American Review of Canadian Studies
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/rarc20

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Published online: 22 Feb 2013.

To cite this article: Adam Lajeunesse (2013): The New Economics of North American Arctic Oil, American Review of Canadian Studies, 43:1, 107-122
To link to this article: http://dx.doi.org/10.1080/02722011.2013.764915

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The New Economics of North American Arctic Oil

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Over the past five years there has been a remarkable resurgence in oil and gas exploration in the North American Arctic. From completed disinterest only a half a decade ago the region has attracted billions of dollars in new investments from a host of different international oil companies. Unlike the past booms in the region, which inevitably ended in busts, this new wave of development is different. This article examines the changes in both the Arctic itself as well as the global energy environment and concludes that the North American Arctic will see slow bust sustained development over the coming decades, ultimately becoming one of the last great oil producing regions in the world.

Keywords: Arctic; oil; gas; hydrocarbon; North America

On July 18, 1968, in Dallas, Texas, DeGolyer and MacNaughton, a local firm of oil consultants, announced the discovery of an enormous oil and gas find off Prudhoe Bay in Alaska. After the shock of the 1967 Arab oil embargo, the news of a massive new Arctic discovery was certainly greeted with enthusiasm and, in the decade to follow, the oil industry flooded into the North looking for comparable discoveries. While the giant onshore Prudhoe Bay field began production in 1977, the anticipated development of the region’s offshore areas never materialized. By the early 1980s, the development boom in Canada had ended, the international oil companies had closed down most of their operations, and their discoveries were left undeveloped. Northern operations were prohibitively expensive and even the act of offshore exploration had proven economical only when it was being heavily subsidized. As crude prices fell throughout the 1980s, the industry consensus was that the time was simply not right for development.

The past seven years have, however, seen a striking and rapid change in the oil industry’s perception of the Arctic. Beginning in 2007, the international oil majors began moving back into the region, together spending billions of dollars and an increasingly large percentage of their exploration budgets in the Beaufort and Chukchi Seas. While environmental change is often cited as the principal catalyst behind this movement, there have in fact been a series of significant influencing factors, from the economic and geological to the political and technological. In light of these changes, the old economics which had governed and limited northern development are proving increasingly invalid. And, while most of the traditional environmental and technical problems inherent in Arctic operations remain, in the context of twenty-first century energy requirements they have been reduced from economically unsurpassable barriers to mere obstacles to be overcome.

This is not to say which Arctic development is in any way inevitable. Patterns which appear obvious can be (and often are) upset by unforeseeable technological or political
developments. There is no way to predict the future but educated guesses can be made by extrapolating from existing and expected economic, demographic and industrial trends. At present, these trends all indicate that the present push into the region by the world’s multinationals is likely to continue.

This development is also not likely to resemble the boom and bust of past Arctic exploration. Instead, present activity will likely result in slow but sustained long-term development. At present this movement has been retarded by the understandable caution within the Canadian and American governments in the wake of the Gulf of Mexico spill and by the slow development and streamlining of the northern regulatory environment. Companies are now using this time to prepare the groundwork and position themselves for the eventual settling of the regulatory regime. This will likely be a temporary lull as, in only a few years, the world’s oil companies have fundamentally reassessed the Arctic and now both the economics and the will appears present for a sizable and sustained move back into the region.

The old economics of Arctic oil
Interest in the region’s hydrocarbons is nothing really new. Since the 1950s there has been private and government-led exploration and even a limited level of development and production. The economic viability of this exploration was generally characterized by a number of factors, the most important of which were: generous, if unreliable, government subsidies, an extremely harsh environment, high oil prices, and obscene transportation and logistical costs. Historically, much of this activity has been made possible through government support. In the 1960s, under Prime Minister John Diefenbaker’s “Northern Vision” program, oil companies were given very generous terms and very low royalty rates to stimulate exploration. Regulations were also minimal and oil companies were spared the difficulties of consulting with local stakeholders. During the 1970s, the Canadian government remained anxious to encourage and assist in northern economic development as a means of asserting its sovereignty and establishing more secure supplies of oil, which could safeguard the country against future Arab oil embargoes. The government’s desire to see the North developed thus encouraged it to agree to significant tax incentives, capped by the Frontier Allowance, to assist in northern exploration. This allowance, more informally referred to as “super depletion” allowed companies spending $5 million or more on a well to write off 120 percent of their expenses in taxes. By August 1979, the Calgary Herald calculated that of the $150 million spent in the Beaufort Sea in 1978 the government had paid for $130–$140 million of it.1

