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A Race to the Top: Oil & Gas Exploration in the Canadian Arctic

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Economic forces will ultimately determine the destiny of the Canadian Arctic, not displays of military force. Economic opportunity will prove far more cost effective and longer lasting than increasing the visibility, or even effectiveness, of Canada's military in the Arctic. Some observers expect the mounting evidence of a treasure trove of hydrocarbons on land and under the sea in Canada's Arctic to act as the economic catalyst. [1] However crude oil and natural gas exploitation in Canada's North is fraught with a myriad of challenges. This paper will shed light on the harsh climactic, economic and political realities of oil and gas exploration and development in the Canadian Arctic. Climatic conditions, even in the wake of evidence of climate change, will still be

[1] Roger Howard, The Arctic Gold Rush: The New Race for Tomorrows Natural Resources (New York: Continuum, 2009)

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extreme as will the distances and the topography. First and foremost the economics have to make sense; a profit has to be available to entice the capital needed for developing the north's vast hydrocarbon potential. Additionally, the political realities include pollution mitigation and outstanding native land claims.

There are vast untapped oil and natural gas resources in the Canadian Arctic, according to the United States Geological Survey (USGS). [2] The USGS estimates potential reserves totalling billions of barrels of oil and trillions of cubic feet of natural gas (tcf). However, as history shows, difficulties arise in first finding the oil and gas and then getting the crude oil or natural gas to markets, while at the same time establishing and establishing preventative measures required to protect the environment, both on land and at sea. Just because there is potential, or even substantial, oil or gas discoveries does not mean the economics or the environmental costs justify the effort.

Other Arctic nations are also actively involved in a race to the top of the world, driven in large part by this promise of oil and gas. Conflicting claims of sovereignty of resource-rich undersea continental shelves only adds to its urgency and complexity. Despite climate change, the challenges in oil and gas exploration in the Arctic are still immense, the distances vast, the topography rugged, the sea often very deep and still ice-covered, and for half the year numbingly cold and dark. Ultimately, as was Canada's experience on its own Arctic Archipelago in the 1960s and 1970s, the resulting oil and gas discoveries do not justify the enormous expense of transporting the oil and gas resources to market.

The Theoretical Backdrop

In analysing the interaction between individuals, institutions or nation states it helps to provide an explanatory framework assembled to aid in discerning what is going on and why. A theoretical analysis provides a rough map, then adds context, while applying today's international realities. Though the two most prevalent theories in international relations remain realism and liberalism, an off shoot of liberalism – commercial liberalism – is gaining wider acceptance.

[2] U.S. Geological Survey, "Circum-Arctic Resource Appraisal: Estimates of Undiscovered Oil and Gas North of the Arctic Circle" USGS Fact Sheet 2008-3049, (Washington, D.C. 2008) p. 1

Much of realism revolves around the state's application of coercion and military power. Its black and white, Machiavellian, view of the world is both elegant and persuasive. Liberalism, especially in this age of rapid globalization, also has many adherents, especially given the absence of war between major states during the past 65 years. Today globalization and the importance of economic power does not mean military might is not used. However, it does indicate its use is more selective and not the blunt policy tool of years past. Commercial liberalism believes the movement of money is a far more important issue for countries and their economies, and ultimately their citizens, than military prowess.

Realists like Kenneth Waltz believe that nation states interact with one another in a world devoid of a central authority.[3] This lack of a world government leaves the international system inherently anarchical. Within this anarchical system nation states vie for power and influence amid the uneven distribution of global resources, practicing what has become known as "power politics". This might have explained the immediate post-war era when the world was divided into two armed camps and the 'free world' looked to the United States for military, political and economic guidance but not today's hyper-commercial and connected world

What gave realism real traction was the Cold War. During that forty year period, as Robert Cooper observes, "Most foreign policy issues could be viewed in the light of a single overwhelming question: was it good for Us or for Them, for the West or the Soviet Bloc, capitalism or communism."[4] The world was black and white, where military power was a primary tool for the advancement of national policy. Today's world is far different. Cooper adds, "A large number of the most powerful states no longer want to fight or conquer...The imperial instinct is dead, at least among the Western powers."[5] Kenneth Waltz on the other hand, while acknowledging these increased ties, still views their impact to be subservient to those found at the state to state level. "Interdependence in some ways promotes peace by multiplying contacts

[3] Kenneth Waltz, "Structural Realism after the Cold War" International Security (Vol. 25 No. 1, Summer 2000)

[4] Robert Cooper, The Breaking of Nations: Order and Chaos in the Twenty-first Century. (Toronto: McClelland & Stewart, 2004) p. 5

[5] Ibid. p .32

among states and contributing to mutual understanding. It also multiplies the occasions for conflict that may promote resentment and even war."[6] Critics of realism have a difficult time with its failure to acknowledge the importance of the global economy and international organizations. Realists say they do in fact look at other levels of analysis, but have concluded that in order to explore 'big events', the default continues to be focused on large, powerful national states, bounded within a permanent structure. Realists do recognise there are other factors; it is matter of degree, however. [7]

The world has moved past pure power politics as a theoretical framework. Joseph Nye defines power as "the ability to attain the outcome one wants…" [8] If so, the pursuit of profit and the power of international markets have largely replaced military force as the weapon of choice in the pursuit of these outcomes. Moreover, the role of the nation state in determining national economic performance has already steadily declined; indeed, states have been eagerly stripping themselves of the blunt instruments of intervention." [9] The world can no longer be described as simply uni-polar, with the United States at its epicentre. Nye describes the world today as a three layered chessboard. [10] The top level, the military realm, is still dominated by the United States. The middle level is the arena for the global economy, where the G-20 and BRIC (Brazil, Russia, India, and China) countries are increasingly influential. The lower level is filled with transnational and non state actors where power is becoming increasingly defused.

