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Arctic Alaska's role in future U.S. Energy Independence

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Abstract

For decades, Arctic Alaska has provided US mainland states with plentiful oil supplies. As reserves in the Prudhoe Bay fields decrease, however, the USA has been forced to consider new options to guarantee the nation's energy security. While debates continue to rage about its reliance on foreign oil, increased prices, consumption levels and climate change, the USA is now contemplating whether predicted new discoveries might actually allow it to become an exporter, rather than importer of oil and gas in the near future. This paper considers the role Arctic Alaska might play in helping secure future US energy security and independence. It also considers what other options exist for securing the State of Alaska's own future post-Prudhoe Bay.

Keywords: Alaska; Arctic, climate change, energy security; gas; oil,

Introduction

In 2006, President George W. Bush in his now-famous *State of the Union* address suggested that ‘keeping America competitive require[d] affordable energy’ and that this was a serious problem as America was ‘addicted to oil...often imported from unstable parts of the world’ (BBC News 2006). What this statement effectively signalled was that the issue of energy (taken here to mean oil and gas production and supply) had officially moved beyond its status as a resource to become a major geopolitical and geoeconomic concern. While this type of rhetoric and posturing was not new, it did indicate that the United States (USA) in its desire to maintain strategic energy reserves was prepared to take a stand against supply disruption due to international security threats. Likewise, it implied that the USA was prepared to rely more heavily on ‘energy products from domestic sources or from countries that [were] unlikely to change the terms of their exports to the United States on the basis of its foreign policy decisions’ (Congressional Budget Office 2012, p. 6). Effectively, this response was to blur the lines between energy production and supply and that of national security, which as Cuita (2010, p.124) suggests, brings energy into the security domain and therefore ‘is likely to affect the manner in which energy policies are pursued’ and where.

Likewise, if the USA’s desire to substitute or at least substantially reduce its dependence on foreign energy supplies is a serious one, then an expanded focus on oil and gas production which also includes unconventional new sources such as ‘extreme’ ‘tight’ and ‘off-shore’ resources extracted by horizontal drilling and fracking technologies will be needed (Cattenao 2012). Appearing to recognise this, in his 2012 *State of the Union* address, President Barack Obama stated that:

Nowhere is the promise of innovation greater than in American-made energy
...We've opened millions of new acres for oil and gas exploration, and tonight,
I'm directing my Administration to open more than 75 percent of our potential
offshore oil and gas resources... (The White House 2012).

One such place where this new exploration is currently taking place is in Arctic Alaska both on and off shore. It has also been predicted that the USA’s Outer Continental Shelf (OCS), particularly in the Chukchi and Beaufort seas off Alaska’s Arctic coast, could additionally hold unprecedented amounts of oil and gas reserves. If proven, these reserves could make Arctic Alaska a very significant player in the push towards the national long-term goal of energy independence.

This paper examines three aspects of this initiative. First, it considers the challenges that have existed historically and continue to exist in the commercial production of oil and gas in remote, Arctic regions of the globe. Second, it briefly explores what role climate change might play in hindering or securing a productive energy future for the region, and third, it reviews Alaska's ongoing role as a domestic energy supplier into the future and questions what this might mean locally in terms of government policy decisions and planning post-Prudhoe Bay.

Alaska's historic role in US oil and gas production

Alaska has numerous natural resources, many of which still remain untapped today. The most significant of these, however, is oil which Arctic Alaska contributes in large amounts to the domestic resource economy. According to Goldsmith (2011b), without oil, the economy in Alaska today would be only half its current size as a third of Alaska's jobs, 127,000, are oil related and dependent on oil production (see figure 1). Much of this oil production comes from the North Slope Borough, including the large Prudhoe Bay oil fields and it is this area that has attracted the most attention over the past 40 years of the State's history (Huskey 2009, Owens and Shively 2009).

According, to Goldsmith (2011b, p.1) the discovery of oil at Prudhoe Bay in 1968 was a 'once-in-a-lifetime discovery' though it has also been labelled by authors such as Howard (2009) and Emmerson (2010, p.203) as 'the beginning of the first sustained Arctic oil rush'. Not only did it succeed in ramping up the initial exploration along Alaska's Arctic coast, but also across the border where the Canadian government established a national Arctic exploration company. Originally, the Prudhoe Bay discovery was estimated to hold approximately 9.6 billion barrels of oil (bbl), nearly double the size of the largest field ever previously found in North America (American Petroleum Institute [API] 2010). This estimate, however, was later revised up to 13bbl due to advances in technology over time (Arctic Energy Office [AEO] 2012). Importantly for the USA though, the discovery came at a time when oil production from the Lower 48 States had started to decline and it offered the U.S. the promise of a significant new source of competitive domestic supply. Advancing this resource, however, was not without its challenges.

Figure 1. The basis for Alaskan jobs. Source: Goldsmith (2011b,p.3).

The challenges of developing Prudhoe Bay

Tapping the oil riches of Prudhoe Bay during the late 1960s and 1970s posed significant logistical challenges as being located inside the Arctic Circle made it unfeasible for large oil tankers. Though ice-breaking tankers and an extended railroad line were considered as possible ways to transport the crude to U.S. markets, in 1970 a consortium of oil companies led by British Petroleum formed to design, engineer, and operate a 780 mile (1250km) pipeline across the whole State to the southern port of Valdez (Howard 2009). From Valdez, tankers would take the crude oil primarily to refineries in California & Washington State (see Figure 2).

