Arctic Council Environmental Initiatives:
Can the United States Promote Implementation?

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When the United States assumed the Arctic Council chairmanship in 2015 they came with the intent to promote full implementation in all Arctic states of the Black Carbon and Methane Task Force recommendations. Reduction of these short-lived climate forcers (SLCFs) would have multiple benefits for environmental and human health, and reduce emissions that are a cause of global warming. Yet, with a history of pollutants migrating to the Arctic from elsewhere, and inherent limitations at the Arctic Council, is to suggest that a paradigm shift is in order. Thus, to the extent that the U.S. has the capacity to exert influence, implementation of emission reductions must start at home and likely requires robust engagement of outside actors. This article will address how the U.S. is demonstrating an intent to tackle SLCFs, specifically black carbon, through policy and regulation; the role of renewable energy sources in Alaska; and why an engaged private sector is critical. To engender change will require a multi-level cross-sector approach.

"A degenerative disease will not be cured by procrastination. It requires decisive action."

Peter F. Drucker, The Theory of the Business, *Harvard Business Review*

Introduction

When the United States assumed the Arctic Council chairmanship on April 24 2015, Secretary of State John Kerry remarked at the Legislative Assembly of Nunavut in Iqaluit, Canada that "One of the biggest challenges everybody has talked about today is climate change. The numbers are alarming, and that's putting it mildly" (Kerry 2015). Toting a self-acknowledged 'ambitious agenda' the U.S. will address the impacts of climate change, which includes promoting full implementation in all Arctic states of the *Task Force on Short-lived Climate Forcers* and *Task Force on Black Carbon and Methane* (2013) recommendations. Reduction of short-lived climate forcers, such as black carbon and methane, would

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have multiple benefits for human health, agriculture and ecosystems to aid in reducing the potential for crop failure, early death, and planetary warming. Observation of pollutants in the Arctic has long been recorded, and the sheer plentitude of documentation originating from the Arctic Council alone attest to the challenges that lay ahead.

This article considers the narratives, policies and actions taken to address the well-known evidence of Arctic pollution, specifically black carbon, also known as soot. To what extent is the U.S. able to exert influence beyond national borders in the implementation of short-lived climate forcer reductions? What actions has the U.S. taken at home? For it is by example that the U.S. can best engage other nations to develop measures and implement existing policy to mitigate the effects of climate change.

Pollutants: Documentation & a slow road to action

The appearance of possible pollutants in the Arctic first occurred in the late 1880s with the observation of 'dark stains' on Arctic snow and ice by Norwegian explorer Fridtjof Nansen. From the 1940s to the 1960s U.S. weather reconnaissance flight crews reported observations of "dense haze that extended for thousands of miles" over the Arctic (Soros 1992: 8). However, it was not until 1987 when President Mikhail Gorbachev appealed to the international community in Murmansk, Russia calling for demilitarization of the Arctic region that the stage was set for multilateral engagement on environmental protection. A significant outcome of his now famous speech was the formation of the Arctic Environmental Protection Strategy (AEPS) in 1991 (Heininen 2011), which represented a "collective, circumpolar approach toward environmental issues," (Canadian Arctic Resources Committee 1993-94).

In the United States, pressing concern about the environmental legacy of nuclear arms led to the 1992 *U.S. Senate Hearing Select Committee on Intelligence, Radioactive and Other Environmental Threats* to the United States and the Arctic resulting from past Soviet activities. The proceedings, which took place in Alaska, made public the extent to which Soviet radioactive contaminants from nuclear reactors, accidents and "reckless nuclear waste disposal" had permeated the Arctic region, reaching the shores of Alaska (United States 1992: 2). Yet Alaska's Senator Frank Murkowski, the Committee Vice Chairman, proclaimed that radioactive containments were "just a part of a larger Arctic pollution problem," a point that was reiterated in the testimonies of numerous others throughout the proceedings (ibid). Pollutants in the Arctic region, he noted, including "small amounts of heavy metals possibly from industrial pollution or Arctic Haze," had contaminated the principle food source of Alaska's residents including walrus and other marine mammals (ibid).

