

Energy outlook for the Arctic: 2020 and beyond

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ABSTRACT. At least four littoral countries have Arctic strategies that address energy issues. However, US, Canada, Russia and Norway strategies up to 2020 and beyond, reveal different interests in exploring Arctic resources. While Arctic oil and gas are of strategic importance to Russia and to Norway, Canada and the US seem content with continuing their current extraction predominantly south of the Arctic Circle. Despite the different approaches, the outcomes seem strangely similar. Indeed, despite the hype concerning the Arctic in the last decade, and for very diverse reasons, it is unlikely that any of these four countries will increase hydrocarbon production in the Arctic during the period under analysis. This was true even before the recent drop in oil prices. For all its potential, it is unclear what lies ahead for the region.

Introduction

While exploring Arctic resources is not a new endeavour, the region has received increasing attention in the last decade, largely as a result of ice melting, an event that might change its geopolitics and strategic importance. Even countries that do not border the Arctic, like China, Singapore, Italy, India, Japan and South Korea, were granted observer status to the Arctic Council in 2013.

An analysis of the Arctic strategies of the US, Canada, Russia and Norway highlights different approaches to exploring the region. This is hardly surprising, given that energy resources are not equally distributed among these countries. Of the 329 billion barrels of oil equivalent of discovered resources, Russia holds the largest amount for both liquid and gas and the US important quantities of liquid hydrocarbons. Considering instead the estimated undiscovered resources by the US Geological Survey (Bird and others 2008), results do not vary considerably. Out of 412 billion barrels of oil equivalent, Russia and Norway hold 72% of the Arctic gas, while the remainder is evenly distributed between the US and Canada (plus Greenland). As for liquid resources, they are evenly split among US, Russia and Norway, Canada and Greenland.

Both discovered and undiscovered Arctic resources represent a significant share of the world total. Furthermore, if the region becomes more accessible, it could turn out to be very attractive to explore for oil and gas, providing that measures are taken to protect the environment. International Oil Companies (and many national), hindered by authoritarian regimes that foster resource nationalism, would profit from better thought out resource exploration approaches. However, the Arctic strategies that US, Canada, Russia and Norway defined for the region, and their exploration policies up to 2020 and beyond, exhibit uneven depth. Thus, there is a feeling of uncertainty concerning the future of oil and gas exploration in the region.

Four Arctic strategies: the energy component

The US, Canada, Norway and Russia have devised Arctic exploration strategies. While the four countries

seemingly ascribe great importance to energy security, their approaches differ greatly concerning oil and gas resources in the region.

The US is an Arctic state by virtue of Alaska, which ranks fourth among its oil-producing states. In July 2011, President Obama issued an executive order creating an interagency group to oversee and coordinate the agencies responsible for developing resources in Alaska. However, it took until May 2013 for the Obama administration to devise a national strategy for the Arctic (USG 2013). The document proposes advancing US security interests, to pursue responsible Arctic stewardship, providing for the country's energy security and strengthening international cooperation as its driving guidelines. While both the proved and potential oil and gas resources are key to fulfilling energy needs and reducing external dependency, the strategy proposes an 'all of the above approach', implying that other sources such as renewable energy are considered equally important.

For Canada, Prime Minister Stephen Harper has declared the Arctic to be an important component of overarching Canadian policies. Indeed, in 2009, the government of Canada released its northern strategy (Canada 2009), based on four pillars: sovereignty, economic and social development, environmental heritage and northern governance. Additionally, Arctic oil and gas are seen as pivotal to promoting both economic and social development. Consequently, at the time of launching that strategy, the government plans included creating new institutions, improving the regulatory environment and streamlining approval of complex projects, like the Mackenzie gas project and exploration in deep waters of the Beaufort Sea. In 2010, the government issued the Canadian Arctic foreign policy (Canada 2010), summarising the main international steps to build the four main pillars. To date, however, progress in developing the Arctic strategy have been relatively slow (Huebert 2010).

After more than 40 years, Russia and Norway settled their offshore maritime Arctic boundary differences. While a temporary agreement was already in place since 1978 regarding fishery, it was only in 2010, that both countries finally solved their disagreement over borders,

in a meeting that took place in Oslo between President Medvedev of Russia and Prime Minister Jens Stoltenberg of Norway. Since the 1970s, Russia claimed the border should be drawn directly through a line from the land border up to the North. Norway, on the other hand, claims that the border should lie midway between the Svalbard and Novaya Zemlya islands (*The New York Times* 15 September 2010). That this 40 year old difference was finally resolved, lays testament to how important oil and gas exploration in the region is to either country.