Apart from physically navigating Alaska's remote North Slope, other important issues that had been simmering in the background for many years soon arose to confront the construction of the proposed pipeline. Native Americans who had sought to have land claims acknowledged since statehood in 1959, renewed their fight for recognition. At the same time, a freeze on issuing patents or federal approval of any state land selections on all lands in Alaska (part of the conditions of Statehood) was also imposed by the federal Secretary of Interior until Native land claims were resolved (Naske & Slotnick, 1987). As a result of this

impasse and a desire to gain access to more land for oil exploration, the State was persuaded to begin negotiation of Native land claims. The Alaska Native Claims Settlement Act (ANCSA) was signed into law in December 1971. It set aside 44 million acres and approximately \$1 billion for Indigenous Alaskans to utilise. Ultimately, it also ensured the safe progression of the Trans-Alaska Pipeline System (TAPS) which was to cross over ground Native Alaskan villages had claimed as their own (Naske & Slotnick, 1987). As such, the significance of this settlement should not be underestimated, for as Haycox (2002, p.100) notes ‘without ANCSA, there would have been no pipeline, no oil production, [and] no oil’.

Figure 2. Map of Trans-Alaska Pipeline (TAPS).

Source: Energy Information Administration (2006).

Despite ANCSA's declaration, the pipeline project still remained stalled in US courts until the Organization of Petroleum Exporting Countries (OPEC) oil embargo in late 1973 put new pressure on the federal government to exploit its own domestic oil reserves. Prior to this, however, the TAPS was one of the first major projects to be constructed after the passage of the National Environmental Policy Act of 1970, thus the onus was on ensuring minimal environmental disruption (Muhn & Stuart, 1988). The nine volume Environmental Impact Statement (EIS) primarily dealt with problems associated with a major oil spill (should one occur) and how the elevated sections of the pipeline would affect wildlife migration routes, particularly those of caribou herds (Kohl in Muhn & Stuart, 1988, p.187). While a challenge to the accuracy of the EIS was filed in the federal court by activists, in November 1973 with congressional approval, President Nixon established the 'Trans-Alaska Pipeline Authorization Act' to further the nation's domestic oil interests. This Act ensured that development continued on regardless of challenges and oil was in production by 1977 (Coates 1993). Importantly for the State of Alaska as Edward Itta (former Mayor of the North Slope Borough) notes, the construction of the Trans-Alaska pipeline and its success was to free 'the state government from [its] longstanding poverty and its humble status as a ward of the federal government' (Itta, 2011).

While much could be said about problems associated with the pipeline, including the large accidents associated with it – particularly the Exxon Valdez in 1989 and BP's large spill in Prudhoe Bay in 2006, in terms of its importance to the national interest, the pipeline's significance cannot be underestimated. According to the AEO (2012), at peak production levels in 1988, the Prudhoe Bay oil fields were producing 2 million barrels of oil per day and providing the U.S. with 25% of its daily needs. Due to decreased production levels over the past 25 years, however, this has led to a rapid decline of 63% and today that number has slipped to less than 619,000 barrels per day, totalling approximately 13.2% of the U.S. total annual domestic production (Resource Development Council Alaska 2011). This decline is widely attributed to depletion of the major initial discoveries at Prudhoe Bay which Goldsmith (2011a) suggests reveal that 80% of the high-revenue oil has been consumed, with approximately only 20% of the identified reserves remaining.

As a whole, the USA only produces about 31.8% of the oil it consumes, and with the Prudhoe Bay oil fields now in rapid decline, the need to find new sources of oil is paramount particularly if the U.S. is to get anywhere near its desired 'energy independence'. While

Goldsmith (2011b, p1) confidently maintains that ‘oil will still be the State [of Alaska’s] biggest economic engine in the years ahead’, finding new local sources will be key to it sustaining its role as a large domestic producer into the future.

The future potential of the Arctic and Alaska’s part in that future

Recognizing the seriousness of the rate of decline at Prudhoe Bay, in mid-2008 the US Geological Survey (USGS) began to assess undiscovered oil and gas resources north of the Arctic Circle. The Circum-Arctic Resource Appraisal included probabilistic estimates of the numbers, sizes, and aggregate volumes of yet-to-be-found oil, gas, and NGLs [natural gas liquids] in undiscovered accumulations, both offshore and onshore (International Petroleum Encyclopedia 2010). Utilising USGS data, the US Bureau of Ocean Energy Management in 2012 estimated that technically recoverable oil and gas in the Chukchi Sea area was assessed to hold 15.38 bbls of oil and 76.77 trillion cubic feet of natural gas – more than any other area on the OCS outside of the Central Gulf of Mexico (Bureau of Oceans Energy Management [BOEM] 2012,p1). Likewise, the Beaufort Sea area was estimated to hold 8.22 bbl of oil and 27.64 trillion cubic feet of natural gas.

Taking these figures into account and recognising the growing desire for increased domestic supplies, the API (2011, p1) proposed two ways to ensure that ‘within 12 years, American and Canadian energy supplies [could] provide 100 per cent of US liquid fuel needs’. These scenarios included: (1) providing access to US oil and natural gas reserves that are currently off-limits’ such as access to the Arctic National Wildlife Refuge (ANWR) to the east, the National Petroleum Reserve – Alaska (NPR-A) to the west, and the offshore OCS areas to the north and (2) partnering with Canada to develop new pipeline capacity to export Canadian crude or gas to the USA (API 2010; 2011). While scenario 1 will be discussed further in the ‘regulatory challenges’ section of the paper, in terms of scenario 2, whether Canada would be in a position to be a large supplier of crude oil or gas to the USA is questionable, as recently Canada has focused its exploration on oil sands (also known as ‘tar sands’) as a viable option for the future. Whether this option will be sustainable for the long-term, remains highly debatable (Canada’s role in exporting Liquefied Natural Gas (LNG) is briefly discussed in the ‘economic challenges’ section of this paper). Importantly, irrespective of which path/s the USA may choose to follow, as Neff (2005, p.365) suggests, if growth demand and reasonable ‘prices’ are to be achieved, then ‘significant expansion in the development of gas from tight sands and coal bed methane foundations, deep gas wells (15,000 feet and more), and Arctic resources will *all* be required’.

