil and gas companies, such as Novatek, the Arctic is of strategic importance to gain the larger market share and draw nearer to Rosneft and Gazprom, where the oversized costs are partly accountable for that market division.

The Russian model of offshore resource exploration relies on a strong governmental component. The development of the shelf was defined as strategic, thus the offshore licences were reserved by law for Russian state (-dominated) companies Rosneft and Gazprom.[62] The main offshore areas are the Barents, Kara, Pechora, Laptev, East-Siberian and Chukchi seas. The Russian section of the Arctic Sea, and in particular the South Kara Sea, is looking to be the most promising by far, as it contains almost 39 per cent of undiscovered gas in the Arctic.[63] In spite of that, the only two producing fields currently are Prirazlomnoye (discovered in 1989/in production since 2013) and Yurkharovskoye (1970/2003, partly offshore). The majority of the fields in the Russian Arctic were discovered in the 1980s (Yamal Peninsula – 1970s), when the average time from discovery to production was around 30 years. The activities on the Russian Arctic shelf had intensified in

54 "ENI Delays First Oil from Arctic Goliat Field to Early 2016", *Rigzone*, 22 December 2015, http://www.rigzone.com/news/oil_gas/a/142221/ENI_Delays_First_Oil_from_Arctic_Goliat_Field_to_Early_2016#sthash.VdraIlJJ.dpuf (accessed January 2016).
55 "Johan Castberg", *SubseaIQ*, http://www.subseaiq.com/data/Project.aspx?project_id=887 (accessed July 2015).
56 Statoil, "Skuld Has Started Production", *News*, 19 November 2013, http://www.statoil.com/en/NewsAndMedia/News/2013/Pages/18Mar_Skuld.aspx (accessed December 2015).
57 Norwegian Petroleum Directorate, "Awards in Predefined Areas 2015 – Announcement", http://www.npd.no/en/Topics/Production-licences/Theme-articles/Licensing-rounds/APA-2015/APA-2015--announcement/ (accessed November 2015).
58 "Offshore Field Development Projects, Search Conducted: Operator 'Statoil'", *SubseaIQ*, 2014, http://www.subseaiq.com/data/default.aspx (accessed 13 January 2015).
59 "Is Norway's Oil & Gas Industry Doomed?", *Blouin news*, 15 December 2015, http://blouinnews.com/84758/story/norways-oil-gas-industry-doomed (accessed January 2015).
60 Keil, "Economic Potential" (see note 15), 24.
61 See: James Henderson and Tatiana Mitrova, *The Political and Commercial Dynamics of Russia's Gas Export Strategy*, OIES Paper: NG 102 (Oxford: OIES, 2015).
62 James Henderson, *Key Determinants for the Future of Russian Oil Production and Exports*, OIES WPM 58 (Oxford: OIES, 2015), 5, http://www.oxfordenergy.org/wpcms/wp-content/uploads/2015/04/WPM-58.pdf (accessed 23 October 2015), 11.
63 Gautier et al., "Assessment of Undiscovered Oil and Gas in the Arctic" (see note 12); Budzik, *Arctic Oil and Natural Gas Potential* (see note 17).

2011, when Gazprom and Rosneft started to actively involve international partners such as ExxonMobil, Eni and Statoil in the exploration process: Rosneft and ExxonMobil in the Kara Sea in 2011; Rosneft and Eni in the Barents Sea, and Rosneft and Statoil in the Barents and Okhotsk seas in 2012; Gazprom and Shell in 2013; Novatek, Total and the China National Petroleum Corporation (CNPC) are currently constructing the Yamal liquefied natural gas plant. These cooperation agreements were highly strategic for Russia. In September 2014, the long-awaited discovery of oil at the Universitetskaya structure in the Kara Sea was made by a consortium of Rosneft and ExxonMobil.[64] However, ExxonMobil completely withdrew from the project and the Russian Arctic as a consequence of US sanctions imposed the same month. Other exploration activities have been put on hold and postponed beyond 2030,[65] due to US and European sanctions against Russia on technology-transfer and the financial sector as well as due to economic turmoil. Russian companies relied on financial resources of their Western partners to cover exploration costs as well as on Western technologies and services to explore and develop offshore fields in the polar region. Thus, most likely, the two producing fields on the Russian Arctic shelf, Prirazlomnoye and Yurkharovskoye, will be the only ones for the near future, if the Yamal mega project (partly offshore, where only the onshore reservoirs are now being developed) is not taken into account.

United States. In the United States, the Arctic oil and gas challenge started onshore with Norman Wells (1920/1932), which was the first Arctic onshore field, followed by the Cook Inlet (1960s) fields (7 fields: 4 oil, 3 gas, 16 platforms, 12 active), which lie outside the Arctic Circle, and Prudhoe Bay (1968/1977). The main production sites are situated in the Alaskan Beaufort Sea and North Slope. Some activities took place in the Chukchi Sea. The prescriptive US offshore petroleum governance with precise requirements[66] has resulted in six currently producing fields in the US Arctic shelf.

It is unlikely that the results of the past can be repeated. Recently, the new licence rounds for 2016 and 2017 were cancelled.[67] The main reasons for that were the same – economic and ecological risks, whereby oil companies willing to keep the Arctic offshore licences under their control until the “better times” now have to wrap up. Canadian and US interest in exploring Arctic natural gas is low because of other, basically nonconventional, sources onshore. In the United States, the D-to-P rate has significantly slowed down due to some uncompleted construction projects (the Point Thomson oil field has been queuing for 51 years). Yet, this displays an almost complete lack of interest by the United States in developing Arctic offshore oil and natural gas resources. Domestic “shale oil and gas development” won the race for nonconventional hydrocarbon production in North America after the fracking revolution took place there.