Concerning Russia, both former and current presidents have devised Arctic strategic policies. Indeed, a few years ago Medvedev challenged the Russian oil and gas industries to reach new frontiers and move to develop offshore fields (Rusnak and Berman 2008). More recently, President Putin (Russia 2013) acknowledged that Russia lacks both the technical means and modern technologies to explore and develop offshore hydrocarbon fields in the Arctic. As his top priority, Putin defends the need to develop and implement a state-supported system to stimulate developing hydrocarbon and other resources. This is to be accomplished through innovative technologies, revamped transport and energy infrastructures, and attractive tariffs and tax regulations. Thus, new and large infrastructure projects should integrate the Arctic with more developed regions of Russia, to explore Timan-Pechora and hydrocarbon deposits on the continental shelf of the Barents, Pechora and Kara seas, and the Yamal Peninsula. In fact, on April 2014, the first cargo oil from ice-covered waters was loaded from Prirazlomnoye field, in the Pechora Sea, ensuing from Russia's Arctic strategy.

Norway also has a well-defined high north vision and strategy (NMFA 2011b) the key elements of which include deepening cooperation with Russia and shaping the contours of a new oil and gas province. As already stated, bilateral relations with Russia have improved in recent years, leading to a strategic energy partnership with a particular incidence in exploring the Arctic resources. This mutual collaboration has also extended to other areas including research, innovative technologies and knowledge sharing. Given estimates suggesting large energy resources in the Arctic, Norway intends to facilitate oil and gas activities in the Barents Sea. For that, government plans include conducting an impact assessment of the southern Barents Sea, towards granting production licenses in the near future. Already in 2011, the country completed an exhaustive research project to define its oil and gas exploration strategy up to 2040 (NMFA 2011a).

Perspectives for the Arctic up to 2020 and beyond

Earlier overviews of the strategies of the US, Canada, Russia and Norway, do suggest different expectations regarding oil and gas exploration in the Arctic. Concerning the US, six states (Texas, California, North Dakota, Oklahoma, New Mexico and Alaska) are responsible for

more than 60% of the onshore oil and gas production. Indeed, the Lower 48 states are expected to remain larger contributors than Alaska in the near future. Indeed, according to US Energy Information Administration (US.EIA), and using the reference case, estimated oil production will increase to 9.6 million bb/d until 2020, mostly the result of onshore tight oil production in North Dakota, Montana, Texas and New Mexico. Another 1.6 to 2.0 million bb/d, will come, during the same period, from offshore production in the deep waters of the Gulf of Mexico (US.EIA 2014a). As for Alaska, total production will probably stay at 513,000 bb/d, (the amount produced in 2013) an incredible reduction when compared with previous production rates. In fact, between 1988 and 2008, oil production in Alaska decreased over 60%. The situation is not much different for natural gas. While overall production is expected to increase to close to 1075 billion cubic meters (bcm)/year in 2040, 52% will be shale gas, 33% tight gas, 12% conventional lower 48 states onshore and offshore, with the remaining 3% originating from Alaska.

As expected, Alaska is no longer the second state after Texas in oil production. It was ranked fourth by the US Energy Information Administration in 2014, after Texas, North Dakota and California. There are two possible explanations for that. First, for the last couple of years, Alaska government policies have not made investments in the region very attractive. Indeed, the Alaska Clear and Equitable Share (ACES) act, in place until 2013, increased oil taxes whenever its price rose. ACES nominal tax rate, applied to the production tax value, in short, net profits, was progressive and a function of the oil market price. Starting at 25%, the tax could go as high as 75% if crude market price increased significantly. Consequently, companies would not produce as much as they could when oil prices were high, since higher taxes would strongly reduce their profitability. To increase the state's attractiveness, some argued that serious tax reforms and co-investment were required (Keithley 2012, 2013). In fact, in 2013 the More Alaska Production Act (MAPA) was implemented, replacing ACES, and applying a flat oil nominal tax rate of 35%. While Alaska Department of Revenue forecast the change would cost \$700 million US dollars in lost revenue in 2014 and more in the subsequent five years, the expectation was that those changes would intensify investments (Goldsmith 2014). Indeed, large corporations like Exxon Mobil, Repsol and ConocoPhillips, as well as many independent companies have already increased their investments in Alaska. These reforms slightly increased the oil and gas production estimates for the next two years. However, it remains to be seen whether they will boost production again. Ermida (2014) has shown that little (not over 6% of total) additional production would be obtained from the Arctic by five major international oil and gas companies, between 2012 and 2017. Indeed, these companies will continue to drill and produce mostly in Africa, Asia and other North American regions. In part, this is due to

higher insurance, logistics and transportation costs in the Arctic. But lifting and finding costs are also higher and therefore it is not surprising that oil and gas companies choose to drill in regions where they can maximise return to shareholders.