Another scenario which makes the above exploration methods appear more plausible, though not necessarily more palatable to some concerned scientific, environmental, and civil society groups, is the evolving role of climate change and the impact it may have on the ease with which these new locations for, and methods of exploration are able to be accessed and developed. Given predictions for the future, the ongoing issue of climate change must be a consideration in any forward planning for the region especially in light of the fact that ‘the Arctic is now experiencing some of the most rapid and severe climate change on earth’ (Arctic Climate Impact Assessment 2005, p10). Likewise, of concern is the fact that over the past 50 years, Alaska itself has warmed at more than twice the rate of the rest of the USA (U.S. Global Change Research program [USGCRP] 2009). These issues are discussed further below.

Climate change

Irrespective of whether one believes climate change to be induced by humans or naturally occurring, the fact is that its effects are already beginning to be felt and this is particularly apparent in Arctic regions such as Alaska (Karl et al 2009). Therefore any decision-making energy companies make now and into the future will need to incorporate managing climate change impacts because these will have a direct influence upon productivity. For example, as temperatures rise, thawing permafrost can damage roads, runways, water and sewage systems and other infrastructure. In Alaska since the 1970s, permafrost temperatures have increased as winters have warmed by 6.3°F (-14.2°C) over the past 50 years and they are predicted to continue to rise from 3.5 to 7 °F during this century (USGCRP 2009).

While this change in temperature may not appear significant to some, issues such as land subsidence associated with thawing permafrost present substantial challenges to engineers who are attempting to preserve Alaska’s infrastructure. Public infrastructure at risk such as roads and runways damaged due to permafrost thaw are estimated to add between \$US3.6 billion to \$US6.1 billion (10-12%) to future costs for publically-owned infrastructure by 2030 and between \$US5.6 billion and \$7.6 billion by 2080 (USGCRP 2009, p.18). Private infrastructure repair costs have yet to be estimated, though it should also be noted that with increased temperature rise, many of the temporary ice roads and bridges commonly used in many parts of Alaska to access northern communities and to provide logistical support for mining and gas operations, may also be threatened.

Thawing ground also has implications for future onshore oil and gas drilling operations. One concern is that the number of days in which travel on tundra is allowed under Alaska's Department of Natural Resources standards has dropped, from more than 200 to approximately 100 days over the past 30 years (USGCRP 2009). This 50 % reduction in days available for oil and gas exploration could translate into decisions not to go ahead with projects should there be delays in equipment or personnel arriving on time and so on. Likewise, in addition to the longer ice-free season, more heat and moisture is expected to increase the frequency and intensity of storms in the Arctic Ocean, thereby adding another dimension to planning off shore drilling operations (Coffey 2007). This is just one challenge among many facing future energy development in Arctic regions more generally today.

Other challenges for the future

Just as climate change in the Arctic specifically could threaten aspects of long-term planning for oil and gas operations, other challenges such as economic challenges will also play a significant role in future decision-making. Issues such as the uncertainty associated with rising shale oil exploration in Canada and other Lower 48 States, the cost of new technologies needed to extract the oil and gas from tighter and more extreme places, as well as the ever-increasing cost of future production and transportation networks and infrastructure, will all need to be considered. These issues are discussed further below.

Economic challenges

While this paper has thus far discussed mainly conventional sources of oil and gas, a larger threat to the potential viability of future Arctic exploration is the surge in domestic shale oil production in North Dakota, and Texas. Other States such as Oklahoma and Pennsylvania also have areas under exploration. In Alaska, while Shell Alaska (a subsidiary of Royal Dutch Shell) has spent \$US5 billion on leases, operational costs and other expenses over the past 7 years for the right to explore in northern Alaska's Beaufort and Chukchi seas (Shell 2012a), it is still in the early stages of its Arctic venture. Delivering any discovery to market is, however, still many years off. As such, the question that arises in light of recent Lower 48 discoveries is - at what stage does a project in the Arctic become uneconomic?

The answer to this question becomes increasingly important when one considers the projections for a future utilising shale oil and gas. Currently, the International Energy Agency (IEA, 2012) suggests that a 'boom' is taking place and that the USA will overtake Saudi

Arabia and Russia to become the world's largest oil producer in approximately 5 years. It also suggests that the USA will be energy self-sufficient by 2030 (IEA 2012). These revised predictions are made based on figures which suggest that USA domestic oil production has jumped by 18% since 2011 as shale oil developments have expanded. In the first 8 months of 2012, it was noted that oil imports were 800,000 barrels a day fewer than a year earlier (IEA 2012). US oil exports also rose over the same time by 300,000 barrels a day, with net imports falling in just 1 year by 1.1 million barrels a day, or about 6% of total consumption (IEA 2012). If this pace is sustained, the IEA's prediction of self sufficiency for the USA by 2030 may prove to be conservative.

The downside to this is that shale oil is not cheap to produce, certainly not as cheap as conventional oil once was. Of late, however, it has become much more commercially viable particularly at the current oil price range of \$US97 and \$US110 a barrel (West Texas Intermediate oil and North Sea Brent, respectively, both on a three month high). This is likely to become less expensive and higher-yielding as development is scaled up. Conversely, returns from the conventional oil fields that are owned predominantly by the world's multinational petroleum giants are falling (Demarban 2012). As older conventional fields cost more to maintain and production dwindles over time, it can be assumed that demand for shale oil and gas will increase, possibly one day leaving conventional sources obsolete. Currently, however, that scenario is a long way off as even if the U.S. were to become a major gas exporter, it would take at least a decade, perhaps two, to negotiate regulatory and environmental approvals and to construct liquid gas processing and export facilities, though the potential for this is definitely there.

While this is promising news for the USA more generally in terms of achieving energy independence, once more one has to consider where does this leave Arctic Alaska? Fortunately for the region, Shell is not the only multinational company with off-shore interests as the proposed Alaska natural gas pipeline shows.

The Alaska natural gas pipeline

In March 2012, a conglomerate involving BP, ConocoPhillips, ExxonMobil and TransCanada, put aside their differences to join forces in a bid to bring the North Slope's estimated annual 15 million to 18 million metric tons of LNG, the equivalent of 2 billion to 2.4 billion cubic feet a day of gas to regional and international export markets (BOEM,

2012). Currently only in the concept stage, the project envisions ‘costing [between] \$45 billion to \$65 billion for a gas treatment plant, a 800-mile (1,290-km) pipeline, liquefaction plant at a site yet to be determined, LNG storage plant and a tanker Terminal (BOEM, 2012, see Figure 3). At this stage of the planning, TransCanada will be responsible for building the North Slope pipeline to carry gas to the export terminals.