Unlike realism, with its emphasis on military power, liberalism has more of an economic and organizational focus. Viewed in the past as idealists, liberals gained much ground following the collapse of the Soviet Union, the ending of the Cold War and the subsequent rapid rise of a globalized economy amid the absence of war between major states. Liberals believe this was no coincidence since they advocated that

[6] Waltz, "Structural Realism,"p. 4.
[7] Ibid.
[8] Joseph S. Nye, The Future of Power. (New York: Public Affairs, 2011), p. 3-24
[9] Michael Hart, From Pride to Influence: Towards a New Canadian Foreign Policy. (Vancouver: UBC Press, 2008), p. 151.
[10] Joseph S. Nye, Power, p. xv.

"free trade and commerce would overcome the artificial barriers between individuals..." and that "economic self-interest would be a powerful disincentive to war." [11]

G. John Ikenberry writes that the international liberal order that has evolved today is the product of centuries of trial, error and maturation. Two "projects", as he puts it, were instrumental in creating the world we live in. One project was the acceptance of the Westphalian state system in 1648. The other was the construction of the liberal order, led by first, the United Kingdom and then, more recently, the United States. The two projects have coalesced and created the current world order. Summarises Ekenberry, "The Westphalian project has focused on solving the "realist" problems of creating stable and cooperative interstate relations under conditions of anarchy, and the liberal-order-building project has been possible only when relations between the great powers have been stabilized" [12] This successful wedding of the state system and liberalism has evolved into a successful international order were an open and rule based system is the accepted norm. "Rising powers are finding incentives and opportunities", comments Ikenberry, "to engage and integrate into this order, doing so to advance their own interests. For these states, the road to modernity runs through – not away from – the existing international order." [13]

Richard Rosecrance has emerged today as a leading proponent of what he calls commercial liberalism.[14] Like others, Rosecrance explains that military expansionism lost its appeal following the two world wars of the twentieth century. For a short while in the post war era 'trading states' emerged, citing Japan, West Germany and the small Asian 'tigers'. But in the end economic size mattered more with larger trading blocks and economic unions emerging. Examples he cites include the European Economic Union, the North American Free Trade Agreement and the ASEAN + 3 grouping that, among others, included China, Japan and South Korea. Rosecrance states, "...military

[11] Scott Burchill, "Liberalism" in Burchill, Scott & Linkletter, Andrew Eds. Theories of International Relations 4th Edition (New York: Palgrave Publishers, 2009), p. 61-65.
[12] John G. Ikenberry, "The Future of the Liberal World Order: Internationalism after America" Foreign Affairs, (May/June, 2011), p. 56.
[13] Ibid., p. 61.
[14] Richard Rosecrance, "Bigger is Better" Foreign Affairs (May/June 2010), p. 42-50.

expansionism...poses far more difficulties today that it did 75 years ago making the potential dangers of regional economic blocks less of a concern today."[15]

The last twenty years has seen a dramatic increase in commercial interactions, while military operations have been left to the margins. Business has increasingly come to define relations between people, companies, countries and trading blocks.[16] As Michael Hart concludes, "Globalization is first and foremost a market phenomenon. It is the product of billions of daily discrete market decisions made by producers and consumers around the world...Governments regulate and shape the choices and responses of buyers and sellers with a wide array of laws and regulations..." [17] The global oil and gas sectors feel this hyper economic connectivity perhaps even more so than other sectors. Goldthau and Martin-Witte observe, "...it is not states drilling for, buying or selling oil and gas, but companies—even if not all of them are fully privately owned; and it is not governments that decide the allocation of capital, technology and manpower, but primarily markets. In the case of oil, these markets are truly global; in the case of natural gas, they remain regional but still international in nature." [18]

Richard Rosecrance believes because of these economic prerogatives between nations, "Patterns of global politics and economics that have prevailed for the last half millennium are increasing outmoded. The power of the marketplace has replaced the power of military force".[19] Despite claims to the contrary the chances of an armed conflict in the Arctic over its resources are remote. [20] Still, analysts such as Michael Klare write, "...that conflict over oil will erupt in the years ahead is almost a foregone

[15] Ibid., p. 48.
[16] Michael Hart, From Pride to Influence: Towards a New Canadian Foreign Policy (Vancouver: UBC Press, 2008), p. 146.
[17] Ibid.
[18] Andreas Goldthau & Martin Witte, (January, 2010) ,"From Energy Security to Global Energy Governance"
http://www.ensec.org/index.php?view=article&catid=103%Aenergysecurityissuecontent&id=234%3Afr...
[19] Rosecrance, "Bigger is Better", p. 44.
[20] Donna Nincic,"Troubled Waters: Energy Security as Maritime Security" in Gal Luft, & Anne Korin, Eds. *Energy Security Challenges for the 21st Century: A Reference Handbook* (Santa Barbara: Praeger Security International, 2009), p. 35.

conclusion" [21] Christopher Fettweis, on the other hand states, "There has never been a war to control territory that contains fossil fuels, and there are good reasons to believe it is likely there never will be. The conventional wisdom concerning the inevitability of energy wars is probably wrong."[22]