This, however, should not divert attention from the fact that there are other drivers that might play out in the future. On the one hand, the state of Alaska is heavily dependent on oil and gas for its economic development; on the other hand, the polar nature is highly fragile, posing a dilemma to future development patterns. Moreover, strategic considerations about the future energy position of the United States have been raised in the Report of the National Petroleum Council on Arctic Potential.[68] They emphasise the need for Arctic hydrocarbon development if the United States is aiming at maintaining its position as an energy-self-sufficient country when tight and shale oil reservoirs deplete in the 2030s and 2040s. For foreign and strategic reasons, representatives of this approach argue that the development of Arctic offshore hydrocarbons should be pursued today, given the long lead-times of projects.[69]

64 “Offshore Field Development Projects, Pobeda”, *SubseaIQ*, 9 December 2014, http://www.subseaiq.com/data/Project.aspx?project_id=2007 (accessed December 2015).
65 “GazpromNeft Decided to Postpone Dolginskoye Field Exploration until 2031”, *Arctic Info*, 23 November 2015, http://www.arctic-info.ru/FederalMonitoringMedia/23-11-2015/dni-arktiki-v-moskve–gosydarstvennaa-politika-v-arktike-i-infrastryktyra-sevmorpyti–monitoring-federal_nih-smi–16-21-noabra (accessed November 2015).

66 Det Norske Veritas, *OLF/NOFO – Summary of Differences between Offshore Drilling Regulations in Norway and U.S. Gulf of Mexico*, Rev. 02, 26 August 2010 (Norway: DNV, 2010).
67 “USA Says Bye to the Arctic Oil” [SShA govorjat “do svidanija” arkticheskoj nefti], *Eadaily*, 26 October 2015, https://eadaily.com/news/2015/10/26/ssha-govoryat-do-svidaniya-arkticheskoy-nefti (accessed November 2015).
68 National Petroleum Council, *Arctic Potential. Realizing the Promise of U.S. Arctic Oil and Gas Resources*, 2015 (USA: NPC, 2015).
69 Ibid., 1; C. Ebinger, “The U.S. Is More Energy Self-sufficient Than Ever Before, and the Arctic Can Assure It Stays That Way”, *Capital Forbes*, Opinion, 9 October 2015, http://www. forbes.com/sites/realspin/2015/09/10/the-u-s-is-more-energy-sufficient-

Canada. The Canadian fields Hibernia (1979/1997), Hebron (1981/2017), Terra Nova (1984/2002) and White Rose (1988/2005) are situated lower than the Arctic Circle. Sometimes these fields are ascribed to the Arctic exploration experience; however, project operators place them in the category of Atlantic projects[70] with harsh environments (not the Arctic environment). Not taking into account these Newfoundland and Labrador fields, Canada has no ongoing Arctic offshore projects. There are currently no operating offshore fields in the Arctic, but there is one – Amauligak oil and gas field (discovered in 1984) – that is still waiting for an investment decision to be made (for almost 30 years).[71] There are also no ongoing drilling operations offshore in the Canadian Arctic, and only one single well has been drilled during the last 20 years. Canada currently has no plans in the Arctic, as it has other, more accessible resources elsewhere (for example, oil sands). Under strong pressure from indigenous peoples, and after the Deepwater Horizon spill, the National Energy Board of Canada is following the strictest ecological safety measures offshore, such as their "same season relief well policy".[72] It requires two wells to be drilled during the same ice-free season, whereby one is an exploration well and another a relief well. In the Beaufort Sea, which has an entire drilling window of only four months, this is almost impossible to achieve.[73] This regulation is creating insuperable economic and technological barriers to the development of the offshore oil and natural gas industry in the Canadian Arctic. There have been no changes in Canada due to an absence of any kind of drilling or exploration; Canadian tar sands took that spot of nonconventional production. In other words, North American Arctic offshore oil and gas are relatively uncompetitive domestically.[74]

Denmark (Greenland). Greenland has not discovered any offshore oil or gas fields, yet.[75] Cairn Energy is the biggest offshore licence holder in Greenland. However, in total, 14 wells have been drilled offshore from Greenland (8 by Cairn Energy),[76] and no big findings were reported.[77] Statoil and Dong gave back their licences.

To summarize, as data shows, the development of Arctic offshore resources is obviously ongoing, but resource exploration has not drastically intensified. The major obstacle is currently the price environment. This, however, does not deprive the Arctic of its offshore oil and natural gas resources potential. The intensity of oil and natural gas resources development differs among the five Arctic coastal states – from low commercial interest in the west to strategic priority in the east.[78] National offshore governance systems, access to resources and state support according to national interests influence the intensity of exploration of Arctic offshore oil and natural gas resources.

Arctic offshore oil and natural gas activity will be dependent on the strategic plans of every country to promote or limit Arctic offshore oil and gas resources development. External factors such as oil price, underregulation and geopolitical tensions are decisive, though. Another issue is technological cooperation in order to make available best-practices as well as safe and efficient technologies, because the Arctic is an ecologically sensitive region. With respect to national interests, it can be concluded that in the United

than-ever-before-and-the-arctic-can-assure-it-stays-that-way/ (accessed January 2016).

70 Husky Energy, "Projects", http://www.huskyenergy.com/operations/growthpillars/atlantic/projects.asp (accessed March 2014).

71 M. E. Enachescu, P. J. Meehan and G. W. Smee, "Amauligak and Beyond: The Quest for a Canadian Beaufort Sea Economic Threshold" (Abstract), *Bulletin of Canadian Petroleum Geology* 39, no. 2 (1991): 211.

72 A relief well is one contingency measure used to respond to an out-of-control well. Sourced from: NEB, "What Is the National Energy Board's Policy Regarding Same Season Relief Wells?", December 2011, https://www.neb-one.gc.ca/nrth/rctcffshrdrllngrvw/2011fnlrprt/index-eng.html (accessed January 2015).

73 James Henderson and Julia Loe, *The Prospects and Challenges for Arctic Oil Development*, 2014 (Oxford: The Oxford Institute for Energy Studies [OIES], 2014), 20.

74 Keil, "Economic Potential" (see note 15), 22.

75 According to data from the government of Greenland, Cairn Energy (the most active operator offshore in Greenland), Nunaoil (the national oil company of Greenland), the *Oil&Gas Journal*, the *Financial Times* and other credible company and media sources, there are no discoveries being made on offshore Greenland, though there are multiple prospects and licence areas being targeted by international oil and gas companies.