While it was predominantly political motivators which encouraged state involvement, there existed a strong economic rationale as well. The region’s geology offers a great deal of potential if it could be economically developed. The Mackenzie region has been estimated to have upwards of 2.8 billion barrels of crude oil reserves and more than 60 trillion cubic feet of natural gas.2 Further east, the Geological Survey of Canada has estimated that the Sverdrup basin contains 4.3 billion barrels of oil and 79.8 trillion cubic feet of gas.3 The American Beaufort is estimated to contain some 7 billion barrels of oil and 77 trillion cubic feet of gas and the Chukchi even more at 15 billion barrels of oil and another 777 trillion cubic feet of gas.4 The region is also one of the least explored in the world, making it one of the only places left where there remains the possibility of significant new discoveries. In the decade of exploration in the Beaufort Sea, for instance, a mere 84 wells have found 1.5 billion barrels of oil.5 Most industry analysts agree that further exploration would certainly yield more.
Yet economical production has always remained out of reach for companies operating in the isolated environment. The harsh Arctic weather makes any activity exceedingly difficult. The wind chill can drop the temperature to minus 50 °F, icebergs pose a perpetual danger to offshore rigs and the difficulty posed to shipping by ice has historically limited the drilling season to a mere four months. The logistics of Arctic operations are also staggering. Because it is so far from North America’s infrastructure, industry and population centers, everything from food to equipment must be shipped thousands of miles. Exacerbating this is the fact that ice prevents reliable shipment by sea, while ground transportation infrastructure usually ranges from limited to non-existent. Paved roads end at Dawson City in the Yukon, roughly 700 kilometers south of the former oil outpost at Tuktoyaktuk. From Dawson, the gravel Dempster Highway runs north to Inuvik from where Tuktoyaktuk can be reached only by a winter road. In the US much of the shoreline along the Chukchi possesses no transportation infrastructure whatsoever.

In the 1970s, when exploration was in full swing, oil companies found logistics in the North to be the most frustrating part of operations. Murray Todd, the vice-president for Canmar Drilling, equated his work to that of a military commander invading a faraway land: “The environment was foreign and we were a long way from traditional infrastructure and supplies. Everything we needed we had to take with us... it was a logistics nightmare.” Operating costs in the Arctic were naturally found to be dramatically higher than similar operations elsewhere. In the winter, goods had be driven in over vast distances or flow in at enormous expense. Flying material in during the winter cost roughly $1 per pound. Renting a Hercules heavy lift jet to transport drilling rigs was priced at $9,000 per hour. Traveling by road was also unusually difficult because of the permafrost. To the west, the entire American Prudhoe Bay operation is serviced by only one carefully-built, 30-foot-wide gravel road.

The operation of drill ships and supply vessels is impeded by ice in the summer and prevented completely during the winter. In their early operations, oil exploration teams were forced to develop and build a small but expensive fleet of icebreakers and ice strengthened supply vessels simply to access and protect their offshore rigs. Offshore drilling platforms were also unusually expensive—sometimes running up to $1 million per day to run, more than the operating cost of 100,000 ton Nimitz class aircraft carrier. The costs of supplying those rigs and the isolated drilling operations were prohibitive without heavy government support. A simple sack of cement, for instance, cost $17 in the Arctic against a price of $1.25 in the south. Clifford Kippen, working on an ice island in the Beaufort, recounted one instance where a fan belt was needed for a tractor; the tractor was vital and so the belt had to be brought all the way from the base at Tuktoyaktuk. With helicopter time the fan belt ended up costing $14,000.

These costs were considered bearable in the 1970s largely because they were being subsidized and because of the skyrocketing price of oil, a result of the Arab embargo of 1973. Yet, by 1979, super depletion had ended and the subsidies of the National Energy Program (of up to 80 percent of drilling costs) had been canceled by 1985. Along with a crash in world oil prices caused by decreased consumption in the West, new production from Alaska and the North Sea and Saudi Arabia, world oil prices crashed from $37 in 1980 to a range in the mid-high teens throughout the latter half of the 1980s. Under these conditions Arctic operations had become uneconomical and the region was rapidly abandoned.

The new economics

In the twenty-first century, however, the economic framework of Arctic exploration and production appears to have shifted dramatically. The government subsidies which enabled
the industry in the past are gone, though prices are again very high. Yet, the essential shift in Arctic economics has taken place not in the North itself but across the global hydrocarbon market. The declining supply of global reserves, available to the multinationals, coupled with the mitigation of many of the past environmental and technical challenges and the exhaustion of much of the world’s easy oil has made the North an increasingly attractive long-term prospect.

Perhaps the most convincing sign that there has been a fundamental re-evaluation of the value and prospects of the Arctic as a development region is the fact that the current movements north are being made without that heavy-government assistance. Oil majors are now paying considerable sums for offshore exploration blocks and putting up their own money for a myriad of preliminary exploration programs from the Canadian Beaufort to the Chukchi Sea.

In the summer of 2007, Imperial Oil and Exxon turned heads with a nearly $600 million bid that won them a 205,321 hectare exploration block on the Canadian side of the Beaufort Sea. In four previous calls for bids in the same area, the industry had shown only minor interest. In 2003 and 2005 there were no bids at all. In November 2007, Devon Energy, conducting the first drilling in the Beaufort since the 1980s revealed that it had found an estimated 240 million barrels of recoverable oil. In 2008 there was an even greater increase in interest as Shell and Conoco Phillips bid nearly $2.7 billion in a blockbuster competition for drilling rights in the Chukchi Sea—a record for any Alaskan oil or gas lease. Randall Luthi, director of the Minerals Management Service, noted that the $2.7 billion in winning bids far surpassed his agency’s expectations that the Chukchi sale would generate $67 million. The last such sale, in 1991, had generated only $7.1 million.