Of course, Russia alone was not the only offender. At a 1993 workshop on Arctic contamination, Murkowski (1993) stated that North American Distant Early Warning, or DEW Line, sites in Alaska (these sites extended from the Aleutian Islands to the Atlantic Ocean) and over 150 U.S. defense sites in Alaska alone had been identified as waste sites contaminated by North American Cold War testing, storage, disposal, and dumping of radioactive tracers. As was argued by numerous witnesses during the *U.S. Senate Hearing on Soviet Activities*, Murkowski (1993) urged the U.S. to support the Arctic Monitoring and Assessment Programme (AMAP), the cornerstone of AEPS, and pressed Washington for funding sufficient for monitoring and clean up.

Indeed, it was unclear as to whether AEPS, and later the Arctic Council (AC), would garner the required pan-Arctic political attention and financial commitment required to deal with the "serious consequences of transboundary environmental issues" (VanderZwaag, Huebert & Ferrara 2002: 2). According to a 2002 report, the AC had "largely involved studying and talking about environmental problems with little concrete action," and noted, "between 1994 and 1996, AMAP was allocated only $ 3,875,200" (ibid: 9). While in principle all Arctic Council member states have, since inception, committed to environmental protection in the Arctic, the Council remains soft law-based, focused on developing non-legally binding guidelines and recommendations (ibid).

Such is the case with black carbon and methane emissions reductions. Indeed, the Iqaluit 2015 SAO (Senior Arctic Officials) Report to Ministers, *Enhanced Black Carbon and Methane Emissions Reductions: An Arctic Council Framework for Action, Annex 4* (Arctic Council 2015a), outlines the agreed upon voluntary actions expected of Arctic states and realized "through the development of national actions or action plans or mitigation strategies, which can include setting of aims and objectives, implementing policies and regulations, identifying best practices and awareness-raising activities." But the Council Framework indirectly acknowledges that action is a long-term process, thus seeks to "promote enhanced action over time" (ibid). Furthermore, the Framework encourages other stakeholders, including civil society, other governments, financial institutions and academia to play a key role in helping to reduce emissions and seeks to "encourage mainstreaming of considerations of these emissions into their broader funding decisions" (ibid).

Short-lived climate forcers: the role of black carbon

Environmental issues have remained at the forefront of Arctic cooperation, first through AEPS and now through the Arctic Council (AC). Indeed, the AC has gained considerable recognition for their science-driven reports, most notably the *Arctic Climate Impact Assessment* (2004). To address the issue of short-lived climate forcers (SLCF) the 2009 Tromsø Declaration launched the *Task Force on Short-Lived Climate Forcers*. The resulting report, *Recommendations to Reduce Black Carbon and Methane Emissions to Slow Arctic Climate Change* (2013) concluded, "Immediate reductions in black carbon and methane can slow Arctic warming over the next few decades", but that simultaneous carbon dioxide (CO_2) emission reductions are critical to "preventing dangerous levels of climate change over the long term" (2). Based on these findings the *Task Force for Action on Black Carbon and Methane* (TFBCM) was established at the 2013 Kiruna Ministerial Meeting with the mandate to develop actionable arrangements to achieve reductions of black carbon (BC) and methane in the Arctic.

As a 2013 scientific study confirmed, the impact of present BC emissions is considerable but that antecedent conditions can be traced back to industrialization. In what is hailed as a 'landmark' scientific study published in the *Journal of Geophysical Research-Atmospheres* (2013) the direct impact of BC is twice that of previous assessments. According to the study, BC, a leading cause of global warming second only to CO_2 emissions, is found to have a direct negative impact on snow, ice, and cloud effects (International Geosphere 2013). This would seem contrary to the AC *Task Force on Short-lived Climate Forcers Recommendations to Reduce Black Carbon and Methane Emissions* (2013: 2), which states "Methane is

estimated to be the second most important greenhouse gas (GHG) emitted by human activities after CO_2," though the Report does acknowledge the study's then-recent findings.