76 Cairn Energy, "Greenland, *Activity*", http://www.cairnenergy.com/index.asp?pageid=80 (accessed 24 January 2014).

77 Andreas Østhagen, "Dimensions of Oil and Gas Development in Greenland" (The Arctic Institute, December 2012), http://www.thearcticinstitute.org/2012/12/dimensions-of-oil-and-gas-development.html (accessed December 2014).

78 Kathrin Keil, *The Role of Arctic Hydrocarbons for Future Energy Security* (Berkeley, CA: Nautilus Institute for Security and Sustainability, 2013), http://nautilus.org/napsnet/napsnet-special-reports/the-role-of-arctic-hydrocarbons-for-future-energysecurity/ (accessed 19 November 2014).

States, shale gas has higher priority in terms of national security and energy self-sufficiency than any other projects, whereas Canada is taking long-term decisions on the destiny of the Trans-Alaska oil pipeline and whether to open the Arctic Wildlife National Refuge for exploration. Other relatively expensive non-conventionals have higher priority for being explored. Greenland is striving for independence and higher revenues. Thus, it unsuccessfully tried to intensify both seismic and exploration activities under Danish supervision though the company Cairn Energy. Even though the main offshore activities in Norway are still concentrated south of the Arctic Circle, Barents Sea oil and natural gas discoveries can obtain a higher priority because Norway needs to maintain its oil and natural gas production to sustain its level of exports. Arctic offshore oil and natural gas development is of high strategic priority for Russia but cannot be handled without international cooperation under "sanction" conditions.

(Geo)Politics in the Arctic – Is International Cooperation on Hydrocarbon Development Fading?

Arctic Governance after the End of the Cold War

As described above, interests in Arctic offshore hydrocarbons are increasingly diverging and asymmetrical among the five Arctic coastal states under the new market conditions. The growing asymmetry, disinterest and disinvestment may result in a loss of stability. In the past, economic cooperation in hydrocarbon development was supposedly a major driver for the common political movement towards stability. Long investment cycles demand a stable environment. Nowadays, the tensions between Russia and the West following the annexation of Crimea and military conflict in eastern Ukraine destabilise the achievements in regional cooperation in the Arctic and globally.

A look at Arctic governance displays the cooperative spirit in international relations that has prevailed in the far north since the end of the Cold War. With respect to hydrocarbon development in the Arctic, the issues of delineation of the seabed and the continental shelf as well as environmental and technological issues are important. The retreating of ice cover and better access to sea passages and territories has resulted in new ambitions. All circumpolar states are involved in territorial disputes. These territorial claims are centred on extending the respective exclusive economic zones of each country in line with the continental shelf, for example with the Lomonosov Ridge (the underwater ridge of continental crust in the Arctic Ocean) by Russia and later by Denmark and Canada. Against the background of the 2008 Circum-Arctic Resource Appraisal, a sense of geopolitical instability was created as well as a race for resources. Yet, this has not resulted, as expected, in geopolitical rivalries but in a striving towards cooperation, predictability and stability.

With the 2008 Ilulissat Declaration, the Arctic states recognised the United Nations Convention on the Law of the Sea (UNCLOS) as a regulation base for Arctic governance (except by the United States, which has not ratified it, yet) and emphasised their commitment to settle overlapping territorial claims in line with the convention.[79] The reformation of fundamental principles of sea governance was made by UNCLOS in 1982 and is still helping "individual members of the community of nations"[80] to secure the share of resources. The Convention defines the extent of coastal states' territorial waters and exclusive economic zones. This has implications for ownership of seabed and marine resources.[81] UNCLOS provides the procedures and mechanisms for extending the coastal states' rights to seabed resources that lie outside their exclusive economies zones. Territorial claims are being submitted to the Commission on the Limits of the Continental Shelf (CLCS), which makes recommendations based on scientific evaluations. Yet, these recommendations are non-binding when claims of different states overlap. Thus, the delineation of the continental shelves is subject to political settlement.[82]

Beyond the UNCLOS regime and the Arctic Council, Arctic coastal states have concluded a number of bilateral cooperation agreements. The most important one with respect to hydrocarbon development and East-West cooperation is the treaty between the Kingdom of Norway and the Russian Federation concerning Maritime Delimitation and Cooperation in the Barents Sea and the Arctic Ocean, 2010,[83] which ended the Norwegian moratorium for Arctic offshore hydrocarbon exploration (see page 17 above).

With respect to the still open settlement of boundaries of respective continental shelves, it is important

79 Timo Koivurova, Juha Käpylä and Harri Mikkola, *Continental Shelf Claims in the Arctic. Will Legal Procedure Survive the Growing Uncertainty?*, FIIA Briefing Paper 178 (Helsinki: The Finnish Institute of International Affairs, August 2015), 3.
80 Rob Huebert and Brooks B. Yeager, *A New Sea: The Need for a Regional Agreement on Management and Conservation of the Arctic Marine Environment*, WWF International Arctic Programme (Oslo: World Wide Fund For Nature [WWF], 2008), 4.
81 Juha Jokela, "Arctic Governance", in: *Arctic Security Matters*, ed. Jokela (see note 15), 35–42 (36).
82 Ibid.
83 Regjeringen.no, official homepage of Norwegian Government, *Treaty between the Kingdom of Norway and the Russian Federation concerning Maritime Delimitation and Cooperation in the Barents Sea and the Arctic Ocean* (English translation), https://www.regjeringen.no/globalassets/upload/ud/vedlegg/folkerett/avtale_engelsk.pdf (accessed 17 July 2015).

to highlight that most of the significant oil and natural gas fields are located in the exclusive economic zones or national territorial waters and not in overlapping areas.[84] The delineation and delimitation of continental shelves in the Arctic has not been settled yet, but it appears that there will not be much of a common area (beyond the limits of national jurisdiction) left for the International Seabed Authority. This authority organises activities and administers commonly used areas.[85]

Despite the geostrategic moves, Russia has until recently embraced multilateral governance such as the Arctic Council and UNCLOS and has submitted its territorial claims to the CLCS. Russia revised and finally submitted its claim on 3 August 2015 because of the Commission's dissatisfaction with its initial submission.[86] Thus, up to now, Arctic coastal states have lived up to the rule-based procedures.