A second reason for decreasing oil and gas production is not dependent on the will of Alaska's state to reform. In fact, it is the result of federal policies. Even though oil production has been declining, president Obama recently proposed to designate 12 million acres in the Alaska Arctic National Wildlife Refuge (ANWR) as wilderness, and therefore off-limits to drilling. What is at stake for Alaska is that considerable estimated oil and gas resources exist in 'area 1002' of ANWR and offshore Chukchi and Beaufort Sea, mainly in federal lands and waters. And while oil and gas production decreased by 6% and 28% respectively in federal lands, they increased by 61% and 33% respectively in state and private lands (Humphries 2014). This state versus federal clash in oil exploration is more critical in Alaska for two reasons. State areas like the North Slope and Cook Inlet are already widely explored. Second, state tax revenues from federal lands might not be equally distributed depending on whether ANWR or offshore are explored. Indeed, royalties from ANWR will probably be evenly split between federal and state governments, whereas offshore drilling will mostly benefit the federal government (Baker Institute 2013). Furthermore, transportation costs will probably be much higher from offshore than ANWR. In summary, the federal versus state and onshore versus offshore quarrel is more critical to Alaska than in the rest of the US. Oil, accounted for about 92% of state revenues in 2013. Without it Alaska would be very much dependent on subsidies from the federal government.

Canada holds important reserves in the three northern territories, Yukon, Nunavut and the Northwest Territories (NWT). Discovered and undiscovered offshore oil accounts for 85% of total, the majority in the NWT–Beaufort Sea (41%), followed by Beaufort Sea and Mackenzie Delta in the Yukon Territory (26%) and the Arctic Islands in Nunavut (23%). As for gas, offshore holds 68% of known reserves. Of this NWT and Nunavut account for very similar amounts (41 and 42%) in the Beaufort Sea, Mackenzie Delta and Arctic Islands. These are followed by Yukon with 17% in the Beaufort Sea (Drummond 2009). In spite of the many billions of dollars spent in the Canadian Arctic to explore oil and gas, little was achieved so far. Indeed, production in the region has declined since 2004. The largest northern areas of Canada, the NWT, Yukon and Nunavut, plus offshore waters, are producing minute amounts. While activity in Nunavut and Yukon seems to have never really taken off, that is not the case for the NWT. In 2013, three fields, Norman Wells, Ikhil and Cameron Hills, were responsible for all the oil and gas drilled in the NWT, totalling 4.1 million barrels of oil (Norman Wells and Cameron Hills) and 133 million cubic meters of gas (Norman Wells, Ikhil and Cameron Hills) (AANDC 2014). However, when compared to total

Canadian production for that year, the Northern territories did not account for more than 0.5% of oil and 0.12% of the gas produced.

Judging from recent auctions, two activities are expected to dominate the Beaufort Sea in the near future: the Mackenzie gas project and deeper offshore exploration. The majority of the near shore areas have already been explored. In fact, of the total licences attributed in the Beaufort Sea, six are located in deep sea while four take place in shallow waters (Callow 2012). However, and despite the auctions and the northern strategy, most of the oil and gas produced until 2030 is not expected to come from the Arctic. This is because conventional crude oil production is expected to decline while oil sands will make for a larger share of output. Indeed, from a forecasted 4.5 million bb/d extracted in 2025, most will come from tar sands. Gas production is also expected to decline, although the forecasts vary widely, owing to the uncertainty in shale gas exploration.

Various reasons can explain this apparent lack of interest in exploring the Canadian Arctic. First, and contrary to the US, Canada never built a pipeline that could bring oil or gas to the consuming regions. The Mackenzie valley pipeline, proposed during the 1970s, to carry gas from the NWT to Alberta, never happened. This project has been facing considerable political and economic challenges. Its lack has proven a barrier to investments in the region. Second, Canada is not really dependent on oil and gas revenues from the Arctic. On what concerns the NWT the focus has been on mining exploration where revenues are expected to rise from 732 in 2011 to 1300 million US dollars in 2020. Finally, the recent decline in oil and gas prices does not really create an incentive to exploring resources in these remote regions.

