

**CLIMATE CHANGE AS A DRIVER OF NATIONAL SECURITY POLICY
COMPARATIVE CASE STUDIES OF DENMARK, SAUDI ARABIA, AND THE
UNITED STATES**

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Abstract: The international relations theory of Realism traditionally focuses on the idea that the state and its ability to project hard power ultimately determine the status of global geopolitics and international security. This idea thus tends not to include issues other than hard power, as matters that pertain to state national security. The transition to the 21st century, however, has brought forth a rise in non-state actor, transnational threats. Of these, one of the most pressing concerns for security analysts is climate change and its impacts to national security. In attempting to determine whether or not Realism has adequately adapted to the threat of climate change, this research paper evaluates the degree to which climate change has influenced state national security policy. The research is underpinned with an evaluation of the various strands within the Realist school of thought. The method of research involves a comparative case study of Denmark, Saudi Arabia, and the United States. The paper identifies the unique challenges presented by climate change to each country and assesses their response to these challenges with respect to national security policy. The findings of the case study reflect how states are facing real threats to security due to climate and suggest that Realism should adapt to this phenomenon to maintain relevancy in international relations theory.

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Climate Change as a Driver of National Security Policy
Comparative Case Studies of Denmark, Saudi Arabia, and the United States

Introduction

Since the end of the Cold War, some scholars have argued that in addition to military adversaries, the national security community should consider environmental threats, and that these are an essential component of national security.¹ The international relations theory of Realism has been resistant to the idea that factors other than the state and its ability to project hard power can be classified as national security issues. While there are various strands within Realism with competing perspectives, the primary argument of traditional Realist thought is that if societal issues that present concern are labeled as “national security threats”, the term *national security* loses its relevancy. The focus of this research is to better understand this issue in the context of a specific environmental concern, climate change. The guiding research question asks: to what degree have states incorporated climate change into their national security policy?

The topic of climate change is an expansive one; for the purposes of this study, the timeframe will be limited to a qualitative, comparative case study of Denmark, Saudi Arabia and the United States from the years 2000 to 2020. Scholars and policymakers do not consistently agree on the definition of the term “national security”, thus defining what constitutes national security policy can be a difficult task. Despite varying perspectives, broadly speaking the term refers to the safeguarding of a people, territory, and way of life. This includes protection from

¹ Gareth Porter. “Environmental security as a national security issue.” *Current History*. May 1995. Vol. 94. No. 592. 218.

physical assault and is thus synonymous with the term, “defense.”² For this paper, the term “national security” will use a framework that draws not only on the idea of safeguarding the resources, population and territory of a country from external threats, but also includes protection from transnational threats in support of the stability and prosperity of a given nation.³ The operationalization of climate change into policy will be viewed through three categories: public statements by cabinet members and above within respective governments, financial investments into green initiatives, as well as formally articulated national security policy and laws, within each respective country. Simple enumeration of these points of measurement in each country would not be a definitive indicator of climate change as an influencer of policy. Qualitative comparison of leadership intent, financial commitment, and binding national authorities, however, illustrate the cumulative socio-political evolution of each nation considered here. In assessing state response to climate change, analysis will be given as to whether or not the school of thought that places state power and national security above all else, Realism, has adequately adapted to the threats posed by climate change.

A review of the current literature indicates that there are essentially two facets within the Realist school in relationship to this question. The primary emphasizes hard power capabilities and a state’s ability to defeat an adversary through kinetic means. The secondary facet recognizes that the modern security environment involves elements other than hard power as national security threats, and thus must be factored into the Realist mode of thought. These differing perspectives present two hypotheses to test. The first is that states will continue to focus on traditional Realist issues and thus shape national security policy by determining their ability

² Michael J. Meese, Suzanne C. Nielsen and Rachel M. Sondheimr. *American National Security*, 7th ed. (Baltimore: Johns Hopkins University Press, 2018), 3.

³ Ibid. 3-5.

to respond to threats posed by other state actors. The second is that with the consideration of the threats posed by climate change, states will include climate change in their national security planning.

While the words “climate” and “climate change” have more agreement in the vernacular than security terms, this research study will adhere to straight-forward definitions, specifically with “climate” as “the average course or condition of weather at a place usually over a period of years as exhibited by temperature, wind velocity and precipitation,”⁴ while “climate change” refers to the rise in global temperatures associated with the burning of fossil fuels since the beginning of the Industrial Revolution.⁵ The dependent variable being measured is the degree to which a state has incorporated climate change into its national security policy, measured as described above. A state’s behavior regarding climate change is influenced by several factors, from its geographic location, energy resource production and consumption rates, as well as the evolution of its political culture. As independent variables, this research will be restricted to the differences in the relationship between each country’s economic and industrial base, the climate effects of its geographical location, and its flexibility to adapt to change.

Literature Review

There is a significant body of scientific and political writing on climate change and its implications for national security studies. This literature review will trace the arc of that writing from identifying the origins of the climate change discussion, facilitating a deeper understanding of the evolution of ideas surrounding the nexus of environment and security. Moving into

⁴ Merriam-Webster, “Climate,” accessed 22 March, 2020, <https://www.merriam-webster.com/dictionary/climate>

⁵ United Nations, “Climate Change”, accessed 20 March, 2020, <https://www.un.org/en/sections/issues-depth/climate-change/>

international relations theory, it will expose the challenges of integrating climate change into a Realist worldview, as Realism is the theory that emphasizes the state's ability to defend itself, and national security above all other policy. Finally, this review will address the shortfalls in current literature that this research study addresses.

Climate Change and Conflict: Historical Perspectives

While this research will focus on the years 2000-2020, scholarship on climate change as a defense issue traces its origins back to the Colonial era and the Civil War period, thus extending beyond the current definition of climate change beginning with the Industrial Revolution.

Historian James Roger Fleming discusses how Colonialists viewed warming the climate through deforestation as a positive effort in establishing a new society, in which a warmer climate would benefit industry and agriculture.⁶ Civil War historian Brian Allen Drake is one of the few who has assessed how climate and the environment affected battlefield outcomes. While traditional military historians tend to focus on tactics, strategy, and combat leadership as the only relevant factors to military history, Drake highlights how a changing environment during the Civil War changed combat outcomes.⁷

The issue of attempting to change the climate to support defense initiatives arose in the Cold War. Fleming has written extensively on mankind's ability to manipulate environmental conditions and its impact to security issues with his book, *Fixing the Sky: The Checkered History*

⁶ James Roger Fleming, *Historical Perspectives on Climate Change*, (New York: Oxford University Press, 1998). 7-8.

⁷ Brian Allen Drake. *The Blue, The Gray, and the Green: Toward an Environmental History of the Civil War*. (Athens University Press, 2015),18.

of Weather and Climate Control.⁸ This work however, is more a discussion of weather manipulation and discusses Soviet and U.S. efforts to “weaponize” the weather during the Cold War through cloud seeding, than it is about modern day security implications of climate change.⁹ In recent years, however, defense officials have begun to understand how the impacts of climate change can negatively affect defense readiness, as discussed in the following section.

Climate Change: a Challenge to IR Theory

Climate change is a global societal issue. Its impacts permeate into a plethora of scholarly fields. Traditional IR theory however, has not yet determined its place within their frameworks. Because the links between climate change and national security are a recent concept, the school which places national security and hard power above all else in its doctrine--Realism, has not adequately addressed the issue of climate change.¹⁰ The topic has tended to be considered a concern of liberalism and institutionalists who believe the problem must be addressed through international agreements, environmental initiatives, legislation, and robust international cooperation. With military leaders and security practitioners becoming more concerned about climate change and its impacts to security, as well as military readiness, it becomes increasingly difficult for Realists to avoid the topic and still maintain relevancy in international relations (IR) scholarship.

There are some scholars who have recently contributed analysis as to how climate change could be viewed through a Realist’s lens. In his article for the Center for Geopolitics & Security in Realism Studies, Daniel Heffron discusses the perspectives of the various strands of Realism

⁸ James Roger Fleming, *Fixing the Sky: The Checkered History of Weather and Climate Control*, (New York: Columbia University Press, 2010). 170.

⁹ Ibid.

¹⁰ Daniel Heffron. “What do realists think about climate change?” Centre for Geopolitics & Security in Realism Studies. November 13, 2015. 7. Accessed 1 March, 2020. <http://cgsrs.org/publications/30>

and concludes that the school has not effectively addressed the issue and that most strands within the IR framework cannot be applied to the climate problem. He does offer however, that Defensive Realism, is a potential theory which could be applied, specifically within Walt's theory of balance. Though each state would be acting in their own self-interest, alliances aimed at addressing climate change would promote the relative security of each.¹¹ Heffron provides a primer for his analysis by first defining the various strands of Realism and their modes of thought. He additionally includes a section to define and explain what climate change is. With this straight-forward approach, his work is able to be consumed by the environmentalist or scientist wishing to understand how to think as some policymakers or military leaders do, so as to influence their decision-making on climate issues. Likewise, he provides the classical Realist theorist an overview of climate change and the real security concerns it poses.

Jonathan Symons differs from Heffron in that he assesses that the risks associated with climate change can be brought into classical Realism's perspective. To premise his research, he asks the question, "But how does Realism respond when the prudent pursuit of state security risks rendering much of the planet uninhabitable?"¹² Symons draws a parallel between the climate problem and the early pursuits of nuclear weapons, citing that the development of the hydrogen bomb in the 1950's created the same type of dilemma as status quo politics now carried a significant risk of thermonuclear omnicide.¹³ Morgenthau's response to this dilemma was to shift the parameters of classical Realism, to include states working in concert to manage

¹¹ Ibid, 17-18.

¹² Jonathan Symons. "Realist climate ethics: Promoting climate ambition within the Classical Realist tradition," *Review of International Studies*, Volume 45, Issue 1, January 2019, 141-160. Accessed 1 March

¹³ Ibid, 143.

risks and safeguard collective national interests.¹⁴ Symons adopts Morgenthau's line of thought with respect to climate change and concludes that states' perceptions of national interest must include cooperative system-preservation alongside traditional security concerns.¹⁵

Traditional Realist thought is centered on military capabilities, kinetic threats and the ability to respond to them, thus the critique of many classical Realists in labeling climate change as a national security concern is that it devalues the definition of a "security threat," and thus risks failing to prioritize actual threats. This idea, referred by many as "securitization", is likely a point of criticism many classical Realists would have regarding Symons' work. It appears as if Symons does not wish to delve away from belonging in the traditional Realist school, so simply changes the standards as opposed to accepting other strands that might be more suitable to embracing climate change. In this regard, Heffron demonstrates a greater degree of adaptability and caters to Realist thinkers willing to do the same.

In his article "Rebranding Climate Change: From a Realist Perspective" for *The International Journal of Climate Change: Impacts and Responses*,¹⁶ Bayard Rogers asserts that definitive, collective societal action in mitigating the risks of climate change is impeded by inconsequential debate over terminology, political correctness, and political and moral philosophies that emphasize individual autonomy and equal opportunity. He further argues that the focus on individual rights prevents societal change that is needed to combat climate change, in that scientists and politicians are a minority of the population, and their conversation excludes the majority responsible for the crisis. He concludes that climate change is a social dilemma, thus

¹⁴ Ibid.

¹⁵ Ibid, 151.

¹⁶ Bayard Rogers. 2019. "Rebranding Climate Change: From a Realist Perspective." *The International Journal of Climate Change: Impacts and Responses* 11 (4): 33-44. doi:10.18848/1835-7156/CGP/v11i04/33-44.

only social change can adequately adapt to the environmental threat. Though his thoughts are categorized as a Realist philosophy, his focus on social change is indicative of a liberal ideal. This article seems slanted as an argument against the domestic concept of liberalism, rather than international relations theory.