British Petroleum, which, as recently as 2002, announced that it had no interest in further Arctic exploration, spent nearly $1.2 billion in a June 2008 auction for oil and gas exploration leases covering roughly 611,000 hectares of the Beaufort seabed north of Tuktoyaktuk. In the same auction, two other leases were won by a trio of companies led by MGM Energy and including ConocoPhillips Canada Resources and Phillips Petroleum Canada. These companies spent $4.3 million for rights to 237,820 hectare of offshore exploration rights. In addition to the initial investment, the five exploration leases came with work commitments totaling more than $300 million. In 2007 Rick Fox, head of Shell’s Alaska operations, told the press that “Conditions are right for us to re-enter and give it another shot... and we are committed in a very big way.”

This activity slowed significantly during the recent recession as global demand slackened and the price of oil plunged. Yet, despite oil trading below its 2008 peak, and with the future health of the world economy still somewhat in doubt, the oil majors have clearly demonstrated that they still believe in the long-term economics of Arctic operations. Despite ongoing and costly legal battles with Alaskan native groups, in addition to a series of operational missteps, Shell is pushing forward with a drilling program in the Chukchi Sea which has already cost the company nearly five billion dollars.

Shell’s plans are certainly the most advanced, however the remaining oil majors are together spending billions more. Imperial Oil, ENI, Chevron and Statoil—among others—are conducting preliminary seismic exploration in preparation for exploratory drilling. ConocoPhillips has set 2014 as a possible start date for its drilling while Repsol has committed to spend $768 million on its exploration program, to start in 2012. These plans are, by necessity, very long-term investments. Shell does not expect to begin commercial production of Beaufort Sea oil until 2019 and of gas until 2029. In the Chukchi, which is farther from established infrastructure, the expected production start date for oil is 2022 with gas by 2036. While much of this activity could certainly be canceled, that
such capital outlay has been planned is a powerful indication of intent and the changing perception of the feasibility of Arctic operations within the industry.

Some of this new confidence comes from changing environmental conditions. Arctic operations have clearly been facilitated by the steadily decreasing sea-ice coverage and thickness in the region. On average, the Arctic has been losing 74,000 square kilometers worth of ice each year—adding up to a loss of over two million square kilometers since the late 1970s. Sea-ice poses the greatest threat to offshore platforms and how quickly it re-establishes itself in the fall determines the duration of the drilling season. The work of supply and offshore service vessels has also been made easier by the increased presence of open water, facilitating both exploration work, re-supply and, in the future, potentially export.

Technologically, the industry has also seen considerable advancements in the decades since their withdrawal from the Arctic. New developments in seismic surveying have dramatically reduced the number of expensive exploration wells needed to locate economical fields and these operations can now be carried out through the ice whereas previously open water had been required. Horizontal drilling has also opened up new, harder to reach fields and minimized the number of expensive surface well pads required. Prefabricated insulated panels for ice-pads are also being introduced which, along with decreasing ice levels, could increase the drilling season by as much as 50 percent.

While conditions are steadily improving for northern operations many of the factors responsible for killing past Arctic exploration booms are decreasing in importance. The mass exodus from northern offshore projects in the mid-1980s was largely due to the precipitous decline in global crude prices. Such a decline is now very unlikely to recur. The realities of global supply and demand indicate that oil prices will likely remain above $100 for the foreseeable future and are unlikely to suffer any sustained weakness. While short term volatility will certainly remain a concern, the long-term prospects remain strong and, given the lengthy timelines of Arctic projects, it is the long-term prospects which remain the most essential.

This expectation stems from the changed reality of petroleum exploration and the greatly decreased chances of any company making significant new conventional discoveries. In the late 1970s and early 1980s, new oil from Alaska, the North Sea and elsewhere helped to increase global supply and drive down prices. And, while the history of oil exploration has often been characterized by surprises, today, new conventional fields of such a size (i.e. those outside of either the Arctic, oil sands, ultra-deep water or shale environment) are unlikely to be discovered.

This is not to say that global oil production is in crisis or that significant new sources will not be brought online. The new shale oil basins in the United States in particular are considerable and it seems very likely that the technology used to open them will soon be applied elsewhere. Like shale gas, this oil is now being extracted in increasingly large quantities using new hydraulic fracturing and horizontal drilling techniques. The Bakken fields in North Dakota and Montana alone, for instance, have seen a massive increase in output of late—from 3000 barrels per day (BPD) in 2005 to 400,000 in September 2011. With roughly 3.6 billion barrels of recoverable oil, it has become the largest discovery in the US since Prudhoe Bay was identified in the 1960s.

Yet, while shale oil has been presented by some as an answer to many of North America’s energy needs, the cost of production will likely remain high. Productions costs can vary widely, though it is generally around $60 per barrel. The huge amounts of water required for hydraulic fracturing are also a limiting factor, as are the potentially serious environmental dangers which have prompted bans on exploration and development...
in certain American states and foreign countries.\textsuperscript{25} While shale oil will certainly play a much greater role in the global supply mix in the coming years it is not likely to create a glut in global supply and, according to Exxon analysts at least, will still constitute a small percentage of global output as late as 2040.\textsuperscript{26}

Likewise, new offshore discoveries like those in Brazil and the continuing development of the Canadian oil sands will certainly add billions of new barrels to global reserves. Yet, all of these new unconventional reserves are going to be very expensive. As such, while the discoveries of the past decade appear to have pushed back the arrival of peak oil, what has seemingly come and gone already is perhaps best described as peak cheap oil. There are simply no more significant deposits of cheap conventional oil to develop and what cheap conventional oil remains is largely in territory controlled by national oil companies.