The amount of oil and gas that Russia extracts from the Arctic can be estimated using Rosneft and Gazprom data from their annual reports. For Rosneft, Arctic oil, including Eastern Siberia, Far East and Timon–Pechora regions, was in 2010, the last year for which data is available for all the three regions, close to 14% of its total output. Gazprom, responsible for more than 70% of the gas produced in Russia, obtained close to 90% of its gas from the Yamal–Nenets Autonomous area, in Siberia. Of the three main gas fields, Yamburg, Urengoy and Medvezh'ye, only Yamburg is located north of the Arctic Circle. But Yamburg together with Zapolyaroye, both explored by Gazprom Dobycha Yamburg, produced 192.3 bcm of gas in 2013, out of a total of 487 bcm, meaning that current Arctic production should be close to 40% (Interfax 2014; Gazprom 2014). Indeed, many other fields in the Arctic region are of utmost importance for Russia, since production in major fields is declining. Specifically, South East Barents and South Kara Seas are the most studied areas and hold large amounts of potential reserves. Other less explored areas, but still very promising, are the offshore regions of the North Kara and North Barents Seas, and the East Arctic shelf, formed by

the Seas of Laptev, East Siberia and Chuckchi (Piskarev and Shkatov 2012).

Although plans to increase oil production in Russia by the end of 2020 encompass Eastern Siberia and the Far East, many of the Arctic key projects, entail exploring the continental shelf of the Barents, Pechora and Kara seas, plus the Yamal Peninsula (MERF 2010). Shokman, one of the largest gas fields in the world, lies in the Barents Sea. There, Gazprom developed an interest in exploring hydrocarbons in 2003, developing many collaborative actions, the most recent with Gazprom, Statoil and Total. Yet, that project was put on hold in 2012, due to escalating costs. Prirazlomnoye, a large oil field in the Pechora Sea, was initially drilled in 1989. But it ran into many technical problems, and Russian companies are struggling to attract foreign investment. Recently, in April 2014, Gazprom was able to ship small quantities of oil from this field. The third and last project is the Yamal Peninsula, on the Kara Sea, with a total projected production of 311 bcm/year of gas by 2030.

Russian objectives for up to 2020, point to major investments in infrastructure for the country to export to European and Asian markets. Still, these plans require money and expertise that Russia does not have, as pointed out by Putin in his latest strategy to the Arctic. Developing the region will certainly require new partnerships to obtain technologies and investments, a strategy that Russia is already exploiting as shown by recent agreements with China National Oil Companies (NOCs). Similarly possible partnerships with western International oil companies (IOCs) have been put on hold by recent economic sanctions. However, EU and US sanctions were not designed to interrupt the normal flow of oil and gas. Instead, they targeted long-term offshore Arctic exploration by restricting access to high western technology, and limiting access to western financial markets. And while Arctic exploration was not totally interrupted, the pace of development was certainly reduced, with considerable implications for the Russian offshore long-term strategy. To bypass the sanctions, Russia has been making agreements with non-complying countries, namely China, Switzerland and Norway. Among these, China has invested heavily in the US to develop technical expertise in shale gas; however, the level of knowledge acquired to date is still unknown. Rosneft acquired Swiss Weatherford, a service company engaged in drilling and well repairs. The company also signed a long-term agreement in offshore drilling with North Atlantic Company, a Norwegian company. Although these partnerships might help Russia to alleviate the effects of sanctions, these will not go away entirely.

Norway's Arctic region was the object of extensive scientific research but had low priority in resource exploration. In 2013, only 4.2 bcm of gas was obtained from Snovit in the Barents Sea (US.EIA 2014b). The remaining came from the north (75%) and the Norwegian Sea (more than 20%). Nonetheless, this might change very soon, now that the government has defined the

northern area as the top strategic priority of its foreign policy. Already in February 2014, the government announced that of the 61 blocks that will be offered for oil and gas exploration, 54 would be on the Barents Sea (US.EIA 2014b). Notwithstanding, 90% of the total Norwegian production by 2020, estimated to be close to 4 million barrels of oil equivalent per day, will come from existing resources. This entails improving recovery rates in current fields, and better exploiting resources in existing discoveries. The remaining 10% might be obtained from undiscovered fields in areas already open to exploration, namely zones in the north and Norwegian Sea, and the southern part of the Barents Sea.