Another scientific assessment that chronicled BC dating established that by the 1890s biofuel produced from open burning was the leading cause of BC emissions, followed by coal emissions from the 1880s to the 1950s, with the addition of diesel and return of biofuel by the latter half of the 20th century (Bond et al. 2007). At present, diesel engines and traditional biofuel account for 90% of BC emissions, with the addition of gas flaring which is associated with significant emissions in the high north (Bond et al. 2013). Together these pollutants contribute to destabilization of the cryosphere and rising temperatures (AMAP 2011). From a global perspective, the long-range impact of Arctic warming has a significant influence on weather patterns and rapid warming of the Northern Hemisphere, also affecting the monsoon season farther south (International Geosphere 2013). Moreover, melting land ice and glaciers do contribute to global sea-level rise (National Research Council 2015).

Keeping in mind that CO_2 emission reductions are paramount, BC reductions offer an achievable control over short-term local warming effects. For its part, the U.S., in cooperation with all Arctic nations, can enable the political direction required for the reduction of SLCF, starting at home. From a national perspective, the U.S. expects a decline in BC emissions of 86% by 2030 based on existing regulation (Environmental Protection Agency, n.d.) This is largely implemented through the Environmental Protect Agency (EPA) under the Clean Air Act, which continues to issue a host of federal regulations and standards directed at lowering toxic emissions. Further incentives are specifically directed toward development of renewable energy projects. In 2009, US$13.3 billion in federal loan guarantees was made available to 16 solar power projects. Adding to existing funding, on August 24, 2015, President Obama announced an additional US$1 billion directed toward "new, innovative projects," including renewable energy and energy efficiency (White House 2015). These incentives represent a host of policy and regulatory instruments recently introduced by this administration to reduce the nation's BC inventory. This serves as a compliment to the U.S. Arctic strategy on short-lived climate pollutants, in tandem with plans to expand the U.S. renewable energy partnerships in Alaska's remote communities (White House 2014a).

Alaska's renewable energy potential

Political will and government policy can either enhance or hinder the advancement of a climate-friendly energy transition. Policy that attracts private investment and takes into account the cost of fossil fuel carbon emissions will more likely encourage development of renewable energy sources and technology. This can be achieved through numerous policy instruments including taxes, emissions trading and subsidy reform (Kaygusuz 2012: 1123). Without such reform on a global scale some estimate "that the energy mix will rely primarily on fossil fuels (80%) and energy-related CO_2 emissions will increase by 55%" (ibid: 1117). Relative to black carbon, however, the United Nations Economic Commission for Europe (UNECE 2011) projects that emissions will decline by one third between 2000 and 2020 primarily as a result of existing legislation directed at the transportation sector. An additional 20% reduction could be achieved through additional measures, the largest share of which

results from residential combustion remediation. Notably, "nearly 50% of the remaining mitigation potential for black carbon emissions in the UNECE region is to be found in the residential heating sector". Although the U.S. and Russia are responsible for nearly 50% of these emissions, the U.S EIA Annual Energy Outlook (2015) reports that federal tax credits and state renewable portfolio standards have driven a relatively robust growth of non-hydropower renewable sources. Renewable energy generation is projected to increase by "72% from 2013 to 2040, accounting for more than one-third of new generation capacity" (Energy Information Administration 2015: ES-6).

In Alaska, renewable energy generation investment increased "dramatically," driven by both a desire for energy security and as a means of reducing the high cost of energy delivery, particularly in remote 'islanded' locations where infrastructure is lacking, according to the *Implementation Plan for Alaska's Arctic Policy* (2015). These drivers have prompted a wealth of research and development in new energy technology, public-private partnerships and a knowledge-based community. As an example, in the last ten years innovation has led to the growth of over 100 microgrid and related businesses designing techniques to feed renewables into isolated energy grids. The *Plan* seeks the support of the legislature to promote Alaska's potential as a "global leader in microgrid deployment and operation to advance a knowledge-based export economy, creating new jobs and revenue for the state," an aspiration potentially within reach given new alliances in the microgrids market such as that between ABB and Samsung SDI (Energy Industry Times 2015: 9).