The project, is estimated to take up to 10 years to build and a decision on whether to proceed with the project is at least 2 years away, though if it is built, the first LNG will not flow before the early 2020s (BOEM, 2012). For over six months, however, more than 200 employees from the four companies have been working on managerial, technical, and commercial aspects of the project and in October 2012 reported their findings to Sean Parnell, the Governor of Alaska (Parnell 2012). In the report they stated: ‘individually, each of these components would represent a world-class project, but combined, they result in a mega-project of unprecedented scale and challenge’, something which the State of Alaska is willing to support especially if it proves to be the boon that the Prudhoe Bay discovery was to the State (Parnell 2012).

While the companies have been developing their LNG project design, the Parnell administration has undertaken significant outreach to Pacific Rim markets in Japan and South Korea to highlight the comparative advantages of Alaskan LNG exports, and to other key stakeholders, including U.S. government officials in charge of export licensing (Parnell 2012). The Alaskan government administration believe that they have an advantage over other parts of Canada and the USA. Potential LNG competitors in British Columbia, for example, must still resolve political issues such as claims by the First Nations which will be costly and time consuming. Likewise, LNG exports from other US locations face regulatory and export license issues that do not apply to Alaska as the State is already home to the only operating LNG export facility in the USA. The ConocoPhillips-owned plant in Kenai, south of Anchorage, has been shipping to Asian customers since 1969 (Sullivan 2012). Realistically though, in an era where energy supply is high on the federal government’s agenda, it is unlikely that regulatory issues in other States will remain an impediment for long.

Should this project get to the production stage, again largely dependent on the price for LNG, it could help Arctic Alaska once more become one of the major suppliers of oil and gas to mainland USA. Like all of the projections for the region though, it will be a case of ‘wait and see’ with many similar projects hoping that the previously untapped Arctic will be

swift in revealing its bountiful secrets. Even if such an event were to take place, any new developments would still, however, have to address challenges posed by local and national regulatory bodies.

Figure 3. Possible major Alaska Gas pipeline routes.

Source: Office of the Federal Coordinator 2012 (<http://www.arcticgas.gov/alaska-lng-project>).

ANWR

While the desire to tap into the numerous resources of Arctic Alaska and the OCS have been considered controversial by some groups throughout the U.S. for many years, it is perhaps the suggestion of opening up the Arctic National Wildlife Refuge which has been the most contentious.

First considered in November 1957, an application was filed for the withdrawal of lands in north-eastern Alaska to create an 'Arctic National Wildlife Range'. On December 6, 1960, after statehood, the Secretary of the Interior issued Public Land Order 2214 reserving the area as the 'Arctic National Wildlife Range' (Coates, 1993). In 1980, when Congress enacted the Alaska National Interest Lands Conservation Act (ANILCA) it protected over 100 million acres (404.6 million ha) of federal lands in Alaska, doubling the size of the

country's national park and refuge system and tripling the amount of land designated as wilderness. ANILCA expanded the national park system in Alaska by over 43 million acres (174 million ha), creating 10 new national parks and increasing the acreage of 3 existing parks (Naske & Slotnick, 1987). The statute also included several sections on ANWR with the 'Arctic Range' being renamed the 'ANWR', and expanded, mostly southward and westward, to include an additional 9.2 million acres (15.1 million ha) (Bengston *et al.* 2010). While Section 702(3) of ANILCA designated much of the original Refuge as a wilderness area, this did not include the coastal plain.

ANILCA also contained a provision, (Section 1002), which mandated a study of the refuge's coastal plain for potential oil and gas development and in doing so, made ANWR the subject of one of the nation's longest and most controversial environmental debates (Bengston *et al.* 2010). While some might suggest that oil development is not related to the Refuge's original protection purposes, given current climate change scenarios and the nation's preoccupation with energy independence, opening up ANWR to exploration may become a more realistic consideration should the 2012 'yes' vote (237-187) in the House of Representatives pass successfully through the Senate. This remains very contentious, however, given that this issue has been voted on 12 times over the past 37 years (Arctic Power, 2012).

Proponents of the plan suggest that they only want to tap into 2000 acres (4942 ha) of the total 19 million acres (46.95 million ha) of the Refuge. Currently, its 1.5 million acre (2.47 million ha) coastal plain is viewed as one of the most likely sources of undeveloped U.S. onshore oil and gas prospects (Sale and Potapov 2010). Opponents point to the reasons why the area was originally declared a refuge - because it encompassed an unbroken continuum of Arctic and subarctic ecosystems housing over 20,000 caribou and their breeding grounds as well as polar bears, wolves and other threatened species (U.S. Fish and Wildlife Service 2011). ANWR also contains the traditional homelands and subsistence areas of the Iñupiaq people of the Arctic coast and the Athabascan Indians of the interior. Essentially, it is feared that as occurred at Prudhoe Bay, once exploration has begun, it will creep further and further into the reserve, as the 2000 acres (4942 ha) scouted for drilling are spaced throughout the coastal plain, thus endangering the entire area (Dunaway 2006). Sale and Potapov (2010, p. 187) also note that 'this figure does not include land disturbed for pipelines...or land not

directly covered by site infrastructures, even if the land is wholly enclosed by pipelines, roads etc.’; nor does it take into account potential oil spills.

Thus the conflict between high oil potential and nearly pristine nature creates a dilemma for the US government in that it must decide whether the Refuge should be given permanent protection from development or whether the need for energy security outweighs conservation values. A report from the Congressional Research Service suggests that a series of questions need to be considered before a decision can be made about opening up ANWR. These include:

- (1) If the area is opened, how can damages be avoided, minimized, or mitigated?
- (2) To what extent should Congress legislate special management of the area (if it is developed), and
- (3) To what extent should federal agencies be allowed to manage the area under existing law? (Gillis *et al.* 2008, p.1).