The dominance of national oil companies has only increased since the last Arctic boom and, in the twenty-first century, these state-run enterprises now control the vast majority of the world’s oil wealth. The principle difficulty facing the multinationals as they seek to replace their reserves has been their exclusion from many of the world’s most promising hydrocarbon basins by countries like Saudi Arabia, Venezuela or Iran. Exxon, the world’s largest multinational, is only the 17\textsuperscript{th} largest oil company by production and 14\textsuperscript{th} by reserves. In fact, the world’s national oil companies control some 94 percent of the planet’s reserves and often either exclude the multinationals or force them to operate as minority partners, often subjected to onerous taxation or crippling levels of corruption.

In many cases (including Russia, Venezuela, Mexico, and Nigeria) these petro-states have also displayed a long history of failing to reinvest enough of their revenue into the national oil infrastructure to allow for a safe continuation of operations and the development of new reserves. The result has been an increasingly difficult working environment in even those petro-states which still allow some foreign participation. As such, while there are plenty of areas with far more promising geology and far cheaper reserves to develop than the Arctic, most of those areas are and will certainly remain off limits.

It also appears as though significant increases from those national oil companies are unlikely to occur. While the reservoir health and production capabilities of most of the world’s major state producers are secret, it is widely understood that only Saudi Arabia maintains any considerable spare production capacity, and that may be less than two million barrels per day.\textsuperscript{27} The ability of the Saudis to raise their production level to bring down global crude prices is thus becoming increasingly limited. The long-term health and growth potential of Saudi reserves have also recently come into question. In contrast to some of the more optimistic statements by the Saudi government and national oil company Aramco, WikiLeaks cables from Riyadh have warned Washington to take seriously a warning that the Kingdom’s crude oil reserves may have been overstated by 40 percent or as much as 300 billion barrels.\textsuperscript{28} This warning came from Sadad al-Husseini, a geologist and former head of exploration at Aramco who told an American consul in 2007 that Aramco would likely never be able to sustain the 12.5 million BPD which it had publicly cited as being within its capability.\textsuperscript{29}

Even if that level of production were sustainable, it would result in only a 3 percent increase in global supply at the current global consumption rate of 87 million BPD.\textsuperscript{30} This would be nothing like the glut in global supply caused by the expansion of Saudi production from 1985 to 1991. In those years, in a quest to win market share, the Saudis chose to increase production from 3.38 million BPD in 1985 all the way to 8.11 million BPD by 1991.\textsuperscript{31} This 240 percent jump led to a 9 percent increase in global supply in six years. Along with the decline in Western consumption after the 1973 embargo and the
increasing production from other developing fields, world crude prices fell from $27 in 1985 to average $16.33 throughout the rest of the decade.  

A similar production boost is simply not within the power of either the Saudis or any other state. Indeed, most of the world’s older reserves are already maturing and beginning to decline. Production and conventional proven reserves in Mexico, Indonesia, Britain, Norway and the continental United States have already peaked, while many other states may just be reaching their production ceiling. Optimistic claims made by many of the less transparent national oil companies have also been called into serious question by industry observers. Matthew Simmons, author and chief of the investment bank Simmons & Co., has garnered attention by challenging the claimed current and projected future capacity of many states, citing the ever increasing difficulty of extracting oil from their few mega fields, the widespread problems with increasing water cuts and the unlikelihood of any significant new discoveries.  

Russia is perhaps the major producer most likely to see production decreases in its maturing fields in the near future. The significant increase in Russian production in recent years—pushing output up to 10 million BPD in 2010—has come almost entirely from its older fields. During the 1980s, in an attempt to increase its falling oil revenues, the Soviet Union opened the well heads on its largest fields, dramatically increasing production but also lowering reservoir pressure and likely causing permanent damage. The US Energy Information Administration (EIA) laid out the stark details: Only two of Russia’s 14 largest oil producing fields were opened after the Soviet Union collapsed in 1991 and half of the 14 were more than 60 percent depleted in 2006. Today, seeking to maintain its production and reserve levels, Russia too is looking to develop its own remote and very expensive Arctic frontier regions.  

Private oil companies are also seeing unnerving declines in their reserves and production levels. The 2010 “oil-equivalent” reserves of Chevron, BP and ConocoPhillips have all fallen since 2008. Shell and Exxon have increased their reserves, however the replacement rate has generally slowed in recent years and more and more of the new ‘oil-equivalent’ barrels being booked are in fact natural gas and not oil. Indeed, despite a very healthy 2010 reserve replacement ratio of 209 percent, Exxon replaced only 95 percent of the actual oil it pumped. Chevron fared even worse, with oil and gas liquid reserves falling 22 percent in only three years (2008–2010). Production levels have also not been increasing in step with growing global demand. Exxon for instance produced only 80,000 BPD more in 2010 than it did in 1998. Indeed the collective production for the big five oil internationals has been relatively stagnant over the past two decades as large new fields become increasingly difficult to find.  