Even though UNCLOS regulates offshore activities on the international level, the legislation, technical standards and overall approaches differ on the national levels. This is where the Arctic Council has a role to play due to its focus on environment and technology, and indeed it has become an agenda-shaping institution that is aiming at common principles for international and national legislation in the North Pole region.

In general, the governance patterns reflect the issue that the Arctic is a special region that consists of remote lands of several northern states[87] governed from distant political centres. Arctic governance is so far organised in an "exclusive club" because of a variety of sovereignty issues. Playing a key role is the platform of the Arctic Council, established in 1996[88] – an intergovernmental forum of Arctic countries (Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden and the United States) and indigenous people. The Arctic Council is characterised by advisory instruments and prompting format; however, some decisions are followed by binding provisions. The members are countries with different priorities and strategies for the Arctic.

Yet, there are also non-Arctic states, mainly from Asia, which are actively entering the Arctic geopolitical and business club: China views northern sea routes as parts of its maritime Silk Road. Indian companies have significant interest in the joint development of oil and natural gas fields in northern and Arctic Russia. South Korea is ready to create a common business model for the Arctic, where its special geographical and ecological characteristics are recognised. As one of Asia's financial centres, Singapore has its own interest in the Arctic, which is to hedge related business risks. The Asian shipping industry is keen to sell more ships and platforms to serve northern exploration and production.

There are also remarkable differences between the Arctic and non-Arctic states that result from their geographical positions, jurisdictional status and access to the Arctic Ocean. On one hand, some non-Arctic states argue for the global character of the Arctic and Arctic politics (France, Japan). On the other hand, none of the non-Arctic states have acquired rights comparable to those of the Arctic countries, which are based on international laws. Thus, non-Arctic states need provision from Arctic states for any kind of activities in the Arctic waters, whether outside or inside the 350-mile zone. The cooperation of Non-Arctic states is valuable in many aspects for the Arctic region's development and should be included on different levels – these are sea and environmental safety, shipping, research, fishing, etc. This is a second key to the sustainability of the region. The Arctic Council has 12 observers,[89] among them six EU member states such as Germany, but also Japan, South Korea, China, Singapore and India. The Arctic Council format of membership and observer status helps countries to mitigate and/or eliminate conflicts. The EU's application has not been accepted so far. The reasons are manifold. First, the European Parliament created some irritation in 2008 when it called for an international Arctic Treaty, comparable

84 Koivurova, Käpylä and Mikkola, *Continental Shelf Claims in the Arctic* (see note 79), 5.

85 Ibid., 4. See also Website of the Authority: https://www.isa.org.jm/authority (accessed 22 December 2015).

86 Koivurova, Käpylä and Mikkola, *Continental Shelf Claims in the Arctic* (see note 79), 3.

87 Oran R. Young, "Governing the Arctic: From Cold War Theater to Mosaic of Cooperation", *Global Governance* 11, no. 1 (2005): 9–15.

88 This analysis focusses on the governance mechanisms mostly relevant for hydrocarbon development. It is worth mentioning that Arctic governance consists of a multi-level framework: regional (Arctic Council), sub regional (Barents Euro-Arctic Council), inter-governmental (Nordic Council of Ministers), communitarian (EU) and bilateral ones. Cooperation functions on governmental, business and indigenous levels (the Sami Council, the Russian Association of Northern Minorities). The International Maritime Organization, the EU and NATO directly or indirectly influence Arctic management.

89 Arctic Council, "Observers", http://www.arctic-council.org/index.php/en/about-us/arctic-council/observers (accessed September 2015).

to the Antarctic Treaty System. The Arctic states entirely rejected the proposal. For them it was a threat to their sovereignty and to the legal status quo in the region.[90] Second, the EU approved a ban in 2008 on the trade of commercial seal products. Last but not least, the activities raised broader concerns that the international community was cutting too far into the sphere of primacy of the five northern polar coastal states in the management of Arctic affairs.[91] Meanwhile, the Arctic Council has brought members and observers to the same level of appreciation. For example, observers have to recognise the international laws of the sea, sovereignty, the rights and jurisdictions of the Arctic states in the Arctic, as well as the specifics and culture of the region.

The Arctic Council has its focus on environmental issues and technological cooperation, which are highly relevant for energy exploration and exploitation. The cooperation on these technical and environmental issues paved the way for stable cooperation before the Ukraine crisis. Two binding agreements have been signed and come into force: one on "cooperation on Aeronautical and Maritime Search and Rescue in the Arctic", which came into force in January 2013; and the second on "Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic", signed in May 2013.[92] The latter aims at enhancing and speeding up cooperation in oil-spill response.

It can be summarised that, in general, the Arctic Council had a positive influence on Arctic cooperation up until the geopolitical tensions between Russia and the West due to the Ukraine conflict. The prospects concerning Arctic offshore oil and gas exploration have moved governance development[93] forward because the projects with long lead-times require a stable environment. Delimitation issues, economic factors and technological possibilities have motivated the international political and business communities to jointly elaborate on a governance structure in the Arctic region. The analysis shows that it is reasonable to balance interests, manage interdependencies and promote cooperation. The gaps in governance and regulations, such as harmonisation of ecological standards, are manageable through combined governance mechanisms as well as bilateral and regional agreements. Arctic research and knowledge-exchange[94] also play an important role in finding the common path to regional prosperity and sustainability. Germany and the EU have been aiming at balancing the two. The EU Council's conclusions of 12 May 2014 outline that action should put an emphasis on "supporting research and channeling knowledge to address the challenges of environmental and climate changes in the Arctic; acting with responsibility to contribute to ensuring economic development […] based on sustainable use of resources and environmental expertise".[95] Germany's Arctic Policy guidelines[96] try squaring the circle of environmental and climate protection and economic opportunities by calling for the highest environmental standards possible and the use of the newest technologies.[97] It remains to be seen to what extent the deterioration of the relationship between Russia and the West will affect that balanced approach in the future.