The Arctic: Frozen and Far, Far Away

According to a United States Geological Survey (USGA) conducted in 2008, the Arctic regions, including Canada's, could contain about 22 percent of the world's undiscovered conventional oil and natural gas discoveries. [23] Summing up, the USGA believes, "the extensive Arctic continental shelves may constitute the geographically largest unexplored prospective area for petroleum remaining on earth. [24] Included in the USGS's estimates are 90 billion barrels of recoverable oil and 1,670 trillion cubic feet (tcf) of recoverable natural gas and 44 billion barrels of natural gas liquids. These totals represent 13 percent of the world's undiscovered oil and 30 percent of the world's undiscovered natural gas. [25] However, reserve estimates are just that, estimates of what is recoverable using today's technology. The process that arrives at these numbers is never an exact science. Moreover, the USGS did not use "the general tools and techniques used in USGS resource assessment", but rather used "a probabilistic methodology of geological analysis and analog modelling." [26] The USGS, in other words, made what can be best described as an educated guess. Nonetheless, these are very motivating numbers for governments and industry alike. However, just because the ice is melting does not mean Arctic oil and gas exploration will not be without serious economic, political and environmental hurdles. It may not even be worth the trouble.

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[21] Christopher J. Fettweis, J, "No Blood for Oil: Why Resource Wars are Obsolete" in Luft, Gal & Korin, Anne. Eds. Energy Security Challenges for the 21st Century: A Reference Handbook (Santa Barbara, Praeger Security International, 2009) , p. 66.
[22] Ibid., p. 67.
[23]U.S. Geological Survey, "Circum-Arctic Resource Appraisal."
[24] Howard, The Arctic Gold Rush, p. 63.
[25] U.S. Geological Survey. "Circum-Arctic Resource Appraisal."
[26] Ibid.

The Arctic region is filled with extremes. For the oil and gas industry this translates into vast distances, extreme topography, darkness for half of the year and extreme cold – the average temperature in Prudhoe Bay, Alaska in January is -45 C, and in the summer, 3 C to 12 C.[27] The Arctic Islands of Canada alone are immense, totalling some 94 major islands (greater than 130 sq km) and 36,469 minor islands, encompassing a total area of 1.4 million sq. km. Six of the world's thirty largest islands are found in this archipelago. [28] Despite a warming climate in the Arctic, sea ice will not disappear all together and shifts dangerously, posing significant hazards to both ships and rigs. The constant freezing and thawing of pipelines may also pose an environmental risk. There is the ever present danger of violent storms, with accompanying high winds and rough seas. The Arctic waters of Canada's North will not become a northern Mediterranean Sea. Also, for much of the year the Canadian Arctic is devoid of sunlight and there is an almost total absence of infrastructure in place, such as roads, airstrips and port facilities, needed for oil and gas exploration. In addition it will be very expensive. A single drilling rig may cost up to $200 million because of the short summers and the resulting need to spread the exploration over many operational seasons.[29] However, time and time again the biggest obstacle, once oil or natural gas reserves are found, is getting the resources to market in a cost effective manner. This simple but effective economic barrier has proven to be largely insurmountable to date.

Oil and gas companies have for decades looked at the Canadian North as a prime location for drilling. Wallace Pratt wrote in 1944, "Oil in the Arctic awaits the advance of civilization upon this, the last of our geographical frontiers." [30] But exploration has been in fits and starts. When exploration first started in the Arctic it was crude oil early drillers were looking for, natural gas was an unwelcomed by-product. Drilling activity in Alaska predates Canadian exploration. Between 1945 and 1953, thirty-five speculative wells or "wildcats" were drilled on the North Slope of Alaska – a naval petroleum reserve by the U.S. Navy, finding 100 million barrels of oil and 1 tcf of

[27] Ibid.
[28] The Canadian Encyclopaedia website. http://www.thecanadianencyyclopedia.com
[29] Oil & Gas Journal "New areas could expand Arctic's oily component" (February 14, 2011), p. 25.
[30] Earle Gray, The Great Canadian Oil Patch: The Petroleum Era from Birth to Peak. (Calgary: June Warren Publishing 2004), p. 361.

natural gas.[31] Much more oil was to be found twenty years later at nearby Prudhoe Bay.[32]

In 1955 and again in 1957 the Geological Survey of Canada (GSOC) sent teams to map the Arctic Islands.[33] This increased activity, and the realization by the federal government of the North's resource potential, according to Earle Gray, "brought the Archipelago into the spotlight as major potential oil and gas producing areas" [34] Also, Canada's North attracted attention due to the Cold War. In 1958 the United States nuclear submarine, U.S.S. 'Nautilus', sailed under the polar icecap, followed two years later by another United States submarine, the U.S.S. 'Sea Dragon', this time through the Northwest Passage[35], causing some to speculate that underwater tankers would be a viable transportation method.[36] Still others saw these voyages through the Arctic Islands Archipelago as threats to Canadian sovereignty, a theme that persists today. [37]

By June 1960, Ottawa had issued exploration permits for 40 million acres throughout the Arctic Islands and adjacent mainland.[38] In late 1961, Calgary headquartered Dome Petroleum drilled at Winter Harbour, on the south east coast of Melville Island, to a depth of 12,543 feet, coming up dry. [39] Tom Kennedy has referred to it as "the most expensive hole in all of Canada." According to Kennedy, the attempt was hugely expensive, costing ten times what a comparable well would cost in Alberta at the time. The drilling contractor, for example, would only do the work for $1 million, all paid up front. All equipment had to be shipped by sea from Montreal, aided by Canadian Coast Guard icebreakers. It was as ambitious as it was expensive.