While improving recovery rates, developing existing discoveries and discovering new fields can occur in all three seas, each offers different prospects. The central and southern parts of the North Sea have a long history of petroleum drilling. Therefore, current and future production from these areas might come primarily from existing fields and discoveries. The northernmost part of the North Sea also contains significant remaining reserves in current fields and discoveries. But the likelihood for large new findings in the whole of North Sea is very small. Instead, large new discoveries are more likely to occur in the deep waters of the Norwegian Sea and the southern parts of the Barents Sea. The Norwegian Petroleum Directorate estimates the Barents Sea to hold up to 42% of Norwegian undiscovered resources. While the area has been relatively untouched, important discoveries like Snohvit and Goliat might cause this to change.

Foreseeably, resources obtained from current fields and developing existing discoveries will decrease to 50% by 2030. By that time, the remaining 50% will most likely come from undiscovered resources both in opened and unopened areas. This trend might continue so that in 2040, the share of hydrocarbons coming from undiscovered reservoirs in open and unopened areas might increase to more than 80%. As such, for the future, Norway expects most of the production to come from undiscovered resources, specifically in the North Sea (Skagerrak), Norwegian Sea (Troms and Nordalan), the surrounding areas of Jan Mayen, and the Barents south and North Sea in the Arctic region.

What lies ahead for the Arctic?

As we have seen, the intentions of the US, Canada, Norway and Russia towards the Arctic vary considerably. Alleging environmental reasons, the US postponed exploring the federal lands in the Arctic. While important, environment issues appear to weigh differently depending on the region being considered. Indeed, shale oil and gas exploration in the lower 48 states has benefited from fracking, a technique that many perceive as risky and environmentally unfriendly. What is more, unconventional exploration, whose tremendous success contributed to a recent marked drop in oil prices, will make it even harder to increase investment in Arctic resources.

Canada does not appear to have much urgency in exploring the region either. The country lacks infrastructure to transport oil and gas to the consuming markets, and the resources in the Arctic might not be sufficient to justify heavy investment. Furthermore, despite the recent drop in prices, exploring the tar sands in Alberta is still cheaper than investing anew in the Arctic.

Only Russia and Norway consider the energy resources a priority of their Arctic strategies, which is not surprising. Oil and gas in Russia represented 31% of the country's GDP in 2010 and 67% of the exports, making the Russian economy highly dependent on energy markets. Petroleum in Norway is the largest industry, representing around 25% of its revenues and 50% of the country's exports. For either country, Arctic resources are expected to replace maturing and declining fields, hence representing an important source of future revenue.

The differences in behaviour of US and Canada in one hand, and Russia and Norway on the other, could also be explained by a market-versus-state driven approach. In the former countries, oil and gas companies are mostly public and their decisions tend to be based on maximising profits and return to shareholders. It could be argued that oil and gas companies do not invest in the Arctic because of smaller return on investment as compared to other regions. On the other hand, Russia and Norway's major hydrocarbon corporations are NOCs and therefore are more prone to government interference. And while Norway could seemingly follow market-driven rules, Petoro does play an important role in managing the country's investment to maximise economic return to the state.

While in theory all this is true, energy is a strategic area. Therefore any of the four countries do interfere by means of regulation or other avenues and therefore affect the oil and gas companies' strategies.

But what is a fact is that uncertainties are high. Owing to their current activities, coupled with the drop in oil prices, neither Canada nor the US place the region at the top of their agendas. Norway does not expect to extract oil and gas from the Arctic in significant amounts until 2040, even though the region is crucial to the country's economy. The same might in fact happen to Russia, whose strategy is contingent on both the US and the European Union easing the economic sanctions in the wake the Ukrainian crisis. Newer political and technology developments coupled with further polar cap melting might change this picture considerably. So far, for all its potential, it is unclear what lies ahead for the Arctic.