Importantly in terms of future US energy security, if Congress takes no action, the Refuge remains closed to energy development and effectively one avenue of future U.S. energy independence is closed off.

As expected, the debate over the oil potential of ANWR currently remains ongoing. Central to this consideration is that while there is a small likelihood of very large discoverable reserves and a high likelihood of only modest discoveries, a USGS analysis points to a mid-range estimate of around 10 billion barrels (API 2011). While this might seem like a significant amount, in reality, when global energy demand is forecast to hover around 100 million barrels per day, it is hard to see how ANWR's roughly 1% contribution to the fungible global pool, would lower petrol pump prices by more than a few cents (Sale and Potapov 2010). Given this, off-shore development may currently be the easier option in terms of achieving regulatory approval and being able to begin exploratory work quickly, especially given that Presidential approval has already been given for this option.

OCS development

While decisions about ANWR continue to be debated, in comparison, few barriers have stood in the way of OCS exploration, in fact 2 years after oil began to flow from the Prudhoe Bay deposits, the first leases were granted for off-shore drilling in the Beaufort Sea off Alaska's

Arctic coastline. These were then followed in 1989 by the first exploratory drill sites in the Chukchi Sea. In early 2008, however, the Chukchi Sea, was to become the centre of a debate over the sale of new drilling leases covering over 30 million acres (Lease Sale 193). The Minerals Management Service (now, the Bureau of Ocean Energy Management) decided to sell drilling leases as a strategy to off-set declining output from Prudhoe Bay (Sale and Potapov 2010).

As previously mentioned, companies such as Shell Alaska rushed in to buy up leases in both the Beaufort and Chukchi Seas buoyed by predictions that an estimated 27 billion barrels of recoverable oil held in Alaska's OCS- plus another 130 trillion cubic feet of natural gas were present in the area (Birger 2012). Other companies, however, were more cautious, choosing to watch closely from the sidelines and avoid any risk. Proponents suggest that should the estimated reserves be found, they would represent roughly three times the amount that has been extracted from the Gulf of Mexico over the past 20 years (Reiss, 2012). Opponents, however, suggest that a spill in this part of the world is a disaster waiting to happen.

Questions have also been asked by environmental groups about the durability of one of Shell's underwater oil spill containment vessels in severe weather events. In June 2012, an episode occurred which resulted in a vessel heading to one of the drilling sites having to be temporarily held at port in Washington due to inclement weather. Likewise, Shell's 20,000-ton 'Kulluk' drilling rig was also grounded near Kodiak Island on New Year's Eve 2012 and is now the subject of a federal inquiry (Demarban 2013). Opponents also fear that floating ice will make any spill in the region a potential disaster with Frances Beinecke, Natural Resources Defense Council President stating that:

this invites an environmental nightmare of unimaginable proportions. There's no way to prevent an off-shore blowout, or to quickly cap one, as we saw so tragically in the Gulf of Mexico. Nobody knows how to contain or clean up a spill in the harsh and remote seas of the Arctic. Unless and until we can, we have no business imperilling the last wild ocean on the planet for the sake of oil company profits. The industry's spill response plan assumes that an emergency relief well can be drilled faster than an exploratory well. That's never been done before under any conditions. If the industry's wrong, and a blowout occurs late in the drilling season, there won't be time to stop it before the winter ice chokes the site, leaving oil to gush uncontrolled for months (Natural Resources Defense Council 2012).

For some, this suggestion brings back memories of the 2010, BP Deepwater Horizon spill that killed 11 oil workers and lasted for three months spewing oil from a well that was 5,000 feet (1524 metres) under water and approximately 40 miles (64 kms) off shore. No one wants this for the Arctic, least of all locals.

Local Concerns

While some of what Beinecke suggests does alarm local Iñupiaq, it is a risk that needs to be heavily weighed against the fact that 11% of the 9,500 population of the North Slope Borough (the region closest to any OCS developments) still live below the poverty line, despite years of oil revenue (U.S. Department of Commerce 2012). No one is more aware of this than the mayor Charlotte Brower who notes:

we hunt and fish on the same land and water that our ancestors have used for thousands of years. We honor and practice their traditions. But the way we use the land and the rivers and oceans is now in competition with other uses. Our people and culture will survive beyond the time of oil and gas development, but it will only thrive if we get things right from the beginning in regards to development. The North Slope is an opportunity for you [oil and gas explorers], it is a revenue source for the State and the Borough, but for my constituents, it's first and foremost home (Brower 2012, p.2)

Importantly, she suggests further (2012, p.5) that 'the people of the North Slope are the experts on the Arctic environment' and as such, they 'are the only ones that have the experience to accurately assess the impacts of Arctic development'. Acknowledging this, Shell Alaska has agreed to fund a scientific environmental monitoring program within local coastal communities which will bring \$3 to \$5 million a year in revenue to the community (Shell Alaska 2012a). As Zalik (2010, p.563) suggests, however, it is in Shell's own interest to properly address local issues such as these because 'the territorial rootedness, and local ecological impacts of oil in these extractive sites, prompt regionally-based social conflict, expressed in claims for resource sovereignty as well as resistance to ongoing hydrocarbon consumption'. Thus social pressures of this nature have a direct impact on industrial operations and how they shape global perceptions of energy security and supply (Zalik 2010, p.563).

Irrespective of the outcome of Shell's exploration activities and those of others to follow, it remains critical that decision-makers at all scales consider the long-term future of

these areas beyond the mere economic benefits they may bring, As Haytor *et al.* (2003) suggest, any future decision-making in Arctic regions must be supplemented by a consensus between aboriginalism, environmentalism, industrialism and nationalism, not by privileging one dimension over another as is common in debates about resource development opportunities. Acknowledging this, Ken Salazar, Secretary of the Interior, speaking at the Arctic Roundtable in Norway, 2012 noted:

the Arctic is a place where development can only safely expand if we also expand our understanding through science and experience. That is why the Arctic, we believe, demands its own approach. We have to listen to each other as global partners and we must listen to local communities. We have to invest in science and share information. We have to cooperate in our planning. And we must always put caution and safety first.