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[31] Ibid., p. 371.
[32] Daniel Yergin, The Prize: The Epic Quest for Oil, Money and Power. (New York: Free Press, 2008), pp. 552-558.
[33] Gray, The Great Canadian Oil Patch,, p. 364.
[34] Ibid., p. 364.
[35] Shelagh Grant, Polar Imperatives: A History of Arctic Sovereignty in North America. (Vancouver: Douglas & McIntyre, 2010), p. 341.
[36] Gray, The Great Canadian Oil Patch, p. 373.
[37] Coates et al, Arctic Front: Defending Canada in the Far North. (Toronto: Thomas Allen Publishers, 2008), p. 94.
[38] Grant, Polar Imperatives, p. 345.
[39] Tom Kennedy, Quest: Canada's Search for Arctic Oil. (Edmonton: Riedmore Press, 1988) p. 125.

There were a few other drilling efforts, but none found either crude oil or natural gas in commercial quantities. Not surprisingly Arctic oil and gas fever started to chill by 1964 as a result to dry holes and successes elsewhere, in the North Sea, the US Gulf Coast and offshore California. Money, staff and equipment moved away. Still, Ottawa was undeterred and continued to view the Arctic in broader terms than merely a platform for resource extraction. [40] "Ottawa," according to Earle Gray, "was interested, not only to see the development of northern resources, but also to strengthen Canada's claim to sovereignty in the High Arctic."

In 1967 one of the largest oil discoveries in the world was made at at Prudhoe Bay, on Alaska's North Coast.[41] By the mid 1980s this field was producing 2 million barrels daily and meeting one-fifth of American domestic crude oil demand. The Alaska Pipeline was then built to connect Prudhoe Bay oil with the town of Valdez, on Alaska's south coast. The United States had solved a transportation issue that was still bedevilling their Canadian counterparts.

The success at Prudhoe Bay spurred additional oil and gas exploration in the Canadian North. Ottawa, through Petro-Canada, became a minority partner (45 percent) in a new commercial venture, Pan-Arctic, whose mandate was to explore and develop oil and gas opportunities in Canada's far North. Ottawa's interest was not solely showing the flag. The federal government controls the mineral rights, including oil and gas, in the Arctic, considered frontier lands, in contrast to the provinces that control their own mineral rights. There was tax and royalty revenue at stake. Success was not long in coming. Two of Pan-Arctic's first four wells each struck large reservoirs of natural gas and promptly blew out of control, taking weeks to get back under control. These discoveries underscored the dilemma facing oil and gas extraction, a problem that is no less an issue today than it was forty years ago. "It's true that two of these holes had discovered two of Canada's largest gas fields, a remarkable exploration success, but they were of dubious value…moving gas out of the Islands presented an even more difficult and costly challenge than shipping oil." [42]

[40] Earle Gray, The Great Canadian Oil Patch, p. 370.
[41] Yergin, The Prize, pp. 552-558.
[42] Gray, The Great Canadian Oil Patch, p. 375.

There were some exploration successes but most discoveires were left stranded, with no cost-effective ability to get crude oil or natural gas to markets in the south where it was needed. Drake Point, also on Melville Island, was the site of a major natural gas discovery in 1969. This is still the largest single field discovered in the Arctic Islands. The nearby Cisco oil field was estimated to have almost 600 million barrels of oil, but was also left unexploited. An interesting exception was the Bent Horn oil field on nearby Cameron Island. Twice annual oil shipments were commenced between this oil field in the High Arctic and a Montreal refinery between 1985 and the late 1990s.[43] The late 1960s and early 1970s were a period of growing Canadian economic and political nationalism, concern for the environment and an awareness that native land claim issues had to be dealt with. As for the resources that were under the sea or the frozen land there was the continuing realization that it would be very expensive and complex.

When the last well had been drilled in the High Arctic in 1987 nearly $1 billion had been spent exploring an area larger than Ontario, twice the size of Texas.[44] According to Natural Resources Canada "more than 400 wells were drilled. Eighteen petroleum fields had been discovered in the Arctic Islands and forty-seven in the Beaufort Mackenzie area."[45] There was still obviously much work to be done but little appetite, as the economics and political uncertainty were too high, for companies to invest the billions of dollars required for a development program in Canada's High Arctic. It did not help that over the almost thirty years of Arctic exploration only 20 percent of the discoveries were oil, while 80 percent were natural gas. Concludes Grey, in a familiar refrain, "The gas is too costly to move, and the oil too little to overcome the icebound challenge."[46]

How to move the new found crude oil or natural gas would continue to stymie both industry and government. The 1969 transiting of the Northwest Passage by the U.S.S. 'Manhattan' showed the waterway could be traversed by an ice reinforced oil tanker (with a little help from the Canadian Coast Guard) and offered a glimmer of

[43] Natural Resources Canada "Arctic Oil & Gas" www.gac.ca/PopularGeoscience.
[44] Ibid.
[45] Natural Resources Canada.
[46] Gray, The Great Canadian Oil Patch, p. 366.

hope in solving oil's transportation issues. Humble Oil, the owner operator of the 'Manhattan' concluded, "The use of icebreaker tankers to transport crude from Alaska's North Slope to U.S. markets is commercially feasible…but pipeline transportation appears to have an economic edge."[47] (Another consequence of the 'Manhattan' voyage – actually on the eve of its second voyage - was Ottawa's enacting of the Arctic Water's Pollution Prevention Act. This legislation enabled Canada to assert jurisdiction within 100 miles offshore for the ostensible purposes of pollution control."[48])