Indeed, technology, logistics and economics are both drivers and conversely deterrents to clean energy development, particularly in remote Alaska locations where diesel-dependent indigenous communities are "facing an unprecedented crisis" (Sikka, Thorton & Wori 2013: 1), thus prompting community-driven renewable energy projects. By transforming the energy system a community not only reaps the benefit of reliable and cost effective energy delivery, but renewable energy development contributes to local decarbonisation and can also create a pathway to local economic development and job creation (Sikka, Thorton & Wori 2013). Conversely, numerous challenges limit rapid expansion of Alaska's renewables – integration logistics with existing power grids is difficult given the highly limited infrastructures; fossil fuel subsidies deter investment into renewable energy; initial investment is often costly and investors are less likely to commit financial backing to projects that are yet commercially viable.

Access to affordable energy is uneven throughout Alaska ranging from reasonable pricing in 'urban' areas to exceedingly costly in rural communities disconnected from the central grid. Whereas urban residential customers located in the Railbelt Region, inclusive of Anchorage and Fairbanks, paid as little as 10 cents per kilowatt-hour in 2011, remote rural communities located in Western and Interior Alaska that rely primarily on diesel for heating and electricity paid roughly 50 cents to more than $1.50 per kilowatt-hour (Ginny, Villalobos Meléndez & West 2012: 7). Prompted by these high costs and environmental regulations, the Denali Commission and Alaska Renewable Energy Fund are tasked as the primary financial sources of rural renewable energy projects (Ginny, Villalobos Meléndez & West 2012).

Established in 1998, the Denali Commission is designed as a cost-effective vehicle for the delivery of federal government services to remote, primarily indigenous, Alaskan communities, with a mandate

to promote rural development, provide power generation and infrastructure requirements. The Commission works closely with the Alaska Energy Authority (AEA) and Alaska Village Electrical Cooperative (AVEC) to provide funding and support for renewable demonstration projects and career training for local residents with a focus on community sustainability. Additional support comes from a variety of government agencies. However, the Commission is constrained by fluctuating and now declining federal funding: "During the 14 years of the Commission's existence, federal budget authority has been as low as $10 million, has expanded to as much as $140 million a year, and over the past four years has steadily declined to $23.9 million," equal to funding in fiscal year 2000 (Denali Commission Alaska 2014: 10).

Despite hurdles numerous projects are showing varying degrees of success in wind, hydro and modern biomass increasing access to a stable energy supply while decreasing their reliance on diesel. These projects encourage integration of energy supply development with the greater needs of the community (Denali Commission Alaska 2014).

- With AEA support the island community of St. George developed an integrated energy supply using wind technology, which at peak has delivered 80% of community power supply. Once dependent on diesel shipped from Anchorage, and occasionally Seattle, Washington, the community now expects that wind turbines will fulfill 50% of local energy requirements including growth of its commercial fishing operation (Alaska Energy Authority 2014).
- Started in 1968, AVEC (About Us) is a non-profit collective serving 56 remote communities, representing the interests of members who are culturally Athabascan, Aleut, Inupiat, Yupik, Siberian Yupik, and Caucasian. Grants from the Denali Commission are funding efficiency upgrades for more than 150 diesel generators, and 34 wind turbines installed in 11 communities are targeted to replace 25% of diesel consumption by 2018. Hooper Bay, AVECs largest community of 1,160 residents, "will displace about 44,500 gallons of diesel fuel [annually] used for power generation."
- Developed in 2007, the Tanana Washateria project is showing promising results. The instillation of two high-efficiency wood-fired Garn heating boilers, which heats this laundry and shower facility, has reduced oil consumption by 30% and saved the community tens of thousands of dollars. In addition woodcutters earn $250 per cord of wood and money remains at home rather than leaving the community in payment for diesel (University of Alaska Fairbanks, Case Study: Tanana).
- The fishing community of Craig installed a biomass energy system fuelled by wood chips from the local sawmill to offset a monthly fuel bill in excess of $10,000 that provides heat for 2 local schools and the community swimming pool. The wood-fired system has displaced 85% diesel and propane use and the community expects the $1.5 million investment to pay for itself in 12 years (University of Alaska Fairbanks, Case Study: Tanana).