While supply is therefore likely to remain constrained, demand seems poised to continue steady growth—with most of that growth coming from the world’s emerging economies. China alone is projected to double its oil consumption from the 7.7 million BPD it used in 2008 to 16.3 million barrels per day by 2030. Despite slowly waning demand in the West, the EIA still projects global consumption to increase to between 108 and 115 million BPD by 2035. This compared to the 87 million BPD consumed in 2010. While there may certainly be new innovations and efficiency programs which cause declines in consumption, the continued growth of nations such as China and India will undoubtedly lead to steady and sustained overall growth in global demand. As such, one of the largest barriers to frontier oil development—the long-term unpredictability of oil prices—is being largely written off. Regardless of short- or even medium-term price drops caused by macroeconomic market convulsions, the long-term outlook for global energy consumption, and therefore prices, will almost certainly remain strong.
New frontiers: the international political economy of resource development

As companies are forced to look to increasingly remote and dangerous regions of the world to replace their reserves and maintain production, the North American Arctic will offer increasingly valuable advantages, among the most important being stability and the rule of law. It is an unfortunate truth that much of the world’s most abundant oil supplies are located in areas where good government is in very short supply. In recent years this has become an even greater concern. The Arab Spring, which has seen the overthrow of the Tunisian, Egyptian and Libyan government and which (at the time of writing) threatens the Syrian government, has shaken the formerly stable Middle Eastern order. The Libyan civil war was particularly disruptive, forcing ENI, Total, BP and other companies to close down operations in that country and evacuate their staffs, removing 1.6 million BPD from the world market.46 At the time of writing there also exists the potential for a serious conflict in the Straits of Hormuz if either Israel or the United States choose to attack Iranian nuclear facilities.

On a smaller scale, violence also continues to affect operations in a number of important producers. Nigeria is perhaps the best example of this form of low intensity warfare. In response, recent investment in Nigeria and elsewhere in Africa has increasingly been channeled into more expensive offshore development, providing a buffer between the industry and the locals themselves. However, attacks on offshore platforms by small armed groups have been expanding and now pose serious problems. Similar violence has also disrupted oil production in countries such as Iraq, Chad, the Congo, and Columbia.

Traditionally, the difficulties inherent in working in unstable and corrupt countries have been outweighed by the environmental and logistical difficulties of Arctic operations—especially offshore Arctic operations. While the tentative positioning currently underway in the North American Arctic implies that this is no longer the case, the rush to operate in the Russian North has demonstrated, beyond a doubt, the shift in how oil majors weigh the costs and benefits of exploration. In August 2011, Exxon entered into a corporate alliance with Russian state producer Rosneft under which the companies plan to undertake joint exploration and development of hydrocarbon resources, primarily into offshore Arctic areas, The agreement includes approximately $3.2 billion to be spent funding exploration of East Prinovozemelskiy Blocks 1, 2 and 3 in the Kara Sea.

Estimates of the Russian Arctic’s oil and gas potential vary but Rosneft has placed its Kara Sea reserves at roughly 36 billion barrels of recoverable oil, while total resources are estimated at 110 billion barrels oil equivalent—more than four times Exxon’s proven worldwide reserves.47 The Exxon/Rosneft program is a long-term plan to bring online one of the world’s last (potentially) giant undeveloped reserves and to do so will take tens of billions of dollars and over a decade.48

Despite the political difficulties which both Exxon and other oil majors have had in the past operating in a state as corrupt as Russia, this deal was considered a coup for Exxon. It came about only after a similar Russian alliance with BP fell apart because of a conflict with BP’s existing Russian partners. For its part, BP was so interested in gaining access to Russia’s Arctic reserves that it was willing to offer Rosneft a substantial five percent stake in the company in a mutual share swap.49

This interest is certainly instructive. The Kara Sea region where, first BP, and now Exxon hope to work will not be significantly more accessible or easy to work in than prospective development areas in North America. Operations in the Kara will face water depths which average 350 meters, storms that sweep across the waters, churning up huge waves and, in the winter, temperatures dropping as low as minus 50 °F creating massive
ice floes that would threaten any oil platform.\textsuperscript{50} Port infrastructure is not much better than similar facilities in North America. The region lacks a deep water oil terminal, adequate repair or harbor facilities and rail links. Precisely how much oil and gas might be present is uncertain as Rosneft’s high numbers conflict with the EIA’s lower figures of 2.5 billion barrels of oil, 622 billion barrels of natural gas and 19 billion barrels of natural gas liquids.\textsuperscript{51} In contrast, the US Geological survey estimates that the Chukchi and Beaufort may possess some 30 billion barrels of oil and 221 trillion cubic feet of natural gas.\textsuperscript{52} In total, the Russian Arctic seems certain to possess more oil equivalent resources; however that may include a much higher percentage of less valuable gas reserves. This ratio, if the EIA’s estimates can be relied upon more than Rosneft’s, would seem to offer the North American Arctic an advantage given the relative values of oil and gas.