As early as 1968 Ottawa realized a pipeline would be the best option for eventually moving oil and gas to southern markets. A government appointed Task Force on Northern Oil Development spent considerable time, according to Shelagh Grant, studying a proposed oil and gas corridor along the Mackenzie River Valley. Other options have also been discussed. In 1980 Petro-Canada, Dome and Husky applied to the National Energy Board for approval to build a $2 billion dollar Liquefied Natural Gas (LNG) facility for the exportation of the Arctic Island's natural gas. [49] LNG is natural gas liquefied at about -162 degrees Celsius and has a volume of about 1/600 of natural gas at room temperature. However, the facilities required are very complex and expensive and require refrigerated ships to transport the gas to market and large storage containers at both the exporting and importing terminals.[50] The consortium withdrew their application later when it was deemed uneconomic.[51]

The Mackenzie Valley Gas Project

Imperial Oil first encountered success in the Mackenzie River region at Norman Wells discovering oil in 1919, and the subsequent construction of a topping plant in 1921. (Later in 1985 a pipeline would tie Norman Wells to Zama, in north-western Alberta[52]) The GSOC also conducted surveys in the region in the 1950s and spurred

[47] Ibid. p. 379.
[48] "The Arctic: A Canadian parliamentary chronology" The Parliamentary Information and Research Service. Publication PRB 08-11E, 24 October 2008.
[49] Gray, The Great Canadian Oil Patch, p. 380.
[50] James G, Speight, Natural Gas: A Basic Handbook. (Houston: Gulf Publishing Company, 2007), p. 100.
[51] Gray, The Great Canadian Oil Patch, p. 380.
[52] Beaufort Regional Environmental Reports Summary, December 2009. p. 3.

activity in the Mackenzie Delta, just as it had in the Arctic Islands. The first oil discovery in the Mackenzie River Delta itself was in 1965, drilled to a depth of 13,000 feet, then in the early 1970s Gulf, Imperial and Shell made three large gas discoveries on the Mackenzie River Delta, at Parson's Lake, Taglu and Niglintgak – today containing some 9 (tcf). Together these new fields would feed into any Mackenzie Valley pipeline.[53]

A pipeline to connect the massive natural gas finds in the Mackenzie River Delta to the Alberta, then North American, marketplace has been a dream of many since the late 1960s. The first go round ended in 1977 when federally appointed Thomas Berger recommended a ten year moratorium on pipeline construction in the North and the settlement of native land claims.[54] According to Peter R. Sinclair, "These conclusions reflected Berger's view that any pipeline should benefit northern residents, including protection for the protection of northern indigenous peoples."[55] These two major recommendations would help to define the Canadian North for a generation. While the Berger Report did create a new urgency to seek a resolution to long-standing native land claims, "It was Judge Berger", states Earle Gray, "who really killed Arctic Gas and any gas pipeline from the Western Arctic for decades."[56] Two months after the Berger report the National Energy Board agreed with Justice Berger and killed the projects. The natural gas that had been found – and would continue to be found in subsequent years – was to remain stranded, thousands of kilometres from a marketplace. Natural gas prices fell and stayed low for many years but many in the North and energy companies clung to the hope that one day a pipeline would be built.

By 2000 natural gas was increasingly being seen as a vital part of overall North American energy security.[57] As drilling activity and natural gas prices started to pick-up it soon became evident that two separate pipelines from the North, one following the Alaska Highway into BC and Alberta and the other, the Mackenzie Gas Project could possibly be built. In January, 2000 Northern Canadian aboriginal leaders met and decided to support a major gas pipeline up the Mackenzie Valley, a major departure

[53] Ibid.
[54] Gray, The Great Canadian Oil Patch, pp. 388-389.
[55] Sinclair, Peter R. 2010. Energy in Canada: Issues in Canada. Don Mills: Oxford University Press, p. 44.
[56] Gray. Earle .2004. p. 389.
[57] Gray, The Great Canadian Oil Patch, p. 394.

from their stance a generation earlier. As a result of these meetings and subsequent requests for permits on August 18, 2004 the Mackenzie Gas Project Joint Review Panel (JRP) was appointed by the Minister of the Environment.[58] The JRP was a seven-member, independent body whose mandate was to "evaluate the potential impacts of the proposed Project on the environment and lives of the people in the project review area."

The proposed Mackenzie Valley Gas Project is massive in its scope.[59] A 30 inch diameter natural gas pipeline would run about 1,220 km following the Mackenzie River Valley, from the Beaufort Sea south to the Alberta border. This main pipeline would initially be fed by natural gas already in place. The total pipe needed to connect these existing gas fields to the main pipeline would be an additional 180 km of 16, 18, 26 and 30 inch pipe. In addition new wells would have to be added to increase the recovery rate. A total of 26 to 40 locations would have to be drilled initially. Additional drilling that would then be required to feed natural gas to the proposed pipeline for the expected 25 year life span of the project. Also, running parallel to the proposed natural gas pipeline would be a 480 km 10 inch natural gas liquids pipeline connecting Inuvik to Norman Wells. At that point it would use existing pipeline infrastructure to move product into the Alberta grid, and on to other parts of North America.