In looking at Maria Trombetta's analysis of the discourse surrounding climate change, the debate regarding whether or not Realist theory is failing to adapt to climate change or whether climate advocates are failing to present the issue in a manner that makes sense to Realist thinkers is again brought forth with the argument of "securitization" of terms. Trombetta claims that attempts to broaden the security agenda have been perceived as spreading the confrontational logic of security.¹⁷ She argues that critics of including non-traditional sectors into matters of national security fail to consider if or how alternative security logics are introduced and whether practices associated with securitization are equally challenged or changed.¹⁸ Her analysis thus objectively challenges both traditional Realism as well as those that would be eager to "securitize" issues they deem a priority, but might not actually be at the level of national security concerns.

Shortfalls in Current Scholarship and Future Research

Current literature reflects a trend towards the integration of climate change as a national security threat. While historically, some viewed the ability to change the climate as an opportunity, the current climate trend in rising temperatures is finding a foothold even in the Realist perspective. There is still some debate as to whether the characterization of

¹⁷ Maria Julia Trombetta. "Environmental security and climate change: analysing the discourse." *Cambridge Review of International Affairs*, 21:4, 585-602, DOI: 10.1080/09557570802452920, 585-586

¹⁸ Ibid.

environmental issues as security issues dilutes the definition of security, however. Future research will likely evolve into calls for collective societal action, whether from defense officials, scientists or national policy-makers. This kind of consensus would be similar to the sacrifices made during World War II or the nuclear attack drills of the Cold War, as well as the current “social distancing” required to deal with the COVID-19 pandemic.¹⁹ With quickly changing temperatures impacting everything from wildfires throughout the country of Australia to an increase in hurricanes in the Caribbean, it is crucial to elevate the climate crisis with a united voice across disciplines. This research will use a comparative case study to evaluate the degree to which three key nations have integrated climate change as a security concern.

Hypothesis and Methods: Comparative Case Studies

The following case studies will test the hypotheses that states will continue to focus on traditional security issues as defined by Realism, or will include climate change into their national security policy formulation. In reviewing three cases, it will further explore whether state behaviors indicate a leaning towards one of the above-mentioned hypotheses. Regardless of current state action in response to climate change, the data might suggest that climate change ought to be considered a national security issue and that if so, the IR theory of Realism ought to achieve consensus as to where the issue of climate change belongs within their theoretical framework.

These comparative case studies will evaluate the national security policies of Denmark, Saudi Arabia and the United States from the turn of the 21st century to the present, with the aim of determining the degree to which climate change has been incorporated into state national

¹⁹ Kaitlyn Tiffany, “The Dos and Don’ts of ‘Social Distancing’”, 12 March, 2020. *The Atlantic*. Accessed 20 March, 2020. <https://www.theatlantic.com/family/archive/2020/03/coronavirus-what-does-social-distancing-mean/607927/>

security policy. While climate change is a global problem with impacts that span across a multitude of research areas, this case is bound by a selection of three states and the specific climate challenges faced by each. Some scientific data pertaining to climate change will be referenced, however, the intent of the research is to provide robust qualitative analysis rather than quantitative data regarding climate related events.

Certain geopolitical and geographical factors were considered in selecting these cases and the significance these factors have in global and regional affairs. Denmark has historically played a relatively minor role on the international stage, yet been driven into a regional leadership role due to its sovereignty of Greenland. As the Arctic becomes a region of increasing interest to global powers such as Russia and China, this ethnically homogenous democratic state is forced to action. Saudi Arabia plays an important role geopolitically for regional stability in the Middle East, and is adapting a new state strategic plan for the 21st century, which entails revisions to energy and socioeconomic policies, aimed at supporting a growing population in an ever-warming region. With a powerful monarchy, however, these actions are easier to control. The United States maintains global influence and power, and also encounters a variety of climate related events due to its geographic size and location. Domestic political polarization has also muddied the waters for U.S. security policy. The objective with these case choices is to assess states facing different types of climate change concerns in various regions, all with variant degrees of international influence and governing styles. This allows for a diversified qualitative focus in terms of region and perspectives on climate change and security.

Denmark

Although climate change related events are occurring globally at an increasing rate, these events are all in some way an effect of the changing conditions in the Arctic region.²⁰ The Arctic essentially serves as ground zero in terms of climate change, with increasing temperatures resulting in rapid sea and glacial ice melt, causing global sea level rise (SLR) and drastic changes to environmental conditions, not only in the Arctic, but throughout the world. States with claims to Arctic territory are therefore gaining the interest of scientists, strategists, and policymakers. Denmark's territory of Greenland allows it to hold membership status in the Arctic Council, an eight-nation diplomatic institution comprised of Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden, and the United States. The council is aimed at facilitating international cooperation as the region opens up to resource extraction and trade avenues due to melting ice increasing access to previously inaccessible waterways.²¹ Greenland's coastlines and surrounding ocean territory are believed to hold billions of barrels of untapped oil and billions of cubic meters of untapped natural gas.²² Ice melt in the region is an effect of increased temperatures due to rising carbon dioxide (CO₂) levels, and with glacial sheets evaporating or disappearing altogether, states are vying for Greenland's rich resources.²³ As a relatively minor player in the international arena, Denmark is not accustomed to posturing against or negotiating with power players such as Russia and China, but both of these nations are already pursuing

²⁰ J Richter-Menge, J.E. Overland, and J.T. Mathis, eds. "Arctic Report Card 2016: Arctic Change--So what; Linkages and Changes." National Oceanic and Atmosphere Administration. December 2016. Washington, D.C. ftp://ftp.oar.noaa.gov/arctic/documents/Arctic_ReportCard_full_report2016.pdf. Accessed November 29, 2017.

²¹ Arctic Council, "Arctic Council at COP23: Climate Change in the Arctic and its Global Impacts." October 20, 2017, www.arctic-council.org.

²² Michael T. Klare, *The Race for What's Left: the global scramble for the world's last resources*, (New York: Picador, 2012,), 78

²³ Ibid.

interests in the region. Although China does not hold Arctic territory and is therefore not an Arctic Council member, it is particularly interested in cornering Greenland's resource market and sent representatives to scope energy resource extraction sites.²⁴ China's interest in the region will only complicate a sensitive situation of geopolitical friction, as all Arctic Council states are already engaged in unresolved territorial disputes with Russia.²⁵

All Arctic Council member states have demonstrated interests in the region.²⁶ Denmark, however presents a particularly interesting case to study in that it is taking an active role in terms of international cooperation and defending national interests in the region. Denmark's territory in Greenland and its relations with indigenous Arctic communities have given the state a significant role in addressing climate and security concerns in the Arctic. Changes occurring in Greenland, and its surrounding oceanic territory, present a number of challenges and opportunities for the international community. These changes give Denmark a key responsibility to defend its interests and maintain cooperation with the native population of Greenland, while simultaneously negotiating with major powers such as Canada, the United States, Russia, and China. In assessing Denmark's national security policy surrounding climate change, it is necessary to look at the climatological factors that might be influencing Danish policymaking bodies.

²⁴ Tim Boersma and Kevin Foley, "The Greenland Gold Rush: Promise and Pitfalls of Greenland's Energy and Mineral Resources," *Energy Security Initiative at Brookings; John L. Thornton China Center at Brookings*. September, 2014. 45-47. <https://www.brookings.edu/wp-content/uploads/2016/06/24-greenland-energy-mineral-resources-boersma-foley-pdf-2.pdf>. Accessed March 4, 2020.

²⁵ Ibid, 88-99.

²⁶ Arctic Council, "The Arctic Council: A backgrounder," 9 September 2017, Accessed 20 March, 2020. <http://hdl.handle.net/11374/2076>

Arctic Climate Trends

A 2004 assessment published by the Arctic Council showed alarming rates of warming trends in the Arctic with results surpassing original predictions of the International Panel on Climate Change (IPCC).²⁷ Some scientific estimates predict the Arctic region will become ice-free by 2040. This is decades earlier than previously predicted.²⁸ While there are regional variations, evidence shows a clear and persistent increase in temperatures across the Arctic. Up from an observed temperature increase of 5 to 7 degrees Fahrenheit over the past fifty years, the Arctic Climate Impact Assessment (ACIA) predicts an increase in ambient air temperatures of 5 to 9 degrees Fahrenheit over land and up to 13 degrees Fahrenheit over ocean within the next one hundred years.²⁹ Aside from the scientific community, various defense entities have dedicated more attention to climate change in recent years due to its implications on security and stability. The United States Office of Naval Research examined 30 different global climate models to account for various research methods and variables. All models indicated a loss of sea ice increase in the Arctic.³⁰ Four scenarios observed demonstrated increase in surface temperatures for the next 20-50 years versus a set of 36 models from the Coupled Model Intercomparison Project (CMIP5) from 1966 through 2005.³¹ Reviews and assessments of climate change impacts

²⁷ Elizabeth L. Chalecki, "He Who Would Rule: Climate Change in the Arctic and its Implications for U.S. National Security," *Journal of Public and International Affairs* (Princeton University), Woodrow Wilson School of Public and International Affairs, 1 March 2007, Accessed 22 March, 2020, <https://jpia.princeton.edu/sites/jpia/files/2007-10.pdf>, 208.

²⁸ Chalecki, 208.

²⁹ Ibid.

³⁰ James E. Overland, Muyin Wang, and John Welsche. "Future Arctic Climate Changes: Adaptation and Mitigation Time Scales." National Oceanic and Atmosphere Administration. Research number: 10.1002/2013EF00162. August 21, 2013. www.pmel.noaa.gov/arctic-zone/future/bib/EarthsFutureJEO.pdf, accessed November 28, 2017.

³¹ Coupled Model Intercomparison Project (CMIP5), World Climate Research Programme, 2008, Accessed 20 March, 2020, <https://www.wcrp-climate.org/wgcm-cmip/wgcm-cmip5>

have been gathered by and shared amongst the scientific and defense communities. The information from them provides conclusive evidence indicating it is not if, but how, climate change in the Arctic will shape Denmark's national defense priorities. The changing environmental conditions are resulting in great power competition over resources and territory belonging to Denmark. In addition, Denmark is concerned about impacts to native populations in Greenland.