The prospects for North American Arctic development

The North American Arctic is also a gas heavy region however and the proportion of oil to gas will likely do much to determine which areas are developed first.\textsuperscript{53} The higher percentage of oil in the Chukchi Sea versus the Canadian and American Beaufort is likely a large reason that that area is seeing more attention at present. The recent technological breakthroughs in shale gas extraction in the continental US has seriously depressed the price of gas, from a high of near $13 per thousand cubic feet in 2007 to current levels hovering in the $3.50 range. Unlike oil, natural gas never recovered from the recession and will likely see a much slower price appreciation in the coming years. While North American oil reserves have been declining or, recently, leveling out, American shale gas plays have been increasing US gas reserves dramatically, with shale output growing an average of 46 percent per year from 2006 to 2010.\textsuperscript{54} Further increases in shale gas production are expected, with total production expected to grow almost threefold by 2035.\textsuperscript{55}

As such, some of the more expensive gas focused projects are likely to be cancelled or shelved for the foreseeable future. These are likely to include the $17 billion Mackenzie Gas Project, a joint tie-up among the Canadian branches of ConocoPhillips, Exxon, Imperial Oil and a Canadian aboriginal group. The first major defection from the project came in July 2011 as Shell announced that it was seeking to sell its 11 percent stake in the project to focus on newly acquired shale reserves.

In Russia there have been similar reassessments, represented by the February 2010 decision to postpone the development of the Shtokman natural gas field in the Barents Sea. Previously, plans had envisaging the field becoming operational in 2013–2014, however with half of the field’s gas having been earmarked to supply the now saturated US market the project has lost much of its impetus.\textsuperscript{56} This decline in the importance of natural gas has been cited as a factor impeding Arctic development; however it seems more likely that it will simply divert attention to more oil rich reserves, at least in the short term.

While the long-term economics of Arctic oil is impossible to anticipate with clarity, the fact that two of the largest international oil companies have proven willing to invest so much capital in a nation known for its poor treatment of oil companies indicates that the industry at least believes the future economics will warrant the risk. The BP and Exxon deals with Rosneft certainly indicate that major internationals are willing to invest billions in Arctic regions with a very high concentration of natural gas, to get the oil but also under the long-term assumption that gas prices will once again be high enough to justify operations when the region’s gas fields do come online later on.\textsuperscript{57}

The multi-billion-dollar Exxon–Rosneft tie-up demonstrates how ready for exploration the North American Arctic is. Operating in Russia is a dangerous proposition and many
international oil companies have been burned by their Russian partners in the past. Exxon itself certainly has reason to distrust Rosneft. In 2003, Exxon had come close to purchasing a large stake in the Russian oil giant Yukos, only to have the deal scuttled when the company’s main shareholder, a political opponent of Vladimir Putin, was arrested and the company’s assets swallowed by Rosneft. As recently as 2008, Exxon CEO Rex Tillerson told a crowd at the St. Petersburg International Economic Forum that there existed “no confidence in the rule of law in Russia today.”

Yet Exxon is now enthusiastically pledging to spend $2.2 billion in Russia in the near term with Arctic development costs ultimately expected to run into the tens or even hundreds of billions. The difference between the Russian and Canadian investment experience is that while the rule of law in North America makes for a safer and more stable long-term business environment, Canada and the United States have also imposed a heavy regulatory burden on companies operating in their territory. This was the case prior to the Deepwater Horizon disaster in the Gulf of Mexico and, after the spill, activity has been slowed to a crawl as both Canada and the US have sought to re-evaluate how offshore activity can be safely conducted.

Local hurdles to development

While the economic environment may point towards a favorable future, development on the scale that is being contemplated for the North American Arctic will certainly be subject to intense political and local influence. Such influence has certainly made an impact in the past and has only become stronger since the last Arctic oil rush. Since that time, local aboriginal groups have won a stake and a powerful voice in the development of their traditional lands (and waters). On occasion local resistance has meant costly delays which have had the power to wreck very tight schedules. Shell’s exploration program in the Chukchi Sea is a case in point. It has been repeatedly stymied by legal challenges from local aboriginal groups and lengthy permitting applications, rejections, and appeals. BP operations in the Beaufort have also been postponed, in part because of increased government review requirements.

In Canada, the issue has become as much about regulatory confusion and delay as about local resistance. Much of the current regulatory system has developed from the settlement of comprehensive land claim agreements which set in place a framework for resource development. This regulatory framework is based on a concept of co-management of the resources by the federal government, the territories and aboriginal groups. The basic philosophy underlying the framework is that those associated with the lands or waters involved in development should have significant input into those proposed developments. The consequence of the regional implementation of this framework has been a fairer system but also one in which more regulatory powers are exercised by more bodies in more areas than ever before.

The presence of so many cooks in the kitchen, so to speak, has resulted in a system which many in industry and government have criticized as being overly complex and prohibitively slow. In his 2008 review of the North’s regulatory system for Indian and Northern Affairs, Neil McCrank concluded that:

... while some of the regulatory bodies have specific timelines, which are usually met, the overall system seems to be stressed and is not able to deliver timely decisions. In other instances there does not appear to be any real attempt to set timelines. While this objective is difficult to assess, the perception is that often the regulatory bodies are not consistent when confronted with identical facts. This leads to a belief that the system is unpredictable.
This is certainly the view held by many in industry. In 2005, when Devon Canada was seeking an environmental assessment for its Beaufort Sea exploration program it was required to undergo a comprehensive study under the Canadian Environmental Assessment Act, as well as an environmental screening under the Inuvialuit Final Agreement. Ultimately, it took two years to complete the review and cost Devon several million dollars. This was taken as a cautionary tale for other companies looking to conduct similar work.