The potential for renewable energy coupled with sustainable socio-economic development is examined in a study (Sikka et al. 2013) conducted in cooperation with the Native Corporation Sealaska and its subsidiary organization Haa Aaní, LLC, located in the nation's largest forest, the Tongass National Forest region, to which Sealaksa holds title. Concerned with outmigration Haa Aaní invested

in the development of numerous new businesses including the processing of wood-pellet biomass as a means of providing employment and economic stability for community members. Further study by the report's authors showed that the residual byproducts of the logging industry could have substantial economic, environmental and social benefits. Community members reap the benefits of energy cost savings and job creation spurring new business; the net environmental benefits of switching from oil to biomass results in significant CO_2 emission reductions and modern biomass technology addresses air quality issues traditionally associated with wood-fuel combustion exhaust, including reductions in black carbon. But, numerous impediments hinder the development of renewables, the least of which is the need for investment. "Sealaska leaders believe that favorable policies, such as tax on fossil-fuel carbon emissions could play a pivotal role in the adoption of wood-pellets for energy" (9). In addition the authors suggest that renewables would benefit by feed-in tariffs, investment subsidies for heating conversion, and tighter environmental regulations at local, state and federal levels (Sikka, Thorton & Wori 2013).

Unlike traditional biomass techniques, modern biomass technology relies on locally available wood chips and shavings, lumber off-cuts or fast-growing tree wood such as willows and alders that thrive in Alaska's conditions. If managed properly biomass can be a clean renewable energy source, resulting in considerable savings for communities otherwise dependent on diesel and propane. Concerns that biomass will produce additional GHG emissions and pollutants are largely addressed by modern bioenergy systems that sequester harmful emissions, however emissions released from combustion must be in balance with fast-growing reforestation (Renewable Energy Policy 2014: 32). Mitigating black carbon through modern biofuel installations reduces emissions substantially and can slow the pace of warming in the Arctic (Bond et al 2013).

Alaska is endowed with the full menu of renewable energy source potential —geothermal, wind, tidal, wave, hydro, biomass and even solar—which if developed could meet most state-wide energy needs and provide additional socio-economic opportunities. However, Alaska's renewable energy potential must be understood relative to the state's prime source of revenue; offshore oil exploration projects are considered "critical to Alaska's economic stability" (Alaska Arctic Policy Commission 2015: 11). Indeed, the 2015 National Petroleum Council (NPC) *Arctic Potential Report* notes that fossil fuels generate approximately 90% of Alaska's general revenue and a third of its jobs. The report claims that projects beginning within the decade will increase economic activity and employment for anticipated production coming online in 20 to 30 years. To attain such results, NPC maintains that "Industry and government have a shared responsibility to gain and maintain the public trust," and that the "effects [of development] must be understood with any negatives minimized" (32). The NPC report advises the U.S. Arctic Council chairmanship to promote Arctic fossil fuel development on a region-wide scale and recommends that they "should seek to strengthen the Arctic Economic Council's formal interaction and engagement with the Arctic Council as well as to promote its business advisory role" (National Petroleum Council 2015: 53).

Offshore fossil fuel extraction in the Arctic is projected to grow in the future (Hossain, Koivurova & Zojer 2014), driven by increased accessibility due to Arctic warming and the decreasing supply of conventional oil reserves that flatlined in 2005 (Mearns 2014). In Alaska, the Prudhoe Bay oilfield,

North America's largest oil field, extraction peaked in 1988 (Energy Information Administration Alaska 2014). Coupled with Alaska's present US$3.6 billion budget deficit (State of Alaska 2015), and high wage-earning potential that averaged US$127,148 in 2012 (Fried 2013), the desire for offshore exploration is considerable. To that end, in August 2015 Royal Dutch Shell received final approval from U.S. Department of Interior's Bureau of Ocean Energy Management (BOEM) to resume work in the Chukchi Sea halted in 2012 when its main drilling rig ran aground. Shell has already invested US$7 billion in exploration for oil in the Arctic (Gardner 2015).