Denmark Policy

Statements:

Statements from government representatives and leaders do not always translate to direct policy implementation. However, statements regarding a government's intentions in addressing climate change can be indicative of certain policy priorities. Upon becoming Denmark's new prime minister in 2019, Mette Frederiksen vowed to cut 70 percent of her country's carbon emissions by 2030.³² In a 2014 statement at the UN Climate Summit, then Danish Prime Minister, Helle Thorning-Schmidt vowed to reduce emissions by 40 percent by 2020, be fossil free by 2050, and stated Denmark would be actively working to enhance climate finance.³³ Denmark has fallen short of this goal as of early 2020, only achieving a 29 percent reduction, however, the Danish Energy and Climate Outlook projects the country is on track to accomplish

³² Martin Selsoe Sorenson, "Denmark's New Prime Minister Vows to Tackle Climate Change." *The New York Times*, 26 June, 2019, accessed 2 March, 2020.
<https://www.nytimes.com/2019/06/26/world/europe/denmark-prime-minister-mette-frederiksen.html>

³³ Helle Thorning-Schmidt, Statement by Denmark at the UN Climate Summit, 23 September, 2014, accessed 2 March, 2020.
<https://fnnewyork.um.dk/denmark/denmarks-engagement-with-the-un/statements/newsdisplaypage/?newsid=1d1f9d60-8d08-43bc-b6c3-126ed1257fc4>

this goal in 2030³⁴. A 2011 Arctic Strategy released by Denmark outlined a comprehensive agenda towards the entire Arctic region. Prior to this, the country's Arctic outlook tended to focus solely on Greenland.³⁵ At a UN Private Sector Forum, former Prime Minister, H.E. Lars Lokke Rasmussen gave a speech in which he emphasized the need for investment into climate change technologies, and the role public-private partnerships would have in bringing about changes that could foster a "global green economy."³⁶ In 2019, Denmark's climate and energy minister, Dan Jorgensen, stated Denmark plans to construct an offshore wind island that could power as many as 10 million European homes. Jorgensen added, "If we really are to realize the enormous potential of offshore wind we must develop technologies of the future to convert the green power into fuel for aircraft, ships and industry."³⁷ In its 2017-2018 Foreign and Security Policy Strategy, Denmark's Ministry of Foreign Affairs claims it will address the security policy challenges associated with extensive new opportunities for development of the Arctic region. It further claims the Danish government will strengthen its embassy in Moscow to ensure stronger representation of Danish interests, particularly regarding security policy and the Arctic.³⁸

Attempts to strengthen diplomatic relations with Russia are a worthy endeavor for Denmark,

³⁴ Danish Energy Agency, "Denmark's Energy and Climate Outlook 2019," October 2019, Accessed 22 March, 2020, <https://ens.dk/sites/ens.dk/files/Analyser/deco19.pdf>

³⁵ Marc Jacobson, "Denmark's strategic interests in the Arctic: It's the Greenlandic connection, stupid!," The Arctic Institute Center for Circumpolar Security Studies, (May 4, 2016), accessed 22 March, 2020. <https://www.thearcticinstitute.org/denmark-interests-arctic-greenland-connection/>

³⁶ Prime Minister's Office, Denmark. Statement by H.E. Lars Lokke Rasmussen, Prime Minister of Denmark, at the United Nations Private Sector Forum. Accessed 2 March, 2020. http://www.stm.dk/_p_13250.html

³⁷ Jacobsen, Stine. "Denmark plans 30 billion offshore wind island that could power 10 million homes." Reuters. 10 December, 2019. Accessed 2 March 2020. <https://www.reuters.com/article/us-climate-change-denmark/denmark-plans-30-billion-offshore-wind-island-that-could-power-10-million-homes-idUSKBN1YE1G6>

³⁸ Ministry of Foreign Affairs of Denmark, "Foreign and Security Policy Strategy 2017-2018," (June 2017): 26, accessed 23 March, 2020, <https://um.dk/en/news/NewsDisplayPage/?newsID=0D9827F1-0ADB-443B-9741-CA265A1E4EBF>

given Russia's territorial claims in the region. Moscow has claimed the Lomonosov and Mendeleev Ridges, extensions of the Russian continental shelf. Denmark and Canada also claim the Lomonosov Ridge as extensions of their respective continental shelves. The adjudication of these claims is a significant security issue, as the ridges pass closely to the geographic North Pole and would dramatically expand the mineral extraction zone for whichever state had control of extraction rights on them. Claims by Russia were submitted to the UN Commission on the Limits of the Continental Shelf (CLCS) in December of 2001, arguing that a large portion of the Arctic ocean floor was an extension of Russian territory. Despite an updated submission in 2015, a final decision on these claims has not been made.³⁹

Investments:

Per its stated emphasis on public-private partnerships, in 2014 Denmark announced the Danish Climate Investment Fund, which will be used to finance climate friendly projects in developing countries.⁴⁰ The investment firm invests in green energy projects around the world, so is not a project solely focused on the Arctic, demonstrating Denmark's commitment to combating climate change more broadly.⁴¹ This year, Denmark also announced its launch of the Danish Agribusiness Fund. The Fund will invest capital in projects in Asia, Africa, Latin America and parts of Europe. Danish officials state the fund will be operated on market

³⁹ United Nations Oceans and Law of the Sea, accessed 22 March, 2020.
http://www.un.org/depts/los/clcs_new/commission_submissions.htm

⁴⁰ Prime Minister, Ms. Helle Thorning-Schmidt, "Statement by Denmark at the UN Climate Summit, 23 September, 2014" accessed 2 March, 2020.
<https://fnnewyork.um.dk/denmark/denmarks-engagement-with-the-un/statements/newsdisplaypage/?newsid=1d1f9d60-8d08-43bc-b6c3-126ed1257fc4>

⁴¹ Introduction to the Danish Climate Investment Fund, 19 November 2015, Danish Climate Investment Fund, accessed 2 March, 2020.
[https://dbdh.dk/download/members_meeting_k%C3%B8ge_19.11.15\(2\)/IFU%20-%20Otto%20Vinther%20Christensen\(2\).pdf](https://dbdh.dk/download/members_meeting_k%C3%B8ge_19.11.15(2)/IFU%20-%20Otto%20Vinther%20Christensen(2).pdf)

conditions and will ensure the investors a competitive return. CEO of PendsionDenmark, Torben Möger Pedersen claims the two funds demonstrate that the best form of development aid is business.⁴² As part of its offshore wind energy project, Denmark has set aside 65 million crowns to research how the energy coming into the hub can be stored or converted into renewable hydrogen as all the power generated will not just be used by domestic customers.⁴³

Legislation:

Complimentary to Denmark's public statements and financial investments into climate initiatives is legislation, demonstrating the government's level of commitment on the climate issue. Denmark recently approved its national Climate Act, which targets reducing greenhouse gas emissions by 70 percent by 2030.⁴⁴ This legally binding act is one of the world's most ambitious. The law establishes a mechanism for setting milestone targets. Every five years the government must set a legally binding target with a ten-year perspective and emissions are calculated in accordance with UN accounting rules.⁴⁵ While this legislation targets Denmark's broader strategy at becoming a greener society, legal efforts focused on the Arctic include Denmark's signatory status to the 1982 United Nations Convention of the Law of the Sea

⁴² Ministry of Foreign Affairs of Denmark. "New Danish Agribusiness Fund to invest millions in developing countries." Accessed 2 March, 2020. <https://um.dk/en/news/newsdisplaypage/?newsid=6e524580-7b2a-409e-a8c9-499888e96f48>

⁴³ Stine Jacobsen, "Denmark plans 30 billion offshore wind island that could power 10 million homes." Reuters, 10 December, 2019, accessed 2 March 2020. <https://www.reuters.com/article/us-climate-change-denmark/denmark-plans-30-billion-offshore-wind-island-that-could-power-10-million-homes-idUSKBN1YE1G6>

⁴⁴Ibid.

⁴⁵ State of Green. "During COP25, Denmark passes Climate Act with a 70 per cent reduction target," 9 December, 2019, accessed March 5, 2019. <https://stateofgreen.com/en/partners/state-of-green/news/during-cop25-denmark-passes-climate-act-with-a-70-per-cent-reduction-target/>

(UNCLOS) and the 2008 Illulissat Declaration, an agreement with five coastal states of the Arctic Ocean undertook to foster cooperation in developing the region under international law.⁴⁶

Other Initiatives:

Aside from legal and financial commitments, Denmark is embracing a number of strategic initiatives, indicating the country is implementing a whole of government approach to climate change and interests in the Arctic. The Danish Foreign Ministry office has established its Office for the Arctic and North America and in 2012 gave its senior Arctic official the title of ‘Arctic Ambassador.’⁴⁷ In a bold move in 2014, Denmark submitted data to the UN Commission on the Limits of the Continental Shelf (CLCS) claiming a territory of 895,000 square kilometers of seabed in the Arctic Ocean. This equates to approximately 19 times the present area of Denmark and nearly half of Greenland. The claim also includes the North Pole and has significant overlaps with Russia’s claims.⁴⁸ In its Strategy for the Arctic 2011-2020, the Danish government announces the country’s “strategic realm,”⁴⁹ consisting of the nation of Denmark, the Faroe Islands, and Greenland.

National Security Policies:

Denmark has embraced a multi-faceted and ambitious agenda with respect to climate change as a whole. While many of its initiatives are focused on holistic societal efforts, its stated

⁴⁶ Ministry of Foreign Affairs of Denmark, “Denmark, Greenland, and the Faroe Islands: Kingdom of Denmark Strategy for the Arctic 2011-2020,” August 2011, accessed 22 March, 2020, <http://library.arcticportal.org/1890/1/DENMARK.pdf>, 13.

⁴⁷ Marc Jacobson, “Denmark’s strategic interests in the Arctic: It’s the Greenlandic connection, stupid!,” The Arctic Institute Center for Circumpolar Security Studies, (May 4, 2016). Accessed 6 August, 2018. <https://www.thearcticinstitute.org/denmark-interests-arctic-greenland-connection/>

⁴⁸ Prime Minister’s Office, Denmark. Statement by H.E. Lars Lokke Rasmussen, Prime Minister of Denmark, at the United Nations Private Sector Forum. Accessed 2 March, 2020. http://www.stm.dk/p_13250.html

⁴⁹ Ministry of Foreign Affairs of Denmark, “The Arctic,” accessed 22 March, 2020, <https://um.dk/en/foreign-policy/the-arctic>.

policies regarding the Arctic are geared towards national security interests. Denmark is member of the Nordic Defense Cooperation (NORDEFECO) and played an integral role in the 2015-2018 NORDEFECO Action Plan, which discusses joint training and military exercises amongst Nordic partner states, to include Arctic exercises.⁵⁰ Unlike the Arctic Council, which focuses on diplomatic cooperation and joint scientific research in the Arctic, NORDEFECO is a political and military alliance, consisting of Denmark, Finland, Iceland, Norway, and Sweden.⁵¹ Denmark also holds membership in the Nordic Atlantic Cooperation (NORA), consisting of the Faroe Islands, Greenland, Iceland and Norway.⁵² NORA's role is aimed at fostering political agreements more so than national defense interests but is included as an important facet of Denmark's holistic Arctic Strategy (2011-2018), published by its Ministry of Foreign Affairs.⁵³ As part of its international cooperation initiatives in the Arctic, Denmark ratified UNCLOS in 2004, but it was not until 2008 that there was an observed increase in security policy initiatives, as irrefutable evidence of a warming Arctic was gaining momentum.⁵⁴ In addition to being signatory to UNCLOS, the Illussat Declaration serves as agreement between Arctic states to resolve conflicts through dialogue and negotiations within the framework of international law.⁵⁵ The Danish

⁵⁰ NORDEFECO (Nordic Defense Cooperation). "The NORDEF MCC Action Plan 2015-2018," (December 12, 2014): 3-8. https://www.nordefco.org/files/141211_NORDEF%20MCC%20AP2015-18_final.pdf

⁵¹ Danish Ministry of Defence. "Nordic Defense Cooperation (NORDEFECO)," accessed 22 March, 2020. <https://fnn.dk/eng/allabout/Pages/nordic-defence-cooperation-nordefco.aspx>

⁵² Ministry of Foreign Affairs of Denmark, "Denmark, Greenland, and the Faroe Islands: Kingdom of Denmark Strategy for the Arctic 2011-2018," (August, 2011), accessed 22 March, 2020. <http://library.arcticportal.org/1890/1/DENMARK.pdf>, 13

⁵³ Ibid, 53.

⁵⁴ Ibid. 13

⁵⁵ Ibid.

Defense Agreement (2010-2014) involves a stronger focus on the tasks of the Danish Armed Forces in the Arctic.⁵⁶

The Kingdom's Arctic strategy calls for the formation of a joint-service Arctic Command and the establishment of an Arctic response force to improve defense readiness and response capability in the region.⁵⁷ Another strategic priority set forth in the strategy is a comprehensive analysis of the armed forces future tasks in the Arctic, which includes an assessment on Thule Air Base potentially playing a larger role in regard to defense in Greenland by the Danish Armed Forces in cooperation with other partner countries.⁵⁸ An objective aimed at fostering stronger ties with Greenland's native population is the recruitment and training of Greenland citizens by Danish defense forces.⁵⁹ Given the data presented, Denmark's national security policy is adapting to the effects of climate change, integrating this concern into its national security formulation, particularly as it pertains to the Arctic.