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References

- AANDC (Aboriginal Affairs and Northern Development Canada). 2014. *Northern oil and gas annual report, 2013*. Winnipeg: AANDC.
- Baker Institute. 2013. *Does drilling in ANWR make more sense than the Alaskan offshore?* Houston: Baker Institute. URL: <http://bakerinstitutealaska.tumblr.com/post/28374130615/does-drilling-in-anwr-make-more-sense-than-the> (accessed 2 April 2015).
- Bird, K.J., R.R. Charpentier, D.L. Gautier and others. 2008. *Circum-Arctic resource appraisal; estimates of undiscovered oil and gas north of the Arctic Circle*. Melon Park: US Geological Survey (Fact Sheet 2008–3049, version 1.0, 23 July 2008).
- Callow, L. 2012. *Oil and gas exploration and development activity forecast, Canadian Beaufort Sea 2012 – 2027*. British Columbia: LTLC Consulting and Salmo Consulting. (Prepared for the Aboriginal Affairs and Northern Development Canada).
- Canada (Government). 2009. *Canada's northern strategy: our north, our heritage, our future*. Ottawa: Government of Canada. URL: <http://www.northernstrategy.gc.ca/cns/cns-eng.asp> (accessed 2 February 2015).
- Canada (Government). 2010. *Statement on Canada Arctic foreign policy*. Ottawa: Government of Canada. URL: <http://www.arcticgovernance.org/canadas-arctic-foreign-policy.4811028-142902.html> (accessed 2 February 2015).
- Drummond, K.J. 2009. *Northern Canada distribution of ultimate oil and gas resources*. Calgary: Drummond Consulting (Prepared for Northern Oil and Gas Branch Indian and Northern Affairs Canada).
- Ermida, G. 2014. Strategic decisions of international oil companies: Arctic versus other regions, *Energy Strategy Reviews* 2 (3–4): 265–272.
- Gazprom. 2014. *Gazprom in figures 2009–2013. Fact book, unlocking the planet's potential*. Moscow: URL: <http://www.gazprom.com/f/posts/29/761233/gazprom-in-figures-2009-2013-en.pdf> (accessed 19 July 2015).
- Goldsmith, S. 2014. *Alaska's oil production tax: comparing the old and the new*. Anchorage: Institute of Social and Economic Research.
- Huebert, R. 2010. *The newly emerging Arctic security environment*. Calgary: Canadian Defence and Foreign Affairs Institute.
- Humphries, M. 2014. *US crude oil and natural gas production in federal and non-federal areas*. Washington DC: Congressional Research Services.
- Interfaxenergy. 2014. *Gazprom Dobycha Yamburg produced 5 tcm of gas at the Yamburg and Zapolyarnoye fields*. London: Interfaxenergy. URL: <http://interfaxenergy.com/gasdaily/article/13935/gazprom-dobycha-yamburg-produced-5-tcm-of-gas-at-the-yamburg-and-zapolyarnoye-fields> (accessed 20 January 2015).
- Keithley, B. 2012. Alaska oil policy, out of alignment. *Alaska Business Monthly*, November 2012.
- Keithley, B. 2013. Alaska oil policy, achieving alignment. *Alaska Business Monthly*, January 2013.
- MERF (Ministry of Energy of the Russian Federation). 2010. *Energy strategy of Russia for the period up to 2030*. Moscow: Institute of Energy Strategy.

- NMFA (Norwegian Ministry of Foreign Affairs). 2011a. *An industry for the future—Norway's petroleum activities*. Oslo: NMFA. (Meld. St. 28 (2010–2011)).
- NMFA (Norwegian Ministry of Foreign Affairs). 2011b. *The high north visions and strategies, 2011*. Oslo: NMFA. (Meld. St. 7 (2011–2012)).
- Piskarev, A. and M. Shkatov. 2012. *Energy potential of the Russian Arctic seas, choice of development strategy*. Oxford: Elsevier.
- Rusnak, M. and I. Berman. 2008. The foundations of Russian Federation policy in the Arctic until 2020 and beyond. *The Journal of International Security Affairs* 18: 97–105.
- Russia (Government). 2013. *The development strategy of the Arctic zone of the Russian Federation, approved by Russian President Vladimir Putin on February 20, 2013*. Moscow: Government of Russia. URL: <http://www.iecca.ru/en/legislation/strategies/item/99-the-development-strategy-of-the-arctic-zone-of-the-russian-federation> (accessed 19 July 2015).
- US. EIA (US Energy Information Administration). 2014a. *Annual energy outlook 2014*. Washington DC: US Department of Energy.
- US. EIA (US Energy Information Administration). 2014b. *Norway country analysis brief*. Washington DC: US Department of Energy.
- USG (US Government). 2013. *National strategy for the Arctic region*. Washington DC: US Government, The White House.