More importantly, echoing both Haytor *et al.*'s (2003) call, along with the words of Ken Salazar, Brower (2012, p.5) suggests that communities 'are eager to partner, share our experience, and work collaboratively. We are much less eager to be an afterthought, to be overrun, to not even be at the table'.

She suggests that one way to ensure this occurs is through the newly created Arctic Policy Commission. This Commission is designed 'to provide the legislature, industry, and local governments the opportunity to remain engaged in the ongoing Arctic dialogue and to help shape future Alaskan Arctic policy' (Brower, 2012, p.6). While this type of development holds great opportunities for all Alaskans and the U.S. as whole, it also promises unprecedented challenges where finding a proper balance between the interests of development, the changes to the Arctic environment, and the cultural needs of the Iñupiaq people will be required.

The challenges for Alaska's future

This paper has sought to outline the role the State of Alaska has played in providing the U.S. mainland with 25% of its daily oil needs for 12 years. It has also sought to outline new ways in which Alaska could once again provide the nation with a large percentage of its energy needs despite the decline in Prudhoe Bay supplies. What needs to be considered further, however, is how the State will address fiscal management into the future, given that much is riding on projected resource estimates which may or may not come to fruition and the fact that the State's general fund spending is climbing by 8% a year (Goldsmith 2012).

Economically, Goldsmith (2011a, p.2) suggests that the challenge will be great as:

Two-thirds of the economic growth since statehood, as measured by jobs and income, can be traced to petroleum production, petroleum revenues, and petroleum spinoffs that have given a boost to other industries and households throughout the state. Although these effects are most obvious in urban Alaska, they reach into every corner of the state—through generous public spending, low taxes, and the Permanent Fund dividend (which was initiated in 1976 for the primary purpose of sharing a proportion of revenue generated from oil with all residents of the State).

While currently oil revenues are at record levels (\$79 billion in savings—including the Permanent Fund—and possibly another \$100 billion worth of petroleum in the ground), as the size of the nest egg fluctuates and the population continues to grow, the State government needs to plan carefully for the future recognising and accepting that another ‘El Dorado’ for Alaska may not exist, so ‘business as usual’ is neither an acceptable nor sustainable option (Goldsmith, 2012, 2013). Likewise, if Alaska continues to spend at the rate it currently is, it is predicted that by 2023, the state budget will be \$US7 billion in deficit and any future revenue gained from development of North Slope natural gas (usually suggested as a replacement for oil revenue) will be too late to make a real difference as the savings accounts ‘will be used up’ by the time this comes online (Goldsmith 2012, p.3). Cole and Cravez (2004, p.1) suggest that such was the enormous value of Prudhoe Bay oil in the past, that memories of this have in fact ‘blinded Alaskans to the perennial dilemma created by relying on temporary resource revenues’.

As such, while non-petroleum revenues presently only make a marginal contribution to State revenues, perhaps now is the time to start supporting these industries more and heavily marketing their services globally. Moreover, reinvesting the revenue the Permanent Fund brings in, not issuing dividends and perhaps even considering some level of personal income tax may be necessary to ensure that the State is able to continue to invest in the well-being of both present and future generations of Alaskans. While drastic decision-making like this is often unpalatable, it may become essential for the State’s fiscal survival especially in light of the fact that under current law, the State will not share in any of the federal revenues collected from OCS production (Goldsmith 2012, p.4). Though there is development

occurring in other onshore oil fields and there may be a possibility of sharing in the spoils from ANWR if it were opened up, the State cannot rely solely on these sources to increase its supply of revenue.

As such, there is no doubt that challenging times lie ahead for Alaska, but it has survived its remoteness, the climatic extremes and endured the historical derision of previous federal legislators to emerge as one of the most resilient, vital and complex States to exist within the USA today (Shervel 2009). With careful management and a willingness to further embrace the many obstacles that lay ahead, Alaska will continue to thrive as a State and remain a place of great potential long into the future.

Conclusion

Arctic Alaska's role in helping the USA achieve energy security will be significant if USGS predictions are realized. While no one can predict the future, the fact that ice caps are now shrinking through climate change, technology has been developed to facilitate deep sea exploration and other nation-states have already found new resources in the Arctic, these signs remain encouraging for America's own energy transition. If the USA continues to expand its focus on oil and gas production to include unconventional new sources such as 'extreme' 'tight' and 'off-shore' resources as it has begun to with shale oil and gas, then it would appear that it is only a matter of time before energy independence is within its grasp (Cattenao 2012, IEA 2012).

There remains one ongoing challenge, however, that must be addressed if future US oil and gas developments are to be truly secure and that is, the ratification of the 'Law of the Sea Treaty'. All of the other 'Arctic powers', bar the USA have signed this Treaty and the USA may wish to do likewise particularly if it intends to claim up to 200 extra miles (339 kms) of undersea territory, if it can prove it is an extension of its own continental shelf (Strandsbjerg 2012). Russia has been trying to do this in regards to its coastline for several years now and Norway's claim has already been granted by the United Nations Convention on the Law of the Sea (UNCLOS). This has extended the Norwegian shelf by some 10 % – roughly the area of Great Britain (Emmerson, 2010). If the US is not prudent and does not act quickly enough, however, it may lose its opportunity to ensure its own 'sea mass' is protected from the strategic interests of other nation states in the future. Geopolitical contestations of this nature are only likely to increase as the Arctic is subject to more commercial attention

and the physical borders that once ‘protected’ nation states and their interests are further dissolved.