Saudi Arabia

Saudi Arabia plays a significant role on the international stage. Its energy, economic, and security policies can impact Middle Eastern regional stability, and have macroeconomic and international security effects, due to its role as one of the leading global exporters of oil. While Saudi Arabia's oil industry has contributed to the state's vast amount of wealth, it has also resulted in its national economy being largely dependent on a fossil fuel resource. The world's demand for oil and consumption of fossil fuels is a leading contributor to human induced climate

⁵⁶ Ibid, 20.

⁵⁷ Ibid.

⁵⁸ Ibid.

⁵⁹ Ibid, 21.

change. The demand for oil however, is the leading driver of Saudi Arabia's rich economy. Despite the wealth accumulated through its oil exportation, Saudi Arabia now faces serious economic and social stability problems due to its reliance on oil as a means of geopolitical power and economic growth, as well as the climatological problems it now faces.

Saudi Climate Trends

Due to its geographical location and climatological conditions, Saudi Arabia is an oil rich, but water poor state. Water scarcity presents threats and challenges to the Kingdom's agricultural industry and overall threats to social stability in terms of ensuring its citizens have clean water and electricity. Water scarcity is increasing due to the effects of climate change. IPCC projections from the mid 2000's predicted a decrease in annual rainfall in the Arabian Peninsula and an increase in the frequency and intensity of extreme events and in recent years, the Peninsula has experienced an increase in warm spells, droughts, flash floods and storm surges.⁶⁰ Increases in temperature, decreases in precipitation, or changes in their variability may adversely affect climactic conditions in the state. Changing conditions may have serious consequences in the area of water supply for agricultural, domestic, and municipal use.⁶¹ Wealth from oil production does not equate to social stability for the Kingdom. Saudi Arabia is impacted more than most countries in the world from recent negative climactic factors, mainly very high temperatures and very low precipitation.⁶² In terms of water supply, it is one of the driest and poorest countries in the world and is surrounded by countries already confronted by water supply

⁶⁰ Mansour Almazroui. "Simulation of present and future climate of Saudi Arabia using a regional climate model (PRECIS)." *International Journal of Climatology*. Vol. 33. May, 2013. 2247.

⁶¹ Fahad M. Alkolibi. "Possible Effects of Global Warming on Agriculture and Water Resources in Saudi Arabia: Impacts and Responses." *Climatic Change*. 54. (2002): 225. <https://doi.org/10.1023/A:1015777403153>

⁶² *Ibid.* 239-240.

problems.⁶³ These issues are compounded by the fact that Saudi Arabia has one of the highest population growth rates in the world, with an average annual population growth increase of 7.2 percent.⁶⁴ This will only increase the demand for both water and basic utilities in the state. With population growth, water demand can only be expected to increase as the temperature increases.⁶⁵ Along with its water scarcity dilemma, which could affect internal stability, Saudi Arabia faces potential energy and economic problems due to international attitudes on climate change, as many countries are seeking ways to be less dependent on fossil fuels and operate under renewable energy resources, thus presenting potential economic blows to Saudi Arabia's revenue from oil. This study will examine the measures Saudi Arabia is undertaking in the wake of climate change's impact to water supply and the potential internal and regional security implications water scarcity presents for the Kingdom. It will also examine the degree to which Saudi Arabia is adjusting to oil consuming countries seeking alternative energy resources as a means to combat the negative effects of climate change.

Saudi Arabia Policy

Statements:

Despite climate change causing economic and stability concerns for Saudi Arabia, the state has gained a reputation internationally as being opposed to initiatives aimed at reducing harmful energy use practices. Some scholars are labeling Saudi Arabia as the ultimate obstructionist when it comes to developing solutions to the global climate problem, due to the state's fears over the potential negative impacts of climate change mitigation policies on its

⁶³ Ibid.

⁶⁴ Ibid.

⁶⁵ Faisal Macci Al Zawad, "Impacts of Climate Change on Water Resources in Saudi Arabia." The 3rd International Conference on Water Resources and Arid Environments and 1st Arab Water Forum (2008), 6

economy.⁶⁶ As the second highest exporter of oil globally, Saudi Arabia holds influence over the entire OPEC community. It can thus be assumed that official OPEC statements are not formed without the input or direct guidance of Saudi Arabia. OPEC has claimed that climate mitigation policies and measures that target oil consumption will slow growth in their revenues from oil exports. They have argued that reducing emissions through carbon taxes (or equivalent measures) in developed countries will reduce global demand for oil and thus the global price of oil.⁶⁷ In 2004, the Kingdom reluctantly announced it would accede to the Kyoto Protocol, aimed at stemming climate change. Upon this announcement however, Saudi Arabia's Minister of Petroleum and Mineral Resources added that he predicted by 2010, Saudi Arabia would "lose at least 19 billion dollars as a result of the policies industrialized nations would adopt to reduce their greenhouse gas emissions."⁶⁸ Saudi Arabia's government also seeks to appear as a supporter of developing nations, claiming that the largest contributors to climate change (developed, industrialized nations), are doing little to reduce the threat, yet imposing burdensome requirements on still developing countries.⁶⁹

Investments:

Despite the threats that climate change mitigation poses to the Saudi economy and thus its national interest, the state does acknowledge it faces its own environmental problems that must be dealt with. The Kingdom has invested in dam/reservoir systems with the intent to store

⁶⁶ Joanna Depledge. "Striving for No: Saudi Arabia in the Climate Change Regime." *Global Environmental Politics*, Vol. 8, No. 4 (2008), 9

⁶⁷ Jon Barnett, "The Worst of Friends: OPEC and G-77 in the Climate Regime," *Global Environmental Politics*. Vol. 8, No. 4 (November, 2008): 2-3.

⁶⁸ Reuters, "Saudi Government Approves Kyoto Climate Protocol," 21 December, 2004, accessed 20 March, 2020. <https://fp.brecorder.com/2004/12/2004122190728/>

⁶⁹ Joanna Depledge, "Striving for No: Saudi Arabia in the Climate Change Regime," *Global Environmental Politics*, Vol. 8, No. 4 MIT Press. (2008): 17-18.

water and reuse waters in an energy efficient manner.⁷⁰ Realizing that such a large portion of the country's water use was due to inefficient agricultural practices, Saudi Arabia also adopted a food supply exchange program in 2011. The program calls for the Saudi Agricultural and Livestock Investment Company (SALIC) to work with the Canadian Wheat Board, ensuring a portion of its grains will go to Saudi Arabia. Twelve additional arrangements have been implemented to outsource food production to developing countries to both aid in their economic development and reduce demand for water in Saudi Arabia's agricultural sector.⁷¹

The major socioeconomic strategy driving Saudi Arabia's whole of government approach to energy and economic issues is the government's *Vision 2030*. This initiative presents the Kingdom's plans to diversify its economy to become less reliant on oil exports.⁷² While it includes measures that could contribute to decelerating harmful energy production practices, these efforts are not directly tied to concerns about climate change. Rather, investments into renewable energy projects stem from concerns about the oil market and encouraging foreign investment into a Saudi solar sector. The drop in oil prices in recent years dealt a significant blow to Saudi Arabia's public finances, due to oil still accounting for roughly 90 percent of the kingdom's export revenue.⁷³ Furthermore, the Saudi government is seeking means of preserving its oil due to increased domestic consumption, and thus is not developing renewable energy with

⁷⁰ O Lopez. Et al. "Water management during climate change using aquifer storage and recovery of stormwater in a dunefield in western Saud Arabia." *Environ. Res. Ltt.* 9, N. 7 (2014)

⁷¹ Erica DeNicola, Omar S. Aburzaiza, et. al. "Climate Change and Water Scarcity: The Case of Saudi Arabia." *Annals of Global Health*. Vol. 81, No.3, 2015. 346-47. <http://dx.doi.org/10.1016/j.aogh.2015.08.005>

⁷² Kingdom of Saudi Arabia, "Vision 2030," accessed 20 March, 2020. <https://vision2030.gov.sa/en>

⁷³ Adel Abdel Ghafar, "Report: A New Kingdom of Saud?" Brookings Institute, 14 February, 2018, accessed 20 March, 2020. <https://www.brookings.edu/research/a-new-kingdom-of-saud/>

the intent of decreasing its own oil consumption.⁷⁴ Interest in solar power started with the 2010 establishment of the King Abdullah City for Atomic and Renewable Energy (K.A.C.A.R.E.). It currently sets an initial target of producing 9.5 gigawatts (GW) of power from renewable energy under the “King Salman Renewable Energy Initiative.”⁷⁵ *Vision 2030* sets wide-ranging, ambitious socioeconomic goals. Analysts are skeptical of the Kingdom’s ability to achieve them due to the hurdles it faces restructuring its government and implementing socioeconomic reform. After decades of a rigid societal structure that did not require a large domestic workforce or a population with the education and skillsets needed to implement alternative energy industries, the country will be hard-pressed to recruit and train a robust domestic work force and still achieve the goals it sets forth, without relying on foreign labor. Utilizing foreign labor however, would detract from the government’s promises of social and economic reform aimed at improving the lives of Saudi citizens.⁷⁶

Legislation:

Saudi Arabia has revised its general environmental laws and the rules for their implementation to be consistent with Article 32 of the nation’s constitution. The revisions state:

“The State shall endeavor to preserve, protect and improve the environment and prevent its pollution; Protect public health from activities and acts that harm the environment; Conserve and develop natural resources; Include environmental planning as an integral part of overall development planning in all industrial, agricultural, architectural and other areas; Raise awareness of environmental issues and strengthen individual and collective feelings regarding the sole and collective responsibility for preserving and improving the environment and encouraging national voluntary efforts; Address various types of environmental violations and

⁷⁴ Makio Yamada, “Vision 2030 and the Birth of Saudi Solar Energy”. *Middle East Institute Policy Focus*. July 2016, accessed 20 March, 2020. https://www.mei.edu/sites/default/files/publications/PF15_Yamada_Saudisolar_web.pdf, 2.

⁷⁵ Ibid. 2

⁷⁶ Ghafar. “Report: A New Kingdom of Saud?”

appropriate penalties for protecting the human health from pollution both at present and in the future."⁷⁷

These are broad and relatively difficult goals to measure at present. However, there are some concrete actions indicating a changing attitude towards climate change, while they are not written in legislation.

Other Initiatives:

In 2007, Saudi Arabia hosted the Third OPEC Summit, in which environmental concerns were featured as one of the primary topical areas to be discussed. Despite Saudi Arabia's obstructionist tendencies to climate change reform, the consensus following the Summit displayed a clear acceptance of human induced climate change, and the responsibility of OPEC countries to address the problem.⁷⁸ Saudi Arabia has since promoted an energy-related income generation method known as Carbon Capture and Storage (CCS).⁷⁹ Many regional oil producers have since promoted CCS as part of the post-Kyoto agreement.⁸⁰ This water conservation method has broader applications, demonstrating that Saudi Arabia and other OPEC nations are taking measures to contribute climate change's challenges. Another technology of interest to the Saudis involves the use of natural slopes to transport water via pipes to storage, versus the use of pumps.⁸¹

⁷⁷ Khalid Alkhathlan, Muhammad Javid. "Energy consumption, carbon emissions and economic growth in Saudi Arabia: An aggregate and disaggregate analysis." *Energy Policy*. Vo. 62 (2013),1526.