The Impact of the Crisis over Ukraine and Sanctions on Russia

Since the end of Cold War, the Arctic – despite opposing national interests – has been characterised as a peaceful zone of cooperation with normalised political relationships among the Arctic states[98] and little political tension. Until 2013, countries had only intensified cooperation in a positive way, including armed forces cooperation. Energy cooperation expanded in many facets, and Russia has had a clear interest in a stable business environment in the Arctic in order to develop its hydrocarbons. Yet, since 2014, the economic situation and the energy price slump have

90 Duncan Depledge, "The EU and the Arctic Council", Commentary ECFR Wider Europe Forum, 20 April 2015, http://www.ecfr.eu/article/commentary_the_eu_and_the_arctic_council3005 (accessed 22 December 2015).
91 Ibid.
92 Arctic Council, "Agreements", https://www.arctic-council.org/index.php/en/environment-and-people/agreements-statements/agreements (accessed 18 September 2015).
93 Christoph Humrich, "Fragmented International Governance of Arctic Offshore Oil: Governance Challenges and Institutional Improvement", *Global Environmental Politics* 13, no. 3 (2013): 80; Huebert and Yeager, *A New Sea* (see note 80), 4.
94 The example is the interdisciplinary research project INSROP – the International Northern Sea Route Programme.
95 Council of the European Union, *Council Conclusions on Developing a European Union Policy towards the Arctic Region*, Foreign Affairs Council meeting (Brussels: Council of the European Union, 2014), Press, 1.
96 *Germany's Arctic Policy Guidelines* (see note 3).
97 Stefan Steinicke, *Exposè Doktorandenkolloquium*, 15 September 2015 (unpublished manuscript).
98 Charles Emmerson and Glada Lahn, *Arctic Opening: Opportunity and Risk in the High North* (London: Chatham House, 2012).

coincided with the difficult geopolitical situation, creating a very unfavourable environment for international Arctic relations. The loss of a relatively stable Arctic region is tangible and also creating new risks for the security of oil and gas supplies in the future. The Russian economy is suffering from the oil price slump, national currency devaluations and a shortage of capital.[99]

The imposition of Western sanctions on Russia as a response to military destabilisation in Ukraine as well as Russian countersanctions contribute to that through the overall deterioration of the relationship, but also because the common development of future hydrocarbon projects is being sanctioned. In 2014 two documents were published on July 31 and September 8 containing restrictive measures against Russia. In December 2015, these sanctions were prolonged till 31 July 2016. The EU has limited the access of the Russian state and national oil and gas companies to European long-term financing, and the entire Russian oil industry (not natural gas production) to European technologies and equipment (drilling, well testing and logging services). The duration of credit was cut to 30 days for Rosneft, Transneft and Gazprom Neft. Nearly the same actions were taken by the United States, which listed Gazprom, Gazprom Neft, Rosneft, LUKoil and Surgutneftegaz. The EU specified their sanctions against Russia in the beginning of December 2014, in particular what is meant by "Arctic" projects. The sanctioned Arctic oil activities were defined as "oil exploration and production in the offshore area north of the Arctic Circle".[100] The same definition was given by the United States a month earlier. Before specifications, sanctions could also target onshore oil projects. Moreover, according to the December 2014 documents, restrictions target not only Russian territory but also its exclusive economic zone and sea shelf. The only equipment that is allowed to be supplied for the Russian oil industry is that which prevents or mitigates oil spills or other accidents that may have significant impact on human health and safety or the environment. Importantly, the sanctions do not apply to already existing oil-producing fields.[101] In particular, they target future oil projects that would approximately come on stream in 5–10 years. On 21 December 2015, the EU prolonged economic sanctions against Russia until 31 July 2016. Norway has aligned itself with the EU's sanctions regime.[102] Norway joined the EU's sanctions right after a deal between Rosneft and Norwegian North Atlantic Drilling Ltd. was accomplished to buy six oilfields and take a 30 per cent share in that company till 2022.[103]

The imposition of Western sanctions as a response to destabilisation has its political rationale, but this should not lead to the false belief that there will be no serious consequences for the energy sphere. They do not come at a negligible cost, despite the currently relaxed and well-supplied international oil and gas markets. The decision to sanction oil development in Arctic deep-sea waters is notable in many respects: Arctic oil exploration and production are highly sensitive issues for Western societies because of climate and ecological concerns. Moreover, the economic viability of these projects is questionable anyway in the current low-price environment. Western sanctions have targeted Russian Arctic oil activities and, in doing so, they have targeted activities that the West has lost (at least for the moment) interest in because of shale oil and gas production in North America, in addition to climate concerns. With this approach, the West is hitting the sore spot in the Russian economy, forcing the Russian energy companies to change strategic priorities, or at least to postpone them.

It remains to be seen in the future how this will affect natural gas exploration and production, but also Russian and Western energy cooperation in general. On the one hand, the return on investment capital is questionable, given the costs of the recently drilled Universitetskaya-1 well in the Kara Sea, in cooperation with ExxonMobil (the costs have reached US$600 billion[104]), even though the price forecasts for the potential resources are huge. On the other hand,

99 Igor Yurgens, *Summitry and Diplomacy in the Arctic*, Council of Councils Sixth Regional Conference, Centre for International Governance Innovation, 28–30 September 2014 (Canada: CoC, 2014).
100 EU, "Council Decision 2014/872/CFSP of 4 December 2014", *Official Journal of the European Union* L 349 (2014): 58–60.
101 Atle Staalesen, "The New Round of EU and US Sanctions Aims at Russian Offshore Arctic Oil and Gas Projects, and Could Put Grand Partnerships between Rosneft, ExxonMobil, ENI and Statoil in Jeopardy", *BarentsObserver*, 12 September 2014, http://barentsobserver.com/en/energy/2014/09/sanctions-target-arctic-petro-partnerships-12-09.
102 Jokela, "Arctic Governance" (see note 81), 39.
103 Richard Milne, "North Atlantic Drilling Expresses No Regret for Rosneft Deal", *Financial Times* (online), 31 August 2014, http://www.ft.com/intl/cms/s/0/f8c7ce0a-30eb-11e4-8313-00144feabdc0.html#axzz3h5yEIuj2.
104 Stephen Bierman, "Exxon's $900 Billion Arctic Prize at Risk after Ukraine", *Bloomberg*, 29 April 2014, http://www.bloomberg.com/news/2014-04-28/exxon-s-900-billion-arctic-prize-at-risk-after-ukraine.html.

international investors have gone through a variety of challenges in the Russian oil and natural gas industry: changing tax regimes and contractual conditions (production-sharing agreements on Sakhalin were considered to be unfair), expropriation, bureaucracy, ecological claims, etc. Thus, the potential of Russian oil and natural gas resources might still prove to be attractive to international energy and service companies.[105] Yet, without doubt, the situation of sanctions and counter-sanctions creates political uncertainty and oil price volatility, which threatens massive long-term investments. It also complicates technical cooperation and transfer of know-how.