There are certainly contrasting opinions on this subject. Some have claimed that the system has been improving in efficiency and, as one federal regulator put it: “... [the system] is initially very confusing. ... But once you actually sit down, and take half a day, even, and have someone explain it to you, it isn’t that difficult. I think people just get frustrated quite easily, because it isn’t what they’re used to.”

At the time of writing, changes to Canada’s regulatory system have only just begun. In April 2012, the federal government officially announced its plans to streamline the process by reducing the number of departments involved in the review process and, most importantly, by setting definite timelines to prevent ridiculous delays like that experienced by the Mackenzie Valley Pipeline. It remains too early to determine how this new approach will affect Arctic projects, given the constitutionalized character of aboriginal land management and related requirements for consultation. However, the Conservative government’s philosophy on the review process generally can only be seen as favorable to development.

Yet, even if the process can be simplified, it still remains partially unsettled. Currently, the most divisive issue in Arctic operation is the requirement that companies drilling in the region have the capacity to complete a relief well in a single season. This is intended to ensure that a blowout is not left to spew crude over a long Arctic winter after ice renders the area inaccessible. The major industry actors have lobbied for the removal of the “same season” part of the rule on the basis that—in their opinion—improved technology can provide equivalency by preventing blowouts.

In its December 2011 report, the National Energy Board had apparently conceded the point. While the same season element has remained in place, operators have been given the opportunity of proposing alternatives which “meet or exceed the intended outcome of our policy.” How this element of the new policy is implemented and what measures would be considered to be “meeting or exceeding” remains in question. The ambiguity of this criteria will likely result in challenges by environmental groups and slow activity until an accepted standard is established, either through regulation or precedent.

If such issues can be settled decisively and the overall review process can be streamlined then the impact on development will be very positive. The majority of Arctic residents certainly still desire development for the jobs and infrastructure that will come with it. In March 2012, David Ramsay, the Northwest Territory’s Minister of Industry, Tourism and Investment, went so far as to warn British Columbia not to make the mistake of pushing away pipeline and hydrocarbon investment. The NWT is in difficult financial straits and has been seeking to push the Mackenzie Valley gas pipeline forward; the project however seems to have foundered on the shoals of low prices and the continuing abundance of shale gas from the United States.

In large measure, the reason the push back into the North American Arctic will be a slow and gradual one is because the territories, the federal government, the local interest groups and all the relevant and involved agencies will need time to determine how they want development to proceed. It is clear that most parties do want to see this development but how to do it with respect for the local population and environment is a very complex question which will take time to resolve. The incentive to resolve it is high however and,
given enough time and, provided the economic conditions remain favorable, it seems very likely that practical northern regulations can be developed which are capable of meeting all these concerns.

International political hurdles to development

Apart from the domestic concerns, there also remain a number of international legal and political hurdles to be resolved before Arctic oil or gas could be brought to southern markets. While the Arctic nations’ attempts to map their northern continental shelves has won headlines by suggesting potential conflicts at the North Pole, the reality is that North American development is far more affected by issues closer to home. Two such disputes in particular could be of great importance. The first such matter is a 21,000 square-kilometer wedge of maritime territory in the Beaufort Sea which is claimed by both Canada and the United States. This dispute has been ongoing for at least 60 years, though there has never been a serious push to resolve the matter. Yet, in order to proceed with exploration or development permitting in the region the two governments will have to settle the question.

Political Scientist Michael Byers has suggested that Canada might do well to adopt the American position, which is based on the principle of equidistance, since that would ultimately grant Canada more territory in the northern section of the Beaufort than it would lose in the south. However, given the importance of accessibility and water depth in offshore drilling, it would seem unlikely that Canada would choose to abandon shallow waters close to shore for deeper areas farther away—even if there is more of it. More likely is a resolution along the lines of the 2010 Norwegian–Russian maritime border agreement, which settled those nations’ longstanding dispute in the Barents Sea. In this case, Norway and Russia essentially divided the disputed region in two. It was a simple enough solution brought about by the pressing desire of both parties to develop the area. While the politics of Arctic sovereignty have never been simple, it seems likely at least that both Ottawa and Washington would be perfectly capable of resolving this dispute amicably along similar lines—provided development had reached a point where sufficient industry pressure was being applied.

More intractable is the question of the Northwest Passage, a body of water which Canada has historically considered to be internal waters and which the United States officially calls an international strait. The prospects of resolving this dispute are less promising. No Canadian government could survive a surrender of sovereignty over waters which hold such national significance while American governments have spent the past 50 years resisting Canadian claims of sovereignty. The question has generated a great deal of attention over the past decade since the melting ice and increased development have raised the possibility of petroleum or LNG shipments out of the Arctic through the passage. Indeed, such shipping had been very seriously considered in the 1960s before the decision was made to move North Slope oil by pipeline instead of tanker.