⁷⁸ Depledge, 30

⁷⁹ Dennis Kumetat, "Climate Change in the Persian Gulf-regional security, sustainability strategies and research needs." CEIDIR's Review. November 9, 2009, accessed 20 March, 2020.
<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.624.5582&rep=rep1&type=pdf>, 10

⁸⁰ Ibid.

⁸¹ O Lopez. Et al. "Water management during climate change," 5

National Security Policies:

This research indicates there is a limited amount of publicly available literature on Saudi Arabian national security strategy. While there is significant literature on the issues of water scarcity and climate change's impact to Saudi Arabia, there is no specific linkage between climate change and Saudi national security policy in the literature reviewed. In regard to comprehensive climate change policies, Saudi has traditionally been far less invested than Denmark, leading an obstructionism bloc and cultivating resistance in the G7.⁸² Saudi policy began to shift somewhat in the early 2000s, as climate change concerns became increasingly severe.⁸³ Even with that recognition of human responsibility, however, Saudi remained a roadblock during the 2009 Copenhagen conference, and continue to block advances during COP 24 in 2018, in particular with the adoption of a UN IPCC report on environmental concerns.⁸⁴ Saudi Arabia continues to lead GCC countries in slowing down action on de-carbonization.⁸⁵ Unlike some Western democracies, which have integrated climate change into their national security discussion,⁸⁶ Saudi Arabia seems to view its economic industrial base as a key component to its national security, so there will likely be resistance from the state's security officials in enacting any policies that could threaten its lucrative oil industry. Its recent reforms and plans to invest in renewable energy however, if successful, may contribute to climate change

⁸² Depledge, "Striving for No."

⁸³ Ibid.

⁸⁴ Dimitrov, R. S. 2010. "Inside Copenhagen: the State of Climate Governance." *Global Environmental Politics* 10 (2); Dryzek, J. S., and H. Stevenson. 2011. "Global Democracy and Earth System Governance." *Ecological Economics*, 70

⁸⁵ Mohammad Al-Saidi, Esmat Zaidan & Suzanne Hammad (2019) Participation modes and diplomacy of Gulf Cooperation Council (GCC) countries towards the global sustainability agenda, *Development in Practice*, 29:5. 554

⁸⁶ Dennis Kumetat, "Climate Change in the Persian Gulf-regional security, sustainability strategies and research needs." *CEIDIR's Review*. November 9, 2009, 1

mitigation.⁸⁷ *Vision 2030* indicates clear intent of investment into a renewable energy industry. Technologies in water preservation have helped slow the water scarcity dilemma, and announcements concerning environmental concerns demonstrate a degree of political will in combating climate change in Saudi Arabia. However, these measures are contradicted at times by senior Saudi government officials, in their attempts to obstruct international green initiatives, particularly if they negatively impact the kingdom's oil revenue. Despite some public messaging on the significance of diversifying their economy to reduce reliance on fossil fuels, Saudi remains focused on hard power funded by oil, their traditional economic industrial base.

United States

The challenges presented by climate change to the United States are multi-faceted. Many countries are threatened by one specific type of climate problem such as desertification or flooding, but due to its geography, the U.S. faces a diverse range of disasters. Floods, drought and wildfires, and hurricanes can all hit the US within a given year. The effects of these types of events extend beyond the physical damage and harm to U.S. communities and into the sphere of national defense. Military installations across the U.S. are threatened by the damaging effects of storms, which have increased in both severity and frequency over the past decade. Threats to critical defense assets and infrastructure impact not only defense readiness, but the ability to project power during a particularly volatile era in global security.

US Climate Trends

Floods are the United States' most costly and destructive natural disaster.⁸⁸ Given this,

⁸⁷ Gengler, J., and L. A. Lambert. 2016, "Renegotiating the Ruling Bargain: Selling Fiscal Reform in the GCC, *The Middle East Journal* 70 (2). 321–329.

⁸⁸ Kenneth D. Frederick and Peter H. Gleick, *Water and Global Climate Change: Potential Impacts on US Water Resources* (Arlington, VA: Pew Center on Global Climate Change, 27 September 1999), 23

serious risk is imposed in ignoring the observed trend of continuously rising sea levels. Scientists estimate that a one-meter rise in sea level would inundate 35,000 square kilometers (km²) of US land, and a 0.5 meter rise would inundate 18,000 km².⁸⁹ Coastal areas, particularly in the mid and south Atlantic states would be the most vulnerable. States on the western coast would be at lesser risk, although the San Francisco Bay area and the Puget Sound region would be exceptions. Many major US cities would be severely affected, to include New York and Washington, DC.⁹⁰ Studies indicate the cumulative costs in defensive and emergency response measures of a one-meter rise in sea level by 2100 would be between \$20 and \$150 billion.⁹¹ Rising sea levels would inundate several major, irreplaceable Department of Defense (DoD) facilities.⁹² While floods have been traditional threats to societies historically, increased global temperatures will increase their intensity and frequency.⁹³

On the opposite end of the spectrum, wildfires and drought pose significant risks to western US states. 2017 and 2018 were record-breaking wildfire years in California. 2018 holds the record for the most destructive wildfire, the largest wildfire, and the costliest wildfire season in California state history.⁹⁴ Although fires and drought present the opposite threat of floods,

⁸⁹ James E. Neumann, Gary Yohe, and Robert Nicholls, *Sea-Level Rise and Global Climate Change: A Review of Impacts to U.S. Coasts* (Arlington, VA: Pew Center on Global Climate Change, February 2000), iv.

⁹⁰ Ibid. 8-13.

⁹¹ Ibid. 22-30.

⁹² CNA Corporation, *National Security and the Threat of Climate Change*, 2007, accessed 20 March, 2020, https://www.cna.org/CNA_files/pdf/National%20Security%20and%20the%20Threat%20of%20Climate%20Change.pdf, 37.

⁹³ John T. Ackerman, "Climate Change, National Security, and the Quadrennial Defense Review: Avoiding the Perfect Storm." *Strategic Studies Quarterly*. Vol. 2, 1. (Spring 2008): 62-63.

⁹⁴ Stephanie C. Herring, N. Christidis, A. Hoell, M. P. Hoerling, and P. A. Stott, Eds., 2020: "Explaining Extreme Events of 2018 from a Climate Perspective," *Bulletin of the American Meteorological Society*, Vol. 101 (1), 1-4 <https://journals.ametsoc.org/doi/pdf/10.1175/BAMS-ExplainingExtremeEvents2018.1>

these effects of climate change are interconnected. As temperatures and drought increased during California's dry seasons leading up to 2017, the 2017-18 wet seasons also saw increased precipitation, producing more vegetation, which served as an increased source of fuel for follow on wildfires during the dry season.⁹⁵

According to a 2019 DoD report, more than two-thirds of the military's operationally critical installations are threatened by climate change.⁹⁶ While the report did not assess all of its hundreds of installations, the Pentagon selected 79 bases that are considered mission essential based on their operational role. Of those, DoD reported that 53 of the 79 are threatened by flooding while 43 of the 79 face threats from drought and 36 face threats from wildfires.⁹⁷ Tyndall Air Force Base in Florida suffered extensive damage due to Hurricane Michael in 2018, with the storm damaging nearly every building on the base.⁹⁸ In addition to threatening defense operational capabilities, damage to military installations carries an economic toll. After Offutt Air Force Base suffered severe flood damage in 2019, the Air Force estimated \$420 million would be required to repair and rebuild facilities.⁹⁹ The base's runway, which houses aircraft for the military's strategic deterrence mission, still operates at a limited capacity.

U.S. Policy

Statements:

⁹⁵ Ibid.

⁹⁶ Tarra Copp, "Climate change threatens a majority of mission-critical military bases, Pentagon says." *Military Times*, January 18, 2019, <https://www.militarytimes.com/news/your-military/2019/01/18/dod-majority-of-mission-critical-bases-face-climate-change-threats/>

⁹⁷ Ibid.

⁹⁸ Ibid.

⁹⁹ The Associated Press. "Cost to rebuild after the flood now estimated at \$420 million." *Air Force Times*. May 2, 2019. <https://www.airforcetimes.com/news/your-air-force/2019/05/02/air-force-increases-estimate-to-repair-and-rebuild-offutt-to-420-million/>

Each U.S. president from the onset of this research period has voiced positions on climate issues. Bill Clinton addressed the issue in his 2000 State of the Union, then known as Global Warming, announcing a significant budget increase to 2.4 billion dollars for global climate change concerns.¹⁰⁰ George Bush gave a speech in the Rose Garden explaining his stance towards the dangerous precedents of the Kyoto Protocol. While still advancing the idea of climate concerns as important, he emphasized the need to balance environmental goals with economic ones.¹⁰¹ In a speech to Georgetown University students in 2013, Barak Obama described his efforts to have the EPA develop standards for carbon emissions, though he warned the audience to understand that a change from fossil fuels would have to come gradually, so as not to disrupt the economy.¹⁰² On the global stage, at the signing of the Paris Climate Accords, President Obama reminded the audience of his commitment to the issue during his inaugural address, and described the agreement as the realization of those initial aspirations.¹⁰³ In contrast, the current Trump administration has been a vocal opponent of the Paris Climate Accords, and prompted the U.S. to withdraw from the agreement with a statement issued by Secretary of State Mike Pompeo.¹⁰⁴

¹⁰⁰ Amy Royden, U.S. Climate Change Policy Under President Clinton: A Look Back, 32 Golden Gate U. L. Rev. (2002). <http://digitalcommons.law.ggu.edu/ggulrev/vol32/iss4/3>, 465

¹⁰¹ The White House- President George W. Bush. "President Bush Discusses Climate Change." Rose Garden, Washington D.C., April 16, 2008. Accessed 20 March, 2020, <https://georgewbush-whitehouse.archives.gov/news/releases/2008/04/20080416-6.html>

¹⁰² The White House-President Barak Obama, "Remarks by the President on Climate Change," Georgetown University, Washington, D.C. June 25, 2013, accessed 20 March, 2020. <https://obamawhitehouse.archives.gov/the-press-office/2013/06/25/remarks-president-climate-change>

¹⁰³ President Barak Obama, "Full Text of President Obama's Speech on the Paris Climate Agreement." December 12, 2015. Paris, accessed 21 March, 2020, <https://abc7news.com/1120330/>

¹⁰⁴ Brady Dennis, "Trump makes it official: U.S. will withdraw from the Paris Climate Accords," *The Washington Post*, 4 November, 2019., accessed 20 March, 2020, <https://www.washingtonpost.com/climate-environment/2019/11/04/trump-makes-it-official-us-will-withdraw-paris-climate-agreement/>

Investments:

Starting in 2009, the DoD began to plan for significant changes in energy consumption by each of the military services. The Air Force sought an alternative petroleum blend for 50% of domestic aviation fuels, the Army sought out 500 non-tactical hybrid vehicles for domestic use, while the Navy ran a trial for the use of bio-fuel for the F/A-18 strike fighter.¹⁰⁵ There are similarly efforts at the lower level, with states joining together to adopting policies that support environmental initiatives, including the Regional Greenhouse Gas Initiative, with ten New England and Mid-Atlantic States adopted a self-imposed program aimed at reducing greenhouse gas.¹⁰⁶ In their study on North American business strategies, Jones and Levy argue that businesses in the United States are rewarded for relatively small gains in environmental issues due to the nature of current federal policies.¹⁰⁷

Legislation:

In the early 1990s, prior to the focus area of this research, the United States drove climate innovation, with a significant shift towards economic concerns when President George H.W. Bush refused to attend the United Nations Conference on Environment and Development in Rio de Janeiro if pressured to commit to greenhouse gas emission targets.¹⁰⁸ This trajectory continued under the Clinton Administration, when the United States Senate passed the Hagel-Byrd Resolution with 95 votes to zero, confirming that the Senate would not support treaties with

¹⁰⁵ Michael Brzoka, "Climate Change and the Military in China, Russia, the United Kingdom, and the United States," *Bulletin of Atomic Scientists*, Vol 68, Issue 2, 43-54, accessed 20 March, 2020, <https://journals.sagepub.com/doi/pdf/10.1177/0096340212438384>, 46

¹⁰⁶ The Regional Greenhouse Gas Initiative. 2020, accessed 21 March, 2020. <https://www.rggi.org>

¹⁰⁷ Charles A. Jones and David L. Levy, "North American Business Strategies towards Climate Change." *European Management Journal*, no. 6 (2007), 428-440, 429

¹⁰⁸ William L. Andreen, "Federal Climate Change Legislation and Preemption." *Environmental and Energy Policy Journal*, 3 (2008), 261

mandatory gas emissions for the US that might harm the economy.¹⁰⁹ With this background, it is unsurprising that when President George W. Bush was faced with the Kyoto Protocol in 2001, he was clear that the U.S. will not abide by the agreement to reduce carbon dioxide emissions.¹¹⁰ For its size and relative global power, the United States has very little legislation aimed at targeting climate change. The Clean Air Act, which the Trump Administration has actively undermined,¹¹¹ is the most representative, however the bulk of the remaining legislation is focused on energy efficiency and renewable energy, including the Energy Policy Act of 2005, the Energy, Independence and Security Act of 2007, and the Food, Conservation and Energy Act of 2008.¹¹² While a related concern, energy legislation alone has not been effective in comprehensively tackling an issue on the scale of global climate change.

Part of this challenge is highlighted by research on ideological views of renewable energy legislation, as partisan perspectives shape priorities. In their research on the relationship between political ideology and support for renewable energy initiatives, Hess et al demonstrated that the reception of environmental policy instruments was directly related to the domestic political leaning of each state.¹¹³ In the United States, despite significant scientific consensus over the

¹⁰⁹ Aaron M. McCright and Riley E. Dunlap, "Defeating Kyoto: the conservative movement's impact on US climate Change Policy." *Social Problems* 50, no. 3 (2003): 348-373, 349

¹¹⁰ McCright and Dunlap, 349

¹¹¹ Jeff Brady, "Trump Administration Escalates Battle Over Environmental Regulations With California." NPR, September 24, 2019. Accessed 22 March, 2020. <https://www.npr.org/2019/09/24/763876070/trump-administration-escalates-battle-over-environmental-regulations-with-califo>

¹¹² Michael Nachmay, et al. "The GLOBE climate legislation study: a review of climate change legislation in 66 countries," 4th ed. GLOBE International and Grantham Research Institute, LSE, London, UK, retried 20 March 2029 at http://eprints.lse.ac.uk/63656/1/_lse.ac.uk_storage_LIBRARY_Secondary_libfile_shared_repository_Content_Grantham_Globe%20climate%204ed_Globe%20climate%20legislation%204ed_2015.pdf

¹¹³ David J. Hess, Quand D. Mai, Kate Pride Brown, "Red states, green laws: Ideology and renewable energy legislation in the United States." *Energy Research and Social Science*, Vol 11, January 2016, pp. 19-28; 27

dangers that climate change presents, legislation on the issue remains tied to divisive, party-driven ideological frameworks.¹¹⁴

National Security Policy:

The National Security policy of the United States will be traced through the Quadrennial Defense Reviews (QDR) produced by the Pentagon and current National Defense Policy. In 2001, the QDR mentions the climate only once, referring for the potential of climate concerns to spurn future conflict.¹¹⁵ In 2006, the first QDR since the attacks of 9/11, the QDR makes no mention of climate concerns, instead focusing on the pressing challenge of confronting terrorism worldwide.¹¹⁶ By 2010, climate was a priority within the QDR, with a specific prong of reform titled “Crafting a Strategic Approach to Climate and Energy,”¹¹⁷ described as playing a crucial role in national security. The QDR of 2010 underscores the ways in which climate change will directly impact the DoD, including shaping the military’s operating environment,¹¹⁸ and the adjustments that DoD would have to prepare for in terms of facilities and military capabilities.¹¹⁹ In their review of the 2010 QDR, Parthemore and Rogers emphasize the shift in the 2010 QDR,

¹¹⁴ Osofsky, Hari M. "Climate change legislation in context." *Nw. L. Rev. Colloquy* 102 (2007): 245, 250

¹¹⁵ U.S. Department of Defense, September 2001, *Quadrennial Defense Review Report*. Prepared by the Department of Defense, accessed 20 March, 2020, 6
<https://history.defense.gov/Portals/70/Documents/quadrennial/QDR2001.pdf?ver=2014-06-25-110946-823>

¹¹⁶ U.S. Department of Defense, February 2006, *Quadrennial Defense Review Report*, prepared by U.S. Department of Defense. Accessed 20 March, 2020.
<https://history.defense.gov/Portals/70/Documents/quadrennial/QDR2006.pdf?ver=2014-06-25-111017-150>

¹¹⁷ U.S. Department of Defense, February 2010, *Quadrennial Defense Review Report*, prepared by the U.S. Department of Defense, accessed 20 March, 2020.
<https://history.defense.gov/Portals/70/Documents/quadrennial/QDR2010.pdf?ver=2014-08-24-144223-573>

¹¹⁸ QDR, 2010, 84

¹¹⁹ QDR, 2010, 85

and the recognition that energy security and climate change are associated security matters.¹²⁰ By 2014, the role of climate change was reduced in the QDR, discussing climate change as a challenge, but not listing it as a specific line of effort.¹²¹ It continues to emphasize the risk to DoD facilities, and brings the U.S. Arctic Strategy to the fore as both a security and climate issue.¹²² In 2018, the QDR transitioned into the National Defense Strategy, a classified document. The unclassified summary, made publically available, makes no mention of environmental concerns, but instead focuses on lethality and flexibility to deal with emerging threats- the kinds of issues that are more in line with traditional thinking about military power and national security.¹²³ In addition, at the Executive branch level, the National Security Strategy of the U.S. released from the White House in 2017, makes no mention of climate change, nor does it mention renewable energy in any of its discussion on energy. The document does state that, “the United States will remain a global leader in reducing traditional pollution, as well as greenhouse gases, while expanding our economy.”¹²⁴ The document goes on to state that energy efficiency gains will not come from “onerous regulations,”¹²⁵ thus demonstrating a similar contradictory stance to Saudi Arabia, in acknowledging the issue, but in a limited capacity so as not to disrupt the economic/industrial base which profits from status-quo energy policy. For the

¹²⁰ Christine Parthemore and Will Rogers, “Promoting the Dialogue: Climate Change and the Quadrennial Defense Review.” *Center for a New American Security*. January 2010.,10

¹²¹ U.S. Department of Defense, 2014, *Quadrennial Defense Review*, prepared by the U.S. Department of Defense, accessed 20 March, 2020, 8, <https://history.defense.gov/Portals/70/Documents/quadrennial/QDR2014.pdf?ver=2014-08-24-144246-293>

¹²² QDR, 2014, 25

¹²³ U.S. Department of Defense, 2018, *National Defense Strategy of the United States of America*, accessed 20 March, 2020. <https://dod.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf>

¹²⁴ President of the United States. December 2017, *National Security Strategy of the United States of America*, , accessed 23 March, 2020, <https://www.whitehouse.gov/wp-content/uploads/2017/12/NSS-Final-12-18-2017-0905.pdf>

¹²⁵ *Ibid.* 22

United States, the issue of climate change remains a point of political polarization. Though the defense and scientific communities have articulated the threat, policy is dependent on the political party in power.

Conclusion

Though climate change is an ever-pressing challenge, it has not yet been universally adopted as a national security concern, in the way that the classical Realist international relations paradigm would categorize such a threat. In Denmark, despite the clear challenges in the Arctic, the public focus of climate change initiatives are underpinned with a collective societal responsibility rather than shaping an articulated security policy. This public narrative could shift in the coming years, as governmental response clearly recognizes the potential for conflict due to a warming Arctic. In Saudi Arabia, while the science has been acknowledged, short-term economic calculus sees threats to oil revenue as more significant than threats posed by climate change. Initiatives to tackle climate change are limited, as the Saudi oil-based economy is the source of Saudi political power and stability. Therefore, despite the environmental threat, the greater problem from a Saudi leadership perspective is the undermining of their oil-based economy due to global action to mitigate climate change. This viewpoint could be altered with the emergence of Prince Mohammed bin Salman, but the fluid status of the political climate in Saudi Arabia renders a conclusive assessment unachievable in the near term. In the United States, the issue of climate change has been articulated by both the scientific and defense research communities. Action or policy towards addressing it, however, has been stalled by domestic political agendas and varying opinions brought forth by different presidential administrations.

In traditional Realist thinking, climate change is not a true national security threat. The contention is that when all issues become security issues (such as food, water, or cyber security), it creates a “securitization” of social problems that do not truly merit that categorization.¹²⁶ This classical Realist approach, however, fails to acknowledge that hard power alone, will not overcome the challenges of climate change. To remain relevant in the 21st century, Realism must grow to incorporate unconventional threats to traditional power, which still prove to be existential. As Porter states, “The term, ‘national security’ has never had a precise definition, even during the Cold War.”¹²⁷ Similarly, according to classical Realists such as Hobbes, security claims about what constitutes threats are complex and ultimately based off opinions rather than established truths and are thus subject to debate and disagreement.¹²⁸ Hobbes views it as acceptable for security judgments and practices to emerge through democratic discussion, with the caveat that the assembly’s choice be taken as absolute.¹²⁹ This echoes the flexibility Morgenthau advocates in ascertaining what defines national security and how the definition must adapt to the times and geopolitical situation, requiring states to sometimes act in concert for their collective good, even if the overall system is one of anarchy.¹³⁰ Thus, from the time of Hobbes to modern day security strategists within Realism, it is ultimately inaccurate to point to traditional Realist thought as a means of downplaying threats other than hard power, so as to prevent them from being included in the national security field. If the outlooks from the scientific and defense

¹²⁶ Kim R. Holmes. “What is National Security?” *The Heritage Foundation*. October 7, 2014. <https://www.heritage.org/military-strength-topical-essays/2015-essays/what-national-security>

¹²⁷ Porter. “Environmental Security as a National Security Issue.” 218.

¹²⁸ Aziz Rana. “Who Decides on Security?” *Cornell Law Faculty Publications*. Paper 1070. (2012). 1431. <http://scholarship.law.cornell.edu/facpub/1070>.

¹²⁹ Ibid.

¹³⁰ Jonathan Symons. “Realist climate ethics: Promoting climate ambition within the Classical Realist tradition.” 140-160.

communities are accurate with respect to climate change, scholars of the modern Realist framework ought to achieve consensus as to how they will incorporate climate change into their national security analysis, if they are to maintain relevancy in international relations theory.