The difference in this latest pipeline application from the one twenty-five years previous was that many of the fiercest opponents in the past had now become the pipeline's biggest supporters. They were now to become part owners of, if it was built, one of the biggest construction projects in Canadian history. The Aboriginal Pipeline Group (APG) had a one-third interest, and had become partners with Imperial Oil, Shell, Conoco Phillips and Exxon Mobil.[60] The APG had also secured an $80 million loan from Trans Canada Pipeline. If the MGP is built, the APG will repay the loan from its share of future pipeline revenues.

[58] Joint Review Panel for the Mackenzie Gas Project. www.ngps.nt.ca/jrp.
[59] "The Mackenzie Gas Project: Pipeline of Opportunity" Consortium Pamphlet (2008) www.mackenziegasproject.com.
[60] Ibid.

For the aboriginal leadership the change in attitude came from the settling of long-standing land claims and economic reality.[61] Bob Reid of APG stated, "The big change over the past twenty-five years or fifty years is that people did live off the land and now there are so few that depend on the land for living. Youth are becoming part of the wage economy." Three of the four opposing communities had settled their land disputes signed on to the new Project; the Inuvialuit in 1984, the Gwish'in 1992, and the Sahtu are in 1993.[62] Only the Deh Cho has not signed a lands claim settlement and joined the APG.

Finally, after five years of delays and technical problems, the JRP issued its report in late 2009. The JRP found the MGP "would deliver valuable and lasting overall benefits and avoid significant adverse environmental impacts." [63] However, in its 679 page report the JRP said its support was conditional on the full implementation of 176 recommendations, most of which were directed to governments and involved monitoring of the project. The report was then handed off to the National Energy Board who would hold their held their own hearings. Their final report was released in late 2010 and did conclude there was a net economic and social benefit for the North. [64]

However, the final decision regarding the fate of the MVGP is in the hands of industry, which now have a couple of years before making a final commitment to go ahead. Many expect the pipeline consortium will not proceed with such an expensive project, now estimated to cost almost $17 billion, fraught with so many economic uncertainties and no government subsidies. Recently Shell put its entire 11.4 percent stake in the MVGP up for sale, apparently frustrated at the length of time the project has taken to date and the poor natural gas pricing fundamentals in North America. The future for the Mackenzie pipeline does not look promising. Claudia Cattaneo wrote, "It fell apart largely because regulators and those feeding off Canada's dysfunctional regulatory system lost sight of their mandate: to look after the public interest." [65] But perhaps more important to the success of a future pipeline from the Arctic are the

[61] "Anatomy of a Pipeline" The McGill Daily (November 8, 2008) Vol. 100 Issue 18.
[62] Ibid.
[63] CBC News website: "Mackenzie pipeline gets green light from panel" December, 30, 2009.
[64] National Energy Board "Reasons for our Decision" www.neb-one.gc.ca.
[65] The Financial Post "Shell Moves Out of the Mackenzie Valley" (Saturday, July 16, 2011) FP-3.

recent shale gas and shale oil discoveries that have begun to change the North American energy picture.

Shale Gas & Oil: A Game Changer

For decades, the calculus in the oil field was simple: "Oil was cash, natural gas was trash." [66] Whereas oil was relatively easy to transport – by barrel, truck, rail or pipeline, gas was not and "had a nasty habit of exploding, and was "nearly worthless to oil companies." [67] Excess gas was flared off or allowed to remain underground. Another use for natural gas was to pump it back into an oil reservoir, helping it maintain pressure, and extending its life. For example, Alaska has re-injected more than 36 tcf of natural gas back into its underground reservoirs over the past 35 years.[68] Improvements in welding techniques, which led to advances in pipeline construction, allowed natural gas to capture increased market share. In the United States, between 1949 and 1957 natural gas consumption doubled, passing coal to become the second largest source of primary energy in that country, behind oil, a position it has retained.[69] Increasingly natural gas is now viewed as a clean alternative to other energy sources.

Over the past four decades increasing demand for North American natural gas coupled with falling domestic supplies caused many to predict a dire shortage of natural gas.[70] Then a "game changer occurred', according to petroleum economist Peter Terzakian.[71] The recent technological advances in horizontal drilling and the use of fracturing – using water and chemicals under extreme pressure to break up shale rock and allow the gas or oil to flow freely - have led to a massive increases in natural gas reserves in Canada and the United States, causing a subsequent collapse in North American natural gas prices. Though touted as new technology, the first documented use of hydraulic fracturing occurred over 60 years ago in Kansas. Early on napalm was

[66] Robert Bryce, Power Hungry: The Myth of Green Energy and the Real Fuels of the Future, (New York: Public Affairs, 2010), p. 225.
[67] Ibid.
[68] Neff, "North America", p. 365.
[69] Bryce, Power Hungry, p. 227.
[70] Ibid., p. 234.
[71] The Globe & Mail. "The New Oil Boom" (February 8, 2010), p. 8.

used as fluid because it processed the required viscosity for pumping. Today's fracing fluids include slick water, oil-based fluids and nitrogen and carbon dioxide foams.[72] The new shale gas discoveries have been huge and have led to impressive upward revisions to natural gas reserves. For example, in 1989 the United States had 168 tcf of proven gas reserves, by the end of 2008, proven gas reserves had increased by 41 percent, to 237 tcf. [73] U.S. natural gas reserves were then subsequently increased at the end of 2009 to 284 tcf, the highest level since 1971.[74]