Thus, what the sanctions have possibly achieved by now is that they have impeded the opportunity to innovate and modernise the technology of the Russian oil and natural gas industry. In the case of the development of offshore hydrocarbon resources in the Arctic, the first and last point of cooperation is technology: Vast and valuable potential resources cannot be extracted from the bottom of the Arctic seas without having available the "best practice". This has also been emphasised by Germany and the EU. Being in an Arctic lock-in, Russian companies are now looking to Chinese, Malaysian and Indonesian second-best technologies. This has dramatically increased environmental and safety risks, even though EU and US sanctions keep a gap open for spill-response and rescue equipment. Thus, the consequences of non-cooperation might be serious setbacks, or even threats to ecological safety, as well as technological progress.

There are likely to be profound long-term costs for the Russian petroleum industry. Again, until the crisis over Ukraine, it looked as if the path towards a cooperative and innovative development of Arctic offshore projects had been found. Russia has a major interest in exploring its Arctic resources, both as a means to maintain production levels (as old giant fields onshore are depleting) *and* to modernise the industry. In recent years Arctic offshore exploration and development have received a qualitative and quantitative kick from growing international involvement and cooperation. Russian companies have invited international partners to explore the potential of offshore oil and natural gas resources of the Russian Arctic, and, in turn, international partners have brought capital investments and technologies. The sanctions mean, in the near future, that the first and only offshore oil project in the Russian Arctic is Prirazlomnoye. All drilling activities that were planned in order to meet Russia's Arctic ambitions were undertaken by international companies, which have pulled back.[106] There are few visible effects today and their impact is unclear, but the real consequences will become evident in (more than) 5 to 10 years' time.

105 Mikael Holter, "Norway Oil Services See Russia Sanctions Risking Arctic Push", *Bloomberg Business*, 12 August 2014, http://www.bloomberg.com/news/articles/2014-08-12/norway-oil-services-risking-arctic-chances-on-russian-sanctions.

106 IEA, *World Energy Outlook 2015* (see note 21), 137.

Outlook and Conclusions

Growing Antagonism between the West and Russia – From Soft to Hard Security Interests?

The prevalence of geopolitics is spilling over into the Arctic. This affects both hydrocarbon development and also Arctic governance issues. In the past, oil and gas activities paved the road for cooperation, but this momentum has lost its vigour due to energy markets as well as price developments. The dramatic change brought by sanctions is that the period of previously silent and smooth cooperation in the Arctic has most likely come to an end.

With Western–Russian energy cooperation on the wane, "hard security matters are moving to the forefront".[107] The current geopolitical tensions and the deterioration of political relations between Russia and the West are negatively affecting Arctic cooperation, for example through a higher level of militarisation of the Arctic region. Russia has a traditional security interest in the Arctic, which was kept to a low and pragmatic level in the period between the dissolution of the Soviet Union and (almost) the first decade of the 2000s. As Pavel Baev notes, "[…] the Kremlin's Arctic policy had followed a two-pronged strategy: strong emphasis on developing international cooperation on the one hand, and the sustained build-up of military capabilities on the other".[108] Yet, nowadays, the "securitisation" of the Arctic is a strategic priority for the Russian government and one of the transformational processes in the region that is speeding up. In Russian Arctic politics, economic rationales are less pronounced, whereas "hard security matters" and geopolitical competition are being highlighted with the appointment of Deputy Prime Minister Dmitri Rogozin to the newly created position of chairman of the State Commission for Arctic Development.[109] Since then, Russia has resumed its military presence. Since the beginning of 2014, Russia has established its fifth joint operational command in the Arctic. It has extensively deployed nuclear assets, including strategic aviation patrols, and carried out tests at the naval strategic platforms of the Northern Fleet.[110] With dialogue and cooperation at a minimum, a "security dilemma"[111] is looming because the level of knowledge and understanding about the motivations and interests of other actors is decreasing. Securitisation is happening in other Arctic countries as well – the United States and Canada conduct regular military exercises in the High North; *Finland, Norway and Sweden conduct joint air exercises, etc.* Securitisation brings no positive results in making the Arctic a zone of peace and cooperation for all the countries involved there, and it is partly the consequence of tensions between Russia and the North Atlantic Treaty Organization (NATO) and recent political tensions due to the Ukrainian conflict. There is the danger of returning to old times: Geopolitically, the Arctic was a highly strategic – and militarised – region during the East-West conflict.

As outlined above in the chapter on diverging national interests, the growing level of antagonism and geopolitical tensions are shaking up the cooperative spirit and raising levels of mistrust. All five circumpolar states are involved in (at least one) territorial dispute. Russia, Canada and Denmark claim their sovereignty over the Lomonosov Ridge. A Finnish study concludes that "Russia's consistent commitment to international law can no longer be taken for granted under the current regime".[112] In May 2015, Norway was confronted with a stern diplomatic note saying that Oslo violated a treaty when its 23rd licensing round included two blocks in offshore Svalbard waters.[113]

Political and regulatory unpredictability adds to that picture, for example with respect to the Arctic Council[114] acting as a main debate and discussion