Bibliography

- Ackerman, John T. "Climate Change, National Security, and the Quadrennial Defense Review: Avoiding the Perfect Storm." *Strategic Studies Quarterly*. Vol. 2, 1. (Spring 2008): 56-96.
- Adel Abdel Ghafar. "Report: A New Kingdom of Saud?" *Brookings Institute*. 14 February, 2018. Accessed 20 March, 2020. <https://www.brookings.edu/research/a-new-kingdom-of-saud/>
- Alkolibi, Fahad M. "Possible Effects of Global Warming on Agriculture and Water Resources in Saudi Arabia: Impacts and Responses." *Climatic Change*. 54. (2002): 225. <https://doi.org/10.1023/A:1015777403153>
- Almazroui, Mansour. "Simulation of present and future climate of Saudi Arabia using a regional climate model (PRECIS)." *International Journal of Climatology*. Vol. 33. May, 2013. 2247.
- Al-Saidi, Mohammed, Esmat Zaidan & Suzanne Hammad (2019) Participation modes and diplomacy of Gulf Cooperation Council (GCC) countries towards the global sustainability agenda, *Development in Practice*, 29:5. 554
- Al Zawad, Faisal Macci. "Impacts of Climate Change on Water Resources in Saudi Arabia." *The 3rd International Conference on Water Resources and Arid Environments and 1st Arab Water Forum*. (2008)
- Arctic Council. "Arctic Council at COP23: Climate Change in the Arctic and its Global Impacts." October 20, 2017. Accessed November 29, 2017. www.arctic-council.org.
- Andreen, William L. "Federal Climate Change Legislation and Preemption." *Environmental and Energy Policy Journal*, 3 (2008) 261-304.
- Arctic Council, "The Arctic Council: A backgrounder," 9 September 2017, Accessed 20 March, 2020. <http://hdl.handle.net/11374/2076>
- Associated Press. "Cost to rebuild after the flood now estimated at \$420 million." *Air Force Times*. May 2, 2019. <https://www.airforcetimes.com/news/your-air-force/2019/05/02/air-force-increases-estimate-to-repair-and-rebuild-offutt-to-420-million/>
- Barnett, Jon. "The Worst of Friends: OPEC and G-77 in the Climate Regime." *Global Environmental Politics*. Vol. 8, No. 4 (November, 2008).
- Bayard Rogers. 2019. "Rebranding Climate Change: From a Realist Perspective." *The International Journal of Climate Change: Impacts and Responses* 11 (4): 33-44. doi:10.18848/1835-7156/CGP/v11i04/33-44.
- Boersma, Tim and Kevin Foley. "The Greenland Gold Rush: Promise and Pitfalls of Greenland's Energy and Mineral Resources." *Energy Security Initiative at Brookings; John L.*

- Thornton China Center at Brookings*. September, 2014. 45-47. Accessed March 4, 2020. <https://www.brookings.edu/research/the-greenland-gold-rush-promise-and-pitfalls-of-greenlands-energy-and-mineral-resources/>
- Brady, Jeff. “Trump Administration Escalates Battle Over Environmental Regulations With California.” NPR, September 24, 2019. Accessed 22 March, 2020. <https://www.npr.org/2019/09/24/763876070/trump-administration-escalates-battle-over-environmental-regulations-with-califo>
- Brzoka, Michael. “Climate Change and the Military in China, Russia, the United Kingdom, and the United States,” *Bulletin of Atomic Scientists*, Vol 68, Issue 2, 43-54, accessed 20 March, 2020, <https://journals.sagepub.com/doi/pdf/10.1177/0096340212438384>
- Chalecki, Elizabeth L. “He Who Would Rule: Climate Change in the Arctic and its Implications for U.S. National Security.” *Journal of Public and International Affairs* (Princeton University). March 2007, Woodrow Wilson School of Public and International Affairs. Accessed 22 March, 2020. <https://jpia.princeton.edu/sites/jpia/files/2007-10.pdf>
- Citino, Robert M. “Military Histories Old and New: A Reintroduction,” *American Historical Review*, 112, No. 4, 1090, doi: 10.1086/ahr.112.4.1070.
- CNA Corporation, *National Security and the Threat of Climate Change*, 2007, accessed 20 March, 2020, https://www.cna.org/CNA_files/pdf/National%20Security%20and%20the%20Threat%20of%20Climate%20Change.pdf, 1-63.
- Copp, Tarra. “Climate change threatens a majority of mission-critical military bases, Pentagon says.” *Military Times*. January 18, 2019. <https://www.militarytimes.com/news/your-military/2019/01/18/dod-majority-of-mission-critical-bases-face-climate-change-threats/>
- Coupled Model Intercomparison Project (CMIP5), World Climate Research Programme, 2008, <https://www.wcrp-climate.org/wgcm-cmip/wgcm-cmip5>
Accessed 22 March, 2020.
- Harvey, Chelsea. “What Could Warming Mean for Pathogens like the Coronavirus?” *Scientific American*. 9 March, 2020. Accessed 20 March, 2020. <https://www.scientificamerican.com/article/what-could-warming-mean-for-pathogens-like-coronavirus/>
- Herring, S. C., N. Christidis, A. Hoell, M. P. Hoerling, and P. A. Stott, Eds., 2020: “Explaining Extreme Events of 2018 from a Climate Perspective”. *Bulletin of the American Meteorological Society*, Vol. 101 (1), 1–128, <https://journals.ametsoc.org/doi/pdf/10.1175/BAMS-ExplainingExtremeEvents2018.1>
- Danish Energy Agency. “Denmark’s Energy and Climate Outlook 2019.” October 2019, Accessed 22 March, 2020, <https://ens.dk/sites/ens.dk/files/Analyser/deco19.pdf>

- Danish Ministry of Defence. "Nordic Defense Cooperation (NORDEFECO)." Accessed 22 March, 2020. <https://fmn.dk/eng/allabout/Pages/nordic-defence-cooperation-nordefco.aspx>
- Dennis, Brady. "Trump makes it official: U.S. will withdraw from the Paris Climate Accords." *The Washington Post*, 4 November, 2019. Accessed 20 March, 2020, <https://www.washingtonpost.com/climate-environment/2019/11/04/trump-makes-it-official-us-will-withdraw-paris-climate-agreement/>
- DeNicola, Erica, Omar S. Aburzaiza, et. al. "Climate Change and Water Scarcity: The Case of Saudi Arabia." *Annals of Global Health*. Vol. 81, No.3, 2015. 346-47. <http://dx.doi.org/10.1016/j.aogh.2015.08.005>
- Depledge, Joanna. "Striving for No: Saudi Arabia in the Climate Change Regime." *Global Environmental Politics*, Vol. 8, No. 4 (2008).
- Dimitrov, R. S. 2010. "Inside Copenhagen: the State of Climate Governance." *Global Environmental Politics* 10 (2); Dryzek, J. S., and H. Stevenson. 2011. "Global Democracy and Earth System Governance." *Ecological Economics*
- Drake, Brian Allen. *The Blue, The Gray, and the Green: Toward an Environmental History of the Civil War*. (Athens University Press, 2015)
- Frederick, Kenneth D. and Peter H. Gleick, *Water and Global Climate Change: Potential Impacts on US Water Resources* (Arlington, VA: Pew Center on Global Climate Change, 27 September 1999).
- Fleming, James Rodger. *Historical Perspectives On Climate Change*. New York: Oxford University Press, 1998.
- . *Fixing the Sky: The Checkered History of Weather and Climate Control*, (New York: Columbia University Press, 2010).
- Gengler, J., and L. A. Lambert. 2016. "Renegotiating the Ruling Bargain: Selling Fiscal Reform in the GCC." *The Middle East Journal* 70 (2). 321–329.
- Heffron, Daniel. "What do realists think about climate change?" *Centre for Geopolitics & Security in Realism Studies*. November 13, 2015. Accessed 1 March, 2020. <http://cgsrs.org/publications/30>
- Hess, David J., Quand D. Mai, Kate Pride Brown. "Red states, green laws: Ideology and renewable energy legislation in the United States." *Energy Research and Social Science*, Vol 11, January 2016, 19-28.

- Holmes, Kim R. "What is National Security?" *The Heritage Foundation*. October 7, 2014. <https://www.heritage.org/military-strength-topical-essays/2015-essays/what-national-security>
- Introduction to the Danish Climate Investment Fund, 19 November 2015. Danish Climate Investment Fund. Accessed 2 March, 2020. [https://dbdh.dk/download/members_meeting_k%C3%B8ge_19.11.15\(2\)/IFU%20-%20Otto%20Vinther%20Christensen\(2\).pdf](https://dbdh.dk/download/members_meeting_k%C3%B8ge_19.11.15(2)/IFU%20-%20Otto%20Vinther%20Christensen(2).pdf)
- Jacobson, Marc. "Denmark's strategic interests in the Arctic: It's the Greenlandic connection, stupid!," The Arctic Institute Center for Circumpolar Security Studies, (May 4, 2016). Accessed 20 March, 2020. <https://www.thearcticinstitute.org/denmark-interests-arctic-greenland-connection/>
- Charles A. Jones and David L. Levy. "North American Business Strategies towards Climate Change." *European Management Journal*, no. 6 (2007), 428-440)
- Jacobsen, Stine. "Denmark plans 30 billion offshore wind island that could power 10 million homes." Reuters. 10 December, 2019. Accessed 2 March 2020. <https://www.reuters.com/article/us-climate-change-denmark/denmark-plans-30-billion-offshore-wind-island-that-could-power-10-million-homes-idUSKBN1YE1G6>
- Khalid. Alkathlan, Muhammad Javid. "Energy consumption, carbon emissions and economic growth in Saudi Arabia: An aggregate and disaggregate analysis." *Energy Policy*. *Vo. 62* (2013). 1525-1532
- Kingdom of Saudi Arabia. "Vision 2030." Accessed 20 March, 2020. <https://vision2030.gov.sa/en>
- Klare, Michael T. *The Race for What's Left: the global scramble for the world's last resources*. New York: Picador, 2012.
- Kumetat, Dennis. "Climate Change in the Persian Gulf-regional security, sustainability strategies and research needs." *CEIDIR's Review*. November 9, 2009, 1-15. Accessed 20 March, 2020. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.624.5582&rep=rep1&type=pdf>
- Lopez. O. Et al. "Water management during climate change using aquifer storage and recovery of stormwater in a dunefield in western Saud Arabia." *Environ. Res. Ltt.* 9, N. 7 (2014)
- McCright, Aaron M. and Riley E. Dunlap, "Defeating Kyoto: the conservative movement's impact on US climate Change Policy." *Social Problems* 50, no. 3 (2003): 348-373.

Meese, Michael J., Suzanne C. Nielsen and Rachel M. Sondheimr. *American National Security*, 7th ed. Baltimore: Johns Hopkins University Press, 2018.

Ministry of Foreign Affairs of Denmark, "Foreign and Security Policy Strategy 2017-2018." (June 2017). Accessed 23 March, 2020.

<https://um.dk/en/news/NewsDisplayPage/?newsID=0D9827F1-0ADB-443B-9741-CA265A1E4EBF>

---. "Denmark, Greenland, and the Faroe Islands: Kingdom of Denmark Strategy for the Arctic 2011-2018," (August, 2011), accessed 22 March, 2020.

<http://library.arcticportal.org/1890/1/DENMARK.pdf>

Ministry of Foreign Affairs of Denmark, "The Arctic," accessed 22 March, 2020,

<https://um.dk/en/foreign-policy/the-arctic>.

Merriam-Webster. "Climate." Accessed 22 March, 2020. [https://www.merriam-](https://www.merriam-webster.com/dictionary/climate)

[webster.com/dictionary/climate](https://www.merriam-webster.com/dictionary/climate)

Michael Nachmay, Fankhauser, Samuel, Townshend, Terry, Collins, Murray, Landesman, Tucker, Matthews, Adam, Pavese, Carolina, Rietig, Katharina, Schleifer, Philip and Setzer, Joana (2014), "The GLOBE climate legislation study: a review of climate change legislation in 66 countries," 4th ed. GLOBE International and Grantham Research Institute, LSE, London, UK, retried 20 March 2029 at

http://eprints.lse.ac.uk/63656/1/_lse.ac.uk_storage_LIBRARY_Secondary_libfile_shared_repository_Content_Grantham_Globe%20climate%204ed_Globe%20climate%20legislation%204ed_2015.pdf

Neumann, James E, Gary Yohe, and Robert Nicholls, *Sea-Level Rise and Global Climate Change: A Review of Impacts to U.S. Coasts*. Arlington: Pew Center on Global Climate Change, 2000.