No one would have predicted a few years ago that such massive amounts of new natural gas reserves would be found. These shale gas finds are changing the face of the North American natural gas market and could ultimately replace oil as the fuel of choice in the transportation sector. In 2007 shale gas presented 5 percent of U.S. natural gas production. The following year that percentage had doubled to ten percent and has been climbing every year. [75] The resulting production surge has greatly deflated the price of natural gas. No one knows if this is temporary or permanent. But for the time being "natural gas", according to John Deutch, a MIT professor and former U.S. Undersecretary of Energy, Deputy Secretary of Defence and Director of Central Intelligence, "has economics on its side. In the United States today, oil is three times as costly as natural gas for a given amount of energy. Such a differential is a powerful incentive to develop new technology to substitute natural gas for gasoline used in the transportation sector." [76] Indicative of the changing marketplace the United States is now, for the first time in five decades, exporting natural gas, via LNG, to Europe. [77] Daniel Yergin recently stated there is more than 100 years of natural gas available with today's technology throughout North America. [78] A single shale gas field, the Marcellus, extends from southern New York across Pennsylvania, and into Maryland, Virginia,

[72] Blaine Edwards, E. James Shephard and Nick Deutsch, "Hydraulic fracturing: protecting against legal and regulatory risk" Oil & Gas Journal, (August 1, 2011), p. 22.
[73] Ibid., p. 242.
[74] U.S. Energy Information Agency Press Release, November 30, 2010. EIA@eia.gov.
[75] John Deutch, "The Good News about Gas: The Natural Gas Revolution and its Consequences" Foreign Policy" (January/ February 2011), pp. 82-93.
[76] Ibid.
[77] Energy & Capital. "Two Reasons you should take another look at LNG". Wednesday, November 10th, 2010. Eac-eletter@angelnexus.com.
[78] Daniel Yergin, Interviewed on WSJ TV. (January, 2011).

West Virginia and Ohio. This single play covers an estimated 95,000 square miles. As reported in Oil & Gas Journal a recent Pennsylvania State University concluded the Marcellus play alone could supply 25 percent of all US natural gas needs by 2020.[79]

Shale rock not only holds natural gas but crude oil as well. For example, the shale oil play known as the Bakken geological area straddles the western United States/Canada border and is estimated to contain over 500 billion barrels of oil, 10 percent to 20 percent being recoverable using today's technologies. Some in the industry believe the Bakken play could be the world's largest discovery in the last 30 to 40 years.[80] Massive amounts of foreign capital, much of it from China, have committed billions of dollars to the development of both shale gas and oil throughout North America.[81] Drilling activity reflects this optimism. In 2010, for example, there were 818 drilling rigs operating in the Bakken play, with production currently at 400,000 barrels/ day. Longer term daily output may exceed 2 million barrels/day by mid-decade [82], on par with what the Athabasca oil sands is expected to export to the United States. Interestingly, this now puts enormous pressure on Canada to find other export markets for its oil, in light of these recent U.S. finds. According to the Independent Petroleum Association of America (IPAA) between the first quarter of 2008 and the first quarter of 2011 US out-put of crude oil and gas-plant liquids increased by slightly more than 500,000 bpd.[83] Only time will tell if this recent uptrend in production reverses the decades long downtrend, but it is encouraging.

No one knows the future price of natural gas in North America and the state of the industry but one has to only look at the LNG sector to see the possible future. The huge increase in shale gas has meant that LNG facilities that were being planned to import natural gas are now being planned to export natural gas abroad.[84] North America is about to start exporting natural gas overseas using LNG ships why spend

[79] Paula Dittrick, "Industry upbeat Marcellus shale holds great economic potential" Oil & Gas Journal, (August 1, 2011), p. 30.
[80] Oil & Gas Journal. "Continental: "Bakken's giant scope underappreciated" (February 16, 2011).
[81] Oil & Gas Journal "Investment fervour continues for US, Canadian shale gas plays" (February 28, 2011).
[82] The Globe & Mail"The New Oil Boom," p. 8.
[83] Oil & Gas Journal "US oil production gains change in energy landscape" (July 22, 2011).
[84] "Energy Sources: Canadian LNG Imports and Export Projects Update" Natural Resources Canada website: http://www.nrcan-rncan-mean.gc.ca/eneene/sources/natnat/imppro-eng.php.

the money to bring expensive and remote natural gas from the Arctic when it can be found readily in Texas, Louisiana, Pennsylvania and British Columbia, to name a few locations, where shale gas is changing the natural gas equation. Recently representatives of South Korea's state owned Korea Gas Corp came to Canada's Arctic to explore the site and feasibility of building an LNG port at Cape Bathurst. [85] This port, if constructed, would then export natural gas from the Mackenzie Delta region to markets in Asia.

The Pollution Fears

Currently there is a moratorium on off-shore drilling in both the United States and Canadian Arctic as a result of the massive 2010 Macondo deep water oil spill in the Gulf of Mexico.[86] The USGS study, cited earlier, concludes that almost 85 percent of the Arctic's oil and gas resources would be found off shore. [87] If true, this represents a very real dilemma for future development. It may come down to resource development or preserving a very delicate environment. If the moratorium is extended there may be little political will to remove it. Courts in the United States have already made important environmental decisions regarding where companies could drill. Shell, for example, recently lost a proposed drilling program in the Beaufort Sea. A U.S. Federal Appeals Court based its opinion, at least in part; on the belief Shell "did not effectively protect the marine environment."[88]

The Macondo oil spill in the Gulf of Mexico in April, 2010 is an example of the risks of offshore oil exploration. It's been generally agreed upon that if such a large scale oil spill happened in the North the results would be even more catastrophic, given the ice, low temperature and slow response times. To date no technology exists to clean oil in sea ice conditions. In the North, during the winter time when it is totally dark, it would be impossible to work, let alone have over flights to determine progress in

[85] The Globe & Mail "In the North, Energy is the Future" (Tuesday, July 19, 2011), p. A-5.
[86] The National Energy Board "Arctic Offshore Drilling Review" The National Energy Board www.neb-one.gc.ca.
[87] US Geological Survey (2008).
[88] Grant, Polar Imperatives, p. 463.

combating the effects of an oil spill. The current Arctic drilling moratorium may be just the start of a political and environmental backlash against future oil and gas development.