Political Scientist Rob Huebert has, for years, advocated a stronger Canadian presence in the passage to ensure that Canadian sovereignty is preserved while other commentators, such as Michael Byers, have pushed a negotiated settlement. Yet, the political imperatives for each state suggest that a negotiated settlement would be difficult if not impossible. What is widely ignored, however, is that it would not be American government vessels shipping oil and moving supplies through these waters, it would be privately owned tankers and service craft. Historically, Canada has had no real problem working with private industry in the North. Firms wishing to use these waters have always been unwilling to challenge Canadian regulations or sovereignty, since to do so would endanger both current and future
operations. Private industry, unlike national governments, has far less invested in issues like Canadian sovereignty or American maritime policy and, as is normally the case in business, would follow the path of least resistance.72

Indeed this was even the case with the SS Manhattan, the ship often held up as the embodiment of the American challenge to Canadian sovereignty. The Manhattan was owned by Humble Oil and, when Canadian nationalistic fervor threatened its operations, the owners soon agreed to comply with Canada’s anti-pollution regulations and even ceded ultimate control of the voyage to the captain of the accompanying Canadian icebreaker.73 As such, while the politics of the Northwest Passage will remain a wild card in future development, sovereignty concerns would be unlikely to seriously impede private enterprise from operating in the North or even moving oil or gas out of the region.

Conclusion

The future of Arctic development remains uncertain. Regulatory hurdles have delayed development and will have to be overcome while certain international issues will need to be resolved. Many of the factors which ended past Arctic booms remain concerns as well. Despite the general warming trend, sea-ice and the region’s extreme environment will continue to pose serious problems, as will the region’s lack of infrastructure and the ever-persistent fear that some unforeseen economic or technological development might alter the economics of working in the North and render much investment pointless. Yet, given current trends and expectations, the region’s prospects still appear to be good. Most importantly, the international oil majors—whose investment will be central to opening up the Arctic—seem to have come to that conclusion as well. The enthusiasm of both BP and Exxon for Russia’s Kara Sea, as well as the billions spent across the North American Arctic in the past few years, indicates that the industry is prepared to tackle these political and physical difficulties.

The prize is one of the world’s last untouched reserves of hydrocarbons. And, while these resources proved out of industry’s grasp in the 1970s the global situation has shifted dramatically. Technological and environmental changes have made the region more accessible while three decades of global reserve depletion has made previously unattractive Arctic basins far more viable than they were when oil companies last abandoned them. Coupled with what appears to be stable long-term oil prices, kept high by a changing global supply and demand dynamic, the new economics of Arctic exploration appear healthy indeed. Industry, government and most of the local inhabitants are all anxious for the benefits which are expected to come from northern operations and the current pause in activity will likely emerge as exactly that.

In the 1970s, the atmosphere created by the Prudhoe Bay discoveries and Ottawa’s tax incentives created what John Livingstone called a “flailing, jostling, no-holds-barred stampede” to the Arctic.74 Development in the twenty-first century will be different. With modern exploration not being fueled by generous subsidies and safety and environmental regulations becoming far more stringent, the pace of development thus far can be best described as cautious but determined, and this pace is likely to continue. At present international oil companies are mostly positioning themselves while the American and Canadian governments finalize their offshore drilling regulations and legal challenges to their lease sales are resolved.75 The question of how best to manage the development of the region will certainly require a great deal of study and will likely result in no small amount of political debate. However, at least on the economic level, it seems the region is poised for a dramatic change.
Notes
5. Chandler.
6. Clark et al., p. 86.
7. Or roughly $3.50 adjusted for inflation; Ibid., p. 91.
8. Or roughly $24,000 adjusted for inflation; Ibid., p. 94.
9. Or roughly $60 vs $3.50 adjusted for inflation; Judith Maxwell, Energy from the Arctic (Canada: Canadian American Committee, 1973).
10. Or roughly $50,000 adjusted for inflation; Clark et al., p. 87.
15. Loy.
22. Ibid.
29. Ibid.
37. See Chevron, ConocoPhillips and BP 2010 annual reports.
38. See Exxon and Shell 2010 annual reports.
39. Much of those reserves were also acquired rather than discovered. ExxonMobil would likely have fallen short of its goal of 100 percent replacement without its $41 billion acquisition of unconventional natural gas giant XTO Energy; Homeland Security News Wire, “Oil Giants Struggle to Find more Oil” (February 23, 2011).
40. Chevron. 2010 Annual Report, (2010), Table V.
41. See Exxon annual reports.
42. Amy Myers Jaffe et al., The International Oil Companies, The James A. Baker III Institute for Public Policy, Rice University (November 2007), p. 15.
43. Susan Lyon et al., “Quenching our Thirst for Oil,” Centre for American Progress (April 23, 2010).
44. EIA, Annual Energy Outlook 2011, p. 61.
49. This trade was to be in exchange for a 9.5 percent stake in Rosneft.
50. Vuk.
55. Ibid.
57. LNG export plans make it likely that some of the North American supply will eventually be exported, thus equalizing low North American gas prices and higher European and Asian prices.
60. The most decisive such impact was certainly the 1977 Berger Report which effectively killed the Mackenzie Valley gas pipeline.
67. Ibid.
75. Several ongoing lawsuits are challenging the validity of all existing Chukchi Sea leases.

**Notes on contributor**

Adam Lajeunesse, Ph.D., recently received his Doctorate in History at the University of Calgary. His research has focused on the evolution of Canadian government policy over the Arctic waters and on Canadian-American defense and law of the sea relations in that area. He has also written on a number of other subjects, including contemporary Arctic sovereignty and security concerns, shipping prospects, hydrocarbon development and international relations.