NORDEFECO (Nordic Defense Cooperation). "The NORDEF MCC Action Plan 2015-2018," (December 12, 2014): 3-8.

https://www.nordefco.org/files/141211_NORDEF%20MCC%20AP2015-18_final.pdf

Osofsky, Hari M. "Climate change legislation in context." *Nw. L. Rev. Colloquy* 102 (2007), 245- 252

Overland, James E, Muyin Wang, and John Welsche. "Future Arctic Climate Changes: Adaptation and Mitigation Time Scales." National Oceanic and Atmosphere Administration. Research number: 10.1002/2013EF00162. August 21, 2013.

www.pmel.noaa.gov/arctic-zone/future/bib/EarthsFutureJEO.pdf, accessed November 28, 2017.

- Porter, Gareth. "Environmental security as a national security issue." *Current History*. May 1995. Vol. 94. No. 592
- President of the United States. December 2017. *National Security Strategy of the United States of America*. Accessed 23 March, 2020, <https://www.whitehouse.gov/wp-content/uploads/2017/12/NSS-Final-12-18-2017-0905.pdf>
- Prime Minister's Office, Denmark. Statement by H.E. Lars Lokke Rasmussen, Prime Minister of Denmark, at the United Nations Private Sector Forum. Accessed 2 March, 2020. http://www.stm.dk/_p_13250.html
- Parthemore, Christine and Will Rogers. "Promoting the Dialogue: Climate Change and the Quadrennial Defense Review." *Center for a New American Security*. January 2010.
- Rana, Aziz. "Who Decides on Security?" *Cornell Law Faculty Publications*. Paper 1070. (2012). <http://scholarship.law.cornell.edu/facpub/1070>, 1417-1490
- Regional Greenhouse Gas Initiative. 2020. Accessed 21 March, 2020. <https://www.rggi.org>
- Reuters, "Saudi Government Approves Kyoto Climate Protocol," 21 December, 2004. Accessed 20 March, 2020. <https://fp.breconder.com/2004/12/2004122190728/>
- Richter-Menge, J., J.E. Overland, and J.T. Mathis, "Arctic Report Card 2016." *National Oceanic and Atmosphere Administration*. December, 2016. Accessed November 29, 2017. ftp://ftp.oar.noaa.gov/arctic/documents/ArcticReportCard_full_report2016.pdf
- Royden, Amy. U.S. Climate Change Policy Under President Clinton: A Look Back, 32 *Golden Gate U. L. Rev.* (2002), 415-478. <http://digitalcommons.law.ggu.edu/ggulrev/vol32/iss4/3>
- Rogers, Bayard. 2019. "Rebranding Climate Change: From a Realist Perspective." *The International Journal of Climate Change: Impacts and Responses* 11 (4): 33-44. doi:10.18848/1835-7156/CGP/v11i04/33-44.
- State of Green. "During COP25, Denmark passes Climate Act with a 70 per cent reduction target." 9 December, 2019. Accessed March 5, 2019. <https://stateofgreen.com/en/partners/state-of-green/news/during-cop25-denmark-passes-climate-act-with-a-70-per-cent-reduction-target/>
- Sorenson, Martin Selsoe. "Denmark's New Prime Minister Vows to Tackle Climate Change." *The New York Times*, 26 June, 2019. Accessed 2 March, 2020. <https://www.nytimes.com/2019/06/26/world/europe/denmark-prime-minister-mette-frederiksen.html>
- Symons, Jonathan. "Realist climate ethics: Promoting climate ambition within the Classical Realist tradition," *Review of International Studies*, Volume 45, Issue 1,

January 2019, 141-160. Accessed 1 March 2020.

<https://www.cambridge.org/core/journals/review-of-international-studies/article/realist-climate-ethics-promoting-climate-ambition-within-the-classical-realist-tradition/200DED1A40ECB348BEE62E67F0151453>

Thorning-Schmidt, Helle, Prime Minister. Statement by Denmark at the UN Climate Summit, 23 September, 2014. Accessed 2 March, 2020.

<https://fnnewyork.um.dk/denmark/denmarks-engagement-with-the-un/statements/newsdisplaypage/?newsid=1d1f9d60-8d08-43bc-b6c3-126ed1257fc4>

Tiffany, Kaitlyn. “The Dos and Don’ts of ‘Social Distancing’”, 12 March, 2020. *The Atlantic*.

Accessed 20 March, 2020.

<https://www.theatlantic.com/family/archive/2020/03/coronavirus-what-does-social-distancing-mean/607927/>

Trombetta, Maria Julia. “Environmental security and climate change: analysing the discourse.” *Cambridge Review of International Affairs*, 21:4, 585-602, DOI: 10.1080/09557570802452920

United Nations. “Oceans and Law of the Sea.” 23 March, 2020.

https://www.un.org/Depts/los/clcs_new/commission_submissions.htm

---. “Climate Change.” Accessed 20 March, 2020. <https://www.un.org/en/sections/issues-depth/climate-change/>

U.S. Department of Defense. September 2001. *Quadrennial Defense Review Report*. Prepared by the Department of Defense. Accessed 20 March, 2020,

<https://history.defense.gov/Portals/70/Documents/quadrennial/QDR2001.pdf?ver=2014-06-25-110946-823>

---. February 2006. *Quadrennial Defense Review Report*. Prepared by U.S. Department of Defense. Accessed 20 March, 2020.

<https://history.defense.gov/Portals/70/Documents/quadrennial/QDR2006.pdf?ver=2014-06-25-111017-150>

---. February 2010. *Quadrennial Defense Review Report*. Prepared by the U.S. Department of Defense. Accessed 20 March, 2020.

<https://history.defense.gov/Portals/70/Documents/quadrennial/QDR2010.pdf?ver=2014-08-24-144223-573>

---. 2014. *Quadrennial Defense Review*. Prepared by the U.S. Department of Defense. Accessed 20 March, 2020, 8,

<https://history.defense.gov/Portals/70/Documents/quadrennial/QDR2014.pdf?ver=2014-08-24-144246-293>

---. 2018. *National Defense Strategy of the United States of America*. Accessed 20 March, 2020.
<https://dod.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf>

White House, The- President George W. Bush. “President Bush Discusses Climate Change.” Rose Garden, Washington D.C., April 16, 2008. Accessed 20 March, 2020,
<https://georgewbush-whitehouse.archives.gov/news/releases/2008/04/20080416-6.html>

White House, The-President Barak Obama. “Remarks by the President on Climate Change.” Georgetown University, Washington, D.C. June 25, 2013. Accessed 20 March, 2020.
<https://obamawhitehouse.archives.gov/the-press-office/2013/06/25/remarks-president-climate-change>

Yamada, Makio. “Vision 2030 and the Birth of Saudi Solar Energy”. *Middle East Institute Policy Focus*. July 2016, accessed 20 March, 2020.
https://www.mei.edu/sites/default/files/publications/PF15_Yamada_Saudisolar_web.pdf.

Appendix 1

COUNTRY	STATEMENTS	INVESTMENTS	LEGISLATION	OTHER INITIATIVES	NATIONAL SECURITY POLICY	
Saudi Arabia	OPEC statement on climate change mitigation policies having negative impact on oil revenue	Investment in dam/reservoir systems to store reuse water	Revisions to Article 32 of KSA Constitution aim to improve environmental protection and reduce pollution	KSA hosts Third OPEC Summit and placed environmental concerns as one of the primary points of discussion	Economic/industrial base prioritized over climate initiatives in near-term	
	Minister of Petroleum and Minerals: Resources predicted that KSA would lose \$19B if industrialized nations implemented mitigation policies	Investment in food supply exchange program to reduce wasteful agricultural practices		Acknowledgement of OPEC responsibility to address climate concerns	Limited publically available NatSec strategy	
	KSA government states that largest contributors to climate change are doing little to reduce the problem yet imposing burdensome requirements on developing nations	Multiple investment initiatives through Vision 2030 socioeconomic reforms		Promotion of Carbon Capture and Storage (CCS) water conservation method		
		Solar energy programs (2010) K.A.C.A.R.E.		New technology involving water transportation/storage via natural slopes		
DENMARK	PM Frederiksen statement vowing to cut 70% of Denmark's carbon emissions by 2030.	Danish Climate Investment Fund (2014)	National Climate Act Passed; reduce emission by 70% by 2030		Establishment of Office for Arctic and North America and "Arctic Ambassador" assignment	
	PM Throning-Schmidt statement to reduce carbon emissions by 40% by 2020; be fossil free by 2050; enhance climate finance	Danish Agribusiness Fund (2020)	Signatory status in UNCLOS agreement		CLCS territory claim of 895, 000 square km of Arctic seabed	
	PM Lokke Rasmussen speech emphasizing need for climate change initiatives	65 million crown investment in offshore wind energy project	Illuissat Declaration Agreement (2008)		Announcement of Denmark's "Strategic Realm" (2011-2020) Arctic Strategy	
	Climate and Energy Minister statement on creating offshore wind island				NORDEFCO Action Plan to include joint Arctic military exercises (2015-2018)	
	Ministry of Foreign Affairs claims it will address the security policy challenges associated with the Arctic; claims it will strengthen embassy in Moscow to ensure greater representation of Danish interests in the region				NORA membership (Arctic Strategy 2011-2018)	
					Security policy initiatives increase in 2008; Danish Defense Agreement (2010-2014)-stronger Danish Armed Forces presence in the Arctic	
					Formation of joint-service Arctic Command and establishment of Arctic Response Force	
					Comprehensive Analysis of Danish armed forces future tasks in the Arctic	
					Training and recruitment program aimed at Greenland natives established	
						2001 QDR mentions climate change once; potential to spur future conflict
United States	Clinton State of the Union statement (2000) announcing \$2.4 billion budget for climate concerns	DoD investment into R&D on alternative fuels for defense assets (2009)	Hagel-Byrd Resolution; confirmed U.S. would not support treaties with mandatory gas emissions		2006 QDR; no mention of climate change	
	Bush statement on balancing environmental goals with economic goals	State level investments into Greenhouse Gas Initiative	Clean Air Act			
	Obama statement on EPA enforcing carbon reduction standards (2013); reduction on fossil fuels must be gradual to not disrupt economy		Energy Policy Act (2005)			2010 QDR climate change is a specific prongue in national defense strategy
	Obama statement at Paris Climate Accords claiming to be committed to the issue		Energy Independence and Security Act (2007)			2014 QDR; climate change listed as challenge but not specific line of effort; states Arctic Strategy as climate and security issue
	Trump statements on his disapproval of Paris Accords		Food Conservation and Energy Act (2008)			2017 National Security Strategy; no mention of climate change or renewable energy in discussing energy policy
					2018 National Defense Strategy; no mention of climate change	

Brendan Wentz
Research Study Seminar: Spring 2020

Brendan Wentz was born in Downer's Grove, Illinois, on 22 October, 1982. He attended John Carroll University in Cleveland, Ohio, for his undergraduate work. Brendan served on active duty in the United States Army for nine years prior to embarking upon his graduate studies. He deployed twice to Iraq, serving as a platoon leader and then intelligence officer from the battalion through brigade levels. During his Johns Hopkins studies, Brendan was fortunate to be able to attend the International Security and Intelligence seminar at Cambridge University.