But the consequences of offshore oil extraction are considerable. Only months before BOEMs approval of Shell's project, the agency's own *Environmental Impact Report* (2015) reported that in a scenario based on the lifetime of a drilling project in the Chukchi Sea that there is a "75% chance of one or more large oil spills," and also estimates the chance for 800 small oil spills. "Even under the best of conditions," NPC (2015: 44) acknowledged, "one can never expect to recover all of the oil from a large spill on water."

Indeed, the potential, if not likelihood, of future oil spills are clearly exemplified by the 1989 Exxon Valdez accident and the 2010 Deepwater Horizon blowout, but seem not to deter expansion of offshore drilling. In the aftermath of the latter Walter Parker, chair of the *Alaska Oil Spill Commission* responsible for the Exxon Valdez oil spill investigation said, "It's as though we had never written the report" (Struzik 2015: 156).

Despite past oil spills, government reports and vast scientific study, efforts to drill in the Arctic are ongoing. A scientific study published in Nature (McGlade & Ekins 2015) said: "We show that development of resources in the Arctic and any increase in unconventional oil production are incommensurate with efforts to limit average global warming to 2 °C. Our results show that policy makers' instincts to exploit rapidly and completely their territorial fossil fuels are, in aggregate, inconsistent with their commitments to this temperature limit."

As the case of Alaska shows, the fledgling development of renewable energies juxtaposed with fossil fuels represents the dueling perspectives. In what is known as the 'energy paradox', Jaffe and Stavins wrote in 1994, "In the long run, the development and widespread adoption of new technologies can greatly ameliorate what, in the short run, sometimes appear to be overwhelming conflicts between economic well-being and environmental quality" (92). This brings to the forefront the question of governance. What is the state of environmental governance when Arctic warming, and broadly climate change are up against the economics and availability of fossil fuels?

Unraveling governance

The concept of governance for the changing Arctic is a challenging question for even the most seasoned of Arctic experts (Koivurova 2012; Young 2013). What are the possibilities and limits of the Arctic Council? What roles do international fora and national policy play in the governance of Arctic development and conservation? For purposes here, I propose that the AC needs to govern for conservation while national policy, writ large, must compliment the principle of environmental protection. If in fact the object of desire is to curb global warming, scientific studies, some of which

I have cited within, strongly suggest that an ongoing cycle of fossil fuel dependency is the bane of sustainable environmental protection. That said the limits of the Arctic Council, as well as national and international bodies are not inconsequential. Although I have not addressed the specific needs of Arctic indigenous peoples, the desire for economic development through responsible non-renewable resource development may be without recourse if suitable options are not available.

To avail ourselves of a broad understanding of environmental governance potential, Young (2013: 2) comments that the human-environmental interaction is key. The environment is not governed, but rather "What we can aspire to manage, or more generally, govern are human beings." In this examination of environmental governance solving for complexity – collective action problems, multi-level and cross-sector interactions, and governance for times of turbulence – demonstrates the sheer breadth of multi-level engagement required to overcome the challenges of global climate change embedded with the rapid acceleration of Arctic change. At all levels, from the local to the global, the process is highly political fraught with impediments from policy inaction, a disconnect between those that create environmental problems and those most affected, to matters of compliance. Knowing this, solving for what is viewed as particularly daunting – "climate change presents a stiff problem" – Young (2013: 153) makes the case for identifying specific features and "devising regimes that fit the essential features of the problems at hand, thereby maximizing the chances of success in problem solving."