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References

- AMERICAN PETROLEUM INSTITUTE (API), 2010, *History of Northern Alaska Petroleum Development* (Washington DC :American Petroleum Institute). Available online at: <http://www.api.org/aboutoilgas/sectors/explore/historyofnorthalaska.cfm>.
- AMERICAN PETROLEUM INSTITUTE (API), 2011, *Energy Security* (Washington DC : American Petroleum Institute). Available online at: http://www.api.org/~media/Files/Policy/American-Energy/Energy_Security_Update.pdf
- ARCTIC CLIMATE IMPACT ASSESSMENT, 2005, *Impacts of a Warming Arctic*. (Cambridge: Cambridge University Press).
- ARCTIC ENERGY OFFICE (AEO), 2012, *Fossil Energy - Alaska Oil History*. Available online at: <http://www.netl.doe.gov/technologies/oil-gas/AEO/FossilEnergy/AlaskaOilHistory.html>
- ARCTIC POWER, 2012, *U.S. House Votes to Open ANWR!* Available online at: <http://www.anwr.org/Headlines/U.S.-House-Votes-to-Open-ANWR.php>
- BBC NEWS, 2006, *Bush urges end to oil 'addiction'*. Available online at: <http://news.bbc.co.uk/2/hi/americas/4665758.stm> [Accessed 15 September 2012].
- BENGSTON, D. N., FAN, D.A. and KAYE, R., 2010, The National Public's values and Interests related to the Arctic National Wildlife Refuge. *International Journal of Wilderness* **16**, pp13-20.
- BIRGER, J., 2012, Why Shell is betting billions to drill for oil in Alaska. *Fortune Magazine*. Available online at: <http://features.blogs.fortune.cnn.com/2012/05/24/oil-shell-alaska-drilling/> [Accessed 12 September 2012].
- BROWER, C.E., 2012, *Perspective from the North Slope Borough, Alaska Shale Conference, Anchorage* , July 31, Available online at: http://www.klgates.com/files/Upload/08_North%20Slope%20Perspective.pdf [Accessed 24 June 2013].
- BUREAU OF OCEANS ENERGY MANAGEMENT (BOEM), 2012, *Alaska OCS Leasing Strategy – Fact sheet*, Available at: http://www.boem.gov/uploadedFiles/BOEM/Oil_and_Gas_Energy_Program/Leasing/Five_Year_Program/2012-2017_Five_Year_Program/Alaska_Fact_Sheet.pdf
- CATTANEO, C., 2012, Will tight oil change the world? *Financial Post* Available online at: <http://business.financialpost.com/2012/07/21/will-tight-oil-change-the-world/> [Accessed 15 September 2012].
- COATES, P. A., 1993, *The Trans-Alaska Pipeline Controversy*. (Anchorage: University of Alaska Press).

- COFFEY, M., 2007, *Public Infrastructure and Climate Change*. (Anchorage: Alaska Department of Transportation and Public Facilities).
- COLE, T., AND CRAVEZ, P., 2004, Blinded by Riches: The Prudhoe Bay Effect. *Understanding Alaska Research Summary 3 - Institute of Social and Economic Research*, pp.1-3.
- CONGRESSIONAL BUDGET OFFICE., 2012, *Energy Security in the United States*. Available online at: www.cbo.gov/sites/default/files/cbofiles/.../05-09-EnergySecurity.pdf
- CUITA, F., 2010, Conceptual Notes on Energy Security: Total or Banal Security? *Security Dialogue* 41, pp.123–144. doi:[10.1177/0967010610361596](https://doi.org/10.1177/0967010610361596)
- DEMARBAN, A., 2013, *Will Arctic offshore oil drilling prove uneconomic in wake of U.S. shale oil boom?* Available online at: <http://www.alaskadispatch.com/article/will-arctic-offshore-oil-drilling-prove-uneconomic-wake-us-shale-oil-boom?page=full>
- DUNAWAY, F., 2006, Reframing the Last Frontier: Subhankar Banerjee and the Visual Politics of the Arctic National Wildlife Refuge. *American Quarterly* 58, pp. 159-180. doi:[10.1353/aq.2006.0023](https://doi.org/10.1353/aq.2006.0023)
- EMMERSON, C., 2010, *The Future History of the Arctic*. (London: The Bodley Head).
- ENERGY INFORMATION ADMINISTRATION (EIA), 2006, *EIA Report on Alaska Prudhoe Bay Crude Oil Shut-in*. (Washington DC: EIA), pp 1-4.
- ENERGY INFORMATION ADMINISTRATION (EIA), 2012, *Annual Energy Outlook 2012 with projections to 2035*. DOE/EIA-038 (Washington DC: EIA).
- GILLIS, A., CORN, M.L. and ROBERTS, B.A., 2008, *Arctic National Wildlife Refuge (ANWR): Legislative Actions Through the 110th Congress, First Session* (Washington DC : Congressional Research Service).
- GOLDSMITH, S., 2011a, *High Oil Prices Give Alaskans a Second Chance: How Will We Use this Opportunity?* (Anchorage: Alaska: Institute of Social and Economic Research, University of Alaska, Anchorage).
- GOLDSMITH, S., 2011b, *Oil Pumps Alaska's Economy to Twice the Size—But What's Ahead?* (Anchorage: Alaska: Institute of Social and Economic Research, University of Alaska, Anchorage).
- GOLDSMITH, S., 2012, *Maximum Sustainable Yield: Wealth Management for the "Owner State"*. (Anchorage: Alaska: Institute of Social and Economic Research, University of Alaska, Anchorage).
- GOLDSMITH, S., 2013, *Maximum Sustainable Yield: FY 2014 Update*. (Anchorage: Alaska: Institute of Social and Economic Research, University of Alaska, Anchorage).
- HAYCOX, S., 2002, *Frigid Embrace - Politics, Economics and Environment in Alaska*. (Corvalli: Oregon State University Press).
- HAYTER, R., BARNES, T.J., and BRADSHAW, M., 2003, Relocating resource peripheries in the core of economic geography's theorizing: rationale and agenda. *Area* 35, pp.15–23. doi:[10.1111/1475-4762.00106](https://doi.org/10.1111/1475-4762.00106)
- HOWARD, R., 2009. *The Arctic Gold Rush*. (London: Continuum UK).
- HUSKEY, L., 2009, Community migration in Alaska's north: the places people stay and the places they leave. *Polar Geography*, 32, pp. 17-30. doi:[10.1080/10889370903000448](https://doi.org/10.1080/10889370903000448)
- INTERNATIONAL ENERGY AGENCY (IEA), 2012, *World Energy Outlook 2012*. Available online at: <http://www.worldenergyoutlook.org/publications/weo-2012/#d.en.26099> [Accessed 23 January 2013].
- INTERNATIONAL PETROLEUM ENCYCLOPEDIA, 2010, *USGS: Arctic resources – Oil*. (Oklahoma: PennWell Corporation).