107 Pavel K. Baev, "Russia's Arctic Ambitions", in *Arctic Security Matters*, ed. Jokela (see note 15), 51–56 (53).
108 Ibid., 51.
109 Ibid.; Koivurova, Käpylä and Mikkola, *Continental Shelf Claims in the Arctic* (see note 79), 7.
110 Baev, "Russia's Arctic Ambitions" (see note 107), 54.
111 Etzold and Steinicke, *Regional Security and Cooperation* (see note 2), 3.
112 Koivurova, Käpylä and Mikkola, *Continental Shelf Claims in the Arctic* (see note 79), 6.
113 "Norway, Russia on Collision Course over Arctic Oil Drilling", *Platts*, 27 May 2015, http://www.platts.com/latest-news/oil/london/norway-russia-on-collision-course-over-arctic-26102429 (accessed 21 September 2015).
114 Bernard W. Funston, "Summitry and Diplomacy in the Arctic", Council of Councils (CoC) Sixth Regional Conference,

forum. Tensions have negative implications on the Arctic Council's activities and established discussion formats, which now require reformation. The geopolitical rifts over Ukraine are having an impact on Arctic governance, and the increasing level of distrust has also stalled attempts to strengthen the Arctic Council as the primary forum for Arctic governance. As described above, the EU's influence on Arctic governance is limited, despite the fact that its norms, rules and legislation extend into the Arctic, because Iceland and Norway are members of the Schengen Area and the European Economic Area. The EU has not yet obtained observer status in the Arctic Council. Due to the ongoing tensions, this item was not put on the agenda of the Arctic Council Ministerial Meeting in April 2015, as originally intended. It has been regarded as likely that Russia will vote against this plan. Yet, the EU is directly involved in the Barents Euro-Arctic Council of the Nordic States, the EU and Russia as well as the Northern Dimension between the EU, Russia, Norway and Iceland. In the face of the crisis over Ukraine, the Northern Dimension has continued to operate on a technical and working level.[115] Yet, the loss of relative stability in the Arctic may have multiple negative spillover effects into other areas of cooperation. The refugee crisis and the reluctant control of the Russian-Norwegian border by the Russian side is adding to a more burdened relationship between the Arctic neighbours. Thus, the Arctic is becoming less immune to critical geopolitical events outside the Arctic region.

We have argued that technologically challenging hydrocarbon resource development has been a major stabilising factor in the Arctic region because of corresponding economic interests between Russia and the West. This immediate positive effect is gone. An immediate negative effect for global and regional energy supplies has not yet been noticeable.

However, the negative consequences for energy supply (security) and the balance of demand and supply will only be felt in the future. Potential long-term effects of the sanctions, coinciding with relatively low oil prices and turbulences in the national economy, can seriously harm the long-term development of offshore hydrocarbon resources programmes in the Arctic, thereby increasing their costs, if not killing off the Russian Arctic initiatives altogether. This hits Russia's future role on the global oil (and possibly also gas) markets the longer the sanctions last. For Russia, this might result in the future in a loss of relative shares in global oil markets – thereby strengthening the position of other conventional producers, for example Saudi Arabia or, soon, Iran – but also backing shale oil production in the United States. In the current situation of a fierce competition over market shares, this factor should not be neglected. Yet, any changes in Russian production will have an impact on global supplies. Given the severe cuts in investment into oil and gas projects because of low prices, the sanction on Russian oil development reinforce the risks of future price hikes and oil supply shortfalls. Much depends, of course, on the duration of the sanctions and how long they will be kept in place. Plus, it remains to be seen to what extent natural gas projects are impeded through the sanctions regime, as the technology used is largely the same as that for oil exploration and production. Any impact on Russia's future production and export capacities will have consequences on the supply to world markets and for the EU. Admittedly, nowadays, in times of an oversupply and downward cyclical swings and relatively low prices, there is less of a sense of energy security. Yet, paying attention to the objective of supply security should not follow cyclical price developments but rather anticipate future challenges.

In face of the twin challenge of rising geopolitics and diminishing economic cooperation, the political (and economic) resources that can be generated to govern "soft security issues" are dwindling. The risk of a vicious circle is looming, as other related risks might no longer be able to be hedged. Such risks are indeed multidimensional and require international cooperation, as they potentially affect more than one country and cannot easily be geographically limited. This is obvious for some specific ecological threats, which are especially significant for the Arctic, for example risk of oil spills.[116] Some technological approaches bring more risk than safety to the Arctic, even though progress in the last years has been remarkable.[117] In terms

Centre for International Governance Innovation (CIGI), 28–30 September 2014 (Waterloo, Ontario, Canada: CIGI, 2014).

115 See for more details: Etzold and Steinicke, *Regional Security and Cooperation* (see note 2).

116 There are a number of resonant accidents, such as on the Statfjord platform in Norway (2008), Oseberg (2008), Deepwater Horizon (2010), Kolskaya in the Okhotsk Sea (2011), etc., which would aggravate tension.

117 This opinion was expressed by the then-head of Total, Christophe de Margerie. Guy Chazan, "Total Warns against Oil Drilling in Arctic", *Financial Times*, 25 September 2012, http://www.ft.com/cms/s/0/350be724-070a-11e2-92ef-00144feabdc0.html#axzz3g9J5cKpq.

of environmental safety, an affirmation of high common standards for the equipment, best practices, etc., plus independent supervision of drilling activities would be desirable. The limited technology-transfer brings not only environmental risks but reputational ones – an oil spill would be very harmful, not only for the sensitive nature of the polar region but for the involved company as well. The absence of any kind of joint agreement on ecological management and safety in the prospective resource-rich areas adds to the growing criticism, societal resistance, and disinvestment but also to conflict potential.

Under the current circumstances, squaring the circle of securing hydrocarbon supplies from the Arctic while at the same time creating a common vision of a more sustainable development of the Arctic seems out of reach. A number of studies focus on a "carbon bubble" and hint to the fact that "the unabated use of all current fossil fuel reserves is incompatible with a warming limit of 2°C".[118] Then, the development of resources in the Arctic is "incommensurate with efforts to limit global warming".[119] If stricter climate targets are really implemented, the risk of stranded investments in expensive hydrocarbon reservoirs is remarkable,[120] and especially high in the Arctic offshore. As the IEA outlines, the fate of complex, costly, long-term projects is uncertain, as climate targets may limit oil demand in the future. Megaprojects with huge potential, but also long timescales, will be less commercially attractive because of the scale and complexity of the work, "lending itself to delays and cost overruns".[121] From the angle of the mitigation of climate change, both the implementation and non-implementation of hydrocarbon projects would require better coordination between business and respective states to define depletion paths and consumption patterns to protect the global commons.