Specific to how Arctic governance functions, Koivurova (2012: 31) notes that the AC "has mainly served as a platform for Arctic actors to discuss Arctic policy issues, with occasional soft-guidance documents adopted… Overall, however, the AC was developed for a region that requires a minimum of governance." Yet, Arctic warming and increased economic interest have compelled AC member states to develop initiatives that take on aspects of regulatory frameworks including the legally-binding *Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic* (2011), and *Agreement on Cooperation on Marine Oil Pollution, Preparedness and Response in the Arctic* (2013). As Koivurova (2014) remarks "This view of the importance of treaties is, of course, very comforting for international lawyers: when things get serious, international legal instruments, treaties, are needed." On the other hand, because the AC is a non-treaty-based forum it has allowed for "soft-law cooperation [that] enables better participation by the region's actors," and decision making ultimately guided by the eight sovereign nation-states. Thus, to understand how the human-environmental interaction will be governed for future developments we need to consider inter-state cooperation and the role of individual state members (Koivurova 2014).

On the part of the U.S., climate change, the role of renewable energy development and black carbon emission reductions are a priority of the U.S. Arctic Council chairmanship, as well as a national imperative. Concurrently, *The Implementation Plan for the National Strategy for the Arctic Region* (2015) upholds its interests in national energy security, which includes development of non-renewable energy sources, and underscores the importance of Alaska as a strategic partner in fulfilling the Arctic agenda. Given the duality of governing for the present and accounting for the future, it may be necessary to understand U.S. initiatives in this light. At the same time, Young (2013: 147) notes that the U.S. "has emerged as a stumbling block for those working to enhance environmental governance" at the UN. These are the breadth of issues that must be considered when assessing U.S. intentions.

The paradox in Arctic policy-making: U.S.

The initial plan for developing Arctic renewable energy sources stemmed from the joint Arctic Council chairmanship agenda led by Norway, Denmark and Sweden, who together identified climate change as a Council priority (Hossain, Koivurova, & Zojer 2009: 69). Thus when U.S. Secretary of State John Kerry (2015) addressed the 2015 Arctic Council Iqaluit Ministerial Meeting his message appeared to convey that U.S. intentions were to move in this direction: "If we got the whole world to embrace clean energy choices rapidly, we can meet our two-degree target…. So it is essential, especially in the Arctic, to provide affordable, reliable energy that is needed here." Indeed, as an instrument of foreign policy the environmental NGO community lauded Kerry for taking a stand on Arctic warming (Kelly 2015). Coming at the heels of *U.S.-China Joint Announcement on Climate Change* (White House 2014b) these utterances could be interpreted as a shift in U.S. climate change policy.

Yet, less than a month later, the Obama administration conditionally approved Shell's plans to resume offshore exploratory drilling in the Chukchi Sea (Davenport 2015). Notably media coverage on the decision was extensive, far more plentiful than it was of Kerry's Iqaluit speech. Most coverage was purely reportorial, but others expressed indignation. "The idea that importing oil is 'bad for our people' is populist pandering," argued Mia Bennett (2015):

> BOEM's [Bureau of Ocean Energy Management] decision also makes the U.S. appear hypocritical as Arctic Council chair given all its talk about the environment and combating climate change in Iqaluit. Contrast this with the Russian minister for natural resources, who wrote on his Facebook page last week: 'There is no alternative to the fields on the shelf.' He may not say what environmentalists want to hear, but at least he can't be accused of going back on his word.

Indeed, U.S. Arctic policy is not without ambiguity. Understood from the most basic perspective, the U.S. Implementation Plan for the National Strategy for the Arctic Region (2015) objectives are to: 1) advance United States security interests, 2) pursue responsible Arctic region stewardship and 3) strengthen international cooperation. Briefly, U.S. security interests include both the pursuit of renewable energy development and ensuring the 'safe' and 'responsible' development of non-renewable energy resources, so it should come as no surprise that this paradox of events came to pass. As is the case with governments worldwide, U.S. interests include economic growth (Stern 2006), but at the same time there is a growing understanding that the environment cannot continue as a back-burner issue. In the U.S., actions on climate change are implemented primarily through the Environmental Protection Agency (EPA). By Executive Action, President Obama has given the EPA a broader regulatory role developing, for example, stricter limits on coal-fired power plants (Baker 2014). But, on the whole environmental governance is stymied by political inertia and most likely suffers from a collective-action problem. As Oran Young (2013: 23) suggests, "Collective-action problems are ubiquitous in human affairs." So, how might we start to unravel the great divide between sound environmental action and the global fossil fuel dependency? If we are to look solely to Washington policy-makers for a grand plan in environmental governance, we will likely be hard pressed to find the solution. Whereas the U.S. played a "leading role in creating the UN system," Young (2013: 147) notes that in subsequent years since the U.S. became "a laggard in the realm of