- ITTA, E. , 2011, *Arctic Imperative Summit Speech*. Available online at: <http://www.alaskapublic.org/2011/07/19/arctic-imperative-edward-saggan-itta-mayor-north-slope-borough/> [Accessed 11 September 2012].
- KARL, T.R., MELILLO, J.M. and PETERSON, T.C. eds., 2009, *Global Climate Change Impacts in the United States*. (Washington, DC: U.S. Global Change Research Program).
- KOHL, A., 1988, A World-Class Project: The Trans-Alaska Pipeline. In: MUHN, J. and STUART, H.R., eds. *Opportunity and Challenge: The Story of BLM*. (Washington, D.C.:U.S. Department of the Interior- Bureau of Land Management), p.187.
- MUHN, J. and STUART, H.R., eds., 1988, *Opportunity and Challenge: The Story of BLM*. (Washington, D.C.:U.S. Department of the Interior- Bureau of Land Management).
- NASKE, C. M. and SLOTNICK, H. E., 1987, *Alaska - A History of the 49th State*. (Norman: University of Oklahoma Press).
- NATURAL RESOURCES DEFENSE COUNCIL., 2012, *NRDC: Arctic Drilling Invites "Environmental Nightmare"*. Available online at: <http://www.nrdc.org/media/2012/120626a.asp> [Accessed 11 September 2012].
- NEFF, S., 2005, North America. In *Energy & Security – Toward a new foreign policy strategy*, J. H. Kalicki and D.L. Goldwyn, eds. (Washington D.C.: Woodrow Wilson Center Press).
- OFFICE OF THE FEDERAL COORDINATOR (OFC), 2012, *Alaska Natural Gas Pipeline Project* ., Available online at: <http://www.arcticgas.gov/alaska-lng-project> [Accessed 24 May 2013].
- OWENS, T., and SHIVELY, J., 2009, Natural resources - Vital to Our Past; a Question for Our Future. In *Alaska at 50*, G. W. Kimura, ed., pp.191-205 (Fairbanks: University of Alaska Press).
- PARNELL, S., 2012, Producers, TransCanada Make Progress on Alaska LNG Export Project. *Media Release* No. 12-136 (Juneau: State of Alaska- Office of the Governor).
- RESOURCE DEVELOPMENT COUNCIL ALASKA, 2011, *Alaska's Oil & Gas Industry*. Available online at: <http://www.akrdc.org/issues/oilgas/overview.html>. [Accessed 2 October 2012].
- REISS, B., 2012, Why we should look at the Arctic. Available online at: <http://edition.cnn.com/2012/07/16/opinion/reiss-arctic-drilling/index.html>
- SALAZAR, K., 2012, *Remarks by the Secretary and Deputy Secretary at Norway Arctic Roundtable, Press Release, US Department of Interior*, Available online at: <http://www.doi.gov/news/pressreleases/Remarks-by-the-Secretary-and-Deputy-Secretary-at-Norway-Arctic-Roundtable.cfm> [Accessed 4 June 2013].
- SALE, R., and POTAPOV, E., 2010, *The Scramble for the Arctic*. (London: Frances Lincoln Ltd).
- SHELL ALASKA., 2012a, Shell begins drilling in the Chukchi Sea. Media release 09/09/2012. Available online at: http://www.shell.us/home/content/usa/aboutshell/projects_locations/alaska/events_news/09082012_spud.html [Accessed 3 September 2012].
- SHELL ALASKA., 2012b, Coexisting with Subsistence Whaling. Available online at: http://www-static.shell.com/static/usa/downloads/alaska/whaling_factsheet.pdf [Accessed 3 September 2012].
- SHERVAL, M., 2009, Native Alaskan engagement with social constructions of rurality. *Journal of Rural Studies*, **25**, pp.425-434. doi:10.1016/j.jrurstud.2009.05.005
- STRANDBJERG, J., 2012, Cartopolitics, Geopolitics and Boundaries in the Arctic. *Geopolitics* **17**, pp. 818-842. doi:10.1080/14650045.2012.660581
- SULLIVAN, D.S., 2012, *Alaska Gas Opportunities*. (Tokyo, Japan: LNG Producer-Consumer Conference).
- U.S. DEPARMENT OF COMMERCE, 2012, *State and County QuickFacts – North Slope Borough, Alaska*. Available online at: <http://quickfacts.census.gov/qfd/states/02/02185.html> [Accessed 3 September 2012].

U.S. FISH AND WILDLIFE SERVICE, 2011, *A Sense of the Refuge - Arctic National Wildlife Refuge*. (Fairbanks, Alaska: U.S. Department of the Interior).

U.S. GLOBAL CHANGE RESEARCH PROGRAM, 2009, *Global Climate Change Impacts in the United States*. (New York : Cambridge University Press).

WHITE HOUSE, 2012, *The 2012 State of the Union*. Available online at: <http://www.whitehouse.gov/state-of-the-union-2012> [Accessed 4 January 2013].

ZALIK, A., 2010, Oil 'futures': Shell's Scenarios and the social constitution of the global oil market. *Geoforum* **41**, pp. 553-564. doi:[10.1016/j.geoforum.2009.11.008](https://doi.org/10.1016/j.geoforum.2009.11.008)