The aftermath of the Exxon Valdez oil spill gave an appreciation of the damage an oil spill can cause and the costs of mitigation and containment. In March, 1989, the single hulled oil tanker Exxon Valdez spilled 11 million gallons of crude oil into Prince William Sound, near the town of Valdez, Alaska, the terminus of the Alaska Pipeline. U.S. Federal, state and industry now have 40 ships nearby on standby with tens of thousands of meters of containment booms at the ready. [89] This is one small geographical area. Much more mitigation would be needed to protect the entirety of the Northwest Passage, for instance. Some are calling for a 'go slow' approach to development in Canada's North. Shelogh Grant believes until Ottawa actually have the assets in place to enforce anti-pollution regulations "developing new off shore oil and gas resources should be deferred." [90]

If Canada is to exploit its vast North major changes have to occur. First, Canada needs to have the ability to control the Northwest Passage. This would involve negotiations with Washington, a prospect that might be met with United States acceptance of Canada's claim to the North West Passage as an internal waterway, according to University of Calgary Professor Rob Huebert.[91] Second, Canada will require the requisite shipping facilities and monitoring systems built and rescue capabilities and clean up protocols in place. This will require massive amounts of capital and political will. A small step was taken in July, 2010 when the Northern Canada Vessel Traffic Services Zone (NORDREG) became mandatory rather than voluntary.[92] This meant that ships larger than 300 gross tons or are carrying a pollutant or a dangerous good have to report to Canadian authorities before entering into Canada's Arctic waters. Previously it was a hit or miss affair, unless according to Huebert, "one of its few air or sea assets stumbles across the foreign vessel."

[89] "The Alaskan Oil Pipeline" Modern Marvels: Energy (1997) A&E Television Rights.
[90] Grant, Polar Imperatives, p. 467.
[91] Robert Huebert, "Walking and Talking Independence in the Canadian North" in Bow, Brian & Lennox, Patrick. Eds. An Independent Foreign Policy for Canada: Challenges and Choices for the Future. (University of Toronto Press: Toronto, 2008), pp. 118-136.
[92] Ibid.

Other nations may still want to access Canada's north for shipping passage. Even with NORDREG in place and mandatory what assurance does Canada have that a foreign flagged Very Large Crude Carrier (VLCC) would have the necessary insurance in place to pay for the necessary clean-up? Will it fall to Canadian taxpayers? This is one of many questions that would need to be addressed.

The combination of environmental concerns and land claims has slowed progress in the development of oil and natural gas resources in Canada's North. This has affected corporate capital planning despite the generally agreed upon consensus that the resources are there. Capital will flow to where it can be put to work the fastest. In the Fraser Institute's Annual Global Petroleum Survey, an international survey of companies spending plans, the Northwest Territories was the least attractive Canadian jurisdiction for oil and gas exploration because of these uncertainties. The NWT score second worst globally for "its regulatory compliance and uncertainty regarding special areas, eight worst globally for the "uncertainty and difficulties relating to environmental regulation and the least attractive globally "due to obstacles poised by land claim problems." [93]

Conclusion

Today there continues to be limited drilling in the Arctic with some success. In 2006 Devon Canada discovered a potential 250 million barrels of crude oil north of Tuktoyaktuk, on the Mackenzie Delta.[94] And in July 2007 Imperial Oil and its sister company, ExxonMobil Canada, bid C$585 million to win a large exploration block in the Beaufort Sea. [95] Devon, for example, made the following comment on its discovery, "While we have confirmed the presence of both oil and gas, but at the end of the day it's beyond economic reach...at this juncture, the company has better places to invest its

[93] Gerry Angevine and Miquel Cervantes, Global Petroleum Survey, (June 2011) www.fraserinstitute.org, p. 36.
[94]Michael Byers, Who Owns the Arctic?: Understanding Sovereignty Disputes in the North. (Vancouver: Douglas & McIntyre, 20090, p. 98.
[95] Howard, Arctic Gold Rush, p. 193.

money." [96] No energy company wants to make a multi-billion dollar mistake; they have been known to end both companies and careers. Not lost on the industry is David Finch's comment regarding the aftermath of the Berger Report, which ended any discussion of a Mackenzie Valley Pipeline for a generation. According to Finch, "This turned out to be for the best because the expensive pipeline would have completed construction in the middle of the 1980s when the price for natural gas hit a record low."[97]

Oil and gas exploration and development in the Canadian Arctic will not be the windfall many are predicting. The climate will still be challenging, but more importantly there are many other areas in North America, and elsewhere in the world, where investment dollars will flow to in the years ahead before it finds its way to the Canadian Arctic. In the end these market forces, not military, will ultimately shape and determine the destiny of Canada's North in the years ahead.

[96] Ibid., p. 79.
[97] David Finch, Pumped: Everyone's Guide to the Oil Patch, (Calgary: Fifth House, 2007), p. 71.

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