118 McGlade and Ekins, "The Geographical Distribution of Fossil Fuels Unused when Limiting Global Warming to 2°C" (see note 6): 187.
119 Ibid.
120 See also: Deborah Gordon, Adam Brandt, Joule Bergerson and Jonathan Koomey, *Know Your Oil: Creating a Global Oil Index*, Report, 11 March 2015, http://carnegieendowment.org/2015/03/11/know-your-oil-creating-global-oil-climate-index.
121 IEA, *World Energy Outlook 2015* (see note 21), 149.

Conclusions and Recommendations from a European Perspective

Arctic offshore production is very modest and is having a limited influence on global consumption and production trends. "The economic future of the Arctic is poised between opportunity and uncertainty."[122] Arctic hydrocarbon exploration and production is at a sensitive point in time due to at least three factors: 1) the deterioration in relations between Russia and the West; 2) low energy prices and 3) climate mitigation and ecological issues. The economic feasibility of these resources is very speculative. International climate politics and also increasing societal resistance is resulting in political and regulatory uncertainty, bringing into question the profitability of oil projects.

Energy cooperation as the major factor for stabilisation faces setbacks. From the end of the Cold War until the Ukraine crisis, energy prospects were conducive to international cooperation in the region. This momentum has been lost and this has significant implications. Yet, the threat of a spillover into geopolitical tensions and military rivalries in the Arctic demands more – rather than fewer – international efforts to hedge and minimise risks. This constitutes a dilemma, as sanctions will stay in place most likely till mid-2016, depending on the developments in eastern Ukraine and the Minsk II process. There is also the possibility that the crisis over Ukraine transforms into a "frozen conflict". If such a situation evolves, a need to rethink the political measures might become pressing. The longer the sanctions last, the less its negative effects on future energy security and sustainability can be ignored.

There might be a delaying or even disrupting effect on environmental governance and the exchange of technology and know-how. There is a need for the newest technological advances, which have to be based on new models of cooperation and innovations for a sustainable Arctic. Sanctions against Russian offshore oil production result in second-best technology options. If drilling occurs in this ecologically sensitive region, then it should be under best practices. Over time, the Arctic club faces the danger of losing its drive towards a common level of appreciation for international law, rights and standards, also in order to minimise environmental risks. Sustainable regional and industrial development is directly dependent on international

122 Emmerson and Lahn, *Arctic Opening* (see note 98), 18.

cooperation and on a prudent management of interdependencies.

Based on the abovementioned assumptions and observations, the following recommendations can be put forward from a German and European perspective:

1. There is an imminent demand for new dialogue, trust-building and cooperation in the Arctic. Therefore, the major recommendation to put forward is to keep dialogue and cooperation in place or to restart it. This is key to sustaining geopolitical, economic and environmental stability in the Arctic and beyond. The risks stemming from non-cooperation between Russia and the West are too high in the fragile Arctic environment.

2. The cooperation on hydrocarbon development should be maintained and expanded when and where possible and appropriate. The EU should stay aware of the fact that two Arctic countries, Norway and Russia, are key suppliers for the EU, and the EU is the major market for both. Norway and Russia are both highly dependent on future hydrocarbon development in the Arctic – Norway more so than Russia. Thus, a stable Arctic is important for EU's supply security for oil and gas (as long as these hydrocarbons are part of the EU's energy consumption). This is also true for the EU's striving towards diversification (understood by some to be the diversification away from Russia), because Norway has its strategic base there. Norway is facing a production plateau in its fields that deliver to the EU market. In 2015 Norway delivered 108 billion cubic metres per year. In order to keep up the level of natural gas production of approximately 90–100 billion cubic metres per year post 2023, the Barents Sea is key for Norway. What Norway needs to move forward with in terms of exploration and development is a clear EU policy on the future role of natural gas and geopolitical stability in the Arctic.

3. Russia is key for a stable Arctic. Russia's interest in a stable region is related to the development of hydrocarbon resources. For Russia, Arctic projects have been of strategic importance and a means to modernise its oil and gas industry. There are good reasons for a trilateral rapprochement and re-engagement in the high north between Norway, Russia and the EU/EU member states. With respect to a future process of rapprochement and confidence-building, Arctic natural gas production opens new possibilities. Germany/the EU, Norway and Russia should engage in a trialogue on a long-term "Arctic natural gas roadmap" that would also include common planning of (liquefied natural gas) export infrastructure.

4. Mutual benefits through innovation and technology-exchange should be created. This would allow for maintaining the highest technical and environmental standards. Energy-related risks such as oil spills, rescue operations and nuclear disposal should be jointly managed. Creating and managing interdependence between the Arctic countries is a real option for setting up a new model of cooperation and ecological management. Arctic research on ecology and climate should be continued and scientific cooperation should be increased.

5. Ideally, climate mitigation has to be made an integral part of hydrocarbon (non)development, for example by clear emission reduction plans that help to define a regional production/consumption and depletion path for specific Arctic oil fields, also in order to hedge the risks of stranded assets. From an idealistic perspective, it can even be argued that the Arctic is the showcase for how the world will live up to the double challenge of climate change/security and energy security. The Arctic has a potential to become a model for future intergovernmental and business cooperation under unconventional and new portents.

Abbreviations

BBC	British Broadcasting Corporation
BP	British Petroleum
CLCS	Commission on the Limits of the Continental Shelf
CNPC	China National Petroleum Corporation
D-to-P	discovery to production
EIA	Energy Information Administration (US)
EU	European Union
IEA	International Energy Agency
mtoe	million tons of oil equivalent
NATO	North Atlantic Treaty Organization
NSIDC	National Snow and Ice Data Center (Boulder, CO)
NUPI	Norsk Utenrikspolitisk Institutt/Norwegian Institute of International Affairs (Oslo)
OECD	Organisation for Economic Co-operation and Development
OIES	Oxford Institute for Energy Studies (Oxford)
UNCLOS	United Nations Convention on the Law of the Sea
USGS	United States Geological Survey
WWF	World Wide Fund For Nature