environmental governance … [and] has emerged as a stumbling block for those working to enhance environmental governance." The U.S. has not ratified the UN Convention on the Law of the Sea nor the Kyoto Protocol. On the other hand, it would appear that as Young (2013: 162) suggests, "Increasingly, success in the creation and administration of these regimes will require the cultivation of coalitions among the public sector, private sector, and civil society," a trend that has gained significant momentum in light of numerous economic reports such as the 2006 *Stern Report*, that provided an unsettling account of the costs of climate change.

"The solution for our energy problems is going to be corporate America, that is actually private enterprise," said Tom Steyer, founder and former CEO of the hedge fund Farallon Capital Management, "that's when we get the policy framework right the people in that sphere will come up with creative, imaginative and innovative solutions that will blow our mind." Steyer has invested $65 million to launch renewable energy centers at Yale and Stanford (Bloomberg 2014). The market would seem to concur. Where cheap oil is thought to be a threat to renewable energies Citibank reports, "Fundamental factors—increasing economic competitiveness, energy security, and environmental goals—all remain potent forces driving ever more rapid adoption of renewable energy globally" (Parkinson 2015). Reporting on the 2015 Bloomberg New Energy Finance summit Bloomberg business said "The question is no longer if the world will transition to cleaner energy, but how long it will take" (Randall 2015). These examples and others suggest that global markets are undergoing a transformational shift, redirecting capital toward the development and consumption of sustainable renewable heating and power sources. Still, the pace at which renewables are developed will depend on numerous factors. In 2013, for example, lower system costs and policy uncertainty precipitated a decline in investment. Yet "new financing structures provided low-cost financing through capital markets" and net investment into added renewable power capacity continued to trend upward outpacing fossil fuels (Renewable Energy 2014: 25). In 2012, renewable energy was an estimated 19% of global consumption, 9% of which was traditional biomass (Renewable Energy 2014: 21), 40% of which utilizes modern bioenergy technology and methods.

Conclusion

The extent to which environmental protection of the Arctic region has evolved is often a condition of extreme circumstance. Emerging from the Cold War years was a glum picture of how extreme geopolitical differences could wreak havoc on a region whose people had no part in the destruction of the environment. Likewise, today the visual depictions of a melting cryosphere has brought heightened awareness to the Arctic as a region where the human race has once again debased the environment, this time as a condition of industrialization. Black carbon is but one of the vast number of issues that government must address in order to make progress toward an environmental sustainability future. In this regard, the Arctic Council has set the stage through scientific evidence and guiding principles, but institutional limitations preclude enforceable procedures. Consequently, the capacity for effectiveness relies on the desire of nations, writ large, to provide the strategy and structure capable of promoting and supporting a transition to environmentally friendly practices.

Throughout this article I have made reference to the private sector. Yes, government has a critical role to play in laying the foundations of robust environmental policy and enforceable regulation, but implementing environmental policy necessitates the support of outside actors. Indeed, the role of NGOs and academia cannot be underestimated, but to bring about pragmatic solutions requires the robust support of the business community and financial institutions. Quite rightly, the U.S. Arctic Council chairmanship has formally encouraged partnership with the public sector and civil society. Of the numerous activities required, to encourage BC reduction strategies such as renewable energy sources is certainly an encouraging step toward climate change mitigation, but the challenge is to parlay small successes into a broader framework, a framework in which government, industry and the investment sector develop synergy.

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